BigFix Configuration Guide

Special notice

Before using this information and the product it supports, read the information in Notices (on page 502).

Edition notice

This edition applies to BigFix version 10 and to all subsequent releases and modifications until otherwise indicated in new editions.

Chapter 1. Introduction

This guide explains additional configuration steps that you can run in your environment after installation.

What is new in BigFix 10 Platform

BigFix 10 Platform provides new features and enhancements.

Patch 12

VMware Plugin enhancements

The VMware Plugin has been extended with inspectors and action commands to improve the management capabilities for both host and guest systems.

For details, see Introduction to Cloud Plugins (on page 208), Configuring cloud plugins (on page 220), VMware Asset Discovery Plugin Inspectors (on page 250) and VMware Plugin Commands (on page 274).

Library and drivers upgrades

- The libcURL library was upgraded to Version 8.6.0.
- The ODBC driver was upgraded to Version 17.10.6.

Patch 11

Added support for BigFix Agent

Added support for BigFix Agent running on VIOS 3.1.3.

Library and drivers upgrades

- The libcURL library was upgraded to Version 8.5.0.
- The ODBC driver was upgraded to Version 17.10.5.

Patch 10

Use “Microsoft Print to PDF” printer driver for exporting PDF reports in Web Reports

Starting from BigFix Platform 10.0.10, Web Reports can generate PDF reports using the “Microsoft Print to PDF” printer driver. BigFix recommends that you take advantage of this driver by running Task ID 5436. Refer to On Windows Systems for more information.

Relay Drive Space Protection From Downloads

BigFix Platform adds now the capability to prevent the BigFix Relay ActiveDownloads folder from filling up, by using a new setting named`_BESRelay_Download_ActiveDownloadsMaxSizeMB`, which represents the maximum size, specified in MB, that the folder can reach.

For details, see Managing Downloads (on page 392).

Plugin Portal - Optimized devices data serialization

Plugin Portal optimization in terms of memory usage of the plugin portal machine as well as in the evaluation time of fixlet and analysis, with this leading to an increased responsiveness in returning data and executing actions on discovered devices.

New set of REST APIs

BigFix Platform now supports a new set of Rest APIs that enable exploiters such as the BigFix WebUI to access the Download status of the actions. These Rest APIs allow also to re-submit failed downloads.

For details, see Action.

Added support for BigFix Agent

Added support for BigFix Agent running on MacOS 14 ARM/x86 64-bit.

Added support for new database level

- Microsoft SQL Server 2022 support.
- Microsoft SQL Server 2022 deployed in a docker container.

For details, see Installing a server with remote database deployed in a docker container and Database requirements.

Library upgrades

- The libcURL library was upgraded to Version 8.1.2.
- The JQuery library was upgraded to Version 3.6.4.
- The OpenSSL library was upgraded to Version 1.0.2zh.
- The Xerces library was upgraded to Version 3.2.4.

Patch 9

Improved certificate management for HTTPS downloads

Starting from BigFix Platform 10.0.9, BigFix introduces an improved management for the CA bundles used in HTTPS downloads, in order to grant more flexibility in the configuration.

For details, see Customizing HTTPS for downloads (on page 400).

MongoDB removal from Plugin Portal

Starting from BigFix Platform 10.0.9, MongoDB is no longer a prerequisite for installing and upgrading the Plugin Portal. The migration of the reports from the MongoDB, if present, will not require manual steps; it will be automatically executed at the initial startup of the Plugin Portal after the upgrade.

For details, see The Plugin Portal (on page 157).

Support for AWS IMDSv2

Starting from BigFix Platform 10.0.9, Amazon Web Services (AWS) metadata are retrieved using Amazon IMDSv2 protocol.

For details, see cloud provider.

Library upgrades

- The OpenSSL library was upgraded to Version 1.0.2zg.
- The libcURL library was upgraded to Version 7.88.1.

Patch 8

Optionally disable local operators to comply with most recent Cyber Security guidelines

Starting from BigFix Platform 10.0.8, you can decide to optionally disable all local operators from logging into the BigFix Console, Web Reports and WebUI, in favour of the LDAP-based operators. This feature may be used to comply with most recent cybersecurity guidelines and standards.

For details, see Disabling local operators (on page 73).

Enhance audit capabilities of your BigFix deployment with new audit logs

BigFix Platform 10.0.8 introduces a new audit log file which tracks every access and action performed using the BigFix Administration Tool when used via the GUI on Windows or when used via the command line on Windows/Linux.

For details, see Server audit logs (on page 452) and Logging.

Get more flexibility in writing relevance statements with regular expressions by leveraging the Perl Regular Expressions standard

BigFix Platform 10.0.8 makes available a new client inspector which allows writing regular expressions based on the Perl Regular Expressions standard. This capability is available on Windows only.

For details, see regular expression.

BigFix Agent supports RHEL systems with FIPS mode enabled

You can now install the BigFix Agent on Red Hat systems where FIPS mode is enabled. This is possible as the RPM package delivered with BigFix Platform 10.0.8 supports the sha256 digest in the RPM header, adding another level of security, required to deal with systems in FIPS mode.

For details, see Red Hat Installation Instructions.

Enhanced flexibility for handling Linux BigFix services via full systemd support

BigFix Platform 10.0.8 introduces full support for the systemd services for all main Platform components while still supporting init.d for backward compatibility.

For details, see Managing the BigFix Services.

Simplify troubleshooting via new installation logs

BigFix Platform 10.0.8 makes available new installation log files for fresh Windows/Linux installations and upgrades. This release also improves logging capabilities for CDT installations.

For details, see Logging.

Enhanced prefetch actionscript command to deal with sites implementing the HTTP to HTTPS redirection

BigFix Platform 10.0.8 adds the capability for the prefetch actionscript command to deal with HTTP to HTTPS redirect requests. The prefetch command will handle the redirections both for server/relay and client.

For details, see Managing Downloads (on page 392).

Upgrade from SQL Server Native Client to Microsoft ODBC Driver

Platform 10.0.8 moves from supporting and shipping SQL Server Native Client 2012 to supporting and shipping the Microsoft ODBC Driver 17.

Given some differences in how the two drivers can be configured, any customization of the BigFix ODBC data sources done prior to upgrading to Version 10.0.8 might no longer work as expected after upgrading to Version 10.0.8. Therefore, if starting from a non-default configuration, after upgrading to Version 10.0.8, it is recommended to review and verify the consistency and effectiveness of the BigFix ODBC data source configurations.

For details, see Configuring ODBC data sources (on page 354).

Get a more current view of your infrastructure via the new automatic clean-up approach for proxied endpoints

The Plugin Portal now implements a clean-up process for proxied endpoints, allowing to automatically delete proxied endpoints that are no longer discovered by the plugins (both cloud and MDM). This will help you to get a more up-to-date status of your infrastructure.

For details, see Discovering cloud resources (on page 199).

Use the Computer Remover to implement different clean up policies for native and proxied endpoints

The Computer Remover is now able to deal with both native and proxied endpoints. You can use Computer Remover to specify the type of endpoint and implement different clean up policies based on that. Additionally, the new version of the Computer Remover reduces to 7 days the minimum value accepted for the “Remove Deleted Computers” option.

For details, see Computer Remover.

BigFix Console logging and diagnostics

Improvements have been made in logging and diagnostic approaches for the BigFix Console, to better understand system capability and bottlenecks. A future publication will provide guidance on leveraging this capability.

Added support for BigFix Agent

Added support for BigFix Agent running on:

- Amazon Linux 2 on ARM Graviton 64-bit.
- Amazon Linux 2023 x86 64-bit.
- Amazon Linux 2023 on ARM Graviton 64-bit.
- Oracle Enterprise Linux 9 x86 64-bit.
- Red Hat Enterprise Linux 9 PPC 64-bit LE on Power 9 and Power 10.
- Rocky Linux 8 x86 64-bit.
- Rocky Linux 9 x86 64-bit.

Library upgrades

- The libcURL library was upgraded to Version 7.86.0.
- The libssh2 library was upgraded to Version 1.10.0.
- The ICU library was upgraded to Version 54.2.
- The JQuery UI library was upgraded to Version 1.13.2.
- The SQLite library was upgraded to Version 3.39.3.

Patch 7

Enable Direct Download based on network

This new feature enables you to allow the Direct Download only for BigFix Clients connected to a specific subnet.

For details, see Managing Downloads (on page 392).

Restart download after Relay switch

This new feature allows you to interrupt the download in progress on a Relay switch.

For details, see Managing Downloads (on page 392).

Enhanced site Rest API to show the site display name and NMO permissions

BigFix Platform 10.0.7 introduces enhancements to the site Rest API to return a new element which consists in the site display name as shown in the BigFix Console. The site Rest API has also been enhanced to show the requester permissions on a specified site.

For details, see Site.

Retrieve VM Custom Attributes via the VMware Cloud Plugin

Starting with BigFix Platform 10.0.7, the VMware Plugin can also retrieve VM Custom Attributes, in addition to the current retrieved properties. This information is visible in the BigFix Console and in the WebUI.

For details, see The cloud analyses data (on page 278).

Client certificate

To comply with the modern industry standards, the lifespan of BigFix Agent client certificates will be reduced to 13 months.

For details, see Client certificate (on page 476).

Web Reports reauthentication

To enhance security for Web Reports, changes to some specific pages now require to re-authenticate using your current credentials.

For details, see Performing the reauthentication.

Added support for BigFix Relay

Added support for BigFix Relay running on:

- Red Hat Enterprise Linux 9 x86 64-bit.
- Ubuntu 22.04 LTS x86 64-bit.

Added support for BigFix Agent

Added support for BigFix Agent running on:

- AIX 7.2 on Power 10.
- AIX 7.3 on Power 9 and Power 10.
- Debian 11 x86 64-bit.
- MacOS 13 ARM/x86 64-bit.
- Red Hat Enterprise Linux 8 on Power 10.
- Red Hat Enterprise Linux 9 x86 64-bit.
- SUSE Linux Enterprise 15 on Power 10.
- Ubuntu 22.04 LTS x86 64-bit.

Added support for Active Directory 2016 or 2019

Added support for Active Directory 2016 or 2019 with Forest functional level Windows Server 2016 and Enterprise Certification Authority for BigFix Server running on Windows only.

For details, see Integrating the Windows server with Active Directory (on page 44).

Library upgrades

- The libcURL library was upgraded to Version 7.83.1.

Patch 6

Added support for BigFix Agent

Added support for BigFix Agent running on Raspberry Pi OS 11 on Raspberry Pi 4.

Performance improvements in the Plugin Portal to reduce RunAction execution time

The Plugin Portal supports full BigFix scale for cloud and mobile devices and is now more efficient than ever. Memory requirements have been reduced by 89% per plugin, with an 18% improvement in the Run Actions execution time.

Library upgrades

- The OpenSSL library was upgraded to Version 1.0.2zd.
- The zlib library was upgraded to Version 1.2.12.
- The jQuery library was upgraded to Version 3.6.0.
- The jQuery UI library was upgraded to Version 1.13.1.

Patch 5

Specify custom installation path for the Plugin Portal

When installing the Plugin Portal on Windows, you can now specify a custom installation path.

For details, see The Plugin Portal (on page 157).

Added the possibility of limiting AWS plugin scanned regions

When installing the AWS plugin, you can now specify the allowed regions.

For details, see Limit AWS Regions to restrict the scope of device discovery.

Added support for BigFix Server and BigFix Console

Added support for BigFix Server and BigFix Console running on Windows Server 2022.

Added support for BigFix Relay

Added support for BigFix Relay running on Tiny Core 12.

Library upgrades

- The libcURL library was upgraded to Version 7.79.1.
- The OpenSSL library was upgraded to Version 1.0.2zb.

Patch 4

AWS IAM role support

You can now take advantage of AWS IAM roles to perform cloud instance discovery and management. This adds further flexibility in the management of AWS credentials as permissions may now be leveraged either through IAM users or through IAM roles.

For details, see Installing cloud plugins (on page 213).

Simplified action targeting to correlated endpoints

You can now create computer groups based on properties retrieved on endpoints both by the BigFix Agent and the Plugin Portal. This will allow for example creating groups for cloud endpoints based on the properties associated to the cloud instances which you can, then, use to target actions to be run by the BigFix Agent.

For details, see Creating Server Based Computer Groups.

Reduce network traffic by limiting PeerNest UDP messages on specific subnets

When using the PeerNest feature, you can now reduce the network traffic associated to PeerNest UDP messages exchanged by the endpoints connected to the same subnet. This can be useful in situations where you have a number of BigFix Clients running in a VPN infrastructure.

For details, see Working with PeerNest (on page 306).

Leverage on MS-PowerShell on ActionScript

Beside BigFix Action Script, UNIX Shell Script and AppleScript you can now also leverage on MS-PowerShell for Action Scripts. For details, see:

- Edit Actions Tab
- Action Script Tab
- Pre-Execution Action Script tab
- Post-Execution Action Script Tab

Simplify BigFix Agent deployments with improved CDT UI

The User Interface of the Client Deployment Tool (CDT) has been enhanced to allow users to provide more easily inputs with multiple client settings and credentials. This will speed up the BigFix Agent deployment in scenarios where you have multiple targets and the targets have different credentials or you need to specify multiple custom client settings.

For details, see Deploying clients from the console.

Enhanced visibility of licensing information

The BigFix License Overview Dashboard has been improved to provide a better visibility of the licensing information associated to your BigFix deployment. You can now have better insights on the status of the different entitlements as well as get a better understanding of the BigFix offerings your endpoints are subscribed to.

For details, see License Overview dashboard.

Support 5x more endpoints through a single Plugin Portal instance

In BigFix 10.0.4, the Plugin Portal management capabilities have grown from 10,000 to 50,000 endpoints per instance. This in turn will reduce your total cost of ownership in scenarios where you have to manage a high number of cloud or MCM endpoints.

For details, see The Plugin Portal (on page 157).

Added support for BigFixConsole

Added support for BigFix Console running on:

- Windows 11 21H2.
- Windows 11 22H2.
- Windows 11 23H2.

Added support for BigFix Relay

Added support for BigFix Relay running on:

- Tiny Core 11.
- Windows Server 2022.
- Windows 11 21H2.
- Windows 11 22H2.
- Windows 11 23H2.

Added support for BigFix Agent

Added support for BigFix Agent running on:

- Windows Server 2022.
- Windows 11 21H2.
- Windows 11 22H2.
- Windows 11 23H2.
- MacOS 12 ARM/x86 64-bit.

Security vulnerabilities and library upgrades

- The libcURL library was upgraded to Version 7.77.0.
- The OpenLDAP library was upgraded to Version 2.4.58.
- The SQlite library was upgraded to Version 3.35.5.

Patch 3

Added support for BigFix Relay, Console and Agent

Added support for BigFix Relay, Console and Agent running on Windows 10 Version 22H2.

Added support for BigFix Relay, Console and Agent

Added support for BigFix Relay, Console and Agent running on Windows 10 Version 21H2.

Added support for BigFix Relay, Console and Agent

Added support for BigFix Relay, Console and Agent running on Windows 10 Version 21H1.

Added support for BigFix Agent

Added support for BigFix Agent running on MacOS 11 ARM64.

Security vulnerabilities and library upgrades

- The SQLite library was upgraded to Version 3.34.1.
- The OpenLDAP library was upgraded to Version 2.4.56.
- The OpenSSL library was upgraded to Version 1.0.2y.

Added property to the operating system inspector

A new property named `display version` was added to the `operating system` inspector. This property returns the Windows operating system version and returns valid information only for Windows 10 20H2 and later Windows 10 versions.

Patch 2

Install BigFix Agent on AWS or Azure VMs by using cloud APIs

You can now install the BigFix Agent in AWS and Azure environments by leveraging the cloud provider services and APIs. With this enhancement, you can speed up the deployment of agents without the need for deploying and configuring the Client Deploy Tool (CDT), and providing OS access credentials for target cloud instances.

For details, see BigFix Agent installation on cloud resources (on page 285).

Improved performance and resilience via guided tuning of the MS-SQL configuration

The installer now checks for and optionally adjusts suboptimal configuration in terms of DoP (Degree of Parallelism) and CTFP (Cost Threshold for Parallelism) of an SQL Server instance. In case of configuration issues that cannot be solved automatically, you are provided with enough background and guidance.

For details, see SQL Server parallelism optimization.

Leverage Docker images for root server DB in Windows

You can now leverage official Ubuntu-based images of MS SQL Server for Docker as a remote database for the Windows BigFix root Server. Platform 10.0.2 officially certifies the MS SQL Server 2017 and MS SQL Server 2019 Docker containers.

For details, see Detailed system requirements.

Improved PeerNest behavior in case of large payloads

Starting with this release, you can elect peers to download files based on the peer cache size too – only specific clients will download large files directly from the Relay. This prevents clients not having enough cache from initiating downloads which in turns helps increase efficiency and reduce network bandwidth utilization.

For details, see Peer to peer mode.

Accelerate responses by allowing clients to use additional CPU in download phase

You can now speed up the operations to evaluate the hash (sha1/sha256) code of downloaded files by temporarily directing the BigFix Client to use additional CPU. This results in a consistent time optimization for the download phase since the time required for the hash evaluation decreases as the engaged CPU increases.

For details, see List of settings and detailed descriptions.

Added support for BigFix Server

Added support for BigFix Server running on Red Hat Enterprise Linux (RHEL) 8 x86 64-bit.

Added support for BigFix Relay

Added support for BigFix Relay running on Raspbian 10 on Raspberry Pi 4.

Added support for BigFix Agent

Added support for BigFix Agent running on:

- Debian 10 x86 64-bit.
- MacOS 11 x86 64-bit.
- Ubuntu 20.04 LTS PPC 64-bit LE on Power 8.

Added support for new database levels

- DB2 Version 11.5.4 / 11.5.5 / 11.5.6 / 11.5.7 / 11.5.8 / 11.5.9 Stardard Edition support.

  Note: Ensure that you upgrade BigFix to Version 10 Patch 2 or higher, before upgrading DB2 11.5.0 to 11.5.4 / 11.5.5 / 11.5.6 / 11.5.7 / 11.5.8 / 11.5.9.

- Microsoft SQL Server 2019 support.
- Microsoft SQL Server 2017 and 2019 deployed in a docker container.

New RPM package required

Starting from Patch 2, the unixODBC RPM package is a prerequisite for the Server components on Linux systems (see Server requirements).

Upgraded libraries

The libcURL file transfer library level was upgraded to Version 7.73.0.

Patch 1

Discover and report cloud assets, now also from Google Cloud Platform

With this feature, you can discover and manage visibility of your cloud assets across different cloud providers by using the Plugin Portal and plugins technology. To install the BigFix client on your discovered cloud assets, use the WebUI or the BigFix Console.

For details, see Extending BigFix management capabilities (on page 196).

Get more from audit logs

The audit log service now provides more details about logging in and out of the BigFix Server, and information on the IP addresses that the clients use to access the server.

For details, see Server audit logs (on page 452).

Enhanced security of TLS connections with support for Forward Secrecy

You can now leverage on the ephemeral Diffie-Hellman (DHE) and ephemeral elliptic curve Diffie-Hellman (ECDHE) for key exchange to increase the level of security of your deployment.

For details, see Using the DHE/ECDHE key exchange method (on page 90).

Mitigate network impact and bandwidth requirements with clients connected through VPN

You can now configure BigFix Client to take payloads directly from the internet based on a configurable list of sites. This helps you mitigate the network impact and bandwidth requirements associated with BigFix Relays that serve BigFix Clients connected through a VPN.

For details, see the configuration setting named `_BESClient_Download_DirectRecovery` described in List of settings and detailed descriptions.

Use Microsoft Office 365 as the email server for WebReports

In the earlier versions of BigFix Platform, Web Reports could only contact email servers by using the basic authentication over SMTP. In this release, you can schedule the sending of reports by using the Office 365 email server with OAuth 2.0 and credentials grant flow.

For details, see Setting Up Email.

Added support for BigFix Relay

Added support for BigFix Relay running on Ubuntu 20.04 LTS on Intel.

Added support for BigFix Agent

Added support for BigFix Agent running on:

- Ubuntu 20.04 LTS on Intel.
- Windows 10 Enterprise for Virtual Desktops.

Note: For Windows 10 Enterprise for Virtual Desktops, the relevance expression "product info string of operating system" returns “Server RDSH”. This limitation is valid for Patch 1 only.

Other enhancements

- Modified the installer to remove the setup of SQL Server 2016 SP1 - Evaluation from the options of the BigFix evaluation installation.

  For details, see Performing an evaluation installation.
- Enhanced serviceability of PeerNest and BigFix Client debug log with more information and the possibility to rotate and set a maximum size.

  For details, see List of settings and detailed descriptions.
- Improved Client Deploy Tool (CDT) wizard. Simplified the installation process for clients that are discovered by the cloud plugins.

  For details, see Installing the BigFix Agent on discovered resources (on page 284).
- Upgraded the following external libraries:
  - The libcURL file transfer library level was upgraded to Version 7.69.1.
  - The Codejock library was upgraded to Version 19.2.0.
  - The jQuery library was upgraded to Version 3.5.1.

Version 10

Multicloud support

BigFix 10 provides you with a single, comprehensive view of all your endpoints, regardless of whether they are in the cloud or on premise. This feature extends the BigFix capabilities to eliminate unmanaged cloud blind spots in your Amazon Web Services, Microsoft Azure, and VMware environments by using native cloud APIs to discover unmanaged servers across multiple cloud providers simultaneously. With this feature, you can also easily deploy the BigFix agent to provide deeper levels of visibility and control in order to bring your cloud devices into full management.

For details, see Extending BigFix management capabilities (on page 196) and Configuring cloud plugins (on page 220).

Enhanced security with an option to deploy relays as authenticating

As a BigFix Administrator, you can now choose to install Relays as authenticating at the time of deployment. By using this option, you can streamline the best practice of securing and configuring the internet-facing relays, thereby safeguarding your environment and data against threats.

For details, see Authenticating relays (on page 481).

Improved support for multiple Web Report servers for REST API calls

When you have multiple BigFix Web Reports servers in your environment, you can define a priority order in which you want specific queries sent to the REST API. This feature introduces more flexibility to the way you control your integrations, while avoiding potential impacts to your operational environment.

For details, see https://developer.bigfix.com/rest-api/api/webreports.html.

Enhanced logging for the BigFix agent

The BigFix agent logs now include additional endpoint identification information (including OS, hostname, and IP address) and relay selection data to help you improve serviceability and simplify troubleshooting.

Other enhancements

- Improvements to the Take Action Dialog to avoid targeting ‘all computers’ by default.
- Introduced MAC address as a reserved property.
- Added support for:

    - BigFix Server on Windows Server 2019.
    - BigFix Relay on SUSE Linux Enterprise Server (SLES) Version 15 on AMD/Intel.
    - BigFix Relay on Red Hat Enterprise Linux Version 8 x86 64-bit on Intel.
    - BigFix Relay and Agent on Amazon Linux 2.

      Note: For Amazon Linux 2, both the relay and the client packages are the Red Hat Enterprise Linux 6 packages.

    - BigFix Agent on Oracle Enterprise Linux 8 on Intel.
    - BigFix Agent on Red Hat Enterprise Linux 8 PPC 64-bit LE on Power 8 and 9.
    - BigFix Agent on SUSE Linux Enterprise Server (SLES) Version 15 on s390x.
- The OpenSSL toolkit level was upgraded to Version 1.0.2u.

OS and database support changes

BigFix 10 introduces some changes to the minimum supported versions of operating systems and databases for various BigFix components. Notable among these changes is that the BigFix 10 Server now requires:

- Either Windows Server 2012 R2 or later + SQL Server 2012 or later.
- Or Red Hat Enterprise Linux Version 7 + DB2 Version 11.5 GA.

For details, see Detailed system requirements.

Chapter 2. BigFix Site Administrator and Console Operators

In BigFix there are two basic classes of users.

The Site Administrator

The Site Administrator is responsible for installing and maintaining the BigFix software, and to run administrative tasks that globally affects the environment such as site-level signing keys management. There is only on Site Administrator for a BigFix environment. For more information, see The Site Administrator *(on page 25)*.

The Console Operators

They are the user of BigFix who access the BigFix Console and, if authorized, the WebUI. They can be **Master Operators (MO)**, the user with Administrators of the BigFix Console, or **Operators (NMO)**, the day-to-day managers of their own domains. While, Master Operators can create other operators and assign management rights, Operators can not. For more information, see Introducing Operators.

Note: When defining an operator, ensure that the user name does not contain any of the following characters: `:`, `@`, and `\`.

The Site Administrator

The site administrator has the following primary responsibilities.

Obtaining and securing the Action Site Credentials

To install BigFix, the site administrator must generate a private key, receive a license certificate from HCL, and create a masthead with the digital signature and configuration information. This is a special key and must be used only for site-level tasks such as:

- Setting global system options
- Editing Mastheads
- Administering Distributed Server Architecture (DSA)

Preparing the Server

The BigFix Server must be correctly set up to communicate externally with the Internet and internally with the Clients. The Server also needs to be configured to host the BigFix database (or another computer can be used as the SQL Server database).

Installing the various components

The site administrator installs the BigFix Client, Server, Relay, and Console modules, and configures the credentials of the first master operator who will connect to the console to define the license subscriptions, gather content from subscribed sites, and define the BigFix network, the roles and the other operators.

The site administrator sets up and administers multiple BigFix Servers in a Disaster Server Architecture (DSA) for doing automatic BigFix server failover and failback.

Maintaining the Server

The BigFix server runs an SQL Server database and several specific services, such as running the Diagnostic Tool and the Administration Tool. Standard maintenance tasks such as upgrades or fixes are managed using Fixlet technology or can be performed manually by the site administrator.

For day-to-day console operations, the site administrator must create a master operator key.

The Site Administrator cannot:

- Access the BigFix Console.
- Create operators in addition to the one created during installation.
- Access the BigFix WebUI.
- Run BigFix Queries.

The Console Operators

There are two types of Console operators:

Master Operators (MO)

They are the administrative users of the Console. They have access to all the computers defined in the BigFix environment and the authority to create and manage other console operators. Any master operator can create, assign, and revoke management rights that allow operators to deploy actions.

Operators or Non-Master Operators (NMO)

They manage the day-to-day BigFix operations, including Fixlet management and action deployment, against a subset of computers they are allowed to manage by the master operator. They cannot create other operators and cannot assign management rights.

By default the Console operators cannot:

- Access the WebUI, unless the **Can use WebUI** permission is set to **YES**.
- Submit BigFix queries, unless both **Can use WebUI** and **Can Submit Queries** permissions are set to **YES**.

These and other permissions can be set by a master operator in the Permissions area of the Details tab of the operator's description. For more information about operators rights, see Mapping authorized activities with permissions *(on page 37)*.

Best practices

The following tables describe when to use a Master Operator (MO) or a Non-Master Operator (NMO) role.

Table 1. Master Operator

MO
They are the administrative users of the BigFix Console. They have access to all the computers defined in the BigFix environment and the authority to create and manage

Table 1. Master Operator (continued)

MO
other console operators. Any master operator can create, assign, and revoke management rights that allow operators to deploy actions.
They create users/operators/roles.
They create custom sites.
They create custom content that can be seen by all operators and will likely be used on most computers.
They issue certain policy actions that pertain to the entire BigFix environment. They keep number of actions to a minimum as this adds to the Master Action Site size.
They manage site subscriptions.
They create the retrieved properties.
They hide content globally.
They activate global analyses – for all master operators and non-master operators.

Table 2. Non-Master Operator

NMO
They manage the day-to-day BigFix operations, including Fixlet management and action deployment, against a subset of computers they are allowed to manage by the master operator. They cannot create other operators and cannot assign management rights.
They issue actions, such as deploying patches.
They make REST API calls.
They deploy/activate/deactivate Fixlets, Tasks, Baselines, Analyses.
They create custom content for a specific purpose.

Table 2. Non-Master Operator (continued)

NMO
They activate local analyses – based on the non-master operator's administered computers.

Different ways to define a Console Operator

There are different ways to add console operators, assigning them roles or granting permissions to view or manage specific computers and sites.

- You can add single operators at any time by selecting the **Tools > Create Operator** item or by right clicking in the operators work area and selecting **Create Operator** as described in Adding Local Operators *(on page 29)*.
- If you are using Active Directory or a generic LDAP, you can add previously defined users by selecting the **Tools > Add LDAP Operator** item or by right clicking in the operators work area and selecting **Add LDAP Operator** as described in Adding LDAP Operators *(on page 56)*.
- You can also associate an LDAP group to an existing role, in this way, with just one click, you add an operator for each user specified in the LDAP group and you associate that operator to the role. For more information about this capability, see Associating an LDAP group *(on page 59)*.

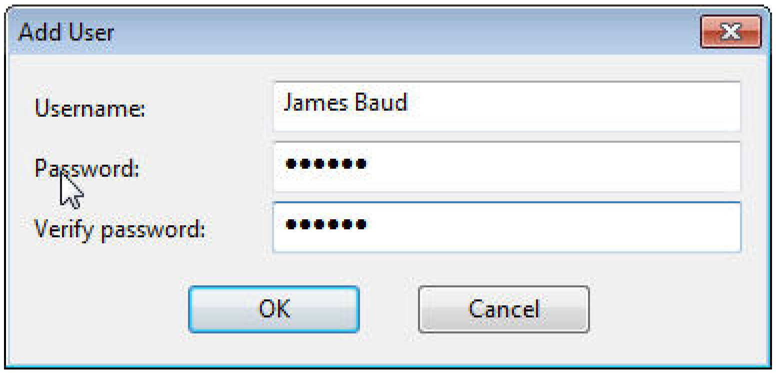
Note: For LDAP operator and LDAP Group an Active Directory or LDAP directory must first be added to BigFix.

Adding Local Operators

You can create accounts for operators that access the console using the local BigFix account.

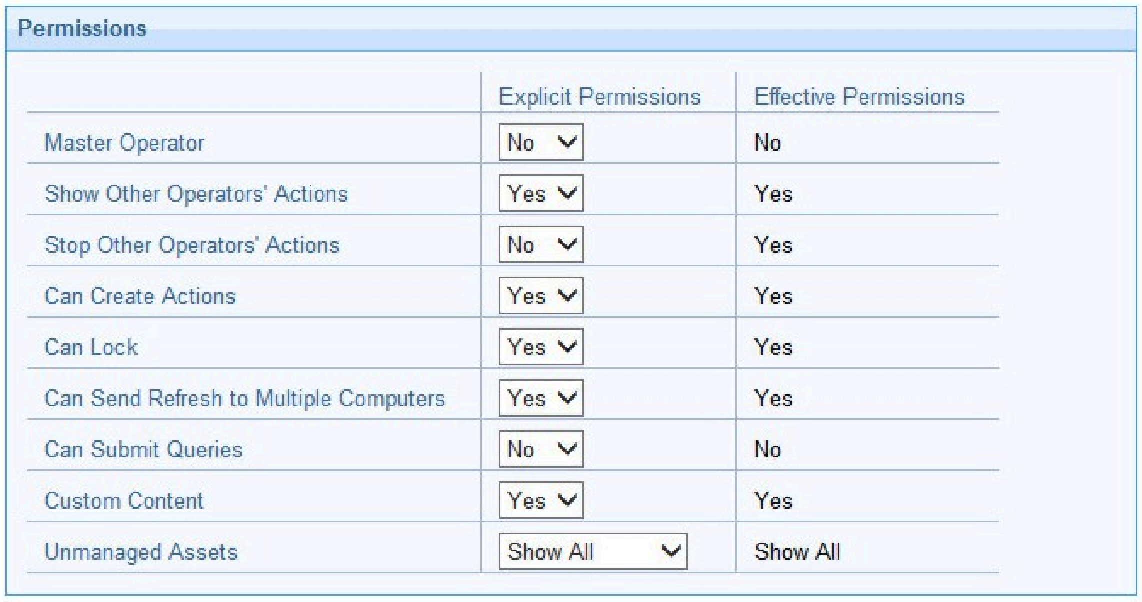
To add a local operator perform the following steps:

1. Click the **Tools > Create Operator** menu item or right click in the operators work area and select **Create Operator**. The **Add User** dialog appears.



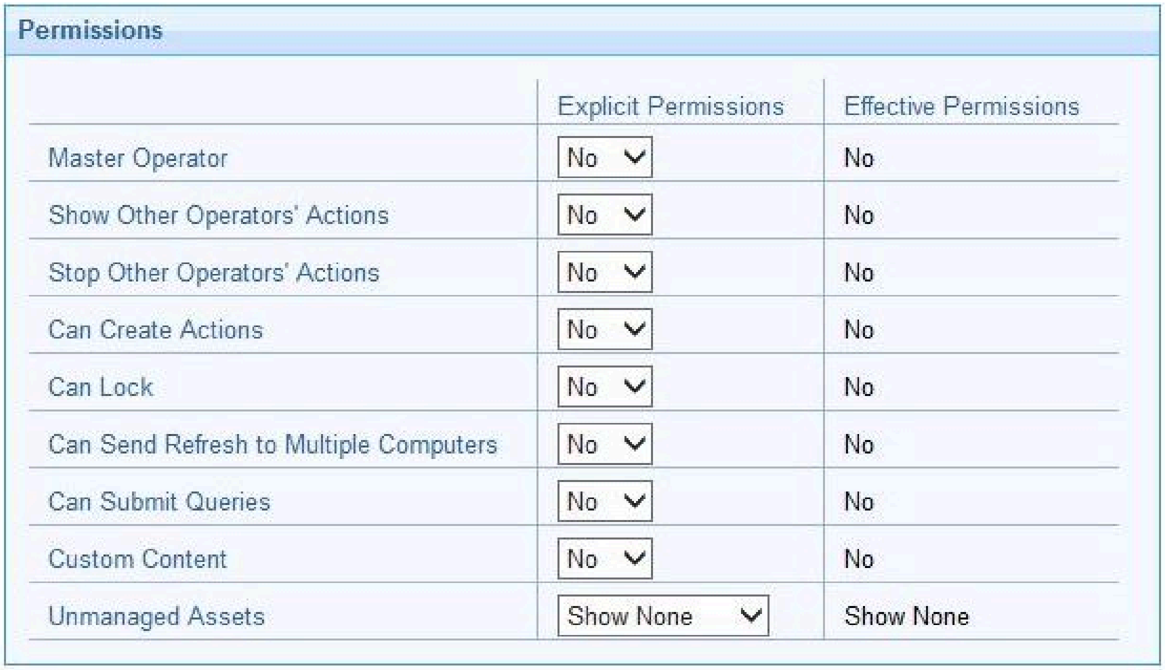
Username:	James Baud
Password:	••••••
Verify password:	••••••

2. Enter the **Username** of the person you want to designate as a publisher or operator.
3. Create a **Password** and retype it for confirmation. When you give the keys to your operators, they can change their passwords if they want.
4. Click **OK**. The **Console Operator** window opens.
5. From the **Details** tab, assign operator permissions.



	Explicit Permissions	Effective Permissions
Master Operator	No	No
Show Other Operators' Actions	Yes	Yes
Stop Other Operators' Actions	No	Yes
Can Create Actions	Yes	Yes
Can Lock	Yes	Yes
Can Send Refresh to Multiple Computers	Yes	Yes
Can Submit Queries	No	No
Custom Content	Yes	Yes
Unmanaged Assets	Show All	Show All

You can control the default settings by using the **defaultOperatorRolePermissions** option in **Advanced Options** of the BigFix Administrative tool. For details, see List of advanced options (on page 456).



Permissions

	Explicit Permissions	Effective Permissions
Master Operator	No	No
Show Other Operators' Actions	No	No
Stop Other Operators' Actions	No	No
Can Create Actions	No	No
Can Lock	No	No
Can Send Refresh to Multiple Computers	No	No
Can Submit Queries	No	No
Custom Content	No	No
Unmanaged Assets	Show None	Show None

where:

Master Operator

Specifies if the operator is a Master operator or not.

Show Other Operator's Actions

Specifies if the operator can see the actions submitted by other operators.

Note: An operator with the **Show Other Operators' Actions** permission can see the action only in the following cases:

- If he is the owner of the action.
- If another operator submitted the action on at least one of his administered computers, and this computer

is administered by both operators. In this case, the information is available only when the computer reports back the data to the BigFix server.

Stop Other Operator's Actions

You can specify if a non-master operator (NMO) can stop the actions submitted by other non-master operators. For more details, see Stop Other Operator's Actions feature *(on page 34)*.

Can Create Actions

Specifies if the operator can create actions.

Note: The **Can Create Actions** permissions are required for a Non Master Operator to remove computers from the database.

Can Lock

Specifies if the operator can lock targets. This is a way to prevent other operators from running activities on those targets.

Can Send Refresh to Multiple Clients

Specifies if the operator can run a refresh on more than one target concurrently by clicking the **Refresh** button on the BigFix console.

Can Submit Queries

Specifies if the operator can submit BigFix Query requests from the WebUI user interface.

Custom Content

Specifies if the operator can run activities that require the creation of custom content.

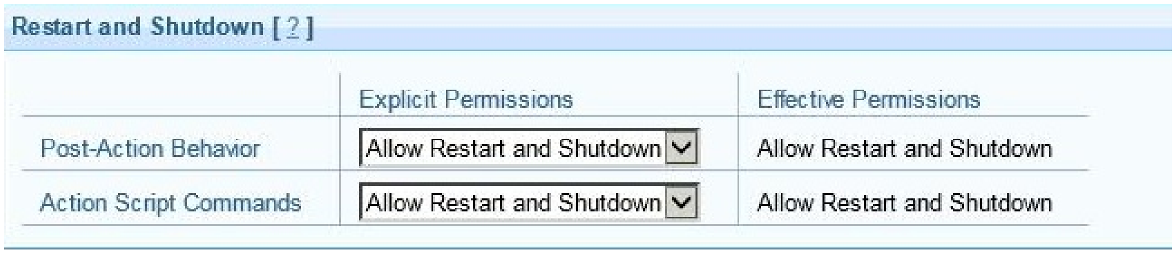
Note: A Non Master Operator with the **Custom Content** and **Can Create Actions** permissions, can only edit/delete existing computer settings but cannot add new computer settings.

Unmanaged Assets

Specifies if the operator can manage assets on which no BigFix component is installed.

An **Explicit Permission** is a permission that you are assigning to the operator. An **Effective Permission** is a permission that is inherited from the roles that the operator is assigned to. If the values displayed in **Explicit Permission** and **Effective Permission** for the same permission are different, the less restrictive permission is applied.

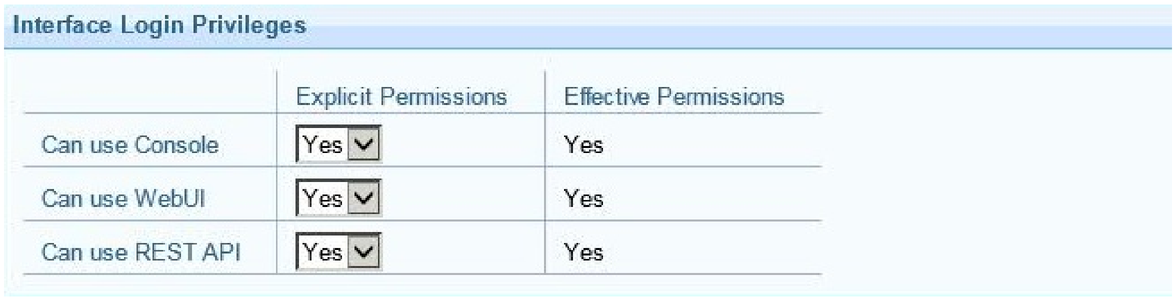
You also decide to influence the ability of the operator to trigger restart and shutdown as Post-Action or to include them in BigFix Action Scripts.



Restart and Shutdown [?]

	Explicit Permissions	Effective Permissions
Post-Action Behavior	Allow Restart and Shutdown	Allow Restart and Shutdown
Action Script Commands	Allow Restart and Shutdown	Allow Restart and Shutdown

Depending on the configuration that you set for a specific operator for shutdown and restart, the radio button in the Take action panel might be disabled for that operator. This configuration has no effect on actions with type other than BigFix Action Script. You can also set permissions to access the BigFix user interfaces.



Interface Login Privileges

	Explicit Permissions	Effective Permissions
Can use Console	Yes	Yes
Can use WebUI	Yes	Yes
Can use REST API	Yes	Yes

6. From the **Administered Computers** tab, you see the list of computers that this operator can manage. This list is populated after the computers that satisfy the criteria specified in the **Computer Assignments** tab report back their information to the BigFix server.
7. From the **Assigned Roles** tab, select the roles to apply to this operator.
8. From the **Sites** tab, assign the sites you want this operator to have access to.
9. From the **Computer Assignments** tab, specify the properties that must be matched by the computers that the operator can manage. For master operators, all the computers are assigned.
10. From the **WebUI Apps** tab, specify the WebUI Applications that the operator is allowed to access.
11. To save the changes click **Save Changes**.

At any time, you can also convert a local operator to an LDAP operator. To do so, follow these steps:

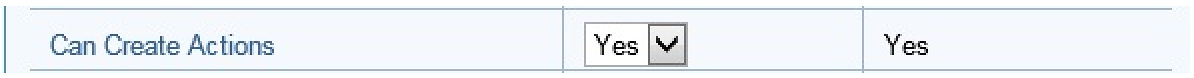
1. From any list of local operators, right click on the operator you want to convert.
2. From the context menu, select **Convert to LDAP Operator**.

Stop Other Operator's Actions feature

A non-master operator (NMO) can stop the actions submitted by other non-master operators if specific conditions are satisfied.

Requirements for the non-master operator (NMO) launching the action (the issuer)

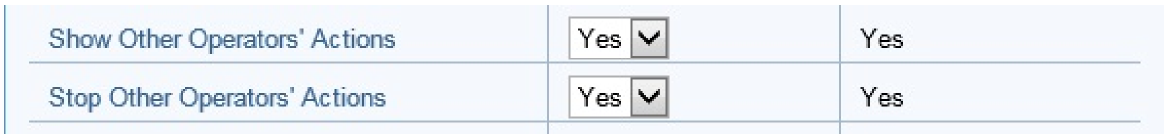
This NMO must have at least the possibility to create and submit an action and some computers assigned, either inherited from an assigned role or explicitely assigned, but there are no other specific restrictions or requirements, related to this feature, for him.



Can Create Actions	Yes	Yes

Requirements for the non-master operator (NMO) stopping the action (the stopper)

1. This NMO must have both the **Show Other Operators' Actions** and the **Stop Other Operator's Actions** effective permissions set to **Yes**.

Show Other Operators' Actions	Yes	Yes
Stop Other Operators' Actions	Yes	Yes

2. This NMO must have a set of assigned role names which is either identical or a superset of those of the issuer. If the issuer has no roles assigned, it is not required for the stopper to have roles assigned as well.

   Note: The role comparison is based only on the name of the assigned roles.

3. This NMO must have a set of Explicit Computer Assignments Definitions which is either identical or a superset of those of the issuer. The issuer can even have no computers explicitly assigned and, in this case, it is not required for the stopper to have explicit assignments as well. The same rule is valid also for roles.

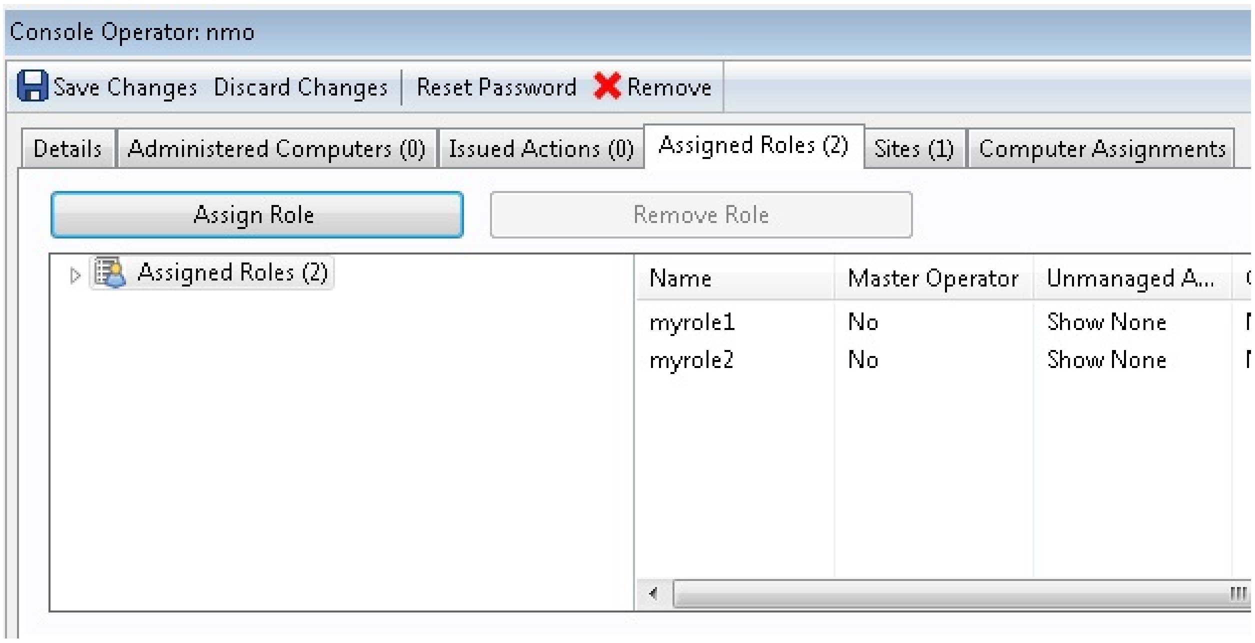
   Note: The "All Computers" explicit assignment is not a superset of other computer assignment definitions.

   Note: The Explicit Computer Assignments Definitions is not the list of computers resulting from the computer assignment, but the definition of those computer assignments.

Note: The assignments inherited from the assigned roles (specified in the Assigned Roles tab of the NMO) and those explicitly assigned (specified in the Computer Assignments tab of the NMO) are evaluated separately.

Now follow some examples of **Assigned Roles** and of **Computer Assignments**.

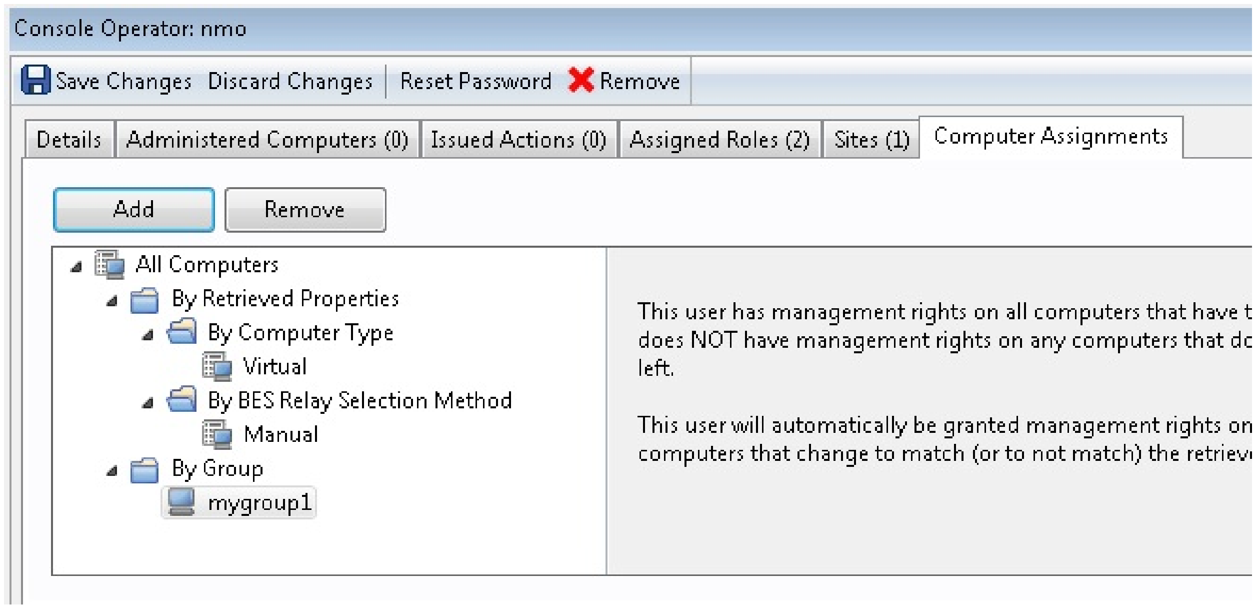
The following screenshot shows multiple roles (myrole1 and myrole2) assigned to an NMO.



Name	Master Operator	Unmanaged A...
myrole1	No	Show None
myrole2	No	Show None

The following screenshot shows multiple computer assignment definitions assigned to an NMO which are:

- By 'Computer Type' property -> Virtual
- By 'BES Relay Selection Method' property -> Manual
- By Group -> mygroup1



This user has management rights on all computers that have t
does NOT have management rights on any computers that do
left.

This user will automatically be granted management rights on
computers that change to match (or to not match) the retriev

Mapping authorized activities with permissions

The following table shows which activities you can, cannot or could, under specific conditions, allow an operator to do by assigning permissions in the Details tab of the Operator Definition.

For more information about the operator specific permissions, see Adding Local Operators (on page 29).

Table 3. Mapping of authorized activities with operator permissions

Activities	Operator
Manage Fixlet Sites	No
Change Client heartbeats	No
Create Fixlets	If **Custom Content** is set to YES
Create Tasks	If **Custom Content** is set to YES
Create Analyses	If **Custom Content** is set to YES
Create Baselines	If **Custom Content** is set to YES

Table 3. Mapping of authorized activities with operator permissions (continued)

Activities	Operator
Activate/Deactivate Analyses	Administered
Take Fixlet/Task/Baseline Action	Administered
Take Custom Action	If **Custom Content** is set to YES and **Can Create Actions** is set to YES
Stop Actions	Administered
Manage Administrative Rights	No
Manage Global Retrieved Properties	No
View Fixlets	Administered
View Tasks	Administered
View Analyses	Administered
View Computers	Administered
View Baselines	Administered
View Computer Groups	Administered
View Unmanaged Assets	Administered
View Actions	Administered
Make Comments	Administered
View Comments	Administered
Globally Hide/Unhide	No
Locally Hide/Unhide	Yes

Table 3. Mapping of authorized activities with operator permissions (continued)

Activities	Operator
Use Wizards	If **Custom Content** is set to YES
Remove computer from database	If **Can Create Actions** is set to YES
Create Manual Computer Groups	If **Can Create Actions** is set to YES
Delete Manual Computer Groups	If **Custom Content** is set to YES
Create Automatic Computer Groups	If **Custom Content** is set to YES
Delete Automatic Computer Groups	If **Custom Content** is set to YES and Administered
Create Custom Site	No
Modify Custom Site Owners	No
Modify Custom Site Read-ers/Writers	Site Owners
Create a Master Operator	No
Use the WebUI	If **Can use WebUI** is set to YES
Submit BigFix Query	If both **Can use WebUI** and **Can Submit Queries** are set to **YES**

Administered: The operator must own or have permissions.

Requires Custom Authoring: Granted by the site administrator through the console.

Operators and analysis

Operators have various rights and restrictions when activating and deactivating analysis.

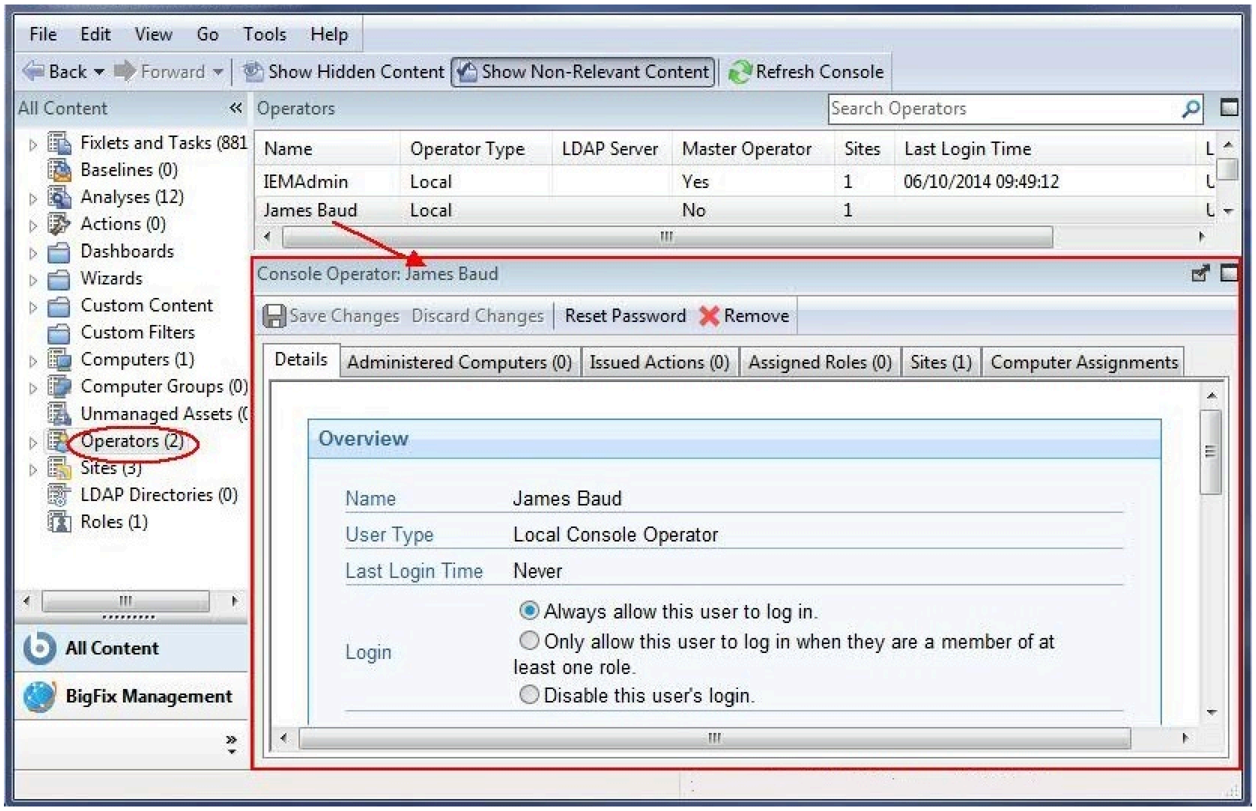
- Ordinary operators cannot deactivate an analysis activated by other operators on computers they administer.
- Master Operators cannot directly activate custom analysis authored by ordinary operators. They can, however, make a copy of an analysis and activate the copy.

Monitoring Operators

If you are a master Operator (you must have a correctly authorized user name created with the BigFix Administration Tool), you can monitor what other operators are doing and what computers they are authorized to administer.

Each operator is represented by, among other attributes, a **Name, User Type** and **Login type**. To view the list of Console Operators, select the **All Content** Domain and then click the node labeled **Operators** from the Domain Panel. In the List Panel on the right, all the current Operators are listed.

Click any operator from the List Panel to open the **Operator** work area.



Name	Operator Type	LDAP Server	Master Operator	Sites	Last Login Time
IEMAdmin	Local		Yes	1	06/10/2014 09:49:12
James Baud	Local		No	1	

Name	James Baud
User Type	Local Console Operator
Last Login Time	Never
Login	[✓ Always allow this user to log in.] Only allow this user to log in when they are a member of at least one role. Disable this user's login.

There are several tabs to choose from:

- **Details:** Describes the operator by name and type and lets you select a login type. This is also where you can view and alter operator permissions.
- **Administered Computers:** Presents a list of computers that are currently assigned to the selected console operator.
- **Issued Actions:** Presents a list of actions that have been issued by the selected console operator.
- **Assigned Roles:** Displays the currently assigned roles, and lets you reassign them.
- **Sites:** Displays the sites currently assigned to this operator, and lets you reassign them. If the site is a custom site, you can also set Read/Write/Owner permissions.
- **Computer Assignments:** Lists the properties that must be matched by the computers that the operator can manage. If you specify a property to be matched, any time a computer is changed to match that property, it is added to the list of computers assigned to the operator. On the other hand, if a computer is changed not to match that property, that computer is removed from the list.

  This tab is available only for not-master operators.

Chapter 3. Integrating with LDAP

You can add Lightweight Directory Access Protocol (LDAP) associations to BigFix.

That allows you and other users to log in to the console using those credentials. The same advantage applies also to Web Reports.

Follow the instructions provided in the next topics to learn how to integrate BigFix with a Generic LDAP or with Active Directory.

Note: If you are using SSL to integrate BigFix with a Generic LDAP server or with an Active Directory server, take into account that BigFix does not support the SSL connection to LDAP servers or Active Directory servers through a load balancer or a DNS alias.

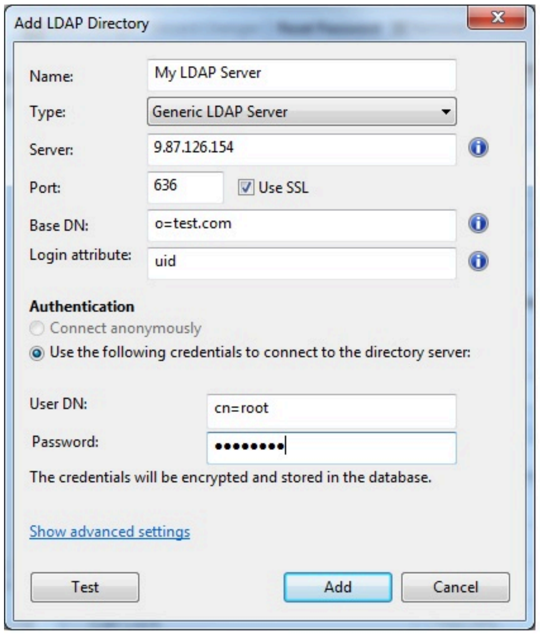
After you completed the steps to integrate with one of these two types of LDAP, you can associate LDAP users or groups to BigFix Console operators or roles as described in Adding LDAP Operators (on page 56) and Associating an LDAP group (on page 59).

Integrating with a Generic LDAP

How to configure the integration with a Generic LDAP by adding an existing LDAP domain to the console.

Perform these steps:

1. From the **Tool** menu, select **Add LDAP Directory** or right click in the work area and then select **Add LDAP Directory**. The **Add LDAP Directory** dialog appears.



Name: My LDAP Server
Type: Generic LDAP Server
Server: 9.87.126.154
Port: 636 [✓ Use SSL]
Base DN: o=test.com
Login attribute: uid

Authentication
Connect anonymously [✓ Use the following credentials to connect to the directory server:]

User DN: cn=root
Password: ••••••••
The credentials will be encrypted and stored in the database.

2. Provide a name and from the Type pull-down, make sure **Generic LDAP Server** is selected. Note that no **global catalog** option is available on generic LDAP servers.
3. Fill in the information pertaining to your LDAP installation. Under **Server**, enter the host name or IP Address of the server.
4. Enter the port number, typically 636 if you are using Secure Sockets Layer (SSL).
5. Enter the base distinguished name (**Base DN**), of the form `dc=example,dc=com`.
6. Click the button to **connect anonymously** or to **use credentials**. If you choose to connect using credentials, enter your **User DN** and **password**.
7. Click **Test** to ensure you have entered your information correctly and a connection can be made to your LDAP.
8. If you want to include user or group filters, click the **Show advanced settings** link. After specified, all further LDAP searches will be subject to the appropriate filter.
9. Click **Add** to complete the LDAP setup.

Your LDAP Server is now configured and available for use in the console.

Integrating with Active Directory

You can use Microsoft Active Directory (AD) to handle authentication on BigFix.

That allows you and other users to log in to the console using your Active Directory credentials, taking advantage of your existing authentication policies. The same advantage applies also to Web Reports.

Starting from BigFix Platform Version 9.5 Patch 14, integration with Active Directory that is configured with LDAP channel binding and LDAP signing is supported.

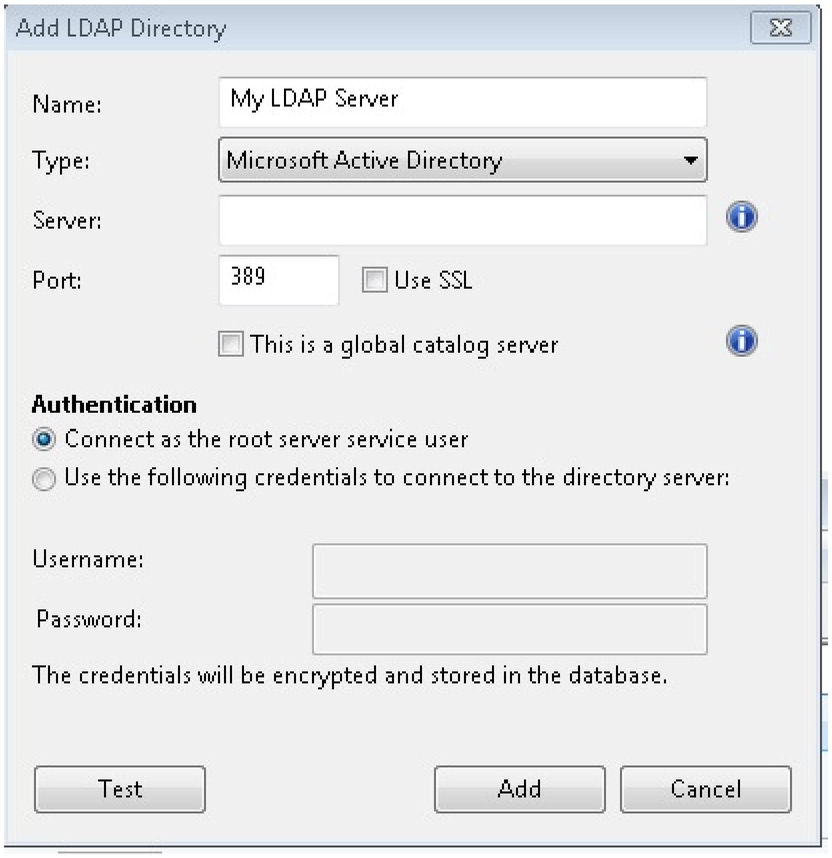
Note: On Windows platforms, the inspector that manages the calls to the Active Directory causes an ephemeral port to be allocated on the User Datagram Protocol (UDP), in addition to the 52311 port already required for the BESClient process. This port is visible in the output of the netstat -an command.

Integrating the Windows server with Active Directory

How to add an existing Active Directory to the console.

Follow these steps:

1. From the **Tool** menu, select **Add LDAP Directory**. The **Add LDAP Directory** dialog displays.



Name: My LDAP Server
Type: Microsoft Active Directory
Server:
Port: 389 ☐ Use SSL
☐ This is a global catalog server

Authentication
[✓ Connect as the root server service user]
Use the following credentials to connect to the directory server:

Username:
Password:

The credentials will be encrypted and stored in the database.

2. Provide a name for the Active Directory and from the Type pull-down, make sure **Microsoft Active Directory** is selected.
3. Under **Server**, enter the host name, IP Address or fully qualified domain name of the server.
4. Click **Use SSL** if you want to configure a secure connection (SSL).
5. To access an entire Active Directory forest, click **This is a global catalog server**.
6. Click the button to **connect as the root server service user** or to **use credentials**. If you choose to connect using credentials, enter your Active Directory **Username** and **Password**.
7. Click **Test** to make sure you have entered your information correctly and a connection can be made to your Active Directory server.
8. Click **Add** to complete the Active Directory setup.

Note: When you add an LDAP Server as **Microsoft Active Directory**, ensure that on the LDAP server you have defined the `UserPrincipalName` attribute corresponding to the **User logon name** of each user. This attribute value is used on the BigFix Console for each user authentication.

Your Active Directory Server is now configured and available for use in the console.

AD Domain/Forest Function level for BigFix Server running on Windows only

BigFix 10.0.7 is fully supported in an AD Domain/Forest Function environment with SSL in the following configuration:

- BES Server must be running on Windows only.
- Active Directories Windows 2016 or 2019 defined with 2016 Domain Functional Level and with patch level updated.
- Every Active Directory installed with Global Catalog.
- Enterprise Certification Authority installed on root domain.
- Creation of a certificate for the CA with the following characteristics:
    - In an AD forest with various domain extension (for example BIGFIX.ACME.COM for root domain and CHILD.BIGFIX.ACME.COM for child domain) consider the common part of domain name and create a certificate having a common name that starts with "*" (for example):

      ```
      CN = *.BIGFIX.ACME.COM
      ```
    - Then, on same certificate, define the DNS and list all AD servers, so the created certificate will have on the Details tab the field "Subject Alternative Name" with the values (for example):

      ```
      DNS Name=MyRootAD.BIGFIX.ACME.COM
      ```

      ```
      DNS Name=MyChildAD.CHILD.BIGFIX.ACME.COM
      ```

The certificate must be loaded on All Active Directories of the SAN list.

The scenario was certified with DNS installed on the Active Directories.

Integrating the Linux server with Active Directory

Configuring Kerberos authentication

To ensure a secure communication between Linux BigFix server and Active Directory, use the Kerberos protocol.

To integrate the Linux BigFix server with the Windows Active Directory domain using LDAP with Kerberos authentication, perform the following steps:

1. Ensure that the host names and the time service are set correctly in both the Linux BigFix server and the Active Directory server.
2. Install the NSS and PAM libraries.
3. Configure the Kerberos LDAP security and authentication.
4. Modify the local LDAP name.
5. Configure the NSS and PAM libraries.

Preliminary Checks

Before running the integration between the BigFix server running on a Red Hat Enterprise Linux 7 or Linux 8 system and the Active Directory server, ensure the following.

- The DNS host names of both the Red Hat Enterprise Linux 7 or Linux 8 system and the Active Directory server are resolved correctly, by performing the following steps on the Red Hat Enterprise Linux 7 or Linux 8 system:
    1. Open the file `/etc/host` and ensure that both DNS host names are specified as fully qualified domain names.
    2. Open the file `/etc/sysconfig/network` and ensure that the host name of the Red Hat Enterprise Linux 7 or Linux 8 system is specified as fully qualified domain name.
- The time between the Active Directory and the Linux BigFix server is synchronized. If needed, you can synchronize the time service on the Red Hat Enterprise Linux 7 or Linux 8 system and the Active Directory server with the time source server, by performing the following steps:

1. In the file `/etc/ntp.conf` on the Red Hat Enterprise Linux 7 or Linux 8 system, replace the following lines:

   ```
   server hostname
   ```

   with:

   ```
   server time_source_server_name
   ```

   where *time_source_server_name* is the server hostname or IP address of the time source server used to synchronize the time.
2. When DNS lookups are not reliable, configure the Red Hat Enterprise Linux systems to perform DNS lookups from the Active Directory server by editing the `/etc/resolv.conf` file as follows:

   ```
   domain my.domain.com
   search my.domain.com
   nameserver1 ipaddress1
   nameserver2 ipaddress2
   ```
3. Activate the change on the Red Hat Enterprise Linux 7 system by:
   - Stopping the **ntp** daemon:

     ```
     service ntpd stop
     ```
   - Updating the time:

     ```
     ntpdate Red_Hat_server_IP
     ```
   - Starting the **ntp** daemon:

     ```
     service ntpd start
     ```
4. Synchronize the Active Directory server with the time source server by entering:

   ```
   w32tm /config /manualpeerlist:"time_source_server_name"
         /syncfromflags:manual /update
   ```

   where *time_source_server_name* specifies the list of DNS names or IP addresses for the NTP time source with which the Linux server synchronizes.

For example, you can specify `time.windows.com` as the NTP time server. When you specify multiple peers, use a space as the delimiter and enclose the names of the peers in quotation marks.

5. On the Active Directory server, run the following command to ensure that the time is synchronized with the time source server

```
w32tm /query /status | find "Source"
w32tm /query /status | find "source"
```

6. On the Red Hat Enterprise Linux 7 system configure the **ntpd** daemon to start at system boot:

```
chkconfig ntpd on
```

Installing the NSS and PAM libraries

Ensure that the following NSS and PAM packages are installed.

```
nss-pam-ldapd-0.7.5-18.2.el6_4.x86_64.rpm
pam_krb5-2.3.11-9.el6.x86_64.rpm
```

Note: If you have a valid RHN subscription, run yum as shown in the following example:

```
yum install nss-pam-ldapd.x86_64 pam_krb5.x86_64
```

Configuring Authentication

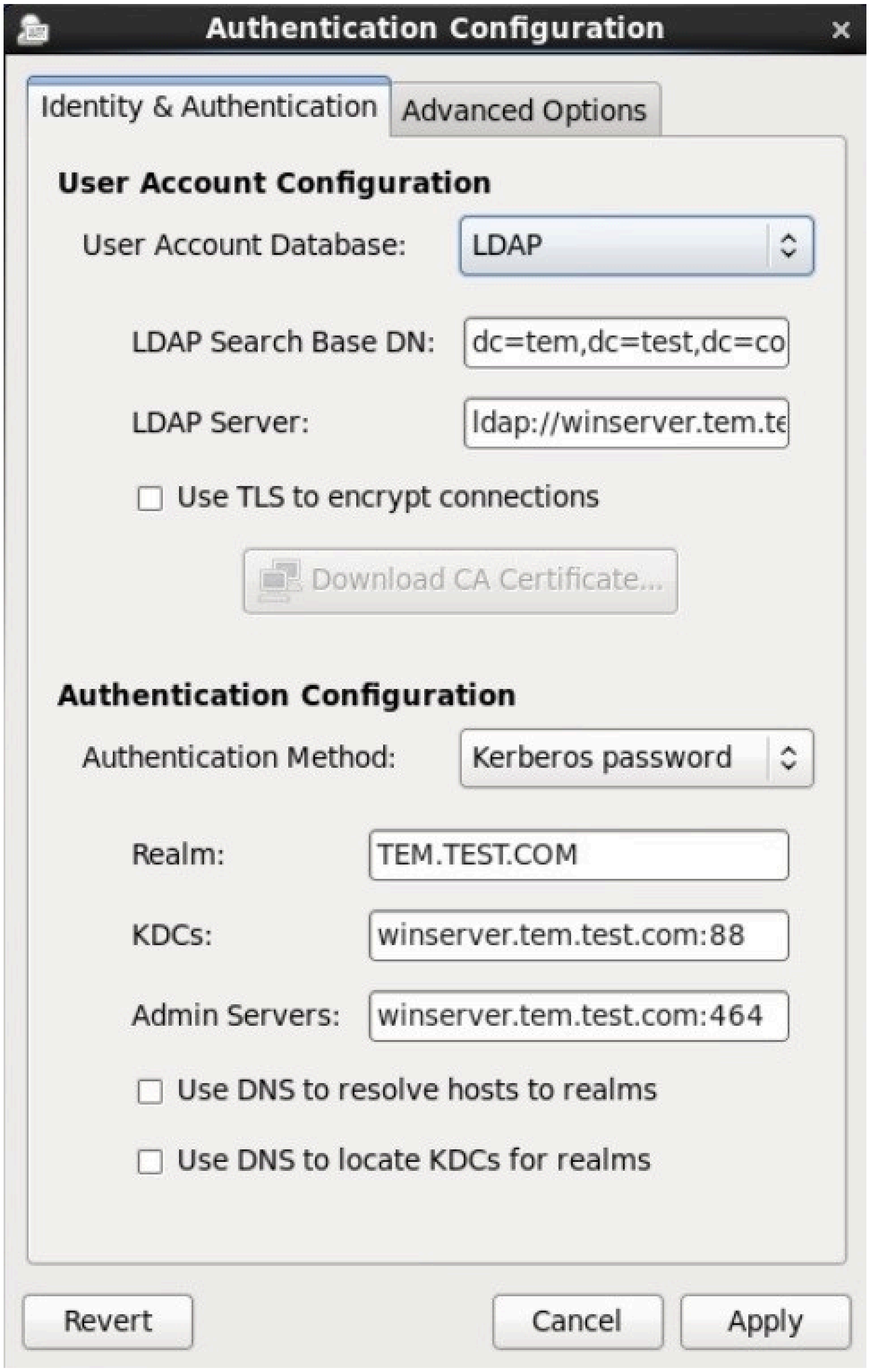
To configure the Kerberos protocol, the LDAP security and the authentication files for Active Directory integration, you can use one of the following methods.

- The **system-config-authentication** graphical tool.
- The **authconfig** command-line tool.

Using the system-config-authentication graphical tool

To configure the authentication with the system-config-authentication tool, perform the following steps.

1. Run the **system-config-authentication** graphical tool to define LDAP as the user account database for user authentication.
2. In **Identity & Authentication,** from the **User Account Database** drop-down list, select **LDAP.** Selecting the **LDAP** option allows the system to be configured to connect to the Windows Active Directory domain using LDAP with Kerberos authentication.


Authentication Configuration

User Account Configuration

User Account Database: LDAP

LDAP Search Base DN: dc=tem,dc=test,dc=co

LDAP Server: ldap://winserver.tem.te

☐ Use TLS to encrypt connections

Authentication Configuration

Authentication Method: Kerberos password

Realm: TEM.TEST.COM

KDCs: winserver.tem.test.com:88

Admin Servers: winserver.tem.test.com:464

☐ Use DNS to resolve hosts to realms

☐ Use DNS to locate KDCs for realms

3. In **LDAP Search Base DN** specify to retrieve the user information using the listed Distinguished Name (DN), such as `dc=tem,dc=test,dc=com`.

4. In **LDAP Server** specify the address of the LDAP server such as `ldap://winserver.tem.test.com`
5. In **Authentication Method** select **Kerberos password**.
6. Configures the realm for the Kerberos server in **Realm**, such as `TEM.TEST.COM`. Ensure you enter the Realm name in uppercase.
7. Specify the *Key Distribution Center* (KDC) in **KDCs** for issuing Kerberos tickets, for example, `winserver.tem.test.com`
8. Specify the administration servers running `kadmind` in the **Admin Servers**, such as `winserver.tem.test.com`
9. Click **Apply**.

For more information about how to use this tool, see Launching the Authentication Configuration Tool UI.

Using the authconfig command-line tool

To update all of the configuration files and services required for system authentication, you can run the **authconfig** command-line tool.

As shown in the following example:

```
authconfig --enableldap --ldapserver=ldap://winserver.tem.test.com:389
 --ldapbasedn="dc=tem,dc=test,dc=com" --enablekrb5
 --krb5realm TEM.TEST.COM --krb5kdc winserver.tem.test.com:88
 --krb5adminserver winserver.tem.test.com:464 --update
```

where:

--enableldap

Specifies to configure to connect the system with the Windows Active Directory domain using LDAP with Kerberos authentication.

--ldapserver

Specifies the address of the LDAP server such as `ldap://winserver.tem.test.com`

--ldapbasedn

Specifies to retrieve the user information using the listed Distinguished Name (DN), such as `dc=tem,dc=test,dc=com`

--enablekrb5

Enables the Kerberos password authentication method.

--krb5realm

Configures the realm for the Kerberos server, such as `TEM.TEST.COM`. Ensure you specify the realm name in uppercase.

--krb5kdc

Specifies the *Key Distribution Center* (KDC) for issuing Kerberos tickets, such as `winserver.tem.test.com`.

--krb5adminserver

Specifies the administration servers running `kadmind`, such as `winserver.tem.test.com`.

--update

Applies all the configuration settings.

For more information about how to use this command, see Configuring Authentication from the Command Line.

Modifying the local LDAP name

To modify the local LDAP name, perform the following steps.

1. Make a backup copy of the LDAP configuration file as follows:

```
cp -p /etc/nslcd.conf /etc/nslcd.conf.bk
```

2. Modify the value of the `base` and `uri` settings in the `/etc/nslcd.conf` file as in the following example:

```
base dc=tem,dc=test,dc=com
uri ldap://winserver.tem.test.com
```

3. Restart the local LDAP name service daemon:

```
service nslcd restart
```

4. Ensure that the local LDAP name service daemon (`nslcd`) is set to start with the server:

```
 chkconfig nslcd on
```

Configuring the NSS and PAM libraries

How to use the LDAP database to authenticate users on a Linux system.

Edit the /etc/nsswitch.conf and change `passwd`, `shadow` and `group` entries from the SSSD daemon (**sss**) to LDAP:

```
passwd:  files sss
shadow:  files sss
group:   files sss
```

to LDAP (**ldap**):

```
passwd:  files ldap
shadow:  files ldap
group:   files ldap
```

To configure the PAM libraries, edit the `/etc/pam.d/system-auth` and `/etc/pam.d/password-auth` files and add the `pam_krb5.so` library entries:

```
auth     sufficient                                  pam_krb5.so
use_first_pass
...
account  [default=bad success=ok user_unknown=ignore] pam_krb5.so
...
password sufficient                                  pam_krb5.so
use_authtok
...
session  optional                                    pam_krb5.so
```

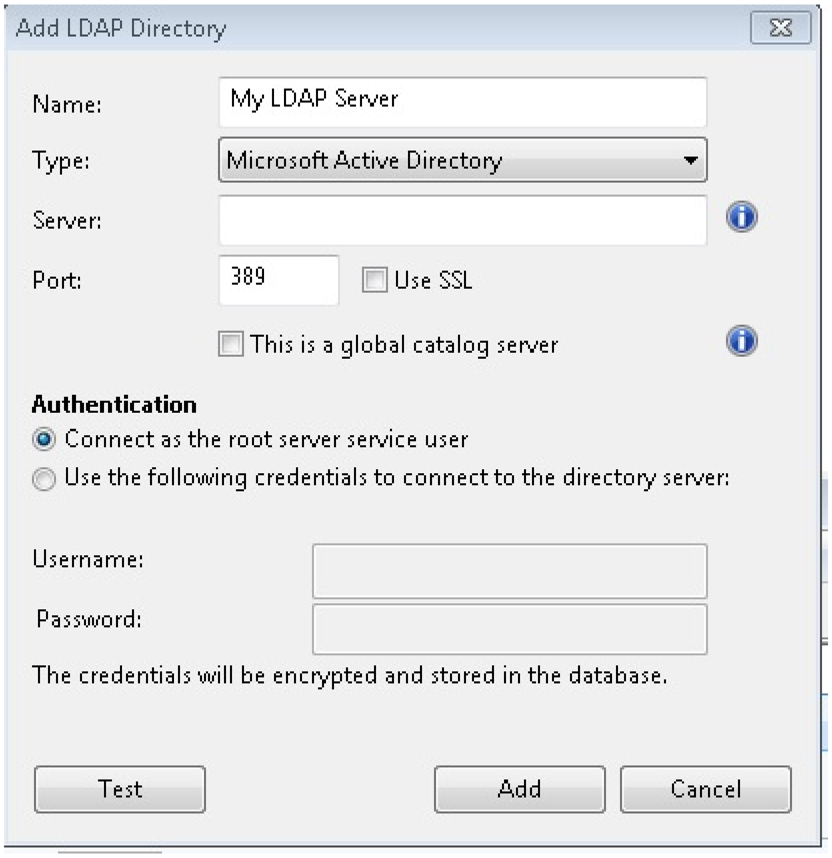
Note: Remove the entries for the SSSD libraries (`pam_sss.so`).

For additional information on RedHat integration see Integrating Red Hat Enterprise Linux 6 with Active Directory.

Integrating the server with Active Directory

How to integrate the BigFix server with Active Directory.

1. From the **Tool** menu, select **Add LDAP Directory**. The **Add LDAP Directory** dialog displays.



Add LDAP Directory

Name: My LDAP Server

Type: Microsoft Active Directory

Server:

Port: 389 ☐ Use SSL

☐ This is a global catalog server

Authentication

● Connect as the root server service user

○ Use the following credentials to connect to the directory server:

Username:

Password:

The credentials will be encrypted and stored in the database.

2. Provide a name for the Active Directory and from the Type pull-down, make sure **Microsoft Active Directory** is selected.
3. Under **Server**, enter the host name, IP Address or fully qualified domain name of the server.

4. Click **Use SSL** if you want to configure a secure connection (SSL).
5. To access an entire Active Directory forest, click **This is a global catalog server**.
6. Click the button to **connect as the root server service user** or to **use credentials**. If you choose to connect using credentials, enter your Active Directory **Username** and **Password**.
7. Click **Test** to make sure you have entered your information correctly and a connection can be made to your Active Directory server.
8. Click **Add** to complete the Active Directory setup.

Note: When you add an LDAP Server as **Microsoft Active Directory**, ensure that on the LDAP server you have defined the `UserPrincipalName` attribute corresponding to the **User logon name** of each user. This attribute value is used on the BigFix Console for each user authentication.

Adding LDAP Operators

You can create accounts for operators to access the console by using an existing Active Directory or LDAP account.

When you select this option, an operator with the same name as the one specified in the LDAP directory, is added to the operators node in the Domain Panel on the BigFix console. These operators can then log in as usual, using one of the following notations:

username
username@domain
domain\username

The permissions assigned to that user in the LDAP directory are not inherited by the newly created operator. You must either assign the needed permissions to the operator or assign the operator to an existing role.

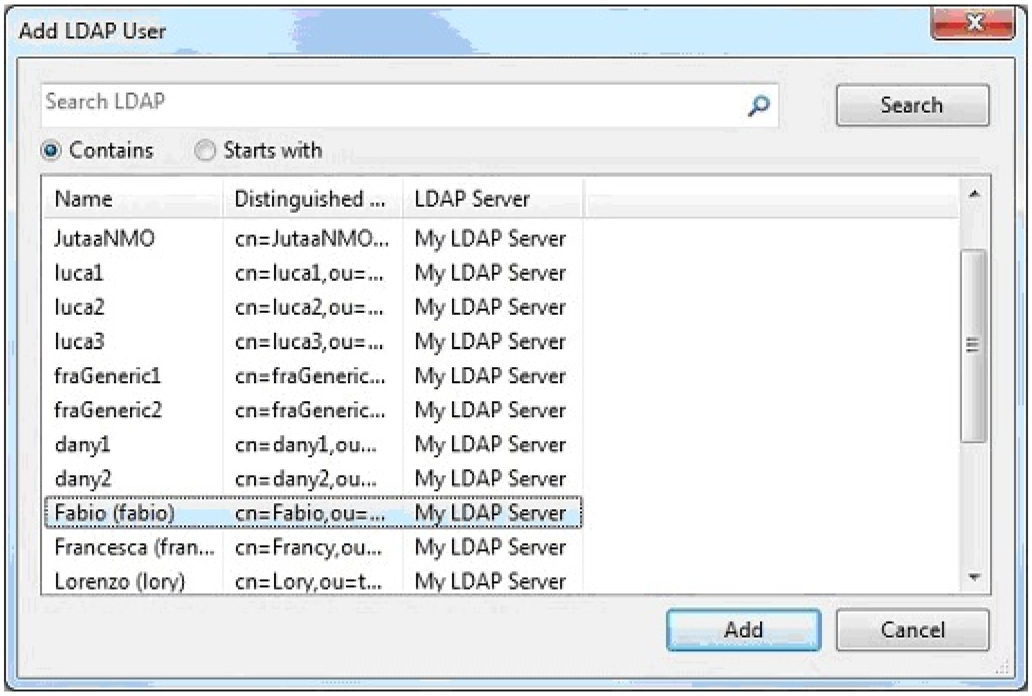
Note: Starting from version 9.2.6 for accesses to Web UI and Web Reports, and from version 9.5 for accesses to the Console, you can integrate BigFix with SAML V2.0 to provide BigFix LDAP operators with:

- Two-factor authentication with Common Access Cards (CAC), Personal Identity Verification (PIV) cards, or other factors, if required by the Identity Provider.
- Web-based Single Sign-On authentication method from the identity provider login URL.

For more information, see Enabling SAML V2.0 authentication for LDAP operators *(on page 61)*.

To add an LDAP operator, complete the following steps:

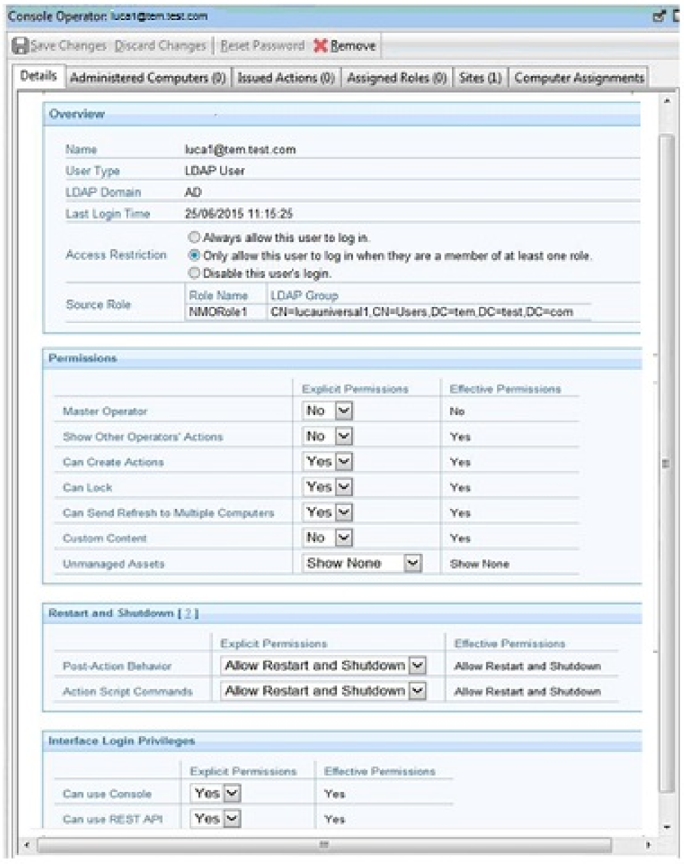
1. Ensure that the needed Active Directory or LDAP directory is added to the BigFix environment.
2. Click the **Tools > Add LDAP Operator** menu item or right click in the work area and then select **Add LDAP Operator**. The Add LDAP User dialog appears.



Name	Distinguished ...	LDAP Server
JutaaNMO	cn=JutaaNMO...	My LDAP Server
luca1	cn=luca1,ou=...	My LDAP Server
luca2	cn=luca2,ou=...	My LDAP Server
luca3	cn=luca3,ou=...	My LDAP Server
fraGeneric1	cn=fraGeneric...	My LDAP Server
fraGeneric2	cn=fraGeneric...	My LDAP Server
dany1	cn=dany1,ou...	My LDAP Server
dany2	cn=dany2,ou...	My LDAP Server
Fabio (fabio)	cn=Fabio,ou=...	My LDAP Server
Francesca (fran...	cn=Francy,ou...	My LDAP Server
Lorenzo (lory)	cn=Lory,ou=t...	My LDAP Server

3. You can query and filter the users defined on the specified LDAP server using the Search field and the two radio buttons.

4. When you find the user to add as LDAP operator, select it and click **Add**. The Console Operator panel opens.



Overview

Name	luca1@tem.test.com
User Type	LDAP User
LDAP Domain	AD
Last Login Time	25/06/2015 11:15:25
Access Restriction	Always allow this user to log in. [✓ Only allow this user to log in when they are a member of at least one role.] Disable this user's login.

Source Role:

Role Name	LDAP Group
NMORole1	CN=lucauniversal1,CN=Users,DC=tem,DC=test,DC=com

Permissions

	Explicit Permissions	Effective Permissions
Master Operator	No	No
Show Other Operators' Actions	No	Yes
Can Create Actions	Yes	Yes
Can Lock	Yes	Yes
Can Send Refresh to Multiple Computers	Yes	Yes
Custom Content	No	Yes
Unmanaged Assets	Show None	Show None

Restart and Shutdown [?]

	Explicit Permissions	Effective Permissions
Post-Action Behavior	Allow Restart and Shutdown	Allow Restart and Shutdown
Action Script Commands	Allow Restart and Shutdown	Allow Restart and Shutdown

Interface Login Privileges

	Explicit Permissions	Effective Permissions
Can use Console	Yes	Yes
Can use REST API	Yes	Yes

5. From the **Details** tab assign operator permissions.

   You can decide to give the operator the ability to trigger restart and shutdown as Post-Action or to include them in BigFix Action Scripts. Depending on the configuration that you set for a specific operator for shutdown and restart, the radio button in the Post Action tab of the Take Action panel might be disabled for that operator. This configuration has no effect on actions with action script type other than BigFix Action Script.

   You can also set permissions to access the BigFix Console and REST API.
6. The **Administered Computers** tab lists the computers managed by this operator.
7. From the **Assigned Role** tab, select the roles that you want to assign or unassign this operator to.

8. From the **Sites** tab, assign the sites that you want this operator to have access to or unassign them.
9. From the **Computer Assignments** tab, specify the properties that must be matched by the computers that the operator can manage.
10. To save the changes click **Save Changes**.

At any time, you can also convert a local operator to an LDAP operator. To do this, follow these steps:

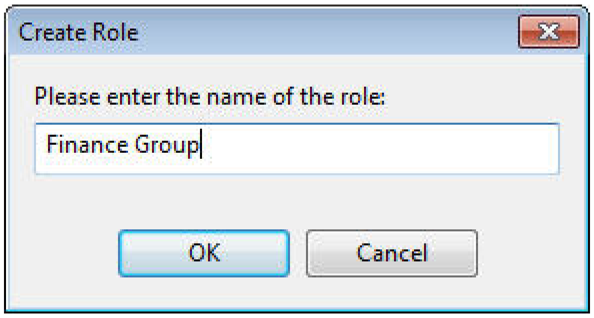
1. From any list of local operators, right click on the operator you want to convert.
2. From the context menu, select **Convert to LDAP Operator**.

Associating an LDAP group

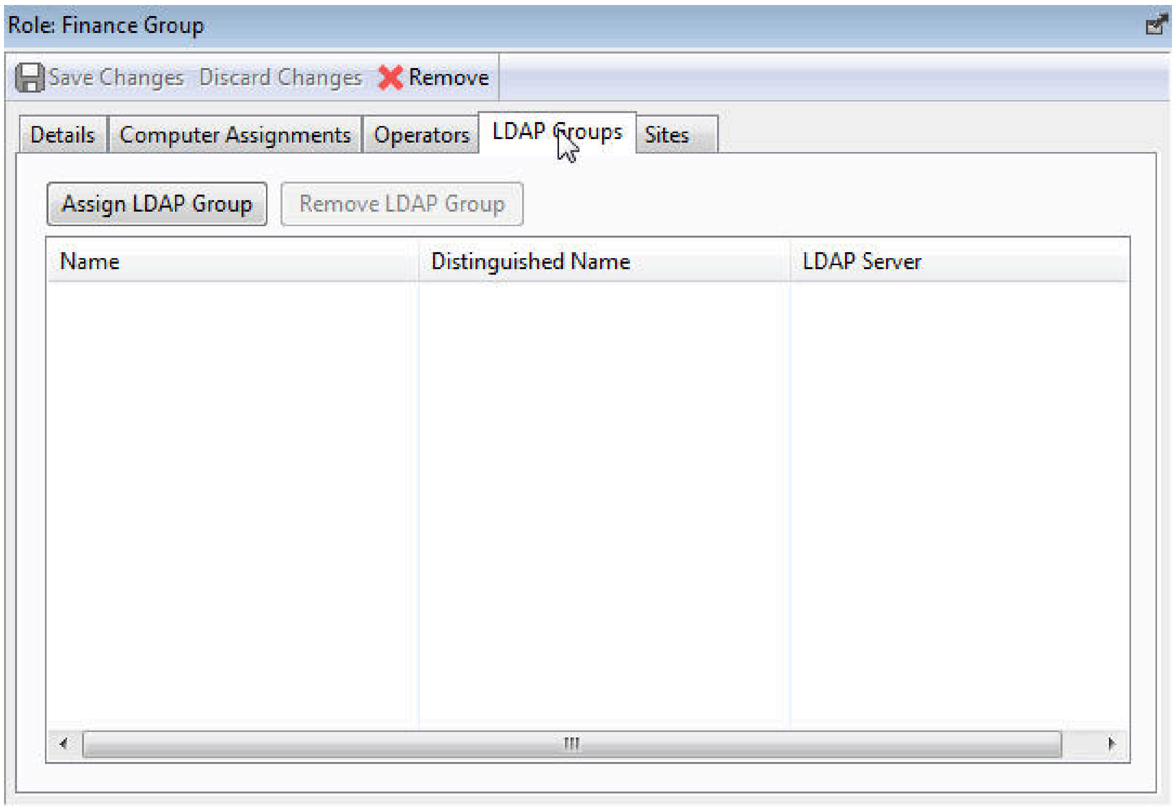
You can associate LDAP users or groups, that have been defined in an existing Active Directory or LDAP directory, to console operators or roles.

To add such a group, perform the following steps:

1. Ensure that the needed Active Directory or LDAP directory is added to the BigFix environment.
2. Create a role to accept your new group by selecting **Tools > Create Role** or right click in the work area and then select **Create Role**.



   Enter a name for your group and click **OK**.
3. The **Role** panel appears.



Click the **LDAP Groups** tab.

4. Select the LDAP group that you want to assign to this role and click **Assign LDAP Group**.
5. To save the changes click **Save Changes**.

When you assign an LDAP group to a role, any user from that group can then log in to the console. Only those users who actually log in will be provisioned with accounts and thus end up in the list of operators. This avoids the creation of unnecessary accounts. Operators are granted the highest privileges resulting from the sum of all their roles and permissions. For instance, if a user has access to computer set A and sites X from role 1, and computer set B and sites Y from role 2, they will have permissions for Sites X and Y across both computer sets A and B.

Chapter 4. Enabling SAML V2.0 authentication for LDAP operators

Starting from Version 9.5.5, BigFix supports SAML V2.0 authentication via LDAP-backed SAML identity providers.

After configuration, SAML V2.0 support enables:

- Two-factor authentication for BigFix with Common Access Cards (CAC), Personal Identity Verification (PIV) cards, or other factors, if required by the Identity Provider.
- Web-based Single Sign-On authentication method from the identity provider login URL. Logged in users are automatically redirected, upon request, to the web-based components that support SAML V2.0 authentication without having to log in again.

What Is SAML 2.0

The OASIS Security Assertion Markup Language (SAML) is a standard that uses an XML-based framework to describe and exchange security information between online entities.

For more details about SAML terminology, see SAML Key terms.

SAML 2.0 supports:

Web-Based Single Sign-On

It provides a standard vendor-independent grammar and protocol for transferring information about a user from one web server to another, independent of the server DNS domains.

Identity federation

It allows partner services to agree on and establish a common name identifier for the user to share information about themselves across organizational boundaries.

This type of sharing helps to reduce identity management costs.

Federated identity implements FIPS 201 to define a US Government-wide interoperable identification credential, known as the Personal Identity

Verification (PIV), for controlling physical access to federal facilities and logical access to federal information systems.

The CAC PIV card is a multi-application smart card for PIV Cardholder authentication that contains a linear barcode, two-dimensional barcode, magnetic stripe, color digital photograph, and printed text. It serves as a token for:

- Logical access to computer systems
- Personnel identification
- Physical access to buildings
- Public-Key Infrastructure (PKI) for signing, encryption, and non-repudiation.

Web services and other industry standards

SAML allows its security assertion format to be used outside a "native" SAML-based protocol context. This modularity has proved useful to other industry efforts addressing authorization services (IETF, OASIS), identity frameworks, web services (OASIS, Liberty Alliance), and so on.

How SAML works

The SAML specification defines three parties.

They are the following:

- The principal, which is typically a user.
- The Identity provider (IdP), which is the LDAP-backed SAML identity provider.
- The service provider (SP), which in this case are the BigFix services.

The SAML standard controls how the identity assertions are exchanged among these three parties. SAML does not specify the method of authentication at the identity provider.

In SAML, one identity provider can provide SAML assertions to many service providers.

For more information about SAML V2.0 use case scenarios, see SAML V2.0 Overview.

Which BigFix user interfaces integrate with SAML V2.0

The SAML authentication enhancement, when configured, affects all BigFix LDAP managed users accessing the Web UI, Web Reports and, starting from BigFix Version 9.5.5, the BigFix console.

How BigFix integrates with SAML V2.0

The integration with SAML V2.0 uses the passport-saml authentication provider to allow both Identity provider (IdP) initiated and Service provider (SP) initiated authentication.

The SAML use and requests are managed, for all the BigFix user interfaces that support it, by a WebUI component.

The way you configure the integration with SAML depends on the use that you plan to do:

- If you want to use the SAML authentication for Web Reports and for theBigFix console only, and you do not need to use it with any WebUI application, you can start the WebUI in SAML-only mode. This SAML configuration allows you to minimize resource consumption. For more information about how to set up this configuration, see Enabling the WebUI in SAML-Only Mode.
- If you want to use the SAML authentication for all the BigFix user interfaces, including the full set of WebUI components, or the WebUI ETL process, follow the instructions provided in WebUI Installation if are using BigFix Version 9.5.5 or later.

If the BigFix environment uses one LDAP server as a user repository, user provisioning is not affected by this integration, and administrators continue to define operators and roles to authorize them to use BigFix services. If your BigFix environment operators are defined on more than one LDAP server, read carefully the information provided in Assumptions and requirements (on page 64).

Integration with SAML 2.0 maintains existing audit scenarios and includes SAML-authenticated user entries in the `server_audit.log` file.

See the following sample use case:

1. The user requests a service from BigFix, for example, accesses a page or attempts to log in, through the Web UI, the Web Reports or the BigFix console.
2. BigFix requests an identity assertion from the LDAP-backed SAML identity provider.
3. Before delivering the identity assertion, the LDAP-backed SAML identity provider might request some user authentication information, such as user name and password, or another form of authentication, including multi-factor authentication.
   A directory service such as LDAP or Active Directory is a typical source of authentication token at an identity provider.
4. On the basis of the identity assertion provided by the identity provider, BigFix decides whether to perform the service requested by that user.
5. The authentication information is retained and used to allow automatic access for the user, according to the assigned permissions, to the services provided by BigFix.

Assumptions and requirements

Before configuring BigFix to use SAML V2.0, carefully read the following list of assumptions and requirements.

- BigFix supports SAML V2.0 authentication with an SAML V2.0-compliant identity provider such as Active Directory Federation Services (ADFS).
- The SAML V2.0 authentication is restricted to:
  - Only one SAML IdP backed by one or more LDAP directories. If you already defined multiple LDAP servers as user repositories in your BigFix environment, be aware that, after enabling SAML authentication, only the users and the groups managed by the selected IdP will still be known to the BigFix environment. In this case, ensure that your IdP environment is correctly configured so that the SAML IdP (ADFS or ISAM) can authenticate users from the different LDAP environments that you want to use as the user repository.
  - Identity providers using SHA256 as secure hash algorithm.
  - Web Reports servers connecting to only one data source (Root server) and configured with SSL.
- To configure and use SAML authentication, you must have the WebUI installed. If you are using the WebUI solely for providing SAML authentication for Web Reports and

the BigFix console, you can start the Web UI in SAML-only mode to reduce resource consumption. For information about how to start the Web UI in SAML-only mode, see the WebUI User's Guide.

- In DSA architecture, the configuration is replicated to replica DSA servers. However, the replica does not enable WebUI for SAML on non-primary DSA's, because multiple WebUI configuration is not supported.
- Starting from Patch 1, the X.509 certificate used as server signing key is generated with a *subjectAltName* field containing DNS name and IPs of the Root server. This prevents the `The name on the security certificate is invalid or does not match the name of the site` security warning from appearing during the authentication process.
    - For fresh installations, a new certificate is created during the process.
    - For upgrades, the old certificate is left in place. To prevent the security warning, do the following steps:
        - Rotate the server signing key for the server to which you are connecting. For details of the parameter, see Additional administration commands. In DSA architecture, you do not need to rotate keys for all the servers.

          Important: This operation resigns all the existing content. In very large deployments, it can take up to some hours. To minimize the impact on the day to day deployment operations, plan a maintenance window.
        - Apply, in alternative, the workaround described in What changes from the BigFix user's perspective *(on page 66)*.
- When running Web Reports, if SAML is enabled, the check on the referrer is not performed. You can use the setting `_HTTPServer_Referrer_CheckEnabled` to enable or disable the referrer check. The referrer is an optional header of the HTTP protocol. It identifies the address of the web page (that is the URI or IRI) that linked to the resource being requested. For information about how BigFix manages the referrer check, see List of settings and detailed descriptions.

What changes from the BigFix user's perspective

From the BigFix user interfaces operator's perspective, this enhancement affects only authentication.

After enabling SAML authentication for LDAP users:

LDAP operators:

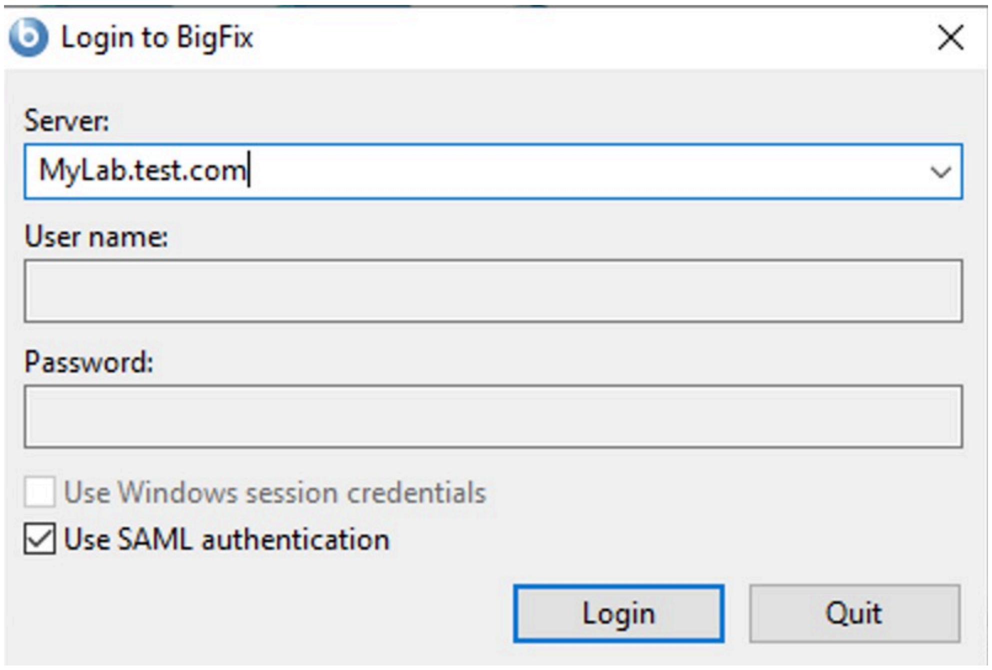
- Must authenticate to the Web UI and to the Web Reports from the SAML identity provider only by accessing the following URLs:

  `https://<WebUI_server>` (for the Web UI server, assuming that it uses port 443)

  `https://<Web_Reports_server>:8083` (for each Web Reports server, assuming that port 8083 is used)

  Note: The buttons and links to log out from the Web UI and the Web Reports redirect these users to a page where they can click a Re-authenticate button to get back to Web UI and Web Reports pages without having to log back on, unless the IdP login timeout has expired; in this case they are brought back to the IdP login page.

- Must enable the **Use SAML authentication** check box in the Console login panel, if the BigFix server was configured to integrate with SAML V2.0.



The selection is automatically validated and retained by BigFix for future login requests.

Local non-LDAP operators:

- Log in to the Web UI or to the Web Reports by accessing the usual login URLs:

  `https://<WebUI_server>/login` (assuming that the Web UI is set on port 443)

  `https://<Web_Reports_server>:8083/login` (for each Web Reports server, assuming that Web Reports is set on port 8083)
- Log in to the BigFix Console from the usual login panel ensuring that the **Use SAML authentication** check box is not selected.

  Note: If SAML is not enabled in the environment, the **Use SAML authentication** check box is greyed out.

After SAML is configured and enabled only local non-LDAP users will be able to log in using API; the 4-eyes authentication approvers must be local accounts.

How to configure BigFix to integrate with SAML 2.0

How to configure the SAML identity provider and the BigFix server.

Before configuring the integration, ensure that:

- The BigFix server can resolve the hostname used in the URL for the identity provider login page.
- The identity provider (ADFS server or another type of supported SAML authentication providers) can resolve the BigFix root server hostname specified in the redirect URLs used to communicate with the Web UI, Web Reports, and BigFix console.
- The Web UI is enabled and active.

The overall configuration comprises two parts:

- The configuration of the SAML identity provider for explicit two-factor authentication, which is under the responsibility of the identity provider administrator. For what concerns this part, ensure that:
    - The redirect URLs are added to the relying party trust indexed, with binding HTTPS_POST, and in this format:

      `https://<WebUI_server>/saml` (for the Web UI server, assuming that it listens on port 443)

      `https://<Web_Reports_server>:8083/saml` (for each Web Reports server, assuming that they listen on port 8083)

      `https://<Bigfix_server>:52311/saml` (for the BigFix Console)

      Note: If the identity provider is ADFS, the redirect URLs must be added, as SAML Assertion Consumer Endpoints, in the Endpoints tab inside the ADFS Relying Party Trust properties.

  - In the Identity Provider configuration, the login setting must be set for FORMS login.
  - If you plan to use the smart card authentication, ensure that the Identity Provider is correctly configured to use multi factor authentication. For example, if you use ADFS, ensure that at least one between Certificate Authentication and Windows Authentication, if you want to use the Windows Integrated Authentication, is enabled in the Global Authentication Policy configuration.
  - For Active Directory user authentication, set the identity provider Claim Rules as follows:

    Attribute store:

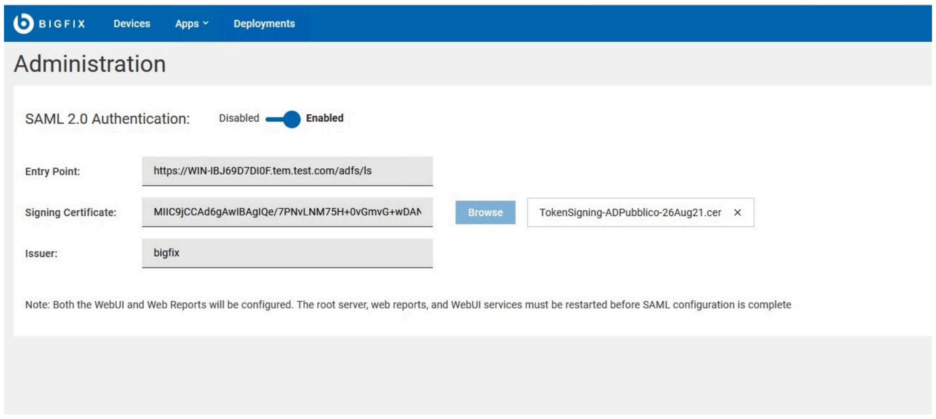
    Active Directory

    Mapping of LDAP attributes to outgoing claim types:

      - LDAP Attribute: User-Principal-Name
      - Outgoing Claim: Name ID
- The configuration to allow the BigFix server to use SAML authentication, which is a Master Operator (MO) and Web Reports administrator responsibility. Complete these steps to accomplish this task:
  1. Configure LDAP with Active Directory in the BigFix Console. For more details, see Integrating the Windows server with Active Directory *(on page 44)*.
  2. Define LDAP operators. For more details, see Adding LDAP Operators *(on page 56)*.
  3. Define Web Reports LDAP operators in the Web Reports user management pages.
  4. Access the Administration page to configure the integration with SAML 2.0:
     a. Log in to the Web UI server:
        - If the Web UI listens on port 443: `https://<WebUI_server>`
        - If the Web UI listens on a port that is different than 443: `https://<WebUI_server>:<webui_port_number>`

     b. Open the Administrator page:

- If the Web UI listens on port 443: `https://<WebUI_server>/administrator`
- If the Web UI listens on a port that is different than 443: `https://<WebUI_server>:<webui_port_number>/administrator`



Administration

SAML 2.0 Authentication: Disabled Enabled

Entry Point: https://WIN-IBJ69D7DI0F.tem.test.com/adfs/ls

Signing Certificate: MIIC9jCCAd6gAwIBAgIQe/7PNvLNM75H+0vGmvG+wDAN TokenSigning-ADPubblico-26Aug21.cer ×

Issuer: bigfix

Note: Both the WebUI and Web Reports will be configured. The root server, web reports, and WebUI services must be restarted before SAML configuration is complete

5. In the Administration page, specify:

   Entry Point:

   The Identity Provider login URL. It is the URL from where the operator can log in and be redirected back to Web UI or to the Web Reports, for example `https://<idp_fqdn>/adfs/ls`.

   Signing Certificate:

   Browse for the certificate file or paste in this field the key from the Identity Provider certificate in Base-64 encoded X.509 (.CER) format.

   Issuer:

   Enter the Identity Provider Identifier in a textual format, for example "BigFix". If you are configuring ADFS configuration, this value must match the ADFS Relying Party Identifier setting.
6. After filling in all the fields, click **Enable**.
7. If WebUI is installed on a separate remote server, set the `_WebUI_AppServer_Hostname` key of the BigFix server computer to the

hostname, fully qualified domain name (FQDN) or IP address of the computer where the WebUI is installed (the WebUI Server computer), ensuring that it matches the WebUI certificate subject name, as specified in **BES WebUI\cert \auth_cert.crt** on Windows and in **BESWebUI/cert/auth_cert.crt** on Linux. If the default WebUI port was changed (`_WebUIAppEnv_APP_PORT`), you must set the `_WebUI_Monitor_Port` key of the BigFix server computer to use the new WebUI port.

> **Note:** Ensure that the port of the WebUI server (default HTTPS 5000) is reachable by the BigFix root server.

8. If you want to enable the Web-based Single Sign-On (SSO) authentication method, on the WebUI machine set the _WebUIAppEnv_SAML_SSO_ENABLE key to 1.
9. If you want to enable the use of smart cards as SAML authentication method, set on the WebUI Server computer the `_WebUIAppEnv_SAML_AUTHNCONTEXT` setting to one of the following two values:
    - `urn:oasis:names:tc:SAML:2.0:ac:classes:TLSClient` if the Identity Provider is set to use the Transport Layer Security (TLS) cryptographic protocol.
    - `urn:federation:authentication:windows` if the Identity Provider is set to use Integrated Windows Authentication (IWA).
10. Restart the BigFix root server.
11. Restart the BigFix Web Reports services.
12. Restart the WebUI Service.

It might take a while for the Web UI to restart after you set up this configuration and restarted the BES root server.

After these steps are successfully run, all LDAP operators from these services must authenticate through the configured identity provider.

An administrator can use the Administration page also to update the existing configuration.

Note: After completing these steps, to prevent errors when logging on to the BigFix console, ensure that you set for the `_BESDataServer_AuthenticationTimeoutMinutes` configuration setting a value, specified in minutes, bigger than 5 minutes.

The following links contain some configuration examples for well known Identity Providers:

- How to configure BigFix to authenticate using SAML SSO via Okta
- How to configure BigFix to authenticate using SAML SSO via Azure AD

Configure SAML 2.0 authentication on other BigFix products

How to make BigFix products work with SAML 2.0.

Other BigFix products can take advantage of SAML integration. Links to specific product documentation follow:

- BigFix Inventory
- BigFix Remote Control
- BigFix Compliance
- BigFix MCM and BigFix Mobile
- BigFix WebUI

Chapter 5. Disabling local operators

Starting from BigFix Version 10.0.8, this feature provides a mechanism where the creation and use of any local operator is prohibited in favor of LDAP-based operators.

When the local operators are disabled:

- The login into the BigFix Console, Web Reports, Rest API and WebUI using a local operator is not allowed. The login using LDAP users is allowed.
- It is not possible to modify local or LDAP operators (for example, create a new operator, set explicit permissions, or directly associate BigFix roles with LDAP users).
- The roles are inherited according to LDAP groups - BigFix roles association.

Prerequisites:

Before disabling local operators and working only with LDAP users, it is necessary to perform the following steps:

1. Web Reports has been launched at least once in order to create a local administrative user.
2. An LDAP server has been configured on the BigFix Console and Web Reports.
3. LDAP groups have been associated with BigFix roles on the BigFix Console and Web Reports.
4. At least an LDAP group has been associated with a BigFix role having Master Operator permissions on the BigFix Console.
5. At least an LDAP group has been associated with the Administrator role on Web Reports.
6. After you disabled all local operators using the "Disabling local operators" feature, it is nevertheless required that:
    - At least one Local Master Operator must exist in the BigFix deployment.

   The still existing Local Master Operator does not represent an issue as it cannot be used until it is enabled.

Affected Components:

The BigFix components affected by this feature are the following:

- BigFix Administration Tool. For details about how the component is affected by the feature, see:

  BESAdmin Windows Command Line

  BESAdmin Linux Command Line
- BigFix Console. For details about how the component is affected by the feature, see:

  Disabling local operators on BigFix Console
- Rest API. For details about how the component is affected by the feature, see:

  Authentication
- Web Reports. For details about how the component is affected by the feature, see:

  Disabling local operators on Web Reports

Note:

If, for any reason, the information needed to disable the local operators is not present in the BigFix Database or is corrupted, it will not be possible to access the BigFix Console, Web Reports, Rest API and WebUI both with local operators and LDAP users.

Workaround:

To solve this issue, it is necessary to launch the BigFix Administration tool to enable or disable the local operators. For details, see the **securitysettings** described in BESAdmin Windows Command Line and BESAdmin Linux Command Line.

Limitations:

- When the local operators are disabled it is not possible to login into the REST API and SOAP API using a local operator. If you configure REST API or SOAP API credentials for the BES Server Plugin Service with a local operator and the local operators are disabled, the service will not work properly.
- When the SAML authentication is configured and the local operators are disabled, it is not possible to use REST APIs and 4-eyes authentication.

Chapter 6. Using multiple servers (DSA)

Some important elements of multiple server installations.

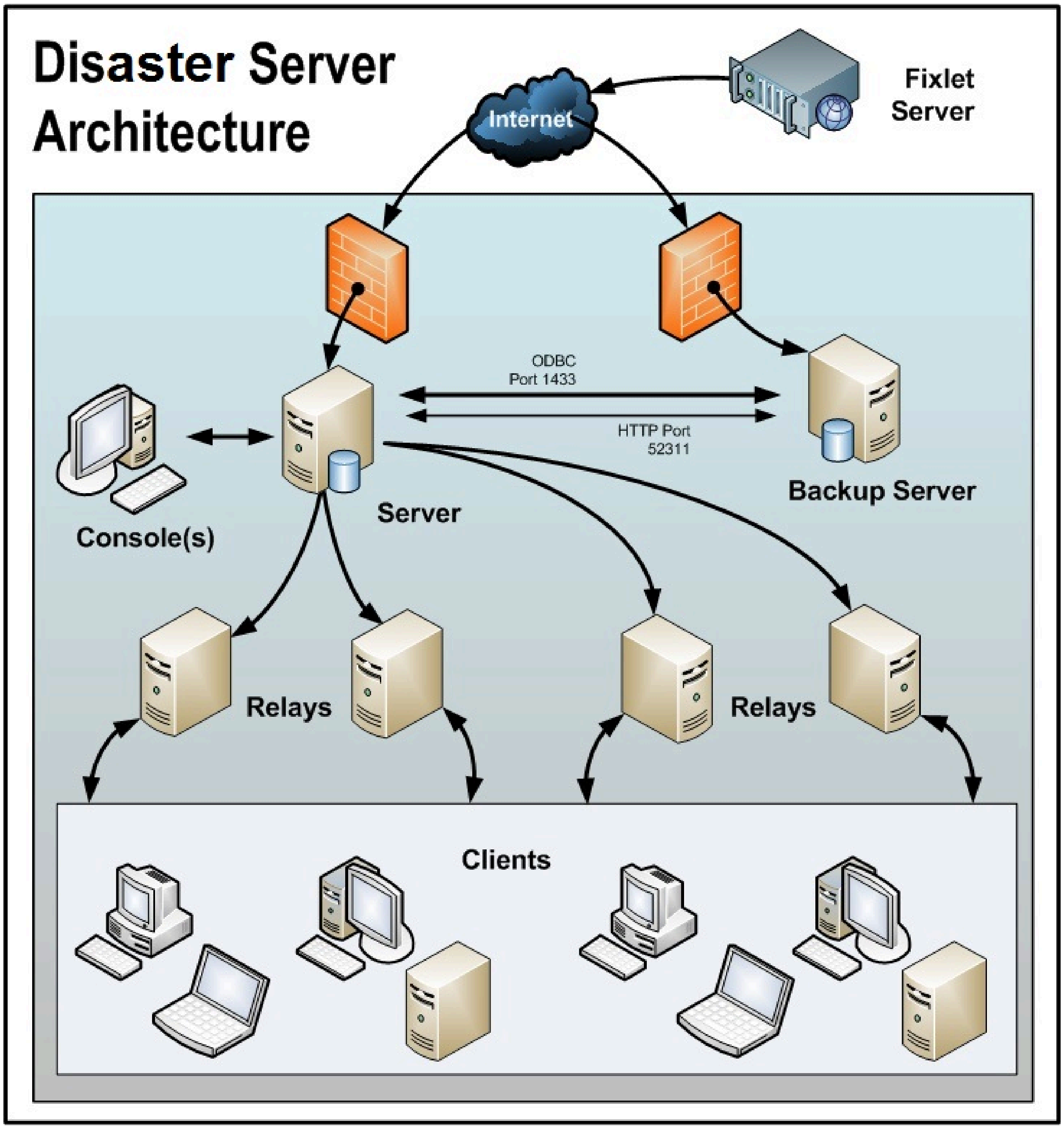
- Depending on the platform where you plan to install the additional server, you can follow the procedures described in Installing Additional Windows Servers (DSA) or Installing Additional Linux Servers (DSA).
- Servers communicate on a regular schedule to replicate their data. To review the current status and adjust the replication interval, see Managing Replication (DSA) on Windows systems *(on page 80)* or Managing Replication (DSA) on Linux systems *(on page 82)*.
- When each server is ready to replicate from the other servers in the deployment, it calculates the shortest path to every other server in the deployment. Primary links are assigned a length of 1, secondary links 100, and tertiary links 10,000. Links that resulted in a connection failure the last time they were used are considered to be non-connected.
- When an outage or other problem causes a network split, it is possible for a custom Fixlet or a retrieved property to be modified independently on both sides of the split. When the network is reconnected, precedence goes to the version on the server with the lowest Server ID.
- If multiple copies of **Web Reports** are installed, they operate independently. Each Web Report server can connect to the server that is most convenient, because they all contain equivalent views of the database.
- By default, server 0 (zero) is the master server. The **BigFix Administration Tool** on Windows and the **BESAdmin** command on Linux only allow you to perform certain administrative tasks (such as creating and deleting users) when connected to the master server.

Disaster Server Architecture (DSA)

The following diagram shows a typical DSA setup with two servers. Each Server is behind a firewall, possibly in a separate office, although it is easy to set up multiple servers in a single office as well.

The servers must have high-speed connections to replicate the BigFix data (generally LAN speeds from 10 to 100Mbps are required). The BigFix servers communicate over ODBC and HTTP protocols.

In case of a failover, the specific configured relays automatically find the backup server and reconnect the network. For more information about the relay configuration see Configuring relay failover (on page 77).

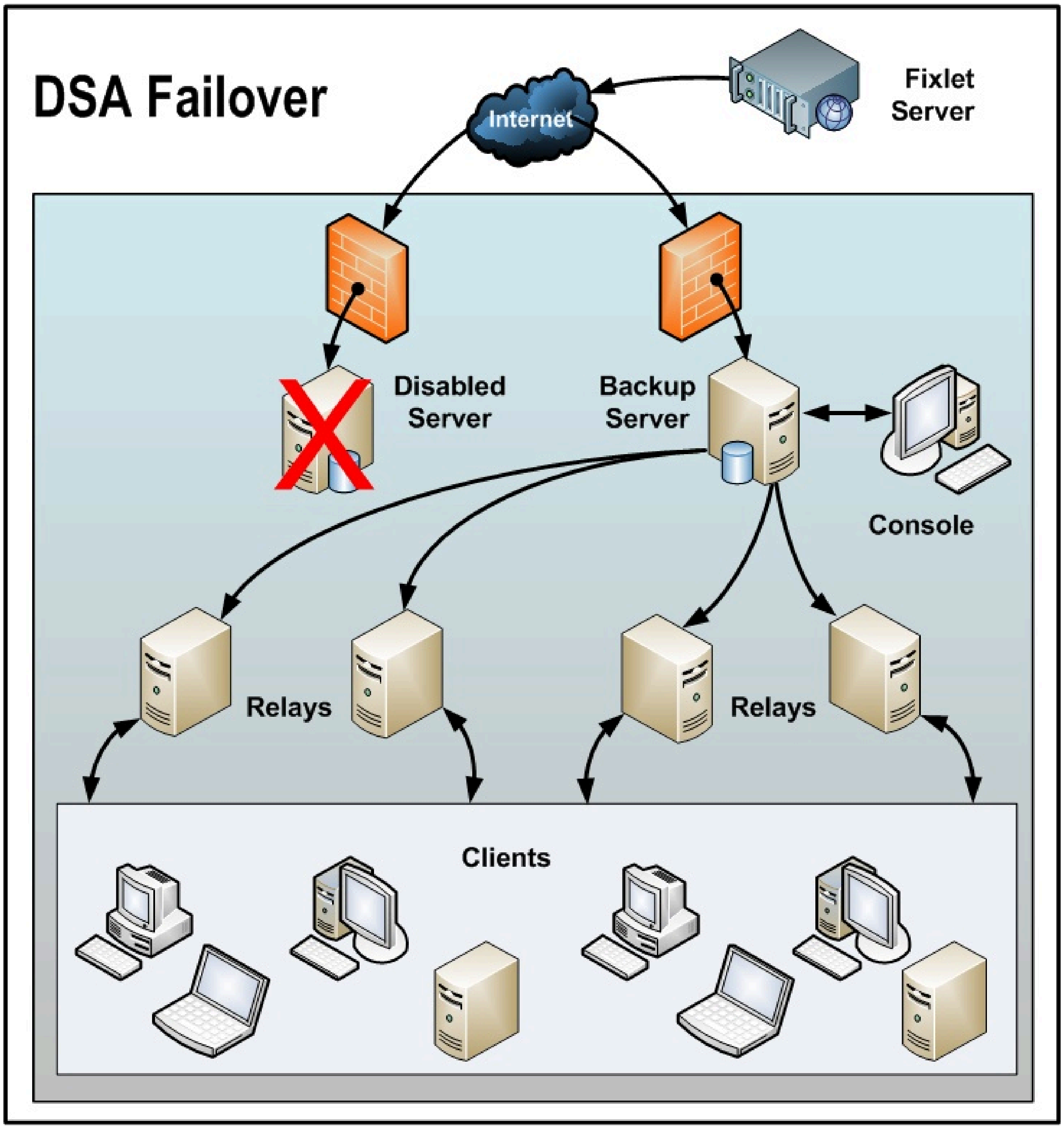


Configuring relay failover

If an BigFix server goes down, whether due to disaster or planned maintenance, the DSA server might be used to find a new server connection. When the disabled server comes back online, its data will automatically be merged with the data on the healthy server.

In order for the failover process to successfully occur set the DSA server as the secondary relay in client settings using `__RelayServer2` for the top-level relays (or via the console Computer right-click settings user interface). When a failure on the primary BigFix server occurs and lower level BigFix relays are unable to report, they use the secondary BigFix relay value during normal relay selection process to find and report to the secondary BigFix server.

Note: The setting `_BESClient_RelaySelect_ResistFailureIntervalSeconds` specified on the client system can have an impact on failover timing. Its value can range from 0 seconds to 6 hours and it defines how many seconds the client ignores reporting failures before attempting to find another parent relay. The default value is 10 minutes. In case of a failover configuration, ensure that, if defined, `_BESClient_RelaySelect_ResistFailureIntervalSeconds` is set to a low value.



Message Level Encryption and DSA

If Message Level Encryption is enabled and clients are set using **Task: BES Client Setting: Encrypted Reports**, move the BigFix server encryption key to the secondary BigFix DSA server.

This enables the BigFix DSA server to process reports from encrypted BigFix clients during normal operations or in the event of an outage on the primary BigFix server.

Copy the encryption key (`.pvk`) from the BigFix server directory:

- Windows server: `%PROGRAM FILES%\BigFix Enterprise\BES Server\Encryption Keys\`
- Linux server: `/var/opt/BESServer/Encryption Keys`

to the DSA secondary server.

Managing Replication (DSA) on Windows systems

To install additional Windows servers, follow the procedure described in Installing Additional Windows Servers (DSA).

You might want to change the interval or allocate your servers differently. Most of these changes are done through the BigFix Administration Tool. Here you can see the current settings for your servers and make the appropriate changes.

Changing the replication interval on Windows systems

On Windows systems if you have multiple servers in your deployment, you can schedule when each one replicates.

The default is five minutes, but you can shorten the time for greater recoverability or increase it to limit network activity:

1. Start up the **BigFix Administration Tool**.
2. Select the **Replication** tab.
3. Click the Refresh button to see the latest **Replication Graph**.
4. Select the server you want from the drop-down menu. Using longer replication intervals means that the servers replicate data less often, but have more data to transfer each time. Note that replication intervals can be different for replicating from and replicating to a server.

5. Select the replication interval from the menu on the right.
6. Click **OK**.

Switching the master server on Windows systems

By default, server 0 (zero) is the master server. The Administration Tool allows you to perform certain administrative tasks (such as creating and deleting users) only when you are connected to the master server.

If you want to switch the master to another server, you must set the deployment option **masterdatabaseServerID** to the other server ID. Here is how:

1. Start up the **BigFix Administration Tool.**
2. Select the **Advanced Options** tab and click **Add**.
3. Type masterDatabaseServerID as the name, and then enter the other server ID as the value.
4. Click **OK**.

After the value has successfully replicated to the new server, it becomes the master server. When a server suffers a failure while it is the master, if you cannot use the **BigFix Administration Tool**, instead you can use the following alternative procedure:

1. From the `BES Server\IEM CLI` folder, using a command prompt, run the command:

   ```
   iem login --server=servername:serverport --user=username
    --password=password
   ```

   followed by the command:

   ```
   iem get admin/fields > switchmaster.xml
   ```

2. In the switchmaster.xml file, created previously during step 1, add or edit the following keyword and its value:

   ```
   <Name>masterDatabaseServerID<Name>
     <Value>0</Value>
   ```

3. To switch the master server to another one, in this example with ID 3:

```
<?xml version="1.0" encoding="UTF-8"?>
<BESAPI xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
   xsi:noNamespaceSchemaLocation="BESAPI.xsd">
    <AdminField>
       <Name>masterDatabaseServerID</Name>
       <Value>3</Value>
    </AdminField>
</BESAPI>
```

4. Run the following command to modify the value:

```
iem post switchmaster.xml admin/fields
```

Managing Replication (DSA) on Linux systems

To install additional Linux servers, follow the procedure described in Installing Additional Linux Servers (DSA).

You might want to change the interval or allocate your servers differently. Most of these changes are done through the `iem` command line. Here you can see the current settings for your servers and make the appropriate changes.

Changing the replication interval on Linux systems

On Linux systems if you have multiple servers in your deployment, you can schedule when each one replicates.

The default is five minutes, but you can shorten the time for greater recoverability or increase it to limit network activity:

To change the replication interval, perform the following steps:

1. From the `/opt/BESServer/bin` command prompt, start the command line:

```
./iem login --server=servername:serverport --user=username
--password=password
```

2. From the `/opt/BESServer/bin` command prompt, run the following command:

   ```
   ./iem get replication/server/0 > /appo/replicationServer0.xml
   ```

3. In the `/appo/replicationServer0.xml` file, edit the following keyword:

   ```
   <ReplicationIntervalSeconds>300</ReplicationIntervalSeconds>
   ```

   to change the value in seconds of the replication interval. Using longer replication intervals means that the servers replicate data less often, but have more data to transfer each time.

   ```
   <?xml version="1.0" encoding="UTF-8"?>
   <BESAPI xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

    xsi:noNamespaceSchemaLocation="BESAPI.xsd">
      <ReplicationServer
    Resource="http://9.87.126.68:52311/api/replication

    /server/0">
             <ServerID>0</ServerID>
             <URL>http://mycompany.com:52311</URL>
             <DNS>mycompany.com</DNS>
        <ReplicationIntervalSeconds>300</ReplicationIntervalSeconds>
        <ReplicationLink
    Resource="http://9.87.126.68:52311/api/replication
          /server/0/link/3">
                <SourceServerID>0</SourceServerID>
                <DestinationServerID>3</DestinationServerID>
                <Weight>1</Weight>
                <IsConnected>0</IsConnected>
                <LastReplication>Fri, 01 Mar 2013 11:17:12 +0000
                </LastReplication>
                <LastError>19NoMatchingRecipient - Fri, 01 Mar 2013
    11:17:12 +0000
   ```

```
               </LastError>
       </ReplicationLink>
       <ReplicationLink
 Resource="http://9.87.126.68:52311/api/replication/server/
                                        3/link/0">
                    <SourceServerID>3</SourceServerID>
                    <DestinationServerID>0</DestinationServerID>
                    <Weight>1</Weight>
                    <IsConnected>1</IsConnected>
                    <LastReplication>Fri, 01 Mar 2013 11:17:18 +0000
                    </LastReplication>
       </ReplicationLink>
    </ReplicationServer>
</BESAPI>
```

4. Upload the modified file by running the following command:

```
./iem post /appo/replicationServer0.xml  replication/server/0
```

Switching the master server on Linux systems

By default, server 0 (zero) is the master server.

If you want to modify the master server ID using the BigFix Administration Tool, perform these steps:

1. Modify the actual value for the master server ID to, for example, 3 by running the command:

```
/opt/BESServer/bin/BESAdmin.sh -setadvancedoptions
 -sitePvkLocation=<path+license.pvk> -update masterDatabaseServerID=3
```

2. You can verify the value by running the command:

```
/opt/BESServer/bin/BESAdmin.sh -setadvancedoptions
 -sitePvkLocation=<path+license.pvk> -display
```

After the value has successfully replicated to the new server, it becomes the master server. If a server suffers a failure while it is the master, you cannot use the **BigFix Administration Tool**, instead you can use the following alternative procedure:

To switch the master to another server, set the deployment option `masterDatabaseServerID` to the other server ID as follows:

1. From the `/opt/BESServer/bin` command prompt, start the command line:

   ```
   ./iem login --server=servername:serverport --user=username
    --password=password
   ```

2. From the `/opt/BESServer/bin` command prompt, run the following command:

   ```
    ./iem get admin/fields > /tmp/switchmaster.xml
   ```

3. In the `/tmp/switchmaster.xml` file, created previously during step 2, add or edit the following keyword and its value:

   ```
   <Name>masterDatabaseServerID<Name>
     <Value>0</Value>
   ```

   to switch the master server to another master server, in this example with ID 3:

   ```
   <?xml version="1.0" encoding="UTF-8"?>
   <BESAPI xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:noNamespaceSchemaLocation="BESAPI.xsd">
       <AdminField>
          <Name>masterDatabaseServerID</Name>
          <Value>3</Value>
       </AdminField>
   </BESAPI>
   ```

4. Run the following command to modify the value:

   ```
   ./iem post /tmp/switchmaster.xml admin/fields
   ```

Chapter 7. Server object IDs

The BigFix server generates unique ids for the objects that it creates: Fixlets, tasks, baselines, properties, analysis, actions, roles, custom sites, computer groups, management rights, subscriptions.

These ids are stored as 32-bit fields into the Platform database, such as:

- ActionID
- FixletID
- ID
- ContentID
- RoleID

The id is displayed in the Console, Web Reports and WebUI interfaces and is used by the REST APIs and tools like AdminTool and PropertyIDMapper.

Before the current implementation, the maximum number of available object ids per server was 16.777.215, and consequently the maximum number of available DSA servers was 256.

To avoid reaching the object id limit when creating Fixlets, tasks, baselines and so on, the bits used for the object id have been rearranged as follows:

|_x__|___y__|____________z____________|

where:

- x= 3 bits, 2 of which to be used for the counter (the first bit is used for agent internal processing)
- y= server id (5 bits instead of the previous 8)
- z= initial 24 bits for the counter (unchanged)

In this way, the number of available object ids was increased to 1.627.389.951 and consequently the number of available DSA servers was decreased to 32.

This solution has the advantage of keeping the 32-bit object id so to avoid any backward compatibility issue.

Chapter 8. Customizing HTTPS for Gathering

This page describes how to customize HTTPS for Gathering purpose. For more details about customizing HTTPS for downloads, refer to Customizing HTTPS for downloads (on page 400).

You can gather license updates and external sites by using the HTTP or HTTPS protocol on a BigFix server or in an airgapped environment.

HTTPS is the default protocol.

Enabling HTTPS, you can create or download (from the curl website) a package of certificates that you want to trust. The curl website offers a prebuilt package that contains the same certificates that are included with Mozilla.

The BigFix server starts the certificate verification during gathering, trusting the provided certificates.

Managing HTTPS

To gather the external sites by using the HTTPS protocol, complete the following steps

On the BigFix Server:

Set the client property `_BESGather_Use_Https` to `0`, `1` or `2`.

When setting the property to 0, the server uses the protocol defined in the URL.

When setting the property to 1, the server tries to gather all sites using the HTTPS protocol only.

When setting the property to 2, the server first tries to gather all sites using the HTTPS protocol. If the server fails to gather a site using HTTPS, it will try to gather again using the HTTP protocol. The fallback from HTTPS to HTTP only applies to sites having URLs starting with `http://`

The default value for this setting is 2.

In the airgapped environment:

Launch the `Airgap` command as follows:

```
Airgap
```

The server tries first to gather all sites using the HTTPS protocol. In case of failure, the server will gather the sites using the HTTP protocol. This redirection applies only if the URL is hard-coded with HTTP. This is the default behavior.

```
Airgap -usehttps
```

The server tries to gather all sites using the HTTPS protocol only.

```
Airgap -no-usehttps
```

The server uses the protocol defined in the URL.

Validating HTTPS certificates

By default the HTTPS certificates used for enabling the HTTPS connection are validated by using the certificate bundle included in the BigFix server installation.

The Windows default path is:

```
C:\Program Files (x86)\BigFix Enterprise\BES Server\Reference\ca-bundle.crt
```

The Linux default path is:

```
/opt/BESServer/Reference/ca-bundle.crt
```

To validate the HTTPS certificates with a custom bundle of trusted certificates before the HTTPS gathering, complete the following steps:

1. Create or download a set of trusted certificates (for example, http://curl.haxx.se/ca/cacert.pem). The certificates that you can use are:
    - "VeriSign Universal Root Certification Authority" (to gather sites)
    - "thawte Primary Root CA - G3" (to check license updates)
2. **On the Server:**

    Set the client property `_BESGather_Use_Https` to `1` or `2` for using the HTTPS protocol and `_BESGather_CACert` keyword to the path of the downloaded set of trusted certificates (for example `c:\TEM\certificates\custom-ca-bundle.crt` on Windows systems and `/TEM/certificates/custom-ca-bundle.crt` on Linux systems).

In the airgapped environment:

Launch the Airgap tool with the option `-cacert <path>`:

```
Airgap -cacert <path>
```

where `<path>` is the path of the saved set of trusted certificates.

Chapter 9. Using the DHE/ECDHE key exchange method

By default, BigFix 10.0 Patch 1 components use the DHE/ECDHE key exchange method if the version of the BigFix component on the other side of the SSL communication allows it.

To use DHE/ECDHE in all SSL communications, all BigFix components must be at any of the following versions:

- Version 10.0 Patch 1 or higher
- Version 9.5 Patch 16 or higher

Other considerations

- BigFix HTTPS servers use RSA for both authentication and key exchange.
- BigFix 10.0 Patch 1 enables ephemeral Diffie-Hellman (DHE) and ephemeral elliptic curve Diffie-Hellman (ECDHE) for key exchange (RSA for authentication).
- Ephemeral means new, random asymmetric keys are chosen for each TLS connection that are never written to persistent storage.
- When the TLS connection terminates, keys are securely erased.
- This means if an RSA private key is ever divulged, that key cannot be used to decrypt any recorded TLS sessions.
- Any secrets exchanged in those TLS sessions, such as BigFixConsole passwords, REST API passwords, Web Reports passwords and session tokens will not be divulged in the event of an RSA private key disclosure.
- To determine the protocols in place, you can use the Nmap utility. A sample invocation is:

  ```
  nmap -p 8083 --script ssl-cert,ssl-enum-ciphers <address>
  ```

Chapter 10. Configuring secure communication

Configuring custom certificates

Things to consider when configuring custom certificates.

Private key and certificate format

Ensure that the private key and the certificate files have the following format and structure.

Private key format

PEM-encoded and without a password protection. The pvk format is not supported. Ensure that the private key (*private.key*) is enclosed between the following statements:

```
-----BEGIN PRIVATE KEY-----
<<base64 string from private.key>>
-----END PRIVATE KEY-----
```

X509 certificate format

PEM-encoded. If you have also received the intermediate and root certificates as separate files, you should combine all of them into a single one. For example, if you have the primary certificate file (*certificate.crt*) and the intermediate certificate file (*ca_intermediate.crt*), ensure that you combine them in the following order, primary certificate first followed by the intermediate certificate:

```
-----BEGIN CERTIFICATE-----
<<primary certificate: base64 string from certificate.crt>>
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
```

```
<<intermediate certificate: base64 string from ca_intermediate.c
rt>>
-----END CERTIFICATE-----
```

If you received the root certificate (*ca_root.crt*) in addition to the intermediate certificate, combine them as follows:

```
-----BEGIN CERTIFICATE-----
<<primary certificate: base64 string from certificate.crt>>
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
<<intermediate certificate: base64 string from ca_intermediate.c
rt>>
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
<<root certificate: base64 string from ca_root.crt>>
-----END CERTIFICATE-----
```

Single file (private key with certificates) format

PEM-encoded. This file can contain both the private key and the primary certificate, or the private key and the chain of certificates, combined in the following order, and with the beginning and end tags on each certificate:

- Private key and primary certificate:

  ```
  -----BEGIN CERTIFICATE-----
  <<primary certificate: certificate.crt>>
  -----END CERTIFICATE-----
  -----BEGIN PRIVATE KEY-----
  <<private key: base64 string from private.key>>
  -----END PRIVATE KEY-----
  ```

- Private key, primary certificate and intermediate certificate:

```
-----BEGIN CERTIFICATE-----
<<primary certificate: base64 string from certificate.crt>>
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
<<intermediate certificate: base64 string from ca_intermedi
ate.crt>>
-----END CERTIFICATE-----
-----BEGIN PRIVATE KEY-----
<<private key: base64 string from private.key>>
-----END PRIVATE KEY-----
```

- Private key, primary certificate, intermediate certificate and root certificate:

```
-----BEGIN CERTIFICATE-----
<<primary certificate: base64 string from certificate.crt>>
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
<<intermediate certificate: base64 string from ca_intermedi
ate.crt>>
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
<<root certificate: base64 string from ca_root.crt>>
-----END CERTIFICATE-----
-----BEGIN PRIVATE KEY-----
<<private key: base64 string from private.key>>
-----END PRIVATE KEY-----
```

If your file has DER-encoded or other formats, you can convert it to the PEM format, for example by using OpenSSL.

Creating a Certificate Signing Request (csr)

Procedure to register a certificate.

1. You need a valid configuration file such as the following one:

   ```
   [ req ]
   default_bits = 4096
   default_keyfile = keyfile.pem
   distinguished_name = req_distinguished_name
   attributes = req_attributes
   prompt = no
   output_password = bigfix

   [ req_distinguished_name ]
   C = US
   ST = California
   L = Emeryville
   O = BigFix
   OU = Development
   CN = Common
   emailAddress = admin@bigfix.com

   [ req_attributes ]
   challengePassword = bigfix
   ```
2. Replace `Common` with the fully qualified domain name of the Web Reports server.
3. Create the certificate request `cert.csr` with the following command.

   ```
   openssl req -new -config "c:\mynewconfig.conf" > cert.csr
   ```

   This also generates the private key called `keyfile.pem`.
4. Remove the password from the private key file `keyfile.pem` and generate a new private key (`nopwdkey.pem`) using the following command:

   ```
   openssl rsa -in keyfile.pem -out nopwdkey.pem
   ```

Generating a Self-Signed Certificate

Procedure to generate a self-signed certificate (`cert.pem`) from a certificate request file (`cert.csr`).

Perform the following steps:

1. Create a Certificate Signing Request (`cert.csr`).
2. Create a certificate file (`cert.pem`) from your private key (`nopwdkey.pem`) and certificate request file (`cert.csr`) using the following command (valid for 365 days):

```
openssl x509 -in cert.csr -out cert.pem -req -signkey nopwdkey.pem
 -days 365
```

Important: The following steps explain how to combine the private key file with the signed certificate file for convenience in later configuration steps. If you prefer, you can use them separately and skip the following steps.

Note: You can use a key pair generated for BigFix Inventory and License Metric Tool also for Web Reports only if the private key is not password protected.

3. Open up your private key file `nopwdkey.pem` in Notepad++, or another text editor.
4. Copy the contents and paste them below the certificate in `cert.pem`, as in the following example:

```
-----BEGIN CERTIFICATE-----
...
-----END CERTIFICATE-----
-----BEGIN RSA PRIVATE KEY-----
...
-----END RSA PRIVATE KEY-----
```

where `...` represents any text.

5. Refer to `cert.pem` on your Web Reports server in the certificate path registry setting as described in Customizing HTTPS on Web Reports.

Requesting a Certificate from a Certificate Authority

To encrypt HTTPS Web Reports with a certificate that browsers implicitly trust, request a signed certificate from a trusted Certificate Authority (or CA) such as Verisign as follows.

1. Create a Certificate Signing Request (csr) *(on page 93)*
2. Forward the `.csr` file to a Certificate Authority (CA). They will issue you a signed (browser-trusted) certificate for your server. Request the certificate as a `.pem` file that includes the entire trust chain.

   Important: The following steps explain how to combine the private key file with the signed certificate file for convenience in later configuration steps. If you prefer, you can use them separately and skip the following steps.

   Note: You can use a key pair generated for BigFix Inventory and License Metric Tool also for Web Reports only if the private key is not password protected.
3. After you have received the signed certificate file, DO NOT import it to any Microsoft default certificate handling facilities.
4. Open the private key file from which you removed the password (`nopwdkey.pem`), and copy its content to the clipboard.
5. Open the signed certificate file with Notepad++, or another text editor.
6. Append the content copied in step 4 to the signed certificate file. This is an example of the resulting content:

```
-----BEGIN CERTIFICATE-----
...
-----END CERTIFICATE-----
-----BEGIN RSA PRIVATE KEY-----
```

```
...
-----END RSA PRIVATE KEY-----
```

where `...` represents any text.

7. Save the modified `.pem` file containing the public certificate and private key.
8. Store this file on your server and refer to it when setting up your Web Reports.

Customizing HTTPS on Web Reports

For details about how to customize HTTPS on Web Reports, see Customizing HTTPS on Web Reports.

Customizing HTTPS on REST API

The BigFix root server is configured to use HTTPS by default when it gets installed and creates its own certificate during the installation. If you want to replace it, you need to configure HTTPS manually.

First steps

If you have a trusted SSL security certificate and key from a certificate authority, you can configure the BigFix root server to use this certificate and key to enable trusted connections. You can also use a self-signed certificate.

When you have a trusted SSL certificate, copy the .pvk (if you have one) and the .pem files on the computer running the BigFix root server.

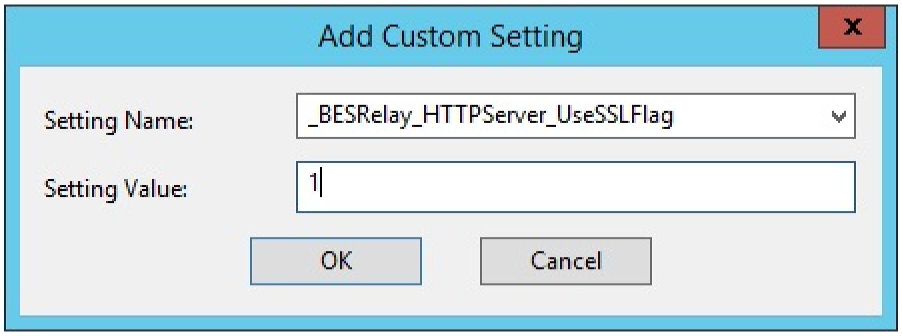
In the following sections, we show ways to implement these macro-steps:

- Specify that you are using a secure communication.
- Specify where the SSL certificate and private key files are located.
- Restart the relevant services.

After you have completed the configurations described in the following sections, the connections from the Rest API and the BigFix Console use this trusted certificate.

Customizing HTTPS using the BigFix Console

1. From the BigFix console select the **Computers** tab.
2. Select the computer running Rest API (usually the server) and **Edit Computer Settings** from the **Edit** menu.
3. Look for **_BESRelay_HTTPServer_UseSSLFlag** setting. If it exists, do not create a second one, but edit its value to `1` to enable HTTPS. If it does not exist, add it:

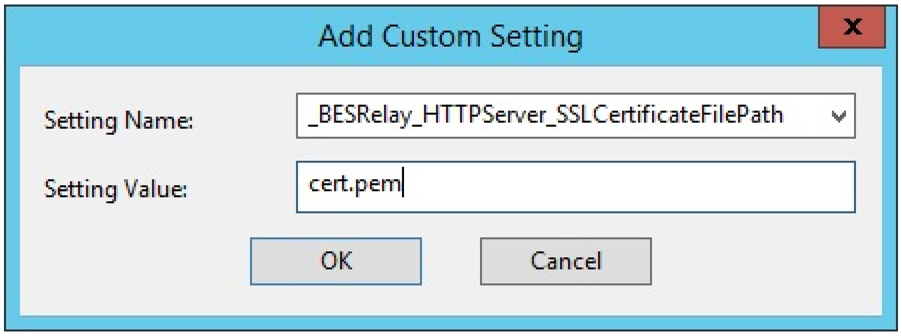


Setting Name: _BESRelay_HTTPServer_UseSSLFlag

Setting Value: 1

4. If you combined the private key file with the certificate file, skip this step and set only the **_BESRelay_HTTPServer_SSLCertificateFilePath**.

   Look for **_BESRelay_HTTPServer_SSLPrivateKeyFilePath** setting. If it exists, do not create a second one, but edit its value to the full path name of the private key (.pvk file which contains the private key for the server). The private key must not have a password. If this setting does not exist, add it.
5. Look for **_BESRelay_HTTPServer_SSLCertificateFilePath** setting. If it exists, do not create a second one, but edit its value to the full path name of the .pem file which might contain both the certificate and private key for the server, or only the certificate. If this setting does not exist, add it:



Setting Name: _BESRelay_HTTPServer_SSLCertificateFilePath

Setting Value: cert.pem

Ensure that the `.pem` file is in standard OpenSSL PKCS7 .pem file format.

The certificate is supplied by the server to connecting clients and they present a dialog to the user containing information from the certificate. If the certificate meets all of the trust requirements of the connecting client, then the client connects without any interventions by the user. If the certificate does not meet the trust requirements of the client, then the user will be prompted with a dialog asking them if it is OK to proceed with the connection, and giving them access to information about the certificate. A trusted certificate is signed by a trusted authority (such as Verisign), contains the correct host name, and is not expired.

6. To require TLS12, look for **_BESRelay_HTTPServer_RequireTLS12**. If it exists, do not create a second one, but edit its value to `1` .

   Note: The REST API component always uses TLS 1.2 when communicating with the BigFix server, (regardless of local settings or settings of the masthead).

7. Restart the **BES Root Server** service:
   - On Windows, open **Services**, select **BES Root Server** and on the **Action** menu, click **Restart**.
   - On Linux run from the prompt: `service besserver restart` or `/etc/init.d/besserver restart`.
8. To restore the connection between the BES Root Server and Web Reports, from Web Reports edit the datasource settings for the datasource whose certificate was modified as follows:
   a. Select **Administration > Datasource Settings > Edit**.
   b. Enter the password in the appropriate field and submit the form to exchange the certificate and accept the request warning.

Note: These settings are stored in the registry under the key **HKLM/Software/WoW6432Node/BigFix/EnterpriseClient/Settings/Client**

Customizing HTTPS manually

If you have a trusted SSL security and a key from a certificate authority (`.pem` file), you can configure the computer running REST API (usually the server) to customize trusted connections.

On Windows systems

To customize HTTPS manually on Windows systems, complete the following steps:

1. Run **regedit** and locate `HKEY_LOCAL_MACHINE\Software\Wow6432Node\BigFix\EnterpriseClient\Settings\Client`

   You need to add or modify subkeys for the HTTPS flag, and for the location of the SSL certificate.
2. Create a subkey of **Client** called `_BESRelay_HTTPServer_UseSSLFlag` (if it does not exist yet). Add a string value (reg_sz) called "value" to the key and set it to 1 to enable HTTPS.
3. **Important: If you combined the private key file with the certificate file, move to step 4.**

   Create a subkey of **Client** called `_BESRelay_HTTPServer_SSLPrivateKeyFilePath` (if it does not exist yet). Add a string value (reg_sz) called "value" to the key and set it to the full path name of the private key (.pvk file which contains the private key for the server).
4. Create a subkey of Client called `_BESRelay_HTTPServer_SSLCertificateFilePath` (if it does not exist yet). Add a string value (reg_sz) called "value" to the key and set it to the full path name of the SSL certificate (cert.pem).
5. **To require TLS 1.2:** Create a subkey of Client called `_BESRelay_HTTPServer_RequireTLS12` (if it does not exist yet). Add a string value (reg_sz) called "value" to the key and set it to 1 to enable TLS 1.2.
6. Restart the `BES Root Server` service.
7. To restore the connection between the BES Root Server and Web Reports, from Web Reports edit the datasource settings for the datasource whose certificate was modified as follows:

a. Select **Administration > Datasource Settings > Edit**.
b. Enter the password in the appropriate field and submit the form to exchange the certificate and accept the request warning.

On Linux systems

To customize HTTPS manually on Linux systems, complete the following steps:

Save the files `cert.pem` and `pvtkey.pvk` (if you have it) in a protected area of the file system, where it can be accessed by the BigFix besserver process, for example, `/etc/opt/BESServer/`.

Edit the `/var/opt/BESServer/besserver.config` file, by adding the following entries.

Important: If you combined the private key file with the certificate file, skip these settings.

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESRelay_HTTPServer_SSLP
rivateKeyFilePath]
value = /etc/opt/BESServer/pvtkey.pvk
```

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESRelay_HTTPServer_SSLC
ertificateFilePath]
value = /etc/opt/BESServer/cert.pem
```

To enable HTTPS:

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESRelay_HTTPServer_UseS
SLFlag]
value = 1
```

To require TLS 1.2:

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESRelay_HTTPServer_Requ
ireTLS12]
value = 1
```

Stop and restart the BigFix root server.

To restore the connection between the BES Root Server and Web Reports:

From Web Reports, edit the datasource settings for the datasource whose certificate was modified as follows:

1. Select **Administration > Datasource Settings > Edit**.
2. Enter the password in the appropriate field and submit the form to exchange the certificate and accept the request warning.

Chapter 11. Real Time AV Exclusions

BigFix Console, Server and Relay components of the architecture perform high volume file operations. This activity is a substantial part of the functionality that these BigFix architecture components provide.

If file operations are interrupted or "shimmed" by anti-virus or heuristic type applications (like HIPS), the performance of these components will be significantly impacted. Sometimes, this can result in errors and instability. The BigFix Client also is continuously evaluating the machine and this also creates a large volume of API, registry and file operations. The client is also negatively impacted by the same concerns and as a result can experience significantly slower content evaluation times.

To address this issue, configure Anti-virus and heuristic applications (such as HIPS) to exclude the following directories and processes. It is important to note the specifications below are related to the exclusion of folders paths and processes for real-time scans and heuristics, we do still recommend scheduled scans be configured and enabled from a security perspective.

Important Caveats

The following applies to BigFix platform core components only and excludes solutions such as BigFix Inventory, ILMT or OSD (which may have their own guidance around AV exceptions). This also assumes that you are using the default installation paths, otherwise you might need to adjust appropriately to the configurations of your environment.

For more details on the AV Exclusions, see AV Exclusions on Windows (on page 103) and AV Exclusions on Linux (on page 106).

Refer to instructions from your virus scanner for more information on how to set this exclusion rule.

For more details, see the technote Configuring your virus scanner to exclude the BigFix client and the BigFix Inventory Scanners.

AV Exclusions on Windows

How to apply the AV exclusion on Windows OS for the BigFix Platform core components.

Note: The default value for <*installation path*> is `C:\Program Files (x86)\BigFix Enterprise`.

- **On the BigFix Server**

  The following folder and sub folder paths should be excluded:

  <installation path>\BES Server*

  C:\Windows\Temp\tem*.tmp*

  Additionally the following processes should be excluded as well:

  <installation path>\BES Server\BESRootServer.exe

  <installation path>\BES Server\BESWebReportsServer.exe

  <installation path>\BES Server\BESAdmin.exe

  <installation path>\BES Server\FillDB.exe

  <installation path>\BES Server\GatherDB.exe
- **On the BigFix Relay**

  The following folder and sub folder paths should be excluded:

  <installation path>\BES Relay*

  Additionally the following processes should be excluded as well:

  <installation path>\BES Relay\BESRelay.exe
- **On the BigFix Client**

  The following folder and sub folder paths should be excluded:

  <installation path>\BES Client*

  Additionally the following processes should be excluded as well:

  <installation path>\BES Client\BESClient.exe

  <installation path>\BES Client\BESClientUI.exe

  Optionally the following process should also be excluded if the following component is installed within the BES Client directory:

<installation path>\BES Client\BESClientHelper.exe

Optionally the following process should also be excluded if leveraging the QNA component within the BES Client directory:

<installation path>\BES Client\qna.exe

- **On the BigFix Console**

  The following folder and sub folder paths should be excluded: this primary AV exception for the console relates to the console cache directory. This directory by default is located within the users profile path. For example:

  %LOCALAPPDATA%\BigFix*

  The user BigFix Console cache location is configurable as well via a registry setting (this may make it easier to apply AV exclusions in some AV and heuristics products). More information on this configuration can be found in Altering BigFix Console cache location.

  Additionally the following processes and files should be excluded as well:

  <installation path>\BES Console\BESConsole.exe

  %LOCALAPPDATA%\Temp\*\tem*.tmp

  %LOCALAPPDATA%\Temp\tem*.tmp

  Optionally the following directory should also be excluded if leveraging the QNA component within the BigFix Console directory:

  <installation path>\BES Console\QNA*

  Additionally, the following processes:

  <installation path>\BES Console\QNA\FixletDebugger.exe
- **On the BigFix WebUI Server**

  The following folder and sub folder paths should be excluded:

  <installation path>\BES WebUI*

  Additionally the following processes should be excluded:

  <installation path>\BES WebUI\WebUIService.exe

<installation path>\BES WebUI\WebUI\node.exe

- **On the BigFix Plugin Portal**

  The following folder and sub folder paths should be excluded:

  <installation path>\BES Plugin Portal*

  Additionally the following processes should be excluded:

  <installation path>\BES Plugin Portal\BESPluginPortal.exe

AV Exclusions on Linux

How to apply the AV exclusion on Linux OS for the BigFix Platform core components.

- **On the BigFix Server**

  The following folder and sub folder paths should be excluded:

  /opt/BESServer/

  /opt/BESWebReportsServer/

  /var/opt/BESServer/

  /var/opt/BESInstallers/

  /var/opt/BESWebReportsServer/

  /var/log/

  /etc/opt/BESServer/

  /etc/opt/BESWebReportsServer/

  /etc/init.d/

  /usr/lib/systemd/system

  Additionally the following processes should be excluded as well:

  /opt/BESServer/bin/BESFillDB

  /opt/BESServer/bin/BESGatherDB

  /opt/BESServer/bin/BESRootServer

/opt/BESServer/bin/BESAdmin.sh

/opt/BESServer/bin/BESAdmin

/opt/BESServer/bin/iem

/opt/BESServer/bin/Airgap

/opt/BESServer/bin/Airgap.sh

/opt/BESWebReportsServer/bin/WebReportsInitDB.sh

/opt/BESWebReportsServer/bin/BESWebReportsServer

- **On the BigFix Relay**

  The following folder and sub folder paths should be excluded:

  /opt/BESRelay/

  /var/opt/BESRelay/

  /var/log/

  /etc/init.d/

  /usr/lib/systemd/system

  Additionally the following processes should be excluded as well:

  /opt/BESRelay/bin/BESRelay

- **On the BigFix Client**

  The following folder and sub folder paths should be excluded:

  /opt/BESClient/

  /var/opt/BESClient/

  /var/opt/BESCommon/

  /etc/opt/BESClient/

  /etc/init.d/

  /usr/lib/systemd/system

  Additionally the following processes should be excluded as well:

/opt/BESClient/bin/BESClient

/opt/BESClient/bin/qna

/opt/BESClient/bin/XBESClientUI

/opt/BESClient/bin/XOpenUI

/opt/BESClient/bin/xqna

- **On the BigFix WebUI Server**

  The following folder and sub folder paths should be excluded:

  /opt/BESWebUI/

  /var/opt/BESWebUI/

  /etc/init.d/

  /usr/lib/systemd/system

  Additionally the following processes should be excluded as well:

  /opt/BESWebUI/bin/BESWebUI

  /var/opt/BESWebUI/node

- **On the BigFix Portal**

  The following folder and sub folder paths should be excluded:

  /opt/BESPluginPortal/

  /var/opt/BESPluginPortal/

  /var/log/

  /etc/init.d/

  /usr/lib/systemd/system

  Additionally the following processes should be excluded as well:

  /opt/BESPluginPortal/bin/BESPluginPortal

Chapter 12. Downloading files in air-gapped environments

In air-gapped environments, to download and transfer files to the main BigFix server, use the Airgap utility and the BES Download Cacher utility.

Overview

In an air-gapped environment where a secure network is physically isolated from insecure networks, such as the public Internet or an insecure local area network, and the computers on opposite sides of the air gap cannot communicate, to download and transfer files to the main BigFix server, you can use the Airgap utility and the BES Download Cacher utility.

Note: The Airgap utility does not support a configuration where the clients are air-gapped separately from the main BigFix server. The clients must be air-gapped together with the main BigFix server to be able to gather across the network from the main BigFix server.

Starting from BigFix Version 9.5.5, you have two different modes to work in an air-gapped environment. The "Extraction usage" mode, that was already available before Version 9.5.5, and the new "Non-extraction usage" mode.

Non-extraction usage overview

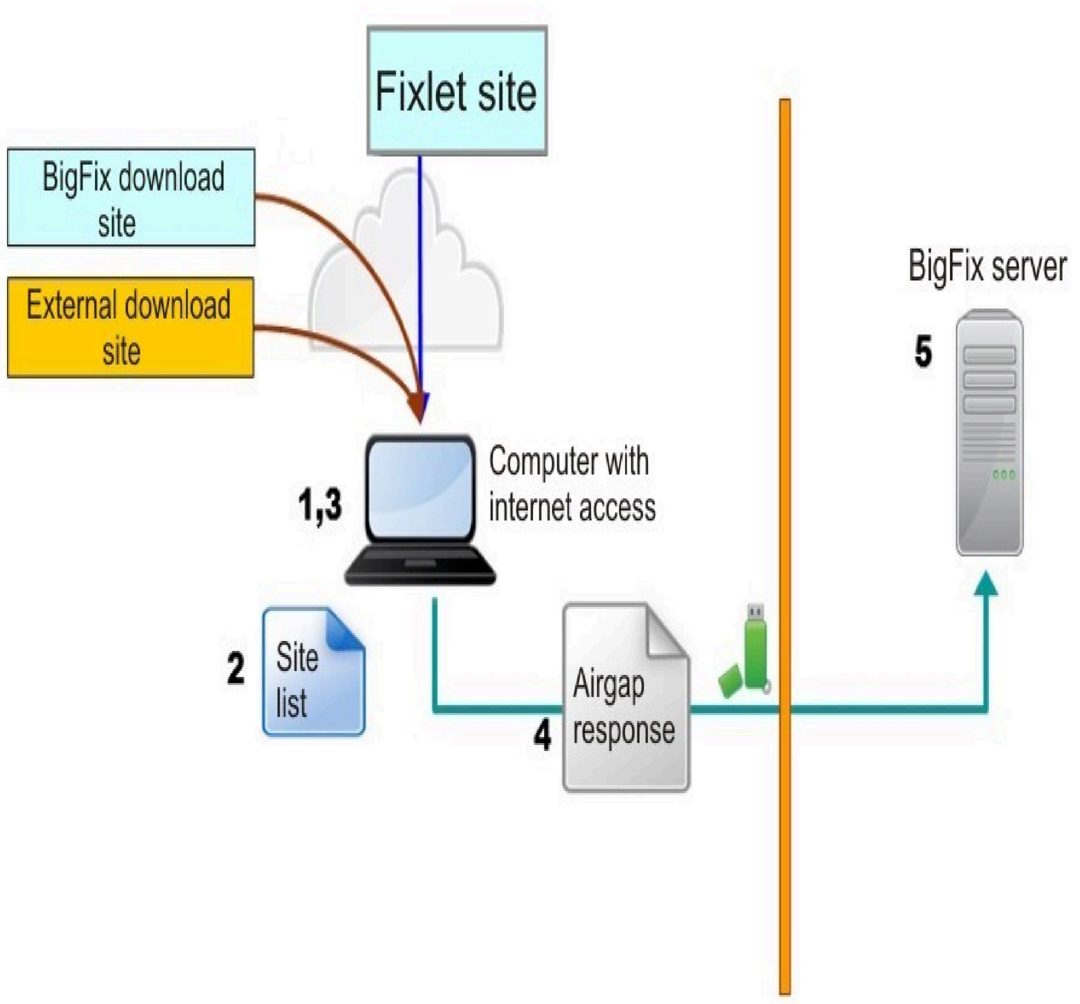
The "Non-extraction usage" mode is available only starting from BigFix Version 9.5.5.

Airgap might need to work without extracting any information from the BigFix server because in some places a rule forbids to extract any information in a secure network and move to an external network, such as Internet. To satisfy these requirements, the Airgap tool can now work without creating any Airgap request.

You can use the Airgap tool in three different ways:

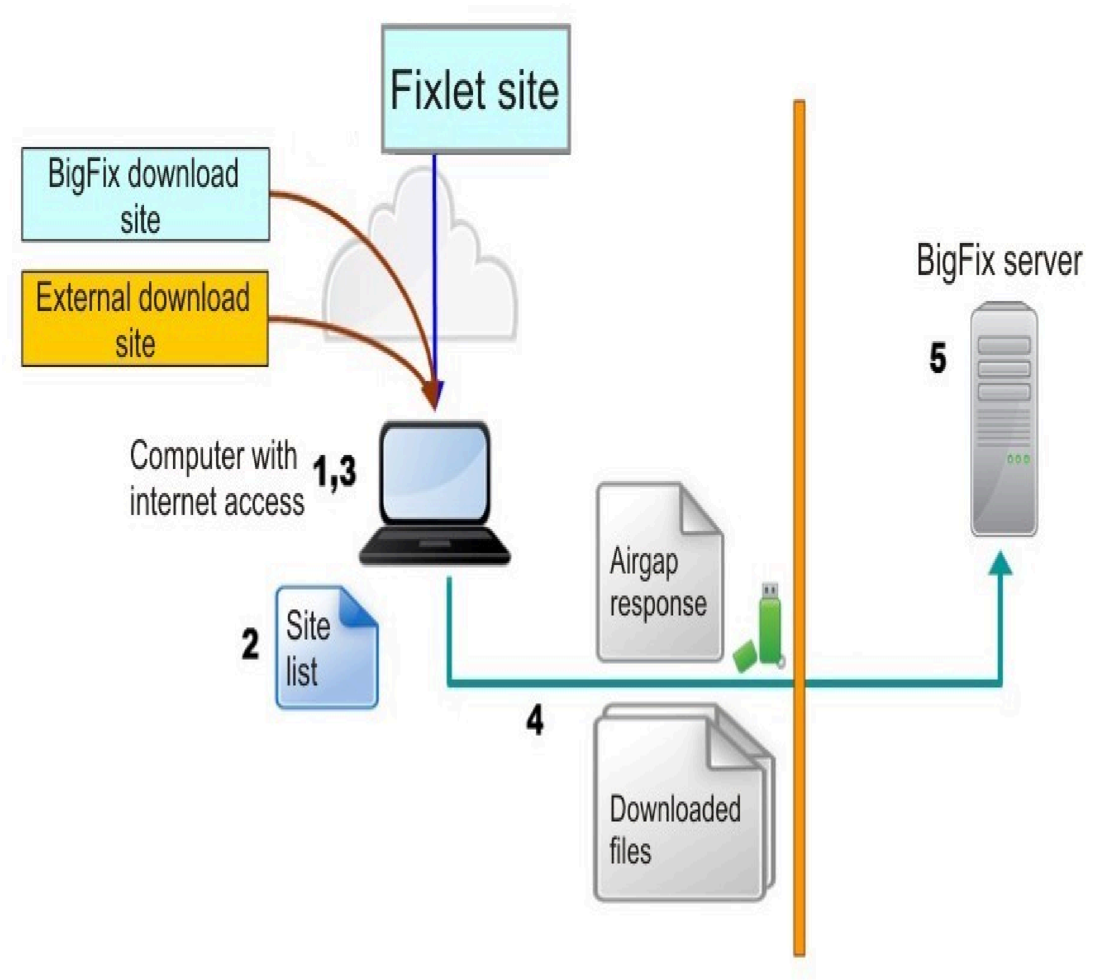
Gather site contents

1. Run the Airgap tool on the internet facing computer to gather license information and create a site list file, which contains information related to the sites that you have licensed.
2. Edit the site list file and change the flags to specify the sites that you want to gather contents from.
3. Run the Airgap tool on the internet facing computer to gather license information and site contents as specified by the site list file into the Airgap response.
4. Move the Airgap response to the BigFix server.
5. Run the Airgap tool on the BigFix server to load the Airgap response into the BigFix server.



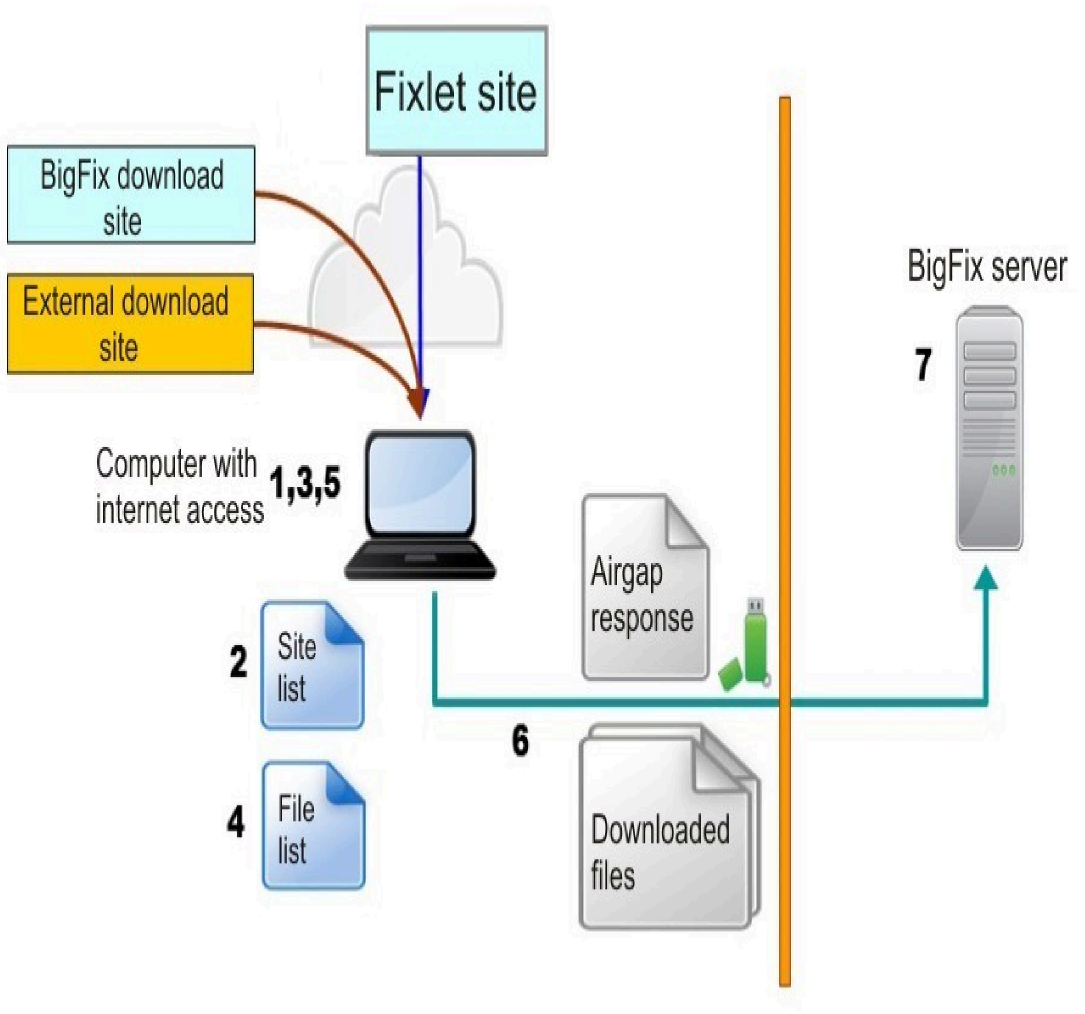
Gather site contents and download files

1. Run the Airgap tool on the internet facing computer to gather license information and create a site list file, which contains information related to the sites that you have licensed.
2. Edit the site list file and change the flags to specify the sites that you want to gather contents from, and the sites from which you want to download referenced files.
3. Run the Airgap tool on the internet facing computer to gather license information and site contents as specified by the site list file into the Airgap response, and then download the files referenced by the Fixlets.
4. Move the Airgap response and the downloaded files to the BigFix server.
5. Run the Airgap tool on the BigFix server to load the Airgap response into the BigFix server, and copy the downloaded files to the cache folder of the BigFix server.



Gather site contents and download files selectively

1. Run the Airgap tool on the internet facing computer to gather license information and create a site list file, which contains information related to the sites that you have licensed.
2. Edit the site list file and change the flags to specify the sites that you want to gather contents from, and sites from which you want to download referenced files.
3. Run the Airgap tool on the internet facing computer to gather license information and site contents as specified by the site list file into the Airgap response, and then create a file list file, which contains information about the referenced files.
4. Edit the file list file to specify the files that you want to download.
5. Run the Airgap tool on the internet facing computer to download the files as specified by the file list file.
6. Move the Airgap response and the downloaded files to the BigFix server.
7. Run the Airgap tool on the BigFix server to load the Airgap response into the BigFix server, and copy the downloaded files to the cache folder of the BigFix server.

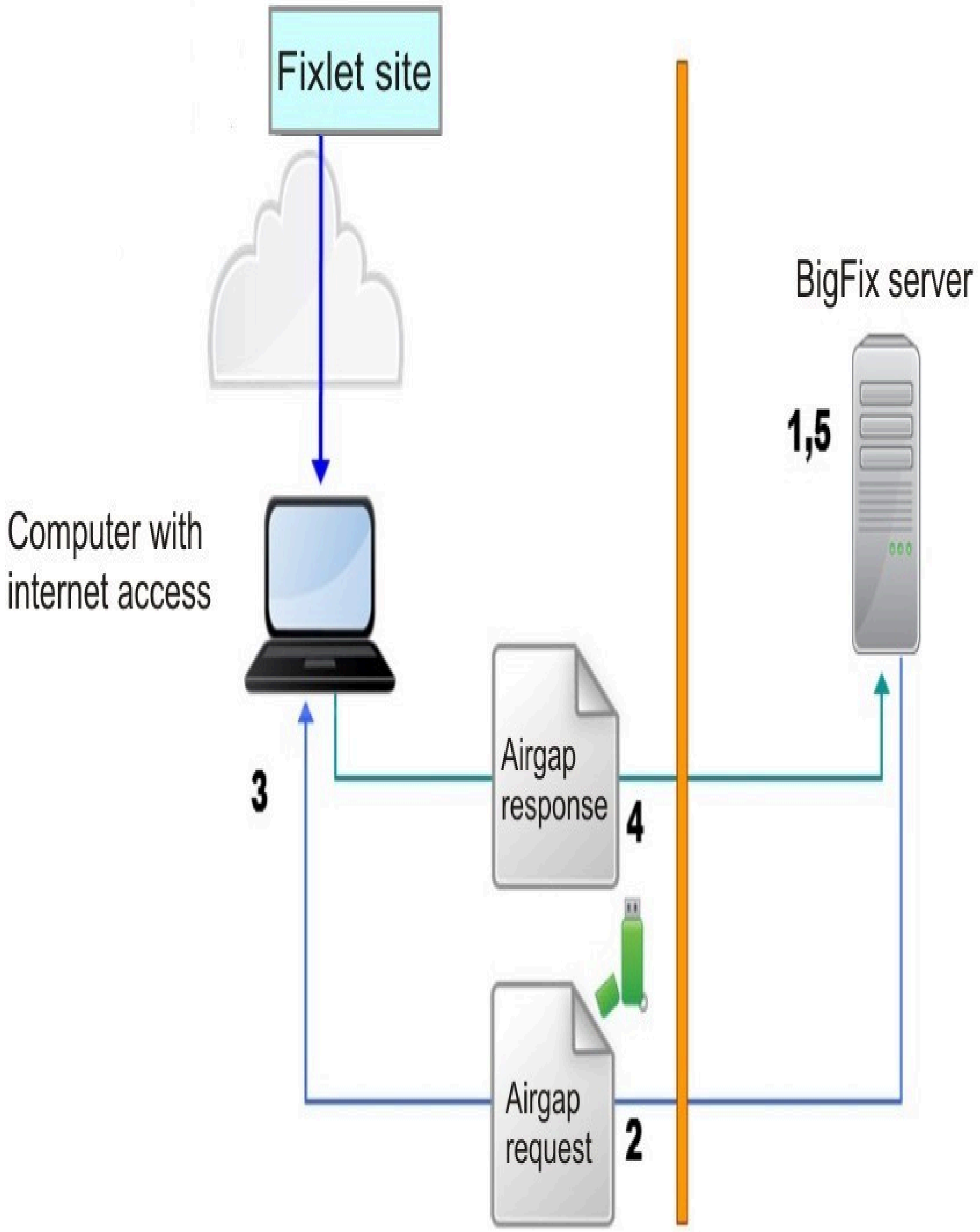

Fixlet site
BigFix download site
External download site
Computer with internet access
1,3,5
2
Site list
4
File list
Airgap response
6
Downloaded files
BigFix server
7

Extraction usage overview

In this mode, the Airgap tool extracts information from the BigFix server.

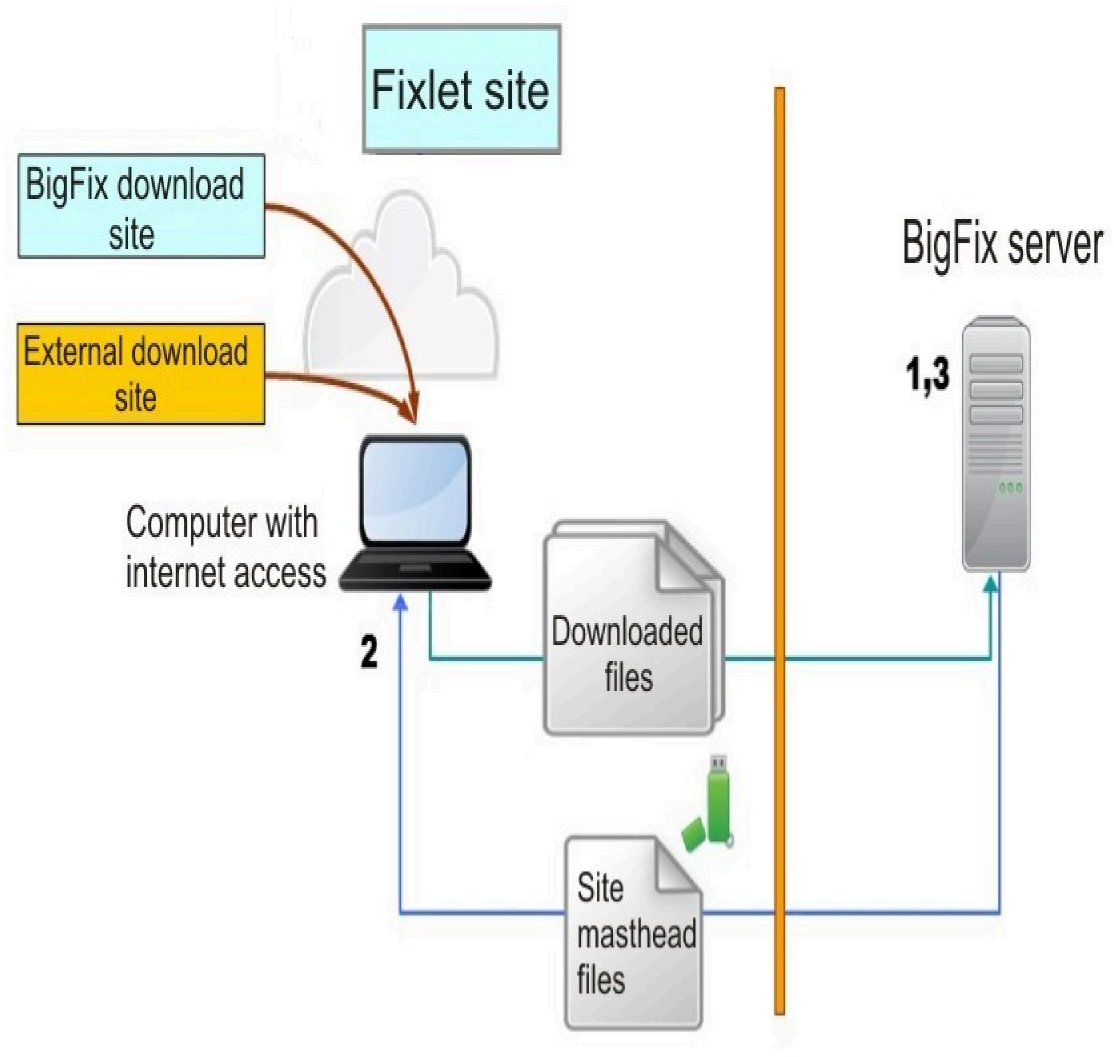
You run the Airgap tool starting from the BigFix server by performing the following steps:

1. Run the Airgap tool on the BigFix server to create the Airgap request.
2. Move the Airgap request to the internet facing computer.
3. Run the Airgap tool on the internet facing computer to gather the license information and the site contents into the Airgap response.
4. Move the Airgap response to the BigFix server.
5. Run the Airgap tool on the BigFix server to load the Airgap response into the BigFix server.


Fixlet site
BigFix server
1,5
Computer with internet access
3
Airgap response
4
Airgap request
2

In this mode, Airgap gathers the contents of the site, but not the files. To download the files referenced by the Fixlets, such as the patch modules, run the BES Download Cacher utility by performing the following steps:

1. Locate the site masthead files for the sites you want to download files for, and copy the site masthead files to the computer with internet access.
2. On the internet facing computer, run the BES Download Cacher utility for each site masthead file to download files referenced from the site that the site masthead file represents.
3. Move the downloaded files to the cache folder of the BigFix server.


Fixlet site
BigFix download site
External download site
Computer with internet access
2
Downloaded files
Site masthead files
BigFix server
1,3

Requirements

When your BigFix server is installed in an air-gapped environment where a secure network is physically isolated from insecure networks, such as the public Internet or an insecure local area network, and the computers on opposite sides of the air gap cannot communicate, you need a workstation that has access to the public Internet to download Fixlet site contents using the Airgap tool, and to download files referenced in the Fixlet action scripts.

This workstation cannot be a BigFix server or a BigFix relay.

The Airgap tool is platform dependent, but the `AirgapRequest.xml` (for extraction usage only) and `AirgapResponse` files are not. For the workstation that has access to the public Internet, you can use different operating systems available for the BigFix server.

Depending on sites gathered, the `AirgapResponse` file can be larger than 4GB. Your workstation must have enough free disk space to save the Airgap tool, the `AirgapResponse` file, and the files to download.

To run the Airgap tool on Windows computers, you must have the following libraries and files installed:

```
BESAirgapTool.exe
libBEScrypto.dll
libBEScryptoFIPS.dll
msvcm90.dll
msvcp90.dll
msvcr90.dll
Microsoft.VC90.CRT.manifest
ca-bundle.crt
```

You can get all the above files by downloading a compressed file (Airgap Tool) from the Utilities page.
To run the Airgap tool on Linux computers, you must have the following files installed:

```
Airgap
Airgap.sh
libBEScrypto.so
```

```
libBEScryptoFIPS.so
ca-bundle.crt
```

If DB2 is not installed on the Linux computer that has access to the public Internet, to run the Airgap tool you must have installed the HCL Data Server Client or HCL Data Server Runtime Client using the `db2setup` command. The DB2 instance must be created with user `db2inst1`.

Using the Airgap tool

Non-extraction usage

The Airgap command line interface can gather site information without having to access the BigFix server and can optionally download files without passing through a download cacher.

With the non-extraction usage, the Airgap tool can download the files specified in Fixlets from download sites like Windows that do not require to authenticate. When you need to download files from sites that require to authenticate with an userid and password, or to download files not specified by prefetch or download commands in Fixlets, as in the case of patch modules for AIX, CentOS, HP-UX, RedHat, Solaris or SUSE, you must use a download cacher.

As a prerequisite for the following procedure, ensure that you have the files required for the Airgap tool to run.

On Windows

You can download the appropriate Airgap tool version from the Support page.

On Linux

Starting from BigFix Version 10.0.2, you must install the package named `unixODBC.x86_64`. The same package version installed on the BigFix Server must also be installed in the workstation connected to the Internet, where you are running the NON-Extraction procedure for Airgap environments.

Access the BigFix server computer, open the `/opt/BESServer/bin` folder and run this command:

```
# cd /opt/BESServer/bin
# ./Airgap.sh -remotedir directory
```

Where *directory* is a folder of your choice.

Move to the directory containing the output generated by the above command, locate the file named `airgap.tar` and decompress it. Delete the `AirgapRequest.xml` file from the directory, copy all the other files portable drive.

To gather site information without accessing the BigFix server, complete the following steps:

1. **Create a site list**

   Run the tool on a workstation that has access to the public Internet specifying the license serial number, the email address used to register your license, and the name of the file in which the tool lists the sites for your license. You must have writing access for the folder where the Airgap tool is located. Enter the following command:

   On Windows operating systems:

   ```
   BESAirgapTool.exe -serial serial_number -email
   mail_address -createSiteList site_list_filename
    [-proxy
   [user:password@]hostname:port] [-usehttps]
   [-cacert crt_filename] [-othersites site_foldername]
    [-timeout timeout_seconds]
   ```

   On Linux operating systems:

   ```
   ./Airgap.sh -serial serial_number -email
   mail_address -createSiteList site_list_filename
    [-proxy
   [user:password@]hostname:port] [-usehttps]
   ```

```
[-cacert crt_filename] [-othersites site_foldername]
 [-timeout timeout_seconds]
```

Where:

mail_address

Is the mail address that you specified in your license; if it does not match, the Airgap tool fails. Option `-email` can be used only together with option `-createSiteList`.

-proxy

Option used when the workstation that has access to the public Internet can connect only by a proxy server. In this case, after the `-proxy` option, specify the hostname and port of the proxy server in the form *hostname:port*. If the proxy is an authenticating proxy, add also the userid and password in the form *userid:password@hostname:port*.

-usehttps

When this option is specified, "https" is used to contact the license server. Use option `-cacert` to specify a path in which to put the file `ca-bundle.crt` if you want to use a different folder from that in which the Airgap tool runs. The file `ca-bundle.crt` is used to validate the server certificate when you use the `-usehttps` option, or when the URL in the Fixlet begins with "https".

-cacert

This option can only be used together with option `-usehttps`.

-othersites

Use this option if your license is entitled to AllowOtherSites, to include sites of your choice to your site list. Create a folder, copy in it all the masthead files (*.efxm files) related to your mastheads not included in your license, and specify the name of this folder with option `-othersites` when you create a site list.

-timeout

This option is available starting from V9.5.7. It specifies a http timeout interval in seconds. Values range from 30 to 3600. The default value is 30. In the event you get the error "HTTP Error 28: Timeout was reached" while using a proxy, try also to use option `-usehttps` as it makes proxy to work in tunneling mode and that might help avoiding timeouts.

After running the tool, a file is created with the name that you specified as *`site_list_filename`*.

Note: The site list file, once created, can be used until you change the license, or HCL adds a new site to the existing license. If you delete the site list file for any reason, you can create it again with the same command, as the history of downloaded files is maintained as long as the license serial number does not change.

2. Edit the site list file

Each line of the file created in step 1 contains three pieces of information separated by a double colon:

```
flag::site_name::site_url
```

You can edit only the *`flag`* parameter, that can have one the following values:

A

Site contents are gathered when a newer site version is available and stored in the `AirgapResponse` file, and used for downloading files or creating a file list.

R

Site contents are always gathered and stored in the `AirgapResponse` file regardless of the version of the site, and used for downloading files.

G

Site contents are gathered when a newer site version is available and stored in the `AirgapResponse` file, but not used for downloading files or creating a file list.

Q

Site contents are always gathered and stored in the `AirgapResponse` file regardless of the version of the site, but not used for downloading files or creating a file list.

D

Site contents are not gathered, but are used for downloading files or creating a file list. This flag is useful when you want to keep the current contents of a site without updating it and download files to run Fixlets at your current site. This option is valid only when the site contents have already been gathered.

N

Site is ignored, but site information is kept in the file for future reference.

Note: When you create a site list file, the default values for the BES Support and Web UI Common components are set to G. If you are not interested in the Web UI component, modify the default Web UI Common value from G to N. The default values for the other components are set to N. At the first run after installing the BigFix server, the license information, the BES Support and the Web UI Common components must be gathered. Only after moving this first Airgap response generated on the workstation that has access to the public Internet to the BigFix server, you can enable the other components that you can access from the License Overview dashboard of the console and continue with the process. Be sure to enable the required components other than default before gathering.

3. **Gather site contents and create the Airgap response file**

   After you have edited the flags in the site list file, run the Airgap tool again to complete one of the following site operations:

   a. **Gather site contents**

      To gather site contents for sites with flag **A** or **R** or **G** or **Q**, run the following command:

      On Windows operating systems:

      ```
      BESAirgapTool.exe -site site_list_filenam
      e
      ```

      On Linux operating systems:

      ```
      ./Airgap.sh -site site_list_filename
      ```

      On completion, you have created the `Airgapresponse` file.

   b. **Gather site contents and download files**

      To gather site contents for sites with flag **A** or **R** or **G** or **Q**, and download files referenced by Fixlets on sites with flag **A** or **R** or **D**, run the following command:

      On Windows operating systems:

      ```
      BESAirgapTool.exe -site site_list_filenam
      e -download
      [-cache cache_name]
      ```

      On Linux operating systems:

```
./Airgap.sh -site site_list_filename -dow
nload
[-cache cache_name]
```

where *cache_name* is the folder path where to store the downloaded files. On completion, you have created the `Airgapresponse` file and downloaded the files to the *cache_name* folder.

c. Gather site contents and download files selectively

To gather site contents for sites with flag **A** or **R** or **G** or **Q**, and create a list of files referenced by Fixlets on sites with flag **A** or **R** or **D**, run the following command:

On Windows operating systems:

```
BESAirgapTool.exe -site site_list_filenam
e
-createFileList referenced_list
```

On Linux operating systems:

```
./Airgap.sh -site site_list_filename
-createFileList referenced_list
```

On completion, you have created the `Airgapresponse` file and the file list with the name specified in *referenced_list*.

In all cases, site contents gathered for sites with flag **A** or **R** or **G** or **Q** are put in the `AirgapResponse` file. When you run the Airgap tool for the first time, all sites with flag **A** or **R** or **G** or **Q** are gathered. For subsequent times, the contents of sites with flag **A** or **G** are gathered only if either they have not been previously gathered or a newer site version is available. For sites with flag **R** or **Q**, contents are always gathered.

Optionally, you can also specify the following options:

`-usehttps`

License information and site contents are gathered using "https". For case "b. Gather site contents and download files", all urls beginning with "http" are forced to use "https". Note that some urls in Fixlets begin with "https" and some patch sites might redirect requests to urls beginning with "https".

`-proxy [`*`user`*`:`*`password`*`@]`*`hostname`*`:`*`port`*

Used when the workstation that has access to the public Internet can connect only through a proxy server. In this case, after the `-proxy` option, specify the host name and port of the proxy server in the format *hostname:port*. If the proxy is an authenticating proxy, add also the user ID and password in the format *userid:password@hostname:port*.

`-cacert` *`crt_filename`*

To specify a path in which to put the file `ca-bundle.crt` if you want to use a different folder from that in which the Airgap tool runs. The file `ca-bundle.crt` is used to validate the server certificate when you use the `-usehttps` option, or when the url in the Fixlet begins with "https". The option `-cacert` can only be used together with option `-usehttps`.

`-timeout` *`timeout_seconds`*

This option is available starting from V9.5.7. It specifies a http timeout interval in seconds. Values range from 30 to 3600. The default value is 30. In the event you get the error "HTTP Error 28: Timeout was reached" while using a proxy, try also to use option `-usehttps` as it makes proxy to work in tunneling mode and that might help avoiding timeouts.

For cases **b** and **c**, you can also use other options to reduce the number of files to download or to gather in the file list. These filtering options select Fixlets that refer to files, not the files themselves. For example, when you specify last 5 days, it means files referenced by Fixlets modified in the last 5 days, not files added or changed by vendors in the last 5 days. To create a list of possible values for filtering options, run the following command:

On Windows operating systems:

```
BESAirgapTool.exe -site site_list_filename
 -createfilterList
filter_list
```

On Linux operating systems:

```
./Airgap.sh -site site_list_filename
 -createfilterList
filter_list
```

The list of available values is limited to the following options: `-fcategory`, `-fcve`, `-fproduct`, `-fseverity`, `-fsource`, and `-fsourceid`. The following options are available for filtering:

`-fcategory`

Fixlet category property.

`-fcve`

To specify the CVE (Common Vulnerabilities and Exposures) id associated with a security patch.

`-fdays`

To select Fixlets whose last modified date falls within a specified number of days from the date you run the command.

`-fproduct`

To specify the product name to which the Fixlet is applicable, such as `Win2008` or `Win7`. This information is not shown in the Console. This option is available only for sites related to patches for Windows operating systems.

`-fseverity`

To specify the severity that a vendor associates with a security patch.

`-fsource`

Provider of file, such as BigFix, Adobe, or Microsoft.

`-fsourceid`

Identification specified by the provider.

`-includeCorrupt`

To include Fixlets marked as Corrupted, that are excluded by default when this option is not specified.

`-includeSuperseded`

To include Fixlets marked as Superseded, that are excluded by default when this option is not specified.

When multiple filter conditions are specified, only Fixlets that satisfy all conditions are selected. For options `-fsource`, `-fsourceid`, `-fcve`, `-fcategory`, and `-fseverity`, you can specify multiple comma-separated values, for example: `-fseverity "Critical, Important"`. When you use commas to separate values, or values contain spaces, enclose parameters in double quotes, as in the previous example. Note that values are case sensitive.

4. Edit the file list

Applicable only to case **c. Gather site contents and download files selectively** of step 3.
With `-createFileList` option, you create a file that contains a list of files. Each line of the list contains pieces of information separated by a double colon:

```
flag::site_name::Fixlet_id::site_url::
size::hash_value::hash algorithm
```

For example:

```
N::site=site_name::fixletid=fixlet_id::
url=url_address::size=file_size::hash=hash_value::
hashtype=hash_type
```

You can edit only the `flag` value, changing it to **Y** to download the file, or to **N** to not download the file.

5. Run the tool on the Internet facing workstation to download files

Applicable only to case **c. Gather site contents and download files selectively** of step 3.
After editing the file list in step 4, to download only the files with flag **Y** in the file list, run the Airgap tool by issuing the following command:

On Windows operating systems:

```
BESAirgapTool.exe -file file_list_filename
 -download
-cache cache_foldername
[-proxy [user:password@]hostname:port] [-usehttps]
[-cacert crt_filename]
```

On Linux operating systems:

```
./Airgap.sh -file file_list_filename -download
-cache cache_foldername
[-proxy [user:password@]hostname:port] [-usehttps]
[-cacert crt_filename]
```

where *cache_foldername* is the folder path where to store the downloaded files. The files already in the cache folder are not downloaded again.

6. Move the Airgap response file to the BigFix server and run the Airgap tool on the BigFix server

Copy in a portable drive the `AirgapResponse` file, and the file list that you have created in step 3 or the downloaded files that you collected in step 5, and transfer them to the BigFix server computer. Make sure that the

`AirgapResponse` file is in the same folder as the Airgap tool, and run it by issuing the following command:

On Windows operating systems:

```
BESAirgapTool.exe -run [-temp temp_folder]
```

On Linux operating systems:

```
./Airgap.sh -run [-temp temp_folder]
```

This imports the response file with the Fixlet content and license updates into your deployment.

Note: The Airgap tool passes site contents in the response file to the GatherDB component of your BigFix server, and the GatherDB component imports site contents. For sites other than WebUI sites, you can monitor the import progress in the DebugOut of the GatherDB component (default name `GatherDB.log`).

Copy the downloaded files also into the BigFix server cache folder. The cache folder default location is:

On Windows operating systems:

`%PROGRAM FILES%\BigFix Enterprise\BES Server\wwwrootbes \bfmirror\downloads\sha1`

On Linux operating systems:

`/var/opt/BESServer/wwwrootbes/bfmirror/downloads/sha1`

Repeat these steps periodically to keep updated the Fixlet content in the main BigFix server. Join the new Fixlet mailing list to receive notifications when Fixlets are updated. Always make sure that the Airgap tool version is compatible with the version of the BigFix server installed.

Usage tips:

1. Unzip the exact same version of the AirgapTool used in Step 1 into a directory on the BigFix root server.
2. Copy the `airgapresponsefile` into this same directory.
3. Run `BESAirgapTool.exe` with no options.
   The contents of the `airgapresponsefile` is imported in to the directory. If you downloaded any files at Step 5, then copy those files in to the SHA1 directory on the root server as well. This might be necessary because the Airgap tool downloads files and names them with their SHA256 values.

   Note: You do not need to rename the SHA256 value as its SHA1 value after pasting it to the SHA1 directory.

Optional actions:

Check if all required files have been downloaded

To check if you have downloaded all the files required for the Fixlet you are planning to apply, use option `-checkfixlet` when you run the Airgap tool. For example:

On Windows operating systems:

```
BESAirgapTool.exe -site site_list.txt -ch
eckfixlet
-fdays 100 -fseverity Critical -cache MyC
ache
```

On Linux operating systems:

```
./Airgap.sh -site site_list.txt -checkfix
let
-fdays 100 -fseverity Critical -cache MyC
ache
```

For Fixlets satisfying the specified filtering conditions, the tool checks the downloaded history and contents of destination folder, and if there are still files to download, Fixlet names and urls are displayed.

Files to be downloaded manually

Some files referenced by Fixlets might not be downloaded because they can be obtained only by contacting the vendor support center, or because the download site requires that you explicitly accept the license terms and this action cannot be automated for legal reasons. In these cases, the involved files have the download url containing the string `MANUAL_BES_CACHING_REQUIRED` and must be downloaded manually. To create a list of these files, use option `-createmanuallist` as in the following example:

On Windows operating systems:

```
BESAirgapTool.exe -site site_list.txt -cr
eatemanuallist
manual_list -fseverity Critical
```

On Linux operating systems:

```
./Airgap.sh -site site_list.txt -createma
nuallist
manual_list -fseverity Critical
```

You can also use the `-checkmanual` option to check if your destination folder contains all the files that must be manually downloaded, as in the following example:

On Windows operating systems:

```
BESAirgapTool.exe -site site_list.txt -ch
eckmanual
-fseverity Critical
-fdays 30 -cache MyCache
```

On Linux operating systems:

```
./Airgap.sh -site site_list.txt -checkman
ual
-fseverity Critical
-fdays 30 -cache MyCache
```

Reset history

The Airgap tool keeps a history of downloaded files. Even if you move all the downloaded files from your public Internet facing workstation to the BigFix server, this history is maintained and files previously downloaded are not downloaded again to save time and disk space. If you deleted part or all of your previously downloaded files and you need them again, you can use the `-resync` option. This option clears the download history and checks the files in the folder specified with `-cache` option. Note that the newly-created download history is based only on the files contained in the folder specified with the `-cache` option.

Changing license

If you want to manage another license, you must erase the history of gathered sites and downloaded files. To complete this action, use the `-force` option as in the following example:

On Windows operating systems:

```
BESAirgapTool.exe -serial serial_number -
email
mail_addess -createSiteList site_list_fil
ename -force
```

On Linux operating systems:

```
./Airgap.sh -serial serial_number -email
mail_addess -createSiteList site_list_fil
ename -force
```

Miscellaneous options

By default, the Airgap tool simultaneously downloads two files. You can change the number of files to download concurrently by specifying a number after the `-download` option . This number can range from 1 to 8. For example, to download 3 files at the same time, specify `-download 3`. Note that you need a larger band width when downloading more than 2 files simultaneously.

When the url specified in a Fixlet begins with "https", or if you specify the `-useHttps` option, the Airgap tool tries to verify that the server specified in the url has an appropriate SSL Server Certificate. If, for any reason, you want to skip this check and avoid a download failure when the Airgap tool cannot verify the server certificate, use the `-noverify` option. With this option, the Airgap tool does not verify the authenticity of the server certificate while it verifies that the server certificate is for the server specified in the URL you operate against. You must check that your workstation translates correctly host names by checking your DNS.

To have the Airgap tool to print more information than usual, use the `-verbose` option.

Working with multiple BigFix servers

If you want to use the same public Internet facing workstation for several BigFix servers, like a test server and a production server, create a folder for each server, copy the Airgap tool in each folder, and work with each folder separately. You can share the same site list among the different folders, but each server keeps its own history in its folder. When using multiple Airgap

tools with different servers, you can also share a cache folder to download only once files that are common to different servers, but you must ensure to run only one instance of the Airgap tool at the same time.
In case you need to gather set of sites, load them to your test server, then perform tests with the gathered sites and load the tested sites, not the latest ones, to your production server, you can load one `AirgapResponse` file to multiple BigFix servers when they are licensed for the same products (like BigFix Lifecycle, BigFix Compliance, etc.). When you intend to load one `AirgapResponse` file to multiple BigFix servers, it is recommended to gather only sites enabled on all of your BigFix servers.

Note: At the first run after installing the BigFix server, the license information, the BES Support, and the Web UI Common components must be gathered for each installation. For this step, an AirgapResponse file must be created for each BigFix server because license information is unique to each serial number.

If you want to update the license information of a particular BigFix server without changing version on any site, you can create an `AirgapResponse` file that contains only license information by running the Airgap tool with a site file containing no lines or with site files where all sites have the flag **N**. Run the following command:

On Windows operating systems:

```
BESAirgapTool.exe -site empty_site_list_f
ilename
-allowemptysite
```

On Linux operating systems:

```
./Airgap.sh -site empty_site_list_filenam
e
-allowemptysite
```

Enabling WebUI in air-gapped environments

To install the WebUI in air-gapped environments, perform the following steps:

1. Gather the latest BES Support and WebUI Common sites, and download the required files to install the WebUI Service. Load them to your BigFix server.
2. Install the WebUI Service by using the task "Install HCL BigFix WebUI Service" in BES Support site.
3. After the installation completes, wait for the activation of a WebUI Service (on Windows operating systems) or process (on Linux operating systems) on the WebUI targeting system. The WebUI initialization has started; wait for its completion. Initialization usually completes in few minutes, but it is suggested to wait 30 minutes or more before proceeding with step 4.
4. Gather all the latest WebUI sites and load them to your BigFix server. You can gather WebUI sites before running the task to install the WebUI service, but you can load them only after the WebUI initialization has completed.

Extraction usage

The "Extraction usage" mode of the Airgap tool.

Important: If you have a BigFix 9.5.7 fresh installation, to make the WebUI sites available, you must complete the following steps:

1. Install the WebUI and run the Airgap tool.
2. Wait a few minutes for the WebUI initialization to complete.
3. Rerun the Airgap tool.

To make Fixlet content and product license updates available in the isolated network, the utility must be transferred from a computer with internet connectivity using the following steps:

On Windows operating systems

1. **Run on the BigFix server**

   From the BigFix server installation directory, double-click `BESAirgapTool.exe` or run it from the command line without any parameters, a Graphical User Interface opens.

   Provide a destination folder for the Airgap tool to store its site request and all the files it requires to run. After the Airgap tool finishes copying the files, copy the entire folder to a portable drive.
2. **Move the Airgap request and run on the internet facing computer**

   Bring the portable drive to a computer with Internet connectivity. You must have the rights to write in the folder where the `BESAirgapTool.exe` is located. Enter the folder and run the Airgap tool by double-clicking `BESAirgapTool.exe` or invoking it from the command line.

   Optionally, you can also specify the following command line parameters:

   -usehttps

   All urls beginning with "http" are forced to use "https" to gather license information and site contents. Note that some urls in Fixlets begin with "https" and some patch sites might redirect requests to urls beginning with "https".

   -proxy [*user*:*password*@]*hostname*:*port*

   This option is available only starting from BigFix Version 9.5.5. Used when the workstation that has access to the public Internet can connect only through a proxy server. In this case, after the `-proxy` option, specify the host name and the port of the proxy server in the format *hostname:port*. If the proxy is an authenticating proxy, add also the user ID and the password in the format *userid:password@hostname:port*. In extraction usage, when a proxy server is configured in the client registry settings or in the Internet Explorer settings for the current user and the `-proxy` option is not specified, the proxy settings are used as in earlier versions of the Airgap tool. When you use the `-proxy` option, the specified values are used regardless of other settings.

-cacert <*full_path_to_ca-bundle.crt_file*>

To specify a path in which to store the file `ca-bundle.crt`, if you want to use a different folder from that where the Airgap tool runs. The file `ca-bundle.crt` is used to validate the server certificate when you use the `-usehttps` option, or when the URL in the Fixlet begins with "https". The option `-cacert` can only be used together with the `-usehttps` option.

A Graphical User Interface opens. The Airgap tool will download all files required by the Airgap request in the same folder as `BESAirgapTool.exe`. This exchanges the Airgap request file for an Airgap response file. Copy the Airgap response file to a portable drive.

3. **Move the Airgap response to the BigFix server and run the Airgap tool on the BigFix server**
Take the portable drive back to the BigFix server computer and run the `BESAirgapTool.exe` again by double-clicking `BESAirgapTool.exe` or invoking it from the command line without any parameters. Ensure that you are running it logged on as a user that:
    - Has Administrator privileges.
    - Has the database permissions necessary to add content to the BFEnterprise database.

A Graphical User Interface opens.

This imports the Airgap response file with the Fixlet content and license updates into your deployment.

The Airgap tool creates temporary files in the folder specified by the `TEMP` environment variable. If you want to use a different folder for temporary files, set the `TEMP` environment variable to that folder before you run the `BESAirgapTool.exe`.

To update the Fixlet content on the main BigFix server, repeat these steps periodically. You can join the new Fixlet mailing list to receive notifications when Fixlets are updated.

Ensure that the Airgap tool version is compatible with the installed BigFix server version.

On Linux operating systems

1. **Run on the BigFix server**

   Ensure that on the Linux computer, the Airgap tool is located in the same path where you installed the BigFix server. The default path is `/opt/BESServer/bin`. Open the Linux Terminal, and enter the following commands to create a tar file named `airgap.tar`, containing the `AirgapRequest.xml` file based on the BigFix database information:

   ```
   # cd /opt/BESServer/bin
   # ./Airgap.sh -remotedir directory
   ```

   Where:

   -remotedir *directory*

   Runs Airgap to generate the request file in the specified folder.

2. **Move the Airgap request and run on the internet facing computer**

   Copy the `airgap.tar` file to a portable drive, and extract the `airgap.tar` file content by issuing the following command:

   ```
   # tar -xf airgap.tar
   ```

   Ensure that your system has an environment variable named `LD_LIBRARY_PATH` set to the path of the folder containing the DB2 library `libdb2.so.1`. Ensure that the

`Airgap.sh` and `AirgapRequest.xml` files are in the same folder and that you have writing rights to that folder. Run the `Airgap.sh` command.
Optionally, you can also specify the following command line parameters:

-usehttps

All urls beginning with "http" are forced to use "https" to gather license information and site contents. Note that some urls in Fixlets begin with "https" and some patch sites might redirect requests to urls beginning with "https".

-proxy [*user*:*password*@]*hostname*:*port*

Used when the workstation that has access to the public Internet can connect only through a proxy server. In this case, after the `-proxy` option, specify the host name and the port of the proxy server in the format *hostname:port*. If the proxy is an authenticating proxy, add also the user ID and the password in the format *userid:password@hostname:port*.

-cacert <*full_path_to_ca-bundle.crt_file*>

To specify a path in which to store the file `ca-bundle.crt`, if you want to use a different folder from that where the Airgap tool runs. The file `ca-bundle.crt` is used to validate the server certificate when you use the `-usehttps` option, or when the URL in the Fixlet begins with "https". The option `-cacert` can only be used together with the `-usehttps` option.

This exchanges the Airgap request file for an Airgap response file. Copy the Airgap response file to a portable drive.

If you receive the following error message when running the Airgap tool:

```
./Airgap: error while loading shared libraries: libdb2.so.1:
cannot open shared object file: No such file or directory
```

Create and export the `LD_LIBRARY_PATH` variable by running the command:

```
export LD_LIBRARY_PATH="$LD_LIBRARY_PATH:/your/path/"
```

Where:

/your/path

Is the path of the folder containing the DB2 library `libdb2.so.1`

3. **Move the Airgap response to the BigFix server and run the Airgap tool on the BigFix server**

   Connect the portable drive back to the BigFix server computer and run the `Airgap.sh` command. This imports the response file with Fixlet content and license updates into your deployment.

   ```
   # cd airgap
   # ./Airgap.sh -run
   ```

   Optionally, you can also specify the following option:

   -temp *directory*

   The Airgap tool creates temporary files under the `/tmp` directory, but in the event you do not have enough space left in it, you can use this option to specify a different folder where you have enough space.

   Note that the `Airgap.sh` and `AirgapRequest.xml` files must be in the same folder.

   To update the Fixlet content on the main BigFix server, repeat these steps periodically. You can join the new Fixlet mailing list to receive notifications when Fixlets are updated.

   Ensure that the Airgap tool version is compatible with the installed BigFix version.

Transferring downloaded files

Deploying Fixlets on the main BigFix server requires downloaded patches and other files from the Internet. You can use the Airgap tool in extraction usage for gathering site contents and in non-extraction usage for downloading files (you can ignore the AirgapResponse file generated in non-extraction usage).

As an alternative, you can use the BES Download Cacher utility. This utility helps to:

- Download and transfer files to the main BigFix server.
- Download patch contents in a Fixlet site or single file downloads from an URL.

You can download the current utility from http://software.bigfix.com/download/bes/util/BESDownloadCacher.exe. To see the list of available options run `BESDownloadCacher.exe /?`. If the BigFix server or an BigFix relay is installed on the system where you run the BES Download Cacher utility, the `-x` utility parameter is optional because the utility detects relevant local BES settings and reuse them as defaults

Some sites require additional steps to download content from patch vendors that restrict access. For additional information see the following documentation pages that describe using a tool to manually download patches for Solaris, Red Hat, SuSE, and AIX.

These sites require a three step process:

1. Run the BESAirgapTool.exe to download Fixlets and Tasks for each site.
2. Run the BES Download Cacher utility to download any site tools from BigFix.
3. Run the download tool for each vendor to download patch contents.

Transferring all files from Fixlet sites

To transfer files from Fixlet sites, perform the following steps.

1. Locate the `.efxm` file for the site from which you want to gather downloads, for example, `BES Asset Discovery.efxm`.
2. Run the BES Download Cacher utility with the following command:

   ```
   BESDownloadCacher.exe -m BES Asset Discovery.efxm -x downloads
   ```

   Note: This might take a very long time because it downloads every file referenced in the Fixlet site and puts the files into the downloads folder. If the files already exist in the downloads folder, they are not re-downloaded. Files are named with their sha1 checksum.

3. When the download finishes, copy the contents of the downloads folder (just the files, not the folder) into the sha1 folder on the main BigFix server. The default location for the sha1 folder is:
    - On Windows systems: `%PROGRAM FILES%\BigFix Enterprise\BES Server\wwwrootbes\bfmirror\downloads\sha1`
    - On Linux systems: `/var/opt/BESServer/wwwrootbes/bfmirror/downloads/sha1`

    The BigFix server uses these files instead of trying to download them from the Internet.

    Note: If you run the BES Download Cacher utility later, you can look at the modification time of the files to see which files are the newest. Using this method, you transfer only the newest files to the Main BigFix server instead of copying every file each time.

You might need to increase the size of the cache on the main BigFix server so that it does not try to delete any files from the cache. Run the BES Download Cacher utility to increase the size of the cache with the following command:

```
BESDownloadCacher.exe -c 1024
```

The default size of the cache is 1024 MB.

Note: Use the `-c` option only when the BigFix server or a relay is installed on the system where you run the BES Download Cacher utility. If no BigFix component is installed, cache has no limit.

After the files are cached in the BigFix server sha1 folder, they are automatically delivered to the BigFix relays and BigFix clients when you click an action in the Fixlet message that references a downloaded file. If the file is not cached, the BigFix console gives you a status of `Waiting for Mirror Server` after you deploy an action.

Transferring a single file

To transfer a single file from a Fixlet site, perform the following steps.

1. Run the BES Download Cacher utility with the following command:

   ```
   BESDownloadCacher.exe -u http://www.mysite/downloads/myplugin.exe -x
    downloads
   ```

2. When the download finishes, copy the contents of the downloads folder (just the file, not the folder) into the sha1 folder on the main BigFix server. The default location for the sha1 folder is:
   - On Windows systems: `%PROGRAM FILES%\BigFix Enterprise\BES Server \wwwrootbes\bfmirror\downloads\sha1`
   - On Linux systems: `/var/opt/BESServer/wwwrootbes/bfmirror/downloads/ sha1`

You might need to increase the size of the cache on the main BigFix server so that it does not try to delete any files from the cache. Run the BES Download Cacher utility to increase the size of the cache with the following command:

```
BESDownloadCacher.exe -c 1024
```

The default size of the cache is 1024 MB.

Note: Use the `-c` option only when the BigFix server or a relay is installed on the system where you run the BES Download Cacher utility. If no BigFix component is installed, cache has no limit.

After the files are cached in the BigFix server sha1 folder, they are automatically delivered to the BigFix relays and BigFix clients when you click an action in the Fixlet message that references a downloaded file. If the file is not cached, the BigFix console gives you a status of "Waiting for Mirror Server" after you deploy an action.

Log files

The Airgap tool produces two types of log files: normal log files and debug log files.

Normal log files record the messages you see in the command window so you can check Airgap tasks, such as sites gathered on a specific date. Debug log files are intended for the HCL Support team. The naming convention for normal log files is:

On Windows operating systems:

`BESAirgapTool_yyyy-mm-dd.log`

On Linux operating systems:

`Airgap_yyyy-mm-dd.log`

where *yyyy-mm-dd* is the date when the file has been created. Starting from V9.5.7, files older than 30 days are deleted.

The debug log file is `AirgapDebugOut.txt`. Starting from V9.5.7, this file contains only information of the last day and older log files are renamed to `AirgapDebugOutyyyymmdd.txt`, where yyyymmdd is the date when the file has been created; files older than 10 days are deleted. The Airgap tool can write more information to the debug log file by using the verbose option `-verbose`.

Chapter 13. Getting client information by using BigFix Query

The BigFix Query feature allows you to retrieve information and run relevance queries on client workstations from the WebUI BigFix Query Application or by using REST APIs.

Use the BigFix Query feature to:

- Quickly collect data from clients without impacting BigFix environment performance.
- Run your query in relevance language on targets identified using an applicability relevance or on a set of target agent IDs.
- Show the collected results in the WebUI Query Application, optionally paging them. The results displayed are updated periodically as new values are received from clients.
- Test relevance expressions on a few selected clients before rolling out to production.

This guide contains the information about how to configure BigFix for using BigFix Query. Additional information is available clicking the following links:

- BigFix Query
- Query in List of settings and detailed descriptions

BigFix Query requirements

The clients that are targeted by BigFix Query requests must satisfy specific conditions.

The following requirements must be satisfied to run BigFix Query on clients:

- The client can receive UDP notifications. The BigFix Query feature does not support components that are connected to the BigFix server through proxies or firewalls.
- BigFix V9.5 Patch 2 or later must be installed on the client machine and on all the intermediate relays that must be passed through to reach the client.

BigFix Query restrictions

Some restrictions apply when using the BigFix Query feature.

The following limitations affect the use of the BigFix Query feature:

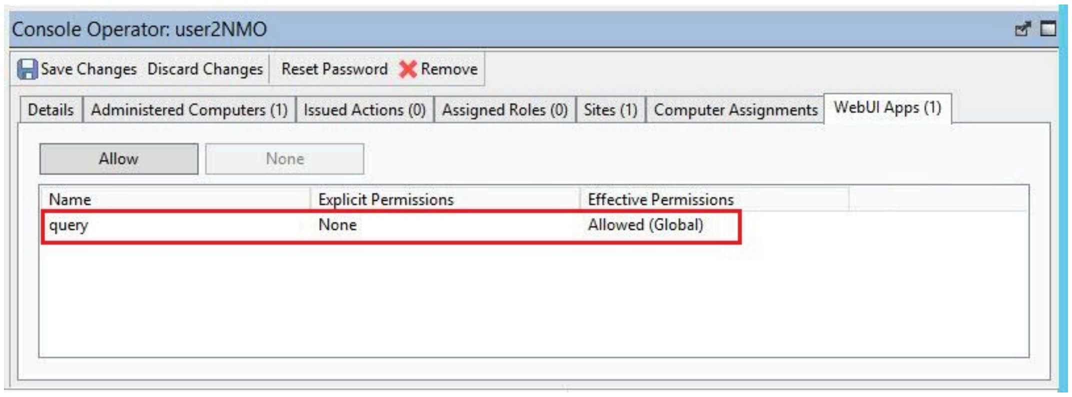
- The feature is available only for BigFix Lifecycle or BigFix Compliance Version 9.5 Patch 2 or later versions.
- Starting from Version 10 Patch 12, the feature is available also for BigFix Workspace, BigFix Workspace+, BigFix Enterprise or BigFix Enterprise+.
- Starting from Version 9.5 Patch 13, the feature supports requests that require the agent context.
- If you configured your environment in a Disaster Server Architecture (DSA), be aware that:
    - The information about BigFix Query is not replicated among the multiple servers.
    - Each server can run BigFix Query requests only on the clients that connect either directly or through relays to the server where the query is submitted.

Who can use BigFix Query

BigFix Query requests can be run by Master Operators and Non-Master Operators. Specific permissions must be set to allow operators to use this feature.

To access the WebUI Query application from the WebUI toolbar:

The user must have, at operator or role level, the effective permission on the **query** WebUI Application set to **Allowed**, for example:



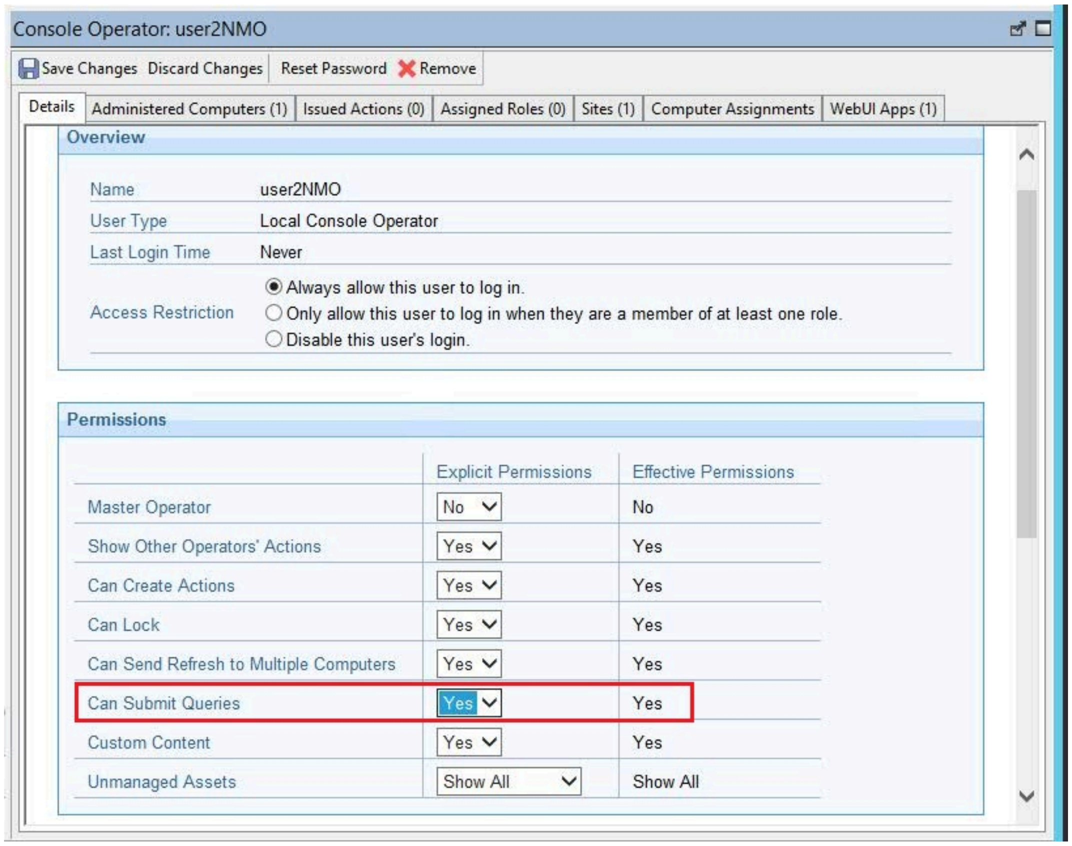
Name	Explicit Permissions	Effective Permissions
query	None	Allowed (Global)

As an alternative, you can see which permissions are assigned to the users on the WebUI Applications in the working area of the **WebUi Apps** Domain. The **WebUi Apps** Domain is available under **All Contents** after you enable the WebUI.

For more information about how to access the WebUI Query Application, see How to run BigFix Query from the WebUI *(on page 151)*.

To run BigFix Query requests and see their results:

Master Operators can run queries by default. A Non-Master Operator must have, at operator or role level, the **Can Submit Queries** permission set to **Yes** in the **Details** tab:



Name	user2NMO
User Type	Local Console Operator
Last Login Time	Never
Access Restriction	[✓ Always allow this user to log in.] Only allow this user to log in when they are a member of at least one role. Disable this user's login.

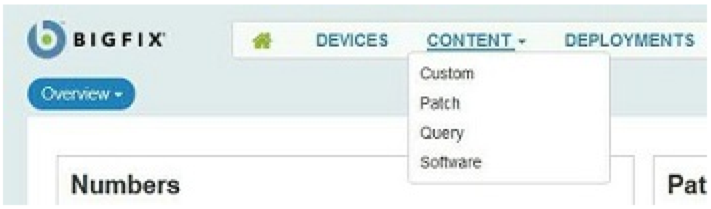
	Explicit Permissions	Effective Permissions
Master Operator	No	No
Show Other Operators' Actions	Yes	Yes
Can Create Actions	Yes	Yes
Can Lock	Yes	Yes
Can Send Refresh to Multiple Computers	Yes	Yes
Can Submit Queries	Yes	Yes
Custom Content	Yes	Yes
Unmanaged Assets	Show All	Show All

The default value of the **Can Submit Queries** permission for Non-Master Operators is **No**.

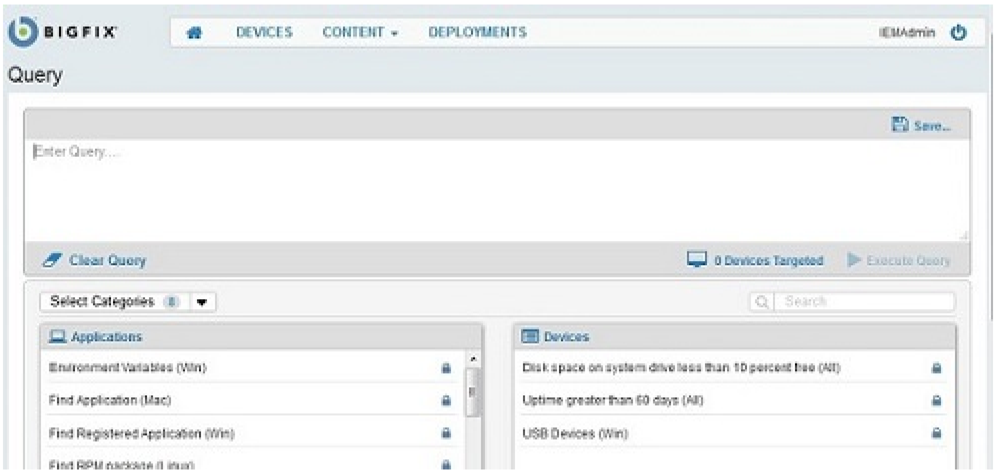
For more information about operator permissions and roles, see Adding Local Operators (on page 29).

How to run BigFix Query from the WebUI

You can access the BigFix Query on the WebUI user interface by selecting **Content -> Query**.



The Query panel opens:

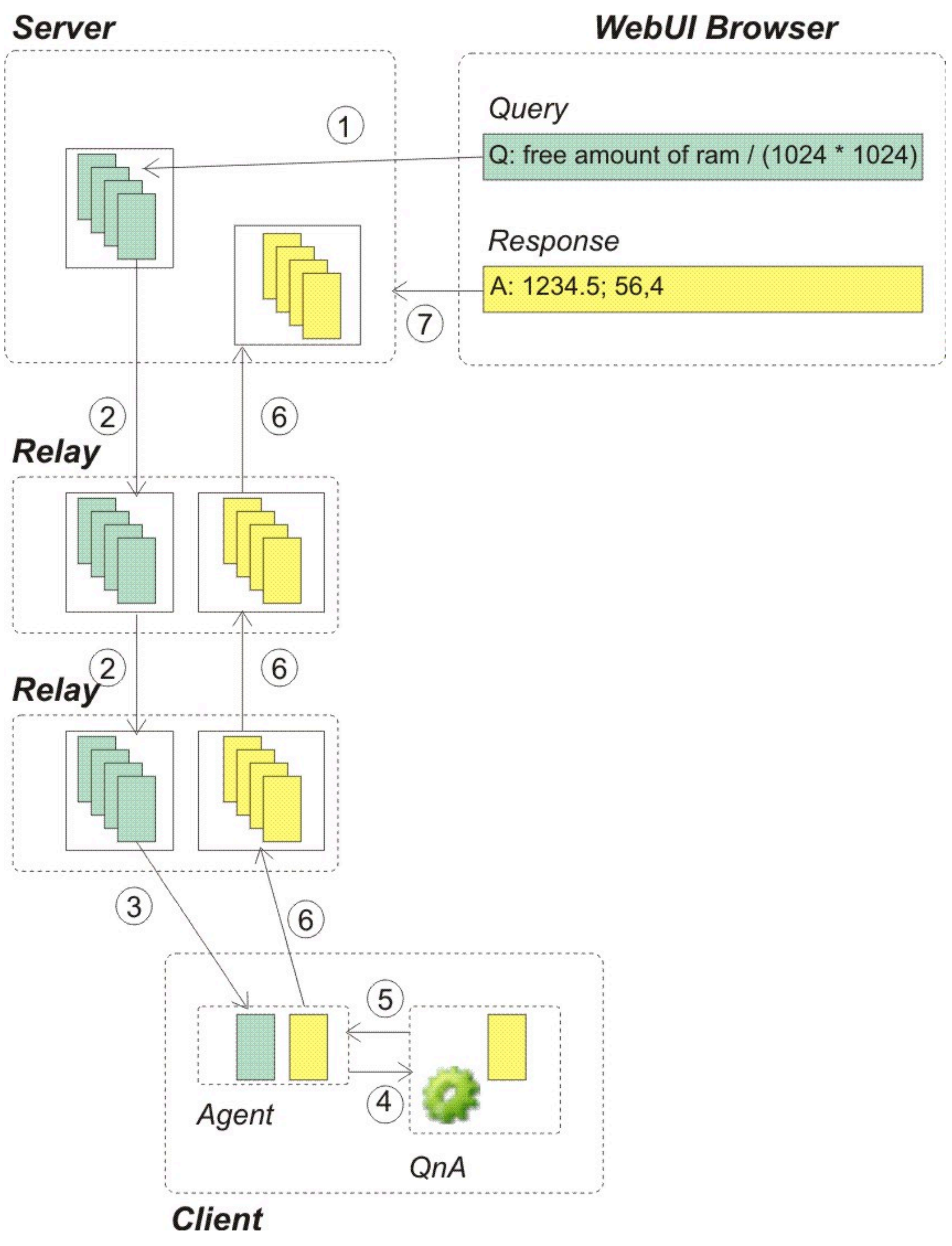


For information about using this feature from the Query panel, see WebUI Enablement.

How BigFix manages BigFix Query requests

A BigFix Query request is processed in a sequence of customizable steps.

The following picture shows the internal flow of a BigFix Query. Each step lists which variables you can configure to tune how BigFix Query requests and responses are managed.



1. The operator that logged on to the WebUI submits a request from the BigFix Query Application.

   What can you customize for this step?

   You can decide to run this step as an operator that is not a master operator. In this case ensure that either the operator permissions or the permissions specified in the role assigned to the operator contain the **Can Submit Queries** value set to **Yes**.

Note: If you are using the REST API to manage the query, be aware that only the operator issuing the query can see its responses.

2. The submitted request is propagated through the relay hierarchy to the target clients using dedicated memory queues on each relay. This ensures that the request quickly reaches the targets without impacting normal BigFix processing. If a target or a child relay does not answer within a given amount of time, then it is no longer requested to answer.

   What can you customize for this step?

   From the BigFix Console you can customize, for the server and for each relay, how the memory queues are cleaned up:

   How often the cleanup task is run.

   The default value is 10 minutes and the name of the setting is **_BESRelay_Query_RemovalTask**.

   How long a request can stay in the queue before being deleted by the cleanup task.

   The default value is 60 minutes and the name of the setting is **_BESRelay_Query_MinTime**.

   The maximum size of the memory queue dedicated to BigFix Query requests.

   Before running the cleanup task, BigFix checks if the size of this memory queue exceeds the maximum size specified. If it exceeds, when the cleanup task runs, it removes the entries in the queue until the size of the queue returns within the threshold. The default value is 100 MB and the name of the setting is **_BESRelay_Query_MemoryLimit**.

For more information about these settings, see Query.

3. When the request reaches the target client parent relay, the relay informs the client, using the UDP protocol, that there is a new request to process, and, in turn, the agent retrieves the request.
4. For each responsive target, the client passes the query to the local QnA to run the query and return the results.

What can you customize for this step?

From the BigFix Console you can customize for the client:

How long can the QnA process a query issued by a Master Operator before the request timeout elapses

The default value is 60 seconds and the name of the setting is **_BESClient_Query_MOMaxQueryTime**.

How long can the QnA process a query issued by a Non Master Operator before the request timeout elapses

The default value is 10 seconds and the name of the setting is **_BESClient_Query_NMOMaxQueryTime**.

How long the QnA waits for new queries to process before stopping.

The default value is 600 seconds and the name of the setting is **_BESClient_Query_IdleTimeout**.

How much CPU is used by the QnA process running the query.

You can limit the CPU used by the QnA process by defining time slots during which the QnA runs. By default the QnA processing the query runs for 10 milliseconds and then sleeps for 480 milliseconds, which corresponds to a CPU usage lower than 1-2 %, and the name of the settings that define this behavior are **_BESClient_Query_WorkTime** and **_BESClient_Query_SleepTime**.

For more information about these settings, see Query.

Note: These settings are not considered when running the QnA tool connected as local user to the client system.

5. When the agent receives the response from the QnA, it creates a report containing the response and delivers it to the parent relay in parallel the other reports.
6. The report is delivered back to the server through the relay hierarchy. On each relay the report is stored in a memory queue while waiting to be delivered to the parent relay. If the parent relay is not available, the report waits in the queue and is delivered as soon as the parent relay becomes available again. The same criteria for encryption and signing used for normal reports are applied also to these reports.

   What can you customize for this step?

   From the BigFix Console you can customize for each relay:

   The maximum size of the memory queue dedicated to BigFix Query results.

   Before running the cleanup task, BigFix checks if the size of this memory queue exceeds the maximum size specified. If it exceeds, when the cleanup task runs, it removes the entries in the queue until the size of the queue returns within the threshold. The default value is 100 MB and the name of the setting is **_BESRelay_Query_ResultsMemoryLimit**.

   For more information about this setting, see Query.
7. When the server receives the result, it stores it in a dedicated queue from where a dedicated FillDB thread gets the data to store it in the database. In this way, the normal processing on the BigFix server is not impacted.

   The database stores, for a specified time period, both the BigFix Query request and its responses, that can be used, for example, to be filtered, displayed, or to create reports.

On a timely basis the BigFix Query Application checks the database for updates and updates the displayed results accordingly.

What can you customize for this step?

From the BigFix Administrative Tool you can customize on the server:

For how long the BigFix Query requests are stored in the database before being deleted.

The default value is 1440 hours (60 days) and the name of the advanced option is **queryHoursToLive**.

For how long the BigFix Query responses are stored in the database before being deleted.

The default value is 4 hours and the name of the advanced option is **queryResultsHoursToLive**.

How many requests and responses, for which queryHoursToLive or queryResultsHoursToLive elapsed, are deleted at a time from the database.

The default value is 100000 entries and the name of the advanced option is **queryPurgeBatchSize**.

For more information about these advanced options, see Advanced Options.

For information about how to edit computer settings, see Edit Settings for Computer.

Chapter 14. The Plugin Portal

The Plugin Portal is a new component introduced in BigFix 10 to help manage cloud devices as well as modern devices such as Windows 10 and MacOS endpoints enrolled to BigFix. For details on modern client management, see the Modern Client Management documentation.

The Plugin Portal is a prerequisite for the installation of individual plugins for cloud or modern devices on your network. It is functional only in the presence of cloud plugins.

Scalability and performance considerations

The Plugin Portal should be installed on a dedicated instance. The instance might be physical or virtual. The memory, CPU, and IO requirements scale with the number of endpoints and the amount of content being managed.

In a nutshell, the BigFix 10.0.4 Plugin Portal scales higher and consumes fewer resources per managed endpoint.

For details, see BigFix Performance & Capacity Planning Resources.

In BigFix 10.0.4, the Plugin Portal management capabilities have grown from 10,000 to 50,000 endpoints per instance. This was achieved through the optimization of resources, and schedule management improvements.

One important optimization has been content reduction. To be more specific, in BigFix 10.0.4, the Plugin Portal adds two functionalities to help filter not needed content: Custom Site management (on page 161) and Filtering the content of subscribed sites (on page 165).

In general, default installation of the BigFix 10.0.4 Plugin Portal has been optimized for excellent performance and resilience. Fine tuning is optional but can further improve performance; it is anyway recommended to carefully read Custom Site management (on page 161) before upgrading from older versions, since certain Custom Sites might get unsubscribed.

Prerequisites for installing the Plugin Portal

On the target computers where you intend to install the Plugin Portal, you must install:

- BigFix Agent, Version 10.0 or higher.
- Up to BigFix Version 10.0.8, MongoDB Version 4.2 or higher.

  Note: If you are installing MongoDB on Red Hat Enterprise Linux with SELinux in *Enforcing* mode, you need to do some additional configuration. For details, see Install MongoDB Community Edition on Red Hat or CentOS.

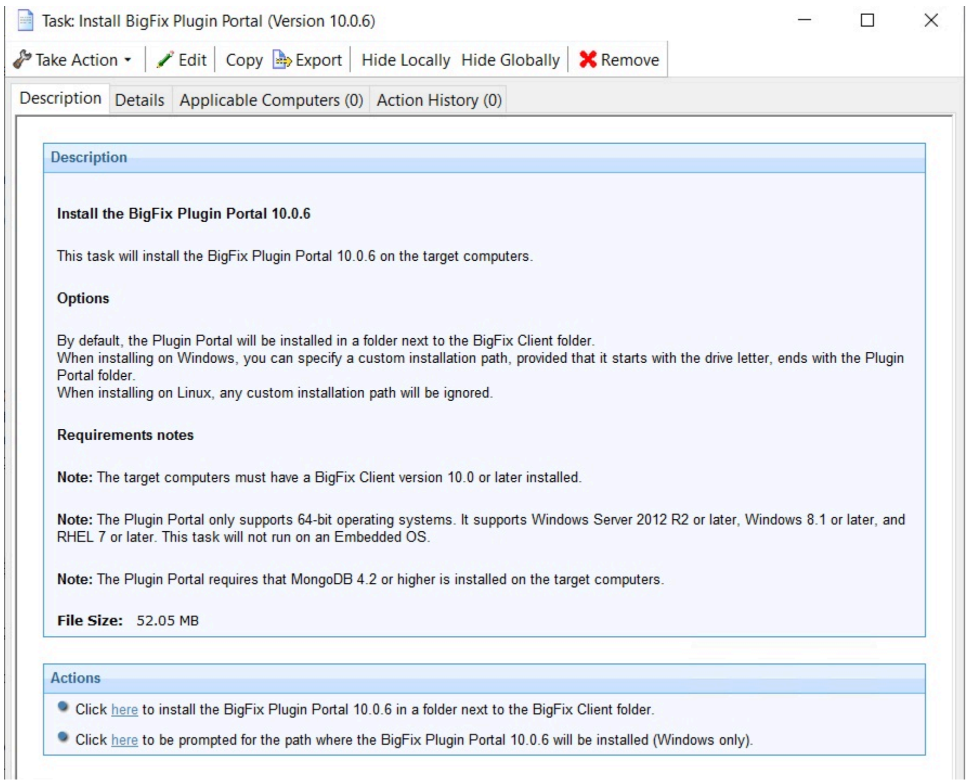
- Starting from BigFix Versions 10.0.9 and later, MongoDB is no longer required.

Note: You must enable the HTTPS traffic, incoming into the target computer where you installed the Plugin Portal, on the TCP port 52311. If there is a rule preventing this communication, the Plugin Portal will not receive the updates from its Parent Relay and the actions to the devices managed by the Plugin Portal will not complete.

You must ensure that on these target computers you do not have the BigFix Relay or the BigFix Server installed as the Plugin Portal is not compatible with those components. Moreover, the Plugin Portal cannot be installed on computers on which the PeerNest (on page 306) feature is enabled.

Installing the Plugin Portal

To install the Plugin Portal on a BigFix Agent, run the Task named **Install BigFix Plugin Portal (Version x)** from the BES Support site. This Task installs the BigFix Plugin Portal version x.x on the selected targets.



Description

Install the BigFix Plugin Portal 10.0.6

This task will install the BigFix Plugin Portal 10.0.6 on the target computers.

Options

By default, the Plugin Portal will be installed in a folder next to the BigFix Client folder.
When installing on Windows, you can specify a custom installation path, provided that it starts with the drive letter, ends with the Plugin Portal folder.
When installing on Linux, any custom installation path will be ignored.

Requirements notes

Note: The target computers must have a BigFix Client version 10.0 or later installed.

Note: The Plugin Portal only supports 64-bit operating systems. It supports Windows Server 2012 R2 or later, Windows 8.1 or later, and RHEL 7 or later. This task will not run on an Embedded OS.

Note: The Plugin Portal requires that MongoDB 4.2 or higher is installed on the target computers.

File Size: 52.05 MB

Actions

- Click here to install the BigFix Plugin Portal 10.0.6 in a folder next to the BigFix Client folder.
- Click here to be prompted for the path where the BigFix Plugin Portal 10.0.6 will be installed (Windows only).

By default, the Plugin Portal is installed in the following directories:

- Windows:
  - C:\Program Files (x86)\BigFix Enterprise\BES Plugin Portal
- Linux:
  - /var/opt/BESPluginPortal
  - /opt/BESPluginPortal

Note: You might have several Plugin Portals in your environment, but there can be just one Plugin Portal installed on any given target computer.

Starting from BigFix 10.0.5, when installing the Plugin Portal on Windows, you can specify a custom installation path that starts with a drive letter and ends with the Plugin Portal folder. When installing the Plugin Portal on Linux, any custom installation path is ignored.

Starting from BigFix 10.0.9, in the Plugin Portal Installation Fixlet, the MongoDB service is no longer checked as a prerequisite for the installation.

You can configure the Plugin Portal by using a few client settings. For details, see Plugin Portal.

You can install the Plugin Portal through WebUI as well. For details, see WebUI documentation.

Upgrading the Plugin Portal

Prerequisite: Upgrade the BigFix Server, Relay, and Console.

To upgrade the Plugin Portal, run the Fixlet named **Updated Plugin Portal - BigFix version X** from the BES Support site. The Fixlet becomes relevant on your endpoints only after the BigFix Server is upgraded. Clients acknowledge that the BigFix Server is upgraded and then begin to report any other upgrade fixlets as relevant (by default, the clients check for the version of the server on registration every once in six hours).

Upgrading the Plugin Portal might prevent your proxied endpoints from reporting on action status and retrieved properties for a specific duration. It is recommended that you run the upgrade when the disruption to your IT operations due to this is minimal. For assistance, contact HCL Technical Support.

Note: Starting from BigFix Versions 10.0.9 and later, during the Plugin Portal upgrade, the MongoDB table, if present, gets migrated. The migration of the reports from the MongoDB will not require manual steps; it will be automatically executed at the initial startup of the Plugin Portal after upgrading to BigFix Version 10.0.9. All reports present in the MongoDB table are migrated into the new SQLite database. After the migration, the MongoDB table is dropped and the Plugin Portal will work with SQLite databases only. If the migration step fails, the MongoDB table continues to exist and will not lose any data.

Uninstalling the Plugin Portal

To uninstall the Plugin Portal from an endpoint, run the Task named **TROUBLESHOOTING: Uninstall BigFix Plugin Portal** from the BES Support site. The Task removes the following:

- The Plugin Portal
- Client settings as relevant
- Files and directories within the Plugin Portal installation and storage directories

Up to BigFix Version 10.0.8, the Task uses the `-deletedatabase` option to drop the Plugin Portal database on MongoDB.

Custom Site management

Usually, Custom Sites are designed to distribute content to endpoints having the BigFix Agent installed.

Subscribing the devices discovered by the Plugin Portal to a Custom Site with unusable content requires unnecessary effort to evaluate and manage the content, producing unnecessary resource usage and poor performance.

For this reason, starting from BigFix 10.0.4, the Plugin Portal adds an additional filter to subscribe the devices it discovers to Custom Sites.

Before BigFix 10.0.4, the Plugin Portal subscribed the devices to a Custom Site after evaluating the applicability relevance resulting from the subscription conditions of the site. Now the applicability relevance will be evaluated by the Plugin Portal **only** if it uses one of the following inspectors:

- **in agent context**
- **in proxy agent context**
- **in plugin portal context**

If the applicability relevance of the Custom Site **does not** use any of the inspectors mentioned above, the Custom Site is not evaluated by the Plugin Portal: the devices it discovers will not subscribe the Custom Site.

If the applicability uses at least one of those inspectors, the subscription to the site **depends on the evaluation of the applicability relevance**, as happened with previous releases.

To clarify with an example, before BigFix 10.0.4, to subscribe all agents to a Custom Site you can use this relevance expression:

- **true**

corresponding to the ***All Computers*** choice in the **Computer Subscription** Console tab. Starting from BigFix 10.0.4, if you need to include also the Plugin Portal agents, you have to explicitly use one of the above described inspectors, for example:

- **true or in plugin portal context**

otherwise the agents discovered by the Plugin Portal **do not subscribe** to the site.

This change only applies to the Plugin Portal represented endpoints, not to endpoints represented by the Proxy Agent.

Nothing changes for agents not discovered by the Plugin Portal, they subscribe the Custom Site depending on the evaluation of the site applicability relevance.

Nothing **changes** for the content of the Custom Site: if a device subscribes the site, the applicability of each content element (Fixlet, task, analysis...) depends only on the relevance specified for the element.

The feature can be disabled by setting

_BESPluginPortal_Performance_ExcludeCustomSitesSubscription = 0

to the client where the Plugin Portal is installed. With this setting, the Plugin Portal behaves as in versions prior to 10.0.4.

This feature is enabled by default. As a consequence, when upgrading the Plugin Portal from versions older than 10.0.4, the **Plugin Portal agents might get unsubscribed from certain Custom Sites**. If you want to prevent this behavior, you must disable the feature before upgrading. When upgrading using the BigFix Console, the Fixlet **Updated Plugin Portal - BigFix version X** also gives you an option to disable it. This option is not available using the BigFix WebUI.

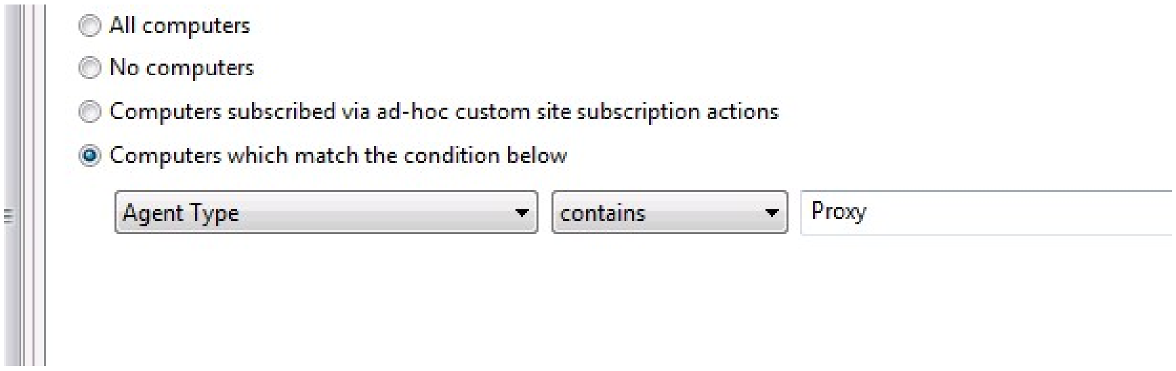
Here are some examples of Custom Site applicability relevance:

- to subscribe only the Plugin Portal agents:
    - **in plugin portal context**
- to subscribe only the native agents:
    - **in agent context**
- to subscribe all agents but not the Plugin Portal ones:
    - **true**
- to subscribe all agents, use one of these:
    - **true or in plugin portal context**
    - **true or in proxy agent context**
- to subscribe only the ***proxied*** agents, which are the ones discovered by the Plugin Portal or by the Proxy Agent, use one of these:
    - **in proxy agent context**
    - **not in agent context**
- to subscribe all the Plugin Portal agents whose names contain “dept1”, case insensitive:
    - **in plugin portal context and exists (computer name) whose (it as string as lowercase contains "dept1")**
- to subscribe all the proxied agents installed on a Red Hat OS:
    - **in proxy agent context and exists (operating system) whose (name of it as lowercase contains "red hat")**
- to subscribe all agents installed on a Red Hat OS except the Plugin Portal ones:
    - **exists (operating system) whose (name of it as lowercase contains "red hat")**

Here are some examples using the **Computer Subscription** Console tab.

Since the Console resolves the **Agent Type** condition into an expression that uses the **in proxy agent** inspector, setting this condition will be enough to ensure that it is not ignored by the Plugin Portal.

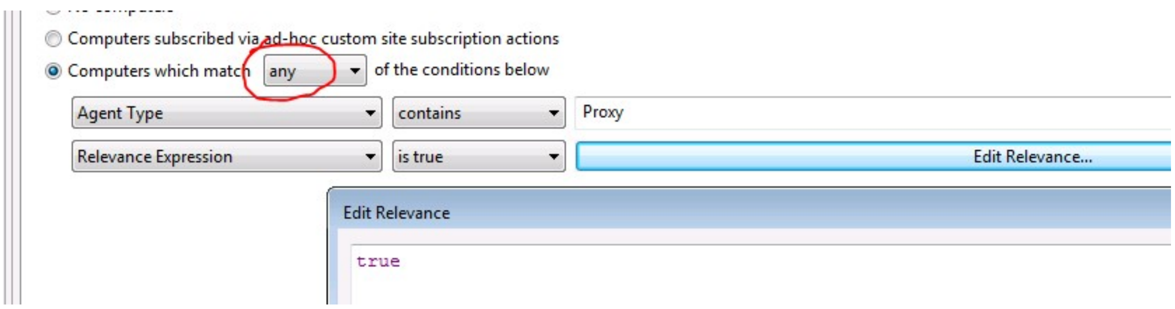
- To subscribe only proxied agents:



All computers
No computers
Computers subscribed via ad-hoc custom site subscription actions
Computers which match the condition below [✓]

Agent Type | contains | Proxy

- To subscribe all the agents:



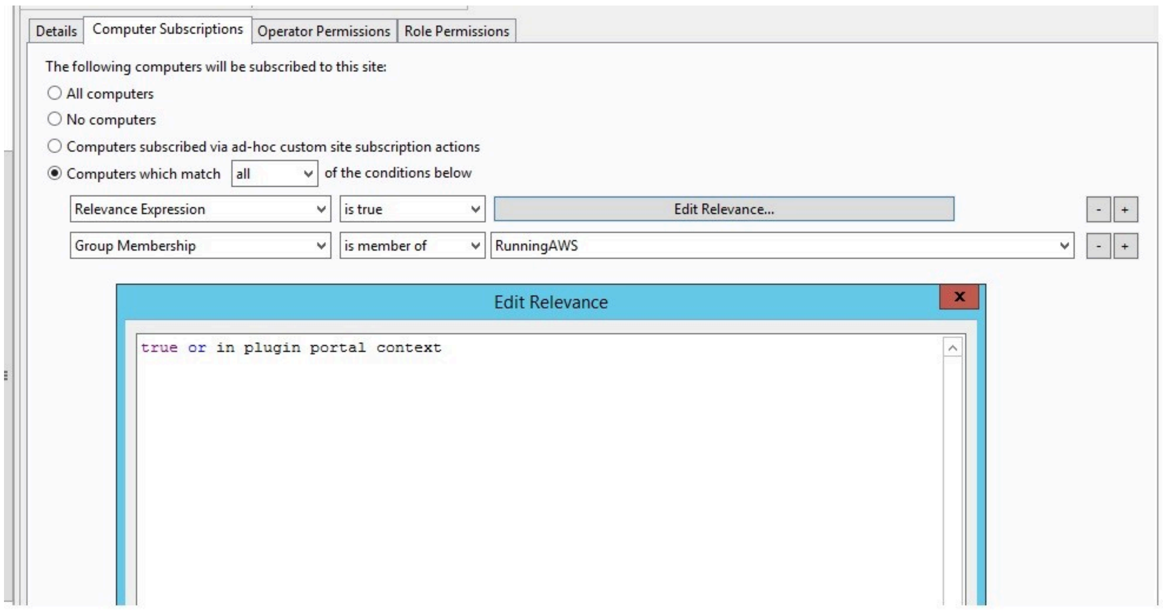
Computers subscribed via ad-hoc custom site subscription actions
Computers which match any of the conditions below [✓]

Agent Type | contains | Proxy
Relevance Expression | is true | Edit Relevance...

Edit Relevance

```
true
```

- To subscribe all agents of the specified Server Based Computer group:



The following computers will be subscribed to this site:
All computers
No computers
Computers subscribed via ad-hoc custom site subscription actions
Computers which match all of the conditions below [✓]

Relevance Expression | is true | Edit Relevance...
Group Membership | is member of | RunningAWS

Edit Relevance

```
true or in plugin portal context
```

Filtering the content of subscribed sites

To reduce the load on the Plugin Portal, starting from BigFix 10.0.4, the Plugin Portal adds a new functionality to avoid managing unnecessary content on the devices it discovers.

Reducing the content is the first thing to do to improve performance, speed up operations and reduce costs. It is highly recommended that you follow the instructions below to filter out Fixlets and analyses not needed to devices discovered by the Plugin Portal for all your External Sites that cannot be entirely excluded. This may be achieved by setting an appropriate subscription relevance or your Custom Sites passing the filter described in Custom Site management (on page 161).

The content filtering functionality described below is simpler and more efficient than changing the relevance of each not needed Fixlet, action or analysis, since the Plugin Portal is not forced to evaluate unnecessary relevance.

After a site is downloaded, at gathering time, the Plugin Portal can exclude some Fixlets or analyses from the evaluation process. It is sufficient to specify the excluded content in a json file, named `PluginPortalSubscriptionOptions.json`, and include it to the site itself.

The json file is composed of three arrays:

- **ExcludedFiles**: array of strings defining the list of **FXF names** to be ignored.
- **ExcludedFixletIDs**: array of integers defining the list of **Fixlet/task IDs** to be ignored.
- **ExcludedAnalysisIDs**: array of integers defining the list of **analysis IDs** to be ignored.

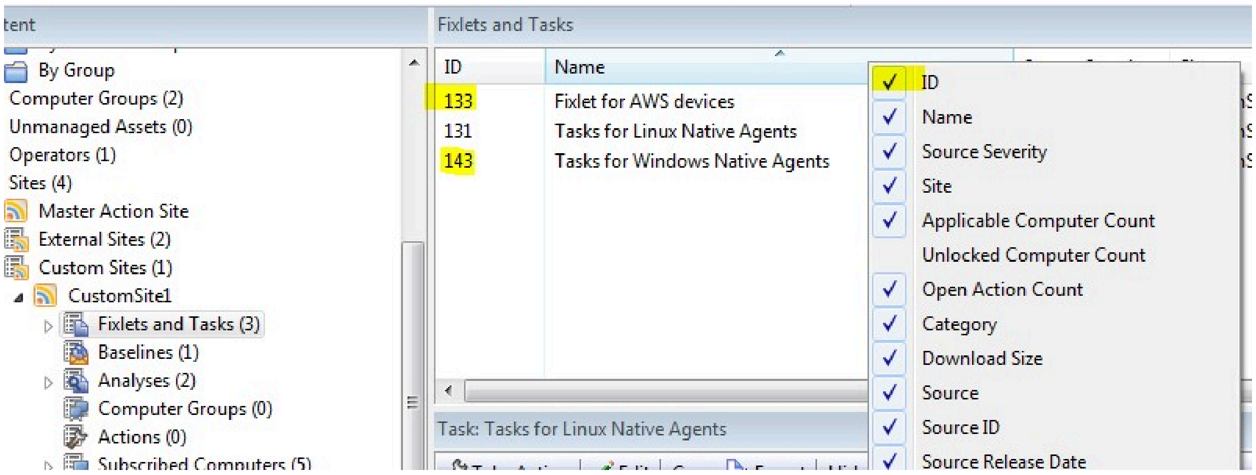
An example of json file:

```
{
  "ExcludedFiles": [
   "My Windows analyses.fxf",
   "Department 121.fxf"
  ],
  "ExcludedFixletIDs": [
   209, 31, 405
  ],
  "ExcludedAnalysisIDs": [
   211, 33
  ]
 }
```

Providing a file name, all the content of that file is ignored by the Portal Plugin during the evaluation phase. If it is not possible to specify a file name, such as for **Custom Sites** or for FXF defining content that must be consumed by proxied devices too, you can provide a list of Fixlet, Task or Analysis IDs to be ignored.

Below is an example using a Custom Site.

To get the IDs of content to exclude, open the **Fixlets and Tasks** BigFix Console panel for the Custom Site and look at the ID column. If the column is not visible, right click the column names and check the ID entry to display the corresponding column.

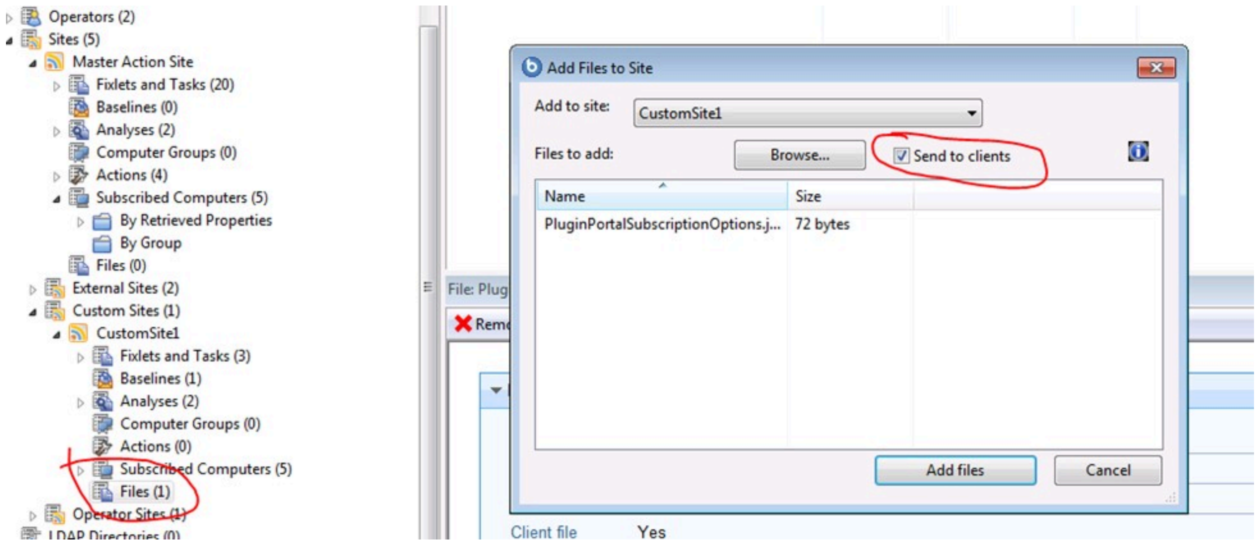


Do the same in the **Analyses** panel.

Once you got the IDs, create the json file anywhere in the BigFix Console machine:

```
{
  "ExcludedFixletIDs": [
   133, 143
  ],
  "ExcludedAnalysisIDs": [
   211, 33
  ]
}
```

Then, you can add the json file to the Custom Site. Ensure that you check the **Send to clients** option.



Name	Size
PluginPortalSubscriptionOptions.j...	72 bytes

By clicking **Add files** the new version of the Custom Site will be distributed to all subscribed computers, including the ones discovered by the Plugin Portal.

Action commands for configuring the BES Plugin Portal plugins

The Plugin Portal plugins can be configured by storing settings in the PluginStore sqlite database. This can be easily accomplished by using some action commands specifically designed for the task.

Introduction

The commands syntax to operate on the PluginStore database through the action scripts is as follows:

```
plugin store "<plugin name>" set "<plugin store key>" value "<setting
 value>" on "{now}"
plugin store "<plugin name>" set encrypted "<plugin store key>" value
 "<setting value>" on "{now}"
```

```
plugin store "<plugin name>" delete "<plugin store key>"
plugin store "<plugin name>" multiple set "<percent encoded json>" on
 "{now}"
plugin store "<plugin name>" multiple set encrypted "<percent encoded
 json>" on "{now}"
```

The **plugin store** command accepts the name of a Plugin, such as `VMwareAssetDiscoveryPlugin`.

The **plugin store key** that follows the **set** keyword always looks like a set of words, called subsections, separated by an underscore, such as `Log_Path`.

The parameter that follows the **value** keyword can be whatever is appropriate to the chosen setting.

An example of how a command should look like:

```
plugin store "AWSAssetDiscoveryPlugin" set "Log_Verbose" value "0" on
 "{parameter "action issue date" of action}"
```

For your reference, consider that the PluginStore database schema is as follows:

Key	Value	Effective Date
TEXT NOT NULL PRIMARY KEY	KEY TEXT NOT NULL	DATE

For more details about the plugin store command, see plugin store.

Configuring the cloud plugins

Several cloud plugins can be installed on the Plugin Portal, in order to manage Amazon Web Services, Microsoft Azure, Google Cloud Platform and VMware cloud environments.

All plugin store commands to configure the plugins should start with the **plugin store** command. For more details on the commands syntax to operate on the PluginStore database, see Introduction (on page 167).

The required plugin names that should follow the "plugin store" keyword for the configuration of the cloud plugins are:

- **AWSAssetDiscoveryPlugin**
- **AzureAssetDiscoveryPlugin**
- **GCPAssetDiscoveryPlugin**
- **VMwareAssetDiscoveryPlugin**

This information is key to configure the settings in the Plugin Store, since the plugin store action commands rely on those names to correctly build up the settings keys.

The options accepted by the **plugin store** command are **set**, **multiple set** and **delete**. If the **set** and **multiple set** keywords are decorated with the keyword **encrypted**, it will result in an encrypted value in the database.

The **set** option must be followed by the Plugin Store key that we want to set, followed by the **value** keyword and the value itself that we want to store. Lastly, the current date is specified after the **on** keyword.

Here follows an example:

plugin store "AWSAssetDiscoveryPlugin" **set** "Credentials_AccessKey_myLabel" **value** "myAccessKey" **on** "{parameter "action issue date" of action}"

pluginstore "AWSAssetDiscoveryPlugin" **set encrypted** "Credentials_SecretAccessKey_myLabel" **value** "mySecret" **on** "{parameter "action issue date" of action}"

The following settings will display in the Plugin Store:

Key	Value	Effective Date
_AWSAssetDiscoveryPlugin_Credentials_AccessKey_myLabel	myAccessKey	0123456789
_AWSAssetDiscoveryPlugin_Credentials_SecretAccessKey_myLabel	{obf}ABCDEF...	0123456789

The **multiple set** option is used to quickly configure multiple settings at once. The **encrypted** option is available for this as well. The **multiple set** option must be followed by a percent encoded JSON that contains a list of the key-value pairs that must be added to the database. An example of the decoded JSON is the following:

```
{
    "Credentials_AccessKey_myLabel" : "myAccessKey",
    "Credentials_Region_myLabel" : "myLabelRegion",
    "HTTP_ProxyURL" : "myProxyURL",
    "HTTP_ProxyUser" : "myProxyUser"
}
```

For example, the output of the following command:

plugin store "AWSAssetDiscoveryPlugin" **multiple set** <example json> **on** "{parameter "action issue date" of action}"

should be the addition of the following settings to the Plugin Store:

Key	Value	Effective Date
_AWSAssetDiscoveryPlugin_Credentials_AccessKey_myLabel	myAccessKey	0123456789
_AWSAssetDiscoveryPlugin_Credentials_Region_myLabel	myLabelRegion	0123456789
_AWSAssetDiscoveryPlugin_HTTP_ProxyURL	myProxyURL	0123456789
_AWSAssetDiscoveryPlugin_HTTP_ProxyUser	myProxyUser	0123456789

The "on" keyword is required by the set commands and should be followed by the date at which the setting is issued:

[...] **on** "{parameter "action issue date" of action}"

The delete option will simply remove a certain key from the plugin store:

plugin store "AWSAssetDiscoveryPlugin" **delete** "Credentials_Region_myLabel"

Key	Value	Effective Date
_AWSAssetDiscoveryPlugin_Credentials_AccessKey_myLabel	myAccessKey	0123456789
_AWSAssetDiscoveryPlugin_HTTP_ProxyURL	myProxyURL	0123456789
_AWSAssetDiscoveryPlugin_HTTP_ProxyUser	myProxyUser	0123456789

Issuing the delete command followed by the keyword **all** will result in all the Plugin Store settings for a given plugin to be deleted.

plugin store "AWSAssetDiscoveryPlugin" **delete all**

Many of the plugins settings are bound to a certain set of credentials, which in turn are identified by what we call a credential label. As such, is a good practice, when building an action script, to store a label in an action parameter in order to re-use it multiple times later in the action script:

```
parameter "credentialsLabel" = "<my label>"
```

Note: The values that you must replace are only the ones wrapped by angled brackets, like <my label>.

If a key or part of it needs to be repreated multiple times, it can be stored in a parameter as well and it can be concatenated later.

```
parameter "accessKey" = "Credentials_AccessKey"
parameter "secretAccessKey" = "Credentials_SecretAccessKey"
```

For example, a new parameter can be defined by the concatenation of the previous parameters:

```
parameter "credentialsLabel" = "<my label>"
```

When configuring the plugin programmatically it could be useful to check whether a parameter exists or if it is not empty, in order to achieve that, simply wrap your code in an if block:

```
if {(exists parameter "myParam")AND (parameter "myParam" != "")}
 // my code
endif
```

Common Plugin settings

The following settings are common among all cloud plugins:

Discovery_Region - The default region for the plugin. This region will be used to retrieve the list of region enabled for all the AWS accounts related to the credentials stored in the plugin. This setting is mandatory.

Log_Path - The path of the log of the plugin.

Log_Verbose - When set to 1, debug logging is enabled. When set to 0, only info logging is displayed.

JSON file settings - Some settings are defined for the cloud plugins through a JSON called settings.json. Here is an example of such a JSON.

```
{
    "ID": <plugin name>,
    "ConfigurationOptions": "",
    "DeviceReportRefreshIntervalMinutes": <refresh interval in minutes>,
    "DeviceReportExpirationIntervalHours": 168,
    "CommandFormat": "JSON",
    "SendSettingsToPlugin": [],
    "ExecutablePath": <executable path>,
    "HandlePartialRefresh": false,
    "FullReportsInRefreshAll": true,
    "NoRefreshBeforeActionIntervalMinutes": 60
}
```

AWSAssetDiscoveryPlugin configuration

Here are the settings needed to fully configure the Amazon Web Services plugin.

IAM User specific settings

Credentials_AccessKey_<label> - The Access Key ID associated to an IAM User. This setting is mandatory.

Credentials_SecretAccessKey_<label> - The Secret Access Key associated to an IAM User. The value of this setting must be encrypted. This setting is mandatory.

Credentials_Region_<label> - The default region for the IAM User credentials with label <label>. This region overrides the Discovery Region.

Credentials_Roles_<label>_<arn> - The region of the role with ARN <arn> to be assumed by the IAM User with label <label>. This region overrides both the Credentials Region and the Discovery Region. The value can be empty.

Credentials_Roles_ExternalId_<label>_<arn> - The external ID of the role with ARN <arn> to be assumed by the IAM User with label <label>. The value must be encrypted. The setting can be omitted if the IAM Roles does not require an external ID.

Advanced settings

HTTP_ProxyURL - The URL of the HTTP Proxy for the plugin.

HTTP_ProxyUser - The User of the HTTP Proxy for the plugin.

HTTP_ProxyPassword - The Password of the HTTP Proxy for the plugin. The value of this setting must be encrypted.

RegionAllowedList_<label> - Forces the plugin to execute discovery only on the listed regions for the user with label <label>. Separate regions with a semicolon ';'.

Example: `eu-central-1;eu-west-1;us-east-1`

When installing the AWS plugin, you can specify the allowed regions. For more details about how to limit the AWS regions, see Limit AWS Regions to restrict the scope of device discovery.

Example of AWSAssetDiscoveryPlugin configuration

Initializing some parameters:

```
parameter "firstLabel" = "foo"
parameter "secondLabel" = "bar"

parameter "accessKey" = "Credentials_AccessKey"
parameter "secretAccessKey" = "Credentials_SecretAccessKey"
```

Note: foo and bar are just invented names for our labels. However, **Credentials_AccessKey** and **Credentials_SecretAccessKey** are real setting names. We are defining these four parameters because, by combining them, we can define the keys that we need to set the user key and password like specified above.

Setting the plugin default region:

```
plugin store "AWSAssetDiscoveryPlugin" set "Discovery_Region" value
 "eu-west-1" on "{parameter "action issue date" of action}"
```

Configuring the first user:

```
parameter "firstUserAccessKey" = "{parameter "accessKey"}_{parameter
 "firstLabel"}"
parameter "firstUserPassword" = "{parameter "secretAccessKey"}_{parameter
 "firstLabel"}"
plugin store "AWSAssetDiscoveryPlugin" set "{parameter
 "firstUserAccessKey"}" value "<myUserKey1>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted "{parameter
 "firstUserPassword} value "<myUserPass1>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Region_{parameter
 "firstLabel"}" value "eu-central-1" on "{parameter "action issue date" of
 action}"
```

Note: We combined the first four parameters into two new parameters, by concatenating them by pairs, in order to fully define the Plugin Store keys. To concatenate the parameters, we are just assigning to a new parameter the string composed by the two parameters separated by an underscore. As such, the content of the parameter “firstUserAccessKey” would be “Credentials_AccessKey_foo”.

Configuring the second user:

```
parameter "secondUserAccessKey" = "{parameter "accessKey"}_{parameter
 "secondLabel"}"
parameter "secondUserPassword" = "{parameter "secretAccessKey"}_{parameter
 "secondLabel"}"
plugin store "AWSAssetDiscoveryPlugin" set "{parameter
 "secondUserAccessKey"}" value "<myUserKey2>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted "{parameter
 "secondUserPassword} value "<myUserPass2>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Roles_{parameter
 "secondLabel"}_fakeRoleARN1" value "us-east-1" on "{parameter "action
 issue date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Roles_{parameter
 "secondLabel"}_fakeRoleARN2" value "us-west-1" on "{parameter "action
 issue date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted
 "Credentials_Roles_ExternalId_{parameter
 "secondLabel"}_fakeRoleARN2" value "myExternalId" on "{parameter "action
 issue date" of action}"
```

Setting the log to verbose:

```
plugin store "AWSAssetDiscoveryPlugin" set "Log_Verbose" value "1" on
 "{parameter "action issue date" of action}"
```

Setting the list of allowed regions:

```
plugin store "AWSAssetDiscoveryPlugin" set "RegionAllowedList_{parameter
 "secondLabel"}" value "us-east-1;us-west-1" on "{parameter "action issue
 date" of action}"
```

When installing the AWS plugin, you can specify the allowed regions. For more details about how to limit the AWS regions, see Limit AWS Regions to restrict the scope of device discovery.

An example of the expected output in the PluginStore is:

Key	Value
_AWSAssetDiscoveryPlugin_Credentials_AccessKey_foo	myUs
_AWSAssetDiscoveryPlugin_Credentials_SecretAccessKey_foo	{obf}A
_AWSAssetDiscoveryPlugin_Credentials_Region_foo	eu-cen
_AWSAssetDiscoveryPlugin_Credentials_AccessKey_bar	myUs
_AWSAssetDiscoveryPlugin_Credentials_SecretAccessKey_bar	{obf}A
_AWSAssetDiscoveryPlugin_Credentials_Roles_bar_fakeRoleARN1	us-eas
_AWSAssetDiscoveryPlugin_Credentials_Roles_bar_fakeRoleARN2	us-we
_AWSAssetDiscoveryPlugin_Credentials_Roles_ExternalId_bar_fakeRoleARN2	{obf}A
_AWSAssetDiscoveryPlugin_Discovery_Region	eu-we
_AWSAssetDiscoveryPlugin_Log_Verbose	1
_AWSAssetDiscoveryPlugin_RegionAllowedList_bar	us-eas

AzureAssetDiscoveryPlugin configuration

Here are the settings needed to fully configure the Microsoft Azure Plugin.

IAM User specific settings

Credentials_ClientID_<label> - The Client ID for the user with label <label>.

Credentials_ClientSecret_<label> - The Client Secret for the user with label <label>.

Credentials_SubscriptionID_<label> - The Subscription ID for the user with label <label>.

Credentials_TenantID_<label> - The tenant ID for the user with label <label>.

Example of AzureAssetDiscoveryPlugin configuration

```
parameter "myLabel" = "foo"
plugin store "AzureAssetDiscoveryPlugin" set
 "Credentials_TenantID_{parameter "myLabel"}" value "myTenantID" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set
 "Credentials_ClientID_{parameter "myLabel"}" value "myClientID" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set encrypted
 "Credentials_ClientSecret_{parameter "myLabel"}" value "myClientSecret" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set
 "Credentials_SubscriptionID_{parameter "myLabel"}" value
 "mySubscriptionID" on "{parameter "action issue date" of action}"
```

Where:

myTenantID

Is the tenant ID for the user.

myClientID

Is the Client ID for the user.

myClientSecret

Is the Client Secret for the user.

mySubscriptionID

Is the Subscription ID for the user.

GCPAssetDiscoveryPlugin configuration

Here are the settings needed to fully configure the Google Cloud Platform Plugin.

Service Account specific settings

Credentials_JSON_<label> - The encrypted JSON key related to a service account member of a project on GCP.

The GCP JSON key file will look something like this:

```
{
  "type": "service_account",
  "project_id": "test-123456",
  "private_key_id": "0123456789abcdefghilmnopqrstuvz",
  "private_key": "-----BEGIN PRIVATE KEY-----\naVeryLongKey\n-----END
 PRIVATE KEY-----\n",
  "client_email": "testusersvc@test-123456.iam.gserviceaccount.com",
  "client_id": "01234567891011121314",
  "auth_uri": "https://accounts.google.com/o/oauth2/auth",
  "token_uri": "https://oauth2.googleapis.com/token",
  "auth_provider_x509_cert_url":
 "https://www.googleapis.com/oauth2/v1/certs",
  "client_x509_cert_url":
 "https://www.googleapis.com/robot/v1/metadata/x509/
  testusersvc%40test-123456.iam.gserviceaccount.com"
}
```

The JSON key must be percent encoded before feeding it to the plugin store action command. Since all the information required to configure a service account into the GCP Plugin is contained in the JSON, this is the only setting to insert or delete.

The JSON must be encrypted, since it contains the private key.

Example of GCPAssetDiscoveryPlugin configuration

```
parameter "jsonKey" = "<percent encoded json>"
plugin store "GCPAssetDiscoveryPlugin" set encrypted
 "Credentials_JSON_foo" value "{parameter "jsonKey"}" on "{parameter
 "action issue date" of action}"
```

VMWareAssetDiscoveryPlugin configuration

Here are the settings needed to fully configure the VMware Plugin.

IAM User specific settings

Credentials_Username_<label> - The username for the user with label <label>.

Credentials_Password_<label> - The encrypted password for the user with label <label>.

Credentials_URL_<label> - The credentials label for the user with label <label>.

Example of VMwareAssetDiscoveryPlugin configuration

```
parameter "myLabel" = "foo"
plugin store "VMWareAssetDiscoveryPlugin" set
 "Credentials_Username_{parameter "myLabel"}" value "myUsername" on
 "{parameter "action issue date" of action}"
plugin store "VMWareAssetDiscoveryPlugin" set "Credentials_URL_{parameter
 "myLabel"}" value "myURL" on "{parameter "action issue date" of action}"
plugin store "VMWareAssetDiscoveryPlugin" set encrypted
 "Credentials_Password_{parameter "myLabel"}" value "myPassword" on
 "{parameter "action issue date" of action}"
```

Where:

myUsername

Is the username for the user.

myURL

Is the credentials label for the user.

myPassword

Is the encrypted password for the user.

Configuring the BESPluginPortal Plugins through REST API

The plugins configuration can be carried out by issuing BigFix Actions through rest APIs.

The data to be passed to the rest APIs must be a BES XML file.

It is sufficient to create an action script containing the commands for the desired configuration, and then fill the fields of the BES XML for the actions accordingly. An example of such XML is the one below.

```
<?xml version="1.0" encoding="utf-8"?>
<BES xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd=
"http://www.w3.org/2001/XMLSchema" SkipUI="true">
    <SingleAction>
        <Title>test action</Title>
        <Relevance>true</Relevance>
        <ActionScript>
            plugin store "<plugin name>" set "<setting key>" value
 "<setting value>" on "{parameter "action issue date" of action}"
        </ActionScript>
        <SuccessCriteria />
        <Settings />
        <SettingsLocks />
        <Target>
            <ComputerID>0123456789</ComputerID>
        </Target>
    </SingleAction>
</BES>
```

The **ActionScript** element will contain the action script text.

The target of this action should be the Native representation of the BESPluginPortal machine on which the plugins to be configured are installed. As such, it is convenient to use the ComputerID element inside the Target field and fill its value with the appropriate computer ID.

After creating the XML file or the XML string by code, the action described in the XML can be issued by executing a POST.

The following command will execute the POST with cURL. The file action.xml will be posted to the server <server> through port <port> (usually 52311 for BigFix) and it will create and execute the action contained in action.xml.

```
curl --request POST --data-binary @action.xml --user <username>:<password>
 https://<server>:<port>/api/actions
```

```
curl -X POST -d @action.xml -ku <username>:<password>
 https://<server>:<port>/api/actions
```

For more information about the Action REST API resource, see Action or the BES.xsd and BESAPI.xsd files.

Alternatively, you can use the IEM CLI to easily issue requests to BigFix REST APIs.

In order to do that, first open a session with the IEM CLI. Open a terminal and locate the IEM CLI in the BigFix Server folder.

Then, run the following command:

```
iem login --server=<server>:<port> --user=<user> --password=<password>
```

Then, after the session is open, simply issue the request with the following command:

```
iem POST <path to action.xml> /api/actions
```

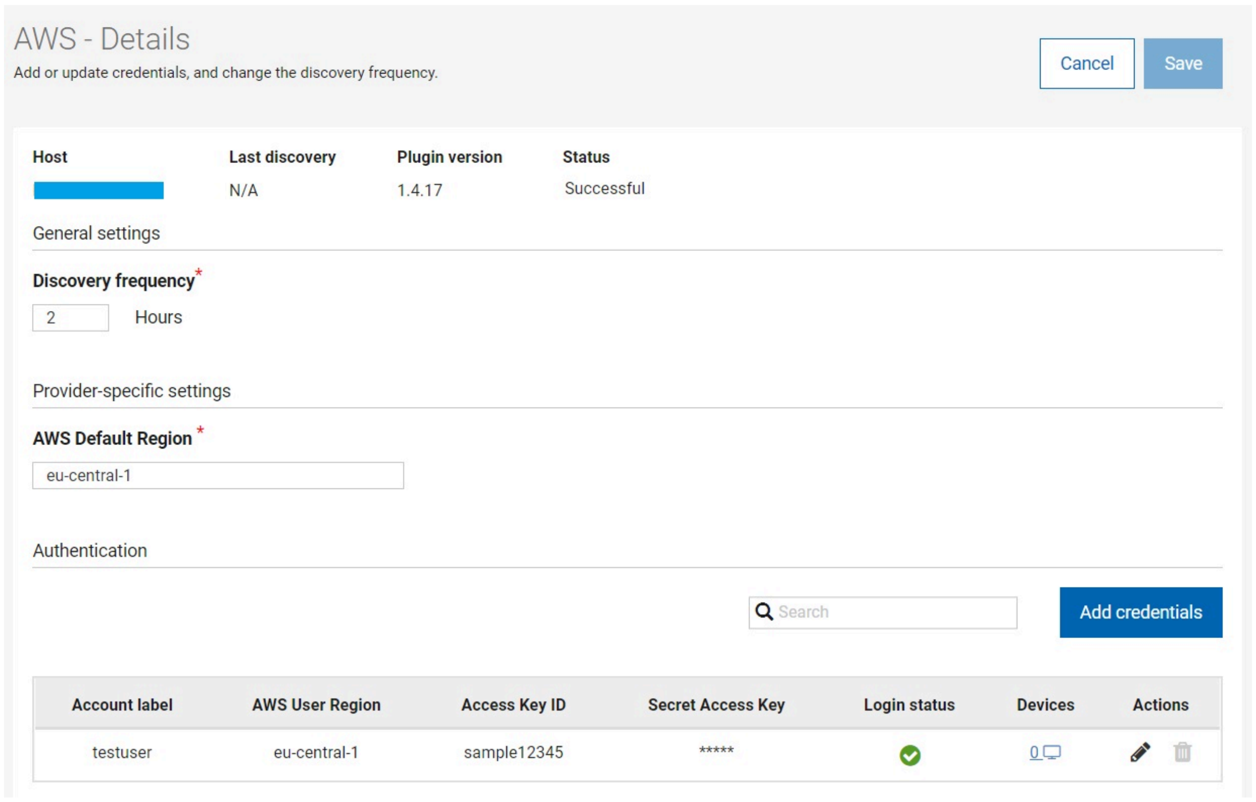
For further reference, see Running Requests from the IEM CLI.

Example 1: Configuring the AWS Plugin

In this example, we are going to configure the AWS Asset Discovery Plugin with the aid of a single action dispatched through the BigFix REST APIs.

Suppose that we already installed the AWS Plugin and have a user already configured but we want to quickly configure a bunch of other users.

As shown in the picture below, we can see that a Plugin is installed and in a Successful status, with a **testuser** configured that correctly executed the login.


AWS - Details
Add or update credentials, and change the discovery frequency.
Cancel
Save
Search
Add credentials

Host	Last discovery	Plugin version	Status
[redacted]	N/A	1.4.17	Successful

General settings

Discovery frequency*: 2 Hours

Provider-specific settings

AWS Default Region*: eu-central-1

Authentication

Account label	AWS User Region	Access Key ID	Secret Access Key	Login status	Devices	Actions
testuser	eu-central-1	sample12345	*****	✓	0	

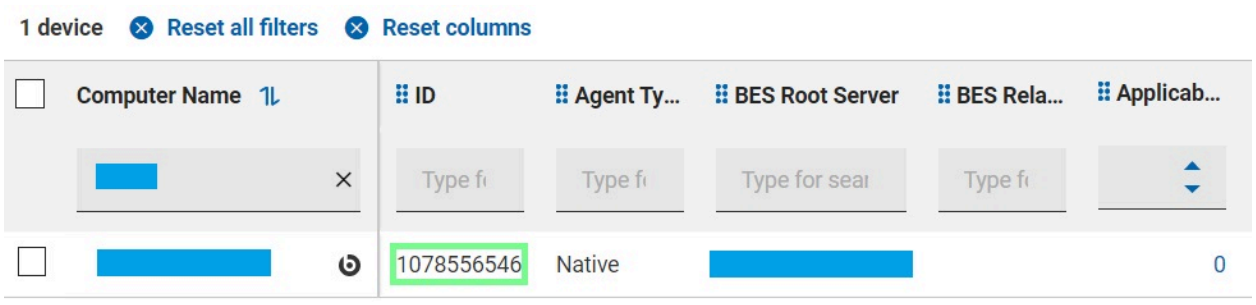
Let us now build an XML file that will be used to update our configuration. Such XML file will be passed as the data file by the REST API command.

Refer to the Configuring the BESPluginPortal Plugins through REST API (on page 180) and The BigFix REST API pages for more information.

We will use the following template for a simple action:

```
<?xml version="1.0" encoding="utf-8"?>
<BES xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema" SkipUI="true">
    <SingleAction>
        <Title>AWS Plugin Config Template</Title>
        <Relevance>true</Relevance>
        <ActionScript>
            <!--Your action script-->
        </ActionScript>
        <SuccessCriteria />
        <Settings />
        <SettingsLocks />
        <Target>
            <ComputerID><!--Your ComputerID--></ComputerID>
        </Target>
    </SingleAction>
</BES>
```

As you can see from the comments in the XML file, we have to fill in at least two fields. Let us begin from locating the **ComputerID**, which would be the ComputerID of the Portal machine upon which the AWSAssetDiscoveryPlugin is installed.



1 device   Reset all filters   Reset columns

	Computer Name	ID	Agent Ty...	BES Root Server	BES Rela...	Applicab...
	[redacted] ×	Type fi	Type fi	Type for sear	Type fi	
	[redacted]	1078556546	Native	[redacted]		0

Now let us build the action script for the configuration. Suppose that we want to configure two users, namely **testuser2** and **testuser3**. Those two users will have respectively, **us-east-1** and **af-south-1** as their regions, which should have priority over the default plugin region.

As mentioned in Configuring the cloud plugins *(on page 168)*, let us store useful keys and data in the action parameters:

```
parameter "firstLabel" = "testuser2"
parameter "secondLabel" = "testuser3"

parameter "accessKey" = "Credentials_AccessKey"
parameter "secretAccessKey" = "Credentials_SecretAccessKey"
parameter "region" = "Credentials_Region"
```

Then, write the commands to configure the plugin store settings:

Note: The values that you must replace are only the ones wrapped by angled brackets, like <myUserKey2>.

```
parameter "firstAccessKey" = "{parameter "accessKey"}_{parameter
 "firstLabel"}"
parameter "firstPassword" = "{parameter "secretAccessKey"}_{parameter
 "firstLabel"}"
plugin store "AWSAssetDiscoveryPlugin" set "{parameter
 "firstAccessKey"}" value "<myUserKey2>" on "{parameter "action issue date"
 of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted "{parameter
 "firstPassword"}" value "<myUserPass2>" on "{parameter "action issue date"
 of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Region_{parameter
 "firstLabel"}" value "us-east-1" on "{parameter "action issue date" of
 action}"

parameter "secondAccessKey" = "{parameter "accessKey"}_{parameter
 "secondLabel"}"
parameter "secondPassword" = "{parameter "secretAccessKey"}_{parameter
 "secondLabel"}"
```

```
plugin store "AWSAssetDiscoveryPlugin" set "{parameter
 "secondAccessKey"}" value "<myUserKey3>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted "{parameter
 "secondPassword"}" value "<myUserPass3>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Region_{parameter
 "secondLabel"}" value "af-south-1" on "{parameter "action issue date" of
 action}"
```

Now that we have what we need, simply save the filled XML file with a custom name, such as **action.xml**:

```
<?xml version="1.0" encoding="utf-8"?>
<BES xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema" SkipUI="true">
    <SingleAction>
        <Title>AWS Plugin Config Template</Title>
        <Relevance>true</Relevance>
        <ActionScript MIMEType="application/x-Fixlet-Windows-Shell">
parameter "firstLabel" = "testuser2"
parameter "secondLabel" = "testuser3"

parameter "accessKey" = "Credentials_AccessKey"
parameter "secretAccessKey" = "Credentials_SecretAccessKey"
parameter "region" = "Credentials_Region"

parameter "firstAccessKey" = "{parameter "accessKey"}_{parameter
 "firstLabel"}"
parameter "firstPassword" = "{parameter "secretAccessKey"}_{parameter
 "firstLabel"}"
```

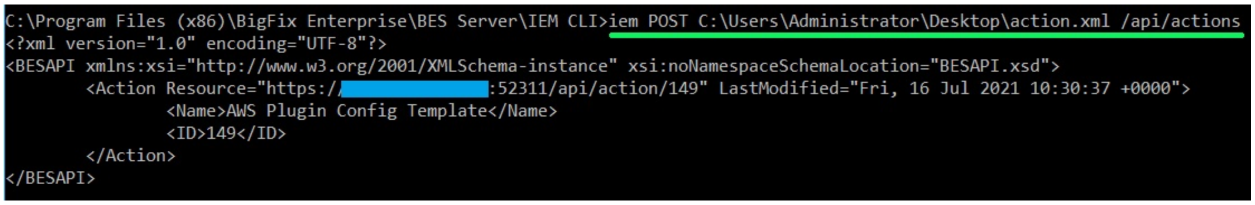
```
plugin store "AWSAssetDiscoveryPlugin" set "{parameter
 "firstAccessKey"}" value "<myUserKey2>" on "{parameter "action issue date"
 of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted "{parameter
 "firstPassword"}" value "<myUserPass2>" on "{parameter "action issue date"
 of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Region_{parameter
 "firstLabel"}" value "us-east-1" on "{parameter "action issue date" of
 action}"

parameter "secondAccessKey" = "{parameter "accessKey"}_{parameter
 "secondLabel"}"
parameter "secondPassword" = "{parameter "secretAccessKey"}_{parameter
 "secondLabel"}"
plugin store "AWSAssetDiscoveryPlugin" set "{parameter
 "secondAccessKey"}" value "<myUserKey3>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set encrypted "{parameter
 "secondPassword"}" value "<myUserPass3>" on "{parameter "action issue
 date" of action}"
plugin store "AWSAssetDiscoveryPlugin" set "Credentials_Region_{parameter
 "secondLabel"}" value "af-south-1" on "{parameter "action issue date" of
 action}"
        </ActionScript>
        <SuccessCriteria />
        <Settings />
        <SettingsLocks />
        <Target>
            <ComputerID>1078556546</ComputerID>
        </Target>
    </SingleAction>
```

Note: testuser2 and testuser3 are just invented names for our labels. However, **Credentials_AccessKey**, **Credentials_SecretAccessKey** and **Credentials_Region** are real setting names. We are defining these parameters because, by combining them, we can define the keys that we need to set the user key and password like specified above.

Issue the following command through the IEM CLI in order to launch the action contained in **action.xml** through REST API:

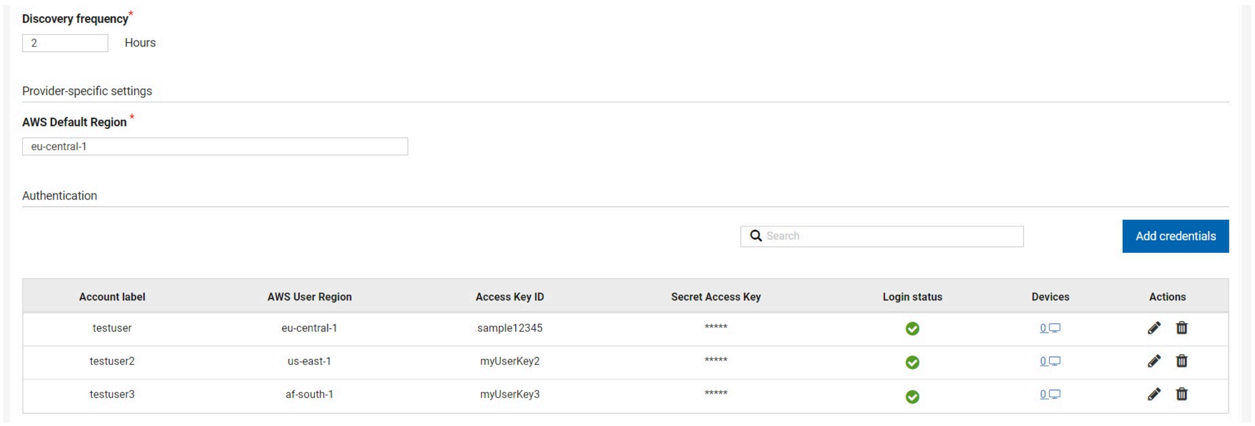
```
iem POST <path to action.xml> /api/actions
```

The output will be something like this:



```
C:\Program Files (x86)\BigFix Enterprise\BES Server\IEM CLI>iem POST C:\Users\Administrator\Desktop\action.xml /api/actions
<?xml version="1.0" encoding="UTF-8"?>
<BESAPI xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="BESAPI.xsd">
        <Action Resource="https://[redacted]:52311/api/action/149" LastModified="Fri, 16 Jul 2021 10:30:37 +0000">
                <Name>AWS Plugin Config Template</Name>
                <ID>149</ID>
        </Action>
</BESAPI>
```

Check on the WebUI whether the action was completed successfully. Should that be the case, the two new users will be immediately available:



Discovery frequency*
2 Hours

Provider-specific settings

AWS Default Region*
eu-central-1

Authentication

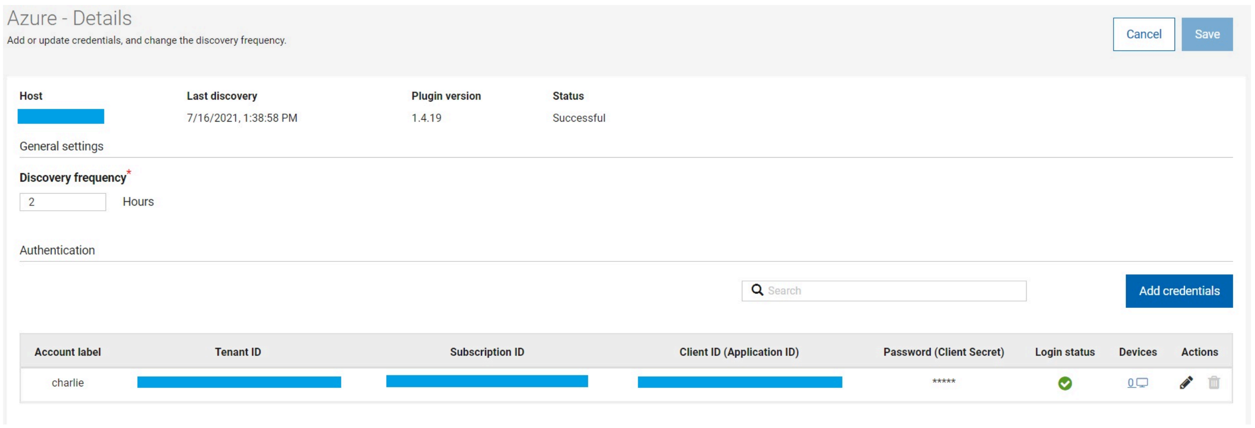
Account label	AWS User Region	Access Key ID	Secret Access Key	Login status	Devices	Actions
testuser	eu-central-1	sample12345	*****	✓	0	✎ 🗑
testuser2	us-east-1	myUserKey2	*****	✓	0	✎ 🗑
testuser3	af-south-1	myUserKey3	*****	✓	0	✎ 🗑

Example 2: Configuring the Azure Plugin with a Custom Action

In this example, we are going to configure the Azure Asset Discovery Plugin by creating and executing a custom action through the BigFix WebUI.

Like in the AWS example described in Example 1: Configuring the AWS Plugin (on page 181) we can assume that we already installed the Azure Plugin.

See below the details reported by the WebUI about the Azure Plugin.



Azure - Details

Add or update credentials, and change the discovery frequency.

Cancel Save

Host	Last discovery	Plugin version	Status
[redacted]	7/16/2021, 1:38:58 PM	1.4.19	Successful

General settings

Discovery frequency*

2 Hours

Authentication

Search

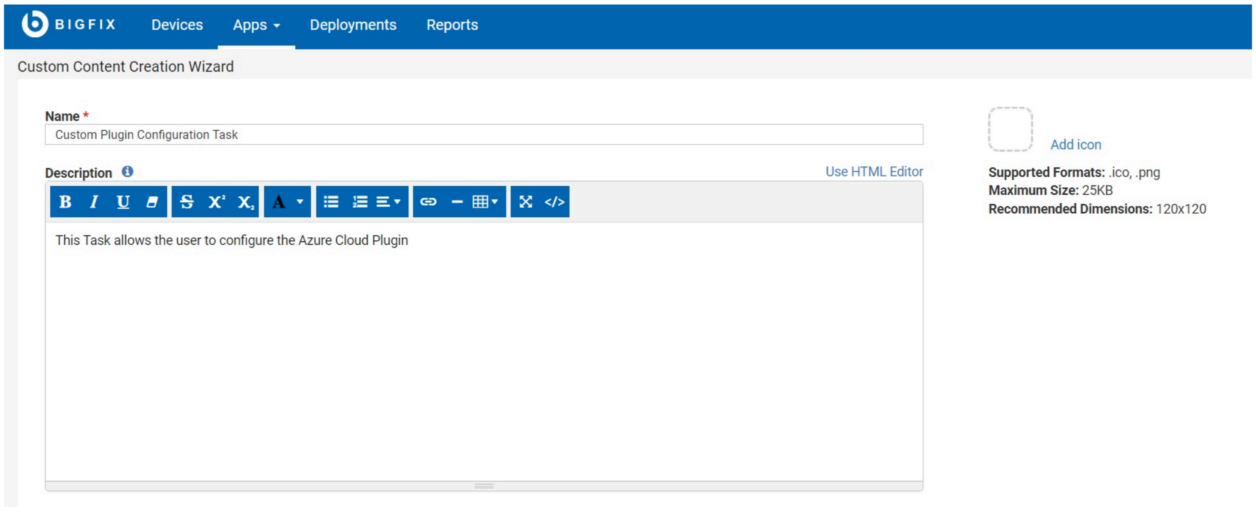
Add credentials

Account label	Tenant ID	Subscription ID	Client ID (Application ID)	Password (Client Secret)	Login status	Devices	Actions
charlie	[redacted]	[redacted]	[redacted]	*****	✓	0	

We want to create a custom action for configuring two users, **foo** and **bar**, for which we have their **TenantID**, **SubscriptionID**, **ClientID** and **ClientSecret** available.

Under **WebUI > Apps > Custom**, click **Create Custom Content**.

Type in a Name and a Description for the item, if you want.



Name *

Custom Plugin Configuration Task

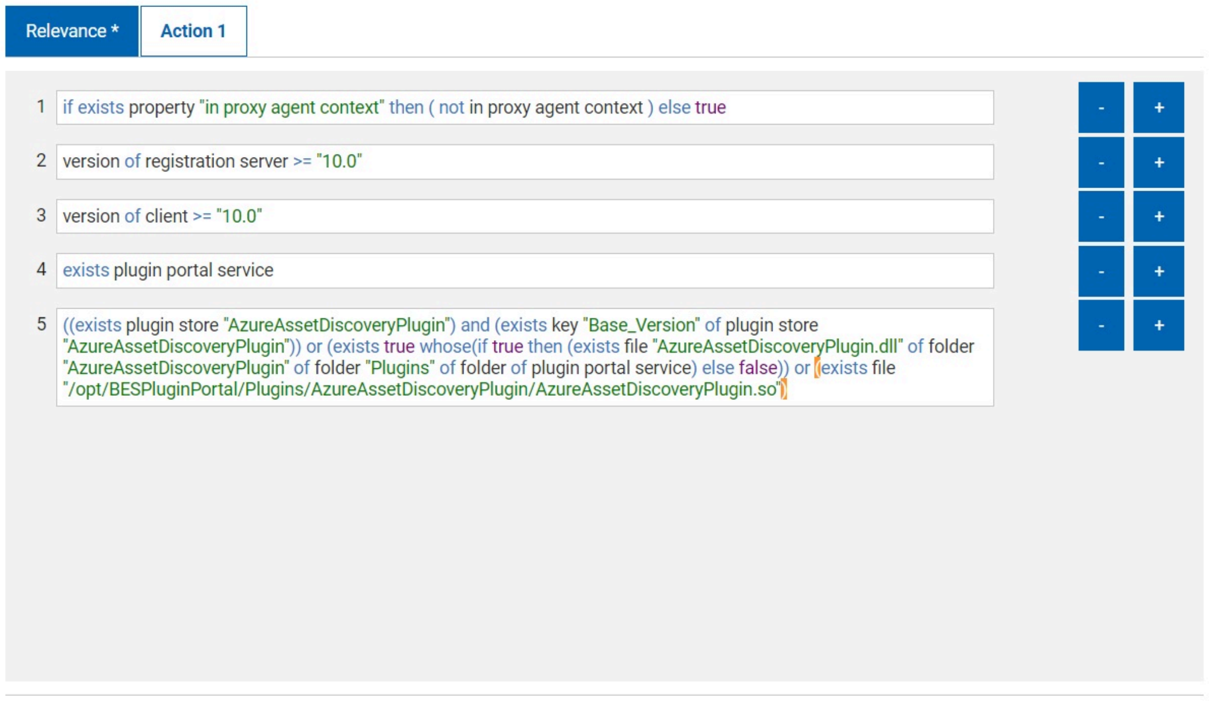
Description

This Task allows the user to configure the Azure Cloud Plugin

Supported Formats: .ico, .png
Maximum Size: 25KB
Recommended Dimensions: 120x120

Then, we could add the following relevances to ensure that we target the right device (which should always be the Plugin Portal on which the Azure Plugin is installed):

```
if exists property "in proxy agent context" then ( not in proxy agent
 context ) else true

version of registration server >= "10.0"

version of client >= "10.0"

exists plugin portal service

((exists plugin store "AzureAssetDiscoveryPlugin") and (exists key
 "Base_Version" of plugin store
"AzureAssetDiscoveryPlugin")) or (exists true whose(if true then (exists
 file "AzureAssetDiscoveryPlugin.dll" of folder
"AzureAssetDiscoveryPlugin" of folder "Plugins" of folder of plugin portal
 service) else false)) or (exists file
"/opt/BESPluginPortal/Plugins/AzureAssetDiscoveryPlugin/AzureAssetDiscovery
Plugin.so")
```



```
if exists property "in proxy agent context" then ( not in proxy agent context ) else true
version of registration server >= "10.0"
version of client >= "10.0"
exists plugin portal service
((exists plugin store "AzureAssetDiscoveryPlugin") and (exists key "Base_Version" of plugin store "AzureAssetDiscoveryPlugin")) or (exists true whose(if true then (exists file "AzureAssetDiscoveryPlugin.dll" of folder "AzureAssetDiscoveryPlugin" of folder "Plugins" of folder of plugin portal service) else false)) or (exists file "/opt/BESPluginPortal/Plugins/AzureAssetDiscoveryPlugin/AzureAssetDiscoveryPlugin.so")
```

Now, similarly to what we did for the AWS Plugin, let us build the action script for the configuration.

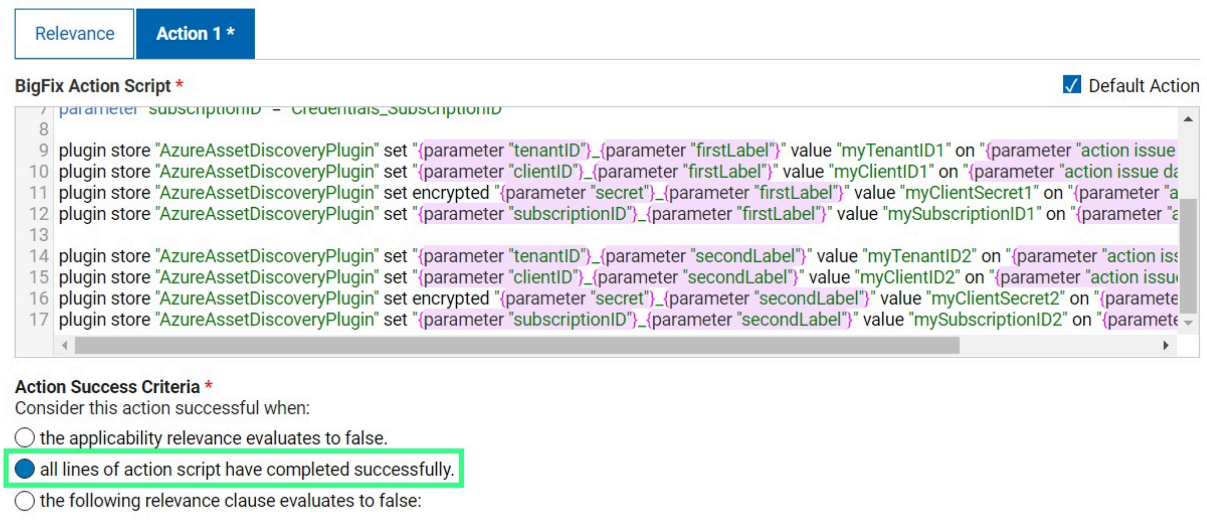
Note: The values that you must replace are only the ones wrapped by angled brackets, like <myTenantID1>.

```
parameter "firstLabel" = "foo"
parameter "secondLabel" = "bar"

parameter "tenantID" = "Credentials_TenantID"
parameter "clientID" = "Credentials_ClientID"
parameter "secret" = "Credentials_ClientSecret"
parameter "subscriptionID" = "Credentials_SubscriptionID"

plugin store "AzureAssetDiscoveryPlugin" set "{parameter
 "tenantID"}_{parameter "firstLabel"}" value "<myTenantID1>" on "{parameter
 "action issue date" of action}"
```

```
plugin store "AzureAssetDiscoveryPlugin" set "{parameter
 "clientID"}_{parameter "firstLabel"}" value "<myClientID1>" on "{parameter
 "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set encrypted "{parameter
 "secret"}_{parameter "firstLabel"}" value "<myClientSecret1>" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set "{parameter
 "subscriptionID"}_{parameter "firstLabel"}" value "<mySubscriptionID1>" on
 "{parameter "action issue date" of action}"

plugin store "AzureAssetDiscoveryPlugin" set "{parameter
 "tenantID"}_{parameter "secondLabel"}" value "<myTenantID2>" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set "{parameter
 "clientID"}_{parameter "secondLabel"}" value "<myClientID2>" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set encrypted "{parameter
 "secret"}_{parameter "secondLabel"}" value "<myClientSecret2>" on
 "{parameter "action issue date" of action}"
plugin store "AzureAssetDiscoveryPlugin" set "{parameter
 "subscriptionID"}_{parameter "secondLabel"}" value
 "<mySubscriptionID2>" on "{parameter "action issue date" of action}"
```

Note: foo and bar are just invented names for our labels. However, **Credentials_TenantID**, **Credentials_ClientID**, **Credentials_ClientSecret** and **Credentials_SubscriptionID** are real setting names. We are defining these four parameters because, by combining them, we can define the keys that we need to set the user key and password like specified above.

Now let us copy and paste the whole script in the Action box, ensuring that we select **all lines of action script have completed successfully**:



BigFix Action Script *   ✓ Default Action

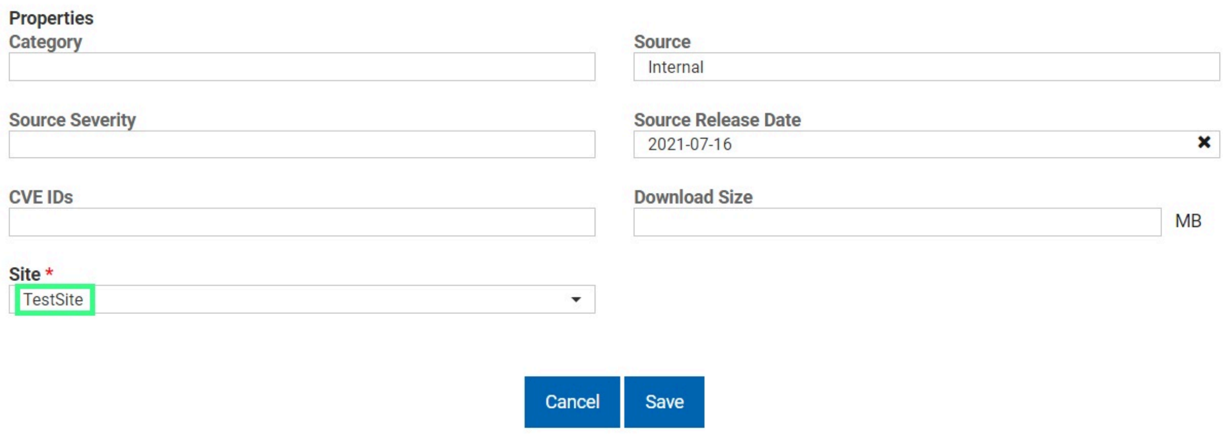
```
parameter "subscriptionID" = "Credentials_SubscriptionID"

plugin store "AzureAssetDiscoveryPlugin" set "{parameter "tenantID"}_{parameter "firstLabel"}" value "myTenantID1" on "{parameter "action issue
plugin store "AzureAssetDiscoveryPlugin" set "{parameter "clientID"}_{parameter "firstLabel"}" value "myClientID1" on "{parameter "action issue da
plugin store "AzureAssetDiscoveryPlugin" set encrypted "{parameter "secret"}_{parameter "firstLabel"}" value "myClientSecret1" on "{parameter "a
plugin store "AzureAssetDiscoveryPlugin" set "{parameter "subscriptionID"}_{parameter "firstLabel"}" value "mySubscriptionID1" on "{parameter "a

plugin store "AzureAssetDiscoveryPlugin" set "{parameter "tenantID"}_{parameter "secondLabel"}" value "myTenantID2" on "{parameter "action iss
plugin store "AzureAssetDiscoveryPlugin" set "{parameter "clientID"}_{parameter "secondLabel"}" value "myClientID2" on "{parameter "action issu
plugin store "AzureAssetDiscoveryPlugin" set encrypted "{parameter "secret"}_{parameter "secondLabel"}" value "myClientSecret2" on "{paramete
plugin store "AzureAssetDiscoveryPlugin" set "{parameter "subscriptionID"}_{parameter "secondLabel"}" value "mySubscriptionID2" on "{paramete
```

Action Success Criteria *

Consider this action successful when:

- ○ the applicability relevance evaluates to false.
- [✓ all lines of action script have completed successfully.]
- ○ the following relevance clause evaluates to false:

We can now choose the **Site** we want and then click **Save**.

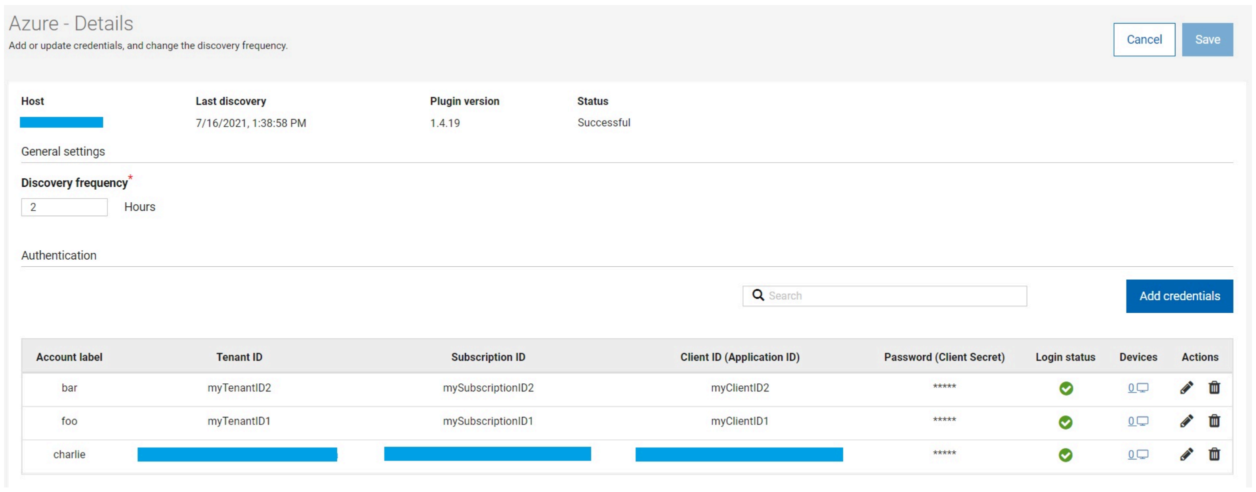


Properties

Category	
Source	Internal
Source Severity	
Source Release Date	2021-07-16
CVE IDs	
Download Size	MB
Site *	TestSite

Now we can just go back to the **WebUI > Apps > Custom** application and deploy the newly created Task to configure the Plugin.

After completing this, you should be able to see the new users in the Plugin Management panel:



Azure - Details

Add or update credentials, and change the discovery frequency.

Host	Last discovery	Plugin version	Status
[redacted]	7/16/2021, 1:38:58 PM	1.4.19	Successful

General settings

Discovery frequency*

2 Hours

Authentication

Account label	Tenant ID	Subscription ID	Client ID (Application ID)	Password (Client Secret)	Login status	Devices	Actions
bar	myTenantID2	mySubscriptionID2	myClientID2	*****	✓	0	
foo	myTenantID1	mySubscriptionID1	myClientID1	*****	✓	0	
charlie	[redacted]	[redacted]	[redacted]	*****	✓	0	

Example 3: Configuring many settings at once

In this example, we are going to configure many settings at once using the **multiple set** option of the **plugin store** command, in order to quickly dispatch a large configuration for a Plugin.

For more information about the plugin store command and options, see plugin store and Introduction (on page 167).

The syntax for this type of command is the following:

```
plugin store "<plugin name>" multiple set "<percent encoded json>" on
 "<now>"
```

Suppose that we already collected a great number of settings for a Plugin in a JSON file formatted as follows:

```
{
    "settingKey1": "settingValue1",
    "settingKey2": "settingValue2",
    "settingKey3": "settingValue3",
    …
    "settingKeyN": "settingValueN",
}
```

As described in Example 1: Configuring the AWS Plugin (on page 181), we can just create a new action and fill the action script with the commands we desire. In this case, we will issue a multiple set after having copied and pasted the percent encoded JSON in the appropriate section.

```
<?xml version="1.0" encoding="utf-8"?>
<BES xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema" SkipUI="true">
    <SingleAction>
        <Title>AWS Plugin Config Template</Title>
        <Relevance>true</Relevance>
        <ActionScript MIMEType="application/x-Fixlet-Windows-Shell">
            plugin store "AWSAssetDiscoveryPlugin" multiple set "<percent
 encoded json>" on "{parameter "action issue date" of action}"
        </ActionScript>
        <SuccessCriteria />
        <Settings />
        <SettingsLocks />
        <Target>
            <ComputerID>1078556546</ComputerID>
        </Target>
    </SingleAction>
</BES>
```

Issuing this action through the REST APIs, will result in the addition of all the key-values of the configuration JSON in the database.

As displayed in the image below, hundreds of settings can be quickly added in one single operation.

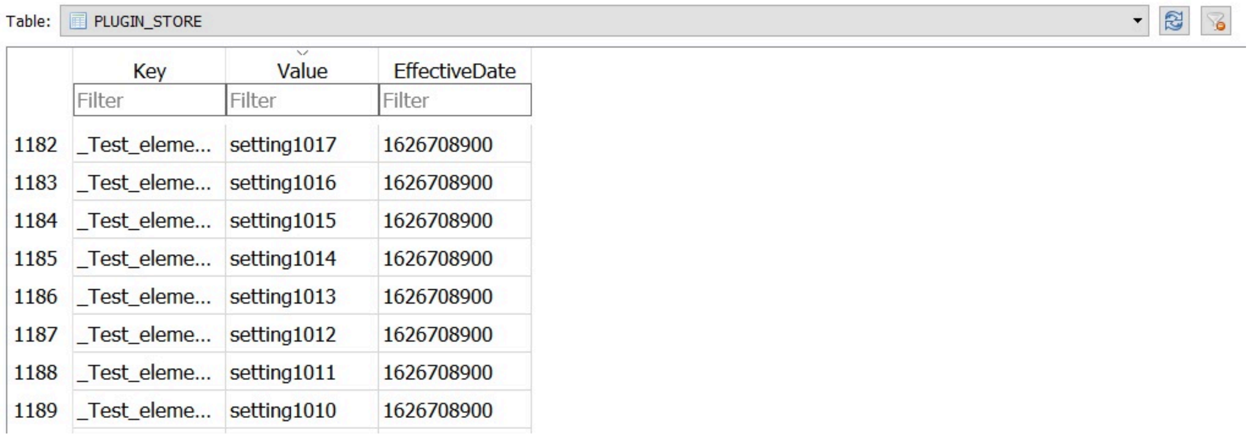


Table: PLUGIN_STORE

	Key	Value	EffectiveDate
	Filter	Filter	Filter
1182	_Test_eleme...	setting1017	1626708900
1183	_Test_eleme...	setting1016	1626708900
1184	_Test_eleme...	setting1015	1626708900
1185	_Test_eleme...	setting1014	1626708900
1186	_Test_eleme...	setting1013	1626708900
1187	_Test_eleme...	setting1012	1626708900
1188	_Test_eleme...	setting1011	1626708900
1189	_Test_eleme...	setting1010	1626708900

Note that the added settings are in clear text as we have not added the “encrypted” keyword.

This type of approach was meant to be executed from code and, as such, the easier path is creating a dedicated script for encoding the JSON file, creating the action script and then issuing the new action through REST APIs.

Chapter 15. Extending BigFix management capabilities

BigFix 10 delivers a few significant new functions for enhancing the visibility and management of devices on your network regardless of whether the devices are physical or virtual.

Challenges faced in managing modern IT infrastructures

Managing their infrastructures is growing more and more challenging and complex for IT organizations. With the advent of multiple types of servers, different operating systems, software, cloud computing and services, and technology that is changing almost every minute, it becomes difficult to track, control, and manage the IT environments.

- Technologies such as cloud computing and mobility change the IT landscapes fast and it becomes difficult to stay current.
- Catering to new compliance and regulatory requirements while still complying with the old ones has mandated the need for a cost-effective solution.
- As IT organizations continue to increase operations around latest technologies, security becomes a major concern.
- Sophisticated IT infrastructures that support high computing and data analysis need efficient and cost-effective data extraction and data storage techniques.

BigFix 10 features

To achieve transparency across your heterogeneous IT environments, you need a more automated, comprehensive, and robust solution like BigFix 10. This all-new version of BigFix provides you with an accurate view of the resources in your network, key analytics, and detailed insights that can enable your decision makers to make faster and informed decisions about IT management.

Related information

Managing cloud resources *(on page 197)*

Managing cloud plugins in WebUI

Modern Client Management

Insights

Managing cloud resources

The IT ecosystem in every organization keeps expanding to include a variety of endpoints such as servers, Mac and Linux desktops, and laptops. With the advent of cloud computing, more and more IT organizations consider shifting their entire on-premise infrastructure including data centers to the cloud, such as Amazon Web Services, Microsoft Azure, VMware, and Google Cloud Platform (GCP). Consequently, managing endpoints is becoming increasingly complex, which has necessitated endpoint management solutions to also support cross-hosting environments.

BigFix 10 includes capabilities for managing your resources that are in a cloud system as well. With the new feature, BigFix administrators and operators can have complete visibility and control over their Windows, Mac, and Linux endpoints on cloud (public, private, and hybrid) in a secure, cost-controlled manner regardless of their location or whether they are physical or virtual.

The feature extends the capabilities of BigFix to help you discover, manage, and secure your virtual devices (AWS®, VMware, Azure, and GCP to start with) within a single pane of glass with no duplication of information.

- Extends BigFix visibility into all cloud instances across multiple cloud providers including private, public, and hybrid cloud.
- Leverages a combination of cloud native APIs and the BigFix Agent to retrieve information from your virtual endpoints for a complete view of your cloud instances.
- Simplifies cloud management and extends BigFix automation to cloud instances.
- Enables better-informed decisions about cloud instance patching
- Ensures continuous compliance for all your endpoints, regardless of their type or location, within a single solution.
- Helps on-prem and cloud teams work more effectively together.

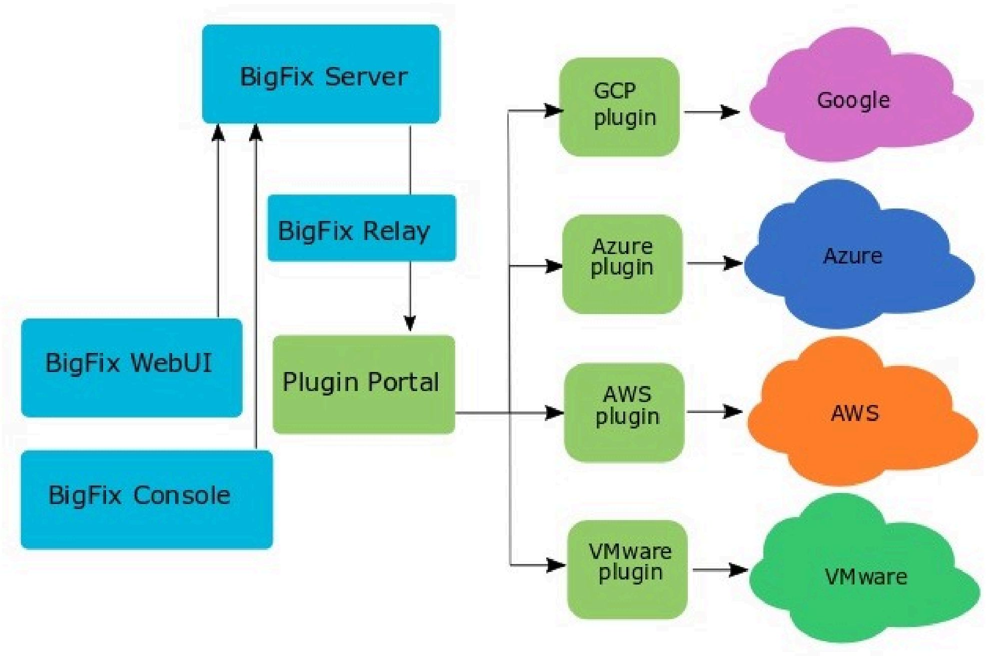
Understanding cloud setup

BigFix Console and WebUI provide operators with a single representation of a cloud resource, regardless of whether it is managed by the BigFix Agent, by the The Plugin Portal (on page 157) through the cloud plugins, or by both. This way, you as an operator can have complete visibility into and control over your cloud infrastructure.

BigFix 10 supports the following use cases for Amazon Web Services (AWS), VMware, Microsoft Azure and Google cloud platforms:

- As a BigFix Master Operator, you can:
  - have all resources under control and monitor what is running on them, with a capability to maintain your environment secure and cost controlled.
  - ensure continuity of service and secure management of your IT enterprise.
  - monitor the cloud instances.
- As a BigFix Operator, you can organize and administer your cloud instances and maintain an inventory of them.
- As an owner of servers that run business-critical applications, you can ensure smooth functioning of your cloud instances.
- As a content creator, you can run analyses to inspect cloud resources and properties without any need to create custom content.

The multicloud management features are available for use in both BigFix Console and WebUI.



In terms of deployment topologies for the Plugin Portal, the following options are available:

- A Portal instance may be deployed geographically remote from the BigFix root server. This may be desirable if there is a large, remote cloud instance that the portal is managing.
- The Plugin Portal may generate large volumes of reports. As such, the higher-level relay infrastructure (if any) should offer high bandwidth. For example, having the Plugin Portal report to a top-level relay, false root relay, or the root server itself is recommended if the Plugin Portal is going to be managing a large number of devices.

Discovering cloud resources

BigFix 10 provides the capability to discover resources that you own on any of the supported cloud providers.

The discovery is performed by the cloud plugins. Each plugin periodically queries the corresponding cloud provider, and retrieves available cloud resource data. Retrieved data is then processed by the Plugin Portal, and eventually sent to the BigFix Server. In case of cloud resources on which the BigFix Agent is installed, the new cloud provider inspector allows retrieving data that is used for computer correlation (on page 201) purposes.

In BigFix Version 10.0.8, a new feature was introduced to delete on the BigFix Database the computer instances no longer discovered. When during a discovery, the Plugin recognizes that a device is no longer present, it sends a report to the Plugin Portal, that removes the device from its database and sends a removal HTTPs Post Request to the Server which will perform either a physical deletion from the database or a logical deletion.

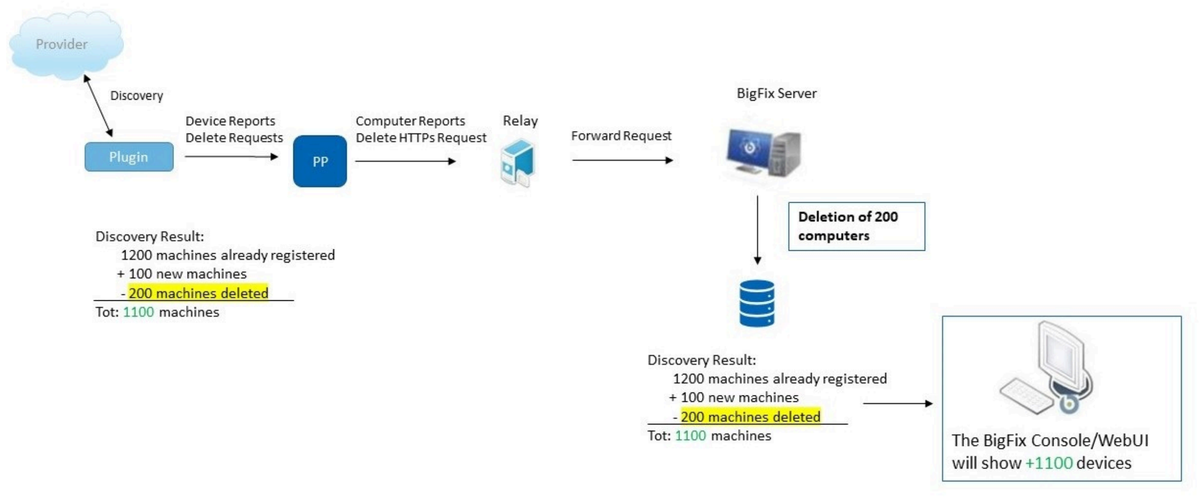
By default, the BigFix Server performs a logical deletion: all the data still remain in the database but the devices are marked as deleted. Devices no longer discovered due to an error, for instance due to wrong credentials, are not removed.

A new setting was added to the Plugins, allowing you to perform the physical deletion from the database. With this option, the BigFix Server physically removes the devices and all its associated data from the database, as the BES Computer Remover Tool does.

To avoid database inconsistencies, we do not support physical delete operations in DSA environments. If the server receiving the physical delete request is within a DSA environment, it logs that the physical delete operations are not supported in DSA environments and switches to a logical delete operation.

Another setting was added to the Plugins, allowing also the deletion of all the correlated instances. Both these settings can be changed from the WebUI. For more details about the settings, see Configuring cloud plugins (on page 220).

In the following example, the Plugin discovers 100 new machines and no longer detects another 200, so the Plugin Portal receives a new report for the 100 new machines and an empty report for the other 200 machines. For its part, the Plugin Portal must register new devices and remove undetected devices (Device alerts / Deletion requests arrow). With this new feature, the Plugin Portal will also send an HTTP delete request for the devices that are no longer detected (Delete HTTPs request arrow). The Relays will forward the request to the BigFix Server, which is in charge of performing either a physical or a logical deletion (depending on the new plugin setting introduced and already described above) of the 200 undetected devices from the BigFix database. What happens is that the removed devices will not be displayed in the BigFix Console and in the WebUI computer list and the BigFix Console and the WebUI will always show the list of the actually detected devices.



Related information

The Plugin Portal *(on page 157)*

Understanding cloud setup *(on page 198)*

Correlated devices

BigFix 10 has the capability of correlating multiple representations of the same computer, allowing operators to manage them as a single entity (also referred to as correlated device throughout this documentation) as well as to operate on a specific representation as needed.

For instance, if the Microsoft Azure cloud plugin discovers a VM created on Microsoft Azure, and at the same time the discovered VM runs the BigFix Agent, then two separate representations of the same computer is reported to the BigFix Server. In this case, BigFix 10 correlates the two representations, and the BigFix Console shows them in a grouped, expandable format.

In this documentation, the term *proxied* refers to computer representations discovered by cloud plugins, and the term *native* refers to computer representations associated to BigFix Agents.

Note: The correlated device requires BigFix Agent version 10 or higher.

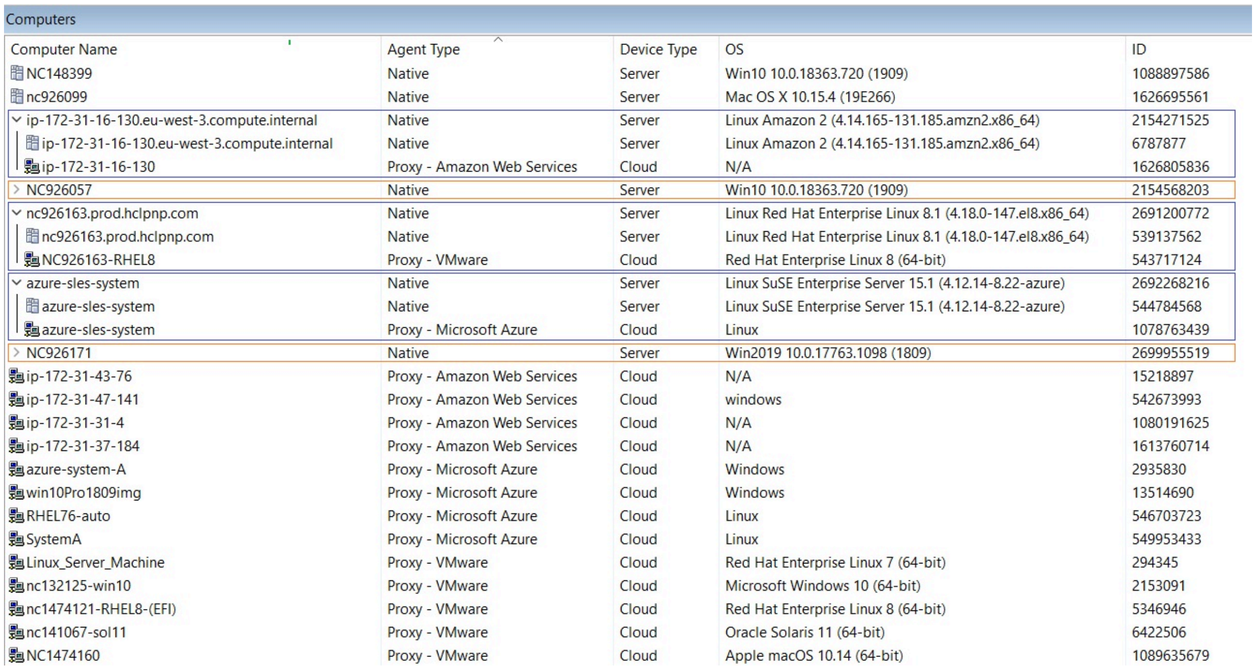
Note: Up to BigFix Platform Version 10.0.8, the data required for the correlation in Amazon Web Services are retrieved by the BigFix Agent using Amazon IMDSv1 protocol. Starting from BigFix Platform Version 10.0.9, these data are retrieved using Amazon IMDSv2 protocol.

Enabling device correlation for a cloud plugin

When a cloud plugin is installed, the correlation feature for devices discovered by that plugin is automatically activated.

Displaying correlated devices

The correlated device is a logical entity, and the BigFix Console shows it as an expandable object in the **Computers** view. The root element of the object represents the correlated device itself, and has an own Computer ID. The ID of the correlated device is created at correlation time, and typically falls in a range higher than the IDs of the single representations. Correlated representations are shown slightly indented when expanding the correlated device.



Computers

Computer Name	Agent Type	Device Type	OS	ID
NC148399	Native	Server	Win10 10.0.18363.720 (1909)	1088897586
nc926099	Native	Server	Mac OS X 10.15.4 (19E266)	1626695561
ip-172-31-16-130.eu-west-3.compute.internal	Native	Server	Linux Amazon 2 (4.14.165-131.185.amzn2.x86_64)	2154271525
ip-172-31-16-130.eu-west-3.compute.internal	Native	Server	Linux Amazon 2 (4.14.165-131.185.amzn2.x86_64)	6787877
ip-172-31-16-130	Proxy - Amazon Web Services	Cloud	N/A	1626805836
NC926057	Native	Server	Win10 10.0.18363.720 (1909)	2154568203
nc926163.prod.hclpnp.com	Native	Server	Linux Red Hat Enterprise Linux 8.1 (4.18.0-147.el8.x86_64)	2691200772
nc926163.prod.hclpnp.com	Native	Server	Linux Red Hat Enterprise Linux 8.1 (4.18.0-147.el8.x86_64)	539137562
NC926163-RHEL8	Proxy - VMware	Cloud	Red Hat Enterprise Linux 8 (64-bit)	543717124
azure-sles-system	Native	Server	Linux SuSE Enterprise Server 15.1 (4.12.14-8.22-azure)	2692268216
azure-sles-system	Native	Server	Linux SuSE Enterprise Server 15.1 (4.12.14-8.22-azure)	544784568
azure-sles-system	Proxy - Microsoft Azure	Cloud	Linux	1078763439
NC926171	Native	Server	Win2019 10.0.17763.1098 (1809)	2699955519
ip-172-31-43-76	Proxy - Amazon Web Services	Cloud	N/A	15218897
ip-172-31-47-141	Proxy - Amazon Web Services	Cloud	windows	542673993
ip-172-31-31-4	Proxy - Amazon Web Services	Cloud	N/A	1080191625
ip-172-31-37-184	Proxy - Amazon Web Services	Cloud	N/A	1613760714
azure-system-A	Proxy - Microsoft Azure	Cloud	Windows	2935830
win10Pro1809img	Proxy - Microsoft Azure	Cloud	Windows	13514690
RHEL76-auto	Proxy - Microsoft Azure	Cloud	Linux	546703723
SystemA	Proxy - Microsoft Azure	Cloud	Linux	549953433
Linux_Server_Machine	Proxy - VMware	Cloud	Red Hat Enterprise Linux 7 (64-bit)	294345
nc132125-win10	Proxy - VMware	Cloud	Microsoft Windows 10 (64-bit)	2153091
nc1474121-RHEL8-(EFI)	Proxy - VMware	Cloud	Red Hat Enterprise Linux 8 (64-bit)	5346946
nc141067-sol11	Proxy - VMware	Cloud	Oracle Solaris 11 (64-bit)	6422506
NC1474160	Proxy - VMware	Cloud	Apple macOS 10.14 (64-bit)	1089635679

The correlated device inherits the properties from all the devices it correlates. In case the devices report different values for the same property, the correlated device inherits the value from the native one as it is the most accurate and meaningful source of data.

Note:

- When one of the correlated representations has not been checking in for the amount of time specified in the BigFix Console preferences, besides appearing itself as offline, it makes the *correlated device* appear offline as well.
- The Agent Version associated with proxied computers corresponds to the version of the Plugin Portal that is managing them.
- The Computer Name of proxied computers discovered by the AWS plugin corresponds to the name of the host taken from the Private DNS Name.

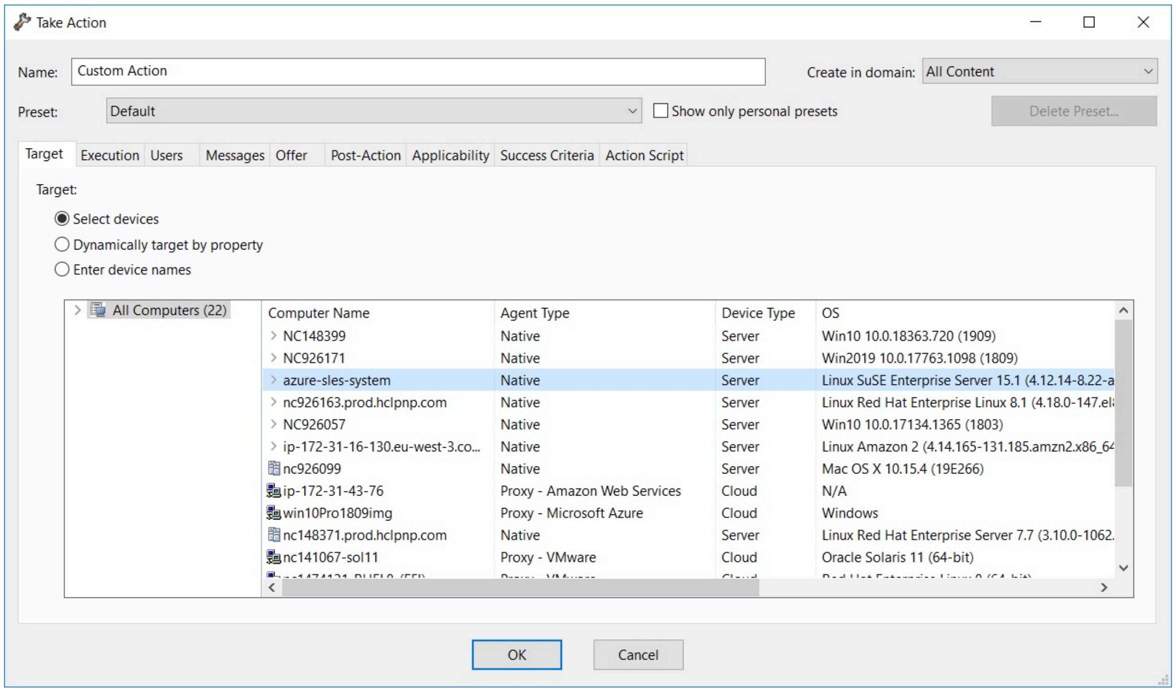
Administering correlated devices

Correlated devices are visible to Master Operators and to Non-Master Operators who administer two or more correlated representations. Operators can administer the correlated representations independently of one another. No inheritance mechanisms propagate administration rights from a correlated representation to another one.

Performing operations on correlated devices

Operators can target correlated devices, and depending on the type of operation, the BigFix Server takes care of dispatching it to the proper correlated representations. Following are a few examples:

- As shown in the following figure, an Operator takes a custom action, and in the **Target** tab, clicks **Select devices** and selects a *correlated device*:



Name: Custom Action

Create in domain: All Content

Preset: Default

☐ Show only personal presets

Target:

[✓ Select devices]
Dynamically target by property
Enter device names

Computer Name	Agent Type	Device Type	OS
NC148399	Native	Server	Win10 10.0.18363.720 (1909)
NC926171	Native	Server	Win2019 10.0.17763.1098 (1809)
azure-sles-system	Native	Server	Linux SuSE Enterprise Server 15.1 (4.12.14-8.22-a
nc926163.prod.hclpnp.com	Native	Server	Linux Red Hat Enterprise Linux 8.1 (4.18.0-147.el
NC926057	Native	Server	Win10 10.0.17134.1365 (1803)
ip-172-31-16-130.eu-west-3.co...	Native	Server	Linux Amazon 2 (4.14.165-131.185.amzn2.x86_64
nc926099	Native	Server	Mac OS X 10.15.4 (19E266)
ip-172-31-43-76	Proxy - Amazon Web Services	Cloud	N/A
win10Pro1809img	Proxy - Microsoft Azure	Cloud	Windows
nc148371.prod.hclpnp.com	Native	Server	Linux Red Hat Enterprise Server 7.7 (3.10.0-1062.
nc141067-sol11	Proxy - VMware	Cloud	Oracle Solaris 11 (64-bit)

In this case, the BigFix Server dispatches the action to one of the correlated representations based on the parsing of the actionscript commands. If only one of the correlated representations can run all the commands of the actionscript, then the BigFix Server dispatches the action to that representation. If the whole actionscript is applicable to more than one representation, then the BigFix Server always chooses to dispatch the action to the native computer.

Note:

    - If the Operator wants to target a specific computer representation, it is enough to expand the *correlated device* in the **Target** tab, and select the desired representation. In this case, the BigFix Server sends the action to that representation directly.
    - If the action is taken from a Fixlet that is applicable to only one of the representations (in this scenario, you can verify it by expanding the *correlated device* in the **Target** tab), then the action is sent to that representation.

- Operator runs a BigFix query and targets a *correlated device*. In this case, the BigFix query is always sent to the native computer because the BigFix Agent is the only component that can execute a BigFix query.
- In the **Computers** view, an operator selects a *correlated device* and adds it to a manual computer group. In this case, all the correlated representations are added to the manual computer group.
- In the **Computers** view, an operator selects a *correlated device* and opts for **Remove From Database...**. In this case, all the correlated representations are set to deleted, and stop being displayed by the BigFix Console both as correlated and standalone computers.
- In the Computers view, an operator selects a *correlated device* and runs a **Send Refresh**. In this case, the refresh notification is sent to all the correlated representations.

Note: Any client relevance expressions referring to the IDs of *correlated device* are not matched by any native or proxied computers, because those IDs represent logical entities that are only known to the BigFix Server. For instance, referring to the IDs of *correlated devices* for defining an automatic computer group or for subscribing computers to a site does not cause any computers to be included in the computer group or be subscribed to the site.

Using REST APIs with correlated devices

While remaining compatible with the XML schema definition of previous BigFix releases, REST APIs in BigFix 10 can handle correlated devices supporting them with methods and applicable resources.

For instance, the ID of a correlated device may be used as target of an action, and in this case the BigFix Server takes care of dispatching the action to the proper target based on the operator permissions and on the commands contained in the actionscript.

Similarly, the ID of a correlated device may be used to retrieve information from the BigFix Server. For instance, if an operator wants to retrieve the settings of a correlated device, the REST API returns an XML made up of a main section with the settings of the native computer, and a subsection named `ManagementExtension` that contains the settings of the proxied computer. For further details, see Computer REST APIs.

Using Session Relevance with correlated devices

When using session relevance, the inspectors `bes computers` and `bes computers set`, in case of correlated devices, will return **only** the BES Computer object related to the CorrelationID. Asking for the value of Properties or applicability of Fixlets on a BES Computer representing a Correlated device will be the same as querying its representations (Native and Azure for example) in order of priority and returning the first available.

Two new session relevance inspectors were introduced, `bes computers with extensions` and `bes computers with extensions set`, where the set of computers returned will include **both** the BES Computer representing the correlated device and its representations.

To check if a BES Computer object represents a correlated device or a representation of a correlated device, two new properties were added to the BES Computer object:

- `correlation flag of <bes_computer> : boolean` returns true for a BES Computer object representing a correlated device.
- `extension flag of <bes_computer> : boolean` returns true for a BES Computer object representing an extension of a correlated device.

Two properties were also added to query an extension for its correlated representation:

- `correlation of <bes_computer> : bes_computer` to return a BES Computer object of the correlation device from an extension.
- `correlation id of <bes_computer> : integer` to return only the Computer ID of the correlation device from an extension.

For example a relevance such as:

```
(name of it, agent type of it, correlation id of it) of bes computer with
 extensions
whose (extension flag of it)
```

returns for all devices that partecipate in a correlated device, their name, their agent type and the ID of the correlated device.
With a deployment like the one in the screenshot of the **Displaying correlated devices** section described above, it would return the following tuples:

```
ip-172-31-16-130.eu-west-3.compute.internal, Native, 2154271525
ip-172-31-16-130, Proxy - Amazon Web Services, 2154271525
NC926057, Native, 2154568203
NC926057-Win10, Proxy - VMware, 2154568203
nc926163.prod.hclpnp.com, Native, 2691200772
NC926163-RHEL8, Proxy - VMware, 2691200772
azure-sles-system, Native, 2692268216
azure-sles-system, Proxy - Microsoft Azure, 2692268216
NC926171, Native, 2699955519
nc926171-Win2019-Srv, Proxy - VMware, 2699955519
```

For further details, see Computer Inspectors.

Deleting a correlated representation

If, for instance, a correlated device correlates a native and a proxied representation, and at some point one of the two representations is set to deleted (either manually through the BigFix Console, by the BigFix Computer Remover tool, or through the BigFix WebUI or automatically by the BigFix Server, when a resource is no longer discovered by the Cloud Plugin, for details see Discovering cloud resources (on page 199)), the correlated device is set to deleted as well, and is no longer displayed by the BigFix Console. The remaining representation goes back to being displayed as a standalone computer.

When the BigFix Computer Remover tool removes the deleted representation from the database, the correlated device is removed as well.

Introduction to Cloud Plugins

Starting from Version 10, BigFix provides a set of Cloud Plugins that can be attached to a Plugin Portal, in order to manage the Cloud environments of Amazon Web Services, Microsoft Azure, Google Cloud Platform and VMware. Each plugin has a set of similar capabilities but each of them differs in the support of some features, due to the nature of the correspondent Cloud Provider.

AWS Asset Discovery Plugin

The AWS Asset Discovery Plugin is able to discover and report data about Amazon Web Services EC2 instances. On top of that, the plugin is also able to deploy the BigFix Agent on the whole AWS cloud environment.

Configuration

As of now, the AWS Asset Discovery Plugin supports IAM Users and Roles in its configuration. Single and cross-account scenarios are supported, in line with AWS best practices.

For more information, see Installing cloud plugins (on page 213) and Action commands for configuring the BES Plugin Portal plugins (on page 167).

BigFix Agent Installation

Starting from Version 10 Patch 2, the AWS Plugin supports the deployment of the BigFix Agent through native APIs.

For more information, see BigFix Agent installation on cloud resources (on page 285).

Inspectors

The AWS Plugin reports several properties of the EC2 instances it discovers. **Starting from Patch 2**, several other AWS System Manager properties are available upon further configuration . It is also possible to discern which set of credentials reported the information, since each instance also reports a credentials label.

For more information, see AWS Asset Discovery Plugin Inspectors (on page 227).

Analyses

Analyses are available for each plugin. See Activating cloud analyses (on page 278) for more information.

Data concerning resources is described in The cloud analyses data (on page 278).

Azure Asset Discovery Plugin

The Azure Asset Discovery Plugin is able to discover and report data about Microsoft Azure Virtual Machines. On top of that, the plugin is also able to deploy the BigFix Agent on the whole Azure cloud environment.

Configuration

The Azure Asset Discovery Plugin requires **Client ID**, **Password**, **Subscription ID** and **Tenant ID** to be configured.

For more information, see Installing cloud plugins (on page 213) and Action commands for configuring the BES Plugin Portal plugins (on page 167).

BigFix Agent Installation

Starting from Version 10 Patch 2, the Azure Plugin supports the deployment of the BigFix Agent through native APIs.

For more information, see BigFix Agent installation on cloud resources (on page 285).

Inspectors

The Azure Plugin reports several properties of the instances it discovers. It is also possible to discern which set of credentials reported the information, since each instance also reports a credentials label.

For more information, see Azure Asset Discovery Plugin Inspectors (on page 238).

Analyses

Analyses are available for each plugin. See Activating cloud analyses (on page 278) for more information.

Data concerning resources is described in The cloud analyses data (on page 278).

GCP Asset Discovery Plugin

Starting from Version 10 Patch 2, the GCP Asset Discovery Plugin is available for installation. The plugin is able to discover and report data about GCP Compute Engine instances.

Configuration

The GCP Asset Discovery Plugin requires a credentials JSON to be configured.

Starting from Version 10 Patch 4, multi-project discovery is also available.

For more information, see Installing cloud plugins (on page 213) and Action commands for configuring the BES Plugin Portal plugins (on page 167).

Inspectors

The GCP Plugin reports several properties of the instances it discovers. It is also possible to discern which set of credentials reported the information, since each instance also reports a credentials label.

For more information, see GCP Asset Discovery Plugin Inspectors (on page 243).

Analyses

Analyses are available for each plugin. See Activating cloud analyses (on page 278) for more information.

Data concerning resources is described in The cloud analyses data (on page 278).

VMware Asset Discovery Plugin

The VMware Asset Discovery is able to discover and report data about VMware Guest Virtual Machines.

Starting from Version 10 Patch 12, VMware Hosts will be available for discovery as well. Furthermore, the VMware Plugin will report a greater number of inspectors and properties for both Guests and Hosts while also allowing the user to take advantage of several action commands. The capabilities of the VMware Plugin will match the ones of the old ESXi management extender.

Configuration

The VMware Asset Discovery Plugin requires a **User name** and **password**, along with the **vCenter Server URL**, to be configured.

For more information, see Installing cloud plugins (on page 213), Configuring cloud plugins (on page 220) and Action commands for configuring the BES Plugin Portal plugins (on page 167).

Action Commands

It is recommended to rely on the Patch for VMware ESXi, Patch for Virtual Endpoint Manager and Server Automation sites content to use this action commands instead of creating custom actions.

For more information, see VMware Plugin Commands (on page 274).

Inspectors

The VMware Plugin reports several properties of VMware Virtual Machines. **Starting from Version 10 Patch 12**, new inspectors and properties are available for VMware Hosts as well. It is possible to discern which set of credentials reported the information, since each instance also reports a credentials label.

For more information, see VMware Asset Discovery Plugin Inspectors (on page 250).

Analyses

Analyses are available for each plugin. See Activating cloud analyses (on page 278) for more information.

Data concerning resources is described in The cloud analyses data (on page 278).

Managing cloud plugins

BigFix 10 Platform includes a plugin for every cloud provider supported, namely Amazon Web Services (AWS), Microsoft Azure, VMware and Google Cloud Platform (GCP). Each of these cloud providers has its own uniqueness, capabilities, and ways to interface with an external program and they handle access to data and capabilities differently.

To be able to install the plugin portal and the cloud plugins, Master Operator (MO) privilege is required.

The multicloud management features are available for use in both BigFix Console and WebUI.

Related information

Installing the plugin portal

Installing cloud plugins

Planning the installation of cloud plugins

Cloud plugins can be installed on computers running the Plugin Portal (on page 157). Optionally, they may all be installed on the same Plugin Portal instance.

However, this option should be taken into account only if it meets the capacity planning requirements of the Plugin Portal that are included in the BigFix Capacity Planning guide.

It is strongly recommended to have only one instance of cloud plugin per type (AWS, Microsoft Azure, VMware , GCP) in a BigFix deployment. The purpose of this recommendation is to avoid having the same cloud resources discovered more than once, which would cause the correlation of multiple instances of the same proxied computer under one correlation computer, adding unnecessary complexity and load to the displaying and management of correlation computers.

While requiring specific configuration information that depends on the supported cloud platform, the installation of every cloud plugin requires the input of credentials that would allow the embedded SDK to call the APIs of the corresponding cloud platform and access related cloud services. As all cloud plugins perform a credential-based discovery, their capability to discover virtual machines and retrieve related data depends on the permissions granted on the cloud platform side to the user owning the credentials. More information about the required permissions are available in Installing cloud plugins (on page 213).

Note: Each cloud plugin supports multiple sets of credentials. However, only one set may be specified at installation time. Any further credential sets can be added later on using the BigFix WebUI.

When installing the AWS, Microsoft Azure and the Google Cloud plugins, you must ensure that these plugins are able to access related cloud services using HTTPS over the Internet.

The cloud plugins are installed in the following default paths:

Windows:

- C:\Program Files (x86)\BigFix Enterprise\BES Plugin Portal\Plugins\Plugin_name

Non-windows:

- /opt/BESPluginPortal/Plugins/*Plugin_name*
- /var/opt/BESPluginPortal/Plugins/*Plugin_name*

Installing cloud plugins

Each cloud plugin has a specific installation task on BES Support, which becomes relevant on computers where the Plugin Portal is installed.

Note: The last published version of the cloud plugins might require an up-to-date version of the Plugin Portal. Older plugins will continue to work properly with the new Plugin Portal.

The task can be run only after filling in all required fields in the **Description** tab.

Only Master Operators (MO) are allowed to install cloud plugins.

The advanced configuration for all cloud plugins can be done using the WebUI.

Amazon Web Services plugin

Account Label

A friendly name for the specified `Access Key ID` / `Secret Access Key` pair. It must contain only alphanumeric characters.

Default region name

It is the name of the AWS region to which the plugin must initially connect to when it performs a discovery. For instance, if you want the plugin to start its discoveries connecting to the Europe (Frankfurt) region, the value to specify is `eu-central-1`. The plugin will, then, automatically complete its discoveries by connecting to all other regions that the specified `Access Key ID` / `Secret Access Key` pair can access.

Note:

- The field is case sensitive, ensure that you input the string with the correct case as documented by AWS.
- When adding a new `Access Key ID` / `Secret Access Key` pair, the BigFix WebUI allows to optionally specify a *user region* value, which for the specified key pair would prevail on the default region.

For more information about available regions, refer to the AWS documentation.

When installing the AWS plugin, you can specify the allowed regions. For more details about how to limit the AWS regions, see Limit AWS Regions to restrict the scope of device discovery.

Access Key ID and Secret Access Key

An `Access Key ID` / `Secret Access Key` pair associated to an IAM user.

Requirements for the IAM user:

- MFA must NOT be enabled
- Must have programmatic access type
- Must have the following permissions at minimum: action "**ec2:Describe***" allowed on resource "*****"
    - A suitable predefined AWS policy is *AmazonEC2ReadOnlyAccess*

For more information about AWS access keys, refer to the AWS documentation.

IAM Roles

An ARN / Region / External ID triple associated to an IAM Role.

Starting from cloud plugin version 1.4, released concurrently with BigFix v10.0 Patch 4, IAM roles are supported. An IAM role is an identity that has a set of assigned permissions and it can be assumed temporarily by any trusted user, including an administrative user, depending on your business needs. Roles do not have credentials and as such they are not subject to password expiration. When assuming a role, the logged on user requests temporary credentials for a certain limited amount of time which cannot be bigger than the maximum amount of time assigned by the administrative user.

Note: If you decide to use IAM roles, ensure that the users assuming the role are authorized to perform `sts:AssumeRole` on the roles.

Note: The roles completely replace the users assuming them, which means that each operation managed by the users is performed by the roles and that the roles must have the same permissions which would be required for a user managing the cloud plugins.

Note: Once AWS Roles are inserted, the AWS plugin will use them during its discovery, instead of the credential from which they derive. You must ensure that these roles include all the AWS devices that you want to discover in your cloud environment: otherwise, some machines may not be discovered.

You have to specify the following information:

An `ARN` / `Region` / `External ID` triple associated to an IAM Role.

Where:

ARN

Is the Amazon Resource Name of the role, which is the unique identifier of a resource on AWS.

For more information about ARNs, refer to the AWS documentation.

Region

(Optional): Is the default AWS region for the IAM role. See the **Default region name** section for more information. When adding a new IAM role, BigFix allows you to optionally specify a *role region* value, which prevails on both the default region and the user region for the specified role.

External ID

(Optional): If you need to delegate access to AWS resources to a third party, an IAM role can be used along with an external ID, devised for the purpose of accessing and using the cloud environment resources and services by the third party. The **external ID** must be provided to the third party by the organization that owns the environment and should be a **GUID**.

For more information about external IDs, refer to the AWS documentation.

HTTP Proxy

Optionally, an HTTP proxy may be specified in case the system where the AWS plugin will be installed does not have a direct connection to the Internet. For supported proxy authentication methods, refer to the AWS documentation.

Microsoft Azure plugin

Account Label

A friendly name for the specified service principal quartet. It must contain only alphanumeric characters.

Client ID, Password, Subscription ID and Tenant ID

A service principal quartet. Requirements for the service principal:

- Must be assigned the built-in *Reader* role.
- MFA must NOT be enabled.

For more information about Microsoft Azure service principals, refer to the Microsoft Azure documentation.

VMware plugin

Account Label

A friendly name for the specified username-password pair. It must contain only alphanumeric characters.

vCenter Server

The hostname or IP address of the vCenter server.

User name and Password

The credentials to access the vCenter server.

Note: The VMware plugin uses the govmomi library and its compatibility defines with which version of vCenter the plugin is compliant. For more details, refer to the govmomi documentation.

Google Cloud Platform plugin

Account Label

A friendly name for the specified Service Account credentials. It must contain only alphanumeric characters.

Service Account Credentials

Copy and paste the content of the .json file provided by Google containing the keys of your Service Account. The IAM permissions required are:

- compute.zones.list
- compute.regions.list
- compute.instances.list
- compute.images.list
- compute.disks.list
- compute.machineTypes.list
- compute.subnetworks.list

All these permissions are mandatory.

For more information about Google Cloud Platform service accounts, refer to the Google documentation.

Note: The Google Cloud Platform plugin will discover the VM instances belonging to the project(s) specified in the .json file(s) with which the plugin was configured. Starting from version 1.4 of the Google Cloud Platform plugin, you can manage all additional project(s) that your Service Account is able to list and has permissions on. To be able to list projects, the Resource Manager API must be enabled and the Service Account must be able to issue requests to it, which means having the *resourcemanager.projects.get* permission. For more information about listing projects, refer to the Google documentation.

Related information

The Plugin Portal *(on page 157)*

Understanding cloud setup *(on page 198)*

Verifying the cloud plugin installation

Once the deployment of a cloud plugin has completed, its first discovery attempt is expected to start immediately and the discovered resources should be displayed in the **Computers** view of the BigFix Console or in the **Devices** page of the BigFix WebUI within a few minutes.

As a post-installation sanity check, you can verify the following:

1. The existence of the cloud plugin log file in the following default path:
    - **Windows**: C:\Program Files (x86)\BigFix Enterprise\BES Plugin Portal\Plugins *Plugin_name*\Logs\log.txt
    - **Linux**: /var/opt/BESPluginPortal/Plugins/*Plugin_name*/Logs/log.txt
2. The content of the cloud plugin log file which for a functioning plugin just installed will be such as:

    ```
    2020/03/31 19:33:48 - [info] <Plugin_name> 1.1.59 starts on <OS
     platform>
    2020/03/31 19:33:48 - [info] Plugin Portal with API version 1
    2020/03/31 19:33:55 - [info] Refresh all: Attempting discovery
    2020/03/31 19:35:53 - [info] Refresh all: Discovery returned <number>
     unique devices
    ```
3. The running status of the BESPluginPortal process.
4. The content of the plugin portal log file, located in the following default path:
    - **Windows**: C:\Program Files (x86)\BigFix Enterprise\BES Plugin Portal \BESPluginPortal.log
    - **Linux**: /var/log/BESPluginPortal.log

    After the latest plugin portal restart, the log file should contain a line such as:

    ```
    Tue, 31 Mar 2020 19:33:49 +0200 - 1222616832 - Running
     plugin'<Plugin_name>'
    ```

    Note: The presence of the following message in the plugin portal log file is expected as long as no discovered resources exist:

    ```
    Tue, 31 Mar 2020 19:33:49 +0200 - 2383846272 - Error reading
     records from the database.
    ```

In case of unexpected results, refer to the Troubleshooting (on page 294) section.

Configuring cloud plugins

Cloud plugins are installed with a base configuration that can be updated later on, primarily through the BigFix WebUI.

Discovery frequency

It is the frequency with which a cloud plugin runs the discovery of the related cloud resources. Cloud plugins are installed with a default discovery frequency of 120 minutes.

The discovery frequency can be updated from the **Plugin Management** section of the BigFix WebUI. There are also BES Support tasks that allow updating the discovery frequency of cloud plugins.

Discovery optimization

Starting from BigFix Version 10.0.12, the total discovery duration of time was optimized by using the multi-threading solution present in the cloud plugins.

To leverage the multi-threading solution, you can enable the following cloud plugin settings:

- _<*PluginName*>_Discovery_MaxConcurrentRoutinesForCredentials (available for all plugins)
    - This setting specifies the maximum amount of concurrent routines that you can use for a given cloud plugin credentials.
    - The allowed value range is: 1 (minimum value) - 200.000 (maximum value).
    - The default value is 10.
- _<*PluginName*>AssetDiscoveryPlugin_Discovery_MaxConcurrentRoutinesForScans (available for VMware and Amazon Web Services plugins)
    - This setting specifies the maximum amount of concurrent routines for a given cloud plugin discovery.
    - The allowed value range is: 1 (minimum value) - 200.000 (maximum value).
    - The default value is 10.

These settings can be specified using the Fixlet under BES Support named <PluginName>**multithreading discovery settings**.

Remove data for Deleted Devices

This option, available starting from BigFix Version 10.0.8, consists of a setting on the Plugins that can be changed from the WebUI. When the Plugin Portal sends a deletion request to the BigFix Server, and this setting is enabled, the BigFix Server performs a physical deletion. It means that it physically removes the devices and all associated data from the database. If this setting is disabled (it is disabled by default), the BigFix Server performs a logical deletion. It means that the devices are marked as deleted but they are still contained in the BigFix Database.

For details about this feature, see Discovering cloud resources (on page 199).

Remove Correlated Instances

This option, available starting from BigFix Version 10.0.8, consists of a setting on the Plugins that can be changed from the WebUI. When the Plugin Portal sends a deletion request to the BigFix Server, and this setting is enabled, the BigFix Server deletes also the native instances associated to the Proxied ones, coming from the Plugin Portal deletion request. This setting is disabled by default.

For details about this feature, see Discovering cloud resources (on page 199).

Logs

Cloud plugins are installed with a standard log level, and the following default log path:

- **Windows**: C:\Program Files (x86)\BigFix Enterprise\BES Plugin Portal\Plugins *Plugin_name*\Logs\log.txt
- **Linux**: /var/opt/BESPluginPortal/Plugins/*Plugin_name*/Logs/log.txt

The log file rotates when it reaches the size of 10 MB. The latest 10 rotated logs are available in the log directory.

You can update the log path and verbosity in the **Plugin Management** section of the BigFix WebUI.

Support of multiple sets of credentials

A cloud plugin might be configured to use multiple sets of credentials. The first set is specified at installation time, further sets can be added at any time from the **Plugin Management** section of the BigFix WebUI.

At each discovery, the cloud plugin goes through all available credential sets, and retrieves the cloud resources that are available to each set. If a credential set reaches the maximum number of failed discovery attempts, it is no longer taken into account during the next discoveries.

Maximum number of failed discovery attempts

It is the maximum number of consecutive discovery failures for a credential set before it is skipped. Not all kind of discovery failures would increase the counter, only those related to failed login attempts due to incorrect or expired passwords. Successful discovery attempts reset the counter. Restarting the plugin portal would reset the counter as well.

Skipping a failing credential set after three consecutive failures helps reducing the chance of having it affected by possible account lockout policies in place on the cloud platform side.

When a credential set reaches the maximum number of failed attempts, the following message is written in the standard log:

```
[error] Refresh all: user 'Account Label' reached the maximum attempts (3)
 and it will be skipped
```

When this happens, the operator should take advantage of the BigFix WebUI to update the password. The updated credential set is taken into account again starting from the next discovery.

Proxy support

The AWS and the Microsoft Azure plugins must be able to access related cloud services using HTTPS over the Internet. In both cases, it is possible to use a proxy to do that, although the supported proxy configuration differs.

How to configure a proxy for AWS plugin

When installing the AWS plugin, you can configure it to run discoveries through a proxy by filling in the appropriate fields of the installation Fixlet or of the Install Cloud Plugin page on the BigFix WebUI. The WebUI also allows you to specify the proxy at a later time by editing the configuration of an installed plugin.

In case of an HTTPS proxy, it is possible to configure the AWS plugin to validate the SSL certificate of the proxy using a custom CA certificate file. A BES Support task allows you to carry out this configuration.

How to configure a proxy for Microsoft Azure plugin

In order to have the Microsoft Azure plugin go through a proxy, it is necessary to configure the proxy as follows:

Windows

The proxy must be set at system level using the *http_proxy* and *https_proxy* environment variables.

Linux

The following key/value pairs must be specified in the */etc/opt/BESPluginPortal/custom.config* file (create this file manually if it does not already exist):

- https_proxy=*http://proxyHost:proxyPort/*
- http_proxy=*http://proxyHost:proxyPort/*

On both Windows and Linux, restart the BigFix Plugin Portal service to make the proxy configuration effective.

Note: Because the Azure SDK embedded in the Azure cloud plugin requires the proxy to be set at system level, communications from the local Plugin Portal to its parent Relay will also be affected. To restore direct communications, the Plugin Portal must have the proxy defined through the relevant BigFix configuration settings, with the parent Relay included in the related exception list. For more details, see List of settings and detailed descriptions.

Related information

The Plugin Portal *(on page 157)*

Understanding cloud setup *(on page 198)*

Cloud Plugins Inspectors

Resources reported by the cloud plugins contain a lot of information related to the instances they represent. Such data is made available through numerous inspectors.

These inspectors are divided between the common section, that all plugins share, and a more specific section for each plugin which is exclusive to the single plugin. In this topic, we describe the **common inspectors**.

Computer Name

```
computer name: string
```

The display name of the device.

CPU

```
main processor: processor
```

Returns the processor object corresponding to the main processor.

```
speed of <processor>: hertz
```

Returns the speed of the processor in Hertz.

```
family name of <processor>: string
```

Returns the family name of the CPU.

Data Source

```
data source: string
```

The data source is the name of the system where data is coming from.

Device ID

```
device id: string
```

The device ID is a unique identifier for each device.

Device Type

```
device type: string
```

The type of device. For cloud plugins resources, it is set to "Cloud" by default.

DNS Name

```
dns name: string
```

The DNS name.

Network

```
network: network
```

The network inspectors report data about the network configuration.

```
ip interfaces of <network>: plural ip interface
```

Returns all the ip interfaces of the network.

```
address of <ip interface>: ipv4or6 address
```

Returns the ip address of the ip interface.

```
subnet address of <ip interface>: ipv4or6 address
```

Returns the subnet address to which the specified interface belongs.

```
loopback of <ip interface>: boolean
```

Indicates whether the particular network ip interface is a loopback interface.

```
adapters of <network>: plural network adapter
```

Returns the one or more network adapter objects of the network.

```
up of <network adapter>: boolean
```

Returns True if the specified network adapter is currently working.

```
loopback of <network adapter>: boolean
```

Returns True if the specified network adapter is a loopback interface.

```
ipv6 interfaces of <network adapter>: plural network adapter interface
```

Returns the IPv6 interfaces of the specified network adapter as a network adapter interface type.

```
address of <network adapter interface>: ipv4or6 address
```

Returns the IP address of the specified network adapter interface as an ipv4or6 address type.

OS

```
operating system: operating system
```

The OS inspectors return data about the operating system. By default the name and version are reported, but additional properties are available depending on the cloud plugin.

```
name of <operating system>: string
```

The name of the OS.

```
version of <operating system>: version
```

The version of the OS.

RAM

```
ram: ram
```

Returns a ram object for inspecting the properties of random access memory of the machine. Additional properties are available depending on the cloud plugin.

```
size of <ram>: integer
```

Returns the number of bytes of random access memory on the current machine.

AWS Asset Discovery Plugin Inspectors

AMI launch index

```
ami launch index: integer
```

The AMI launch index.

Association Overview

```
association overview: association overview
```

The Association Overview inspectors return the status information about the aggregated associations.

```
detailed status of <association overview>: string
```

The detailed status information about the aggregated associations.

```
status count of <association overview>: string
```

The number of associations for the instance.

AWS Image

```
aws image: aws image
```

The AWS Image inspectors represent an AMI and its properties.

```
id of <aws image>: string
```

The ID of the AMI.

```
name of <aws image>: string
```

The name of the AMI.

```
architecture of <aws image>: string
```

The architecture of the AMI.

```
description of <aws image>: string
```

The description that was provided during the AMI creation.

```
creation date of <aws image>: string
```

The time and date of the AMI creation.

```
hypervisor of <aws image>: string
```

The hypervisor of the AMI.

```
location of <aws image>: string
```

The location of the AMI.

```
owner alias of <aws image>: string
```

The AWS account alias or the AWS account ID of the AMI owner.

```
type of <aws image>: string
```

The type of the AMI.

```
kernel id of <aws image>: string
```

The kernel associated with the image, if any. Only applicable for machine images.

```
public of <aws image>: boolean
```

Returns true if the image has public launch permissions or false if it has only implicit and explicit launch permissions.

```
tags of <aws image>: plural tag
```

An array of tags assigned to the AMI.

```
product codes of <aws image>: plural product code
```

An array of product codes.

```
virtualization type of <aws image>: string
```

The virtualization type of the AMI.

```
platform details of <aws image>: string
```

The platform details associated with the billing code of the AMI.

Block Device Mapping

```
block device mapping: block device mapping
```

```
[block device mapping, block device mappings]: plural block device mapping
```

The Block Device Mapping inspectors describes a block device mapping. The return an array of data for each block device mapping.

```
device name of <block device mapping>: string
```

The device name of the block device mapping.

```
ebs of <block device mapping>: ebs
```

Parameters used to automatically set up EBS volumes when the instance is launched.

CPU Package

```
cpupackage: cpupackage
```

The CPU Package inspectors return data about the CPU options.

```
core of <cpupackage>: integer
```

The number of cores for the instance.

```
thread of <cpupackage>: integer
```

The number of threads per core.

Credentials Label

```
credentials label: string
```

The credentials label is a custom string defined by the user when installing the plugin. It uniquely identifies a user's set of credentials.

Credentials Role

```
credentials role: string
```

The role ARN of the IAM Role through which the instance was discovered. The value is left empty if no role is specified in the credentials.

EBS

```
ebs: ebs
```

```
ebses: plural ebs
```

The EBS inspectors describe the parameters used to set up an EBS volume in a block device mapping.

```
attach time of <ebs>: string
```

The time stamp when the attachment initiated.

```
delete on termination of <ebs>: boolean
```

Indicates whether the volume is deleted on instance termination.

```
status of <ebs>: string
```

The attachment state.

```
volume id of <ebs>: string
```

The ID of the EBS volume.

ENA enabled

```
ena enabled: boolean
```

Specifies whether enhanced networking with ENA is enabled.

Hypervisor

```
hypervisor: string
```

The hypervisor of the instance.

Image ID

```
image id: string
```

The ID of the AMI image used to launch the instance.

Instance ID

```
instance id: string
```

The unique identifier for the instance.

Instance Type

```
instance type: string
```

The type of the instance.

Key name

```
key name: string
```

The name of the key pair the instance was launched with, if any.

Launch Time

```
launch time: string
```

The time the instance was launched.

Owner ID

```
owner id: integer
```

The ID of the instance owner.

Placement

```
placement: placement
```

The location where the instance launched, if applicable.

```
affinity of <placement>: string
```

The affinity setting for the instance on the Dedicated Host.

```
availability zone of <placement>: string
```

The availability zone of the instance.

```
group name of <placement>: string
```

The name of the placement group the instance is in.

```
host id of <placement>: string
```

The ID of the Dedicated Host on which the instance resides.

```
partition number of <placement>: string
```

The number of the partition the instance is in. Valid only if the placement group strategy is set to partition.

```
spread domain of <placement>: string
```

The spread domain of the instance.

```
tenancy of <placement>: string
```

The tenancy of the instance (if the instance is running in a VPC).

Private DNS name

```
private dns name: string
```

The private DNS hostname name assigned to the instance.

Private IP Address

```
private ip address: string
```

The private IPv4 address assigned to the instance.

Product Code

```
product codes: plural product codes
```

The product code inspectors return an object that describes a product code.

```
id of <product code>: string
```

The product code.

```
type of <product code>: string
```

The type of the product code.

Public IP Address

```
public ip address: string
```

The public IPv4 address, or the Carrier IP address assigned to the instance.

Public DNS name

```
public dns name: string
```

The public DNS hostname name assigned to the instance.

Region

```
region: string
```

The AWS Region where the instance resides.

Requested ID

```
requester id: integer
```

The ID of the requester that launched the instances on your behalf.

Root Device Type

```
root device type: string
```

The root device type used by the AMI.

Security Group

```
security groups: plural security group
```

The Security Group inspectors return data about the security groups assigned to an instance.

```
id of <security group>: string
```

The ID of the security group.

```
name of <security group>: string
```

The name of the security group.

State

```
state: string
```

The current state of the instance.

Subnet ID

```
subnet id: string
```

The ID of the subnet in which the instance is running.

System Manager

```
system manager: system manager
```

The System Manager inspectors returns information about the AWS System Manager, if available for the instance. The System Manager inspectors are required for the BigFix Agent deployment on AWS through native APIs. See BigFix Agent installation on cloud resources (on page 285) for further details.

```
activation id of <system manager>: string
```

The activation ID created by Systems Manager when the server or VM was registered.

```
agent version of <system manager>: string
```

The version of the SSM agent present on the instance, if any. Should exist for the BigFix Agent installation.

```
association overview of <system manager>: association overview
```

Returns the overview of the aggregated association.

```
association status of <system manager>: string
```

The status of the association.

```
computer name of <system manager>: string
```

The fully qualified domain name of the instance.

```
ip address of <system manager>: string
```

The IP address of the instance.

```
iam role of <system manager>: string
```

The IAM Role assigned to the on-premises Systems Manager managed instance.

```
instance id of <system manager>: string
```

The instance ID.

```
latest version of <system manager>: boolean
```

The version of the SSM Agent installed.

```
last association execution of <system manager>: string
```

The last date the association was run.

```
last ping of <system manager>: string
```

The time and date the SSM Agent pinged the System Manager service.

```
last successful association of <system manager>: string
```

The last date the association was successfully run.

```
name of <system manager>: string
```

The name assigned to an on-premises server or virtual machine when it is activated as a Systems Manager managed instance.

```
ping status of <system manager>: string
```

The connection status of the SSM Agent. Should be “Online” for the BigFix Agent installation.

```
platform name of <system manager>: string
```

The name of the operating system platform of the instance.

```
platform type of <system manager>: string
```

The type of the operating system platform of the instance.

```
platform version of <system manager>: string
```

The version of the operating system platform of the instance.

```
registration date of <system manager>: string
```

The date the server or VM was registered with AWS as a managed instance.

```
resource type of <system manager>: string
```

The resource type, either EC2 or managed instance.

Tag

```
tags: plural tag
```

The Tag inspectors return the array of tags associated to an instance.

```
key of <tag>: string
```

The key of the Tag.

```
value of <tag>: string
```

The value of the Tag.

Uptime

```
uptime: integer
```

The hours since the time the instance was launched, if known.

Virtualization Type

```
virtualization type: string
```

The type of virtualization used by the instance.

VPC ID

```
vpc id: string
```

The ID of the VPC in which the instance is running.

Azure Asset Discovery Plugin Inspectors

Azure Image

```
azure image: azure image
```

The Azure Image inspectors return data concerning the Azure Image of the instance.

```
publisher of <azure image>: string
```

Specifies the image publisher.

```
offer of <azure image>: string
```

Specifies the offer of the platform image or marketplace image used to create the virtual machine.

```
sku of <azure image>: string
```

The image SKU.

```
version of <azure image>: string
```

Specifies the version of the platform image or marketplace image used to create the virtual machine. The allowed formats are Major.Minor.Build or 'latest'.

Credentials Label

```
credentials label: string
```

The credentials label is a custom string defined by the user when installing the plugin. It uniquely identifies a user’s set of credentials.

Instance ID

```
[instance id, instances id]: string
```

```
instance id: string
```

The instance ID is the unique idenfitier for the instance and it corresponds to the VMID, a 128-bits identifier.

Instance Type

```
instance type: string
```

Specifies the size of the virtual machine.

License Type

```
license type: string
```

Specifies that the image or disk that is being used was licensed on-premises. This element is only used for images that contain the Windows Server operating system.

Linux Configuration

```
linux configuration of <operating system>: linux configuration
```

Specifies the Linux operating system settings on the virtual machine.

```
disable password authentication of <linux configuration>: boolean
```

Specifies whether the password authentication should be disabled.

```
provision vm agent of <linux configuration>: boolean
```

Indicates whether virtual machine agent should be provisioned on the virtual machine.

Network

The Network inspectors are defined in the common section. Here are the additional IP interface properties for the Microsoft Azure Plugin.

```
public address of <ip interface>: ipv4or6 address
```

The public IP address bound to the IP configuration.

Operating System

The Operating System inspectors are defined in the common section. Here are the additional properties for the Microsoft Azure Plugin.

```
admin username of <operating system>: string
```

Specifies the name of the administrator account.

```
windows configuration of <operating system>: windows configuration
```

Specifies the Windows operating system settings on the virtual machine.

```
linux configuration of <operating system>: linux configuration
```

Specifies the Linux operating system settings on the virtual machine.

OS Disk

```
os disk: os disk
```

The OS Disk inspectors report information about the operating system disk used by the virtual machine.

```
caching of <os disk>: string
```

Specifies the caching requirements.

```
create option of <os disk>: string
```

Specifies how the instance should be created.

```
disk size gb of <os disk>: string
```

The size of the disk reported in gigabytes.

```
storage account type of <os disk>: string
```

Specifies the storage account type for the managed disk.

```
name of <os disk>: string
```

The disk name.

```
os type of <os disk>: string
```

The OS type included in the disk.

Provisioning State

```
provisioning state: provisioning state
```

The Provisioning State inspectors return data about the state of the provisioning.

```
status of <provisioning state>: string
```

The short localizable label for the status.

```
time of <provisioning state>: string
```

The time of the status.

Region

```
region: string
```

The resource location.

Resource Group

```
resource group: string
```

The resource group of the virtual machine.

Status

```
status: string
```

The power state of the virtual machine.

Tag

```
tags: plural tag
```

The Tag inspectors return the array of tags associated to an instance.

```
key of <tag>: string
```

The key of the Tag.

```
value of <tag>: string
```

The value of the Tag.

Ultra SSD enabled

```
ultra ssd enabled: boolean
```

The flag that enables or disables a capability to have one or more managed data disks with UltraSSD_LRS storage account type on the VM or VMSS.

Windows Configuration

```
windows configuration of <operating system>: windows configuration
```

Specifies the Windows operating system settings on the virtual machine.

```
provision vm agent of <windows configuration>: boolean
```

Indicates whether virtual machine agent should be provisioned on the virtual machine.

```
enable automatic updates of <windows configuration>: boolean
```

Specifies whether the automatic updated are enabled on the Windows virtual machine.

```
timezone of <windows configuration>: string
```

Specifies the time zone of the virtual machine.

VM Agent

```
vm agent: vm agent
```

The VM Agent inspectors return data about the VM Agent present on the virtual machine, if available. The VM Agent inspectors are required for the BigFix Agent deployment on Azure through native APIs. See BigFix Agent installation on cloud resources (on page 285) for further details.

```
version of <vm agent>: string
```

The version of the VM Agent. Should exist for the BigFix Agent installation.

```
status of <vm agent>: string
```

The status of the VM agent. Should be “Ready” for the BigFix Agent installation.

GCP Asset Discovery Plugin Inspectors

Can IP Forward

```
can ip forward: boolean
```

Flags whether the instance is allowed to send and receive packets with non-matching destination or source IPs.

Computer name

```
computer name: string
```

The name of the resource, provided by the client when initially creating the resource.

CPU Platform

```
cpu platform: string
```

The CPU platform used by the current instance.

Creation Timestamp

```
creation timestamp: string
```

The creation timestamp.

Credentials Label

```
credentials label: string
```

The credentials label is a custom string defined by the user when installing the plugin. It uniquely identifies a user's set of credentials.

Data Source

```
data source: string
```

The data source is the name of the system where data is coming from. For the VMware Plugin, it is set to "Proxy – Google Cloud Platform" by default.

Deletion Protection

```
deletion protection: boolean
```

Whether the resource should be protected against deletion.

Description

```
description: string
```

Optional description of this resource.

Disk

```
disks: plural gcp disk
```

The disk inspectors contains information about the instance storage.

```
type of <gcp disk>: string
```

Specifies the type of the disk, either SCRATCH or PERSISTENT.

```
mode of <gcp disk>: string
```

The mode in which to attach this disk, either READ_WRITE or READ_ONLY.

```
source of <gcp disk>: string
```

Specifies a valid partial or full URL to an existing Persistent Disk resource.

```
device name of <gcp disk>: string
```

Specifies a unique device name. If not specified, the server chooses a default name in the form persistent-disk-x, where x is a number assigned by the Google Compute Engine. This field is only applicable for persistent disks.

```
index of <gcp disk>: integer
```

Zero-based index to this disk, where 0 is reserved for the boot disk.

```
boot of <gcp disk>: boolean
```

Indicates that this is a boot disk.

```
auto delete of <gcp disk>: boolean
```

Specifies whether the disk will be auto-deleted when the instance is deleted, but not when the disk is detatched.

```
interface of <gcp disk>: string
```

Specifies the disk interface to use for attaching this disk, which is either SCSI or NVME.

```
size gb of <gcp disk>: integer
```

The size of the persistent disk, specified in GB.

```
description of <gcp disk>: string
```

An optional description of the resource.

```
zone of <gcp disk>: string
```

The URL of the zone where the disk resides.

```
status of <gcp disk>: string
```

The status of disk creation. Possible values are CREATING, DELETING, READY, FAILED, RESTORING.

```
source image of <gcp disk>: gcp image
```

The source image used to create this disk.

```
creation timestamp of <gcp disk>: string
```

The timestamp fo the creation.

Hostname

```
hostname: string
```

Specifies the RFC1035 compliant hostname of the instance.

Image

```
archive size bytes of <gcp image>: integer
```

The size of the image tar.gz archive stored in the Google Cloud Storage (in bytes).

```
creation timestamp of <gcp image>: string
```

The creation timestamp.

```
source disk of <gcp image>: string
```

The URL of the source disk used to create this image.

```
size gb of <gcp image>: integer
```

The size of the image when restored onto a persistent disk in GB.

```
family of <gcp image>: string
```

The name of the image family to which this image belongs.

```
id of <gcp image>: integer
```

The unique identifier for the resource.

```
name of <gcp image>: string
```

The name of the resource; provided by the client when the resource is created.

```
status of <gcp image>: string
```

The status of the image. Possible values are DELETING, FAILED, PENDING, READY.

```
source type of <gcp image>: string
```

The type of the image used to create this disk.

```
description of <gcp image>: string
```

An optional description of the resource.

Instance ID

```
[instance id, instances id]: string
```

The unique identifier for the resource. This identifier is defined by the server.

Labels

```
labels: plural tag
```

Labels to apply to the instance.

```
key of <tag>: string
```

The key of the label.

```
value of <tag>: string
```

The value of the label.

Machine Type

```
machine type: string
```

Full or partial URL of the machine type resource to use for this instance, in the `zones/zone/machineTypes/machine-type` format. This is provided by the client when the instance is created.

Minimum CPU Platform

```
minimum cpu platform: string
```

Specifies a minimum CPU platform for the VM instance.

Network

```
network tags: plural string
```

The network inspectors are defined in the common section. An array of tags.

```
name of <ip interface>: string
```

The name of the network interface.

```
gateway address of <ip interface>: ipv4or6 address
```

The gateway address for default routes to reach destination addresses outside the subnetwork.

```
external address of <ip interface>: ipv4or6 address
```

An external IP address associated with this instance.

```
access configurations of <ip interface>: plural access configuration
```

The access configurations attached to an instance network interface.

```
type of <access configuration>: string
```

The type of configuration.

```
name of <access configuration>: string
```

The name of this access configuration.

```
nat ip of <access configuration>: ipv4or6 address
```

An external IP address associated with this instance.

```
network tier of <access configuration>: string
```

This signifies the networking tier used for configuring the corresponding access configuration.

```
domain name of <access configuration>: string
```

The DNS domain name for the public PTR record.

Project ID

```
project id: string
```

The ID of the project of the instance.

Self Link

```
self link: string
```

The Server-defined URL for the resource.

Start Restricted

```
start restricted: boolean
```

Whether a VM has been restricted for start because the Compute Engine has detected suspicious activity.

Status

```
status: string
```

The status of the instance.

Status Message

```
status message: string
```

A human-readable message explaining the status.

Zone

```
zone: string
```

The URL of the zone where the instance resides.

VMware Asset Discovery Plugin Inspectors

The Fixlet named **5629 - VMware Plugin manage Hosts discovery** can be used to retrieve information related to the Host VMware Inspectors and display them in the BigFix Console. These information apply to the inspector sections described in this page which contain **(Host)** in their titles.

Bios

```
vm bios: bios
```

The vm bios inspector returns contains the uuid of the bios property.

```
uuid of <bios>: string
```

The 128-bit SMBIOS UUID of a virtual machine represented as a hexadecimal string in the `12345678-abcd-1234-cdef-123456789abc` format.

Bios (Guest)

```
version of <vm bios>: string
```

The current BIOS version of the physical chassis.

```
release date of <vm bios>: time
```

The release date for the BIOS.

Bios (Host)

```
host bios : <host bios>
```

The Host BIOS inspector returns information about the system BIOS of the host.

```
model of <host bios>: string
```

The Host BIOS model identification.

```
platform of <host bios>: platform
```

Returns the platform object of the Host BIOS.

```
serial number of <platform>: string
```

The serial number of the Host BIOS, taken from the platform object.

Computer Name

```
computer name: string
```

The display name of the device. The name of the virtual machine for Guest devices and the host name for Host devices.

Credentials Label

```
credentials label: string
```

The credentials label is a custom string defined by the user when installing the plugin. It uniquely identifies a user's set of credentials.

Custom Attributes

```
custom attributes: plural custom attribute
```

This inspector returns the custom attributes. An array of base types for storing values.

```
attribute of <custom attribute>: string
```

The attribute name of the custom attribute.

```
value of <custom attribute>: string
```

The string value of the custom attribute.

Data Source

```
data source: string
```

The data source is the name of the system where data is coming from. For the VMware Plugin, it is set to "Proxy – VMware" by default.

Device

```
device: device
```

The overall alarm status on this node. In releases after vSphere API 5.0, vSphere Servers might not generate property collector update notifications for this property.

Device (Guest)

```
status of <device>: string
```

The current power state of the virtual machine.

```
state of <device>: string
```

The current state of the virtual machine.

```
vm uuid of <device>: string
```

The VC-specific identifier of the virtual machine.

```
bios uuid of <device>: string
```

The virtual machine BIOS identification.

```
description of <device>: string
```

The description for the virtual machine.

```
vm path name of <device>: string
```

The path name to the configuration file for the virtual machine

```
clean power off of <device>: string
```

For a powered off virtual machine, it indicates whether the virtual machine's last shutdown was an orderly power off or not. Unset if the virtual machine is running or suspended.

```
virtual disk count of <device>: integer
```

The number of virtual disks attached to the virtual machine.

```
ethernet card count of <device>: integer
```

The number of virtual network adapters.

```
modification time of <device>: time
```

The last executed task.

```
template of <device>: boolean
```

This data object type describes a template virtual machine configuration file.

Device (Host)

```
bios release date of <device>: time
```

The release date for the bios.

```
bios version of <device>: string
```

The current bios version of the physical chassis.

```
bios uuid of <device>: string
```

The hardware BIOS identification.

```
file system type of <device>: string
```

Represents the list of supported file system volume types.

```
maintenance mode of <device>: boolean
```

The flag to indicate whether or not the host is in maintenance mode. This flag is set when the host has entered the maintenance mode. It is not set during the entering phase of maintenance mode.

```
model of <device>: string
```

The system model identification.

```
network adapters of <device>: string
```

The number of network adapters.

```
pending restart of <device>: boolean
```

Indicates whether or not the host requires a reboot due to a configuration change.

```
port number of <device>: string
```

The port number.

```
status of <device>: string
```

The overall alarm status of the host.

```
vendor of <device>: string
```

The vendor type.

```
vmotion of <device>: boolean
```

The flag to indicate whether or not VMotion is enabled on this host.

```
vswitches of <device>: plural vswitches
```

The virtual switches.

```
portgroups of <vswitches>: plural string
```

The port groups of the virtual switches.

```
name of <vswitches>: string
```

The name of the virtual switches.

```
hostd log enabled of <device>: boolean
```

The flag to indicate if hostd log file exists.

```
messages log enabled of <device>: boolean
```

The flag to indicate if messages log file exists.

```
vmkernel log enabled of <device>: boolean
```

The flag to indicate if vmkernel log file exists.

Device ID

```
device id: string
```

The device ID is a unique identifier for each device. For VMware Guest devices, it corresponds to the instance UUID, which is the VC-specific identifier of the virtual machine. For VMware Hosts, it corresponds to the Host name with the “Host - “ prefix prepended.

Disk

```
disk: disk
```

The disk inspectors return data concerning the storage used by a machine.

```
provisioned storage of <disk> : string
```

The total storage space, in bytes, both committed and uncommitted to this virtual machine on all datastores.

```
used storage of <disk> : string
```

The total storage space, in bytes, committed to this virtual machine across all datastores.

```
unshared storage of <disk> : string
```

The total storage space, in bytes, occupied by the virtual machine across all datastores, that is not shared with any other virtual machine.

Drive (Guest)

```
drive: drive
```

```
drives: plural drive
```

The drive inspectors return data about the file system.

```
name of <drive>: string
```

The name of the virtual disk in the guest operating system. For example: C:\

```
free space of <drive>: integer
```

The free space on the disk, in bytes. This is retrieved by the VMware Tools.

```
total space of <drive>: integer
```

The total capacity of the disk, in bytes. This is part of the virtual machine configuration.

Guest VM

```
 guest vms: plural guest vm
```

These inspectors retrieve properties for the guest virtual machine.

```
name of <guest vm>: string
```

The guest name configured on the virtual machine.

```
network of <guest vm>: network
```

The network configured on the virtual machine.

```
operating system of <guest vm>: operating system
```

The operating system on the virtual machine.

```
host of <guest vm>: host
```

The host name.

```
 tool of <guest vm>: tool
```

The tool on the virtual machine.

```
processor of <guest vm>: processor
```

The processor on the virtual machine.

```
ram of <guest vm>: ram
```

The RAM on the virtual machine.

```
usage statistic of <guest vm>: usage statistic
```

The usage statistic of the virtual machine.

```
drives of <guest vm>: drive
```

The drives of the virtual machine.

```
device of <guest vm>: device
```

The devices configured on the virtual machine.

```
snapshots of <guest vm>: snapshot
```

The snaphots of the virtual machine.

Hardware

```
hardware: hardware
```

This inspector holds properties about the hardware type of the VMware representation of an instance. By default, the virtual and proxied properties return true on cloud plugins representations.

```
virtual of <hardware>: boolean
```

Returns true if the client is running on a virtual machine.

```
proxied of <hardware>: boolean
```

Returns true if the device reports to the BES Plugin Portal. Otherwise, it returns false.

Host (Guest)

```
host: host
```

The Host inspectors report the name of the host of the current guest.

```
name of <host>: string
```

The name of the host.

Services (Host)

```
[host service, host services]: plural host service
```

The Host Service inspectors return information about each configured service that runs on a host.

```
key name of <host service> : string
```

The brief identifier for the service.

```
label of <host service> : string
```

Displays the label for the service.

```
policy of <host service> : string
```

The service activation policy.

```
required of <host service> : string
```

The flag indicating whether the service is required and cannot be disabled.

```
running status of <host service> : string
```

The flag indicating whether the service is currently running.

Network

The network inspector is defined in the common section. The following properties are available for the VMware cloud plugin.

```
ip interfaces of <network>: plural ip interface
```

Returns all the IP interfaces of the network.

```
address of <ip interface>: string
```

The primary IP address assigned to the guest operating system, if known. Otherwise, the preferred one.

```
loopback of <ip interface>: boolean
```

The routing of electronic signals or digital data streams back to their source without intentional processing or modification.

```
mac address of <ip interface>: string
```

The MAC address of the adapter.

Network (Guest)

The VNIC inspectors provide Guest information about network adapters, if known.

```
vnics of <network>: plural vnic
```

Returns the VNICs of the network.

```
vnic counter of <network>: integer
```

Represents the virtual network identity cards counter.

```
name of <vnic>: string
```

The label for the device.

```
up of <vnic>: boolean
```

The flag indicating whether or not the virtual device is connected.

```
mac address of <vnic>: string
```

The MAC address of the adapter.

```
[address, addresses] of <vnic>: plural string
```

Zero, one or more manual (static) assigned IP addresses to be configured on a given interface.

```
dhcp enabled of <vnic>: boolean
```

Indicates whether or not dynamic host control protocol (DHCP) is used to configure DNS configuration.

```
connected of <vnic>: boolean
```

The flag indicating whether or not the virtual device is connected.

```
device config id of <vnic>: integer
```

The link to the corresponding virtual device.

```
label of <vnic>: string
```

The display label of the VNIC.

```
address counter of <vnic>: string
```

The number of addresses found.

```
vnic counter of <network>: string
```

The number of VNICs found.

OS

The operating system inspector is defined in the common section.

```
name of <operating system>: string
```

The complete product name, including the version information, if known. Otherwise, the short form of the product name.

```
version of <operating system>: string
```

The dot-separated version string.

OS (Guest)

```
[family, families] of <operating system>: string
```

The guest operating system family, if known.

```
id of <operating system>: string
```

The guest operating system identifier short name, if known.

OS (Host)

```
api version of <operating system>: version
```

The version of the API as a dot-separated string.

```
api type of <operating system>: string
```

Indicates whether or not the service instance represents a standalone host. If the service instance represents a standalone host, then the physical inventory for that service instance is fixed to that single host. VirtualCenter server provides additional features over single hosts.

```
boot time of <operating system>: time
```

Represents the time when the host was booted.

```
build number of <operating system>: integer
```

The OS host build number.

```
license product name of <operating system>: string
```

The name of the license product.

```
license product version of <operating system>: string
```

The version of the license product.

```
locale build of <operating system>: string
```

The build number for the current session's locale. Typically, this is a small number reflecting a localization change from the normal product build.

```
locale version of <operating system>: string
```

The version of the message catalog for the current session's locale.

```
major version of <operating system>: version
```

The first number of the OS Version property as a dot-separated string.

```
minor version of <operating system>: version
```

The second number of the OS Version property as a dot-separated string.

```
os type of <operating system>: string
```

The operating system type and architecture.

```
product line id of <operating system>: string
```

The product ID which is a unique identifier for a product line.

```
vendor of <operating system>: string
```

The name of the vendor of this product.

Patch Status (Host)

```
[patch status, patch statuses]: plural patch status
```

This inspector collects the information about the patch enforcement of the ESXi.

```
package name of <patch status>: string
```

The identifier that uniquely identifies the software package.

```
package install date of <patch status>: string
```

The time when the package was installed. On Autodeploy stateless installations, there is no value set.

```
package version of <patch status>: string
```

The version string that uniquely identifies the software package.

```
package vendor of <patch status>: string
```

The corporate entity that created the software package.

```
package acceptance of <patch status>: string
```

The acceptance level definitions. See here for details.

Processor

```
processor: processor
```

The processor inspector is defined in the common section. It returns processor objects defined on the machine.

```
speed of <processor>: hertz
```

Returns the speed of the processor in Hertz. Defaults to -1.

```
family name of <processor>: string
```

Returns the family name of the CPU. For the VMware cloud plugin it is left empty.

Processor (Guest)

```
count of <processor>: integer
```

The number of processors in the virtual machine.

```
resource settings of <processor>: resource setting
```

The resource settings specifies the reserved resource requirement as well as the limit (maximum allowed usage) for a given kind of resource. CPU allocation is specified in MHz.

Processor (Host)

```
logical processor count of <processor>: integer
```

The number of physical CPU threads on the host.

```
physical processor count of <processor>: integer
```

The number of physical CPU packages on the host.

```
power management currenty policy of <processor>: string
```

The information about the current CPU power management policy.

```
power management hardware support of <processor>: string
```

The information about the supported CPU power management.

```
total processor core count of <processor>: integer
```

The number of physical CPU cores on the host.

```
cpu packages of <processor>: plural cpu package
```

The CPU packages of the processor.

```
cpu pkg bus hz of <cpu package>: integer
```

The bus speed in HZ.

```
cpu pkg description of <cpu package>: string
```

The string summary description of the CPU.

```
cpu pkg hz of <cpu package>: integer
```

The CPU speed in HZ.

```
cpu pkg vendor of <cpu package>: string
```

The CPU vendor name. Possible names currently are "Intel", "AMD", "arm", "hygon", or "unknown".

RAM

The RAM inspector is defined in the common section.

```
size of <ram>: integer
```

Returns the number of bytes of random access memory on the current machine.

RAM (Guest)

The amount of memory resource (in bytes) that will be used by the virtual machine above its guest memory requirements. This value is set if and only if the virtual machine is registered on a host that supports memory resource allocation features. For powered off VMs, this is the minimum overhead required to power on the VM on the registered host. For powered on

VMs, this is the current overhead reservation, a value which is almost always larger than the minimum overhead, and which grows with time.

```
overhead of <ram>: integer
```

The bytes of memory used by the virtual machine above its guest memory requirements.

```
resource settings of <ram>: resource setting
```

Resource settings specifies the reserved resource requirement as well as the limit (maximum allowed usage) for a given kind of resource. Memory allocation is specified in MB.

Resource Setting

The properties below are common to ram and processor.

```
reservation of <resource setting>: integer
```

The amount of resource that is guaranteed available to the virtual machine or resource pool. Reserved resources are not wasted if they are not used. If the utilization is less than the reservation, the resources can be utilized by other running virtual machines. Units are MB for memory, MHz for CPU.

```
limit of <resource setting>: string
```

The utilization of a virtual machine/resource pool will not exceed this limit, even if there are available resources. This is typically used to ensure a consistent performance of virtual machines / resource pools independent of available resources. If set to -1, then there is no fixed limit on resource usage (only bounded by available resources and shares). Units are MB for memory, MHz for CPU.

```
overhead limit of <resource setting>: string
```

The maximum allowed overhead memory. For a powered on virtual machine, the overhead memory reservation cannot be larger than its overheadLimit. This property is only applicable to powered on virtual machines and is not persisted across reboots. This property is not applicable for resource pools. If set to -1, then there is no limit on reservation. Units are MB.

```
shares of <resource setting>: string
```

The allocation level. The level is a simplified view of shares. Levels map to a pre-determined set of numeric values for shares. If the shares value does not map to a predefined size, then the level is set as custom.

Snapshot (Guest)

```
snapshots: plural snapshot
```

The snapshot inspectors report all the read-only data produced by a snapshot.

```
creation time of <snapshot>: time
```

The date and time the snapshot was taken.

```
description of <snapshot>: string
```

The description of the snapshot.

```
name of <snapshot>: string
```

The name of the snapshot.

```
id of <snapshot>: integer
```

The unique identifier that distinguishes this snapshot from other snapshots of the virtual machine.

```
quiesced of <snapshot>: boolean
```

The flag to indicate whether or not the snapshot was created with the "quiesce" option, ensuring a consistent state of the file system.

```
replay supported of <snapshot>: boolean
```

The flag to indicate whether this snapshot is associated with a recording session on the virtual machine that can be replayed.

```
type of <snapshot>: string
```

The name of the managed object type of this snapshot.

```
value of <snapshot>: string
```

The specific instance of the managed object of this snapshot.

```
vm state of <snapshot>: string
```

The power state of the virtual machine when this snapshot was taken.

```
children of <snapshot>: snapshots
```

The snapshot data for all snapshots for which this snapshot is the parent.

Tool (Guest)

```
tool : <tool>
```

The tool inspectors report data about the VMware Tools.

```
status of <tool>: string
```

The current version status of VMware Tools, if known.

```
running status of <tool>: string
```

The current running status of VMware Tools in the guest operating system, if known.

```
version of <tool>: string
```

The current version of VMware Tools, if known.

```
version status of <tool>: string
```

The current version status of VMware Tools in the guest operating system, if known.

Usage Statistic (Guest)

```
usage statistic: usage statistic
```

The Usage Statistic inspector returns a set of statistics for a Virtual Machine.

```
overall cpu of <usage statistic>: hertz
```

The basic CPU performance statistics, in MHz. Valid while the virtual machine is running.

```
memory of <usage statistic>: integer
```

The guest memory utilization statistics, in MB. This is also known as active guest memory. The number can be between 0 and the configured memory size of the virtual machine. Valid while the virtual machine is running.

```
maximum cpu of <usage statistic>: hertz
```

The current upper-bound on CPU usage.

```
[maximum memory, maximum memories] of <usage statistic>: integer
```

The current upper-bound on memory usage.

```
[host memory, host memories] of <usage statistic>: integer
```

The Host memory utilization in bytes, including the overhead memory of the MV. The value ranges between 0 and the configured resource limit and it is valid while the virtual machine is running. Also known as the consumed host memory.

USB Device (Host)

```
[usb device, usb devices] : plural usb device
```

The USB device inspector returns a set of properties.

```
name of <usb device>: string
```

The USB device name.

```
description of <usb device>: string
```

A user visible name of the USB device.

```
family of <usb device>: string
```

The device class families. For possible values, see VirtualMachineUsbInfoFamily.

```
physicalpath of <usb device>: string
```

An autoconnect pattern which describes the device physical path. This is the path to the specific port on the host where the USB device is attached.

```
product of <usb device>: integer
```

The product ID of the USB device.

```
speed of <usb device>: string
```

The possible device speeds detected by the server. For possible values, see VirtualMachineUsbInfoSpeed.

```
vendor of <usb device>: integer
```

The vendor ID of the USB device.

```
usage summary of <usb device>: usage summary
```

The summary information about the virtual machine that is currently using this device, if any.

```
vm name of <usage summary>: string
```

The name of the virtual machine

```
vm path of <usage summary>: string
```

The path name to the configuration file for the virtual machine.

Virtualization inspectors

```
datacenters: plural datacenter
```

The Virtualization inspectors return a set of datacenter properties.

Virtualization inspectors for datacenters

```
name of <datacenter>: string
```

The name of the datacenter.

```
datastores of <datacenter>: plural datastore
```

A collection of references to the datastore objects available in this datacenter.

```
name of <datastore>: string
```

The name of the datastore.

```
free space of <datastore>: string
```

The free space of this datastore, in bytes. The server periodically updates this value. It can be explicitly refreshed with the Refresh operation.

```
max file size of <datastore>: string
```

The maximum size of a file that can reside on this file system volume.

```
timestamp of <datastore>: string
```

The time when the free-space and capacity values in DatastoreInfo and DatastoreSummary were updated.

```
url of <datastore>: string
```

The unique locator for the datastore.

```
iso images of <datastore>: plural iso image
```

The ISO images of the datastore.

```
path of <iso image>: string
```

The path relative to the folder path in the search results.

Virtualization inspectors for hard drivers

```
disk of <guest vm>: disk
```

The disk.

```
hard driver counter of <guest vm>: string
```

The number of hard drivers.

```
hard drivers of <guest vm>: plural hard driver
```

The hard drivers.

```
hard drivers: plural hard driver
```

Array.

```
unitnumber of <hard driver>: string
```

The unit number of this device on its controller. This property is null if the controller property is null (for example, when the device is not attached to a specific controller object).

```
datastore name of <hard driver>: string
```

The name of the datastore.

```
controllerkey of <hard driver>: string
```

The object key for the controller object for this device. This property contains the key property value of the controller device object.

```
label of <hard driver>: string
```

The label of the disk.

```
capacity of <hard driver>: string
```

The total capacity of the disk, in bytes. This is part of the virtual machine configuration.

```
key of <hard driver>: string
```

A unique key that distinguishes this device from other devices in the same virtual machine. Keys are immutable but may be recycled; that is, a key does not change as long as the device is associated with a particular virtual machine. However, once a device is removed, its key may be used when another device is added. This property is not read-only, but the client cannot control its value. Persistent device keys are always assigned and managed by the server, which guarantees that all devices will have non-negative key values. When adding new devices, it may be necessary for a client to assign keys temporarily in order to associate controllers with devices in configuring a virtual machine. However, the server does not allow a client to reassign a device key, and the server may assign a different value from the one passed during configuration. Clients should ensure that existing device keys are not reused as temporary key values for the new device to be added (for example, by using unique negative integers as temporary keys). When editing or deleting a device, clients must use the server-provided key to refer to an existing device.

Virtualization inspectors for disk for last time refreshed

```
last time refreshed: string
```

Last time refreshed simply refers to the report production time for the disk discovery. The layout should be: `<year> <month> <day> <hour>:<min>:<sec>`.

```
last time refreshed of <guest vm>: string
```

Last time refreshed simply refers to the report production time for the disk discovery. The layout should be: `<year> <month> <day> <hour>:<min>:<sec>`.

Virtualization inspector for VM name

```
name: string
```

Name of the Guest or Host, unique relative to its parent. Could contain escaped characters.

Cloud Plugins Commands

The Cloud plugins have the capability of supporting a wide range of actions.

Commands for the Cloud plugins work like the classical Action Script commands. The main difference, is that the targets should be representations of some Cloud Provider instances.

In a single script, more commands can be included, which will be run in sequence on the relevant representations.

The applicability or the relevance for an instance is based on the properties reported by the corresponding Cloud plugin. Similarly, a Cloud plugin's ability to execute a command is dependent on which commands the plugin supports.

Ensure that your Cloud plugin supports the appropriate inspectors. For further reference, see Cloud Plugins Inspectors (on page 224).

Moreover, check the supported commands in the child page of this section.

For an introduction to action scripts, see: https://developer.bigfix.com/action-script/

For the action scripts guide, see: https://developer.bigfix.com/action-script/guide/

VMware Plugin Commands

Host Commands

The following table describes the Host Commands:

Name	Syntax	Description
shutdown host	shutdown host [force=<force>]	This command shuts down a host.
reboot host	reboot host [force=<force>]	This command reboots a host.
enter maintenance	enter maintenance mode [action=<action> timeout=<time-	This command puts the host in maintenance mode. While this task is running and when the host is in maintenance mode, no virtual machines can be powered on

nance mode	out> evacuate=<evacuate>]	and no provisioning operations can be performed on the host.
exit maintenance mode	exit maintenance mode [timeout=<timeout>]	This command takes the host out of maintenance mode, unless any concurrent running maintenance-only host configurations operations are being performed.

Required VMware privileges:

- *Host.Config.Maintenance*

Guest Power Commands

The following table describes the Guest Power Commands:

Name	Syntax	Description
power on	power on	This command powers on the target Guest Virtual Machine.
power off hard	power off hard	This command powers off the target Guest Virtual Machine.
power off soft	power off soft	This command shuts down the target Guest Virtual Machine.
reset	reset	This command resets (first powers off, then powers on) the target Guest Virtual Machine.
restart	restart	This command reboots the target Guest Virtual Machine.
suspend soft	suspend soft	This command asks the target Guest Virtual Machine operating system to prepare for a suspend operation.
suspend hard	suspend hard	This command suspends the execution in the target Guest Virtual Machine.

Required VMware privileges:

- *VirtualMachine.Interact.PowerOn*
- *VirtualMachine.Interact.PowerOff* for both power off soft and hard
- *VirtualMachine.Interact.Suspend* for both suspend soft and hard
- *VirtualMachine.Interact.Reset* for both reset and restart

Guest Snapshot Commands

The following table describes the Guest Snapshot Commands:

Name	Syntax	Description
create snapshot	create snapshot <snapshot-name>	This command creates a snapshot with the given name.
revert snapshot	revert snapshot	This command reverts the virtual machine to the current snapshot. If no snapshot exists, the virtual machine state remains unchanged.
go to snapshot	go to snapshot <snapshot-name>	This command changes the execution state of the virtual machine to the state of the snapshot with the given name.
rename snapshot	rename snapshot <snapshot-name>|+| <new-snapshot-name>	This command renames the shapshot with the given name.
remove snapshot	remove snapshot <snapshot-name> [<children>]	This command removes the snapshot with the given name. If the optional boolean is set to true, it will delete all the snapshot children.
remove all snapshots	remove all snapshots	This command removes all the snapshot of a Virtual Machine.

Required VMware privileges:

- *VirtualMachine.State.CreateSnapshot*
- *VirtualMachine.State.RemoveSnapshot* for both remove snapshot and remove all snapshots
- *VirtualMachine.State.RenameSnapshot*
- *VirtualMachine.State.RevertToSnapshot* for both revert snapshot and go to snapshot

Guest Tools Commands

The following table describes the Guest Tools Commands:

Name	Syntax	Description
mount tools	mount tools	This command will mount the VMware Tools installer on a Virtual Machine.
upgrade tools	upgrade tools	This command upgrades the VMware Tools for a Virtual Machine.

Required VMware privileges:

- *VirtualMachine.Interact.ToolsInstall* for both mount tools and upgrade tools

Guest VLAN Command

The following table describes the Guest VLAN Command:

Name	Syntax	Description
change vlan	change vlan <vlan-name>|+|<adapter-number>	This command will switch the VLAN of a Virtual Machine.

Required VMware privileges:

- *VirtualMachine.Config.EditDevice*

Activating cloud analyses

When a cloud plugin is installed, the following BES Support analyses must be activated to take advantage of the new cloud-related capabilities of BigFix 10.

Activate:

- BES Component Versions
- Cloud Correlation Data
- *Plugin_name* Plugin Settings
- *Plugin_name* Resources

- Some of the required analyses can be activated also from the Cloud Plugin Dashboard *(on page 282)*.
- Some of the required analyses are activated automatically when installing a cloud plugin from the WebUI.

The cloud analyses data

The analysis is sent to all the cloud virtual instances, discoverable by the specific cloud plugins, which evaluate it for relevance and report the status. You can monitor specific properties of your cloud virtual instances from the BigFix Console.

Data provided by the analysis: *Cloud provider* Plugin Settings

The information reported by these analyses are the following plugin settings:

- Settings: A multi-property which displays a list of all settings.
- Version: The plugin version.
- Refresh Interval: The value, specified in minutes, set for the Task named **Plugin Update Refresh Interval**.

Data provided by the analysis: Amazon Web Services Resources

This analysis reports information that is specific to each provider. In particular, the Amazon Web Services Resources analysis reports data such as:

- State AWS: The state of the virtual machine.
- Launch Time: The time when the instance was launched.
- Type AWS: The specific instance type.
- Image ID: The image ID number.
- Owner ID: The owner ID number.
- Tags AWS: The predefined tags used.
- Region AWS: The region in which the virtual machine is located.
- Tenancy: The tenancy model used. Dedicated or shared. The default tenancy model is the shared tenancy.
- Platform: The value is Windows for Windows instances; otherwise blank (this is a limitation for the API AWS).
- Private / Public IP AWS: The private / public IP address assigned to the virtual machine.
- Private / Public DNS Name: The private / public DNS assigned to the virtual machine.
- Security Groups: The security group, that acts as a virtual firewall for your instance, used to control inbound and outbound traffic.
- Availability Zone: The distinct location within the region that is engineered to be isolated from failures in other availability zones.
- Key Name: The key name associated to the virtual machine.
- VPC ID: The ID number of the specific Virtual Private Cloud (VPC) used.
- Image Name: A unique name for the image used.
- Instance ID AWS: The instance ID number.
- Account Alias AWS: The Account Alias used.
- Correlation ID AWS: The correlation ID number.
- IAM Role AWS: The IAM Role used for discovering the instance.

The cloud plugins might be able to report additional information as well.

Data provided by the analysis: Microsoft Azure Resources

The information reported back from this analysis is specific for each provider. In particular, the Microsoft Azure Resources analysis reports back data such as:

- State Azure: The state of the virtual machine.
- Provisioning State: The provisioning state of the virtual machine.
- Provisioning Time: The provisioning time of the virtual machine.
- Type Azure: The type of virtual machine.
- Image Publisher: The publisher / organization that created the image.
- Image Offer: The name of a group of related images created by a publisher.
- Tags Azure: The predefined tags used.
- Region Azure: The region in which the virtual machine is located.
- Private / Public IP Azure: The private / public IP address assigned to the virtual machine.
- Resource Group: The group of resources the virtual machine belongs to.
- Instance ID Azure: The instance ID number.
- Account Alias Azure: The Account Alias used.
- Correlation ID Azure: The correlation ID number.

The cloud plugins might be able to report back also additional information.

Data provided by the analysis: VMware Resources

The information reported back from this analysis is specific for each provider. In particular, the VMware Resources analysis reports back data such as:

- Custom Attributes: The Custom Attributes defined for the virtual machine.
- Operating System: The operating system used.
- Power State VMware: The power state of the virtual machine.
- Status VMware: The state of the virtual machine.
- BIOS UUID: The BIOS UUID (Universal Unique Identifier) number.
- Host: The host virtual machine.
- VM UUID: The virtual machine UUID (Universal Unique Identifier) number.
- Account Alias VMware: The Account Alias used.

The cloud plugins might be able to report back also additional information.

Data provided by the analysis: Google Cloud Platform Resources

The information reported back from this analysis is specific for each provider. In particular, the Google Cloud Platform Resources analysis reports back data such as:

- Instance ID GCP: The instance ID number.
- Account Label GCP: The credentials label.
- Tags GCP: The predefined tags used.
- Status Message GCP: The status message.
- Status GCP: The status.
- Type GCP: The machine type.
- Creation Time: The creation timestamp.
- CPU Platform: The cpu platform.
- Zone GCP: The zone.
- Network Interface Name: The names of IP interfaces of network.
- Network Subnet Address: The subnet address of IP interfaces of network.
- Private IP GCP: The addresses of IP interfaces of network.
- Public IP GCP: The external addresses of IP interfaces of network.
- IP Forwarding: If the IP address can forward.
- Correlation ID GCP: The correlation ID.
- Project ID GCP: The project ID of the project to which the GCP instance belongs.

Cloud inspectors

Cloud inspectors gather information from the BigFix Agent, such as the following:

- Whether it is a virtual machine or not.
- If yes:
  - The name of the Cloud Provider.
  - Region and availability zone of the instance.
  - Unique ID of the instance (Instance ID or VM ID).
  - Private IP.

For details of various cloud provider configuration properties, see their respective documentation.

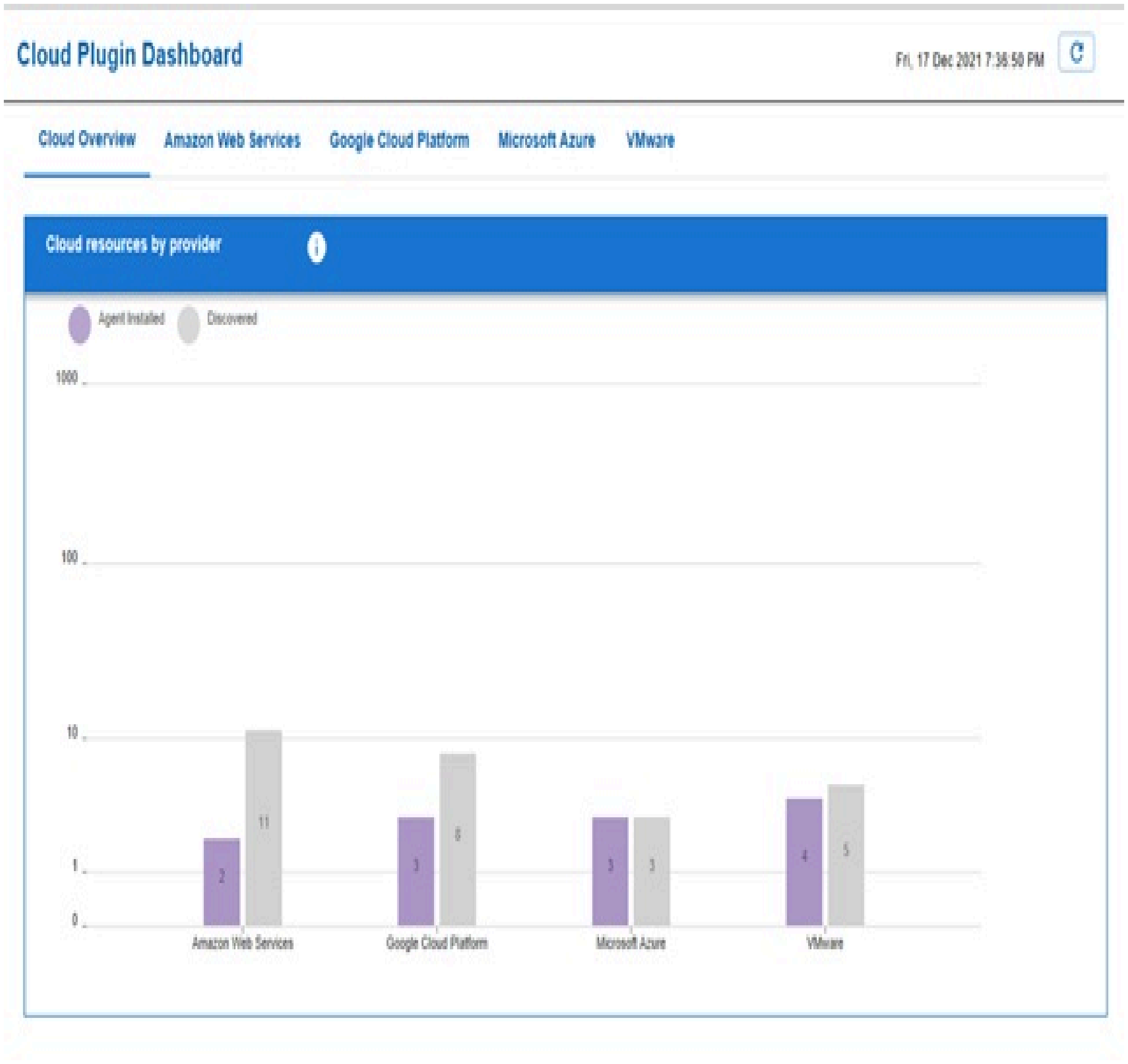
Working with the cloud plugin dashboard

The information displayed by the **Cloud Plugin Dashboard**.

Activate the **Cloud Providers** analysis of BES Support to start using the Cloud Plugin Dashboard.

To access the Cloud Plugin Dashboard, run the following steps on the BigFix Console:

1. Click the **All Content** domain on the leftmost panel of the console.
2. Expand the **Dashboards** entry.
3. Expand the **BES Support** entry.
4. Click **Cloud Plugin Dashboard**. The dashboard is displayed.



The **Cloud Overview** tab shows all discovered cloud resources, both managed by a BigFix Agent and unmanaged. The bar in violet indicates cloud resources on which the BigFix Agent is installed. The bar in gray indicates cloud resources on which the BigFix Agent is not installed yet.

When clicking on a violet bar or on a gray bar, details about all cloud resources represented by that bar are shown in a tabular format. You can then filter the items listed in the table by any column name. The "Name" column contains hyperlinks to the properties of the corresponding computers.

- The **Amazon Web Services** tab contains key information about the cloud resources discovered by the AWS plugin.
- The **Microsoft Azure** tab contains key information about the cloud resources discovered by the Azure plugin.
- The **VMware** tab contains key information about the cloud resources discovered by the VMware plugin.
- The **Google Cloud Platform** tab contains key information about the cloud resources discovered by the Google Cloud Platform plugin.

Installing the BigFix Agent on discovered resources

The resources retrieved by cloud plugins do not necessarily have the BigFix Agent installed. By using the **Cloud Plugin Dashboard** that lists all resources discovered on cloud, you can install the BigFix Agent on those that are still unmanaged.

1. From the **Cloud Overview** tab of the dashboard, click the gray bar for your cloud provider. A table with all unmanaged resources for that cloud provider is displayed.
2. In the table, click the row to select the resource on which you want to install the BigFix Agent. Multi-selection with Ctrl or Shift buttons is supported. If you want to select all the resources at once, click the **Select unmanaged resources** button.
3. Click the **Deploy agent** button.

The dashboard displays the Client Deployment Tool Wizard, with the list of targets to install already filled in. The installation then follows the standard Client Deployment Tool Wizard flow. For details on how to use the Client Deploy Tool Wizard, see Using the Client Deploy Tool.

Note: When launching the Client Deployment Tool Wizard from the **Cloud Plugin Dashboard**:

- In the **Set Target Credentials** page of the wizard, the **Add Targets** button is disabled.
- In the **Set Advanced Settings** page of the wizard, in the **OS families** section, the platforms which are not supported by the cloud infrastructures are greyed out.
- In the **Set Advanced Settings** page of the wizard, in the **Client Version** pull-down menu, only versions 10 or later are available.

Once the BigFix Agent is installed, the selected resources have two representations, the proxied one and the native one, which the BigFix Server correlates under one correlation computer.

BigFix Agent installation on cloud resources

Starting from Patch 2, you can install the BigFix Agent on the discovered cloud resources (AWS and Azure), using the cloud provider services through the corresponding BigFix cloud plugin.

BigFix Platform offers two new tasks (specific for each cloud provider) on BigFix Enterprise Suite (BES) Support so that you can deploy the agent on the discovered cloud resources.

The tasks are available from both the BigFix Console and from the WebUI. Use one of these tasks, depending on your cloud provider:

- `4774 Install BigFix Client through Amazon Web Services`
- `4775 Install BigFix Client through Microsoft Azure`

What the tasks do

The tasks go through the following actions that are completed locally on the target cloud resources:

- Fetch the installation script from software.bigfix.com.
- Fetch the client installer based on the version of the Plugin Portal from software.bigfix.com.

- Fetch the deployment masthead from the non-authenticating relay that is supplied for input to the tasks.
- Install the client and register it with the non-authenticating relay.
- Wait for the client registration to finish.

Requirements

To use this new installation feature, the discovered cloud resources must satisfy a number of cloud provider-specific configuration requirements. A subset of these requirements is automatically checked by the relevances that are contained in the tasks. You must ascertain that your cloud resources are configured correctly.

The primary requirements for installing the Agent on discovered cloud resources are as follows:

- Provider-specific cloud agent must be installed on the cloud resource. For details, see AWS *(on page 286)* and Azure *(on page 288)*.
- Cloud resources must be active and running.
- The name of a non-authenticating relay (which you supply as input while you run the tasks). For details, see Relay name as input *(on page 288)*.
- Operating system running on the cloud resource must be supported by the BigFix Client. For details, see Supported operating systems *(on page 289)*.
- The Plugin Portal must be at Patch 2 level at the minimum.

Important considerations

The feature does *not* support the following relays and settings:

- Authenticating relays
- Custom client settings that are set during installation

Requirements for AWS

VM requirements

- The presence of an active and running AWS Systems Manager (SSM) agent on the VM
- An IAM instance profile with the `AmazonSSMManagedInstanceCore` IAM policy that is associated with profile through an IAM Role. The IAM instance profile must be attached to the VM. This requirement enables the AWS Systems Manager to securely run commands on the VM.

IAM Identities requirements

The basic requirements IAM Identities (Users and Roles) should always met, when configured in the AWS Cloud Plugin, are the following:

- MFA must be disabled
- Must have programmatic access type

When installing the BigFix Agent with an IAM User associated with the Access Key ID-Secret Access Key pair that is used as credentials of the AWS Cloud Plugin, the permissions required are as follows:

- Must have the following ec2 permissions at the minimum: the ec2:Describe* action must be allowed on the * resource.
- Must have the following ssm permissions at the minimum: the ssm:DescribeInstanceInformation ,ssm:SendCommand, ssm:GetCommandInvocation actions must be allowed on the * resource

When installing the BigFix Agent with an IAM Role that can be assumed by an IAM user configured in the AWS Cloud Plugin, the permissions required are as follows.

For the User:

- Must be able to perform sts:AssumeRole on the target Role

For the Role:

- Must have the following ec2 permissions at the minimum: the ec2:Describe* action must be allowed on the * resource.
- Must have the following ssm permissions at the minimum: the ssm:DescribeInstanceInformation ,ssm:SendCommand, ssm:GetCommandInvocation actions must be allowed on the * resource
- The IAM User assuming the role should be a trusted identity for the Role

Note: Once AWS Roles are inserted, the AWS plugin will use them during its discovery, instead of the credential from which they derive. You must ensure that these roles include all the AWS devices that you want to discover in your cloud environment: otherwise, some machines may not be discovered.

For a complete list of prerequisites, see Systems Manager prerequisites. Amazon Linux base AMIs that are dated 2017.09 or later include the systems manager by default. On other Amazon Machine Images (AMIs) or custom AMIs, you must install Systems Manager (SSM) Agent manually if it is not present already. For details about operating systems support, see Supported operating systems for Systems Manager.

Requirements for Azure

- The VM Agent must be present on the VM.
  Azure provides two agents that run commands, based on the platform:
    - Azure Linux Agent
    - Azure Virtual Machine Agent
- The operator (discovery credentials) must have at least the action permission.

If the agents are not present, you can install them as specified in the preceding references, provided that the OS requirements are met. To run commands on Azure VMs, an operator must have at least the action permission: `Microsoft.Compute/virtualMachines/runCommand/action`. The contributor role or higher built-in roles have this permission by default. However, you can also define a specific custom role.

Relay name as input

The tasks prompt for the name of a non-authenticating relay. Enter it in one of the following formats:

- The relay host name. For example, enter `myhostname`.
- The fully qualified domain name (FQDN) for the relay. For example, enter `myhostname.mydomain.com`.
- The relay IP address. For example, enter `10.10.10.10`.

Supported operating systems

This feature requires that one of the following provider-specific agents is installed and active:

- The SSM agent for AWS
- The VM Agent for Azure

Consequently, some operating systems that are supported by the provider agent might not be supported by BigFix. This subset of operating systems might vary in the future and is subject to change.

OS supported for AWS VMs

To see on which operating system types the AWS SSM agent is currently supported, see AWS SSM supported OSes.

For details about the BigFix agent operating systems currently supported, see Detailed system requirements.

OS supported for Azure VMs

To learn on which operating system types the Azure VM agent is currently supported, refer to the following documentation:

- Windows VM Agent supported OSes
- Linux VM Agent supported OSes
- Support extensions agent version

For details about the BigFix agent operating systems currently supported, see Detailed system requirements.

Troubleshooting

You have several ways to troubleshoot the agent installation failures:

- You can check a list of custom exit codes which is provided below.
- You can use a troubleshooting feature which is an sqlite database, named ActionResultsStore.db. The database is available for each cloud plugin.
- You can check the action logs. Logs can be checked manually and the default locations are described later.

Installation script exit codes

Table 4. Native agent installation exit codes

Exit code	Cause	How to resolve
209	Client log file not found. This might be because the installed client failed to install within the specified time.	Wait for a few minutes for the client to register. If that does not work, uninstall the client manually and install it again.
210	Client registration failed. This might be because the target cannot contact the relay or the masthead is corrupted.	Check whether the target instance resolves the relay FQDN, IP, or hostname and it resolves the hostname specified in the relay masthead.
211	BESClient service not found.	Check the client installation log on the target at /tmp/BigFix or %TEMP%/BigFix. Uninstall the client and install it again.
212	Client already installed. An installation of the client exists on the target.	

Table 4. Native agent installation exit codes (continued)

Exit code	Cause	How to resolve
213	Missing input parameter. This might be due to a manual error.	Enter a value for the input parameter when prompted and try again.
215	Incorrect value returned by checksum. The downloaded installation script is corrupted.	Check if the target has network connetivity and can reach the BES Support site.
216	Curl and wget utilities not found on Linux target.	Install wget or curl utilities on the Linux targets.
217	The retrieved OS data does not allow the script execution. This might be because the OS installed on the targets is not supported or the information about OS returned by the targets is insufficient.	Install the client manually or by using CDT.
218	Insufficient OS data retrieved. This might be because the OS installed on targets is not supported or the information about OS returned by the targets is insufficient.	Install the client manually or by using CDT.
219	Shasum and sha256sum unavailable on Linux target.	Install the shasum or sha256 utility on the Linux target.
220	Installer file not found.	Check whether the target can reach software.bigfix.com.
221	Masthead file not found.	Check whether the target can reach the relay. In case the relay is authen-

Table 4. Native agent installation exit codes (continued)

Exit code	Cause	How to resolve
		ticating, install the client manually or by using CDT.

Table 5. Other common installation exit codes

Exit code	Cause	How to resolve
6	On Linux targets, the curl error "Could not resolve host" occurs.	Check if the target can reach soft-ware.bigfix.com, the relay, and BES support site.
22	On Linux targets, the curl error "Request has encontered an error greater than 400" occurs.	Check if target can reach soft-ware.bigfix.com, the relay, and BES support site.

ActionResultsStore database

The ActionResultsStore database is stored inside each plugin folder and it contains the action results of the actions that have either a failed or error status.

The database consists of a table, named ACTION_RESULTS, which has the following columns:

- ActionID
- DeviceID
- InstanceID
- Results
- Date

The primary key will be (ActionID, DeviceID).
The Results column in the database contains a JSON string. Each JSON under Results has the following keys:

- **status** represents the status of the action.
- **exitCode** when there is an exit code available.
- **output** the output of the request to the provider.

An example table follows:

```
{
    "status":"Error",
    "exitCode":1,
    "output":{
       "CloudWatchOutputConfig":{
          "CloudWatchLogGroupName":"",
          "CloudWatchOutputEnabled":false
       },
       "CommandId":"461eee16-e70f-4cf9-b64c-
  e2902e355f49",
       "Comment":"BES Plugin Shell Cmd",
       "DocumentName":"AWS-RunShellScript",
       "DocumentVersion":"",
       "ExecutionElapsedTime":"PT0.011S",
       "ExecutionEndDateTime":"2020-11
  -20T08:08:40.693Z",
       "ExecutionStartDateTime":"2020-11-20T08:08:40.693Z",
       "InstanceId":"i-
   04f8e15e41aaf1544",
       "PluginName":"aws:runShellScript",
       "ResponseCode":1,
       "StandardErrorContent":"mkdir: missing operand\nTry 'mkdir --help'
 for more
       information.\nfailed to run commands: exit status 1",
       "StandardErrorUrl":"",
       "StandardOutputContent":"",
       "StandardOutputUrl":"",
       "Status":"Failed",
       "StatusDetails":"Failed"
    }
 }
```

The database can be accessed remotely with the BigFix sqlite inspectors. As an example of this, we can use the Fixlet Debugger, set the query channel feature and the ID of the BES Portal endpoint, and evaluate a query like this example:

```
Q: rows of statement <sql statement> of sqlite database of file
 "ActionResultsStore.db"
of folder <plugin folder>
```

Once a day, the ActionResultsStore database will be automatically cleaned up. Every cleaning removes all entries older than a specified number of days, which can be configured by a setting that is available for each plugin, named `<plugin_name>_ActionResultsStore_CleanupDays`. The value, for this setting, must be larger than 0 (zero) and is specified in days.

Installer, masthead and Log file locations

The installer, masthead and log files, which are part of the installation task outcome, are stored in a folder named "BigFix" which can be found in the following directories, within each target instance:

On Windows

%LOCALAPPDATA%\BigFix

On Linux

/tmp/BigFix

Troubleshooting

This section helps you troubleshoot some common issues or limitations.

Unexpected error in InspectorDataJSONCallback" message in plugin portal log

Description: After installing a cloud plugin, no discovered resources show up in the BigFix Console, and the log of the plugin portal contains the following error message:

```
Mon, 30 Mar 2020 18:31:56 +0200 - 28965245 - Unexpected error in
 InspectorDataJSONCallback
No suitable servers found: `serverSelectionTimeoutMS` expired: [
connection refused calling ismaster
on 'localhost:27017'] .
```

This issue can occur up to BigFix Version 10.0.8.

Reason: This error message might be due to the MongoDB being stopped.

Solution: Start the MongoDB. On Windows this may be done from the Windows Services tool, on Linux by issuing the `systemctl start mongod` command.

BESPluginPortal not running after installing a cloud plugin

Description: After installing a cloud plugin, the BESPluginPortal process is not running.

Reason: This behavior is unexpected and might be due to unpredictable reasons that need to be investigated.

Solution:

- On Windows:
  - Try restarting the BESPluginPortal process from the Windows Services tool.
  - If the BESPluginPortal is still not running, verify the presence of errors related to the BESPluginPortal process in the Windows Event Viewer.
- On non-Windows:

- Try restarting the BESPluginPortal process by issuing the `/etc/init.d/bespluginportal start` command.
- If the BESPluginPortal is still not running, verify the presence of error messages related to the BESPluginPortal process in `/var/log/messages`.

AWS plugin cannot discover resources due to authentication failure (status code: 401)

Description: The AWS cloud plugin fails to perform a resource discovery and logs the following error message:

```
2020/03/30 15:50:22 - [error] Got error calling DescribeRegions:
 AuthFailure:
AWS was not able to validate the provided access credentials
status code: 401, request id: 1879798f-b446-4ar1-acdc-w35a1ut3y0
u
```

Reason: The error message may be displayed in the following use cases:

1. The specified `Access Key ID` / `Secret Access Key` pair is either wrong or inactive.
2. The specified `Access Key ID` / `Secret Access Key` pair is associated to a SessionToken as part of a temporary credential set created by assuming a IAM Role.
3. Date and time of the computer on which the AWS plugin is installed is not accurate.

Solution: Depending on the use case, the solution differs as follows:

1. Verify that the specified `Access Key ID` / `Secret Access Key` pair is correct and that its status is active.
2. Temporary credentials associated to a Session Token are not supported. Replace the credentials with an `Access Key ID` / `Secret Access Key` pair associated to a IAM User.

3. Adjust the clock (date, time and timezone) of the computer where the AWS plugin is installed (+/- 5minutes should be the maximum deviation tolerated by AWS). For more information about signing incoming requests, refer to the AWS documentation.

Correlation computers not included in automatic computer groups

Description: When creating an automatic computer group with inclusion criteria that refer to the IDs of *correlation computers*, neither the *correlation computers* nor any of the correlated representations are included in the group.

Reason: *Correlation computers* represent logical entities that are only known to the BigFix Server, therefore no BigFix Agent answers for the ID of a *correlation computer*.

Solution: None. This is the expected behavior.

Distinct VMware computers correlated with each other

Description: Two distinct proxied computers of VMware type are correlated under the same *correlation computer*.

Reason: By design, the BigFix Server correlates VMware computers that are reporting the same value for the "BIOS UUID" property of the "VMware Resources" analysis. Although this value is generally expected to be unique in VMware, there are documented cases that might lead to having duplicated values, like converting a VM using the VMware converter or cloning a VM (not a template). For further information about the BIOS UUID duplication, refer to the VMware Knowledge Base.

Solution: To eliminate a duplicate BIOS UUID, refer to the official VMware documentation (for example: Editing a virtual machine with a duplicate UUID.bios). At the next discovery of the VMware plugin, after removing the BIOS UUID duplication, the unexpected correlation should be removed automatically.

VMware plugin does not discover some resources

Description: Some devices are not discovered by the VMware plugin. In the example, two instances are discarded:

```
2022/01/12 12:18:31 +0100 - [info] Refresh all: Discovery return
ed 8 unique devices
2022/01/12 12:18:31 +0100 - [debug] Refresh all: Reported instan
ces: 10 - Unique instances: 8 -
Terminated instances: 0 - Null instances: 0 - Other errors: 0
```

Reason: The VMware plugin uses the vm.uuid as the unique key during its discovery. A device discovered that has not this key will not be considered by the plugin.

Solution: None. This is the expected behavior.

Cloud computers often displayed as offline

Description: The BigFix Console often shows proxied computers, discovered by the cloud plugins, offline.

Reason: By default, the cloud plugins have a discovery frequency of 120 minutes. This time interval is bigger than the default value for the "Mark as offline after" preference of the BigFix Console, which is 45 minutes. As a consequence, 45 minutes after the latest discovery performed by the cloud plugins, the proxied computers start displaying as offline on the BigFix Console, until the next discovery occurs.

Solution: This is the expected behavior when using the default values for the discovery frequency of the cloud plugins and for the "Mark as offline after" preference of the BigFix Console.

Chapter 16. Persistent connections

The capability to establish persistent connections was added to the product.

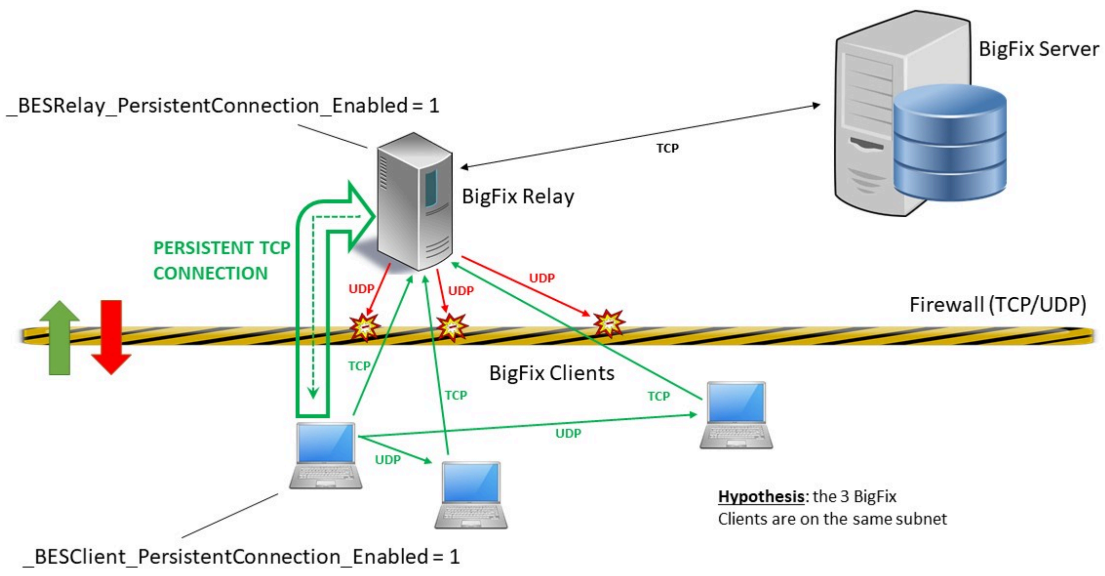
Clients behind firewall or NAT

Firewalls or NAT might prevent the BigFix Query function from working properly because the UDP notification, with which a parent relay delivers the query to the child clients, cannot usually reach the clients. Unlike other product functions, the BigFix Query cannot take advantage of client polling to overcome this restriction in the downstream communications.

This restriction is overcome by establishing a persistent TCP connection between the parent relay and at least one of its child clients. The persistent connection, which is always initiated by the client, is used by the relay to send UDP notifications to all clients in the same subnet of the persistently connected client (PCC).

Overview

The following picture displays the persistent TCP connection established between client and relay, and the UDP notifications sent from the PCC to other clients of the same subnet:


BigFix Server
_BESRelay_PersistentConnection_Enabled = 1
TCP
BigFix Relay
PERSISTENT TCP CONNECTION
UDP
UDP
UDP
Firewall (TCP/UDP)
TCP
BigFix Clients
TCP
TCP
UDP
UDP
Hypothesis: the 3 BigFix Clients are on the same subnet
_BESClient_PersistentConnection_Enabled = 1

Enabling persistent connections on the relay

1. Log in as a master operator to the BigFix Console.
2. Locate and right-click the relay computer. Select **Edit Computer Settings...**
3. Add the following setting to the computer:

```
_BESRelay_PersistentConnection_Enabled = 1
```

4. Restart the relay process for the setting to become effective.

Note: When adding this setting to a relay computer having a Version prior to 9.5 Patch 11, the behavior of its child clients remains unchanged.

Note: This setting is not effective on the BigFix server computer.

Enabling persistent connections on the client

1. Log in as a master operator to the BigFix Console.
2. Locate and right-click the client computer. Select **Edit Computer Settings...**
3. Add the following setting to the computer:

```
_BESClient_PersistentConnection_Enabled = 1
```

Establishing a persistent connection

After being enabled, a persistent TCP connection between a client and its parent relay is normally established at the next registration of the client.

When the next registration occurs, the relay on which the client is registering checks whether the client is eligible to open a persistent connection, based on the overall number of persistent connections that the relay is already handling, and their partition by subnet. If the client is eligible, the relay notifies it accordingly. The client, then, waits for 60 seconds. If the client does not receive a test UDP notification from the relay within this time interval, it eventually opens the persistent connection.

If the client fails when establishing the persistent connection, it will retry opening the persistent connection after 3 minutes, up to a maximum of 4 attempts in total.

The persistent connection can generally be closed and then established again every time the client performs a new registration, provided that all prerequisites are still satisfied. The persistent connection might also terminate when either the client or the relay must handle restart and shutdown operations.

Communicating on the persistent connection

Directly:

If the relay must send a UDP notification to a persistently connected client (PCC), it uses the persistent connection to send it directly to the target client.

Served by another client of the same subnet:

If the relay must send a UDP notification to a client in a subnet served by a PCC, the relay sends the notification and the target client information (hostname/IP address stored during the registration phase) to the PCC. The PCC reads the notification and sends it through UDP to the target client. The target client processes the notification normally, and sends back a reply directly to the relay, as usually. If there is more than one PCC available, within the same subnet, that can serve the client, the relay sends the notification to one PCC only, not to all available PCCs.

Managing persistent connections

You can manage persistent connections by configuring a few settings. For details, see Persistent TCP connections.

Chapter 17. Relays in DMZ

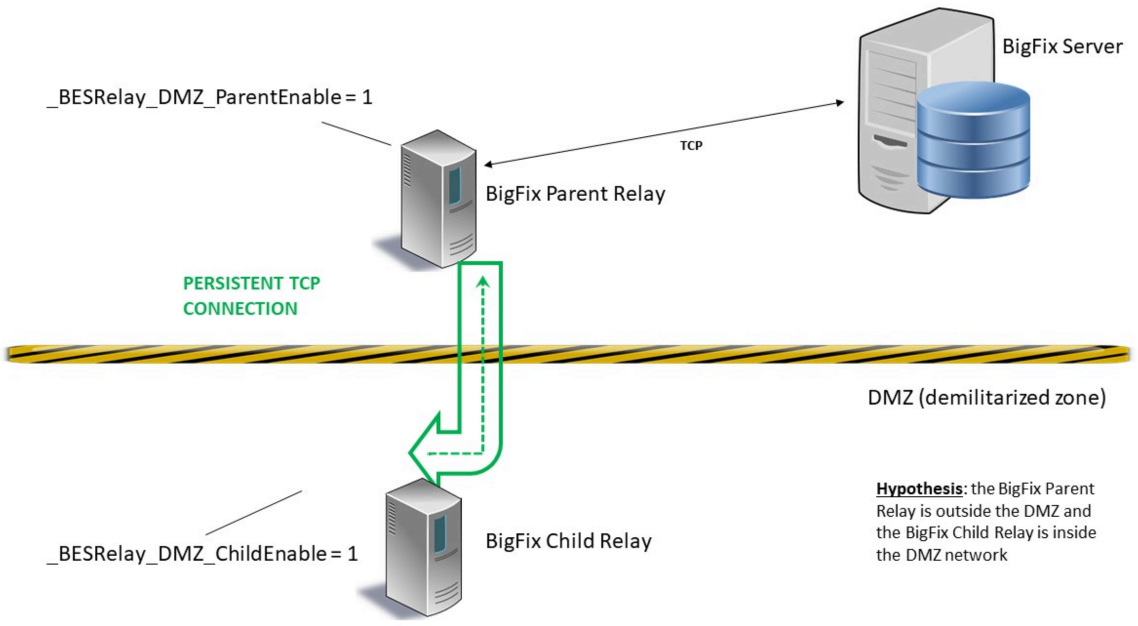
The capability to establish a persistent TCP connection between the parent relay in the more secure zone and its child relay inside the DMZ network was added to the product. This allows you to manage systems in a demilitarized zone (DMZ network).

In an environment where a relay in DMZ reports to a parent relay within its intranet network, it can be assumed that all communications between intranet and DMZ pass through a firewall that does not allow any upstream communication. In this case, any attempt for the child relay in the DMZ to initiate communication with its parent relay will fail.

This restriction is overcome by establishing a persistent TCP connection between the parent relay and its child relay inside the DMZ. The persistent connection is always initiated by the parent relay. The communication cannot be initiated by the child relay due to network restrictions.

Overview

The following picture displays the persistent TCP connection established between parent relay and child relay:


BigFix Server
_BESRelay_DMZ_ParentEnable = 1
TCP
BigFix Parent Relay
PERSISTENT TCP CONNECTION
DMZ (demilitarized zone)
Hypothesis: the BigFix Parent Relay is outside the DMZ and the BigFix Child Relay is inside the DMZ network
_BESRelay_DMZ_ChildEnable = 1
BigFix Child Relay

In the picture are displayed:

- In green: The persistent TCP connection established between the parent relay located in the more secure zone and the child relay located in the demilitarized zone.
- In yellow and black: The line of the demilitarized zone (DMZ network).

Enabling persistent connections on both parent and child relay

On a child relay where the BigFix client was not registered on the BigFix server yet

1. Log in to the BigFix Console.
2. Run the `Relays in DMZ: Enable Parent Relay and set Child Relay List` Fixlet on the parent relay computer:

   Note: Before running the Fixlet, you must specify in the text field of the Description tab the list of child relays allowed.

3. Manually install the BigFix client on the child computer. For more details, see Installing the Client on Windows and Installing the Client on Linux.
4. Manually install the BigFix relay on the child computer by downloading the appropriate package depending on your operating system from the following web site: http://support.bigfix.com/bes/release/

   Note: In a typical scenario, run the Fixlet first on the parent relay and then manually configure the child relay.

5. On the child computer, ensure that the client and relay processes are stopped.
6. On a Windows child relay, add the `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\BigFix\EnterpriseClient\Settings\Client\_BESRelay_DMZ_ChildEnable` key to the Windows registry and set its string REG_SZ value to 1.
7. On a Linux child relay, if the besclient.config file does not already exist, make a copy of the file named besclient.config.default located in the /var/opt/BESClient/ directory

and rename it into besclient.config. Manually edit the besclient.config by adding the following new section:

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESRelay_DMZ_ChildE
nable]
value                          = 1
```

8. Restart first the relay process.
9. At least one minute after restarting the relay process, restart the client process.

Note: If your parent relay was configured as an authenticating relay, it might be necessary to temporarily disable the relay authentication to allow the child relay to register successfully for the first time. Enable again the relay authentication after your child relay was registered successfully.

On a child relay where the BigFix client was already registered on the BigFix server

1. Log in to the BigFix Console.
2. Run the `Relays in DMZ: Enable Parent Relay and set Child Relay List` Fixlet on the parent relay computer:

   Note: Before running the Fixlet, you must specify in the text field of the Description tab the list of child relays allowed.

3. Run the `Relays in DMZ: Enable Child Relay` Fixlet on the child relay computer:

   Note: In a typical scenario, run the Fixlet first on the parent relay and then on the child relay.

4. Both Fixlets will restart the relay process.

Establishing a persistent connection

The parent relay will try to open a socket to the child relay at port 52311.

The child relay can "grab" the socket used by the parent to communicate with it and keep it alive by sending ping messages periodically. At the same time, the child relay will start to listen on a different port such as 52312 only on its loopback address, this will be used to forward all the traffic through the socket opened by the parent that was previously grabbed.

All requests coming to the child relay that must be propagated upstream (for example during the registration of a client below the child relay or for reporting purposes) will be internally routed to the loopback address to be sent to the parent relay within the intranet.

Communicating on the persistent connection

To achieve the requirement, the parent relay initiates a communication with its own child relay and keeps the connection standing and persistent to, later on, use it from the child relay to the parent relay when upstream communication is needed by the child relay.

Managing persistent connections

You can manage the Relays in DMZ persistent connections by configuring a few settings. For details, see Relays in DMZ.

Chapter 18. Working with PeerNest

The BigFix Client includes a new feature named PeerNest, that allows to share binary files among Clients located in the same subnet. The feature is available starting from BigFix Version 9.5 Patch 11.

A practical use case is a branch office connected to the data center through a slow link: with earlier BigFix versions, the suggested configuration required a Relay to be installed in the branch office in order to download and cache large payloads.

With PeerNest, the BigFix Clients can share downloaded binaries and therefore reduce the number of communications going outside of the branch office even if a Relay is not installed locally. In this way, multiple Clients generate on the Relay the download load of a single Client, because only one Client downloads from the Relay and then shares the download with the peers.

Note: Up to BigFix 10.0.7, the PeerNest feature does not work if it is enabled on BigFix clients residing on a subnet hosting also clients belonging to a different BigFix deployment. Starting from BigFix 10.0.7, peer requests coming from clients belonging to different deployments are ignored and so this limitation is no longer applicable.

Use of PeerNest can help reducing the number of Relays in some complex BigFix deployment scenarios, therefore reducing infrastructural costs.

An introduction video can be found here: https://www.youtube.com/watch?v=tXRX3zlw1aQ.

Enabling PeerNest

To enable the PeerNest feature, set to 1 the following configuration setting on the Client:

```
_BESClient_PeerNest_Enabled = 1
```

The Client enables all the PeerNest feature in order to locally optimize the download of binaries.

This configuration setting requires a restart of the Client to be effective.

Note: If you require BigFix to optimize the download of the binaries required to execute actions, ensure that the hash of the file is specified inside the *prefetch* statement.

PeerNest configuration settings

For details about all available settings, see Peer to peer mode.

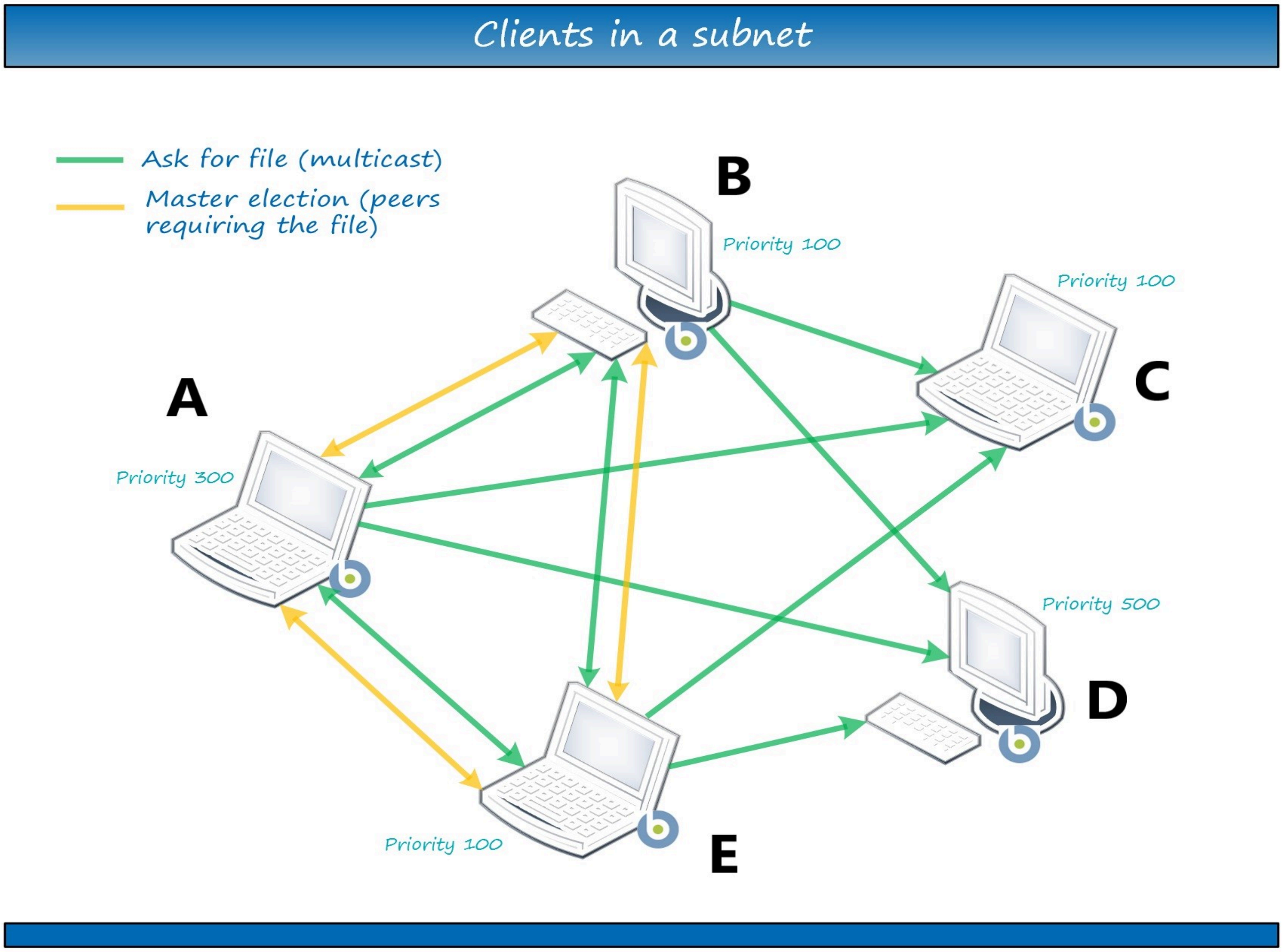
PeerNest in depth

When multiple Clients are executing actions requiring the prefetch of a binary file, they check with their peers if the file is already cached in the subnet. If the binary was not cached then the Clients can elect one of them as responsible for downloading from the Relay (**Figure 1**): the peer with the highest priority, among the peers requiring the file, will manage the download; if all peers have the same priority, the computer with the lowest ID will download the file from the Relay. By doing so, for a given action, all files will likely be downloaded from the Relay by the same computer, and so the downloads will be serialized (one file at a time), thus ensuring minimum bandwidth occupation in the link between Relay and computer.

The following figure shows in details the master election process:

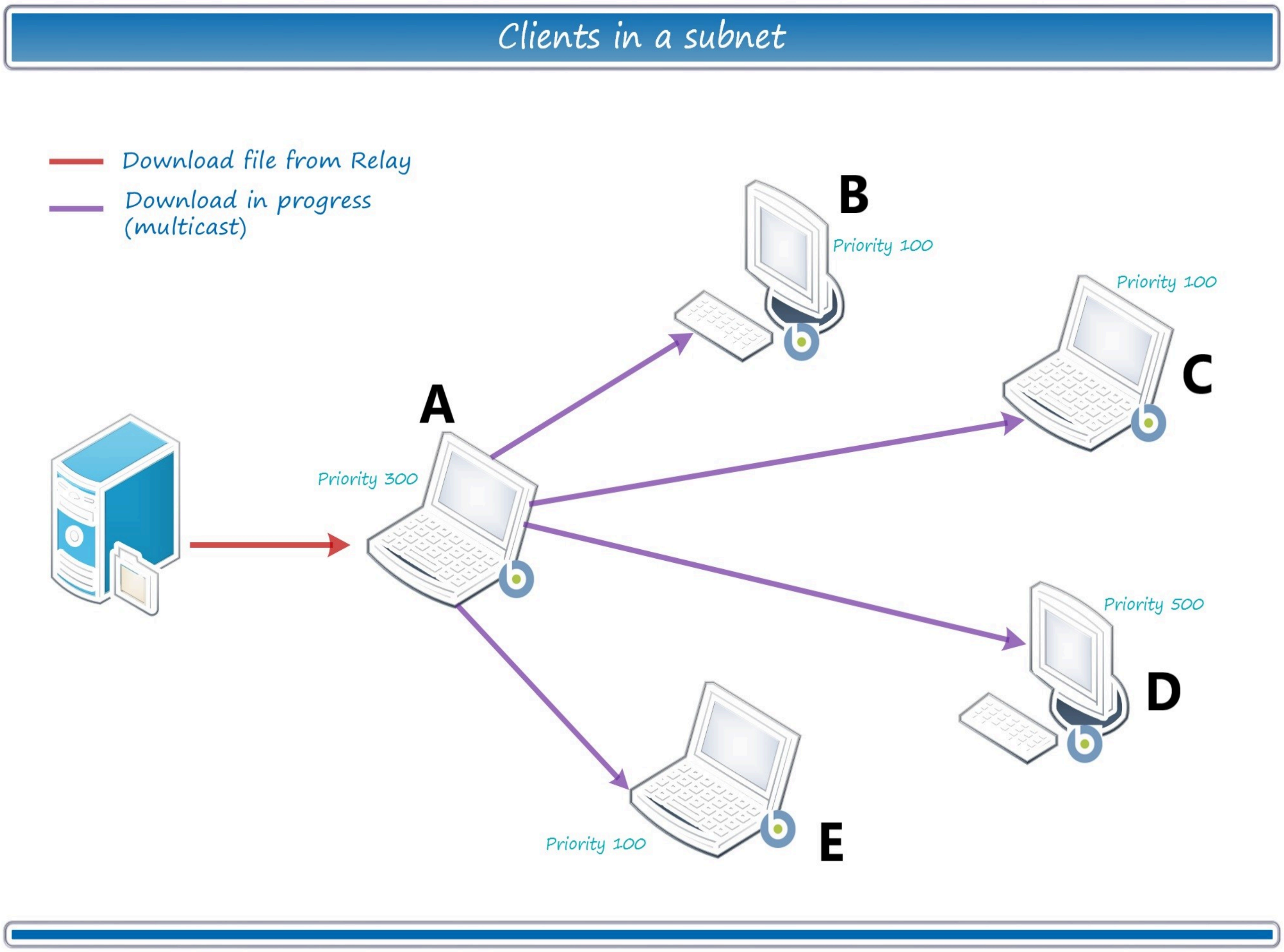
- **A** will be elected as master as it has the highest priority among the peers requiring the file (**A**, **B**, **E**).
- **C** and **D** do not require the file, so even if **D** has higher priority than **A**, **D** is not involved in the master election process.

Figure 1: Master election



As soon as the elected master (**A**) starts downloading the file from the Relay (**Figure 2**) it notifies the other peers that there is a download in progress, so they wait for it without taking further actions. The master sends periodic notifications about the download.

Figure 2: Download in progress

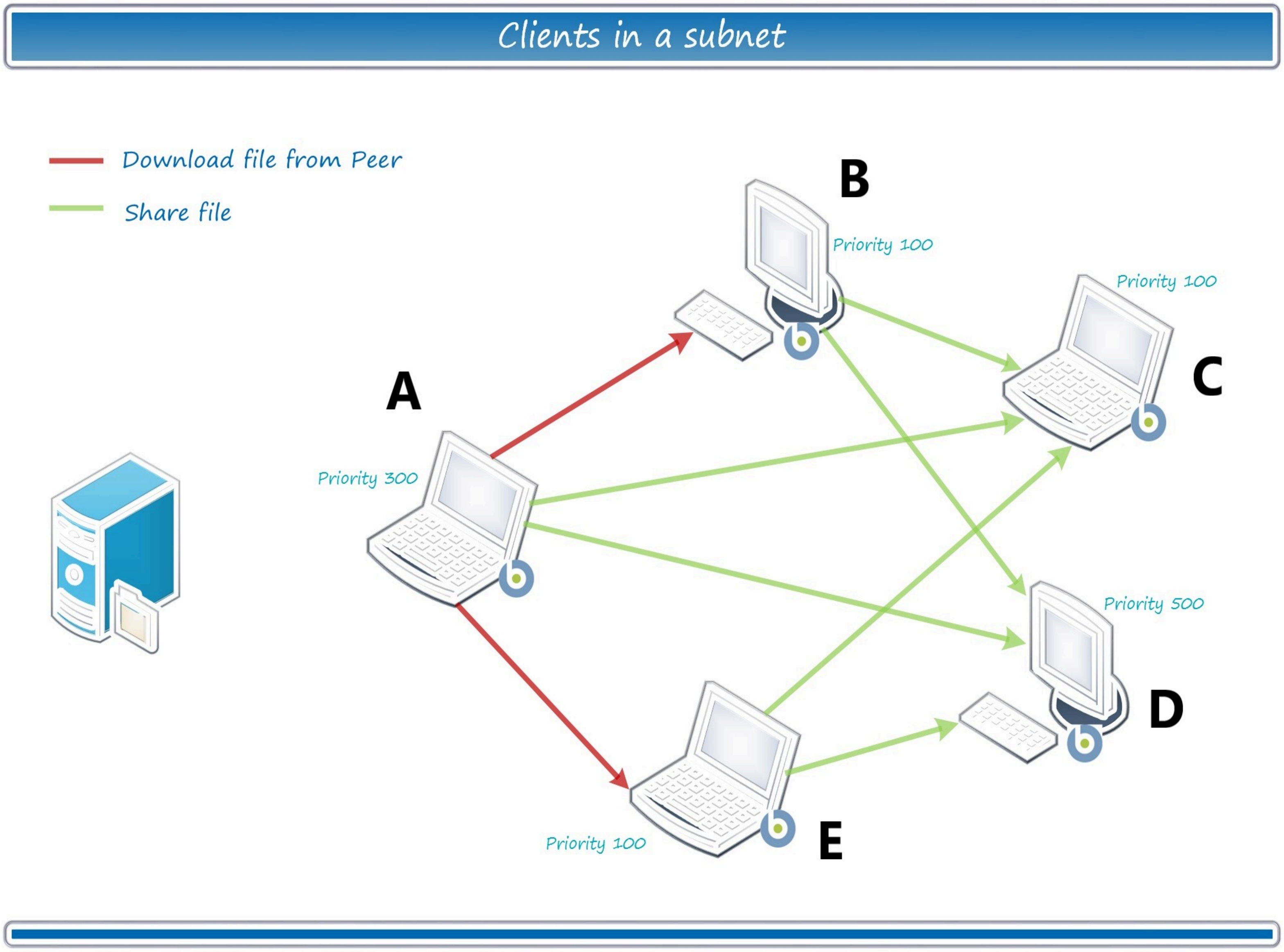


If the peers did not receive the download in progress message (download failed, Client down, network issue), a new election process is started over and another peer becomes master.

When the elected master finishes the download, it moves the file into the PeerNest cache and notifies the other peers about its availability; the peers interested in the file then start downloading it from master and share it, using the same mechanism (**Figure 3**). In this way, multiple Clients generate on the Relay the download load of a single Client, because only one Client downloads from the Relay and then shares the download with the peers.

The following figure shows how the peers interested in the file (**B**, **E**) start downloading it directly from peer **A**, instead of downloading it from the Relay. When their download completes, the file is cached to be available for future usage: so the Clients **A**, **B** and **E** will share the downloaded file with **C** and **D**.

Figure 3: File sharing



Clients with peer enabled will start up an HTTP Server listening on port 52311 for peer transfers. Each Client can serve at the same time a maximum of `_BESClient_PeerNest_MaxActiveFileDownloads` other peers (default value is 5).

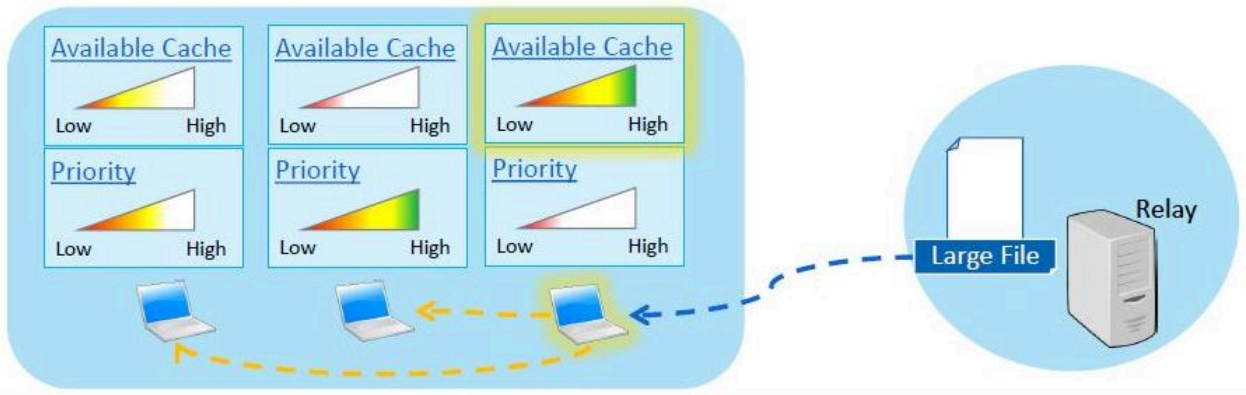
The Client priority comes also into play when there are 2 or more peers available to share the same file. The Client that wants to download the file creates a memory list of peers serving the file; it will pick up the peer randomly with weighted probability, based on priority: for instance, if the memory list is made up of two peers, say C1 with priority W, and C2 with priority 2W, picking C2 will be twice as likely as picking C1. In this case, the legacy retry-behavior applies – ruled by the `_BESClient_Download_RetryMinutes` and `_BESClient_Download_RetryLimit` Client settings – with the following addition:

1. The peer from which a failed download attempt has occurred gets removed from the memory peer list (unless that peer is the only one in memory), and so the next attempt will be done with another peer.
2. If the retry-count reaches the limit, the Client will go to download the file directly from the Relay.

If the Client fails to download the file because the peer that it has tried to connect to is already serving 5 downloads (default case), the retry-count is not increased and the peer is not removed from the memory peer list.

PeerNest behavior for files bigger than the PeerCache size

Starting from Version 10 Patch 2, a new feature allows time optimization for actions that require prefetching of large files. This feature ensures that the peers elected for downloads are those with real ability to store files rather than simply those with highest priority.



In fact, prior to Version 10.0.2, in a PeerNest configuration, when BigFix Clients are performing actions requiring the prefetch of a binary file, they check if the file is already cached in the subnet. If the binary file is not cached yet, the BigFix Clients can elect one of them as responsible for downloading from the BigFix Relay and then sharing the file with the peers. The elected peer is generally the one with the highest priority assigned. If the elected peer does not have enough cache to store the payload, the distribution fails, and all the other peers wait needlessly.

Starting from Version 10 Patch 2, with the `_BESClient_PeerNest_UseNoSpaceDownload` setting, you can configure the PeerNest to elect for downloads only the peers with a cache limit higher than the payload size. The same option forces the peers with high priority but not enough cache limit in passive mode. In this way, you avoid that the peers have a useless waiting and the file is downloaded sequentially. With this option, you also provide the peers with the ability to download the file directly from the BigFix Relay without waiting for the other peers that might eventually fail.

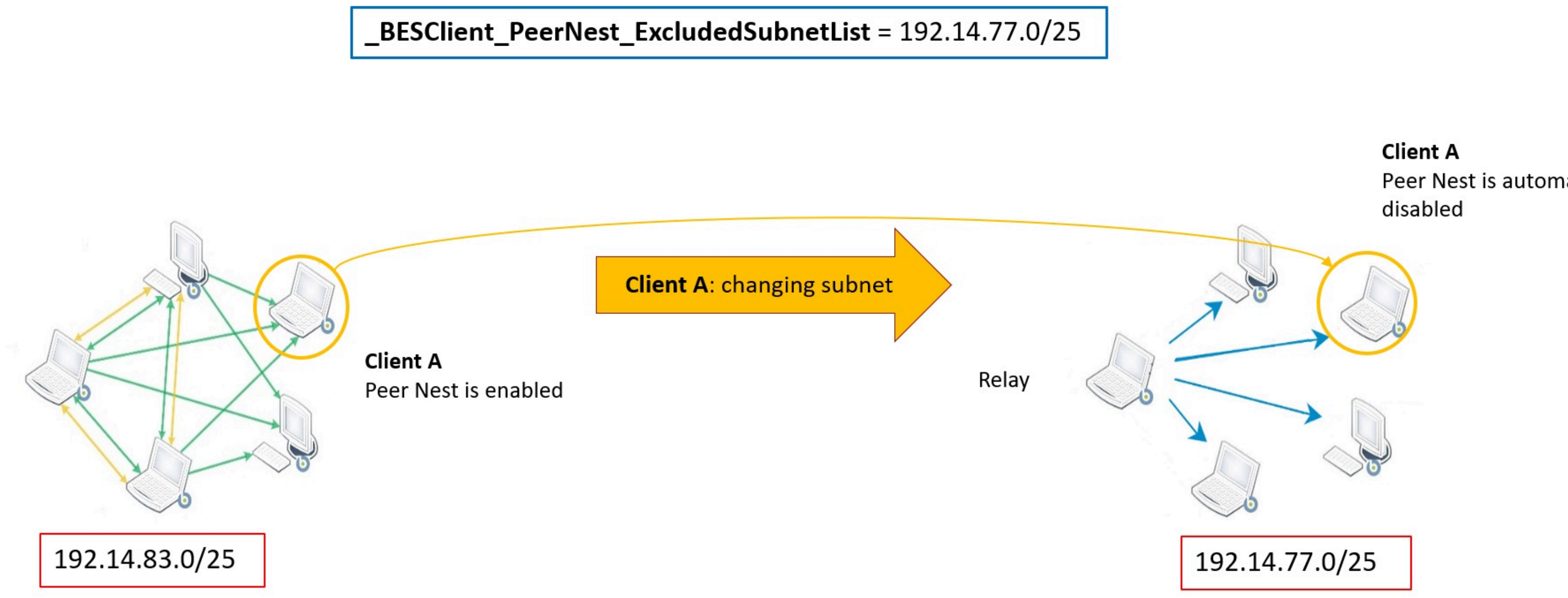
Excluding a list of subnets

Starting from Version 10 Patch 4, a new feature allows you to disable the PeerNest mechanism for BigFix Clients connected to a specific subnet.

The devices that use the PeerNest mechanism, send and receive messages using the UDP communication protocol. When you have many devices connected on the same subnet, they share network traffic among themselves. This might cause an excessive consumption of network resources. According to your specific needs, you might want to limit the UDP traffic on some specific network subnets. For example, if you have BigFix Clients running in a VPN infrastructure.

Starting from Version 10 Patch 4, with the `_BESClient_PeerNest_ExcludedSubnetList` setting, that contains a list of subnets (for example: 192.1.77.0/25;192.1.77.129/25), you can exclude from the PeerNest mechanism the Clients that belong to one of the subnets specified in the list. When a Client with PeerNest enabled (`_BESClient_PeerNest_Enabled` = 1) registers with the BigFix Relay, the new feature identifies the subnet of the Client and checks if its subnet belongs to this list. If yes, then the PeerNest mechanism is disabled for the Client.

Moreover, when you need to change the Client subnet, for example when you connect to a VPN, if the new subnet is already included into the Exclusion Subnet List, the P2P mechanism is automatically disabled like shown in the following figure.



Adding/modifying/deleting the value of the new setting requires a restart of the BigFix Client.

Best Practices

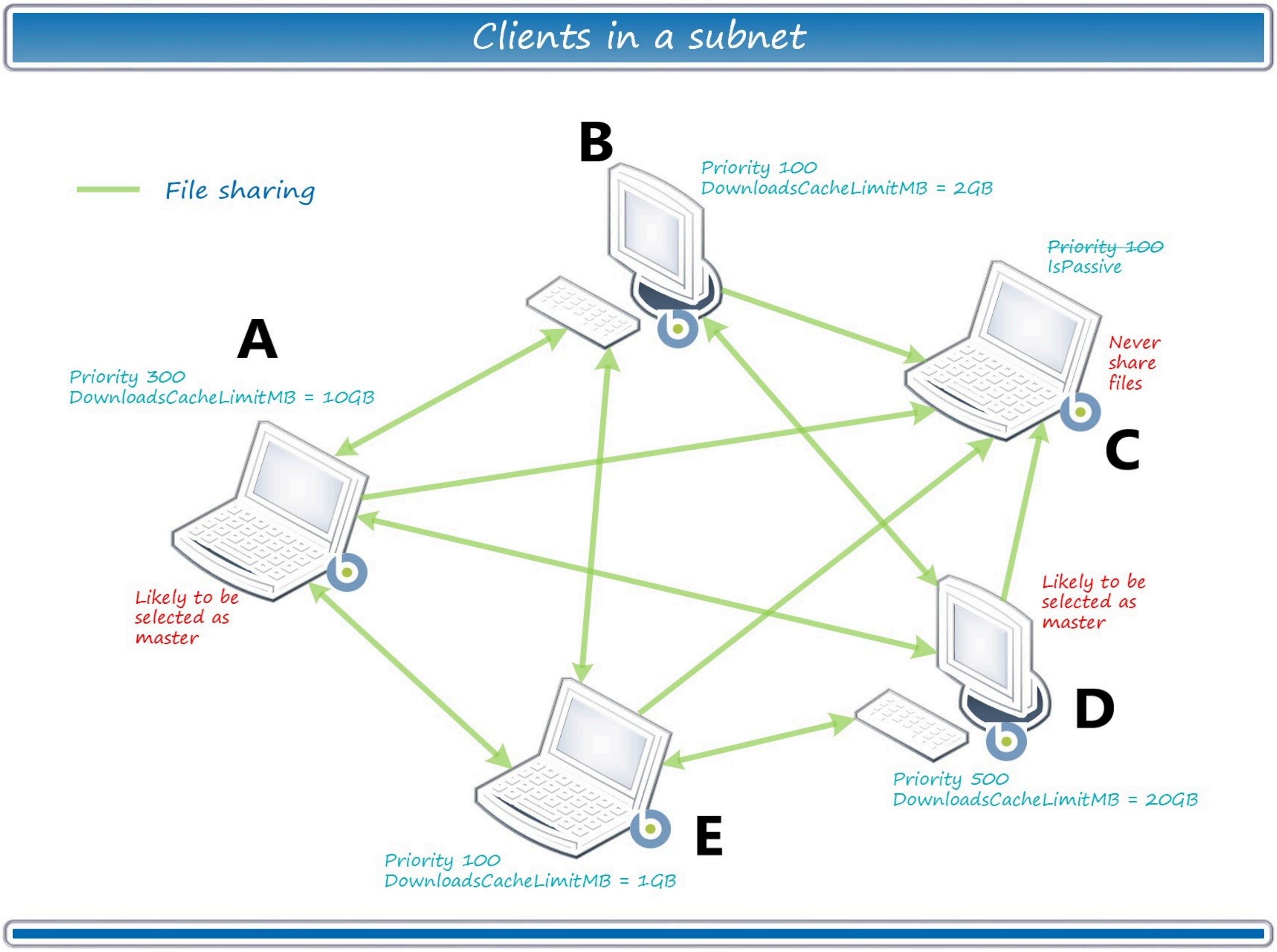
A good practice is to assign higher priorities to computers with a better link to the Relay and enough resources to serve the other peers of the subnet (and possibly a steady power supply).

PeerNest requires an increased disk storage space for caching files. The default PeerNest cache size is 2GB, which is enough for many scenarios; it must be increased in case of transfer of large files (patch management, software distribution, etc.) in order to fit the cache. The PeerNest cache is intended as a temporary storage, so usage and lifetime can be fine tuned with the following parameters: `_BESClient_PeerNest_DownloadsCacheLimitMB`, `_BESClient_PeerNest_MinimumDiskFreeMB`, `_BESClient_PeerNest_MinimumCacheDays`, `_BESClient_PeerNest_MaximumCacheDays`.

PeerNest requires UDP (port 52311) communication to be enabled, in order to allow the BigFix Clients to communicate with each other.

It also requires TCP (port 52311) to allow the BigFix Clients to download files from a peer, and the subnet supporting multicasting.

It is recommended to set PeerNest in passive mode (using the `_BESClient_PeerNest_IsPassive` configuration setting) on Clients that cannot open this port or do not want to use additional disk space for caching. Passive Clients will only download from the other peers but will not share content. The following figure shows an example of configuration.


Clients in a subnet
File sharing
B
Priority 100
DownloadsCacheLimitMB = 2GB
~~Priority 100~~
IsPassive
Never share files
C
A
Priority 300
DownloadsCacheLimitMB = 10GB
Likely to be selected as master
Likely to be selected as master
D
Priority 500
DownloadsCacheLimitMB = 20GB
E
Priority 100
DownloadsCacheLimitMB = 1GB

Bandwidth Throttling

Clients with peer enabled will start up an HTTP Server; the other peers can connect to it for downloading.

Each Client serving files to the other peers can control the amount of bandwidth allocated for that purpose. The `_BESClient_HTTPServer_ThrottleKBPS` setting defines the total number of kilobytes that the Client gives to all of the peers combined per second (0 means no limit): if its value is 1000 KB/sec and there are 10 peers downloading simultaneously, the Client will send data to each at 100 KB/sec (for a total of 1000 KB/sec).

Troubleshooting scenario 1

On BigFix Clients hosted on an Operating System that has the Internet Protocol version 6 (**IPv6**) disabled or not configured:

If you want to use the PeerNest feature, you must:

1. Set on these Clients the `_BESClient_Comm_IPCommunicationsMode` configuration setting as follows:

   ```
   _BESClient_Comm_IPCommunicationsMode = OnlyIpv4
   ```
2. Restart the Clients for the changes to take effect.

Troubleshooting scenario 2

On BigFix Clients that have an active polling set using the `_BESClient_Comm_CommandPollEnable` and `_BESClient_Comm_CommandPollIntervalSeconds` configuration settings:

If you want to use the PeerNest feature, you must not configure these Clients to be "passive" PeerNest agents. Do not enable on them the `_BESClient_PeerNest_IsPassive` configuration setting. Otherwise, depending on the timing of the polling, multiple Clients in a subnet can download the same binary, without sharing it.

Chapter 19. Archiving Client files on the BigFix Server

You can collect multiple files from BigFix clients into an archive and move them through the relay system to the server.

This allows the BigFix Administrator to automatically log data from specific managed computers.

To do this, a new component called the **Archive Manager** has been added to the BigFix Client which can collect files periodically or on command. It passes the resultant compressed tar-ball to the **Upload Manager** on the BigFix Client. The Upload Manager has an input directory that queues the files for uploading.

The Upload Manager performs one upload operation at a time, moving the data in manageable chunks to reduce network traffic. It sends these chunks to the nearest BigFix relay or server, where the **PostFile** program reassembles the chunks back into the original file.

PostFile then passes the file up the chain, to the next BigFix relay or to its ultimate destination at the BigFix server. It again uses the Upload Manager to slice the file into chunks and send them on to the next PostFile program in the hierarchy. When the file finally arrives at the BigFix server, it is saved in a special directory location based on the ID of the client computer. Along the way, both the Upload Manager and the PostFile program can alter the chunk size or throttle the upload speed to smooth out network traffic.

For information about configuration settings related to these components, see Archiving client files.

Note: When it encounters an unregistered BigFix Client, the Upload Manager pauses. This can happen for a variety of reasons, including a downed network, a busy server, or a disconnected client. As soon as the BigFix client can register with the BigFix system again, it restarts the Upload Manager and continues from where it stopped.

Archive manager settings

A typical archive is a collection of logs and configuration files that are compiled regularly and posted to the server. There are many settings available to help you customize your logging needs.

For details about the configuration settings related to this component, see Archive Manager in BigFix Configuration Settings (on page 324).

Creating a Custom Action

You can create custom actions that can post attributes about the BigFix client to an archive file.

To create a custom action:

1. Start the BigFix Console.
2. Select the **Computers** tab.
3. From the filter/list, select the set of computers that you want to target for the action.
4. Select **Take Custom Action** from the **Tools** menu.
5. Select the **Action Script** tab.
6. Enter the desired **Action Script** in the text box provided.

Archive Manager

Archive Manager is a component of the BigFix Client that can collect files periodically or on command. It passes the resultant compressed tar-ball to the Upload Manager on the BigFix Client.

For details about the configuration settings related to this component, see Archive Manager in BigFix Configuration Settings (on page 324).

Archive Manager internal variables

These are the internal variables of the Archive Manager component.

__BESClient_ArchiveManager_LastArchive

The Archive Manager updates this setting whenever it posts an archive. The value of the setting is the secure hash algorithm (sha1) of the file that was posted.

__BESClient_ArchiveManager_LastIntervalNumber

The BigFix Client updates this setting whenever it posts an archive. It represents the interval number from 1970 to the time when the archive was last collected. If the interval is a day long (the default), then the setting indicates the number of days from 1970 to the day when it created the last archive. It is calculated such that when the interval number changes, it is time to create a new archive.

The value is also offset by a time corresponding to the computer id, to stagger the collecting of archives.

Archive Manager Index File Format

During the building of the archive, the Archive Manager creates an index containing metadata about the archive.

This is a sample index from an archive with a single file:

```
MIME-Version: 1.0
Content-Type: multipart/x-directory2; boundary="==="
Unique-ID: 1077307147
Archive-Size: 105
SendAll: 0
Date: Wed, 17 Mar 2004 02:23:01 +0000
FileSet-(LOG): c:\temp\log\newfile.log


--===
```

`URL:` file:///c:/temp/log/newfile.log

```
NAME: (LOG)newfile.log
SIZE: 105
```

```
TYPE: FILE
HASH: 3a2952e0db8b1e31683f801c6384943aae7fb273
MODIFIED: Sun, 14 Mar 2004 18:32:58 +0000

--===--
```

Upload Manager

The Upload Manager coordinates the sending of files in chunks to the Post File program. You can throttle the upload dataflow to conserve bandwidth. The file system uses 64-bits, sufficient for file sizes of up to $2^{64} - 1$ bytes in length.

For details about the configuration settings related to this component, see Upload Manager in BigFix Configuration Settings (on page 324).

PostFile

The PostFile program receives the chunks of files posted by the Upload Manager and appends them to its own copy of the file. The Upload Manager specifies the range of bytes being posted and the sha1 of the file, which is used as the filename. For details about the configuration settings related to this component, see Post File in BigFix Configuration Settings (on page 324).

These parameters are appended to the URL as in the following example:

```
postfile.exe?sha1=51ee4cf2196c4cb73abc6c6698944cd321593007&range=1000,1999,
20000
```

Here the sha1 value identifies the file, and the range in this case specifies the second 1,000 byte chunk of a 20,000 byte file.

When PostFile receives a chunk of the file it first checks to make sure it is the correct segment. If so, it appends the posted data to its local copy of the file. It returns the size of this file, as well as the current chunk size and throttle BPS settings.

PostFile has to handle several BigFix clients feeding into it at the same time. To balance that load, it adjusts the throttle rate. The effective throttling rate is determined by dividing the limiting PostFile rate by the number of concurrently uploading files.

For example, if PostFile has a throttle setting of 100 KBPS and 50 clients are simultaneously uploading files, the throttle value returned to each client would be adjusted to 2 KBPS. By setting custom throttle values to specific BigFix relays, you can efficiently deal with any bottlenecks in your network.

PostFile stores the partially uploaded files in the Upload Manager's buffer directory with an underscore in front of them (the Upload Manager does not upload files that begin with underscore). When PostFile receives the last chunk of the file, it calculates the sha1 of the file and checks that it matches the sha1 parameter in the URL. If so, it removes the leading underscore.

The Upload Manager can then upload the file to the next relay up the hierarchy (or any other server, if so specified).

PostFile determines whether or not the Upload Manager is running. If not, PostFile assumes that it has reached its root server destination. It renames the uploaded file, extracts the files from the archive, and deposits them in a subfolder of the Upload Manager's buffer directory.

The program calculates the subfolder path using a modulus of the computer ID. This has the effect of spreading out file directory accesses and preventing an overpopulation of any single directory.

For example, the path to file "log" from computer ID1076028615 is converted to the path "BufferDir/sha1/**15**/1076028615/log" where 15 is the remainder modulo 100 (the lower two digits) of the id.

If the uploaded file is a valid BigFix archive and is successfully extracted, then the original uploaded file is deleted.

Resource Examples

Some concrete examples.

Example 1

In this example, we want to collect all the files in the `c:\log` folder and all the .ini files in the `c:\myapp` folder once an hour. Send up only the differences and do not send the archive if it exceeds 1,000,000 bytes in size. To set this up, create the following settings in the BigFix Console:

```
_BESClient_ArchiveManager_FileSet-(Log) = c:\log
_BESClient_ArchiveManager_FileSet-(Ini) = c:\myapp\*.ini
_BESClient_ArchiveManager_OperatingMode = 1
_BESClient_ArchiveManager_Interval_Seconds = 3600
_BESClient_ArchiveManager_SendAll = 0
_BESClient_ArchiveManager_MaxArchiveSize = 1000000
```

Example 2

In this example, we want the same set of files as above, but we also want to collect some useful attributes (retrieved properties) from the client computer. A custom action can generate these attributes and trigger an archive when it completes. It uses the same settings as above, but sets the operating mode to 2 to enable the **archive now** action command:

```
_BESClient_ArchiveManager_OperatingMode = 2
```

You can then create a custom action, specifying the attributes you want to collect. For example, to append the operating system, computer name, and DNS name to the log file, create a custom action like this:

```
appendfile {"System:" & name of operating system}
appendfile {"Computer:" & computer name}
appendfile {"DNS name:" & dns name}
delete "c:\log\properties.log"
copy __appendfile "c:\log\properties.log"
archive now
```

The **appendfile** command creates a temporary text file named **__appendfile** . Each time you invoke the command, it appends the text you specify to the end of this temporary file.

The **delete** and **copy** commands clear out the old log file (if any) and copy the **__**appendfile to the log. This has the effect of creating a new properties.log file. The **archive now** command immediately creates an archive, as long as the OperatingMode is set to 2.

You can then target this action to any subset of BigFix Clients, using whatever scheduling you choose. Using variations on this scheme, you could perform a full archive once a week, in addition to nightly differences.

Chapter 20. BigFix Configuration Settings

A number of advanced BigFix configuration settings are available that can give you substantial control over the behavior of the BigFix suite. These options allow you to customize the behavior of the BigFix server, relays, and clients in your network.

Overview

The configuration settings apply to the BigFix server, relays, and clients. You can administer them through the Custom Settings configuration in the console's **Computer Status** dialog.

- Settings take on their default values unless you modify them.
- If you specify an invalid value for a setting, it reverts to its default value.
- All configuration values are stored as strings in the registry (or a configuration file).
- To prevent older settings from overriding newer settings, each setting has an "effective date" associated with it. An action with an older effective date does not overwrite settings with newer effective dates. Effective dates are set to the time that the action was taken.
- Numeric values are stored as strings, and assumed to fit in unsigned integers with a maximum of 32 bits (max value is 4,294,967,296).
- Numeric values that are negative, greater than the maximum value, or that contain non-numeric characters are treated as invalid values. The settings revert to their default values in such cases.
- Boolean values are stored as strings - either as *"1"*or *"0"* corresponding to *true* and *false* respectively. Boolean values that do not contain either of these allowed values are treated as invalid. The settings revert to their default values in such cases.

Warning: Use the configuration settings with caution. If misused, they can cause non-optimal behavior or prevent BigFix from functioning properly. When in doubt, consult with your support technician.

For details, see List of settings and detailed descriptions.

Chapter 21. Additional configuration steps

These topics explain additional configuration steps that you can run in your environment.

Installing and configuring the email notification service

You can use the email notification service to send automatic email notifications to notify you about the completion status of Baselines that you run. To use this notification feature, you must first install the notification service by running a Task. After you have installed the service, you must configure it by running another Task.

The BigFix Server Plugin Service must be installed on the BigFix Server and the REST API master operator credentials must be configured using Fixlet 1294 on BES Support.

The installation and setup Task are available from the BES Support site. To help you ensure that you run Task in the correct order, the installation and setup Task become relevant in the order in which you need to run them. So each Task will become relevant only when you need to run it.

Complete the following steps to install and set up the notification service.

1. To install the notification service, from the **Fixlets and Tasks** node of the navigation tree in BES Support, select one of the following Task, depending on whether you are installing the notification service on Windows or Linux:
    - Task 2238 `Install Latest Notification Service (SHA256)` to install the notification service on Windows operating system. When you run the Task, target the BigFix Server and enter the port number on which you want the notification service to listen. Enter a string in the **passphrase for cert generation** field (For secure communication, the Notification service requires SHA 256 certificate that is generated using the OpenSSL). This Task downloads and installs the notification service.
    - Task 2241 `Install Latest Notification Service (sha256 - RHEL)` to install the notification service on Linux. When you run the Task, target the BigFix Server and enter the port number on which you want the notification

service to listen. Enter a string in the **passphrase for cert generation** field (For secure communication, the Notification service requires SHA 256 certificate that is generated using the OpenSSL). This Task downloads and installs the notification service.

> **Note:** To install the latest version of Notification Service 3.2.3, upgrade RHEL to 8.2 or later.

If the installation does not complete successfully, check to see if a Task has become relevant in the **Notification > Warnings** folder. If there is a Task that is relevant in the **Warnings** folder, run the relevant Task. After the Task has completed, run the installation Task again.

2. Activate analysis 2243 `Notification Service Settings`.
3. Run Task 2240 `Configure Settings for Notification Service` to configure the SMTP login settings for the email notification service. Complete the form, as follows, and then click **Take Action**:
    - **Notification Service Port**: you can change the value here to update the port number that the notification service listens on, as set in Task 2238 `Install Latest Notification Service` or Task 2241 `Install Latest Notification Service (RHEL)`.
    - **From Email Address**: you can change the value here to update the default `From` email address that is displayed in the `From` field of the notification email and the email address as configured in Task 2244 **Send an Email Notification**, which is the Task that you use to send the email notification.
    - **SMTP Method**: select an SMTP method for the notification service, either **Login** or **None**. If you select **None**, no SMTP authentication is used and the **User name** and **Password** fields are disabled. If you select **Login**, you must authenticate with a user name and password is required.
    - **SMTP Host**: enter the IP address, host name or fully qualified host name of the SMTP server. This is a required field.
    - **SMTP Port**: accept the default port number value of 25 or enter a different value for the port number of the SMTP server. This is a required field.

- **User name**: enter the user name for the email account. This is a required field if you selected **Login** as the SMTP method.
- **Password**: enter the password for the email account. This is a required field if you selected **Login** as the SMTP method.
- **Confirm Password**: confirm the password that you entered in the previous field. This is a required field if you selected **Login** as the SMTP method.

After you have completed this step, the notification service is set up and ready to use.

The notification service is set up and configured according to your settings.

Note: To uninstall the notification service, use `Task 2239 Uninstall Notification Service` to uninstall from Microsoft Windows platforms or `Task 2242 Uninstall Notification Service (RHEL)` to uninstall from Linux platforms.

Sending email notifications

You can use the email notification service to send automatic email notifications to notify you about the completion status of Baselines that you run.

Before you can send email notifications, you must set up and configure the notification service.

After you have installed and configured the notification service, you can send email notifications to notify you about the completion status of Baselines.

Complete the following steps to send email notifications.

1. To use the notification service, add a modified copy of Task 2245 `Sample Task: Send an Email Notification` as a component in a Baseline at the point at which you want the notification to be sent. For example, if you want an email notification to be sent when the Baseline has completed, add the Task as the last component in the Baseline. Copy and modify the Task as follows:

- Copy Task 2245 `Sample Task: Send an Email Notification using Static Action Script Content`.
- Modify the copy of the Task by removing all the relevances except for the relevance "True" and by changing the details in the action script to include your specific settings for the following keys. The keys included in the following example represent the minimum required keys to send a notification:

```
// NOTIFICATION_START
// to: "< your comma separated list of recepient email addresses
 goes here >"
// from: "< your single email address that will be shown as the
 sender of
           the email goes here >"
// subject: "< your email title goes here >"
// body: "< your main email detail content goes here >"
// NOTIFICATION_END
```

The complete list of keys are listed in the following table.

Table 6. Notification keys

Key	Description
`to`	The email addresses to whom the notification is be sent. The valid values are a comma (,) separated list of valid email addresses. This is a required key.
`from`	The email address that is displayed as the sender of the notification email. The email address does not have to exist, but the value that you specify must be in the format of a valid email address. This is a required key.
`subject`	The notification summary that appears as the subject of the email. Any text is a valid entry for this key.

Key	Description
	The text that you enter can include tokens that are replaced at run-time. This is a required field.
`body`	The main notification text content for the email. You can enter any text for this key, including tokens that are replaced at run-time. This is a required field.
`failure-trigger`	This defines the number of failures that cause the notification to be sent. When this key is specified, the notification is sent when the specified number of failures occurs. When this key is omitted, the notification is sent when it completes. Enter a whole number greater than zero. This is an optional key.
`scope`	Determines which action is examined for result statuses when determining if an action failed or completed successfully. When this key is omitted, the results of the action containing these notification comments are examined. The valid value is `parent`, which means the results of the parent Baseline are examined instead of the action containing the notification comments. This is an optional key.

- Save the modified copy of the Task.
- Add your modified copy to the Baseline for which you want to send the email notification.

Review the Task description for complete information about how to modify the Task and include in a Baseline. Examples are included in the **Example** section below.

2. Run the Baseline. When the Baseline completes, an email notification is sent to the email addresses that you specified.

The following examples show how you can use the keys:

If you add the Task with the following notification comments as a component in a baseline, it sends an email when this Task (component) completes (for example, this may be useful if added to the middle of a baseline):

```
// NOTIFICATION_START
// to: "me@me.com, you@you.com"
// from: "noreply@bigfixteam.mycompany.com"
// subject: "Basline component '{actionName}' has completed successfully"
// body: "Baseline is 50% complete now"
// NOTIFICATION_END
```

When a Task consisting of the following notification comments is added as a component in a Baseline, it sends an email when that overall Baseline completes:

```
// NOTIFICATION_START
// to: "me@me.com, you@you.com"
// from: "noreply@bigfixteam.mycompany.com"
// subject: "Basline '{actionName}' with ID {actionID} has completed
 successfully"
// body: "The Baseline is complete!"
// scope: "parent"
// NOTIFICATION_END
```

You can add the previous two examples only to baselines that are statically targeted. Baselines targeted by group, property or name list do not enable a notification to be sent.

You can specify the following example in Baselines targeted statically or dynamically:

```
// NOTIFICATION_START
// to: "me@me.com, you@you.com"
// from: "noreply@bigfixteam.mycompany.com"
// subject: "Basline '{actionName}' with ID {actionID} has failed on 5 or
 more computers"
// body: "Review the results of Baseline '{actionName}' (ID: {actionID})"
// failure-trigger: "5"
// scope: "parent"
// NOTIFICATION_END
```

Configuring FillDB

The FillDB process runs on the BigFix Server system and is responsible for storing the information returned from the BigFix Agents into the BigFix database.

This information can be:

- Data, such as the value of retrieved properties or the result of the evaluation of the applicability relevance or the success criteria of Fixlets and Tasks.
- The information contained in a report returning the result of a BigFix Query.

This is how you can configure FillDB processing:

- Configuring the FillDB database performance *(on page 331)*
- Increasing the size of the FillDB buffer directory *(on page 332)*
- Enabling FillDB parallel processing *(on page 334)*

Configuring the FillDB database performance

DatabaseBoostLevel parameter

The FillDB utility offers a parameter called `DatabaseBoostLevel` to optimize BigFix performance.

On **Windows** systems: The possible values for the `DatabaseBoostLevel` parameter are 1 for enabled and 0 for disabled. The default value is 1.

On **Linux** systems (fresh installations and upgrades): The `DatabaseBoostLevel` parameter value is always: Database Boost Level is ON with maxBatchSize = 1000.

The improvements to BigFix performance depend on the environment in which BigFix runs. To find the best performance configuration for your environment, tune the data insertion mechanism in the FillDB database as follows:

1. Enable the performance log.
   Set the following string value in the `[HKLM\Software\Wow6432Node\BigFix\Enterprise Server\FillDB]` registry:
   ```
   "PerformanceDataPath"[REG_SZ] = "[BigFix Server
    folder]\FillDB\FillDBperf.log"
   ```
2. Restart the FillDB service and monitor the performance log for a while, registering the database insertion rate in "rows per second" of the various tables.
3. Add the `DatabaseBoostLevel` DWord value to the registry key `HKLM\Software\Wow6432Node\BigFix\Enterprise Server\FillDB` and set it to 0.
4. Restart the FillDB service and monitor the performance log again for a while, registering the database insertion rate in "rows per second" of the various tables.
5. Compare the insertion rate before and after setting the new value of the `DatabaseBoostLevel` parameter, ensuring that you keep the same level of workload during the monitoring. The more rows that are processed per second, the better the performance. The key tables to monitor are: questionresults, fixletresults, actionresults and longquestionresults. The number of rows processed per table is an indicator of the importance that the table has in your environment.

Increasing the size of the FillDB buffer directory

The FillDB buffer directory temporarily stores reports from the clients before they are stored into the database.

By default the directory is full if it contains 3MB of files or if it has more than 10,000 files. The consequence is that the information is not sent to the BigFix server quickly, and it might be a severe problem.

You can configure the FillDB buffer directory and the maximum number of hold files by performing the following steps:

On Windows systems:

1. Add the following keys to the registry path `HKLM\Software\Wow6432Node\BigFix\Enterprise Server\PostResults`:

   BufferDirectoryMaxSize

   It defines the maximum size of the FillDB buffer directory, in bytes. The default value is 3MB.

   Note: Do not increase this value over 20MB without specific guidance from HCL Support.

   BufferDirectoryMaxCount

   It defines the maximum number of files allowed in the FillDB buffer directory. The default value is 10,000.
2. Restart the FillDB service.

Note: On Windows systems, if you are adding these keys to a BigFix relay and not to a BigFix server, the registry path where to add them is `HKLM\Software\BigFix\Enterprise Server\PostResults`.

On Linux systems:

1. Add the following lines to the `/var/opt/BESServer/besserver.config` file:

```
[Software\BigFix\Enterprise Server\PostResults]
BufferDirectoryMaxSize = <SIZE_IN_BYTES>

[Software\BigFix\Enterprise Server\PostResults]
BufferDirectoryMaxCount = <MAX_NUMBER_OF_FILES>
```

   where:

   BufferDirectoryMaxSize

   It defines the maximum size of the FillDB buffer directory, in bytes. The default value is 3MB.

BufferDirectoryMaxCount

It defines the maximum number of files allowed in the FillDB buffer directory. The default value is 10,000.

2. Restart the FillDB service.

Enabling FillDB parallel processing

On the BigFix Server, the FillDB process is responsible to run in a single thread the following activities.

- Read the buffer directory content.
- Parse the report, which includes:
  - Decrypting the encrypted reports.
  - Decompressing the compressed reports.
- Store the report data in the database.
- Replicate content from other DSA servers (optional).

An additional thread is responsible for performing the same type of processing for the reports returned by the BigFix Query processing.

Starting from V9.5 Patch 5, the parallel processing is enabled by default during a fresh installation and upgrade according to the following rules:

- If the machine has 6 to 9 cores, the parallelism is enabled for normal reports by configuring 3 parsing threads and 3 database update threads.
- If the machine has at least 10 cores, the parallelism is enabled both for normal and for query reports by configuring for each of them 3 parsing threads and 3 database update threads for a total of 12 threads.

You can manually enable or disable the FillDB parallel processing by configuring the following settings on the BigFix Server:

- ParallelismEnabled
- ParallelismEnabledForQuery

Once you enabled the FillDB parallel processing, you can configure its behavior by specifying the following settings on the BigFix Server:

- NumberOfParsingThreads
- NumberOfDBUpdatingThreads
- MaxNumberOfReportsReadyForDB
- MinNumberOfReportsReadyForDB
- MaxNumberOfReportsInParsingQueue
- NumberOfParsingThreadsForQuery
- NumberOfDBUpdatingThreadsForQuery
- MaxNumberOfQueryReportsReadyForDB
- MinNumberOfQueryReportsReadyForDB
- MaxNumberOfQueryReportsInParsingQueue

For more information about these settings, see Configuring parallel FillDB *(on page 335)*. Run the following steps to activate changes on one or more of the settings specified above:

If the BigFix Server is installed on a Windows system:

1. Stop the BES FillDB service.
2. Update the values of the settings as appropriate in the Windows registry.
3. Start the BES FillDB service

If the BigFix Server is installed on a Linux system:

1. Stop besfilldb, for example `/etc/init.d/besfilldb stop`
2. Stop besserver, for example `/etc/init.d/besserver stop`
3. Update the values of the settings as appropriate in the `besserver.config` file.
4. Start besserver, for example `/etc/init.d/besserver start`
5. Start besfilldb, for example `/etc/init.d/besfilldb start`

Configuring parallel FillDB

Name/Description	Values	Components(s) affected	Version(s) applicable	References
Parallelism-Enabled This setting allows to enable parallel processing for agents reports. For details on the occasions	Default Value: 1 (enabled) Setting Type: REG_DWORD on Windows, entry in besserver.config on Linux Value range: 0 - 1 Task available: No Requires restart: FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Component(s) affected	Version(s) applicable	References
on which parallelism is enabled, see Enabling FillDB parallel processing *(on page 334)*.				
NumberOfParsingThreads This setting	Default Value: 3 Setting Type: REG_DWORD on Windows, entry in	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Com-po-nen-t(s) af-fect-ed	Ver-sion(s) ap-plic-a-ble	References
defines the number of threads that are responsible for parsing the reports. It is used only if the parallelism is enabled.	besserver.config on Linux Value range: 1 - 5 Task available: No Requires restart: FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			

Name/Description	Values	Component(s) affected	Version(s) applicable	References
NumberOfDBUpdatingThreads This setting defines the number of threads that store report data in the DB. It is used only if the parallelism	Default Value: 3 Setting Type: REG_DWORD on Windows, entry in besserver.config on Linux Value range: 1 - 5 Task available: No Requires restart: FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Component(s) affected	Version(s) applicable	References
is enabled.				
MaxNumberOfReportsReadyForDB This setting represents the maximum number of reports that a DB updating thread can	Default Value: 1000 / NumberOfDBUpdatingThreads Setting Type: REG_DWORD on Windows, entry in besserver.config on Linux Value range: 500-5000 / NumberOfDBUpdatingThreadsStandard Task available: No	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values		Component(s) affected	Version(s) applicable	References
process in a single run. It is used only if the parallelism is enabled.	Requires restart	FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			
MinNumberOfReportsReadyForDB This setting represents the minimum num-	Default Value	MaxNumberOfReportsReadyForDB / 2	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*
	Setting Type	REG_DWORD on Windows, entry in besserver.config on Linux			

Name/Description	Values		Com-po-nen-t(s) af-fect-ed	Ver-sion(s) ap-plic-a-ble	References
ber of re-ports that a DB up-dat-ing thread can process in a single run. It is used only if the paral-lelism is en-abled.	Value range	MaxNum-berOf-Reports-ReadyFor-DB / 1-3			
	Task available	No			
	Requires restart	FillDB Restart on Windows systems and FillDB and Bes-RootServ-er restart on Linux			
MaxNumber-OfReportsIn-ParsingQueue	Default Value	10 * Num-berOf-	Serv-er	9.5.5 and	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values		Component(s) affected	Version(s) applicable	References
This setting represents the maximum number of reports that can be in the queue waiting for a parsing thread to process		ParsingThreads		later	
	Setting Type	REG_DWORD on Windows, entry in besserver.config on Linux			
	Value range	(2-20) * NumberOfParsingThreads			
	Task available	No			
	Requires restart	FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			

Name/Description	Values	Com-po-nen-t(s) af-fect-ed	Ver-sion(s) ap-plic-a-ble	References
them. It is used only if the paral-lelism is en-abled.				
Parallelism-EnabledFor-Query This set-ting al-lows to en-able par-allel pro-cess-ing	Default Value: 0; Setting Type: REG_D-WORD on Windows, entry in besserv-er.config on Linux; Value range: 0 - 1; Task available: No	Serv-er	9.5.5 and lat-er	None

Name/Description	Values		Component(s) affected	Version(s) applicable	References
for BigFix query reports.	Requires restart	FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			
NumberOfParsingThreadsForQuery This setting defines the number of threads that are re-	Default Value	3	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*
	Setting Type	REG_DWORD on Windows, entry in besserver.config on Linux			
	Value range	1 - 5			
	Task available	No			

Name/Description	Values		Component(s) affected	Version(s) applicable	References
sponsible for parsing the BigFix query reports. It is used only if the parallelism is enabled for BigFix query reports' pro-	Requires restart	FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			

Name/Description	Values	Component(s) affected	Version(s) applicable	References
cessing.				
NumberOfDBUpdatingThreadsForQuery This setting defines the number of threads that store BigFix query report data in the DB. It is used	Default Value: 3 Setting Type: REG_DWORD on Windows, entry in besserver.config on Linux Value range: 1 - 5 Task available: No Requires restart: FillDB Restart on Windows systems and FillDB and BesRootServ-	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Component(s) affected	Version(s) applicable	References
only if the parallelism is enabled for BigFix query reports' processing.	er restart on Linux			
MaxNumberOfQueryReportsReadyForDB This setting represents the	Default Value: 1000 / NumberOfDBUpdatingThreadsForQuery Setting Type: REG_DWORD on Windows, entry in	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Components(s) affected	Version(s) applicable	References
maximum number of BigFix query reports that a DB updating thread can process in a single run. It is used only if the parallelism	besserver.config on Linux **Value range:** (500-5000) / NumberOfDBUpdatingThreadsForQuery **Task available:** No **Requires restart:** FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			

Name/Description	Values	Component(s) affected	Version(s) applicable	References
is enabled for BigFix query reports' processing.				
MinNumberOfQueryReportsReadyForDB This setting represents the minimum number of BigFix	Default Value: MaxNumberOfQueryReportsReadyForDB / 2 Setting Type: REG_DWORD on Windows, entry in besserver.config on Linux	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Component(s) affected	Version(s) applicable	References
query reports that a DB updating thread can process in a single run. It is used only if the parallelism is enabled for BigFix query	Value range: MaxNumberOfQueryReportsReadyForDB / (3-1) Task available: No Requires restart: FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			

Name/Description	Values	Component(s) affected	Version(s) applicable	References
reports' processing.				
MaxNumberOfQueryReportsInParsingQueue This setting represents the maximum number of BigFix query reports that	Default Value: 10 * NumberOfParsingThreadsForQuery Setting Type: REG_DWORD on Windows, entry in besserver.config on Linux Value range: (2-20) * NumberOfParsingThreadsForQuery	Server	9.5.5 and later	Enabling FillDB parallel processing *(on page 334)*

Name/Description	Values	Components(s) affected	Version(s) applicable	References
can be in the queue waiting for a parsing thread to process them. It is used only if the parallelism is enabled for BigFix query re-	Task available: No Requires restart: FillDB Restart on Windows systems and FillDB and BesRootServer restart on Linux			

Name/Description	Values	Com-po-nen-t(s) af-fect-ed	Ver-sion(s) ap-plic-a-ble	References
ports' pro-cess-ing.				

Configuring ODBC data sources

How to use Open DataBase Connectivity (ODBC) to set up and configure ODBC Data Sources with BigFix.

The BigFix components that use a database connect to it using Open DataBase Connectivity (OBDC).

To open an ODBC connection, you need:

- An ODBC driver, a piece of software allowing your application call the ODBC APIs of the database engine.
- An ODBC data source, the information identifying the target database and detailing the connection parameters.

There can be several ODBC drivers installed on the same computer and several ODBC data sources saved on it. Often, the data source also specifies what driver to use to connect to the target database.

Each ODBC data source is identified by a Data Source Name (DSN), not to be confused with a DNS (Domain Name System), which has a similar acronym but is an entirely different thing.

ODBC on Windows

On Windows, an ODBC data source can be 32-bit or 64-bit. There can be two sources with the same name if one is 32-bit and the other is 64-bit.

ODBC data sources with the same name but different bitness often refer to the same database and have the same connection parameters, except for the path of the ODBC driver they specify.

In fact, ODBC drivers often have a 32-bit dll for 32-bit applications and 64-bit dll for 64-bit applications.

ODBC data sources are saved in the registry:

- 32-bit ODBC data sources appear in HKEY_LOCAL_MACHINE\SOFTWARE \Wow6432Node\ODBC\ODBC.INI
- 64-bit ODBC data sources appear in HKEY_LOCAL_MACHINE\SOFTWARE\ODBC \ODBC.INI

You can edit them directly or configure them using these dedicated tools:

- Start > Windows Administrative Tools > ODBC Data Sources (32-bit)
- Start > Windows Administrative Tools > ODBC Data Sources (64-bit)

The BigFix Platform components use these ODBC data sources on Windows:

- enterprise_setup, used by the installers, especially during upgrades
- bes_bfenterprise, used by the BigFix Server to access its database
- LocalBESReportingServer, used by Web Reports to access its database

All the above ODBC data source names have a corresponding 32-bit source and a 64-bit source.

In total there are 6 BigFix data sources (3 pairs).

The BigFix Administration Tool (BESAdmin) usually relies on the same ODBC data source as the BigFix Server, but it may use a different data source depending on the command it runs.

The BigFix WebUI does not use ODBC data sources and saves its connection data internally.

If you want to change a BigFix ODBC data source, remember to:

- Update both the 32-bit and 64-bit versions of the data source.
- Ensure that the corresponding settings in other data sources remain consistent.

If you do not keep all data sources aligned, you may encounter database connection issues when using certain BigFix functions but not while using others.

For example, if you change bes_bfenterprise and forget to update the corresponding information in enterprise_setup, you might only find out during the BigFix pre-upgrade checks.

BigFix components might connect to databases hosted on SQL Server either:

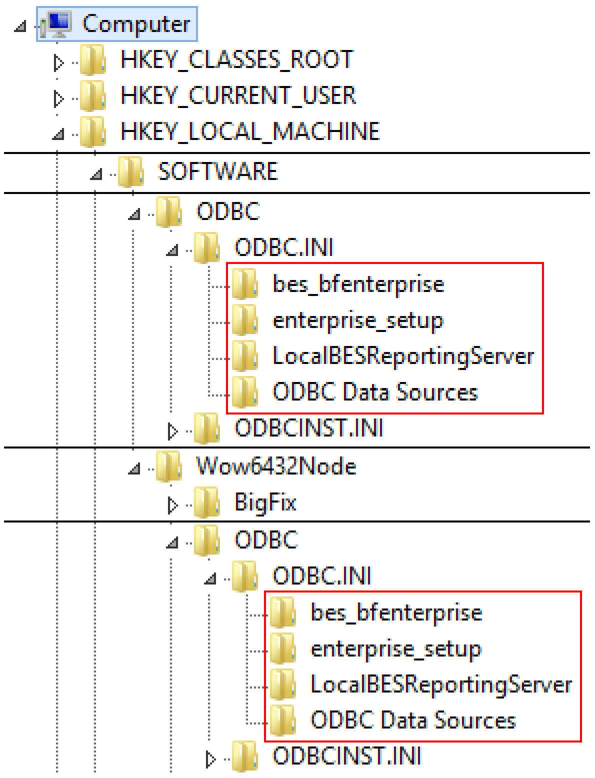
- Via Windows authentication, which relies on the Windows credentials of the user running the application process.
- Via SQL Server authentication, which relies on separate credentials, unrelated to Windows user credentials.

When a BigFix component uses Windows authentication, the user running its service is the same that will access the database. This is true for all components except for the BigFix WebUI.

When connecting to a local database, BigFix uses Windows authentication by default.

When connecting to a remote database, BigFix can be configured to use Windows authentication or SQL Server authentication.

This image shows the ODBC keys of a computer with both the BigFix Server and Web Reports installed.



Changes introduced in Patch 8

Given some differences in how the two drivers can be configured, any customization of the BigFix ODBC data sources done prior to upgrading to Version 10.0.8 might no longer work as expected after upgrading to Version 10.0.8. Therefore, if starting from a non-default configuration, after upgrading to Version 10.0.8, it is recommended to review and verify the consistency and effectiveness of the BigFix ODBC data source configurations.

ODBC examples for Windows

Example of ODBC configuration up to Patch 7

This configuration code shows the 64-bit and 32-bit ODBC keys of a computer with the BigFix Server and Web Reports using a local database and configured to use Microsoft SQL Server Native Client for the connection.

```
Windows Registry Editor Version 5.00


[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI]
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\bes_bfenterprise]
"Database"="BFEnterprise"
"Driver"="C:\\Windows\\system32\\sqlncli11.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\enterprise_setup]
"Driver"="C:\\Windows\\system32\\sqlncli11.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\LocalBESReportingServer]
"Database"="BESReporting"
"Driver"="C:\\Windows\\system32\\sqlncli11.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\ODBC Data Sources]
"enterprise_setup"="SQL Server Native Client 11.0"
"bes_bfenterprise"="SQL Server Native Client 11.0"
"LocalBESReportingServer"="SQL Server Native Client 11.0"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI]

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\bes_bfenterprise]
"Database"="BFEnterprise"
"Driver"="C:\\Windows\\SysWOW64\\sqlncli11.dll"
"Registration"="System Data Source"
```

```
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\enterprise_setup]
"Driver"="C:\\Windows\\SysWOW64\\sqlncli11.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\LocalBESReportingSer
ver]
"Database"="BESReporting"
"Driver"="C:\\Windows\\SysWOW64\\sqlncli11.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\ODBC Data Sources]
"enterprise_setup"="SQL Server Native Client 11.0"
"bes_bfenterprise"="SQL Server Native Client 11.0"
"LocalBESReportingServer"="SQL Server Native Client 11.0"
```

The "Trusted_Connection" registry value is set to "Yes", which means it is using Windows authentication. If that value is missing, the connection defaults to SQL Server authentication.

Example of ODBC configuration from Patch 8 and later

This configuration code shows the 64-bit and 32-bit ODBC keys of a computer with the BigFix Server and Web Reports using a local database and configured to use Microsoft SQL Server Native Client for the connection.

```
Windows Registry Editor Version 5.00


[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI]
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\bes_bfenterprise]
"Database"="BFEnterprise"
"Driver"="C:\\Windows\\system32\\msodbcsql17.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\enterprise_setup]
"Driver"="C:\\Windows\\system32\\msodbcsql17.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\LocalBESReportingServer]
"Database"="BESReporting"
"Driver"="C:\\Windows\\system32\\msodbcsql17.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\ODBC Data Sources]
"enterprise_setup"="ODBC Driver 17 for SQL Server"
"bes_bfenterprise"="ODBC Driver 17 for SQL Server"
"LocalBESReportingServer"="ODBC Driver 17 for SQL Server"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI]

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\bes_bfenterprise]
"Database"="BFEnterprise"
"Driver"="C:\\Windows\\SysWOW64\\msodbcsql17.dll"
"Registration"="System Data Source"
```

```
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\enterprise_setup]
"Driver"="C:\\Windows\\SysWOW64\\msodbcsql17.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\LocalBESReportingSer
ver]
"Database"="BESReporting"
"Driver"="C:\\Windows\\SysWOW64\\msodbcsql17.dll"
"Registration"="System Data Source"
"Server"="(local)"
"Trusted_Connection"="Yes"

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ODBC\ODBC.INI\ODBC Data Sources]
"enterprise_setup"="ODBC Driver 17 for SQL Server"
"bes_bfenterprise"="ODBC Driver 17 for SQL Server"
"LocalBESReportingServer"="ODBC Driver 17 for SQL Server"
```

ODBC on Linux

On Linux, the concept of an ODBC data source is more vaguely defined and database connection settings are set by interacting with the DB2 Client and driver, usually via the command line.

Configuring the number of Web Reports results

To avoid excessive use of memory when displaying Web Reports results on `Explore Computers` reports, you can configure the `MaxReportResults` keyword. This keyword sets the maximum number of rows that can be displayed in a web report. Its default value is `1000000`.

The valid value range of the keyword is 1-4294967295.

When you get the message:

```
Unable to update data table: server aborted or there was an error
 processing your request
```

on the report page and you see the exception:

```
Too many results returned from computer report. Report execution has been
 aborted
```

in the log files, indicating that the number of lines to be displayed exceeds the default value, tune the keyword value by taking into account the type of report, the computer properties, and the resources of the system where Web Reports is running.

You can set this keyword both on Windows and Linux systems where Web Reports is running, by completing the following steps:

On Windows systems:

Run **regedit** and locate the path `HKEY_LOCAL_MACHINE\Software\Wow6432Node\BigFix\Enterprise Server\BESReports`.

Create the string value (reg_sz) `MaxReportResults` and set it to the identified value.

```
"MaxReportResults"[REG_SZ] = "1000000"
```

On Linux systems:

Add the `MaxReportResults` keyword to the `[Software\BigFix\Enterprise Server\BESReports]` section of the `beswebreports.config` file and set it to the identified value:

```
MaxReportResults = 1000000
```

Managing Daylight Saving Time (DST) for Web Reports

By default, Web Reports track scheduled activity next attempt times using UTC rather than the local time zone.

So, when the local time zone changes, for example from daylight saving time to non-daylight saving time, reports run an hour earlier or later, depending on the direction of the change.

Starting from BigFix Version 9.5 you can prevent to run scheduled reports an hour earlier or later because of the change due to the daylight saving time by setting the `AdjustScheduleForDST` keyword to 1.

You can set this keyword both on Windows and Linux systems where Web Reports is running, by completing the following steps:

On Windows systems:

Run **regedit** and locate the path `HKEY_LOCAL_MACHINE\Software\Wow6432Node\BigFix\Enterprise Server\BESReports`.

Create the string value `AdjustScheduleForDST` and set it to 1.

```
"AdjustScheduleForDST" = "1"
```

On Linux systems:

Add the `AdjustScheduleForDST` keyword to the `[Software\BigFix\Enterprise Server\BESReports]` section of the `beswebreports.config` file and set it to 1:

```
AdjustScheduleForDST = 1
```

Important: The Daylight Saving Time setting becomes effective when the first event after the change is triggered.

FIPS 140-2 cryptography in the BigFix environment

BigFix uses the BigFix Cryptographic Module to perform cryptographic functions throughout its environment.

For instance, every time an operator logs into the BigFix console, creates a new user, initiates an action, or subscribes to new content there are cryptographic operations performed by this module.

The BigFix Cryptographic Module uses OpenSSL FIPS Object Module 2.0 that has been certified by NIST as compliant with the FIPS (Federal Information Processing Standard) 140-2 standard.

Configuring FIPS 140-2 on the BigFix Server

You can configure the BigFix server to use FIPS 140-2.

In this way, when the state of BigFix Cryptographic Module is in error, BigFix does not start or stops running.

To verify the appropriate setup and initialization of the module you must check the client log file by completing the following steps:

1. On the BigFix server, launch the BigFix Administration Tool by selecting **Start > All Programs > BigFix > BigFix Administration Tool**.
2. Browse to the location of your site license and click **OK**
3. Select the **Masthead Management** tab.
4. Click **Edit Masthead**.
5. Check **Require use of FIPS 140-2 compliant cryptography** to enable FIPS 140-2.
6. Click **OK**.
7. Enter the Administrator password to perform the action.
8. To ensure that the setting has been enabled check the client log file (default log path: `C:\Program Files\BigFix Enterprise\BES Client\__BESData\__Global\Logs\YYYYMMDD.log` for the following types of messages:
    - **FIPS 140-2 Enable log file message**

      ```
      At 14:36:12 -0700 -
      FIPS mode enabled by masthead.
      At 14:36:13 -0700 -
      Cryptographic module initialized successfully in FIPS mode.
      ```
    - **FIPS 140-2 Disabled log file message**

```
At 14:58:28 -0700 -
FIPS mode disabled by default.
Unrestricted mode
```

You can enforce the FIPS mode, by setting the `_BESClient_Cryptography_FipsMode` value on the client.

Note: The client setting **_BESClient_Cryptography_FipsMode** overrides the FIPS setting specified in the masthead for the BES Client and the Web Reports components. When setting the value to **none**, the BES Client and the Web Reports components will not use the FIPS libraries. When setting the value to **required**, they will use the FIPS libraries.

In this way the client does not run in FIPS mode when the Cryptographic Module encounters an error at startup.

To force BigFix components to use only the FIPS validated Cryptographic library, complete the following steps:

1. Launch the BigFix Console.
2. From the **Computers** tab, right-click any listed computer and choose **Edit Computer Settings**.
3. Click **Add**.
4. In the Add Custom Settings dialog enter: `_BESClient_Cryptography_FipsMode` in the **Setting Name** and `required` in the **Setting Value**.
5. Click **OK**.
6. In the **Target** tab select `All computers`. When FIPS mode is enabled all cryptographic operations such as digital signatures, encryption and SHA1, SHA2 hashing are performed using the FIPS 140-2 Level 2 certified cryptographic module.
7. In the **Execution** tab of the dialog choose **Reapply this action whenever it becomes relevant again** and click **OK**

Note: To enable FIPS 140-2 on the BigFix Linux server, see the `-advRequireFIPScompliantCrypto` option described in Editing the Masthead on Linux systems *(on page 419)*.

Note:

- When enabling the FIPS module, the OpenSSL library must be loaded at a static address to satisfy its own self tests.
- The most common error related to the FIPS mode startup occurs on AIX and HP-UX systems when there is not enough system entropy available for the Cryptographic Module.
- The FIPS Mode setting and the Message Level Encryption (MLE) setting are independent. You can set FIPS without setting the MLE and viceversa.

For information on Message Level Encryption see Message Level Encryption (MLE) Overview (on page 371) and Message Level Encryption and DSA (on page 79)

Managing Client Encryption

Server and relay-bound communications from clients can be encrypted to prevent unauthorized access to sensitive information. To enable it, you must generate a key and provide a value on clients for the setting named `_BESClient_Report_Encryption`.

By default, the value for this setting is set to **optional**. The value is set in the console and is described in the BigFix Installation Guide.

On Windows servers, the key is generated from the **Encryption** tab of the BigFix Administration Tool:

1. Launch the BigFix Administration Tool by selecting **Start > Programs > BigFix > BigFix Administration Tool**.
2. Select the **Encryption** tab. At the top of the dialog is a statement of the current state.

Client encryption has four states: Disabled, Pending, Enabled, and Pending Rotation:

Disabled

This state indicates that no encryption certificate is included in your deployment masthead, which means that Clients cannot encrypt their reports even if they are told to do so. Click **Generate Key** to create an encryption certificate (and the corresponding private key, which can be used to decrypt reports at the receiving end). The state is set to **Pending** state.

Pending

In this state, an encryption certificate has been generated and is ready for deployment, but the private key has not yet been distributed to all necessary decrypting relays and servers. When you have manually distributed the private key, click the **Enable Encryption** button to embed the certificate in the masthead and send it out to all clients. The state is set to Enabled. Click **Cancel** to return to the Disabled state.

Enabled

In this state, an encryption certificate has been found in your deployment masthead, which means that you are able to turn on encryption (using the setting discussed previously) for any of the clients in your deployment. At any time, you can click **Generate new key** to create a new encryption certificate. This is useful if you have a key rotation policy or if your encryption key is ever compromised (see next section). Generating a new key returns the state to Pending (unless you choose to deploy immediately as described in the next section). You can also click **Disable** to move back to the Disabled state.

Pending Rotation

In this state, an encryption certificate is included in your deployment masthead, and a new certificate has been generated and is ready to replace the existing certificate.

On Linux servers, you can encrypt clients by completing the following steps as super user:

1. Generate the key:

```
./BESAdmin.sh -reportencryption -generatekey -privateKeySize=max
 -deploynow=yes
-sitePvkLocation=<path+license.pvk> -sitePvkPassword=<password>
```

2. Activate the key:

```
./BESAdmin.sh -reportencryption -enablekey
 -sitePvkLocation=<path+license.pvk>
-sitePvkPassword=<password>
```

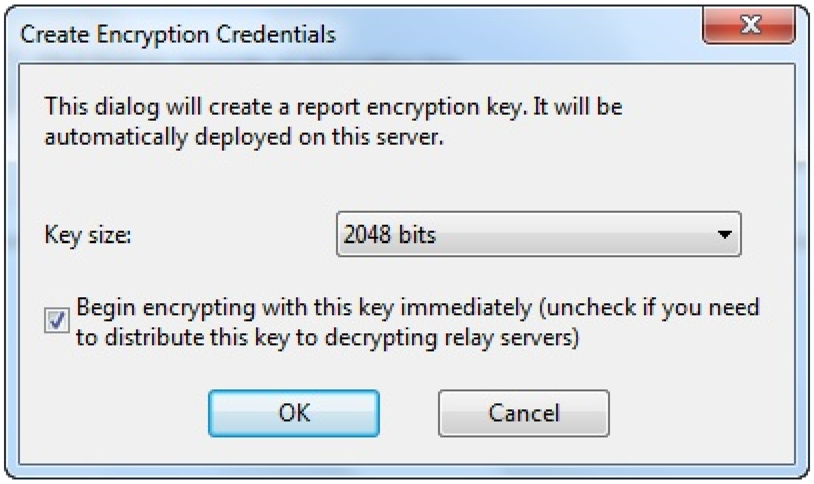
To list all the available options run:

```
./BESAdmin.sh -reportencryption -h
```

Generating a new encryption key

If your private key is compromised or if you have a policy of rotating keys, you can generate a new key from the **BigFix Administration Tool**.

1. Launch the BigFix Administration Tool by selecting **Start > Programs > BigFix > BigFix Administration Tool**.
2. Select the **Encryption** tab.
3. Click the **Generate key** button. The Create Encryption Credentials dialog opens.


Create Encryption Credentials

This dialog will create a report encryption key. It will be automatically deployed on this server.

Key size: 2048 bits

[✓] Begin encrypting with this key immediately (uncheck if you need to distribute this key to decrypting relay servers)

4. From this dialog, select the key size. The default is 2048, which is adequate for most purposes. Check the box to use this key immediately. However, if you have established relays that use encryption, leave this box unchecked until you can distribute the new key to those relays.
5. Click **OK** to distribute this new key to your clients. You must provide your Site Administration Private Key to propagate the action. A final dialog asks for confirmation. For more information about encryption key sizes and server requirements, see the knowledge-base article on server requirements at the BigFix support site.

Creating top-level decrypting relays

When an action is deployed, thousands of clients might report back in a short time frame, typically to a relay. If you have chosen to encrypt these reports, the relay bundles the reports together and passes them to the server, which must then split up and decrypt each one of them.

With many thousands of clients, this can impose a significant computational burden on the server.

To improve performance, you can lighten the load on your server by allowing your top-level relays to do the bulk of the decryption. If you have over 50,000 clients, you might be able to substantially reduce the load on your server by moving decryption down into the relay chain. If the relay has its own decryption key, it can first decrypt the client messages into plain text and then bundle thousands of them into a single archive. This can then be compressed, encrypted, and passed to the server. At that point, the server can perform a single decryption on the entire archive, noticeably reducing its overhead.

To spread the decryption tasks, distribute your encryption keys to your top-level relays. For normal server-level encryption, HCL creates an encryption key for you and places it in the program folder:

On Windows systems:

```
%PROGRAM FILES%\BigFix Enterprise\BES Server\Encryption Keys
```

On Linux systems:

```
      var/opt/BES Server/Encryption Keys
```

To allocate the load to your top-level relays, place the encryption key in the equivalent relay directory:

On Windows systems:

```
      %PROGRAM FILES%\BigFix Enterprise\BES Relay\Encryption Keys
```

On Linux systems:

```
      var/opt/BES Relay/Encryption Keys
```

These top-level relays decrypt all the documents received, bundle them together, and then re-sign them with a single signature. You can put as many keys as you want in the folder and the relay attempts to use each of them when it gets an encrypted client report. clients encrypt against the key found in the masthead file, which should be the last key created. However, it is possible that a client transmits a report with an older version of the masthead (and thus a different encryption key) if it has not gathered the latest actionsite for any reason.

When you use top-level encryption, consider the following best practices:

- You must manually transfer the key file from the server to the relay every time you create a new encryption key.
- During the transfer process, it is important not to expose your private key file. This means that you must not move the key over the internet because anyone listening might be able make a copy of your private key file. Instead, physically transfer the key from one computer to another, for example, with a USB key.
- During the encryption key creation process, you have the option to create the private key file, but not propagate it out in the masthead. This step gives you time to transfer the new key file to the relays before clients start posting encryption messages with that key.

Message Level Encryption (MLE) Overview

Message Level Encryption (MLE) allows your Clients to encrypt upstream data using a combination of an RSA public/private key-pair and an AES session key.

The RSA key-pair can be of 2048- or 4096-bit key length, with longer keys offering additional security, but requiring more processing power for decryption at the server. The AES session key uses the maximum FIPS-recommended length of 256 bits. You can configure your Relays to reduce the load on the Server by decrypting and repackaging the Client data before relaying it.

The RSA public key encrypts the session key and adds it to the AES-encrypted report. At the BigFix Server (or a decrypting Relay) the corresponding RSA private key is used to decrypt the AES session key, which is then used to decrypt the Client report.

There are three levels of report encryption:

Required

Clients require encryption of reports and uploads. The client does not report or upload files if it cannot find an encryption certificate or if its parent relay does not support receipt of encrypted documents.

Optional

Clients prefer, but do not require encryption of reports and uploads. If encryption cannot be performed, reports and uploads are done in clear-text.

None

Clients do not encrypt, even if an encryption certificate is present.

For more information about how to set encryption on Clients, see the Installation Guide.

Changing the Client Icon

By default, the icon in the upper left corner of the client UI is the BigFix logo.

This same icon is shown in the tray when an action is pending and in the task bar when the program is running. You can change this icon to help you clarify to your users who is the source of the action, and also to comply with corporate branding and trademark requirements. Follow these steps to change the icon:

- On Windows systems:
    1. Run the BigFix Administration Tool from **Start > Program Files > BigFix > BigFix Administration Tool**.
    2. Click **System Options** tab.
    3. Click **Add Icon** and use the **Open** dialog to browse for your icon (.ico) file.

On Linux systems:

1. Identify the path of the new icon, for example: `/IEM/newicon.ico`.
2. From the `/opt/BESServer/bin` command prompt, start the command line:

    ```
    ./iem login --server=servername:serverport --user=username
     --password=password
    ```
3. From the `/opt/BESServer/bin` command prompt, run the following command:

    ```
    ./iem post /IEM/newicon.ico admin/icon
    ```

    where: */IEM/newicon.ico* represents the full path of the new icon and `admin/icon` is the parameter to use to upload the new icon.

The icon is propagated to the clients, but it is not incorporated into the interface until the client restarts. After that, when a client interface opens (in response to an action, a dashboard or an offer), it includes the graphic icon you specified.

Client UI main actions

The BigFix Client UI is used to display message boxes to the end users logged on to the client computer (including pre-action messages, action running messages, and restart/shutdown messages).

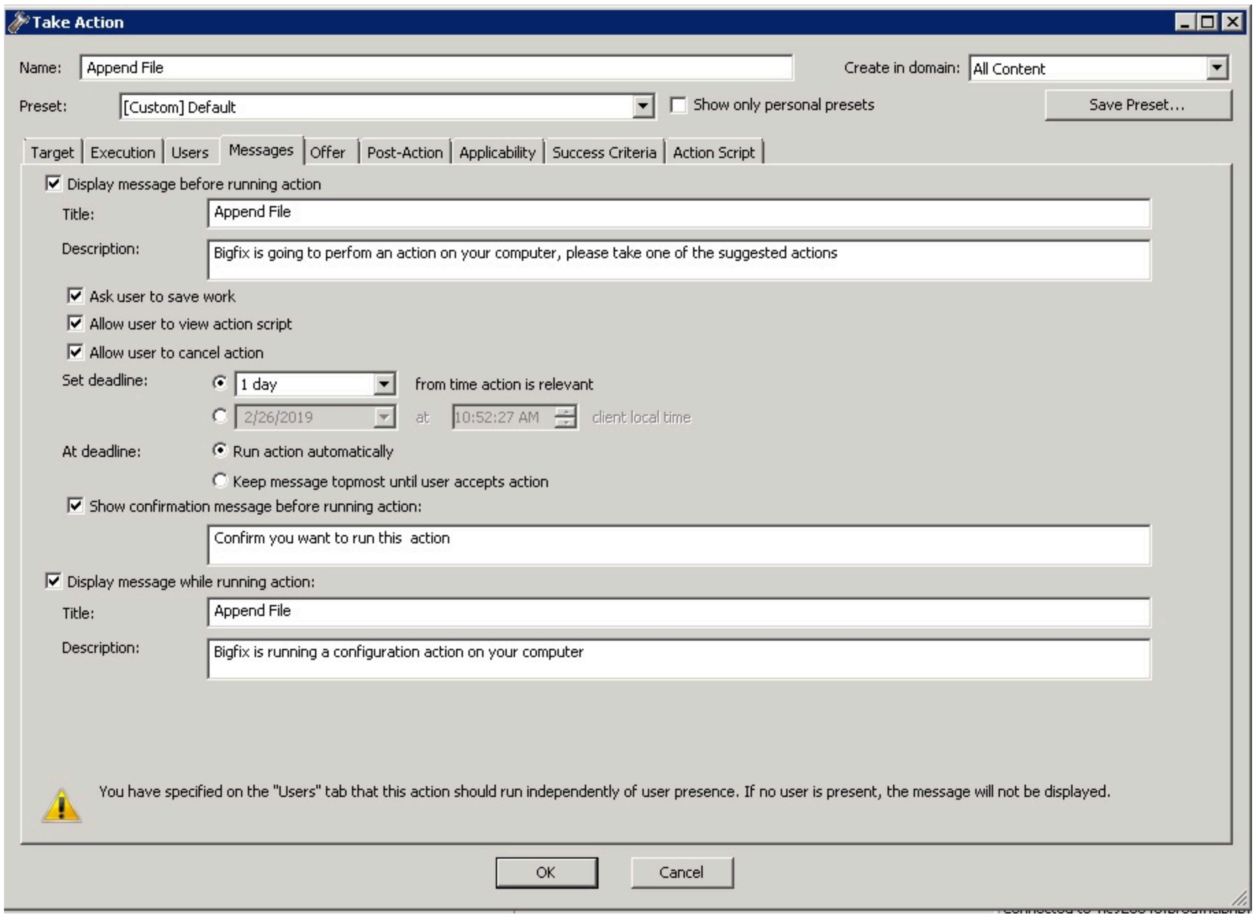
If the BigFix Client UI is not running in the user session, the end user will not see any BigFix messages.

The BigFix client UI displays messages in the client notification area, for example the task bar on Windows.

This topic describes in particular what the Client UI shows on the client computer when the **Messages** and **Offer** tabs of the **Take Action** panel are triggered from the BigFix Console.

Scenario 1 (Messages tab)

If the BigFix Console operator specifies the following settings in the **Messages** tab of the **Take Action** panel:



Name: Append File

Create in domain: All Content

Preset: [Custom] Default

☐ Show only personal presets

☑ Display message before running action

Title: Append File

Description: Bigfix is going to perfom an action on your computer, please take one of the suggested actions

☑ Ask user to save work

☑ Allow user to view action script

☑ Allow user to cancel action

Set deadline: ◉ 1 day from time action is relevant

○ 2/26/2019 at 10:52:27 AM client local time

At deadline: ◉ Run action automatically

○ Keep message topmost until user accepts action

☑ Show confirmation message before running action:

Confirm you want to run this action

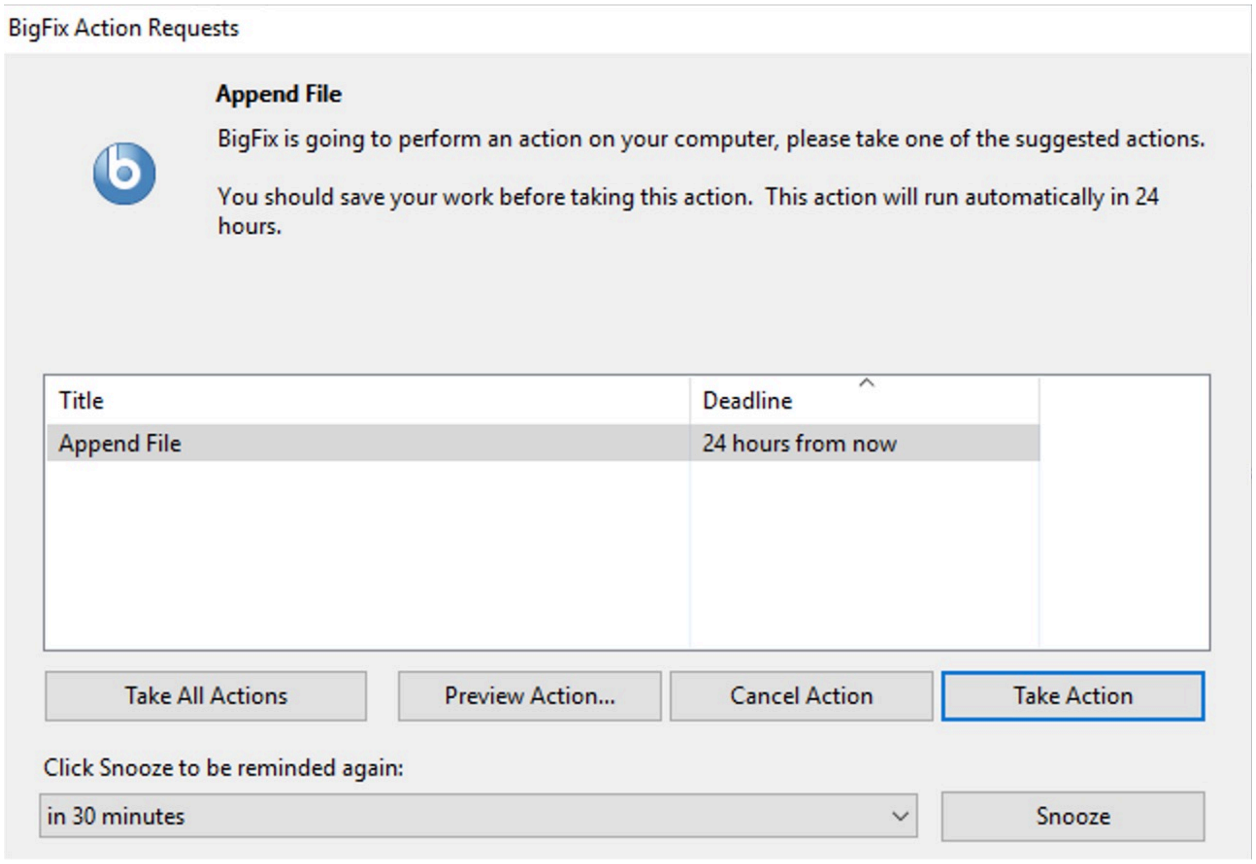
☑ Display message while running action:

Title: Append File

Description: Bigfix is running a configuration action on your computer

You have specified on the "Users" tab that this action should run independently of user presence. If no user is present, the message will not be displayed.

The screen capture below represents what an end user will see on the client computer:


BigFix Action Requests

Append File

BigFix is going to perform an action on your computer, please take one of the suggested actions.

You should save your work before taking this action. This action will run automatically in 24 hours.

Title	Deadline
Append File	24 hours from now

Click Snooze to be reminded again:

in 30 minutes

The main actions that can be performed here by the end user are:

Take Action / Take All Actions

Performs the action on the client computer.

Preview Action

Displays the action script contained in the action.

Cancel Action

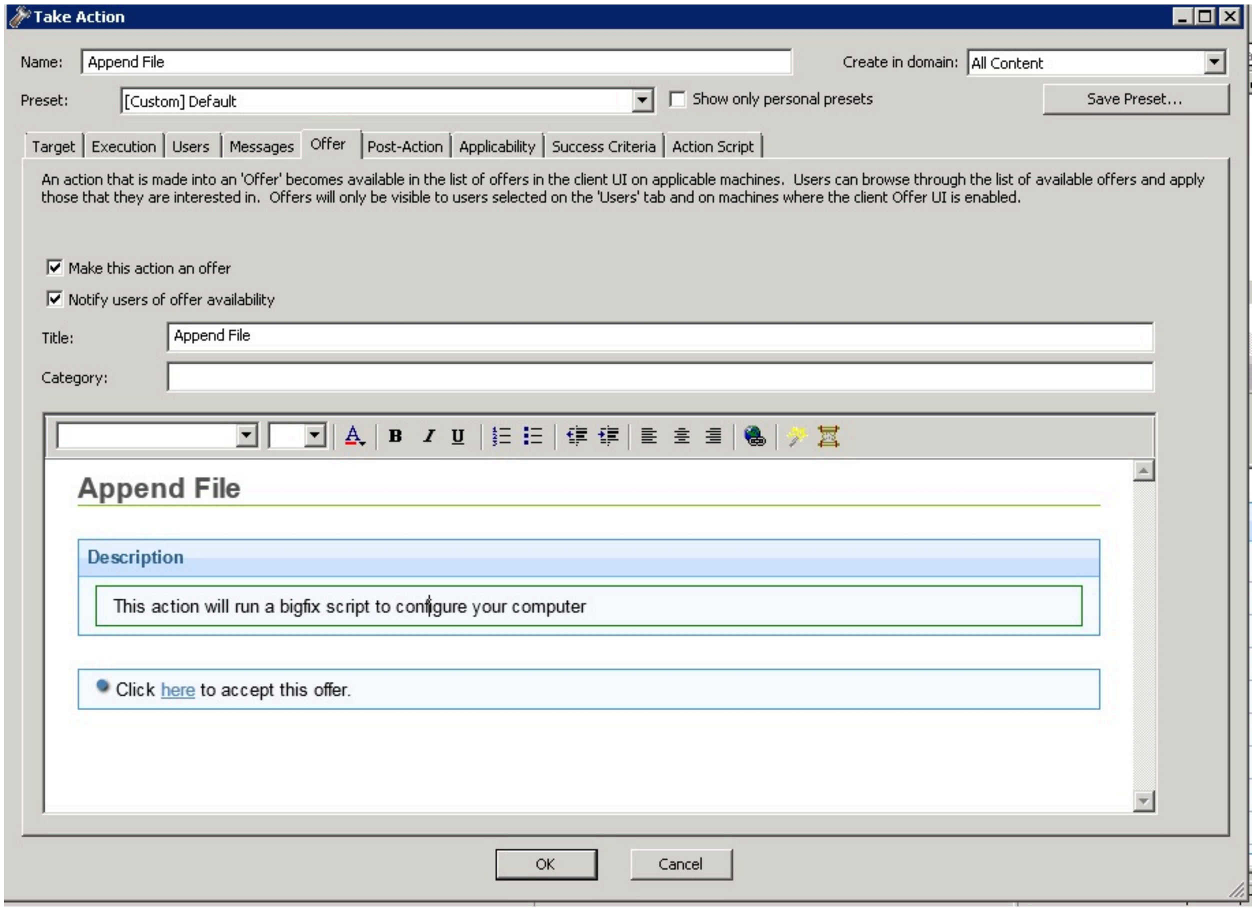
Deletes the action.

Snooze

Postpones the action and allows you to choose when to be reminded about the action to perform.

Scenario 2 (Offer tab)

If the BigFix Console operator specifies the following settings in the **Offer** tab of the **Take Action** panel:



Name: Append File

Create in domain: All Content

Preset: [Custom] Default

☐ Show only personal presets

An action that is made into an 'Offer' becomes available in the list of offers in the client UI on applicable machines. Users can browse through the list of available offers and apply those that they are interested in. Offers will only be visible to users selected on the 'Users' tab and on machines where the client Offer UI is enabled.

☑ Make this action an offer

☑ Notify users of offer availability

Title: Append File

Category:

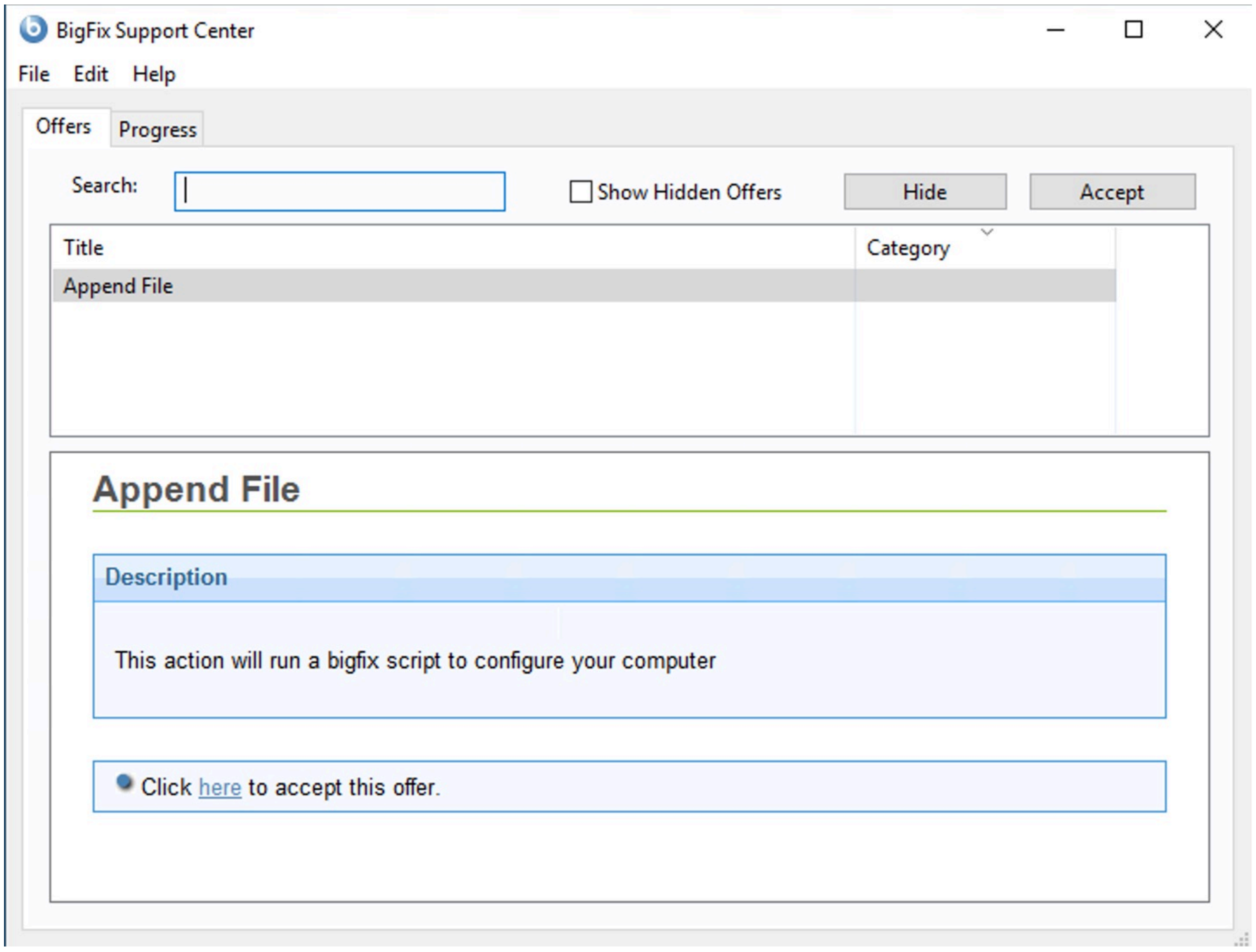
Append File

Description

This action will run a bigfix script to configure your computer

Click here to accept this offer.

The screen capture below represents what an end user will see on the client computer:



Append File

Description

This action will run a bigfix script to configure your computer

Click here to accept this offer.

The main actions that can be performed here by the end user are:

Hide

Hides the client notification panel.

Accept

Performs the action on the client computer.

Note: The main actions can be performed on the **Offers** tab, while the **Progress** tab shows you the status of all prior activities (previously received offers).

Optimizing the servers

BigFix operates efficiently, with minimal impact on network resources. However, there might be installations that stretch the recommended configurations, where there are too many clients for the allotted server power.

The best solution is to choose a server with the required characteristics for your environment; you might be able to modify some preferences to get better performance. Most of these optimizations involve a trade-off between throughput and responsiveness, so proceed with caution. Your HCL Software Support has more information about which modifications might be best for your particular deployment.

Here are some possible optimization techniques:

- Deploy **Relays** to reduce the load on the server. This is the most effective way to increase the performance and responsiveness of BigFix. Generally, the more relays, the better the performance (as a rule of thumb, one relay for 500 to 1000 clients is a good choice, although it can be much higher for a dedicated computer).
- Slow down the **Client heartbeat** from **File > Preferences**. This decreases the frequency of messages that are regularly dispatched by the clients to update their retrieved properties. Reducing this frequency reduces the amount of network traffic generated, but also decreases the timeliness of the retrieved properties. However, regardless of the heartbeat settings, the clients always send their latest information whenever they receive a refresh ping from the server or when they notice that a Fixlet is relevant.
- Slow down the **Fixlet List Refresh** rate from **File > Preferences**. This decreases the update frequency for the information displayed in the console. If there are many clients or consoles simultaneously connected or the database is very large, reducing this frequency can substantially reduce the load on the server. If multiple console operators are going to be simultaneously using the console, set the refresh rate to be something higher than the default (15 seconds) to reduce the load on the BigFix database. Consider changing it to 60-120 seconds or more if there are many console operators. The BigFix Administration Tool on the server allows you to set a global minimum refresh rate.

- Your database administrator might be able to help you with the following optimizations:
  - Change the SQL server Recovery Model for the BFEnterprise database to **Simple transaction logging**.
  - Reduce the percentage of memory allocated to SQL server from 100% to 85%, to ensure that the web server and operating system are not short of memory.

More performance recommendations can be found at the BigFix support site.

Optimizing the consoles

To be responsive, the console requires reasonable CPU power, memory, and cache space.

If you have a console that is taking a long time to load or that is performing sluggishly, there are several techniques you can use to speed it up:

- **Make sure you have sufficient memory**. The BigFix console benefits greatly from capacious memory to speed up the viewing, filtering, and sorting of content (Fixlet messages, tasks, actions, and so on). If your computer does not have enough physical memory, the console will run noticeably slower. You can check memory usage from the Task Manager (Ctrl-Shift-ESC). Select the Performance tab and refer to the Physical Memory section. If the available memory is less than 10% of the total memory, you are running low on RAM and can benefit by adding more.
- **Use high-speed network connections** between your consoles and servers, preferably with LAN connections of at least 100 MBPS. The BigFix Database can be sizeable for a large network, so running the console from a computer with a slow connection often results in very long load times.
- **Use remote control software**. With so much data to load and display, operating the console in a remote office over a slow link can be tedious. In situations like this, you might be able to benefit from solutions such as Citrix, Terminal Services, or other remote control software. Set up the remote control server on a computer with fast access to the server. Allow that machine to present instances of the console and have the branch office run these consoles remotely. The database stays in the main office,

and the remote office has optimal performance. For more information, see the *BigFix Installation Guide*.
- **Delete old actions**. The BigFix database stores information about old actions, which the console loads in at startup and saves out at shutdown. If you do not need to track these old actions, you can delete them, allowing the console to load and close faster. Note that deleted actions continue to exist in the database, but are not loaded into the console or Web Reports and can be undeleted if necessary.
- For more information about how to enhance performance, see Performance Configurations.

Managing Bandwidth

File downloads consume the bulk of the bandwidth in a typical installation. You can control the bandwidth by throttling, which limits the number of bytes per second.

You can specify the bandwidth throttling on either the server, on the client, or on both (in which case the lower of the two values is used). This can be important whenever you have bandwidth issues, as in the following situations:

- A remote office with a thin channel
- Remote dial-in users or users on a slow connection
- A shared channel with higher-priority applications
- A WAN or LAN that is already saturated or has stringent load requirements

Bandwidth throttling settings (and other relay, server, and client settings) can be set using the tasks from the Support site. Select the **BigFix Management** domain and select the **BES Component Management** node in the navigation tree to see the entire task list.

Bandwidth throttling

Many network environments have limited bandwidth between certain geographic locations, between offices and home users using VPNs, and so forth. Deploying large Microsoft® patches (for example: the Windows 7 SP1 update is 537 MB!) can overwhelm limited bandwidth connections and cause bandwidth problems for certain users or applications.

To avoid issues related to bandwidth usage, BigFix uses the following mechanisms:

- Properly implemented and maintained Relay architecture
- Distributing patch deployments over time
- Applying bandwidth throttling configurations between components

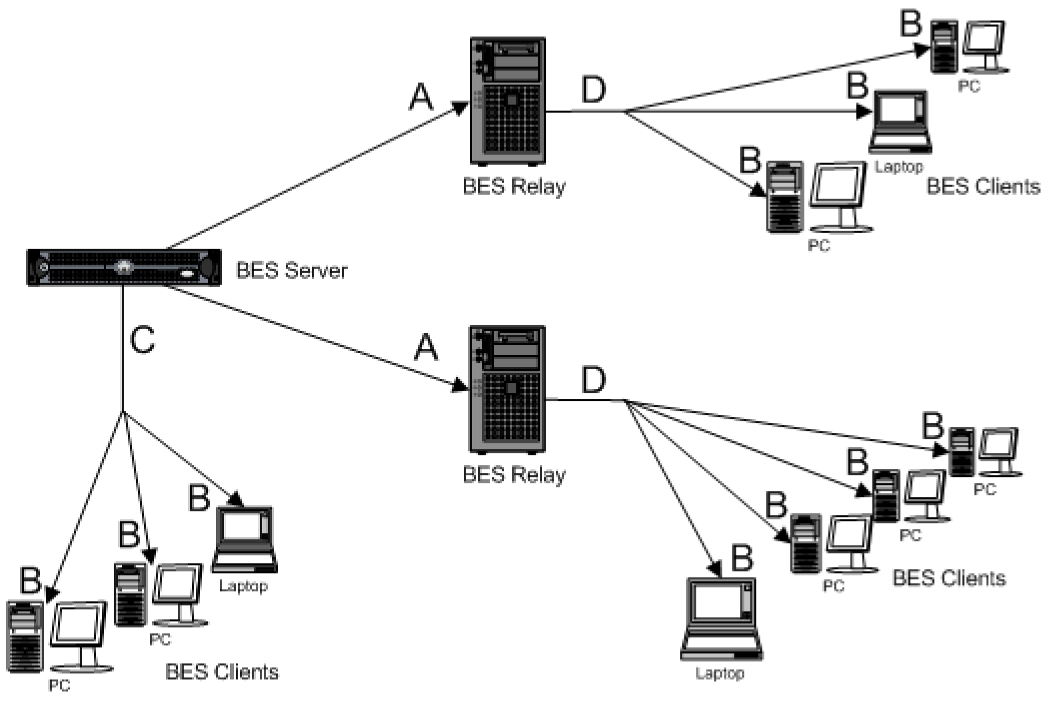
This section explains how to configure the BigFix components to use bandwidth throttling. The BigFix Console operator can control the maximum number of bytes per second that is used to send files over a network connection through client configuration settings and it can be done at the levels of the BigFix Server, Relay, or Client components.

You can configure the bandwidth throttling settings through tasks within the BES Support site. On the console, click **All Content > Fixets and Tasks > Tasks Only > By Site > BES Support** and search for the term throttle. All settings are set as registry key client settings on the endpoint in the client section of the registry, that is, `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\BigFix\EnterpriseClient\Settings\Client` and with a `String [REG_SZ]` type of named value. The value is entered as a numeric; for example, 500 bps is entered as 500.

For details about the related configuration settings, see Bandwidth throttling.

Throttling methods

The following diagram helps you determine the settings you can use to configure bandwidth throttling for a specific segment type.



Throttling through Relays (A)

Relays downloading from the BigFix Server

BigFix Relays can be configured to throttle file downloads when downloading from the BigFix Server. When BigFix Relay throttling is enabled, it downloads from the BigFix Server no more than the specified number of bytes per second. This setting is especially useful for Relays that have a slow connection to the Server (such as a Relay in a remote location).

You can configure client throttling by using the **_BESGather_Download_LimitBytesPerSecond** setting on the Relays. For details on how to configure this setting, see Bandwidth throttling.

Total outgoing download traffic for the BigFix Relay

The BigFix Relay can be configured to throttle the cumulative file downloads anytime. When this throttling setting is enabled, a Relay sends out no more than the specified number of bytes per second for all file downloads (including Clients and child Relays). This setting is especially useful if there is a concern in a local area network that too much bandwidth is used when a patch is sent simultaneously to many clients.

Relay cumulative download throttling can be configured by using the **_BESRelay_HTTPServer_ThrottleKBPS** setting on the Relay. Set this number to the total number of kilobytes that the Relay gives to all of the clients combined per second.

Throttling through BigFix Clients (B)

Clients downloading files from the Server or Relay

BigFix Clients can be configured to throttle file downloads when downloading from the BigFix Server or BigFix Relays. When BigFix Client throttling is enabled, a client downloads from the Server or Relays at no more than the specified number of bytes per second. This setting is especially useful for individual computers that are on slow connections (such as traveling sales representatives or home users on dial-ups).

Client throttling can be configured by using the **_BESClient_Download_LimitBytesPerSecond** setting on the Clients. For details on how to configure this setting, see Bandwidth throttling.

Throttling through the BigFix Server/Relays (C and D)

Total outgoing download traffic for the Server/Relays

The Server can be configured to throttle the cumulative file downloads at any given time. When this throttling setting is enabled, the Server/Relays send out no more than the specified number of bytes per second for all file downloads (including Clients and child Relays). This setting is especially useful if there is a concern in a local area network that too much bandwidth will be used when a patch is sent out to many Clients simultaneously.

BigFix Server cumulative download throttling can be configured by using the **_BESRelay_HTTPServer_ThrottleKBPS** setting on the Server. For details on how to configure this setting, see Bandwidth throttling.

Note: For any changes to the configuration settings to take effect, you must restart the BES Root Server or BES Relay services as appropriate.

Throttling options

BigFix has a great number of settings that control how different components throttle traffic between one another. Throttling is always done for specific components, and some components might not have throttling available.

Throttled Components

These are any files that are downloaded directly from the `wwwrootbes` directory of the Relay, Server, or WebReports. Files downloaded for actions (for example, patches, service packs, and so forth) are downloaded this way. The contents of Fixlet sites are also downloaded this way during the gather interaction (although the site directory listing comes in separately).

Un-throttled Components

There are however, a number of "throttle-like" capabilities around client registration. The amount of downstream UDP traffic generated can be rate limited on the Relay/Server side, the frequency of client registration can be turned down on the client side, and the amount of ICMP traffic generated during relay selection can be rate limited on the client side. Note that client registration is not bandwidth intensive, although it can be a significant source of load. Download request plugin, status reporting plugins, the "Web Reports" plug-in, etc. For the Client, we expect this traffic to be negligible. However, things like the download status report generate a lot of traffic between the Console and the Root Server, and they cannot be throttled. When the Client asks the Relay "please tell me the latest contents of site X" (logged as 'GatherActionMV command received. Version difference, gathering'), the interaction is not throttled. The response of the Relay is typically small (anywhere from 0-~40k). If absolutely necessary, you can turn down the gather intervals on Clients to get this information less frequently, but this traffic should usually be negligible.

There are also things you can do to control the amount of traffic going upstream through the "PostResults" interface. The most basic "throttling" mechanism is simply to turn up the minimum report interval on the Client or lengthen the heartbeat interval. You can also put a crude limit on the amount of traffic a Relay can send up through a combination of the "ResultSizeLimit" and "ResultTimeLimit" Relay settings. However, you should check with Customer Support before doing so: it's unlikely that you'll get the behavior you expect.

Posting results takes more bandwidth than client registration, but is still much smaller than the amount of bandwidth used by the download and upload components. For most deployments, the amount of traffic should be negligible.

Throttling Minimum Transfer Rates

During throttled communication, the BigFix Client will send chunks of data and then wait longer than necessary before sending the next chunk. The BigFix Client can vary the amount of data in each chunk along with the amount of time to wait. By lowering the amount of data per chunk and maximizing the amount of data between chunks, a minimum transfer rate will be established for throttling.

The BigFix Relay component actually does the throttling work so if you need to upgrade BigFix to change the minimum throttling rate, it is important to upgrade the BigFix Relays along with the BigFix Clients to the newer version.

The effective minimum throttling rate is 100 Bytes/Sec.

All throttling settings are given in either BPS (Bytes per Second) or KBPS (KBPS). Given the effective minimum values listed above, if you set the throttling rate below the effective minimum it doesn't go that low, it only goes to the effective minimum value. Also notice that the effective minimum is less than 1 KBPS but the minimum value you can set KBPS throttling setting to is only 1 so you can't reach the effective minimum. IE., in some cases the effective minimum rate is controlled by the setting and in other cases the effective minimum is controlled by the client's throttling limits.

The settings used to specify the chunk size are:

_BESClient_UploadManager_ChunkSize

The value is specified in bytes (Default: 131072, that corresponds to 128 KB).

"0" means that the upload is done in a single chunk.

In a conflict between this computer and the upstream computer, the size of the chunk is set to the smaller of the two.

_BESRelay_UploadManager_ChunkSize

The value is specified in bytes (Default: 131072, that corresponds to 128 KB).

"0" means that the upload is done in a single chunk.

In a conflict between this computer and the upstream computer, the size of the chunk is set to the smaller of the two.

Upload Throttling

The uploads generated by the "Upload Manager" can be throttled from the Client side or from the Relay/Server side. This component only supports static throttling. There is a "PostFile" setting that sets an overall throttle on incoming connections, and an "UploadManager" setting that sets the throttle on outgoing connections (there is only one outgoing connection at a time). When both are set, the child is responsible for using the lesser of the two values.

_BESRelay_PostFile_ThrottleKBPS

"0" means "no limit" (Default: 0)

This setting is not sufficient to throttle PostFile, indeed it needs _BESClient_UploadManager_ThrottleKBPS to be set on Client with a non-0 value to work. The limit will be the lesser of the two values.

At the start of an upload interaction, the PostFilePlugIn divides this number by the total number of uploads currently in progress on the Relay and sends the result down to the child, who is responsible for respecting the resulting limit.

Same setting on both Server and Relay

_BESRelay_UploadManager_ThrottleKBPS

Default: 0

Only relevant on Relay (Server has no one to upload *to*, although DSA may change that at some point)

When Relay uploads files to its parent, it will limit itself to this rate. It provides the limitation by breaking the interaction into chunks and doing a connection for each chunk, with waits in between (this in contrast to download throttling, which maintains a single connection over the length of the interaction).

"0" means "no limit"

_BESClient_UploadManager_ThrottleKBPS

Default: 0

Only relevant on Client

When Client uploads files to its parent, it will limit itself to this rate. It provides the limitation by breaking the interaction into chunks and doing a connection for each chunk, with waits in between (this in contrast to download throttling, which maintains a single connection over the length of the interaction).

"0" means "no limit"

These are files uploaded from the endpoints through the "Upload Manager".

Two major axes of download throttling settings

"Server Side" or "Client side"

Server-side throttling (Server/Relay/Web Reports) is expressed as an amount of bandwidth to be shared among all connecting children

Client-side throttling (Client/Relay) is expressed as an amount of bandwidth to be used on a single upstream connection. Note that Clients may use more bandwidth if they have multiple simultaneous upstream connections.

Static or Dynamic

When Server-side and Client-side throttling is in effect, BigFix components use the lower of the calculated bandwidth limits. When Dynamic and Static throttling are both in effect, the Dynamic throttling settings are used in place of the Static throttling settings.

Server-side static throttling is the only type of throttling that can affect non-BigFix components (such as Web Browsers).

Static throttling

Server-side and Client-side static throttling settings are described.

Server Side

Server-side static throttling settings control the total amount of download traffic that a server will send out to Clients using static throttling. The amount of bandwidth allocated to any given write connection is simply the "ThrottleKBPS" setting divided by the number of active write connections. Note that plug-in connections do not count as "write" connections. However, file downloads with static or dynamic throttling enabled do count as "write" connections. If you have:

- ThrottleKBPS = 500
- One Client connecting without dynamic throttling
- One Client connecting with dynamic throttling

...then the Client without dynamic throttling will get 250 KBPS of bandwidth allocated. The bandwidth usage of the Client with dynamic throttling will be determined by the dynamic throttling algorithm -- it may turn out to be much less or greater than 250 KBPS, so that the total bandwidth usage of the server will not necessarily be 500 KBPS.

Note: Server-side settings are in KBPS. For Relay and Root Server:

- _BESRelay_HTTPServer_ThrottleKBPS
    - Default: 0
    - "0" means "no limit"
- For Web Reports:
    - _WebReports_HTTPServer_ThrottleKBPS
    - Default: 0
    - "0" means "no limit"

Client Side

Client-side static throttling is the simplest of these settings. A "Client" (could be a Client or a Relay) simply tells its parent "please send me files at this speed" and the parent obliges. Settings are in BPS. For a BES Client:

- _BESClient_Download_LimitBytesPerSecond
    - Default: 0
    - "0" means "no limit"

For a BES Relay downloading files from its parent:

- _BESGather_Download_LimitBytesPerSecond
    - Default: 0
    - "0" means "no limit"

Throttle Groups

"Throttle Groups" are a part of the static throttling functionality that allow a set of Clients reporting to the same Parent Relay to throttle themselves as a group instead of individually (or along with every other connection through Server-side throttling).

"Throttle Groups" across Clients that report to different Parent Relays is not supported.

When a Client identifies itself as part of a "throttle group", it sends up the name of the group it belongs to, along with the speed it would like the entire group to have. So for example a Client might say "I am in the 'remote' group, and we would like to be given 10000 BPS as a whole". When the Server sends data down to that Client, it throttles based on the total number of connections in the Clients group. So if there are five active connection from the 'remote' group, our Client will get 2000 BPS. Note that different Clients can send up different values for the "limit bytes per second", so another Client could say "I am in the 'remote' group, and we would like to be given 5000 BPS as a whole", and it would be given 1000 BPS at the same time our first Client was given 2000 BPS. The special group "ipaddress" will cause the Server to group this connection along with other connections from the same IP address. This is the default for Relay upstream traffic. Clients default to the group "", so that their "LimitBytesPerSecond" setting is shared among all of their currently active file downloads.

- _BESGather_Download_ThrottleGroup (valid on Windows Server only)
    - Default: "ipaddress"
    - The parent will consider this Relay to be part of whichever group is specified here
- _BESClient_Download_ThrottleGroup

- Default: computer id as string
- The parent will consider this Client to be part of whichever group is specified here
- This is a string value: older versions of ClientSettings documentation incorrectly claimed this was a numeric value.

Dynamic throttling is unaffected by throttle groups (an interesting side effect of this is that a Client set to target 20% of available bandwidth may end up using 40% if it's downloading two files simultaneously).

Dynamic throttling

Important: A dynamic bandwidth throttling implementation is not recommended. It is highly recommended that you configure static bandwidth throttling. For more details, see Static throttling (on page 386). If you would still like to use dynamic bandwidth throttling in your deployment, as these bandwidth calculations are not reliable or predictable (this is especially true in low bandwidth network environments), contact our HCL Support team for implementing and testing dynamic bandwidth throttling within your deployment and network.

When a large download becomes available, each link in your deployment might have unique bandwidth issues.

There are server-to-client, server-to-relay, and relay-to-client links to consider, and each might require individual adjustment. As explained elsewhere, it is possible to simply set a maximum value (throttle) for the data rates, and for this there are broad-based policies you can follow. You might, for example, throttle a BigFix Client to 2Kb/s if it is more than three hops from a Relay. However, the optimal data rates can vary significantly, depending on the current hierarchy and the network environment.

A better technique is to use dynamic bandwidth throttling, which monitors and analyzes overall network capacity. Whereas normal throttling simply specifies a maximum data rate, dynamic throttling adds a "busy time" percentage. This is the fraction of the bandwidth that you want to allocate when the network is busy. For example, you could specify that downloads do not use any more than 10% of the available bandwidth whenever the program detects existing network traffic. Dynamic throttling also provides for a minimum data rate, in the case the busy percentage is too low to be practical.

When you enable dynamic throttling for any given link, the program monitors and analyzes the existing data throughput to establish an appropriate data rate. If there is no competing traffic, the throughput is set to the maximum rate. In the case of existing traffic, the program throttles the data rate to the specified percentage or the minimum rate, whichever is higher. You must enable dynamic throttling on both the server and the client side to have it work correctly.

You control dynamic bandwidth throttling with computer settings. There are four basic settings for each link:

DynamicThrottleEnabled

> This setting defaults to zero (disabled). Any other value enables dynamic throttling for the given link.

DynamicThrottleMax

> This setting usually defaults to the maximum unsigned integer value, which indicates full throttle. Depending on the link, this value sets the maximum data rate in bits or kilobits per second.

DynamicThrottleMin

> This setting defaults to zero. Depending on the link, this value sets the minimum data rate in bits or kilobits per second. This value places a lower limit on the percentage rate given below.

DynamicThrottlePercentage

> This setting defaults to 100%, which has the same effect as normal (non-dynamic) throttling.. It represents the fraction of the maximum bandwidth you want to use when the network is busy. It typically has a value between five and ten percent, to prevent it from dominating existing network traffic. (A zero for this setting is the same as 100%.).

As with any other setting, you can create or edit the dynamic bandwidth settings by right-clicking an item (or group of items) in any computer list and choosing **Edit Computer Settings** from the context menu.

The specific variable names include:

The BigFix server and relay settings:

```
_BESRelay_HTTPServer_DynamicThrottleEnabled
_BESRelay_HTTPServer_DynamicThrottleMaxKBPS
_BESRelay_HTTPServer_DynamicThrottleMinKBPS
_BESRelay_HTTPServer_DynamicThrottlePercentage
```

The BigFix Client settings:

```
_BESClient_Download_DynamicThrottleEnabled
_BESClient_Download_DynamicThrottleMaxBytesPerSecond
_BESClient_Download_DynamicThrottleMinBytesPerSecond
_BESClient_Download_DynamicThrottlePercentage
```

The Gathering settings:

```
_BESGather_Download_DynamicThrottleEnabled
_BESGather_Download_DynamicThrottleMaxBytesPerSecond
_BESGather_Download_DynamicThrottleMinBytesPerSecond
_BESGather_Download_DynamicThrottlePercentage
```

Note: For any of these settings to take effect, you must restart the affected services (Server, Relay, or Client).

If you set a Server and its connected Client to differing maximums or minimums, the connection chooses the smaller value of the two.

Managing Downloads

BigFix uses several methods to ensure that downloads are efficient and make the best use of available bandwidth. Among other techniques, caching is used extensively by all the BigFix elements, including servers, relays, and clients.

When an action on a client runs a download file command, the existence of the file is checked first in the client local cache. If the client cannot find it locally, it requests the file from its parent, typically a relay. In turn, the relay checks its own cache. If it finds the file, it immediately sends it down to the requesting client. Otherwise, it passes the request up to its parent, which might be another relay and the process continues. Ultimately, a server retrieves the file from an internal server or the Internet, caches it, and then passes it back down the chain. After receiving the file, each relay in the chain caches it, and continues to forward it down to the original client, which also caches it.

If the agent runs the download now command while performing the action, the file is requested and collected from the URL specified in the action script.

Each cache retains the file until it runs out of space. At that point, the cache is purged of the least-recently used (LRU) files to provide more space. You can view the relay cache size and other relay information by activating the **Analysis ID# 227 BES Relay Cache Information** available from the BES Support Site. The default cache size is 1 GB, but you can change it by using the **Task ID# 148 BES Relay/Server Setting: Download Cache Size**, also from the BES Support site.

There might be situations that require files to be manually downloaded and cached, typically because such files are not publicly available, in which case you must download the files directly from the source. Review the **Fixlet Description** tab for more information about specific manual cache requirements. You can pre-populate the download cache by copying files to the download cache location `__Download`. You can also delete these files manually.

The caches are stored as sub-folders of the program folder, which is created by default at `%PROGRAM FILES%\BigFix Enterprise` on Windows systems, and `/var/opt/BES Server` on Linux systems. The server download cache is `BES Server\wwwrootbes\bfmirror\downloads\sha1`, and the client download cache is found at `BES Client\__BESData\__Global\__Cache\Downloads`.

As well as the download cache, relays maintain an action cache (also 1 GB) holding all the files needed for each Action, and clients maintain a Utility cache.

For information about troubleshooting relays, including bandwidth and downloading, see Relay Health.

The client collects the file by requesting it from the url listed in the action script in one of the following ways:

- When the complete set of downloads can be computed by parsing the action script, the complete set of downloads is computed by the server. The agent can ask the relay with a single request if the prefetch downloads are available for a specific action. In this request, the agent sends up the action ID, and the server response indicates all the files are available, or they are not. If these are all available, the agent starts requesting the files by their ordinal number (1 indicates the first file in the script, 2 indicates the second file in the script, etc.). If the files are not available, the relay informs the agent they are not and begins the process of fetching them, and the agent notifies that it is waiting for downloads to be available and put itself into a pending downloads state for that action for 10 minutes, at which time it asks the relay again, if the downloads are available for the specific action.

  When the downloads for an action become available on a relay, a notification is sent to the children of the relay, which uses the notification to accelerate requesting the downloads again. If notification messages are blocked for any reason, the agents 10 minute 'ask the relay again' behavior will eventually result in the agent detecting that the downloads are available, and begin to collect them. Child relays are also notified by their parent when the downloads based on the action ID and the ordinal numbers become available. They use this notification to accelerate their own request for the downloads again.
- For downloads where any of the download url, size, and hash value are listed in the action script such that only the agents can compute them, the agents query their parent relay using an itemized downloads available request. The request contains a list of download items the particular agent needs. The relay and client behave the same way as described above, delaying subsequent requests, waiting for notifications

Resuming a download

If the download fails for connection problems, the download process is resumed as follow:

- If the client is downloading from a BigFix Relay or Server, the download can be restarted at 10,000 byte chunks. This means that, when the client process is restarted, it verifies the 10,000 byte blocks already received, and then it resumes the download after the last verified block.
- If the client is running a direct download from another server's URL, when the client process restarts, the download starts again from the beginning.

Downloading directly from the Internet site

In addition to the existing client settings for Download Direct, starting from Patch 1, you can configure your clients to download specific resources directly from the site where they are located, to mitigate the network impact and bandwidth requirements for relays serving VPN-based clients.

You can specify that all resource requests to a specific set of domains must be downloaded directly from the Internet and not from the relay. Use the client setting named **_BESClient_Download_Direct_Domainlist** to specify the list of domains for which the direct download is desired.

Note: If the PeerNest is enabled, the behavior remains unchanged. The resource is still requested from the peer URL.

Note: This setting should be used as an alternative to using **_BESClient_Download_Direct**. The **_BESClient_Download_Direct** setting, in fact, will force all resources to be downloaded directly from the Internet, regardless of the domain specified.

If the direct download from the Internet fails, you can specify that the clients attempt to download the file from the BigFix Relay or Server. Use the client setting named **_BESClient_Download_DirectRecovery** to enable this behavior.

Note: The setting has effect only if the client settings **_BESClient_Download_Direct** or **_BESClient_Download_Direct_Domainlist** are enabled.

For more details about these settings, see Download.

Enable Direct Download based on network

Starting from Patch 7, a new feature enables you to allow the Direct Download only for BigFix Clients connected to a specific subnet.

You can specify the list of subnets that allow the Direct Download with the new setting **_BESClient_Download_Direct_SubnetList**. The setting accepts only subnets specified in CIDR notation format, for example: `192.1.77.0/25;192.1.0.0/16`.

In case of computers with multiple network interfaces, the subnet considered when checking the allowed list is the subnet of the IP Address connected to the BigFix Relay.

In case of direct downloads in progress, if the Client reregisters using a new IP address that does not belong to any of the subnets in the list, then the Client interrupts the ongoing download.

When the Client interrupts the direct download in progress, the following error is logged:

```
The direct download (Action <action_id>) was canceled after Relay Select:
the address connected to the relay is changed.
```

Note: The **_BESClient_Download_Direct_SubnetList** setting provides added value to all situations in which a Direct Download is expected, for instance when the **_BESClient_Download_Direct** setting is enabled or the URL belongs to the **_BESClient_Download_Direct_Domainlist** setting.

For more details about this setting, see Download.

Restart download after Relay switch

Starting from Patch 7, a new feature allows you to interrupt the download in progress on a Relay switch. By default, if a BigFix Client moves to a new relay while a download operation is in progress (from the former relay), the file download continues from the former relay, if that is still reachable by the Client.

Only if the former relay is no longer reachable, the download fails, and a new download is attempted from the new Relay.

Enabling the new setting named **_BESClient_Download_ResetOnRelaySwitch** allows you to stop the download from the former relay, even if it is still reachable and, then, restart the download from the new Relay.

In the BigFix Client log file, after the relay switch, when the Client interrupts the download in progress from the former Relay, the following error is logged:

```
The download from Relay (Action <action_id>) was canceled after Relay
 Select:
the relay is changed.
```

For more details about this setting, see Download.

Automatic URL redirection from HTTP to HTTPS

In addition to the existing configuration settings for Download, starting from Patch 8, the URL redirection from HTTP to HTTPS will be handled both on the Bigfix server/relay and on the BigFix client (direct download).

To support the download from an HTTPS URL, it will be necessary to provide appropriate trusted certificates to verify the remote server identity.

In case of a download from an HTTPS URL, the certificate of the remote server will be validated using the CA bundle distributed through the BES Support site. The CA bundle is the file that contains root and intermediate certificates of trusted authorities.

Before this new feature, the CA bundle was pre-installed on the BigFix server and already used for gathering purposes. With this new feature, the CA bundle will be distributed and kept up-to-date through the BES Support site for download purposes.

For more details about these settings, see Download.

For more details about customizing HTTPS for downloads, see Customizing HTTPS for downloads (on page 400).

Relay Drive Space Protection From Downloads

Starting from Patch 10, an optimization for the BigFix Relay was introduced.

To prevent the BigFix Relay ActiveDownloads folder from filling up, a new setting named `_BESRelay_Download_ActiveDownloadsMaxSize` was created which represents the maximum size of the folder contents. For more information about this setting, see Download.

The ActiveDownloads folder is used by the BigFix Relay to store the contents it is downloading, before caching them for the other BigFix Clients.

Introducing this cap means that the BigFix Relay does not allow to download files that exceed the limit you set. Before start downloading a file, the BigFix Relay checks the ActiveDownloads free space, and, depending on the setting value, allows the download only if the file size does not exceed the remaining space.

Enabling data pre-cache

You can specify for each Client if the data to download to run an action must be pre-cached on the Client or not and how.

You can decide whether the data requested to run an action on a Client can start to be downloaded:

After all constrains are satisfied.

If you do so, after all constraints are satisfied, the action needs to wait for the entire data to be downloaded, in the *pre-fetch* area, before starting to run. In this case the data download is a constraint itself. When the data download to the pre-fetch area completes, the action satisfies all the constraints so the data is moved in the *__Download* area and the action can start running. The risk is that the download might take longer than expected and, in the worst case, the time window during which the action can run could elapse before the data download completes, preventing the action from running.

Before all constrains are satisfied.

In this case the data download starts as soon as the action becomes relevant for the Client and before all constraints, such as *start time*, are evaluated.

The data is downloaded on the Client disk in the *pre-cache* area. When all the constraints are met, the downloaded data is moved from the pre-cache area to the *pre-fetch* area. When the action is ready to start, the data is moved in the *__Download* area and the action starts running.

By doing so you allow the action to start earlier and, in case of an offer displayed to the user, you shorten the time that a user must wait for the offer to be downloaded after acceptance.

The potential risks in this case consist of the possibility of an action deadlock due to a lack of disk space, and, if running a group action, the possibility that the group will never starts because the disk space configuration does not allow the simultaneous existence of all downloads of the group in the Client system.
Starting from BigFix V9.5.10, you can prevent the risk to affect the group action processing by using the client setting **_BESClient_Download_PreCacheStageContinueWhenDiskLimited**. If you set **_BESClient_Download_PreCacheStageContinueWhenDiskLimited=1**, on that Client a group action can start, assuming that all other constraints are met, as long as the first sub action requiring downloads can collect all downloads for that sub action, and the action processing can continue even when the pre-cached downloads for all sub action cannot be available on the system at the same time due to disk space requirements (**DiskLimited** or **DiskFreeLimited** constraints).

Note: This setting does not affect single action processing, In other words, a single action or sub-action can still be constrained and blocked from running by insufficient disk space to hold downloads required for that specific action.

By default, on a BigFix Client **_BESClient_Download_PreCacheStageContinueWhenDiskLimited=0**, which means that a group action can start only after all the sub action downloads are available at the same time on the system.

Dynamic download White-lists

Dynamic downloading extends the flexibility of action scripts, adding the ability to use relevance clauses to specify URLs.

As with static downloads, dynamic downloads must specify files with the confirmation of a size or sha1. However, the URL, size, and sha1 are allowed to come from a source outside of the action script. This outside source might be a manifest containing a changing list of new downloads. This technique makes it easy to access files that change quickly or on a schedule, such as antivirus or security monitors.

This flexibility entails extra scrutiny. Because any client can use dynamic downloading to request a file, it creates an opportunity for people to use your server to host files indiscriminately. To prevent this, dynamic downloading uses a white-list. Any request to download from a URL (that is not explicitly authorized by use of a literal URL in the action script) must meet one of the criteria specified in a white-list of URLs that is contained in the following file:

On Windows systems:

`<Server Install Path>\Mirror Server\Config\DownloadWhitelist.txt`

On Linux systems:

`<Server Install Path>/Mirror Server/config/DownloadWhitelist.txt`

This file contains a newline-separated list of regular expressions using a Perl regex format, such as the following:

```
http://.*\.site-a\.com/.*
http://software\.site-b\.com/.*
http://download\.site-c\.com/patches/JustThisOneFile\.qfx
```

The first line is the least restrictive, allowing any file at the entire site-a domain to be downloaded. The second line requires a specific domain host and the third is the most restrictive, limiting the URL to a single file named "JustThisOneFile.qfx". If a requested URL fails to match an entry in the white-list, the download immediately fails with status

NotAvailable. A note is made in the relay log containing the URL that failed to pass. An empty or non-existent white-list causes all dynamic downloads to fail. A white-list entry of "*" (dot star) allows any URL to be downloaded.

Customizing HTTPS for downloads

This page describes the usage of CA bundles in HTTPS downloads and how to customize them.

On this topic, the word “downloads” refers exclusively to the effect triggered by the action commands prefetch and download. Such commands might also be invoked by BigFix applications (such as BigFix Inventory) to download catalogs or other required data.

Site gathering and/or communication between BigFix components (for example, server – client communication) are not affected by this topic.

For more details about customizing HTTPS for gathering, refer to Customizing HTTPS for Gathering (on page 87).

Overview

The main purposes of HTTPS protocol are authentication of the accessed website and protection of the privacy, as well as integrity of the exchanged data. This is obtained through the verification of the remote server certificate, using a trusted third party (Certification Authority), and the channel encryption. The check is performed during the handshake, and, if it fails, the connection is dropped. It protects the communication against malicious attacks.

Starting from Patch 8, to support the download from an HTTPS URL, it is necessary to provide appropriate trusted certificates to verify the remote server identity.

Public CA, Private CA and self-signed certificates

Majority of BigFix Content works without additional changes in Platform configuration. Customization is needed only in specific cases, depending on the type of certificate used:

- Certificates signed by external / public CA: no action needed.
- Certificates signed by internal / private CA: needs the certificate to be added. See Custom certificates *(on page 402)*.
- Self-signed certificates: needs the certificate to be added. See Custom certificates *(on page 402)*.

Certificates shipped with BigFix

The curl website offers a prebuilt package that contains the same certificates that are included with Mozilla.

This package is copied in a certificate bundle named `ca-bundle.crt` and distributed in the BES Support site. The certificate bundle is searched in different locations, depending on the BigFix version:

- In Patch 8, both the server/relay and the client load the CA bundle from the BES Support site directory under the BigFix client installation path.

  Note: If the BigFix server/relay is running without administration privileges, for example a Domain user on Windows AD, it will not be able to read the folder located under the client path: in that case, a custom CA bundle must be specified. See the section below named Custom certificates.

- Starting from Patch 9, for the BigFix server/relay, the bundle is loaded from the last gathered BES Support folder under the BigFix server/relay directory. This folder is always accessible, regardless of the privileges accorded to the process. For example, on a UNIX platform the bundle path could be:

  ```
  /
  var/opt/BESServer/wwwrootbes/bfmirror/bfsites/enterprisemirror_<SiteID
  >_<SiteVersion>
  ```

  In case the ca-bundle.crt file is not present or cannot be read, the server/relay will fall back on the default client path, as for Patch 8. For what concerns the BigFix client, the bundle location is the same as Patch 8.

Notice that BigFix does not perform any active monitoring on certificates validity and/or their expiration dates. No warning is provided prior to certificate expiration. Using expired or invalid certificates will result in download failure.

Enabling HTTPS downloads from untrusted sites

Starting from Patch 8, the following settings can be used to allow or disallow the download from untrusted sites:

- **_BESRelay_Download_UntrustedSites** (server/relay). It is a boolean setting. When it is set to 0 (default value), the downloads from untrusted sites are not allowed. When it is set to 1, the downloads from untrusted sites are allowed.
- **_BESClient_Download_UntrustedSites** (client). As described above, but the setting works for the client.

Custom certificates

Starting from Patch 8, custom CA bundles (included self-signed certificates) can be set for the components: server, relay and client. The setting changes according to the patch version.

In Patch 8, the following parameters can be set:

- **_BESRelay_Download_CACertPath** (server/relay). It is a string setting where you can declare the full path of a custom CA bundle. It overrides the default one.
- **_BESClient_Download_CACertPath** (client). As described above, but the setting works for the client.

Note: These parameters are still recognized in Patch 9 and above, but they are considered as deprecated and should not be used. This is done for retro-compatibility purpose. Their behavior is slightly different, though: unlike Patch 8, the custom bundle will be appended to the other certificates, and will not override them. Versions from 10.0.9 and later are also provided with a specific parameter to ignore the default certificates (see below).

Default directory for custom certificates

In Patch 9, a predefined folder is introduced for all the BigFix components (server, relay and client), `<StorageFolder>/TrustedDownloadCerts`, that can be used to store custom certificates and/or bundles. All the `.crt` and `.pem` files contained in this folder are added to the default certificates when an HTTPS download is performed. For example, on a default Linux/UNIX installation, the folder full path for the client custom CA bundle is: `/var/opt/BESClient/TrustedDownloadCerts`, while the full path for the relay custom CA bundle is `/var/opt/BESRelay/TrustedDownloadCerts`.

Only files with extensions `.pem` and `.crt` are loaded, and they can contain both certificates bundles or single certificates. No check is performed on such files: if a file contains invalid data, it might cause a download failure.

The following is a sample task that creates a .`crt` file inside the `<StorageFolder>/TrustedDownloadCerts`. This sample can also be used as a template for understanding how to retrieve the <`StorageFolder>/TrustedDownloadCerts` directory for server, relays and clients.

```
<?xml version="1.0" encoding="UTF-8"?>
 <BES xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:noNamespaceSchemaLocation="BES.xsd">
  <Task>
   <Title>Add Download Certificate</Title>
   <Description><![CDATA[Sample Task for creating and downloading a custom
 certificate.]]></Description>
   <Relevance>if exists property "in proxy agent context" then ( not in
 proxy agent context ) else true</Relevance>
   <Category></Category>
   <Source>Internal</Source>
   <SourceID></SourceID>
   <SourceReleaseDate>2023-02-14</SourceReleaseDate>
   <SourceSeverity></SourceSeverity>
   <CVENames></CVENames>
   <SANSID></SANSID>
```

```
    <MIMEField>
     <Name>x-fixlet-modification-time</Name>
     <Value>Tue, 14 Feb 2023 15:04:24 +0000</Value>
    </MIMEField>
    <Domain>BESC</Domain>
    <DefaultAction ID="Action1">
     <Description>
      <PreLink>Click </PreLink>
      <Link>here</Link>
      <PostLink> to deploy this action.</PostLink>
     </Description>
     <ActionScript MIMEType="application/x-Fixlet-Windows-Shell"><![CDATA[
// This is a sample Task for reading the TrustedDownloadCerts folder and
copying a certificate
// This Task will add a certificate in the bundle.
// The certificate will be added in the Server folder if the Server is
installed, on the Relay folder if the relay is installed, in the Client
folder otherwise

if {exists main gather service}
    if {windows of operating system}
     parameter "storageDir" = "{value "StoragePath" of key
"HKEY_LOCAL_MACHINE\SOFTWARE\BigFix\Enterprise Server\GlobalOptions" of
registry as string}"
 else
     parameter "storageDir" = "{key ("StoragePath") of section
("Software\BigFix\Enterprise Server\GlobalOptions") of file
"/var/opt/BESServer/besserver.config"}"
 endif
elseif {exists relay service}
    if {windows of operating system}
```

```
     parameter "storageDir" = "{value "StoragePath" of key
"HKEY_LOCAL_MACHINE\SOFTWARE\BigFix\Enterprise Server\GlobalOptions" of
registry as string}"
 else
     parameter "storageDir" = "{key ("StoragePath") of section
("Software\BigFix\Enterprise Server\GlobalOptions") of file
"/var/opt/BESRelay/besrelay.config"}"
 endif
else
    parameter "storageDir" = "{storage folder of client}"
endif

delete __appendfile

appendfile -----BEGIN CERTIFICATE-----
appendfile
MIIDhTCCAm2gAwIBAgIEFtnq9zANBgkqhkiG9w0BAQsFADBbMScwJQYDVQQDDB5SZWdlcnkgU2
V
appendfile
Zi1TaWduZWQgQ2VydGlmaWNhdGUxIzAhBgNVBAoMGlJlZ2VyeSwgaHR0cHM6Ly9yZWdlcnkuY2
9
appendfile
MQswCQYDVQQGEwJVQTAgFw0yMzAyMjcwMDAwMDBaGA8yMTIzMDIyNzEwMDYyMFowRzETMBEGA1
U
appendfile
AwwKbXlzaXRlLmNvbTEjMCEGA1UECgwaUmVnZXJ5LCBodHRwczovL3JlZ2VyeS5jb20xCzAJBg
N
appendfile
BAYTAlVBMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAh8F7GgL4IQrc8E4AHJBmdY
u
```

```
 appendfile
 X7DEJ0X5XnXeD+tj5XVe7AE3lsoFqLkrNo/mWzZrp9y6ZHoew9AaLrJgUmFdU5c/1aUhWlVtB
U+
 appendfile
 tOBqnZNRKEy+AsObZ2lYryNTVwAbTieTLVPM4pDNr6dwZen1tWfVIKg/2NiApTjwCdamalljP2
J
 appendfile
 V
+NxLsjFhGg8q8lD0JJiqoNUm1bi22JrqWJ8Z9cXXmuiNHzUxzVW7XaxzXyWXE4WNWZMIO/gUl5
 appendfile
 mP9VjXvyXymzMoeDxjMg9cyyrni5ZJsv8Uqkq6ni/Tml6QOYahjNOYmHF8j9v+vTLI/YwfFF4l
U
 appendfile
 QXcOXsHxWyepkwIDAQABo2MwYTAPBgNVHRMBAf8EBTADAQH/MA4GA1UdDwEB/wQEAwIBhjAdBg
N
 appendfile
 HQ4EFgQUeokEssftpr4W/DjX8EDSYkr9V3AwHwYDVR0jBBgwFoAUeokEssftpr4W/DjX8EDSYk
r
 appendfile
 V3AwDQYJKoZIhvcNAQELBQADggEBAE64aGOnSfA0ePiu6CguxH5GKojTM6N7z2ouzPJGymrVPd
M
 appendfile
 jNfb81Xm+VJ0Eervw8uz/D3NYVCJy4/Q
+gvAyYGHFmRxmIue/4RjsOK482WkeICGTsZWggoz3wX
 appendfile
 12ZX13noMCULcU1lI83eNBn3LFvA/bYH7cwSBGxmLidg1jkbATktZMQYJXIQ6cNtst4NgfMZPz
j
 appendfile
 w6b9+1tf6ohk+zjYNWPf3N58mziQ3JayWaZFqCHkPVvJYITUPySf4vkhcBNvkWF2W+w4SujpqA
E
 appendfile
 xAdZcMwfwCgUGpyAPeNfPxmQcEwVpDyhK+jfMWLB74swoq/1/k2EwKd4rq/PcOoC394=
 appendfile -----END CERTIFICATE-----

 move "__appendfile" "{parameter "storageDir" &
 "/TrustedDownloadCerts/testCert.crt"}
 ]]></ActionScript>
   </DefaultAction>
  </Task>
 </BES>
```

Additional certificates

Starting from Patch 9, in addition to `<StorageFolder>/TrustedDownloadCerts`, a custom directory can be specified using the following parameter:

- **_BESRelay_Download_CaCertDirectory** (server/relay). It is a string setting where you can declare the full path of a folder where the user stores its custom CA bundles. All the `.crt` and `.pem` files contained in this folder are added to the default certificates.
- **_BESClient_Download_CaCertDirectory** (client). As described above, but the setting works for the client.

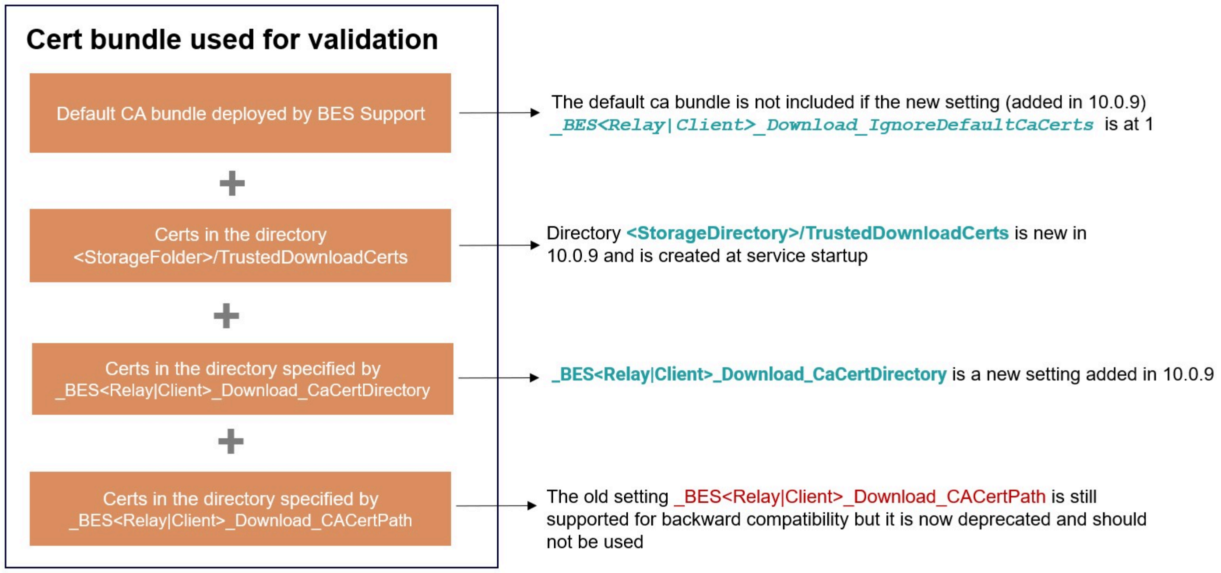
Disabling default certificates

Also, starting from Patch 9, a specific parameter can be set in order to ignore the default certificates and exclusively use the custom ones:

- **_BESRelay_Download_IgnoreDefaultCaCerts** (server/relay). It is a boolean setting with two possible values: 0 and 1. When set to 1, it tells the component to ignore the default `ca-bundle.crt` certificate bundle located under BES Support. The default value is 0.
- **_BESClient_Download_IgnoreDefaultCaCerts** (client). As described above, but the setting works for the client.

Summary

The following figure shows a summary of the locations used starting from Patch 9 to build the list of certificates. All contributions are appended to the certificate list, unless expressly ignored or empty.


Cert bundle used for validation
Default CA bundle deployed by BES Support
+
Certs in the directory <StorageFolder>/TrustedDownloadCerts
+
Certs in the directory specified by _BES<Relay|Client>_Download_CaCertDirectory
+
Certs in the directory specified by _BES<Relay|Client>_Download_CACertPath
The default ca bundle is not included if the new setting (added in 10.0.9) _BES<Relay|Client>_Download_IgnoreDefaultCaCerts is at 1
Directory <StorageDirectory>/TrustedDownloadCerts is new in 10.0.9 and is created at service startup
_BES<Relay|Client>_Download_CaCertDirectory is a new setting added in 10.0.9
The old setting _BES<Relay|Client>_Download_CACertPath is still supported for backward compatibility but it is now deprecated and should not be used

For more details about download settings, see Download.

Troubleshooting hints

On Linux/UNIX platforms, the curl utility can be used to verify that a custom certificate bundle is valid and working for a specific download through HTTPS.

For example, on a Linux/UNIX server installation, the default certificate bundle can be tested with the following command, provided that the download URL is `https://download.server.url/file-to-download`:

```
curl --cacert
/
var/opt/BESServer/wwwrootbes/bfmirror/bfsites/enterprisemirror_<SiteID>_<Si
teVersion>
/ca-bundle.crt -o file-to-download
 https://download.server.url/file-to-download
```

Note that you need to substitute the parameters <SiteID> and <SiteVersion> to get the actual directory name for the last version of the BES Support site.

To test a custom certificate bundle, the following command can be run (make sure to substitute the parameters with the appropriate values):

```
curl --cacert </path-to-certificate/custom-certificate.pem>
-o file-to-download https://download.server.url/file-to-download
```

Note: In some Windows versions, PowerShell maps the cmdlet Invoke-WebRequest to the curl executable; however, this does not provide a reliable method for certificate verification. Use openSSL instead, as described below.

On a Windows platform, the same test can be performed using openSSL. In the following example, `download.server.url` is the address of the HTTPS server and `C:\path\to\certificate\certificate-bundle.pem` is the local path to the certificate bundle.

```
openssl.exe s_client -connect download.server.url:443 -CAfile
C:\path\to\certificate\certificate-bundle.pem
```

In this case, it is necessary to check the return code of the command in its output, which may be composed by many lines: the ones starting with “Verify return code” are those to look for. Possible examples are:

- Verify return code: 0 (ok)
- Verify return code: 20 (unable to get local issuer certificate)
- Verify return code: 18 (self signed certificate)

Creating custom client dashboards

You can create custom Client Dashboards, similar to those in the console. Dashboards are HTML files with embedded Relevance clauses that can analyze the local computer and print out the current results.

Clients with a dashboard have an extra tab to display the resulting report. Note that dashboard global variables can be accessed from custom dashboards owned by other operators regardless of permissions.

To create a Client Dashboard, you must create a new folder named __UISupport (note the leading underlines) in the __BESData folder. This is a subfolder of the client folder, so the final pathname looks like:

Program Files/BigFix Enterprise/BES Client/__BESData/__UISupport

Place the Dashboard file (named `_dashboard.html`) and any accompanying graphics files into this folder. The next time the client starts, it incorporates these files into its interface, adding to the **Dashboard** tab. When you click this tab, the Dashboard calculates the latest values of each Relevance clause and displays them.

Any further changes to your custom dashboard must be performed in the __UISupport folder and promoted by restarting the client computer.

The Relevance statements are embedded in the HTML inside special tags with the form:

```
      <?relevance statement ?>
```

For example, to find and print the time, use the following:

```
      <?relevance now ?>
```

When the client displays the page containing this statement, the client evaluates the Relevance clause “now?" and substitutes the value for the tag. The following sample HTML prints out the word “Date:�? and then the current date and time:

```
<html>
 <body>
 Date: <?relevance now ?>
 </body>
</html>
```

To refresh the Relevance evaluation, add this line to the file:

```
<html>
 <body>
 Date: <?relevance now ?>
 <A href="cid:load?page=_dashboard.html"> Refresh </A>
 </body>
</html>
```

This link, labeled **Refresh**, causes the page to reload. When it does, it reevaluates the relevance clauses. It is easy to see how you would add other Relevance expressions to this page.

For example, to print out the operating system and the computer name, add these two lines:

```
<html>
 <body>
 Date: <?relevance now ?>
 Operating System: <?relevance name of operating system ?>
 Computer Name: <?relevance computer name ?>
 <A href="cid:load?page=_dashboard.html"> Refresh </A>
 </body>
</html>
```

You can use style sheets to format the output. You can use the default style-sheet, **offer.css** for some preset formatting. Here is an example of a Dashboard with a title, a header, a refresh link, and a section of retrieved property values:

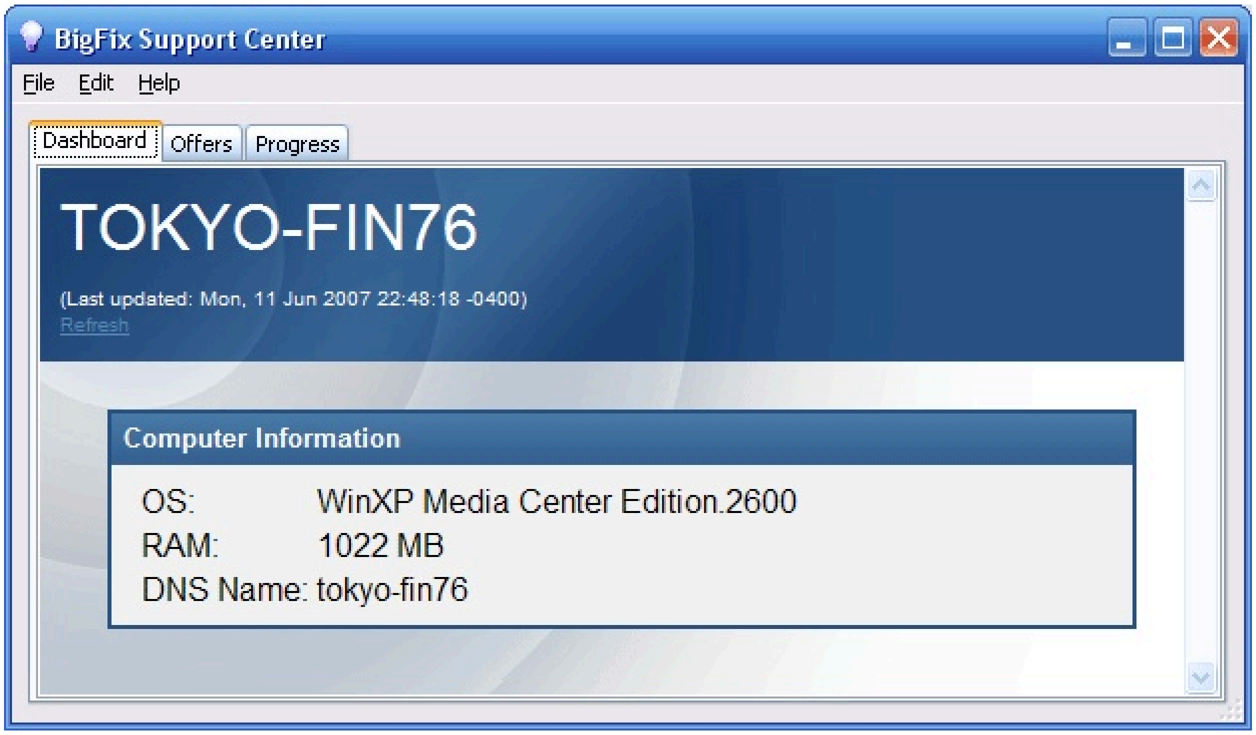
```
<html>
      <head>
         <link type="text/css" rel="stylesheet" href="offer.css"></link>
         <title>BigFix Dashboard Example</title>
      </head>
      <body>

       <div class="header">
         <div class="headerTitle">
```

```
             <font size="6"><?relevance computer name ?></font>
         </div>
         <div class="headerCategory">
             <font size="1">(Last updated: <?relevance now ?>)</font><BR>
           <div><font size="1">
              <a href="cid:load?page=_dashboard.html">Refresh</a></font>
           </div>
         </div>
       </div>

          <div class="section">
                <div class="sectionHeader">Computer Information</div>
                <div class="subsection">
                    <table>
                        <tr>
                             <td valign="top">OS: </td>
                             <td><?relevance operating system ?></td>
                        </tr>
                        <tr>
                           <td valign="top">RAM: </td>
                           <td><?relevance (size of ram)/1048576 ?> MB</td>
                        </tr>
                        <tr>
                           <td valign="top">DNS Name: </td>
                           <td><?relevance dns name ?></td>
                        </tr>
                    </table>
                </div>
          </div>
    </body>
</html>
```

For the offer.css to work correctly, the following graphics files must be copied to the __UISupport directory from the Client directory:

```
bodyBg.jpg,
bodyHeaderBg.jpg
bullet.gif
sectionHeaderBG.gif
```

When run from the Client, this dashboard produces the following output:



TOKYO-FIN76

(Last updated: Mon, 11 Jun 2007 22:48:18 -0400)

Computer Information

OS: WinXP Media Center Edition.2600
RAM: 1022 MB
DNS Name: tokyo-fin76

To learn more about Relevance expressions, see the Relevance Language Reference.

Geographically locating clients

Because clients are often deployed in remote offices, it is useful to create a property that lets the clients report their own location.

You can create a location property in BigFix using the **Location Property Wizard**.

1. In the console, go to the **BigFix Management** domain, click **Computer Management** , and then click **Location Property Wizard** . A wizard document opens.
2. The wizard creates a named property allowing the clients to identify themselves based on their subnet, IP range, or other information. Read the instructions in the wizard to create the property.

Locking clients

You can change the locked status of any BigFix client in the network. This lets you exclude specific computers or groups of computers from the effects of Fixlet actions.

This could be useful, for example, if you wanted to exclude certain development computers from any changes or updates. It also provides a powerful technique for testing new Fixlet actions on a limited set of unlocked computers, while keeping the rest of the network locked down. client computers can be locked forever (until explicitly unlocked) or for a defined period of time.

Changes are made to the locked status of a client by sending an action. As a consequence, the Console operator must supply proper authentication to lock or unlock any computer. Even though a client is locked, there is still a subset of actions that can be accepted by the client, including clock changes and unlock actions as well as actions from the BES Support site.

To lock or unlock a computer, follow these steps:

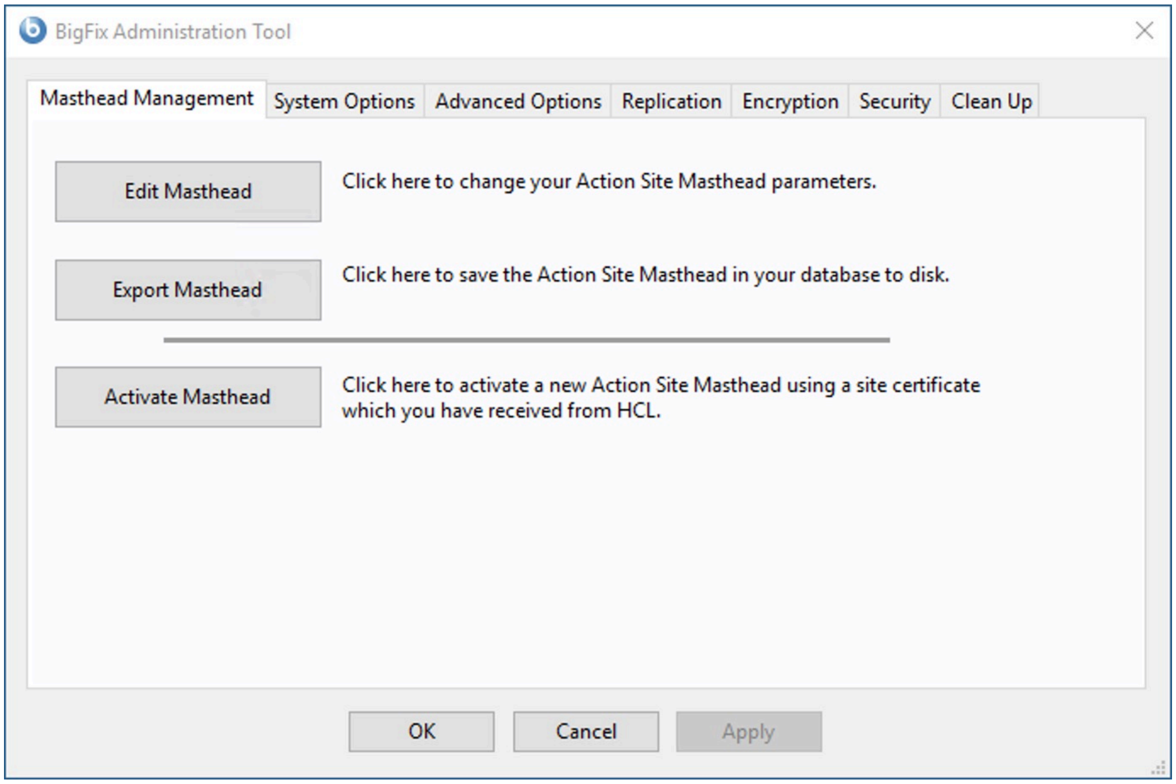
1. Click the **Computers** icon in the Domain Panel navigation tree to see the List Panel of networked BigFix client computers.
2. Select the computers that you want to lock.
3. Right-click and select **Edit Computer Settings** from the pop-up menu (or select **Edit Computer Settings** from the **Edit** menu). The Edit Setting dialog opens.
4. Click the check box to either lock or unlock the computer.

Although the console does not provide an explicit interface for setting an expiration date on the lock, you can create a custom action to do this. For more information, see the BigFix Developer site.

Editing the Masthead on Windows systems

You can change default parameters stored in the masthead by using the **BigFix Administration Tool**.

1. Launch the program from **Start > Programs > BigFix > BigFix Administration Tool**.
2. Browse to the private key (`license.pvk`) and click **OK**.
3. Select the **Masthead Management** tab and click **Edit Masthead**.

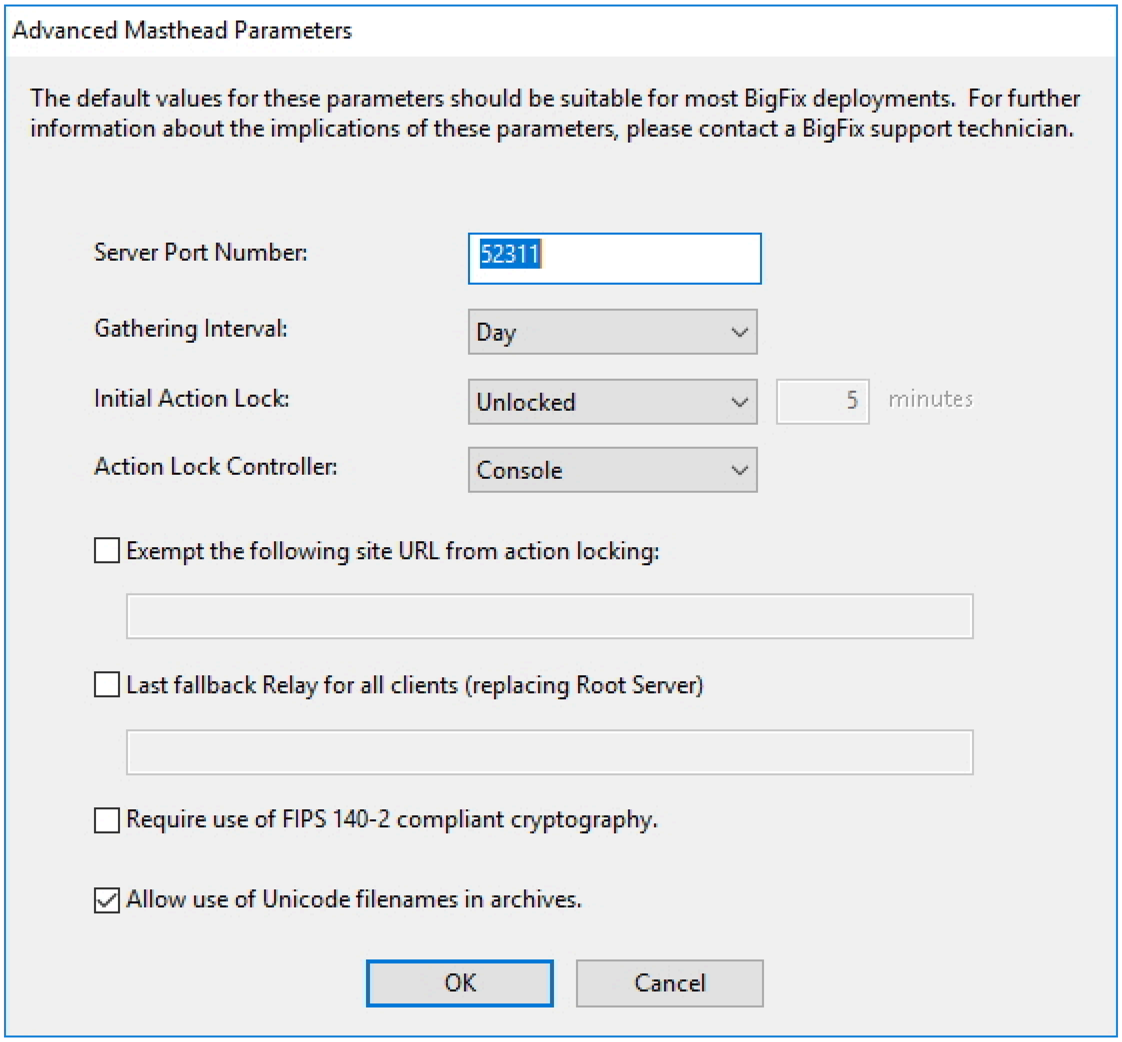


Click here to change your Action Site Masthead parameters.

Click here to save the Action Site Masthead in your database to disk.

Click here to activate a new Action Site Masthead using a site certificate which you have received from HCL.

4. Enter the parameters of the masthead file that contains configuration and license information together with a public key that is used to verify digital signatures. This file is saved in your credential folder.



Advanced Masthead Parameters

The default values for these parameters should be suitable for most BigFix deployments. For further information about the implications of these parameters, please contact a BigFix support technician.

Server Port Number: 52311

Gathering Interval: Day

Initial Action Lock: Unlocked 5 minutes

Action Lock Controller: Console

☐ Exempt the following site URL from action locking:

☐ Last fallback Relay for all clients (replacing Root Server)

☐ Require use of FIPS 140-2 compliant cryptography.

☑ Allow use of Unicode filenames in archives.

You can edit the following options:

Server Port Number:

In general, you do not need to change this number. 52311 is the recommended port number, but you can choose a different port if that is more convenient for your particular network. Typically, you choose a port from the IANA range of private ports (49152 through 65535). You can use a reserved port number (ports 1-1024), but this might reduce the ability to monitor or restrict traffic correctly and it prevents you from using port numbers for specific applications. Do not change the server port number *after* installing the clients and creating the masthead, because BigFix might not work correctly. For additional information, see *Modifying port numbers* in the next section.

Gathering Interval:

This option determines how long the clients wait without hearing from the server before they check whether new content is available. In general, whenever the server gathers new content, it attempts to notify the clients that the new content is available through a UDP connection, circumventing this delay. However, in situations where UDP is blocked by firewalls or where network address translation (NAT) remaps the IP address of the client from the servers perspective, a smaller interval becomes necessary to get a timely response from the clients. Higher gathering rates only slightly affect the performance of the server, because only the differences are gathered; a client does not gather information that it already has.

Initial Action Lock:

You can specify the initial lock state of all clients, if you want to lock a client automatically after installation. Locked clients report which Fixlet messages are relevant for them, but do not apply any actions. The default is to leave them unlocked and to lock specific clients later on. However, you might want to start with the clients locked and then unlock them on an individual basis to give you more control over newly-installed clients. Alternatively, you can set clients to be locked for a certain period of time (in minutes).

Action Lock Controller:

This parameter determines who can change the action lock state. The default is **Console**, which allows any Console operator with management rights to change the lock state of any client in the network. If you want to delegate control over locking to the end user, you can select **Client**, but this is not recommended.

Exempt the following site URL from action locking:

In rare cases, you might need to exempt a specific URL from any locking actions. Check this box and enter the exempt URL. You can specify only one site URL and it must begin with `http://`.

Note: Baseline components are not exempt from action locking because they can come from different sites.

Last fallback Relay for all clients (replacing Root Server):

You might need to define a fallback relay for your clients when they do not connect to any relay specified in their settings. Select this check box and specify the fallback relay of your environment in one of the following formats:

- Hostname. For example, *myhostname*.
- Fully qualified domain name (FQDN). For example, *myhostname.mydomain.com*.
- IP address. For example, *10.10.10.10*.

If you do not select this check box and define a fallback relay, the root server of your environment is used.

Note: Before specifying a fallback relay, ensure that any client or relay reporting directly to the root server has the root server defined as a relay. This setting will not prevent endpoints from selecting the root server. Set *_BESRelay_Register_Affiliation_AdvertisementList* on the BES Root Server to a group name that will not be set on any clients, such as DoNotSelectMe.

Require use of FIPS 140-2 compliant cryptography

Check this box to be compliant with the Federal Information Processing Standard in your network. This changes the masthead so that every BigFix component attempts to go into FIPS mode. By default, the client continues in non-FIPS mode if it fails to correctly enter FIPS, which might be a problem with certain legacy operating systems. Be aware that checking this box can add a few seconds to the client startup time.

Allow use of Unicode filenames in archives

This setting specifies the codepage used to write filenames in the BigFix archives. Check this box to write filenames UTF-8 codepage.
Do not check this box to write filenames using the local deployment codepage, for example Windows-1252 or Shift JIS. If you run a fresh install of BigFix V9.5, by default, the filenames are written in UTF-8.

Note: If you upgraded your BigFix environment to V9.5, by default, the filenames are written in the local deployment code page.

5. Click **OK** to enter the changes.

Note: The masthead changes do NOT affect clients that are already deployed, but you can export the masthead using the Administration Tool (**Masthead Management** tab) and replace the masthead in the BES Installers directory of the BigFix server (default directory: `<drive>:\Program Files\BigFix Enterprise\BES Installers`) so that newly deployed or installed clients use these changes.

Editing the Masthead on Linux systems

To modify the masthead, run the following command as super user.

```
./BESAdmin.sh -editmasthead -sitePvkLocation=<path+license.pvk>
[ -sitePvkPassword=<password> ]
[ -display ] [ -advGatherSchedule=<0-10> ] [ -advController=<0-2> ]
[ -advInitialLockState=<0|2> | -advInitialLockState=1
 -advInitialLockDuration=<num> ]
[ -advActionLockExemptionURL=<url> ]
 [ -advRequireFIPScompliantCrypto=<true|false> ]
[ -advEnableFallbackRelay=0 | -advEnableFallbackRelay=1
-advFallbackRelay=<host> ]
```

where:

`-sitePvkLocation=<path+license.pvk>`

Specifies the private key file (*`filename`*`.pvk`). This private key file and its password are required to run the Administration Tool. Only users with access to the site level signing key and password are able to create new BigFix operators.

Note: The notation `<path+license.pvk>` used in the command syntax stands for *`path_to_license_file/`*`license.pvk`.

`-sitePvkPassword=<password>`

Specifies the password associated to the private key file (*`filename`*`.pvk`). This setting is optional, if you omit it you will be asked to specify the password interactively when the command runs.

`-display`

Displays the current settings for the masthead.

`-advGatherSchedule (optional, integer)`

Determines how long the clients wait without hearing from the server before they check whether new content is available. In general, whenever the server gathers new content, it attempts to notify the clients that the new content is available through a UDP connection, circumventing this delay. However, in situations where UDP is blocked by firewalls or where network address translation (NAT) remaps the IP address of the client from the servers perspective, a smaller interval becomes necessary to get a timely response from the clients. Higher gathering rates only slightly affect the performance of the Server, because only the differences are gathered; a client does not gather information that it already has. Valid values are:

```
    0=Fifteen Minutes,
    1=Half Hour, 2=Hour,
    3=Eight Hours,
    4=Half day,
    5=Day,
    6=Two Days,
    7=Week,
    8=Two Weeks,
    9=Month,
    10=Two Months
```

`-advController (optional, integer)`

Determines who can change the action lock state. The default is **Console**, which allows any Console operator with management rights to change the lock state of any client in the network. If you want to delegate control over locking to the user, you can select **Client**, but this is not recommended. Valid values are:

```
0=console,
1=client,
2=nobody
```

`-advInitialLockState (optional, integer)`

Specifies the initial lock state of all clients. Locked clients report which Fixlet messages are relevant for them, but do not apply any actions. The default is to leave them unlocked and to lock specific clients later on. However, you might want to start with the clients locked and then unlock them on an individual basis to give you more control over newly-installed clients. Alternatively, you can set them to be locked for a certain period of time. Valid values are:

```
0=Locked,
1=timed (specify duration),
2=Unlocked
```

`-advInitialLockDuration (optional, integer)`

Defines the period of time in seconds the clients must be locked.

`-advActionLockExemptionURL (optional, string)`

In rare cases, you might need to exempt a specific URL from any locking actions. Check this box and enter the exempt URL.

Note: You can specify only one site URL and it must begin with `http://`.

`-advRequireFIPScompliantCrypto (optional, boolean)`

Implements the Federal Information Processing Standard on your network. This changes the masthead so that every BigFix component attempts to go into FIPS mode. By default, the client continues in non-FIPS mode if it fails to correctly enter FIPS, which might be a problem with certain legacy operating systems. Be aware that checking this box can add a few seconds to the client startup time.

Note: Enabling FIPS mode prevents the use of some authentication methods when connecting to a proxy. If you selected to use a proxy to access the Internet or to communicate with BigFix subcomponents, ensure that the proxy configuration is set up to use an authentication method other than `digest`, `negotiate` or `ntlm`.

`-advEnableFallbackRelay (optional,boolean)`

Enables or disables a fallback relay for your clients when they do not connect to any relay specified in their settings. If you do not define a fallback relay, the root server of your environment is used.

`-advFallbackRelay (optional, string)`

Defines the host name of the fallback relay of your environment in one of the following formats:

- Hostname. For example, *myhostname*.
- Fully qualified domain name (FQDN). For example, *myhostname.mydomain.com*.
- IP address. For example, *10.10.10.10*.

Note: Before specifying a fallback relay, ensure that any client or relay reporting directly to the root server has the root server defined as a relay. This setting will not prevent endpoints from selecting the root server. Set *_BESRelay_Register_Affiliation_AdvertisementList* on the BES Root Server to a group name that will not be set on any clients, such as DoNotSelectMe.

Obfuscating server passwords

You can replace the passwords on the server with obfuscated passwords, by indicating the type of password that you want to replace and the new password.

The password is obfuscated and stored in the registry on Windows systems and in the configuration files on Linux systems.

Run the following command to obfuscate server password:

On Windows systems:

```
BESAdmin.exe /updatepassword /type:<type> [ /password:<password>
 ]
/sitePvkFile:<path+license.pvk> [ /sitePassword:<pvk_password> ]
```

where:

`type:<type>`

Specifies one of the following types of password:

server_db

The password to be updated and recorded obfuscated is related to the connection with the server database

dsa_db

The password to be updated and recorded as obfuscated is related to the connection with the DSA database

`password:<password>`

Specifies the password to be obfuscated and then recorded.

`sitePvkFile:<path+license.pvk>`

Specifies the private key file (*`filename`*`.pvk`). This private key file and its password are required to run the Administration Tool. Only users with access to the site level signing key and password are able to create new BigFix operators.

Note: The notation `<path+license.pvk>` used in the command syntax stands for *`path_to_license_file`*`\license.pvk`.

`sitePassword:<password>`

Specifies the password associated to the private key file (*`filename`*`.pvk`). This setting is optional, if you omit it you will be asked to specify the password interactively when the command runs.

On Linux systems:

where:

`type=<type>`

Specifies one of the following types of password:

server_db

The password to be updated and recorded obfuscated is related to the connection with the server database

dsa_db

The password to be updated and recorded as obfuscated is related to the connection with the DSA database

`password=<password>`

Specifies the password to be obfuscated and then recorded.

`sitePvkLocation=<path+license.pvk>`

Specifies the private key file (`*filename*.pvk`). This private key file and its password are required to run the Administration Tool. Only users with access to the site level signing key and password are able to create new BigFix operators.

Note: The notation `<path+license.pvk>` used in the command syntax stands for *`path_to_license_file/`* `license.pvk`.

`-sitePvkPassword=<password>`

Specifies the password associated to the private key file (`*filename*.pvk`). This setting is optional, if you omit it you will be asked to specify the password interactively when the command runs.

Modifying Global System Options

To modify a few basic system defaults, such as the minimum refresh time and the Fixlet visibility, perform the following steps.

On Windows systems:

1. Launch the Administration Tool from **Start > Programs > BigFix > BigFix Administration Tool**.
2. Select the **System Options** tab.
3. At the top, you can set the global **Minimum Refresh**. The default is 15 seconds, which is a good balance between responsiveness and low network load. If you find that these communications are impacting your network, you can increase the minimum to 60 seconds or more.
4. External sites are visible to all console operators by default, but you can change that in the section marked **Default Fixlet Visibility**. Click the lower button to make external content invisible to all except Master Operators. On the BigFix console, master operators can show hidden external content sites by clicking the **Show Hidden Content** button available in console toolbar.

On Linux systems:

1. From the `/opt/BESServer/bin` command prompt start the command line:

   ```
   ./iem login --server=servername:serverport --user=username
    --password=password
   ```
2. From the `/opt/BESServer/bin` command prompt run the following command:

   ```
   ./iem get admin/options  > /appo/options.xml
   ```
3. In the `/appo/options.xml` file:

   ```
   <?xml version="1.0" encoding="UTF-8"?>
   <BESAPI xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xsi:noNamespaceSchemaLocation="BESAPI.xsd">
       <SystemOptions
    Resource="https://nc926065:52311/api/admin/options">
           <MinimumRefreshSeconds>15</MinimumRefreshSeconds>

           <DefaultFixletVisibility>Visible</DefaultFixletVisibility>
   ```

```
    </SystemOptions>
</BESAPI>
```

edit the following keywords to set the minimum refresh time in seconds and the external sites as visible to all the console operators or to only the Master operators:

```
<MinimumRefreshSeconds>15</MinimumRefreshSeconds>
<DefaultFixletVisibility>Visible</DefaultFixletVisibility>
```

If you change the value assigned to these keywords, you must restart the BigFix console active sessions to activate changes.

Note: On the BigFix console, Master operators can show hidden external content sites by clicking the **Show Hidden Content** button available in console toolbar.

4. Upload the modified file by running the following command:

```
./iem post /appo/options.xml admin/options
```

Extending the BigFix License

When you first request your action site license, you are issued a license for a specific period of time. Before your license expires, BigFix warns you, giving you sufficient time to renew your license.

When you are coming close to the expiration date, BigFix notifies you by showing a message in the BigFix Console. Similarly, if you start to exceed the number of clients allocated by your license, BigFix alerts you. To extend your license expiration or add new client licenses to your installation, follow these steps:

1. Notify your HCL representative (if you have not paid for the extended license, you must talk to your sales person or reseller to buy an extended license).
2. Your server checks daily for a new version of your license. If you want to force your server to check immediately, in the console, go to the **BigFix Management** domain, click **License Overview** node, and click the **Check for license update**.

For additional information about how to manage licenses see the Managing licenses chapter of the Administration Guide.

Re-creating Site Credentials

Private and public key encryption creates a chain of signing authority from the BigFix root down through the Site Administrator and including each console operator.

If you lose your site credential or change the IP address of your server, the chain is broken. The consequences are serious: you must start again with a new request to HCL for a site certificate. Then you must reinstall the entire system, including all the clients (contact your support technician for details about how you might migrate your clients to a new server) and re-create all the users. If this happens, contact your support technician. To protect your site certificate, follow these important rules:

- **Do not lose the certificate (license.crt)** and **the private key for your site (license.pvk)**. Follow standard procedures for backing up and securing critical confidential information.
- **Do not change the IP address and hostname or port number of the server**, because it is the primary identifier for your site certificate. Any change to the IP address or port number that was specified when the license was requested negates the license and necessitates a fresh installation of the BigFix system. If you plan to decommission a server, be sure to apply the same IP address and port number to the replacement server.
- **Do not forget your password.** Follow your corporate standards for noting and storing your password.

Note: The BigFix Site Administrator can change the password of the site-level key, if they know the current password.

Creating special custom sites whose name begins with FileOnlyCustomSite

You might delete special custom sites whose name begins with FileOnlyCustomSite that are generated to propagate files to agents accidentally or purposely, for example, when performing a gather reset. You can recreate them by using the `PropagateFiles.exe` tool.

To log in by using `PropagateFile.exe`, you must enable the **Can use Console** permission.

This procedure describes how to recreate special custom sites whose name begins with `FileOnlyCustomSite`. By following these steps, you can avoid errors such as `Unable to find site id for URL`.

1. Create a dummy directory containing an empty file, for example: `C:\dummy` with `foo_file.txt`.
2. Navigate to the BigFix server directory. For example, `C:\Program Files (x86)\BigFix Enterprise\BES Server`.
3. To authorize a user to write in to the special custom site, run the `PropagateFiles.exe` tool as follows:

```
PropagateFiles.exe CreateFileOnlyCustomSiteUserAuthorization <site
 admin pvk> <site admin password> <serverURL> <operator
 name> <operator password> <site name>
```

   where:

   - *site admin pvk*: The full path to the BigFix license file (`license.pvk`).
   - *site admin password*: The password for the license file.
   - *serverURL*: The server URL that is copied from the masthead file.
   - *operator name*: The name of an existing user.
   - *operator password*: The user password for the user.
   - *site name*: The name of the special custom site. The site must contain only files and the name must begin with `FileOnlyCustomSite`.

For example, `PropagateFiles.exe CreateFileOnlyCustomSiteUserAuthorization C:\licenses\licence.pvk lcs_password http://bigfixserver:52311 bigfixuser bfu_password FileOnlyCustomSite_FOO`.

Alternatively, you can use your Windows credentials to authenticate:

```
PropagateFiles.exe CreateFileOnlyCustomSiteUserAuthorization
 Windowsauthentication <site admin pvk> <site admin
 password> <serverURL> <site name>
```

4. To propagate the dummy directory contents to the custom site, run the following command:

```
PropagateFiles.exe UpdateFileOnlyCustomSite <serverURL> <operator
 name> <operator password> <pvk file location> <directory to
 propagate> <site name>
```

For example, `PropagateFiles.exe UpdatefileOnlyCustomSite http://bigfixserver:52311 bigfixuser bfu_password C:\licenses\licence.pvk C:\dummy FileOnlyCustomSite_FOO`.

Alternatively, you can use your Windows credentials to authenticate:

```
PropagateFiles.exe UpdateFileOnlyCustomSite
 Windowsauthentication <serverURL> <directory to propagate> <site
 name>
```

Attention: This operation replaces the custom site contents with your directory contents.

5. To distribute the custom site with its file content to the targets, run a custom action with an action script.

```
custom site subscribe CustomSite_<site name> as "<site name>" on
 "{parameter "action issue date" of action}"
```

For example:

```
custom site subscribe CustomSite_FileOnlyCustomSite_FOO as
 "FileOnlyCustomSite_FOO" on "{now}"
```

A special custom site called `CustomSite_FileOnlyCustomSite_FOO` is created.

Special custom sites are not visible on the BigFix console. To verify that the site has been correctly created, check the following files:

- `C:\Program Files (x86)\BigFix Enterprise\BES Server\Mirror Server\Inbox\bfemapfile.xml`
- `C:\Program Files (x86)\BigFix Enterprise\BES Server\Mirror Server\Inbox\GatherState.xml`

Configuring Client CPU Utilization

How to configure the amount of CPU the BigFix client uses on an endpoint machine.

Applies to

BigFix Platform

Problem

CPU utilization by the BigFix client and how to govern the amount of CPU the BigFix client uses.

Resolution

The amount of CPU the BigFix client uses on an endpoint machine during the evaluation cycle is governed by the following two client settings:

- _BESClient_Resource_WorkIdle
- _BESClient_Resource_SleepIdle

By default, the _BESClient_Resource_WorkIdle setting is set to 10 and the _BESClient_Resource_SleepIdle setting is set to 480.

The BigFix client will do work (evaluate relevance) for a designated amount of time then go to sleep for a designated amount of time. The WorkIdle setting controls how many milliseconds to work before going to sleep in each cycle and the SleepIdle setting controls how many milliseconds to sleep after performing work in cycle. If the WorkIdle setting is high in comparison to the SleepIdle setting, then the BigFix client will evaluate Fixlet relevance faster, but the CPU usage will be higher. By default, WorkIdle is 10 milliseconds and SleepIdle is 480 Milliseconds. Since 10 is 2% of 480 you can expect the BigFix client to use at most 2% of the CPU. Both WorkIdle and SleepIdle have maximum values of 500.

To determine the upper bound on the amount of CPU the agent will use with your custom settings, use the formula:

Max agent %CPU = workidle / (workidle + sleepidle)

Example (default settings): 10 / (10 + 480) = 2%

You can easily manage these settings and adjust the amount of CPU the BigFix client will use via Task # 168 in the BES Support site.

The task offers you the ability to set the client CPU usage to any of 5 different modes (using 5 different actions and preset values in the action script).

_BESClient_Resource_-WorkIdle	**_BESClient_Resource_-SleepIdle**	**CPU Mode**	**CPU Upper bound**
2	500	very low	< 0.5%
10	480	default	< 1-2%
25	460	medium	< 5%
50	450	high	< 10%
100	400	very high	< 20%

All of these calculations apply to the single processor where the agent runs, so if you have multiple processors the overall % of agent CPU is reduced significantly because it is divided by the number of processors. For example, if you want your agent to use less than 5% of CPU and the relevance 'number of processors' returns 4, you must set workidle to 100 and sleepidle to 400 because [100 / (100 + 400)] / 4 = 5%.

In case of a system with a single processor, the CPU Mode to a value different from the default is Not Recommended.

For AIX components using an LPAR:

- Max agent % CPU calculation for AIX LPAR with Entitled Capacity for Mode of Uncapped and Mode of Capped.
- - Usage _BESClient_Resource_Entitlement=100 for AIX LPARs with mode of Uncapped can be considered to use to eliminate reduction of Max Agent CPU% by Entitled Capacity.

For the behavior of pSeries Hypervisor see the example below:

With Mode: Uncapped, Entitled Capacity : 0.10, if the AIX LPAR uses 0.10 CPU core, then 100% usage. If the physical CPU cores in the

pSeries pool are not fully utilized, then pSeries hypervisor will allow the AIX LPAR to use more of CPU cores. You can also use pSeries LPAR weighting to give certain AIX LPARs like production higher priority for CPU resources than other AIX LPARs like development.

BigFix computer settings _BESClient_Resource_WorkNormal, _BESClient_Resource_SleepNormal when the BigFix agent is running a task that can be set.

Questions and Answers:

Question 1:

For Red Hat, SLES, Windows:

Max agent % CPU = workidle / (workidle + sleepidle)

0.0476 = 20 / (20 + 400)

0.0476 x 100 = 4.76%

...

_BESClient_Resource_WorkIdle Statement "The "Entitled Capacity : 0.10," means we have 1/10th of a CPU so all calculations for the workidle/sleepidle need to have 0.1 multiplied against them as the system has told us we have 10% of a full CPU."

For AIX LPARs is the calculation the following?

Max agent % CPU = (workidle / (workidle + sleepidle)) x Entitled

Capacity

0.00476 = (20 / (20 + 400)) x 0.10

0.00476 x 100 / = 0.476% of CPU available to AIX LPAR can be used

Answer:

It is true that the BigFix Max agent % CPU with be multiplied by the AIX LPAR Entitled Capacity to further reduce BigFix Max agent % CPU for AIX LPARs with mode of Uncapped or mode of Capped. The BigFix Max agent % CPU is based on a single physical CPU core.

Question 2:

For AIX LPAR with Mode: Uncapped from lparstat -i, can I turn off lparstat -i Entitled Capacity to reduce Max agent %CPU by setting the BigFix AIX computer _BESClient_Resource_Entitlement to 100?

Answer:

Yes

Question 3:

For BigFix agent on AIX LPAR with _BESClient_Resource_Entitlement to 100, will the behaviour be the same as Linux on Intel and Windows on VMware for limiting Max agent %CPU to a single physical CPU core?

Answer:

Yes.

There is also BigFix computer setting _BESClient_Resource_WorkNormal, _BESClient_Resource_SleepNormal when the BigFix agent is running a task that can be set.

Question 4:

Why BigFix Client process keeps on using high CPU% after the completion of the action?

Answer:

BigFix Client leaves on using high CPU% when it has no more actions to run and has completed an evaluation of the action sites.

Note:

- Test these settings on a limited set of endpoint machines before deploying them to the majority of your deployment endpoint machines.
- In practice, the CPU usage is typically lower than this ratio (because the agent will often be waiting for IO and it will yield its CPU time).
- If you adjust the CPU usage away from the default and experience issues, switch the CPU usage back to the default values.
- These CPU settings strictly govern BES Client evaluating content in the evaluation mode of the client's cycle. The BigFix agent might use up to 50% of the CPU at times during the execution parts of its operation (i.e. initiating an install). These CPU spikes are normal and are expected to be short lived to where they would not be typically noticeable. If the BES Client experiences a sustained CPU spike it may mean there is a problem in the client executing on a problematic action or a systemic issue. This would need to be investigated and the problem determined through analyzing the BigFix Client logs and/or BigFix Client debug log.

Allowing the clients to use additional CPU to complete download operations

After download actions, the BigFix Client performs the sha code evaluation on downloaded files. For large files, the time taken to evaluate can become very long, especially on a BigFix Client constrained to default 2% CPU. The optimization of this time is achieved by allowing the BigFix Client to temporarily use additional CPU during this operation.

Starting from Patch 2, you can speed up the operations to evaluate the sha code in downloaded files by temporarily directing the BigFix Client to use additional CPU. This results in a consistent time optimization for the download phase as the time required for the evaluation decreases as the CPU used increases.

The `_BESClient_Resource_WorkFastHashVerify` and `_BESClient_Resource_SleepFastHashVerify` configuration settings allow you to manage the amount of CPU that the BigFix Client can use.

For more details about these settings, see CPU Usage.

The `_BESClient_Download_FastHashVerify` configuration setting enables the BigFix Client to temporarily use additional CPU for the Hash Code Evaluation (default increase to 25%).

For more details about the setting, see Download.

Customizing Client UI message strings

You can customize the Client UI message strings. It is possible to alter the English text output and also to change any of the localizable string translations by using the XLAT files for the Client UI. The Client UI XLAT files default location for a 64-bit machine is `C:\Program Files (x86)\BigFix Enterprise\BES Client\BESLib\Reference`.

Proceed as follows:

1. Locate the file named `<lang>.xlat` under `C:\Program Files (x86)\BigFix Enterprise\BES Client\BESLib\Reference` where `<lang>` is the identifier of the language you want to address (e.g. ITA).
2. Browse `C:\Program Files (x86)\BigFix Enterprise\BES Client\BESLib\Reference\<lang>.xlat` and identify the line with the translation string that you want to modify.
3. Save this line with the modified translation into `C:\Program Files (x86)\BigFix Enterprise\BES Client\__BESData\__UISupport\_brand<lang>.xlat`.
4. Restart the BigFix client.

Note: The file `C:\Program Files (x86)\BigFix Enterprise\BES Client\BESLib\Reference\ENU.xlat` (English xlat) is empty. However, you can follow the procedure described above by looking for the English strings in any of the other language files.

Note: After the upgrade to Version 10, you need to align the English strings of the custom XLAT files to the ones of the upgraded `C:\Program Files` `(x86)\BigFix Enterprise\BES Client\BESLib\Reference \<lang>.xlat` files.

Chapter 22. Migrating the BigFix Server (Windows/MS-SQL)

This section details the steps and operational procedures necessary for migrating the BigFix Server from existing hardware onto new computer systems.

Typical use cases for these steps include:

- Hardware refresh
- OS or SQL Server upgrades
- 32-bit to 64-bit architecture migration
- Remote SQL server migration

The steps below apply to the following BigFix server versions for Windows:

- 9.2
- 9.5
- 10.0

Due to the complexity and risks of migrating BigFix Servers, it is strongly recommended that an BigFix Technician help in performing the BigFix Server Migration process.

Considerations for migration

This section provides some notes and guidelines for the migration of the BigFix Root or application server.

General notes and guidelines

- The migration should first be performed and tested in a segregated test/development environment, if possible.
- If leveraging BigFix Disaster Server Architecture (DSA - Disaster Server Architecture), the replica/secondary server should be migrated before the primary BigFix Server.

- Custom settings that have been applied to the BigFix Server will need to be implemented again after migration. Typical examples include: Web Reports HTTPS configurations, Download Gather Cache Size, etc…
- Download plug-ins and other extensions/applications will also need to be re-installed in any new installation location.
- Typical examples include: Unmanaged Asset Importer, Wake on LAN medic, Upload service, Automation Plan Engine.

Pre-migration checklist

- Ensure that a strategy has been determined to allow the Clients to continue to connect to the new BigFix Server per the GatherURL specified in the masthead (corresponding to Assumption #1 above).
- Back up the BFEnterprise and BESReporting SQL databases.
- Back up the site level credentials such as license.crt, license.pvk, and the masthead. If using <8.1 then you should also back up user/operator credentials such as publisher.pvk and publisher.crt.
- Document the authentication method to the MSSQL database (SQL versus NT).
- If using NT Authentication, document the NT Domain/service account used for BigFix Server services.
- If using SQL Authentication, document the SQL account used for SQL Authentication Registry values.
- Document (consider taking a screenshot) the ODBC connections: bes_BFEnterprise, bes_EnterpriseServer, enterprise_setup, and LocalBESReportingServer. For 64-bit Windows systems, use the 32-bit version of the ODBC tool (C:\Windows\SysWOW64\odbcad32.exe) to configure the System DSNs.
- If migrating the Primary BigFix Server, consider implementing the following prior to the migration to reduce downtime:
    - Change the following BigFix Client settings on all clients:
        - _BESClient_Report_MinimumInterval = 3600.

          This setting will reduce the amount of incoming data from the endpoints to allow the system to recover more quickly and reduce potential downtime.

        - _BESClient_RelaySelect_ResistFailureIntervalSeconds = 21600

          This value represents the amount of time BES Clients will wait after its relay appears down before performing BES Relay selection. This can prevent unnecessary automatic relay selection during the migration.
    - Change the heartbeat in the BigFix Console to 6 hours: Console Preferences

      Note: This is another way to reduce the amount of incoming data from the endpoints.

- Carefully review the migration steps.

Migrating the BigFix root server

How to migrate the root server.

The following scenarios are assumed to be true prior to performing the BigFix Server migrations:

- If migrating the Primary/Master BigFix server, the new BigFix server will have to leverage the same DNS name/alias or IP address that is specified in the masthead/license (https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0023184), otherwise the BigFix infrastructure will not be able to communicate with the new BigFix server. If this is not possible, a new license may need to be obtained, and an infrastructure migration be performed rather than a server migration. This is a crucial element of the migration strategy, and requires proper planning!
    - If the masthead leverages an IP address, the new Server will have to leverage the same IP address.
    - If the masthead leverages a host name, the new Server may have to leverage the same host name.
    - If the masthead leverages a DNS name/alias (per best practice), the alias will have to be re-pointed to the new BigFix server as part of the migration process. If leveraging a DNS name/alias within the masthead, perform a DNS switch for

the DNS name so that the alias now points to the new BigFix Server. Wait for the DNS switch to propagate (this might take some time depending on your DNS services/infrastructure).

- The existing BigFix server is operating normally before the migration.
- The new BigFix server has been built, meets the requirements of an BigFix server, and is properly configured to serve as a BigFix server. In particular, the OS and database platforms should be supported for the given BigFix version being migrated.
- The installation folders are in the same location and path for the original BigFix /DSA servers and the new BigFix /DSA servers (if not, some manual modification of files will be necessary, which is outlined in the steps below).
- The migration is performed off-hours to minimize potential impact or down-time.

1. To facilitate migration verification, note the current actionsite version.
    - For any BigFix server version: https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0023338.
    - With v8.2 and above, the actionsite version can also be obtained from the Server's Diagnostics page (http://<BigFixServer:port>/rd), select the 'Get Current Version' request type under Site Gathering Information, select the actionsite URL from the dropdown, click Submit, and note the actionsite version.
2. Stop and consider disabling all BES Services on the original Server.
3. Run the Server Backup procedure as described in Server Backup.
4. Run the Server Recovery procedure as described in Server Recovery.
5. Run the Verify restore results procedure as described in Verifying restore results.
6. Verify that the actionsite version being hosted by the new BigFix Server matches the one noted in Step 1 using the same steps outlined in Step 1.
7. Check the relay selection settings on all top-level Relays. If any setting points to the original BigFix Server using an IP Address or hostname, they may need to be re-pointed to the new BigFix server.
8. Uninstall the BigFix Server software from the old BigFix Server computer. Do NOT restart the BES Services on this computer. Attempting to use the old BigFix Server may cause errors on the new BigFix Server if it is used again.

9. Run BESAdmin.exe /resetDatabaseEpoch to force the consoles to refresh their cache with the new server.
10. Reset the Client settings and heartbeat to settings prior to shutting down the BigFix Server services.

Migrating databases

This procedure applies to remote database installations.

Before you begin

- Back up the BFEnterprise and BESReporting SQL databases (A current backup must be taken immediately prior to the move. You must not have any differences between the backup and production database).
- Back up the "BFEnterprise Full Database Index Reorganization" job.
    - Open SQL Server Management Studio.
    - Expand **SQL Server Agent**, and expand **Jobs**.
    - Right-click the **BFEnterprise Full Database Index Reorganization** job and select **Script Job as**.
    - Select **CREATE To**, then select New Query Editor Window, File, or Clipboard to select a destination for the script. Typically, the destination is a file with a .sql extension.
- Document the authentication method to the MSSQL database (SQL versus NT).
    - If using NT Authentication, document the NT Domain/service account used for BigFix Server services.
    - If using SQL Authentication, document the SQL account used for SQL Authentication Registry values.
- Document (consider taking a screenshot) the ODBC connections: bes_BFEnterprise, enterprise_setup, and LocalBESReportingServer. Record both 32-bit and 64-bit information in order to replicate them.

    Note: For 64-bit Windows systems, you must use the 32-bit version of the ODBC tool to configure the 32-bit System DSNs.

- Use ODBC wizard on the Root Server to test a basic connection to new database location (new MS-SQL Server).
- Consider implementing the following prior to the migration to reduce downtime:
  - Change the following BigFix Client settings on all clients:
    - _BESClient_Report_MinimumInterval = 3600 * This setting will reduce the amount of incoming data from the endpoints to allow the system to recover more quickly and reduce potential downtime.
    - _BESClient_RelaySelect_ResistFailureIntervalSeconds = 21600 * This value represents the amount of time BES Clients will wait after its relay appears down before performing BES Relay selection. This can prevent unnecessary automatic relay selection during the migration.
  - Change the heartbeat in the BigFix Console to 6 hours: Console Preferences

    Note: This is another way to reduce the amount of incoming data from the endpoints.
- Carefully review the migration steps.

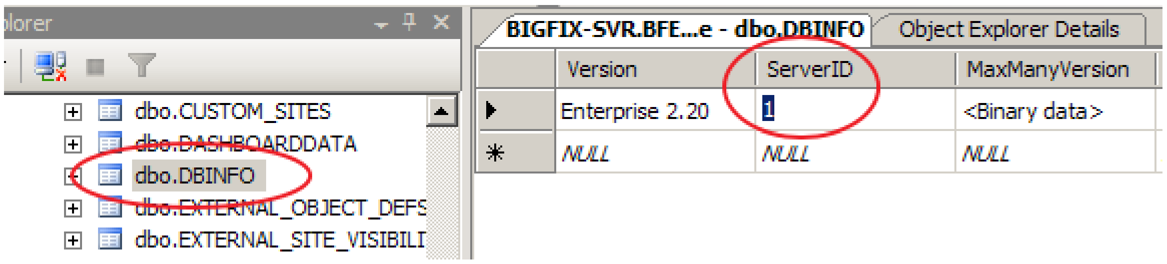
Procedure

1. Stop all BES Server services.
2. Detach the BFEnterprise and BESReporting databases from the current SQL Server instance databases.
3. Move the BFEnterprise and BESReporting databases to the new SQL Server instance.
4. Attach the BFEnterprise and BESReporting databases to the new SQL Server instance.
5. Restore the "BFEnterprise Full Database Index Reorganization" job from the script.
   - Open SQL Server Management Studio.
   - On the File menu, Open the file containing the scripted job.
   - Execute the script to create the "BFEnterprise Full Database Index Reorganization" job.
6. Modify the ODBC System DSNs (bes_BFEnterprise, enterprise_setup, and LocalBESReportingServer) to point to the new SQL server instance. This modification will allow you to avoid re-installing the BigFix Server application.

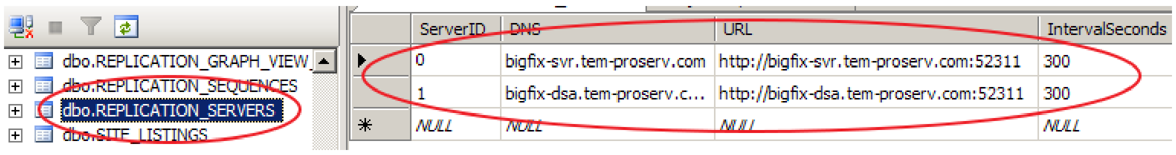
- Use ODBC connection wizard to test connection.
- Update and verify both 32-bit and 64-bit configurations.

Note: For 64-bit Windows systems, you must use the 32-bit version of the ODBC tool to configure the System DSNs.

7. If leveraging DSA, use SQL Server Management Studio to connect to the BFEnterprise database and examine the DBINFO and REPLICATION_SERVERS tables:



Version	ServerID	MaxManyVersion
Enterprise 2.20	1	<Binary data>
NULL	NULL	NULL



ServerID	DNS	URL	IntervalSeconds
0	bigfix-svr.tem-proserv.com	http://bigfix-svr.tem-proserv.com:52311	300
1	bigfix-dsa.tem-proserv.c...	http://bigfix-dsa.tem-proserv.com:52311	300
NULL	NULL	NULL	NULL

If DNS aliases are being leveraged for the servers, this should not change. If is using hostnames, and the hostnames are changing, these column values may need manual modification.

Note: The setting "HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\BigFix \Enterprise Server\UseRemoteDB" has a value set by default to "0", if the BigFix database is local, or set to "1", if the BigFix database is remote.

Verifying the migration

To make sure that your BigFix Server has been successfully migrated, perform the procedure outlined in this section.

1. Check the BigFix Diagnostics Tool to make sure all services are properly started.
2. Log in the BigFix Admin tool (if it opens normally database connectivity is verified and the tool can be closed).
3. Log in with the BigFix Console and verify that the logins work properly and the database information was properly restored.
4. BigFix Clients and BigFix Relays should soon notice that the Server is available and will be reporting data to the server. Full recovery with all Agents reporting will usually take anywhere from a few minutes to many hours (depending on the size of the deployment and how long the Server was unavailable). In any circumstance, at least some Agents should be reporting updated information within an hour or so.
5. After verifying some agents are reporting properly, send a "blank action" (Tools > Take Custom Action, target "All Computers", click OK) to all computers. The blank action will not make any changes to the Agent computers, but the Agents will report that they received the blank action. If the most Agents respond to a blank action, it is a very strong indicator that everything is working well because sending an action tests many core components and communication paths of BigFix.
6. Log in to Web Reports and ensure the data was restored properly.
7. Contact BigFix Support with any issues or questions.

Chapter 23. Migrating the BigFix Server (Linux)

This section provides basic information on migrating your BigFix Server from existing Linux hardware onto new systems.

The procedures referenced below are meant for the server components only. You must backup and restore additional applications and/or server customization in your setup, if any, separately.

Note: Due to the complexity and risks of migrating BigFix Servers, it is strongly recommended that you take assistance from a trained BigFix Technician while migrating the BigFix Server.

Before you begin

The following scenarios are assumed to be true prior to performing the BigFix Server migrations:

- If migrating the Primary/Master BigFix server, the new BigFix server will have to leverage the same DNS name/alias or IP address that is specified in the masthead/license (https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0023184), otherwise the BigFix infrastructure will not be able to communicate with the new BigFix server. If this is not possible, a new license may need to be obtained, and an infrastructure migration be performed rather than a server migration. This is a crucial element of the migration strategy, and requires proper planning!
  - If the masthead leverages an IP address, the new Server will have to leverage the same IP address.
  - If the masthead leverages a host name, the new Server may have to leverage the same host name.
  - If the masthead leverages a DNS name/alias (per best practice), the alias will have to be re-pointed to the new BigFix server as part of the migration process. If leveraging a DNS name/alias within the masthead, perform a DNS switch for

the DNS name so that the alias now points to the new BigFix Server. Wait for the DNS switch to propagate (this might take some time depending on your DNS services/infrastructure).

- The existing BigFix server is operating normally before the migration.
- The new BigFix server has been built, meets the requirements of an BigFix server, and is properly configured to serve as a BigFix server. In particular, the OS and database platforms should be supported for the given BigFix version being migrated.
- The installation folders are in the same location and path for the original BigFix /DSA servers and the new BigFix /DSA servers (if not, some manual modification of files will be necessary, which is outlined in the steps below).
- The migration is performed off-hours to minimize potential impact or down-time.

Procedure

1. To facilitate migration verification, note the current actionsite version.
    - For any BigFix server version: https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0023338.
    - With v8.2 and above, the actionsite version can also be obtained from the Server's Diagnostics page (http://<BigFixServer:port>/rd), select the 'Get Current Version' request type under Site Gathering Information, select the actionsite URL from the dropdown, click Submit, and note the actionsite version.
2. Stop and consider disabling all BES Services on the original Server.
3. Run the Server Backup procedure as described in Server Backup.
4. Run the Server Recovery procedure as described in Server Recovery.
5. Run the Verify restore results procedure as described in Verifying restore results.
6. Verify that the actionsite version being hosted by the new BigFix Server matches the one noted in Step 1 using the same steps outlined in Step 1.
7. Check the relay selection settings on all top-level Relays. If any setting points to the original BigFix Server using an IP Address or hostname, they may need to be re-pointed to the new BigFix server.
8. Uninstall the BigFix Server software from the old BigFix Server computer. Do NOT restart the BES Services on this computer. Attempting to use the old BigFix Server may cause errors on the new BigFix Server if it is used again.

9. Run ./BESAdmin.sh -resetDatabaseEpoch to force the consoles to refresh their cache with the new server.
10. Reset the Client settings and heartbeat to settings prior to shutting down the BigFix Server services.

Relocating databases on a remote server

How to relocate the database and upgrade it after its relocation.

General guidelines

If you want to move your local BigFix database, located on the same machine where the BigFix Server is installed, to another remote server, or you need to relocate it from a remote DB2 server to another one, take into account the following guidelines.

Since you need to back up BigFix databases from the current DB2 Server and to restore them on the new DB2 Server, it is strongly suggested to back up/restore using the same DB2 level.

If needed, perform the DB2 upgrade only after restoring the BigFix databases.

Relocating the BigFix databases on a different server is currently supported only using the same instance name (default is db2inst1).

For more details about the DB2 installation requirements and configurations, refer to the following links:

Database requirements

Installing and configuring DB2

Migrating BigFix databases

To migrate BigFix databases, perform the following steps:

1. Verify that the starting and the destination DB2 are at the same level and the new DB2 system uses the same instance (default: db2inst1).
2. Stop all BigFix services.
3. Run the DB2 database backup commands:

```
BACKUP DB BFENT COMPRESS
BACKUP DB BESREPOR COMPRESS
```

4. Restore the BigFix databases on the new DB2 system:

```
RESTORE DB BFENT
RESTORE DB BESREPOR
```

5. Catalog the new databases on the BigFix Server. From the BigFix Server, run the following DB2 commands:

```
UNCATALOG DATABASE BFENT
UNCATALOG DATABASE BESREPOR
UNCATALOG NODE TEM_REM
CATALOG TCPIP NODE TEM_REM REMOTE {host} SERVER {port}
CATALOG DATABASE BFENT AS BFENT AT NODE TEM_REM
CATALOG DATABASE BESREPOR AS BESREPOR AT NODE TEM_REM
```

   Where:

   {host} is your DB2 remote server hostname and {port} is the DB2 remote server port used.

6. Update the BigFix Server database settings (as needed) in `/var/opt/BESServer/besserver.config`.

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESServer_Database_
DatabaseAddress]
value = <new_hostname>

[Software\BigFix\EnterpriseClient\Settings\Client\_BESServer_Database_
Port]
value = "<new_port_number>"
```

7. If Web Reports is installed, update the following settings (as needed) in `/var/opt/BESWebReportsServer/beswebreports.config`.

```
[Software\BigFix\Enterprise Server\FillAggregateDB]
DatabaseAddress = <new_hostname>
Port = <new_port_number>
```

8. Update the DB2 password on the BigFix Server, (if the password of the db2inst1 user on the new DB2 server is different from the one you have on the old DB2 server) as described in Changing the database password .
9. Start the BigFix Server services (except the WebUI).

```
/etc/init.d/besserver start
/etc/init.d/besfilldb start
/etc/init.d/besgatherdb start
/etc/init.d/beswebreports start
/etc/init.d/bespluginportal start (if installed)
/etc/init.d/besclient start
```

10. Verify that the components start and the connection with the new configured database works.
11. If the WebUI is installed, run the BES Support Fixlet ID 2687 from the BES Console to update the "BigFix Server Database Host" with the new Database Configuration specifications (it will also start the WebUI service) .
12. Update the DNS field in the REPLICATION_SERVERS table with the new DB2 Server hostname.

Upgrading the database after its relocation

If you need to perform the DB2 upgrade, after you did a relocation from local to remote, you can follow these steps:

1. Remove the local DB2 Server from the BigFix Server machine.
   a. Stop all BigFix services.
   b. From the BigFix Server run the following DB2 commands:

   ```
   UNCATALOG DATABASE BFENT
   UNCATALOG DATABASE BESREPOR
   UNCATALOG NODE TEM_REM
   ```

c. Proceed uninstalling the DB2 Server. For details, see the following IBM documentation: Uninstalling DB2 database products.
d. Remove DB2 users and groups.

2. Install the IBM Data Server at the same version you are going to upgrade the server.
3. On the new DB2 Server, upgrade the DB2 Server to the target version following the IBM documentation.

   Note: Do not create a new instance during the new DB2 version installation.

4. After the DB2 Server was upgraded, define the remote node and catalog the remote databases on the BigFix Server:

```
CATALOG TCPIP NODE TEM_REM REMOTE {host} SERVER {port}
CATALOG DATABASE BFENT AS BFENT AT NODE TEM_REM
CATALOG DATABASE BESREPOR AS BESREPOR AT NODE TEM_REM
```

5. Test the database connection from the BigFix Server.
6. Start all BigFix services.

Chapter 24. Server audit logs

The BigFix Server generates a server audit log file which contains the access information (login/logout) and information about the actions performed through the Console or the WebUI by the different users.

Morever, the server audit log file keeps track of specific actions sent through the BigFix Server from the Console or the WebUI to the client and then, later on, canceled. It also records access information to the BigFix Server when using either Web Reports or the BigFix REST API.

Starting with BigFix version 10.0.8, also the BigFix Administration Tool generates a specific log file providing information about the operations and the configuration changes performed.

Format of the audit log messages

Audit entries are presented in a single line and contain the same number of field delimiters. Field delimiters are present even if no value exists for a specific field. Since the format of the audit fields is subject to change over time, each line has a version number as the first entry.

The default location of the audit logs on the BigFix Server is as follows:

- On Windows computers: `%ProgramFiles(x86)%\BigFix Enterprise\BES Server\server_audit.log`
- On Linux computers: `/var/opt/BESServer/server_audit.log`

The default location of the audit logs on the BigFix Administration Tool is as follows:

- On Windows computers:
  - For each user that runs the BigFix Administration Tool:

    `C:\Users\<USERNAME>\AppData\Local\BigFix\besadmin_audit.log`

    For example:

    `C:\Users\Administrator\AppData\Local\BigFix\besadmin_audit.log`

    - When the BigFix Administration Tool (BESAdmin) is invoked by a Fixlet or run by the LocalSystem user:

      `C:\Windows\System32\config\systemprofile\AppData\Local\BigFix\besadmin_audit.log`
- On Linux computers:

  `/var/log/besadmin_audit.log`

Starting with BigFix version 9.5.11, the audit log messages are in the following format:

```
<format-version>|<timestamp>|<message-priority>|<username>|<event-source>|<event-label>|<event-type>|<ip-address>|<message>
```

"|" is the field separator.

- `format-version`: The version of the message format. For example, *1*.
- `timestamp`: The timestamp of the log message, which can be the server timezone or UTC.
- `message-priority`: The priority of the log.
    - EMERG (emergency, system non-functioning or unusable)
    - ERROR (error condition)
    - WARN (warning)
    - INFO (informational message)
- `username`: The username of the event initiator. In case it is not a user event, then the field is set to *SYSTEM*.
- `event-source`: The source from which the event originates. Possible values: *CONSOLE*, *RESTAPI* , *WEBUI* , *WEBREPORTS*.
- `event-label`: The event or the artifact that is affected.

  Possible values: USER, SITE, ACTION, ROLE, COMPUTER , AUTHZ, SETTING , DATABASE.
- `event-type`: The type of the event.

  Possible values: CREATE, DELETE, UPDATE, LOGIN , LOGOUT , SEARCH.

- `ip-address`: The IP address of the component which initiated the event request. For SYSTEM, this is the server IP address.
- `message`: The actual log message.

Starting with BigFix version 9.5.11, the server audit logs include also the following items:

- Messages for deletion of computers from the console or through API.
- Messages for deletion of actions.

Examples

Following are a few examples of the log messages in the new format:

```
1|Tue, 05 Sep 2017 10:57:06
 -0700|INFO|johndoe|CONSOLE|AUTHZ|LOGIN|172.28.128.5|user “johndoe “
(1):Successful log in. (Data Connection)
```

```
1|Tue, 05 Sep 2017 10:58:32
 -0700|INFO|johndoe|CONSOLE|ACTION|DELETE|172.28.128.5|
Action waitOverrideTest(50) was deleted
```

In case of audit entries other than those introduced in 9.5.11 or later, the messages are formatted as follows: `<format-version>|<timestamp>|<message-priority>||||||<message>`. For example:

`1|Tue, 05 Sep 2017 10:57:06 -0700|INFO||||||user "johndoe" (1): Successful log in. (Data Connection)`

Managing logs

The default size of an audit log file is 100 MB. When the size reaches its maximum value, the log file is renamed and a new file is created. Renamed log files are never deleted. To optimally use the space, you should move the log files to a different location or purge them at regular internals.

You can change the value by using the setting:

- *_Audit_Logging_LogMaxSize* on the BigFix server.
- *_BESAdminAudit_Logging_LogMaxSize*, introduced with BigFix version 10.0.8, on the BigFix Administration Tool.

Using the _BESAdminAudit_Logging_LogDirectoryPath setting, you can also modify the audit log directory path of the BigFix Administration Tool; it cannot be done on the BigFix server.

For details, see Logging and BigFix Logging Guide.

Note: When you upgrade to version 9.5.11, the `server_audit.log` file is forced to rotate to `server_audit.YYYYMMDDHHMM`. This is a one-time action and is applicable regardless of whether or not you have configured log rotation. The `server_audit.YYYYMMDDHHMM` file only contains audit logs in the old format, whereas `server_audit.log` only contains audit logs in the new format.

Note: When you upgrade to version 10.0.1, if you insert the character " | " (pipe) in the user name or in the content of the message, the character is replaced with " %7C " to allow the automatic tools to parse the log files and to avoid that the log files are wrongly formatted.

Chapter 25. List of advanced options

The following lists show the advanced options.

Advanced options that you can specify in the Advanced Options tab of the BigFix Administrative tool on Windows systems, or in the `BESAdmin.sh` command on Linux systems using the following syntax:

```
./BESAdmin.sh -setadvancedoptions -sitePvkLocation=<path+license.pvk>
[-sitePvkPassword=<password>]
{ -list | -display
| [ -f ] -delete option_name
| [ -f ] -update option_name=option_value }
```

Note: The notation `<path+license.pvk>` used in the command syntax stands for *`path_to_license_file/`*`license.pvk`.

These options are typically supplied by your HCL Software Support.

Advanced options for disabling functions

Use these options if you want to disable specific capabilities on the console.

disableNmoSiteManagementDialog

If set to "1", the site management dialog is unavailable to non-master operators (NMOs).

disableNmoComments

If set to "1", NMOs cannot add comments. NMOs will still be able to view comments.

disableNmoManualGroups

If set to "1", NMOs cannot add or remove computers from manual groups, and see manual groups that none of their computers are members of.

disableGlobalRelayVisibility

If set to "1", NMOs cannot see relays in the relay-selection drop-downs in the console that don't belong to them. The exception is if they view a machine that is currently configured to report to a relay not administered by them, in this case that relay appears in the list as well.

disableNmoRelaySelModeChanges

If set to "1", NMOs cannot toggle automatic relay selection on and off.

disableDebugDialog

If set to "1", the keyboard sequence CTRL-ALT-SHIFT-D cannot be used to open up the console's debug dialog.

disableComputerNameTargeting

If set to "1", the third radio option "target by list of computer names" is removed on the targeting tab of the take action dialog.

allowOfferCreation

If set to "0", the 'Offer' tab in the Take Action Dialog is disabled. Offer presets in Fixlets are ignored by the console.

disableNmoCustomSiteSubscribe

If set to "1", the "Modify Custom Site Subscriptions" menu item is disabled for all NMOs

Advanced options for password policies

Use these settings to enforce password policies in your BigFix environment.

passwordComplexityRegex

Specifies a *perl-style* regular expression to use as a password complexity requirement when choosing or changing operator passwords. These are some examples:

- Require a 6-letter or longer password that does not equal the string 'bigfix'.

  ```
  (?![bB][iI][gG][fF][iI][xX]).{6,}
  ```

- Require a 6-letter or longer password containing lowercase, upper case, and punctuation.

  ```
  (?=.*[[:lower:]])(?=.*[[:upper:]])(?=.*[[:punct:]]).{6,}
  ```

- Require an eight-character or longer password that contains 3 of the following 4 character classes: lowercase, uppercase, punctuation, and numeric.

  ```
  ((?=.*[[:lower:]])(?=.*[[:upper:]])(?=.*[[:punct:]])|
  (?=.*[[:lower:]])(?=.*[[:upper:]])(?=.*[[:digit:]])|
  (?=.*[[:lower:]])(?=.*[[:digit:]])(?=.*[[:punct:]])|
  (?=.*[[:digit:]])(?=.*[[:upper:]])(?=.*[[:punct:]])).{8,}
  ```

Note: The Site Administrator passwords are not affected by this complexity requirement.

passwordComplexityDescription

Specifies a description of the password complexity requirement. This string is displayed to the user when a password choice fails the complexity requirements set using the **passwordComplexity** option. An example of password complexity description is "Passwords must have at least 6 characters." If you do not set this value but you set **passwordComplexityRegex** setting, the description set in **passwordComplexityRegex** is displayed to the user.

passwordsRemembered

Specifies the number of unique new passwords that can be set for an user account before an old password can be reused. The default value is "0".

This option was introduced with BigFix V8.2.

maximumPasswordAgeDays

Specifies the number of days that a password can be used before the system requires the user to change it. The default value is "0" (no maximum).

This option was introduced with BigFix V8.2.

minimumPasswordLength

Specifies the least number of characters that a password for a user account can contain. The default value is "6". This is an usage example of this option:

```
./BESAdmin.sh -setadvancedoptions -sitePvkLocation=LOCATION
-sitePvkPassword=PASSWORD -update minimumPasswordLenth=9
```

This option was introduced with BigFix V8.2.

enforcePasswordComplexity

If set to '1' or 'true', the passwords must meet the following minimum requirements:

- They must not contain the user's account name or parts of the user's full name that exceed two consecutive characters.
- They must be at least six characters long.
- They must contain characters from three of the following four categories:

```
    English uppercase characters (A through Z)
    English lowercase characters (a through z)
    Base 10 digits (0 through 9)
    Non-alphabetic characters (for example, !, $, #, %)
```

If you specify also the **minimumPasswordLength** setting, then the effective minimum password length will be the higher value between six and the value of **minimumPasswordLength**.

Complexity requirements are enforced when passwords are changed or created. The default value is "0".

This option was introduced with BigFix V8.2.

accountLockoutThreshold

Specifies the number of incorrect logon attempts for a user name before the account is locked for **accountLockoutDurationSeconds** seconds. The default value is "5".

This option was introduced with BigFix V8.2.

accountLockoutDurationSeconds

Specifies the number of seconds that an account gets locked after **accountLockoutThreshold** failed log on attempts. The default value is "1800".

This option was introduced with BigFix V8.2.

Note: Web Reports has similar password controls, but they have to be set separately ('Users'->'User Options').

Advanced options for targeting restrictions

Use these advanced options to specify the targeting restrictions globally. If you to set them for a specific user, add those settings in the registry key of the BigFix Console computer under the hive `HKEY_CURRENT_USER\Software\BigFix\Enterprise Console\Targeting` as a DWORD.

The options listed in the following table take effect only if the corresponding registry keys are not set on the consoles or if the keys are set to the default values.

targetBySpecificListLimit

Specifies the maximum number of computers that can be targeted by individual selection. The default value is 10000.

targetBySpecificListWarning

Specifies the threshold for the number of computers that can be targeted by individual selection before the console displays a warning message. The default value is 1000.

targetByListSizeLimit

Specifies the maximum number of bytes that can be supplied when targeting by textual list of computer names. The default value is 100000.

Here is the correspondence between the name of the advanced option and the name of the related registry setting:

```
targetBySpecificListLimit => SpecificListLimit
targetBySpecificListWarning => SpecificListWarning
targetByListSizeLimit => ByListSizeLimit
```

The following example restricts to 9000 = 0x2328 the SpecificListLimit setting (correspondent to the targetBySpecificListLimit advanced option):

```
{[HKEY_CURRENT_USER\Software\BigFix\Enterprise Console\Targeting]
"SpecificListLimit"=dword:00002328}
```

Note: Do not increase the default values.

Advanced options for authentication

Use these settings to manage user authentications to the console.

loginTimeoutSeconds

Specifies the amount of idle time in seconds before the console requires the user to authenticate again to take certain actions. The timer is reset every time the user authenticates or does an action that would have required authentication within the idle time threshold. The default value is zero on upgrade from a deployment earlier than V8.2, the default value is infinity on a clean install of V8.2 or later.

loginWarningBanner

Specifies the text to show to any user after he/she logs into the Console or Web Reports. The user must click **OK** to continue. This is a usage example of this option:

```
./BESAdmin.sh -setadvancedoptions
 -sitePvkLocation=/root/backup/license.pvk
-sitePvkPassword=pippo000 -update loginWarningBanner='new messag
e'
```

This option was introduced with BigFix V9.1.

timeoutLockMinutes

Specifies how many idle time minutes must elapse before the console requires to authenticate again. This setting is different from **loginTimeoutSeconds** because **timeoutLockMinutes** hides the entire console to prevent any other user to see or use it. The idle time refers to the lack of any type of input to the session including key buttons, mouse clicks, and mouse movements.

This option does not take any effect on the console if an operator accesses it using the Windows session credentials (Windows authentication).

This option was introduced with BigFix V9.1.

timeoutLogoutMinutes

Specifies how many idle time minutes must elapse before the console is closed. This setting is different from **loginTimeoutSeconds** and **timeoutLockMinutes**, because **timeoutLogoutMinutes** closes the console completely. The idle time refers to the lack of any type of input to the session including key buttons, mouse clicks, and mouse movements.

This option was introduced with BigFix V9.5.11.

Note: Non efficient mime advanced option is no longer supported by the BigFix V9.5 server. Existing actions continue to run on clients but the server is no longer able to generate non efficient mime actions.

Advanced options for customizing computer removal

By defaults, inactive computers are not automatically managed by BigFix, they continue to be displayed in the console views, unless you mark them as deleted by deleting their entries from the Computers list view, and their data is always kept in the database filling in tables with unused data.

You can modify this behavior by specifying advanced options that mark inactive computers as deleted, hiding them in the console views, and remove their data from the BigFix database.

In this way the console views show only the computers that reported back to the BigFix server within a specified number of days and the database runs faster because you free more disk space.

Use the following options to automatically remove computers from the console and delete their data from the database:

inactiveComputerDeletionDays

Specifies the number of consecutive days that a computer does not report back to the BigFix server before it is marked as deleted. When the computer reports back again, the computer is no more marked as deleted and an entry for it is shown again in the console views. The default value for this option is **0**, which means that inactive computers are never automatically marked as deleted.

inactiveComputerPurgeDays

Specifies the number of consecutive days that a computer does not report back to the BigFix server before its data is deleted from the BigFix database. When the computer reports back again, it is requested to send back a full refresh to restore its data in the database and it is no more marked as deleted. The default value for this option is **0**, which means that computer data is never automatically removed from the database.

inactiveComputerPurgeBatchSize

On a daily basis, BigFix runs an internal task that removes from the database the data of the computers for which **inactiveComputerPurgeDays** elapsed. The task deletes the computer data, including he computer's hostname, in buffers to avoid potential load to the database. The **inactiveComputerPurgeBatchSize** value specifies how many computers are cleaned up in the database in each buffer. The default value for this option is **1000**. If the computer reports back again, the matching with its entry in the database is done using the computer ID.

Note: Specify the option **inactiveComputerPurgeBatchSize** if you assigned a value different from **0** to **inactiveComputerPurgeDays**.

Advanced options for customizing BigFix Query

You can optionally set some parameters to customize the BigFix Query feature.

To avoid using too much space available in the database to store the BigFix Query requests and their results, you can customize the following advanced option in the administration tool on the BigFix server:

queryHoursToLive

Determines how many hours the BigFix Query requests are kept in the database. The default value for this option is **1440**, which corresponds to 60 days. Valid values are from 0 to 8760, that means 1 year.

queryResultsHoursToLive

Determines how many hours the BigFix Query results are kept in the database. The default value is **4** hours, and the valid values are from 1 to 336 (two weeks). If you enter value that lies outside this range, the default value is used.

queryPurgeBatchSize

The entries in the database that represent requests and results for which **queryHoursToLive** or **queryResultsHoursToLive** elapsed, are deleted from the database in buffers. This advanced option determines the number of database entries contained in each of these buffers. The default value for this option is **100000** bytes, which means 100 KB.

These are other configuration settings available to customize the BigFix Query feature:

queryPerformanceDataPath

Defines the path of the log file that stores the performance information about FillDB - server interaction when running BigFix Queries. The default value for this option is *none*.

Enterprise Server BigFix Query_MaxTargetsForGroups

Determines the highest number of targets that a BigFix Query request, targeted by group, can be addressed to. If the number of targets exceeds the specified value, the BigFix Query request is sent to all clients and each client determines whether or not it is a member of the targeted group. If the number of targets does not exceed the specified value, the BigFix Query request is sent only to clients that are member of the group. You can configure this setting on the BigFix console by selecting the server in the Computers list and clicking Edit settings. The default value for this option is **100**.

Other advanced options

Use these options to customize other aspects of your BigFix environment.

automaticBackupLocation

If set to an existing path, accessible both by `root` and by the database instance owner, by default `db2inst1`, this option enables the BigFix Server to run automatically the backup of the `BFENT` and `BESREPOR` databases before and after running the upgrade process.

This option is available only for Linux BigFix Servers V9.5.3 and later.

For more information, see Automatic databases backup upon upgrade.

clientIdentityMatch

This advanced option can help you to avoid having duplicate computer entries when the endpoints are detected as possible clones by the BigFix Server.

The BigFix Server can use the existing computer information to try to match the identity of a Client and reassign the same `ComputerID` to computers that might have been rolled back or restored.

If **clientIdentityMatch=0**, the BigFix Server performs strict clone detection. This means that, if the BigFix Server receives a registration request from a Client that was rolled back or restored, the Server invalidates the old `ComputerID`, resets the old Client definition, and assigns a new `ComputerID` to the registering Client. This is the default behavior and is the same way the BigFix Servers earlier than V9.5.7 operate.

If **clientIdentityMatch=100,** the BigFix Server performs an additional check before assigning a new `ComputerID` to a registering Client to avoid creating cloned computer entries. This means that the BigFix Server tries to determine if the information about the rolled-back Client sufficiently matches the data held for that `ComputerID`. If the identity of the Client is matched, the Client keeps using the old `ComputerID` and its identity is not reset.

For more information, see Avoiding duplicates when a Client is restored.

includeSFIDsInBaselineActions

If set to "1", it requires the console to include source Fixlet IDs when emitting baseline actions. Emitting these IDs is not compatible with 5.1 clients.

defaultHiddenFixletSiteIDs

This option allows to selectively change the default Fixlet visibility on a per-site basis. It only takes effect when global default Fixlet hiding is not in use. You specify a comma-separated list of all the site IDs to be hidden by default. The list of sites IDs is in the SITENAMEMAP table in the database.

defaultOperatorRolePermissions

This option allows you to change the default permissions that apply when you create operators and roles. It can take the following values:

- 0: Operators and roles are created with the default permissions that applied until BigFix V9.5.10.
- 1: Operators and roles are created with minimum default permissions. The same default settings apply even when you do not set any value.
- 2: Operators and roles are created with minimum default permissions as in the previous case, except that **Show Other Operators' Actions** is set to **Yes** and **Unmanaged Assets** is set to **By Scan Point** (for operators). In the case of roles, however, **Unmanaged Assets** is always set to **Show None**. The **Access Restriction** for the operators is set to **Always allow this user to log in**. The login privilege **Can use Console** is set to **Yes** both for operators and roles.

This option was introduced with BigFix V9.5.11.

enableRESTAPIOperatorID

This option allows you to display operator resource URLs with the operator ID instead of the operator name. For example, `https://BigFix_Server_URL:52311/api/operator/<Operator_ID>`. To enable the option, set it to true or 1.

This option was introduced with BigFix V9.5.10.

showSingleActionPrePostTabs

If set to "1", the 'Pre-Action Script' and 'Post-Action Script' tabs of the Take Action Dialog shows up even on single actions.

propertyNamespaceDelimiter

Specifies the separator for retrieved properties. By default, retrieved properties are separated into namespaces by the character sequence '::'. The character sequence used to indicate a separator can be changed using this deployment option.

DefaultFixletVisibility

If set, this option allows you to specify either to make Fixlets, tasks and analysis gathered from external sites globally visible or to make them globally hidden. By default, they are globally visible to all Console operators.

Note: On Windows platforms only, this option is also available in the "System option" tab of the BigFix Administrative tool.

MinimumRefreshSeconds

If set, this option allows you to specify the minimum amount of time after which console operators are allowed to set their automatic refresh interval. This amount of time is specified in seconds. By default, it is set to 5 seconds.

Note: On Windows platforms only, this option is also available in the "System option" tab of the BigFix Administrative tool.

minimumConsoleRequirements

Specifies if the minimum requirements that must be satisfied by the machines running the database that the console connect to. Its value consists of a comma separated list of one or more of the following requirement strings:

"RAM:<min MB MO ram>/<min MB NMO ram>"

Requires that the console runs on a machine with at least the specified amount of physical RAM. Two different values must be supplied; one for master operators and another for non-master operators. Both values must be less than 2^32. For example, "RAM:2048/1024" .

"ClientApproval"

States that the BES Client must determine if a machine is suitable for login. A machine is considered suitable for login if one of the following settings is specified locally:

- **"moConsoleLoginAllowed"**
- **"nmoConsoleLoginAllowed"**

The console must run as an account with permissions to read the client registry keys stored under HKEY_LOCAL_MACHINE to log in when using the **"ClientApproval"** option.

actionSiteDBQueryTimeoutSecs

Specifies how long action site database queries can run before the console stops the query (to release its read lock and let any database writers through), and then restart the query where it left off. If not set, the default value is 60 seconds. If set to "0" the action site database queries never time out.

usePre70ClientCompatibleMIME

If set to "true", the console can create action MIME documents that pre-7.0 clients can understand. By default, it is set to "true" on upgrade and "false" for fresh installs.

disableRunningMessageTextLimit

If set to a value other than "0", the console users can enter more than 255 characters in the running message text in the Take Action Dialog.

useFourEyesAuthentication

If set to "true", you can set the approvers for user actions in console user document. The approver must confirm the action on the same console where the user is logged on.

masterDatabaseServerID

By default, the database with server ID 0 is the master database. This is the database that BESAdmin needs to connect to. Use this option to change the master database to a different machine.

enableWakeOnLAN

If set to "1", the console shows the "right click WakeOnLAN" functionality in the computer list. By default the functionality is not shown.

enableWakeDeepSleep

If set to "1", the console shows the "right click Send BESClient Alert Request" functionality in the computer list. By default the functionality is not shown. During Deep sleep, all UDP messages except this specific wake up message are ignored.

requireConfirmAction

If set to "1", every time an action is taken a confirmation pop-up window with a summary of the action details is displayed. The information listed in the pop-up window is:

```
Action Title
Estimated endpoints targeted
Start time
End time
Originated by or Source
```

The summary lists the need of doing a restart or a shutdown as well, if the action requires it. By default the confirmation window is not displayed.

Note: When you enable this option, the displayed value for the **Estimated targeted computers** might not be correct, if you performed the action from a wizard of a BigFix Application such as, for example, Server Automation or OSD.

You must restart the BigFix Console after configuring this option.

Chapter 26. Security Configuration Scenarios

BigFix provides the capability to follow the NIST security standards by configuring an enhanced security option.

This setting enables SHA-256 as the hashing algorithm for digital signatures as well as content verification. It also enables the TLS 1.2 communication among the BigFix components.

You can set the enhanced security option only after you install or upgrade all the BigFix components.

Note: When you set this option you configure a very restricted security environment. You can enable or disable this security setting at any time by editing the masthead file. For additional information see the Configuration Guide.

Note: After enabling it, the Enhanced Security feature may take time to be applied to the whole deployment since it requires an updated masthead to be propagated to all BigFix clients and relays.

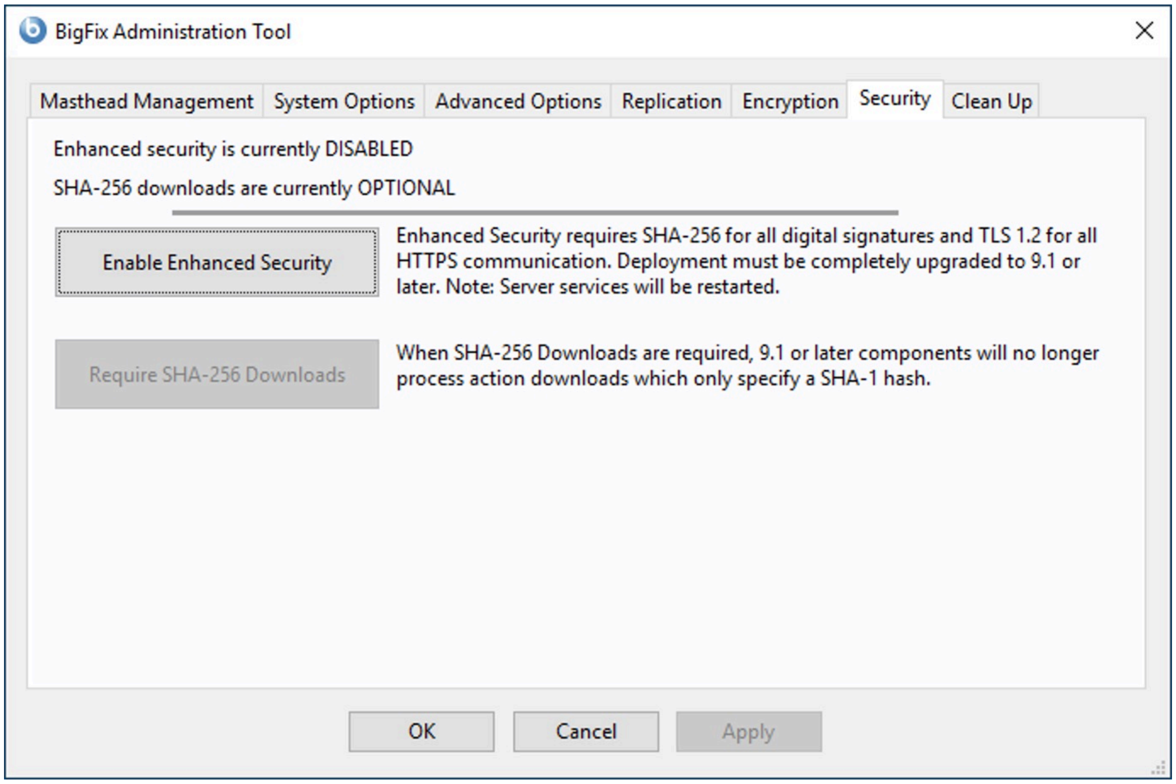
In addition to the enhanced security setting, you can set a check for verifying the file download integrity using the SHA-256 algorithm. If you do not set this option, the file download integrity check is run using the SHA-1 algorithm. This option can be set only if you set the enhanced security option and, therefore, only if all the BigFix components are V10 or above.

In a complex environment, you can enable the enhanced security option, only after all the DSA servers are upgraded to BigFix V10 or above and have got a new license.

On Windows Systems

You can set the enhanced security option by performing the following steps:

1. Run the Administration Tool by clicking **Start > All Programs > BigFix > BigFix Administration Tool.** .
2. Browse to the location of your site license (`license.pvk`) and click **OK**.
3. Select the **Security** tab. The following window is displayed:

   Enhanced security is currently DISABLED

   SHA-256 downloads are currently OPTIONAL

   Enhanced Security requires SHA-256 for all digital signatures and TLS 1.2 for all HTTPS communication. Deployment must be completely upgraded to 9.1 or later. Note: Server services will be restarted.

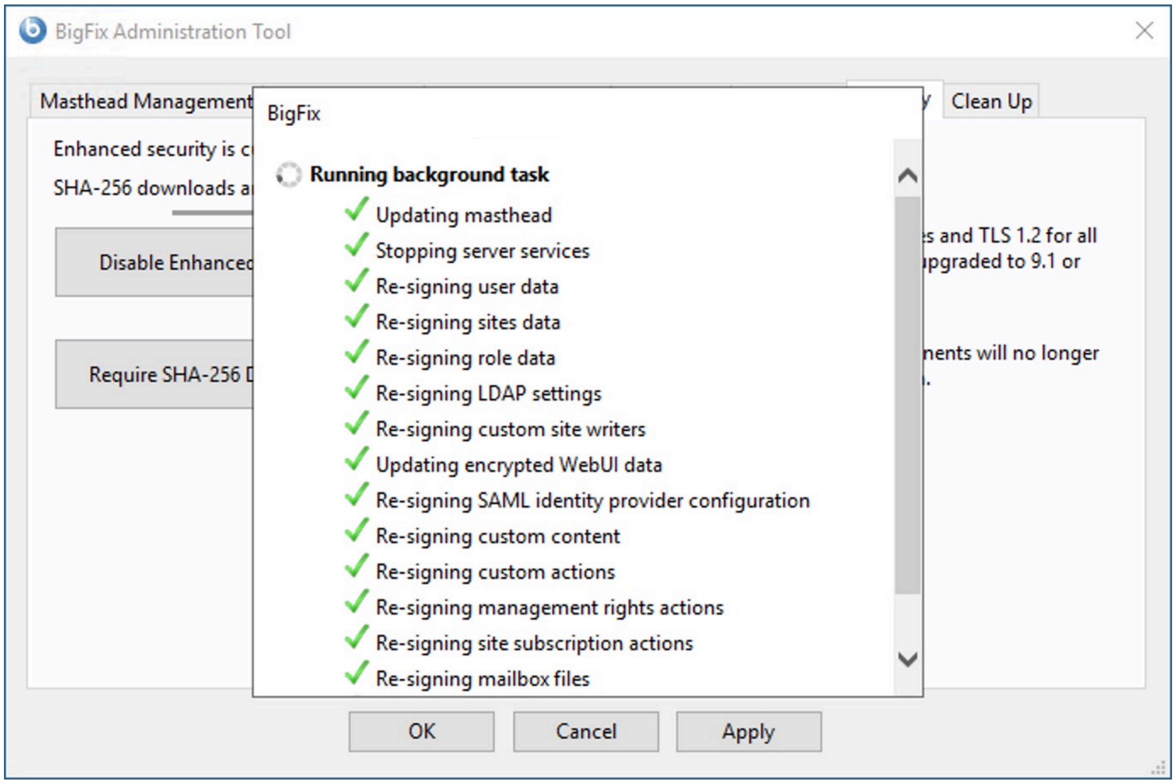
   When SHA-256 Downloads are required, 9.1 or later components will no longer process action downloads which only specify a SHA-1 hash.

   You can now enable the enhanced security options.

   If you upgraded BigFix from an earlier version and the sites to which you were subscribed, supported the enhanced security option, the **Unsubscribe from sites which do not support Enhanced Security** is not selected.

   The checkbox **Run BESAdmin on the following replication servers** is not checked until the product verifies that all the BigFix servers involved in a Disaster Server Architecture (DSA) are version 10 and have the updated license.
4. Click **Gather license now** if you want to use the security enhancements provided with BigFix version 10. If you do not click you will use the security behavior provided by BigFix version 9.0.

When you click **Gather license now** your updated license is gathered from the HCL site and is distributed to the BigFix clients. This step ensures that you use the updated license authorizations if you specified an existing licence file during the installation steps.



Running background task
- ✓ Updating masthead
- ✓ Stopping server services
- ✓ Re-signing user data
- ✓ Re-signing sites data
- ✓ Re-signing role data
- ✓ Re-signing LDAP settings
- ✓ Re-signing custom site writers
- ✓ Updating encrypted WebUI data
- ✓ Re-signing SAML identity provider configuration
- ✓ Re-signing custom content
- ✓ Re-signing custom actions
- ✓ Re-signing management rights actions
- ✓ Re-signing site subscription actions
- ✓ Re-signing mailbox files

5. When the three check marks are green, you can set the enhanced security by clicking **Enable Enhanced Security**.
6. To ensure that data has not changed after you download it using the SHA-256 algorithm click **Require SHA-256 Downloads**. If you do not select this option, the integrity check of the downloaded files is run using the SHA-1 algorithm.

Note: You can enable the **Require SHA-256 Downloads** option only after you enable the **Enable Enhanced Security** option.

On Linux Systems

You can set the security options after you install BigFix V10 or upgrade it to V10, by running the following command as super user:

```
./BESAdmin.sh -securitysettings -sitePvkLocation=<path+license.pvk>
              -enableEnhancedSecurity -requireSHA256Downloads
```

Note: The notation `<path+license.pvk>` used in the command syntax stands for *`path_to_license_file`*`/license.pvk`.

The full syntax of the `./BESAdmin.sh -securitysettings` is the following:

```
./BESAdmin.sh -securitysettings -sitePvkLocation=<path+license.pvk>
   [-sitePvkPassword=<password>]
   { -status | {-enableEnhancedSecurity|-disableEnhancedSecurity}
   | {-requireSHA256Downloads|-allowSHA1Downloads} }
```

where:

status

Shows the status of the security settings in your BigFix environment.
Example:

```
BESAdmin.sh -securitysettings -sitePvkLocation=/root/backup/lice
nse.pvk
-sitePvkPassword=mypassw0rd -status

Enhanced security is currently ENABLED
SHA-256 downloads are currently OPTIONAL
```

enableEnhancedSecurity | disableEnhancedSecurity

Enables or disables the enhanced security that adopts the SHA-256 cryptographic digest algorithm for all digital signatures as well as content verification and the TLS 1.2 protocol for communications among the BigFix components.

requireSHA256Downloads

Ensures that data has not changed after you download it using the SHA-256 algorithm.

Note: You can set **requireSHA256Downloads** only if you also set **enableEnhancedSecurity**.

allowSHA1Downloads

Ensures that the file download integrity check is run using the SHA-1 algorithm.

Chapter 27. Client certificate

To comply with the modern industry standards, starting from product version 10.0.7, the client certificate of the BigFix Agent will have a validity period of 13 months.

Except for a few specific cases described in the following sections, the transition to the 13-month client certificate and its subsequent management will be automatic and will not require any manual intervention.

Client Certificate Validity Period

Up to product version 10.0.6, BigFix Agents have client certificates with a validity period of 10 years.

Since the modern industry standards provide for SSL/TLS certificates with a maximum validity of 13 months, starting from product version 10.0.7, BigFix Agents will automatically have their client certificates updated to comply with the 13-month lifespan standard.

BigFix Agent Automatic Transition to 13-Month Client Certificates

On its first registration attempt, after being upgraded to version 10.0.7, a BigFix Agent will autonomously switch from a 10-year client certificate to a 13-month certificate, provided that the relay-chain, up to the BigFix Server, to which the Agent is connected, is entirely at 10.0.7 level (or later).

As long as this condition is not met, the BigFix Agent will keep the 10-year certificate, and will continue to use it as needed without this implying any limitation or compromising the BigFix Agent ability to autonomously switch to the 13-month certificate at a later time when it will have the possibility to perform a registration through a relay-chain that is entirely at 10.0.7 level (or later).

When a BigFix Agent 10.0.7 switches from the 10-year client certificate to the 13-month one, it will log the following two lines to the standard client log file (YYYYMMDD.log):

```
The current Client certificate validity (3650 days) does not match the
 value
```

```
specified in the masthead (398 days), starting the certificate update
 process now.
Completed Client certificate update.
```

BigFix Agent Automatic Maintenance of 13-Month Client Certificates

After a BigFix Agent switches to a 13-month client certificate, it will autonomously take care of keeping it up-to-date by requesting a certificate update when the expiration date of the current certificate approaches. This would normally occur **45 days** before the expiration date to have sufficient time span to deal with possible periods of shutdown, impediments, or unforeseen events.

When a BigFix Agent, at 10.0.7 level, gets an update of its 13-month client certificate, it will log the following two lines to the standard client log file (YYYYMMDD.log):

```
Client Certificate expires in N days, HH:MM:SS, refreshing it now.
Completed Client certificate update.
```

If a BigFix Agent is unable to update its certificate before it expires, if it is connected to an Authenticating Relay, it will be necessary to run the manual procedure, which is described in How to Recover from an Expired Client Certificate (on page 478), to allow it to reconnect to the BigFix deployment.

How to Monitor the Status of Client Certificates

To monitor the status of the client certificate on the BigFix Agents of your deployment, you can activate the **Client Certificate Information** analysis of BES Support. For each BigFix Agent, the analysis will provide the following information:

- **Client Certificate Expiration Date**: The expiration date of the client certificate.
- **Client Certificate Overall Validity**: The overall validity of the client certificate.
- **Client Certificate Expires In**: The remaining validity of the client certificate.

How to Recover from an Expired Client Certificate

If a BigFix Agent has an expired client certificate and it can only reach an Authenticating relay on the network, you can manually run the following command on the BigFix Agent to allow it getting an updated certificate through the Authenticating relay:

BESClient -update-certificate <password> http://<relay>:52311

The command includes a password that the Authenticating relay will verify before forwarding the update request upwards. The Authenticating relay must be at 10.0.7 level (or later).

The password on the Authenticating relay might be configured as:

- A single password set through the client setting **_BESRelay_Comm_ClientCertUpdatePassword** to be defined on the relay.
- A newline-delimited list of one-time passwords stored in a file named **ManualUpdateCertificatePasswords** and saved in the storage directory of the relay (value **StoragePath** of HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\BigFix \Enterprise Server\GlobalOptions).

Note: Passwords must have ASCII characters only.

Note: If you want to avoid specifying the clear-text password as part of the manual command, the following alternate syntax will prompt for entering the password without displaying it:

- **Windows**: cmd /c BESClient.exe -update-certificate http://<relay>:52311
- **Linux**: BESClient -update-certificate http://<relay>:52311
- **Mac**: BESAgent -update-certificate http://<relay>:52311

How to Force the Update of the Client Certificate

You have the possibility to force a BigFix Agent at 10.0.7 level to update its client certificate at any given moment by targeting it with an action that uses the following new actionscript command:

client certificate refresh

Since BigFix Agents will be able to maintain their client certificates autonomously, under normal conditions BigFix Operators are not expected to have to use this command. However, there might be cases where this command helps, for instance to address specific situations where the 45-day certificate update window is not suitable to guarantee that certificates will not expire, and so a BigFix Operator might want to anticipate the certificate update.

Note: It is important to point out that the command will force the BigFix Agent to request a certificate update regardless of the version of its relay-chain. As a consequence, in case the relay-chain is not entirely at 10.0.7 level (or later), the command will make the BigFix Agent get an updated certificate with a validity of 10 years. In this case, the Agent will switch back to applying the logic, described in BigFix Agent Automatic Transition to 13-Month Client Certificates *(on page 476)*, which allows the transition from a 10-year certificate to a 13-month one.

Chapter 28. Client Authentication

Client Authentication (introduced in version 9) extends the security model used by BigFix to encompass trusted client reports and private messages.

This feature is not backward-compatible, and clients prior to version 9.0 will not be able to communicate with an authenticating relay or server.

Note: Some of the security options of the Client Authentication feature, can also be defined by setting the **minimumSupportedClient** and **minimumSupportedRelay** services as described in BESAdmin Windows Command Line for Windows systems, or BESAdmin Linux Command Line for Linux systems.

The original security model has two central capabilities:

- **Clients trust content from server.** All commands and questions that clients receive are signed by a key that is verified against a public key installed on the client.
- **Clients can submit private reports to server.** The client can choose to encrypt reports that it sends up to the server, so that no attacker can interpret what is contained in the report. This feature is disabled by default, and is switched on with a setting.

Client Authentication extends the security model to provide the mirror image of these two capabilities:

- **Server can trust reports from clients (non-repudiation).** Clients sign every report that they submit to the server, which is able to verify that the report does not come from an attacker.
- **Server can send private data to clients (mailboxing).** The server can encrypt data that it sends to an individual client, so that no attacker can interpret the data.

Communication using an authenticated relay is a two-way trusted and private communication channel that uses SSL to encrypt all communications. However, communication between a non-authenticating relay and its children is not encrypted unless it is an encrypted report or a mailboxed action or file.

This level of security is useful for many purposes. Your company may have security policies that require authenticating relays on your internet-facing nodes, in your DMZ, or any network connection that you do not totally trust. With authentication, you can prevent clients that have not yet joined your deployment from getting any information about the deployment.

Authenticating relays

BigFix deployments with internet-facing relays that are not configured as authenticating are prone to security threats.

Security threats, in this context, might mean unauthorized access to the relays and any content or actions, and download packages associated with them or to the **Relay Diagnostics** page that might contain sensitive information (for example, software, vulnerability information, and passwords).

You can configure relays as "authenticating" to authenticate the agents. This way, only trusted agents can gather site content or post reports. Use an authenticating relay configuration for an internet-facing relays in the DMZ. A relay configured to authenticate agents only performs TLS communication with child agents or relays that present a TLS certificate issued and signed by the server during a key exchange.

When a relay is configured as *authenticating*, only the BigFix clients in your environment can connect to it and all the communication between them happens through TLS (HTTPS). This configuration also prevents any unauthorized access to the Relay and Server diagnostics page.

Note: If you need to install new clients and you can only reach an authenticating relay, then you must perform a manual key exchange. For details, see Manual key exchange *(on page 483)*.

How to enable relay authentication

To upgrade the relays to authenticating relays, do the following steps:

1. On the BES Support website, find the **BES Client Settings: Enable Relay authentication** fixlet.
2. Run the fixlet and wait for the action to finish.

You can configure relays for authentication by manually updating the `_BESRelay_Comm_Authenticating` configuration setting also. The default value of the setting is `0` which indicates that the relay authentication is disabled; to enable the authentication, set the value to `1`. For more details, see Authentication.

By default, every client re-registers with its parent relay once every six hours. Existing clients cannot send reports until they re-register themselves with the relay.

Related information

BigFix - Easily setup an internet facing relay

Handling the key exchange

When an agent tries to register and does not have a key and certificate, it automatically tries to perform a key exchange with its selected relay.

If the relay is a non-authenticating relay, it forwards the request up the relay chain to the server, which signs a certificate for the agent. This certificate can later be used by the agent when connecting to an authenticating relay.

Authenticating relays deny these automatic key exchange operations. The following is a typical scenario:

When you deploy a new BigFix 9.5 environment or upgrade an existing BigFix environment to 9.5 all agents automatically perform the key exchange with their relays. If the administrator configures the internet facing relay as an authenticating relay, the existing agents already have the certificate and work correctly. No further action is required. When you connect new agents to the authenticating relay they do not work, until the manual key exchange (on page 483) procedure is run on them.

Manual key exchange

If an agent does not have a certificate and can only reach an authenticating relay on the network, connected through the internet, you can manually run the following command on the agent so it can perform the key exchange with an authenticating relay:

```
BESClient -register [<password>] http://<relay>:52311
```

The client includes the password in its key exchange with the authenticating relay, which verifies it before forwarding the key exchange to its parent.

If you execute the command omitting the password, the password is requested interactively. On Windows sytems, run the command using the cmd /c prefix.

Another way to perform a manual registration to an authenticating relay is by setting a value to the client setting `_BESClient_SecureRegistration`. The value specifies the password needed to perform a manual registration to the authenticating relay. This setting is read only at client startup time. You can specify the relay in the `clientsettings.cfg` configuration file. For more information about this configuration file, see Windows Clients.

You can configure the password on the relay as:

- A single password in the client setting `_BESRelay_Comm_KeyExchangePassword` on the relay.
- A newline-delimited list of one-time passwords stored in a file named `KeyExchangePasswords` in the relay storage directory (value **StoragePath** of `HKEY\SOFTWARE\WOW6432Node\BigFix\Enterprise Server\GlobalOptions`).

Note: You can use only passwords that have ASCII characters and not passwords containing non-ASCII characters.

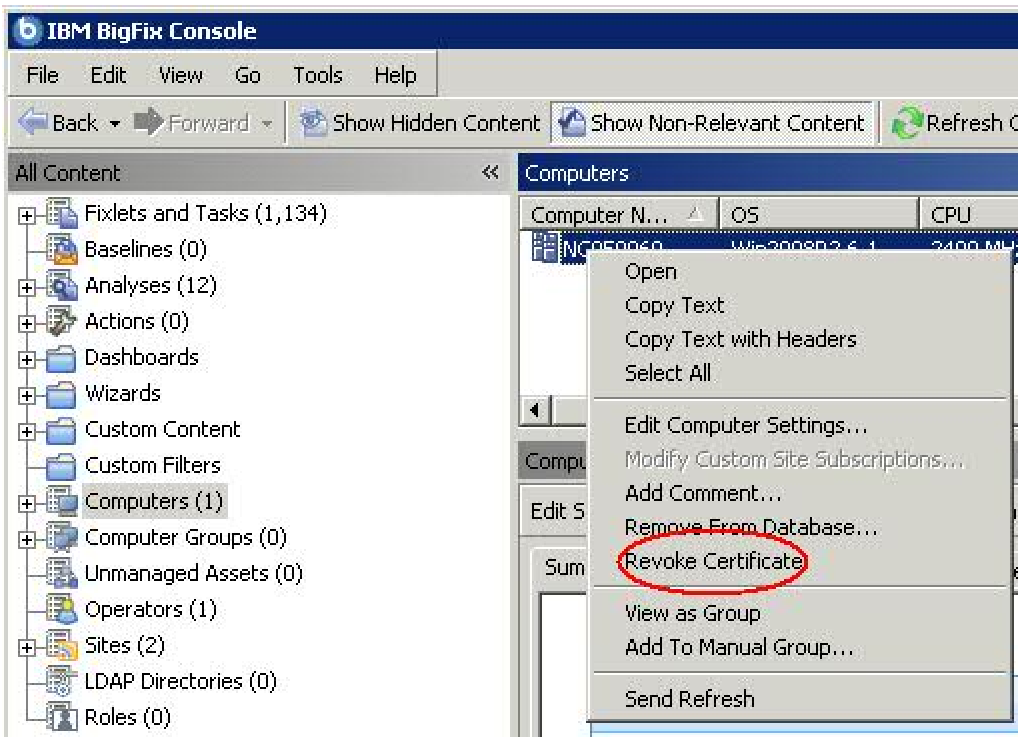
Revoking Client Certificates

After a client authenticates, you can revoke its certificate if you have any reason to doubt its validity.

When you do, that client is no longer authenticated for trusted communication. It is removed from the console and a revocation list is updated and collected by all relays, so that the client's key can no longer be used to communicate with authenticating relays.

To revoke a computer:

1. Right-click a computer in any list of computers.



2. From the pop-up menu, click **Revoke Certificate**.
3. From the confirmation dialog click **OK** if you are sure you want to remove the computer certificate.

This sends revocations down to the relays. After revoked, that client can no longer use its private key to gather content from the authenticating relays. The revoked client disappears from the computer list in the console.

Re-registering a revoked client

The client revoke procedure removes a client from the console and updates a client certificate revocation list.

Clients can automatically get a new certificate if they can connect to any non authenticating relay.

If such a relay is unavailable you must complete the following manual cleanup to register the client again:

1. Stop the client.
2. Delete the KeyStorage client directory and the client computer ID.
3. Complete the manual key exchange procedure.
4. Start the client.

At the end of this procedure the client gets a fresh certificate and a new client computer ID.

Note: If you must revoke the certificate of a SuSe client, connected to an authenticating relay but blocked from the root server, ensure that, before running the manual registration with the password, you copy the following entries in the `besclient.conf` file:

```
Settings\Client\__Relay_Control_Server
Settings\Client\__RelayServer1
```

The manual registration, in fact, deletes automatically these entries in the configuration file and does not create them again, so you must add them manually, after the registration completes, to let the client communicate again with its authenticating relay.

Mailboxing

With Client Mailboxing you can send an encrypted action to any given client, instead of broadcasting it to all clients.

This improves efficiency, since the client doesn't need to qualify every action, and it minimizes network traffic. As a consequence,

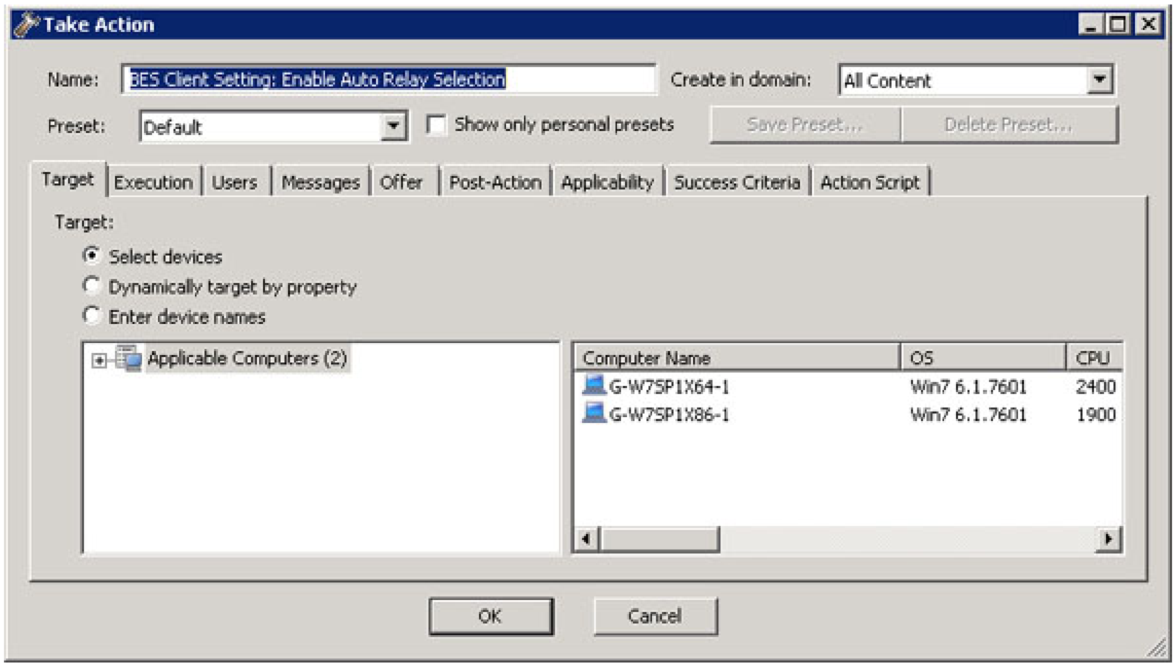
- Clients are only interrupted when they are targeted.
- Clients don't have to process actions that are not relevant to them for reporting, evaluating, gathering, and action processing.

Privacy is assured because the message is encrypted specifically for each recipient; only the targeted client can decrypt it.

A client's mailbox is implemented as a specialized action site, and each client is automatically subscribed to it. The client knows to scan for actions in this site as well as the master site and operator sites.

To send an encrypted action directly to a client mailbox, follow these steps:

1. Open the **Take Action** dialog (available from the Tools menu and various other dialogs).



Name: BES Client Setting: Enable Auto Relay Selection
Create in domain: All Content
Preset: Default

Computer Name	OS	CPU
G-W7SP1X64-1	Win7 6.1.7601	2400
G-W7SP1X86-1	Win7 6.1.7601	1900

2. Click the **Target** tab.
3. Click **Select devices** or **Enter device names**. Mail-boxing is only available when you specify a static list of clients. Dynamically targeted computers will not be encrypted and will instead be sent in the open to the master site or a specific operator site. If you

select target clients with versions prior to 9.0, the action will also go into the master or operator site.

4. Click **OK**. Actions targeted by computer ID or name will now be encrypted and sent to the client mailbox.

The identifier of the operator who deploys the action is included with the action. Before a client takes the action, it first determines if it is currently administered by that operator. If not, it refuses to run the action.

Chapter 29. Maintenance and Troubleshooting

If you are subscribed to the Patches for Windows site, you can ensure that you have the latest upgrades and patches to your SQL server database servers.

This means that you must install the client on all your computers, including the server and console computers. In addition, you might want to take advantage of these other tools and procedures:

- If you have the SQL Server installed, you should become familiar with the **MS SQL Server Tools**, which can help you keep the database running smoothly.
- It is standard practice to back up your database on a regular schedule, and the BigFix database is no exception. It is also wise to run the occasional error-check to validate the data.
- If you start to notice any performance degradation, check for fragmentation. BigFix writes out many temporary files, which might create a lot of disk fragmentation, so defragment your drive when necessary. Regular maintenance also involves running the occasional error-check on your disk drives.
- The BigFix **Diagnostics Tool** performs a complete test on the server components and can be run any time you experience problems. For additional information, see Running the BigFix Diagnostics tool.
- Check the **BigFix Management** domain often. There are a number of Fixlets available that can detect problems with any of your BigFix components. This can often prevent problems before they ever affect your network.
- Add relays to improve the overall system performance and pay close attention to them. Healthy relays are important for a healthy deployment.
- Review the **Deployment Health Checks** dashboard in the **BigFix Management** domain for optimizations and failures.
- Set up monitoring activities on the servers to notify you in the event of a software or hardware failure, including:
    - Server powered off or unavailable
    - Disk failure

    - Event log errors about server applications
    - Server services states
    - FillDB buffer directory data back-up situations

Monitoring relays health

BigFix allows you to monitor your client and relay setups to ensure they are working optimally.

Before deploying a large patch, you might want to check the status of your relays to guarantee a smooth rollout.

Here are some suggestions for monitoring your relay deployment:

- Click the **BigFix Management** domain and the **Analyses** node and activate the relay Status analysis. This Analysis contains a number of properties that give you a detailed view of the relay health.
- Click the **Results** tab for the analysis to monitor the Distance to relay property in the relay status analysis to see what is normal in your network. If your topology suddenly changes, or you notice that some of your clients are using extra hops to get to the server, it could indicate the failure of a relay.
- Try to minimize the number of clients reporting directly to the server because it is generally less efficient than using relays. You can see which computers are reporting to which relays by studying this analysis.

Relay and Server diagnostics

To monitor your BigFix environment setup and status and to complete actions on your clients.

You can use the following diagnostics functions to get information about your server and your relay settings and to complete actions on your clients. Starting from V9.5.6, the relay diagnostics page is disabled by default and can be protected by a password when enabled; for more information, see: Relay diagnostics.

To access the diagnostics, open a browser and type in the address field:

```
http://<computer_name>:52311/rd
```

or

```
http://<computer_name>:52311/RelayDiagnostics
```

where:

`<computer_name>`

Is the address of the workstation where the server or the relay that you want to check is installed.

The diagnostics page is divided in the following sections:

Relay or Server Diagnostics

In this section, you can gather information about your environment settings. Click the `+` sign to expand the different types of setting and see their values.

Note: The entry **Query Settings** refers to BigFix Query processing. For more information about this function, see Getting client information by using BigFix Query *(on page 148)*.

Relay Status Information

In this section, you can view information about the cache used on the relay in the queues dedicated to FillDB and toBigFix Query requests and results.

- **FillDB File Size Limit**
- **FillDB File Counter Limit**
- **Timeout for queries in queue** displays how long the BigFix Query requests can stay in the queue before being removed.
- **Size of queries in queue** shows the size of the cache that is used on the relay to store the BigFix Query requests.
- **Size of results in queue** shows the size of the cache that is used on the relay to store the BigFix Query results.

If you click the **Empty Query Queues** buttons, the queues that store the BigFix Query requests and results in the relay cache are cleaned up.

Console user information

In this section, you can check whether an user is authorized to access BigFix. This section is available only when you access the server diagnostic.

Click **Check User Authorization** and type the user's credentials to verify whether that user is granted access to the BigFix console without the need to actually log in with those credentials.

Site gathering information

In this section, you can collect information related to your environment sites.

- Click **Gather Status Page** to get information about site gathering status.
- Click **Gather All Sites** button to gather the latest version of site contents.
- In **Fixlet Site Requests**, you can collect information about different types of requests related to a site. Select the type of request, the URL of the site in the list provided, whether you want to use CRC or not and then click **Submit**.

Client register

In this section, you can perform requests either for a single computer or for all the computers in your environment.

- Click **Get Computer ID** button to know the computer ID of your relay.
- In **Single Computer Requests**, you can choose different types of requests related to a single computer by selecting one of the requests in the list and by clicking the **Submit** button. Depending on the request type, you might need to fill one or more text fields. The needed fields are automatically enabled.

- In **All Computer Requests**, you can select different types of requests related to all the computers in your environment by selecting one of the requests in the provided list and clicking the **Submit** button. Depending on the request type, you might need to specify the **Action ID**, if enabled.

Download information

In this section, you can collect information about the downloads that are run on the system.

- Click **Download Status Page** to get information about downloads active on your server or relay.
- Click **Download Status Text Page** to get information, in xml language, about downloads active on your server or on your relay.
- In **Download Requests**, you can collect information about a specific action for a specific site by providing the **Action ID** and the **Site URL** in the related fields. Click **Gather Download Request** button to run your request.

Virtualized environments and virtual machines

To run your operating system in multiple virtual machines.

In BigFix you can run your operating system in multiple images to benefit from the ability to share hardware and software resources. This is true especially on HCL z Systems where, within the z/VM environment, Linux images benefit from the reliability, availability, and serviceability of IBM z Systems servers and from internal high-speed communications. z/VM offers an ideal platform for consolidating Linux workloads on a single physical server where you can run hundreds to thousands of Linux images.

In BigFix design, the BESClient agent works in a loop checking the activity to run based on the contents of its directory `<BESClient_installation_path>/__BESData`. These activities, together with a large number of concurrent virtual machines as it is common in z/VM environments, might result in a 100% CPU usage. To avoid this problem and control the CPU assignment to processes, use the configuration settings described in CPU Usage.

Some useful parameters are `_BESClient_Resource_WorkIdle` and `_BESClient_Resource_SleepIdle`, that have default values of 10 and 480 milliseconds respectively, to control the CPU consumption by balancing the amount of work with the amount of idle time; with the default values, this means about 2% of work for each virtual machine. You can change these values if you need to have a lower percentage; the negative side in this instance is that the BigFix client becomes slower when a new activity must be processed. By setting new values, you can take account of the number of virtual machines and avoid the overall CPU being 100% busy.

With other parameters you can set your agents to remain quiet during a part of the day and become active for the remainder of the day; during the quiet period the CPU consumption is almost 0%. The parameters that control this behavior are `_BESClient_Resource_QuietEnable`, `_BESClient_Resource_QuietStartTime`, and `_BESClient_Resource_QuietSeconds`. For example, by setting the following values:

```
_BESClient_Resource_QuietEnable=1
_BESClient_Resource_QuietSeconds=43200
_BESClient_Resource_QuietStartTime=07:00
```

the agent enters quiet mode at 07:00 AM each day, remains in this state for 43,200 seconds, that is for 12 hours, and wakes up at 07:00 PM. During quiet mode, the agent uses almost 0% of CPU time and does not process activities.

Other useful parameters to control the amount of time a client stays in sleep mode, especially suitable when there are battery low power problems or the need to reduce CPU utilization, are `_BESClient_Resource_PowerSaveEnable` and `_BESClient_Resource_PowerSaveTimeout`*`X`* (X ranging from 0 to 5).

For a full description of all of these parameters and many more, see the configuration settings in the link listed previously.

Related reference

List of settings and detailed descriptions

Related information

CPU Usage

BES Client Helper Service (Windows only)

The BES Client Helper is intended to be a watcher process for the BES Client and will attempt to restart the service if the BES Client is not running.

The BES Client Helper will also perform a number of troubleshooting steps in the event that the BES Client service does not start at the right time:

1. It attempts a restart.
2. If it fails, it will try to remove the revocation file (create a backup copy) and attempt a new restart.
3. If it fails, it will try to remove the BESData folder and attempt a last restart.

This tool is intended to be installed as a service. It can be installed and uninstalled with the following Fixlets:

- #591: Install BES Client Helper Service
- #592: Uninstall BES Client Helper Service

The service checks the BES Client process once a day by default and no log file is produced. During the installation, you can choose a different check frequency and you can enable the logging activity.

How to change the settings after the installation: Frequency

Set the desired frequency (specified in seconds) into the registry key `_[HKEY_LOCAL_MACHINE\SOFTWARE\BigFix\BESClientHelper\ServiceRunPeriod]_` and restart the service.

How to change the settings after the installation: Logging

Uninstall and install again the helper with different settings using the Fixlet.

Alternatively, you can reinstall the service as follows:

1. Change the registry key `_[HKEY_LOCAL_MACHINE\SOFTWARE\BigFix\BESClientHelper\ServiceInstallationParameters]_` to "-l" (without quotes) to enable logging, or empty to disable
2. Run `_<path of BESClient>\BESClientHelper.exe -remove_`
3. Run `_<path of BESClient>\BESClientHelper.exe -install auto_`

Enabling debug/verbose logging for the BES Root Server and BES Relay services

This procedure describes the steps to enable debug/verbose logging on the BigFix Server or Relays, to log the activity performed by the BigFix Server and by the Relays.

Perform the following steps to enable debug/verbose logging level on BigFix server or relay.

The logging can be enabled by different means; using a Fixlet, creating a BigFix client setting with the BigFix Console or enabling it manually on the machine.

Enabling logging through the Fixlets

Use the following BESSupport Fixlets to enable/disable verbose logging on the BigFix server or relay:

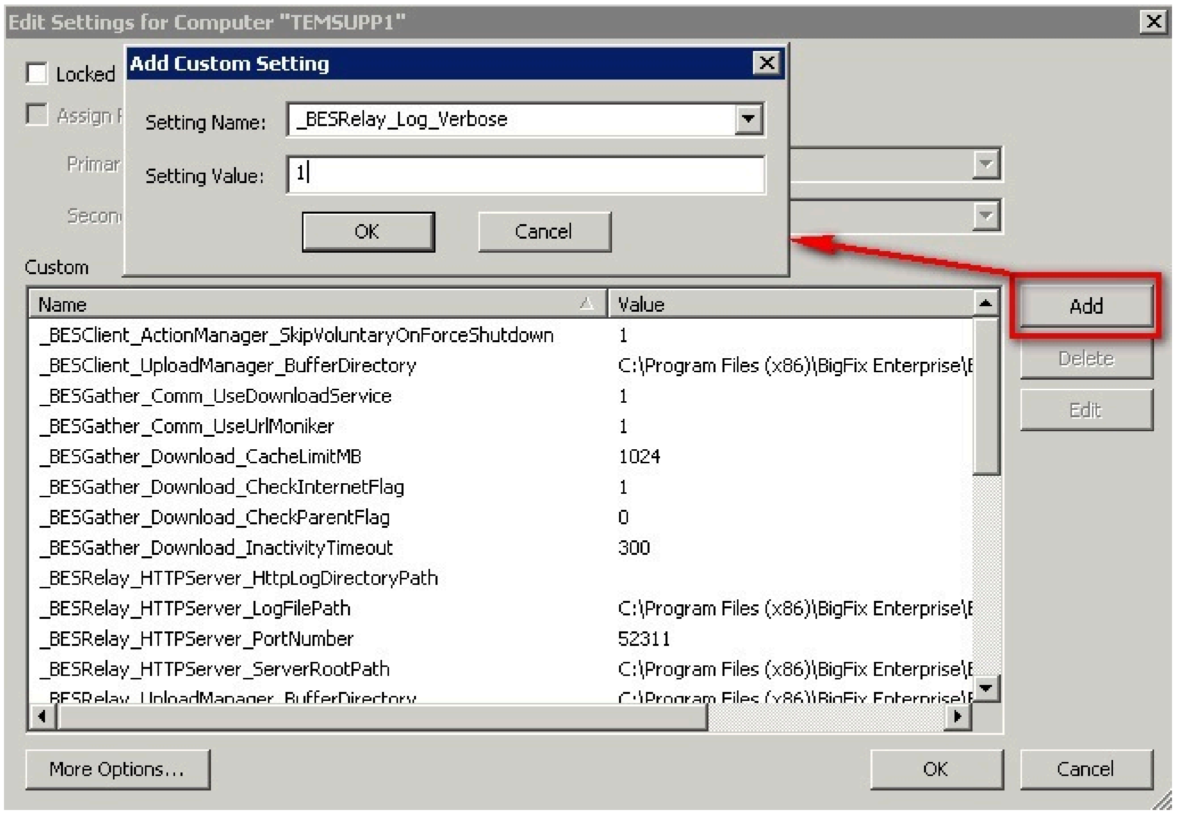
- Fixlet ID: 4595 - Enable Server verbose log
- Fixlet ID: 4596 - WARNING: Server verbose log is enabled

- Fixlet ID: 4776 - Enable Relay verbose log
- Fixlet ID: 4777 - WARNING: Relay verbose log is enabled

Enabling logging through the BigFix Console

1. Log in to the console as a master console operator.
2. Right click the BigFix Server or relay computer in the console.
3. Select Edit Computer Settings....
4. Check in the list to see if the _BESRelay_Log_Verbose setting has already been created. If it has, click the button Edit and change its value to 1 (to enable it).

5. If the setting has not been created, click the button Add to create it. Enter _BESRelay_Log_Verbose for the setting name and 1 for the setting value to enable the verbose logging.



Setting Name: _BESRelay_Log_Verbose

Setting Value: 1

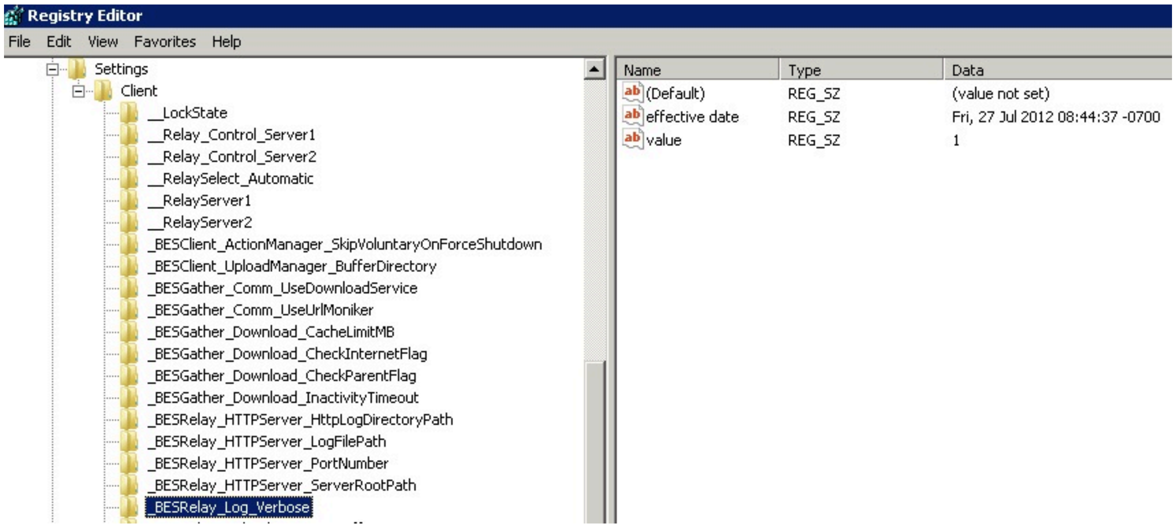
Name	Value
_BESClient_ActionManager_SkipVoluntaryOnForceShutdown	1
_BESClient_UploadManager_BufferDirectory	C:\Program Files (x86)\BigFix Enterprise\E
_BESGather_Comm_UseDownloadService	1
_BESGather_Comm_UseUrlMoniker	1
_BESGather_Download_CacheLimitMB	1024
_BESGather_Download_CheckInternetFlag	1
_BESGather_Download_CheckParentFlag	0
_BESGather_Download_InactivityTimeout	300
_BESRelay_HTTPServer_HttpLogDirectoryPath	
_BESRelay_HTTPServer_LogFilePath	C:\Program Files (x86)\BigFix Enterprise\E
_BESRelay_HTTPServer_PortNumber	52311
_BESRelay_HTTPServer_ServerRootPath	C:\Program Files (x86)\BigFix Enterprise\E
_BESRelay_UploadManager_BufferDirectory	C:\Program Files (x86)\BigFix Enterprise\E

6. Click OK. An action named "Change '_BESRelay_Log_Verbose' Setting" is taken targeted at the BigFix server or relay machine.
7. After the action has completed successfully (and the setting has been applied), the new logging level is effective for the BES Root Server service, while the restart of the BES Relay service is needed for BigFix relay. You can take action on Task # 447: Restart Service in the BES Support site to do this.

Enabling logging manually through the registry (Windows)

1. Log in to the BigFix server or relay machine.
2. Open up the registry editor (regedit).

3. Add the registry key _BESRelay_Log_Verbose in HKEY_LOCAL_MACHINE\SOFTWARE \Wow6432Node\BigFix\EnterpriseClient\Settings\Client.
4. Create a REG_SZ value named "value".
5. Set the value to 1.



```
Settings
  Client
    __LockState
    __Relay_Control_Server1
    __Relay_Control_Server2
    __RelaySelect_Automatic
    __RelayServer1
    __RelayServer2
    _BESClient_ActionManager_SkipVoluntaryOnForceShutdown
    _BESClient_UploadManager_BufferDirectory
    _BESGather_Comm_UseDownloadService
    _BESGather_Comm_UseUrlMoniker
    _BESGather_Download_CacheLimitMB
    _BESGather_Download_CheckInternetFlag
    _BESGather_Download_CheckParentFlag
    _BESGather_Download_InactivityTimeout
    _BESRelay_HTTPServer_HttpLogDirectoryPath
    _BESRelay_HTTPServer_LogFilePath
    _BESRelay_HTTPServer_PortNumber
    _BESRelay_HTTPServer_ServerRootPath
    _BESRelay_Log_Verbose
```

Name	Type	Data
(Default)	REG_SZ	(value not set)
effective date	REG_SZ	Fri, 27 Jul 2012 08:44:37 -0700
value	REG_SZ	1

6. Restart the BES Relay service if on a relay, while it is not needed on the BigFix Server.

Verbose data is output to <BigFix_Server_Installation_Folder>\BESRelay.log file on the server and <BigFix_Relay_Installation_Folder>\logfile.txt on a relay.

An example of <BigFix_Server_Installation_Folder> on the server is `C:\Program Files (x86)\BigFix Enterprise\BES Server`.

Enabling logging manually through the settings file (Linux)

1. Log in to the BigFix relay machine.
2. Stop BESClient service, to prevent the changes to the configuration file are overwritten, with the command:

   ```
   service besclient stop
   ```

3. Edit the configuration file /var/opt/BESClient/besclient.config and add or modify the following lines:

```
[Software\BigFix\EnterpriseClient\Settings\Client\_BESRelay_Log_Verbos
e]
effective date = [Enter Current Date Time In Standard Format]
value = 1
```

The effective current date time must be in a format similar to "Wed, 06 Jun 2012 11:00:00 -0700".

4. Start BESClient service with the command:

```
service besclient start
```

5. Restart the BESRelay service if on a relay:

```
service besrelay stop
service besrelay start
```

Note: The restart of BESRootServer service for the BigFix Server is not required to make the change effective.

Note: Verbose data is output to the `/var/log/BESRelay.log` file on both the server and a relay.

Note: To disable verbose logging, set the BigFix Client setting to 0.

Warning: Leave the verbose logging on just the time needed to troubleshoot the issue you are experiencing, in order to save disk space and processing resources. In large environments, leaving verbose logging on for extended periods of time may heavily lower the BES root service performances causing console timeouts and server activities deadlocks.

Note: A maximum of 10 rotated log files will be maintained in addition to the active log file with the names *logfile.txt*, *logfile.txt_0*, *logfile.txt_1*, ..., *logfile.txt_9*. The default value is 50*1024*1024 (52,428,800) bytes.

Monitoring expensive relevances on Web Reports

Monitor the relevances on your BigFix Web Reports that exceed a custom defined value to evaluate.

This feature is available starting from BigFix Version 10.0.8.

To enable this feature, perform the following steps:

1. Enable the Web Reports log and set it at least to "critical". You can use the Fixlet ID 4591 "Enable Web Reports Server log" from the BES Support site or follow the procedure described in Logging Web Reports.
2. On the machine where the Web Reports is running, add the "WarnOnLongRelevanceEvaluationMinutes" setting to indicate the number of minutes beyond which a relevance is to be considered expensive (the default is "0", that means the feature is disabled):
   - On Windows:

     ```
     HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\BigFix\Enterprise
      Server\BESReports
     Value: WarnOnLongRelevanceEvaluationMinutes
     Type: REG_SZ
     ```
   - On Linux, modify the `/var/opt/BESWebReportsServer/beswebreports.config` file by adding the key "WarnOnLongRelevanceEvaluationMinutes" in the "Software\BigFix\Enterprise Server\BESReports" section.

   When this setting is defined and its value is bigger than "0", any relevance expression that is evaluated at a time beyond this value is tracked in the Web Reports log file with a message such as the following:

```
Wed, 07 Sep 2022 16:35:56 +0200 -- /relevance (8032) -- The following
 relevance expression
exceeded the "WarnOnLongRelevanceEvaluationMinutes" timeout ( 2
 minutes ) for the evaluation:
'exists ... whose ... ' (1234 ms)
```

Appendix A. Support

For more information about this product, see the following resources:

- BigFix Support Portal
- BigFix Developer
- BigFix Playlist on YouTube
- BigFix Tech Advisors channel on YouTube
- BigFix Forum

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