HCL HERO V1.0.0.6 Documentation

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Overview

About HERO documentation

Welcome to the **HCL HERO (HEalthcheck & Runbook Optimizer)** documentation, where you can find information about how to install, configure, and use HERO.

HERO effectively helps **Workload Automation** Administrators monitor the health of their servers and perform informed recovery actions with specialized runbooks, keeping Workload Automation environments responsive and reliable. HERO brings the benefits of Artificial Intelligence (AI) technology to customers. By providing both actual KPIs (such as throughput and queue monitoring) and AI-powered trend estimation of KPIs, HERO enables the prediction of potential problems.

For information about **HCL Workload Automation**, see HCL Workload Automation documentation.

Use the Table of Contents to navigate HERO documentation and find information about how to install, configure, and use the product.

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Product Overview

Enterprises depend on **Workload Automation** to manage business critical workloads, reduce operating costs and deploy new services faster. **HCL HERO** effectively helps IT Administrators monitor the health of their servers and perform informed recovery actions with specialized Runbooks, keeping your multiple Workload Automation environments responsive and reliable. Reduce manual labor, reduce downtime of servers, and improve IT operational efficiency across the enterprise.

Capabilities

HERO effectively combines centralized application monitoring with Runbook automation, providing a solution dedicated to Workload Automation, that makes your infrastructure easy to control and hassle free.

It provides the following capabilities:

- Monitor the health of multiple production and non-production environments simultaneously
- Easily integrate a Runbook library with customized monitors and KPIs
- Provide dedicated performance indicators for Workload Automation, with predictive analysis and Runbook recommendation
- Recommend and execute Runbooks correlated to specific issues identified on the components of your application server infrastructure

Benefits

HERO brings the benefits of Artificial Intelligence (AI) technology to customers. By providing an automated, intelligent solution to monitor the health of your Workload Automation environments, HERO frees up IT Administrator’s time and reduces manual effort:

- Out-of-the-box monitors and Runbooks
    - Eliminate the need to manually maintain custom monitor scripts
    - Open platform to integrate predefined custom monitor scripts and Runbooks
- KPIs trends prediction
    - Provide actual KPIs, such as throughput and queue monitoring
    - Provide AI-powered trend estimation of KPIs to predict potential problems
- Failure prevention
    - Provide intuitive dashboard with warnings, errors prioritization, and email notification
    - Control internal queues exhaustion before system hangs
- Achieve optimum performance
    - Get insights on your infrastructure weaknesses
    - Plan resources allocation

What's New

See what's new with HERO releases.

HERO V1.0.0.6

HERO V1.0.0.6 includes the following enhancements:

1. Support of Workload Automation V10.1.0.

HERO V1.0.0.5

HERO V1.0.0.5 includes the following enhancements:

1. Workload Automation database connection through JDBC driver is no longer required. With HERO V1.0.0.5, you can get information about throughput and critical agents by using Workload Automation APIs.

2. Prediction improvement

3. HERO User Interface has been renewed to improve the user experience.

HERO V1.0.0.4

HERO V1.0.0.4 includes the following enhancements:

1. Creation, management, and monitoring of product log parsing rules with alert generation. See Log Parsing and Alert Setting.

2. Support of SSL encryption for JDBC connection.

HERO V1.0.0.3

HERO V1.0.0.3 includes the following enhancements:

1. Five additional Monitors

    - **Final Job Stream Check**

      Checks if the Final Job Stream succeeded based on Plan last update time

    - **Event Processor Monitor**

      Checks the event processing status based on Master status codes

    - **Broker Process Status**

Checks the process status of Dynamic Workload Broker V9.4 or earlier, and validates that one Broker, at maximum, is up for each environment.

- **WAS Certificate Expiration Check**

  Validates certificate expiration date for WAS

- **DB2 Certificate Expiration Check**

  Validates certificate expiration date for DB2

2. Two additional Runbooks

   - **Check rule status**

     Shows the list of active rules

   - **Start event processor**

3. An additional KPI collector

   - Job trends

Documentation in PDF format

HCL HERO documentation is available in PDF format: PDF

A Quick Start Guide for HERO is available in PDF format. It describes a quick and easy way to install the product. PDF

Product Videos

You can find a detailed description of the capabilities and benefits provided by **HERO for Workload Automation** in videos demonstrating user scenarios:

HERO for Workload Automation

Automate more, better, and smarter with HCL Automation Power Suite

How to install HCL HERO V1.0.0.3

Customer Support

To contact HCL Customer Support or create a product case, see: Customer Portal.

Installation Guide

About the Installation Guide

The Installation Guide provides information about how to install and configure HCL HERO.

System Requirements

HERO is installed using Docker.

You can install HERO on Linux 64 bit operating system.

Supported browsers

- Google Chrome
- Mozilla Firefox (Quantum recommended)

Software requirements

- Docker CE (Community Edition) Engine 18.09.0 or later
- Docker Compose 1.23.2 or later

Hardware requirements

Docker must be installed and configured with the following minimum requirements:

- CPUs 4
- RAM 24GB
- Swap 1024MB

HERO must be installed and configured with the following minimum requirements:

- CPU 64 bit, 2+ core
- RAM 32GB+
- Storage 200 GB HDD

Workload Automation Requirements

HERO can monitor Workload Automation environments starting from Workload Automation version 9.1. in which the prerequisite feature **Plan data replication in the database** (also known as "mirroring") is enabled. For more information about the “mirroring” feature, see Replicating plan data in the database.

HERO supports direct monitoring for Master Domain Manager (MDM), Backup Domain Manager (BKM), and Dynamic Workload Console (DWC). Monitoring for all the remaining agents is performed using the database on MDM.

The supported operating systems for MDM, BKM, and DWC are **AIX** and **Linux 64 bit.**

Prerequisites for connecting the monitored environments

Once the monitoring scripts are deployed to the target workstations, they are scheduled by HERO to run on a regular basis.

The HERO server requires a connection to each DB2 or Oracle instance in the monitored environments from which to collect throughput data and information about the agent status.

The following prerequisites must be met for HERO to monitor Workload Automation environments:

- SSH server daemon must be up (SSH daemon allows authentication with username and password)
- The user specified at workstation discovery time, i.e. the owner of the WA instance, must have the following permissions:
    - Permission to write in his own home directory and in the <TWA_HOME> directory. Access permission must be through SSH.
    - Permission to read the WA registries.
    - Permission to create job and job stream definitions, to submit, and cancel them.
- For some recovery actions, and for some monitors based on previous versions of Workload Automation, it might be necessary to run actions as “sudo”. In this case, the sudo user must be authorized without specifying a password.
- It must be possible for the target workstation to open an https or http connection with the HERO server (typically using port 8080, but the port number can be customized).

Starting from version 9.5, Workload Automation can be deployed on Docker containers. During the server discovery process, if containerized components are present on a server, you are requested to provide the image name for each component to be retrieved.

Ports to be opened for the communication between HERO and the product servers

For the communication between HERO and the product servers, make sure ports are opened as follows:

- From HERO to the product servers:
    - SSH port (default port 22), used by HERO to connect to the product servers
- From the product servers to HERO:
    - https on port 443 (default port) or any custom port, required for status updating
- For machines connected through WinRM protocol over https, port 5986 must be opened.

System requirements and considerations for training and prediction

Hardware requirements depend on the number of WA servers where you want to run the prediction, but you must consider that CPUs with AVX instructions support are required (for this reason, old CPUs might not work).

To start the training process, it is recommended to have at least 10 hours of new data for the prediction procedure.

The performance, in terms of computational time of the train (or retrain) procedure, is highly dependent on the technical specifications of the machine on which it runs.

There are no minimal requirements with the exception of 4GB of RAM to run FBProphet. With 8 GB of RAM available and an Intel core i7 processor, the estimated time is about 12 minutes for the training phase per server.

In addition to this time, the swap in / out time for writing and reading from Elasticsearch should also be considered.

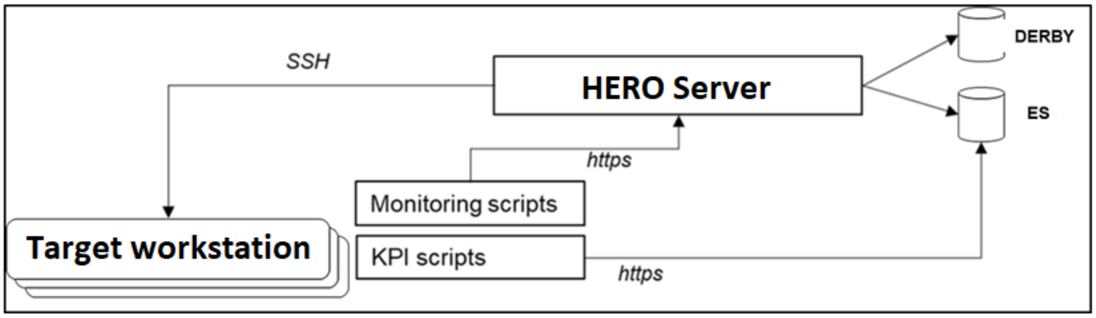
Basic Architecture

HERO consists of three main components:

- HERO Server
- HERO Historical Database (ES)
- HERO Transactional Database (Derby stored on the filesystem)

The HERO Server consists of two main components:

- HERO Web Application services (WAR application deployed on the Tomcat application server)
- HERO Dashboarding services (Kibana)



To connect to the target workstations and run discovery operations and scripts, the HERO server uses the SSH protocol.

When a target workstation is discovered, the HERO server deploys a monitoring script for each monitor previously selected by the user. The scripts are deployed in the directory specified in the scriptPath property of the dashboard.property configuration file (default directory: <%USER_HOME%\HERO>), and are scheduled to run on a regular basis.

Starting from version 9.5, Workload Automation can be deployed on Docker containers. In this case, monitors run in the container where the monitored component has been deployed.

KPI Scripts collect Performance Indicators data and send it to the historical database.

HERO Quick Start Guide

A Quick Start Guide for HERO is available in PDF format. This guide describes a quick and easy way to install the product.

To download or open HERO Quick Start Guide, see Documentation in PDF format.

Installing and Configuring HERO

Checking system prerequisites

Before starting to install HERO, you must check the following system prerequisites:

1. Verify that Docker and Docker Compose are installed, configured, and ready to use. For the required version, see System Requirements.

   If you don't have Docker and Docker Compose already installed, see Installing Docker and Docker Compose.

2. HERO requires some values to be set for **ulimit** parameter, for Linux OS. See: How to verify and set ulimit parameter.

3. Verify the available virtual memory. See: How to verify and set the available virtual memory.

4. If you are installing HERO on RHEL or CentOS distros, SELinux must be set to Permissive or Disabled. See: How to set SELinux to permissive.

5. Verify that the Workload Automation user entitled to discover servers in HERO has access to the **crontab** command.

6. Before you start HERO installation, create a License Server to associate to your license entitlement (License ID). The License Server and the License ID must be specified during the installation procedure. For details, see What is the HCL Software License & Download Portal. The license entitlement and expiration date depend on the type of license you are buying (if product, bundle, or trial).

Installation procedure

To install and configure HERO, run the following procedure.

1. From HCL License Portal download the appropriate HERO installation package.

2. Extract the content of the tar.gz file into <BUILD_DIR>, a directory of your choice. Use one of the extraction tools available on your system or downloadable from the Internet. The tool you use must be able to keep the file permissions on the extracted files.

3. If you want to enable IPv6 connectivity in Docker containers, you must properly set the subnet values (gateway and ipv6_address) in the <BUILD_DIR>/devops/templates/ipv6/docker-compose.yml file. For details, see Docker documentation.

4. HERO server uses Tomcat standard time zone (UTC). If the monitored servers use a different time zone, this might impact HERO monitoring activities. To set up a different time zone in HERO, before starting with the installation, you must edit the <BUILD_DIR>/docker-compose.yml file in the following way:

   - At the end of the following line:

     - CATALINA_OPTS=-Xmx4g -Xms4g -Dnashorn.args=--no-deprecation-warning

     add the following parameter:

     -Duser.timezone=*selected_time_zone*

     Configuration example for GMT time zone:

     - CATALINA_OPTS=-Xmx4g -Xms4g -Dnashorn.args=--no-deprecation-warning -Duser.timezone=GMT

Note:

Make sure you do not change file indentation.

For the list of supported time zones in Tomcat, see the section **Available Time Zones** in the Java documentation.

5. To install HERO on Windows operating system, user must have administrator permissions. To install HERO on Linux operating system, user must have read and write permissions for the <BUILD_DIR> directory. The user must have execute permissions for Docker commands. This means that the user must be a member of sudoers group or Docker group. If the user is a member of sudoers group but not of Docker group, the installation script must be run with sudo. Also, in order for Docker containers to access HERO configuration files, all sub-folders and files in the <BUILD_DIR>/EXT directory must have permission set to 775 .

6. For Windows, open a PowerShell console. For Linux, open a Bash shell.

7. From the <BUILD_DIR> directory, start the installation script:

   - For Linux, issue the command: **./installHERO.sh**

     To get the command help, type: **./installHERO.sh --help**

   - For Windows, issue the command: **.\installHERO.ps1**

     To get the command help, type: **Get-help .\installHERO.ps1**

   Note: By default HERO installation script will start offline. **To install HERO online, run the installation script with "-o" flag.**

8. You can supply the required parameters either within the command:

   - For Linux: **./installHERO.sh -h <current hostname> -d < current deploy path > -p < current port > -l < current licenseID>**

   - For Windows: **.\installHERO.ps1 -HOSTNAME <current hostname> -deployPath <current deploy path> -port <current port> -licenseID <current licenseID>**

   or when the installHERO script requires them during the installation process. Required parameters are:

   - **hostname -** the host name of the machine where you are installing HERO. It must be reachable from any server where you want to deploy the monitoring scripts. This parameter is **mandatory**.

     If you are installing HERO on a SELinux machine such as RHEL or CentOS, set the hostname to the Fully Qualified Domain Name of the machine. To identify it, run the command **hostname --fqdn**.

   - **port** - the https port of the HERO server. This parameter is **optional**.

   - **licenseID -** the License Key you received when you purchased the product. This parameter is **mandatory**.

   - **deployPath** - the directory on the target server in which the monitoring scripts must be deployed. This directory cannot contain blanks. This parameter is **optional**.

9. If you want to configure alerting by email, you are required to enter the following SMTP parameters:

   - **alertSMTPemail -** The sender email account [Example: username@gmail.com].

   - **alertSMTPpassword -** The password associated to the sender email account.

   - **alertSMTPserver -** Fully qualified hostname of the SMTP Server that will be used by HERO to send alerts by email [Example: smtp.gmail.com].

- **alertSMTPport -** The port of the SMTP mail server.
- **smtpTlsEnabled -** To set the TLS enablement for smtp client while establishing a connection from HERO [Can be "true" or "false". Default value is "true"].

10. If you are using a custom SSL truststore file for your JDBC connection, you are required to enter the following parameter:
    - **sslTrustStorePassword** - the SSL truststore password. You can also change the truststore password during HERO installation.
11. The installation script runs the installation process and verifies its successful completion.

Post installation steps

When the installation is complete, the following link is prompted to access the HERO dashboard:
https://<your_host_machine_address:port>/Dashboard

The installation script generates two HERO users:

- userid **test**, password **test**, with user role
- userid **admin**, password **admin,** with administrator role

Use the Keycloak administration console to define new users, new roles, or change default passwords. You can access Keycloak administration console at the following link: https://<IP:PORT>/keycloak/auth/admin by using the following credentials:

- userid=**admin**
- password=**password**

If you want, you can change Keycloak default password. For instructions, see Configuring Security.

Before adding environments to the HERO dashboard, verify that the installation process has created a **Kibana default index pattern:**

- In the environment page, check if the KPI link appears on top of the server card.
- If the link doesn't show up, manually set the Kibana default index pattern by following the procedure in the Appendix.

To stop HERO (for example, after changing some configuration parameters), from the <BUILD_DIR> directory, type **docker-compose stop.**

To restart HERO, from the <BUILD_DIR> directory, type **docker-compose start.**

For any reference, you can find the manual installation procedure in the Appendix. It guides you to manually execute the steps run by the automatic installation script.

Managing containers

To manage HERO containers, run the following procedures from the <BUILD_DIR> directory.

- To gracefully stop/restart HERO, for example after reconfiguring HERO, run the following commands:

  1. **docker-compose stop**
  2. **docker-compose start**

- To reset the containers, while maintaining HERO configuration and data stored in the DB, run the following procedure:

  1. **docker-compose down**
  2. **docker-compose up --build -d**

  This procedure doesn't reset the custom client secret if you have created one (see Configuring Security).

- To reset the containers and the HERO configuration, while maintaining the data stored in the DB, run the following procedure:

  1. **docker-compose down**
  2. **docker volume rm <BUILD_DIR>_hero-home**
  3. **docker-compose up --build -d**

  This procedure doesn't reset the custom client secret if you have created one (see Configuring Security).

- To reset the containers, the HERO configuration, and the data stored in the DB, run the following procedure:

  1. **docker-compose down**
  2. **docker volume rm <BUILD_DIR>_hero-home <BUILD_DIR>_ build_hero-db-data <BUILD_DIR>_ build_hero-es-data <BUILD_DIR>_ build_keycloak-nginx-ssl <BUILD_DIR>_ build_pgdata**
  3. **docker-compose up --build -d**

  This procedure resets also the custom client secret if you have created one (see Configuring Security). Reconfigure HERO with the default client secret or create a new one.

- In addition, to delete also HERO images, run the following command:

  docker rmi <BUILD_DIR>] _tomcat <BUILD_DIR>_prediction <BUILD_DIR>_keycloak <BUILD_DIR>_nginx <BUILD_DIR>_licensesrv <BUILD_DIR>_kibana docker.elastic.co/kibana/kibana-oss docker.elastic.co/elasticsearch/elasticsearch-oss

  This command completely uninstall HERO.

Applying changes to Runbooks and Monitors

Every time a runbook is added, or a new monitor is created, run the following commands from the <BUILD_DIR> directory:

1. **docker stop hero-tomcat**
2. **docker rm hero-tomcat**

3. **docker volume rm <BUILD_DIR>_hero-home** (to remove the configuration volume)
4. **docker-compose up --build -d**

Configuration Files

The **dashboard.properties** file contains general configuration parameters:

disk-space	Minimum percentage for the disk space monitor to generate an alert.
IPdashboard	The URL of the HERO server used by the monitoring scripts.
IPdashboard_curl_options	The options used by the CURL command run by the monitoring scripts. Used for authentication purposes on the HERO server.
elasticsearch_external	The historical database (ES) URL to be used by the monitoring scripts running on the workstation.
elasticsearch_curl_options	The options for the CURL command run by the KPI scripts. Used for authentication purposes on the Elastichsearch.
Queue_< queue name >_limit	Warning that notifies when the queue availability is lower than the limit that you set. Supported only for Workload Automation.
esClientLink	The link used by the HERO server to reach the Historical Database (ES).
kibanaLink	Link to Kibana.
scheduledTime	The frequency of the scheduling operations for HERO monitors.
esQueueMapping	Template for creating the index on ES.
esQueueDashboardTemplate	Template for creating the queue dashboard.
esQueueChartVisualizationTemplate	Template for creating the chart visualization for the queue.
esQueueGaugeVisualizationTemplate	Template for creating the Gauge visualization for the chart in the dashboard.
esQueuePanelJSONTemplate	Template for creating the Queue panel.
esThroughputMapping	Template for creating the ES index for throughput.
esThroughputChartVisualizationTemplate	Template for the throughput visualization for the chart in the dashboard.
esThroughputPanelJSONTemplate	Template for creating the throughput panel.
LaunchInContextUrl	The url of the HERO UI that will be used in the alert emails.
tempPath	The path on the HERO Server where the monitor files will be stored before deploying.
runbookLimit	Maximum number of visualized runbooks.

alertSmtpEmail	The sender email account [Example: username@gmail.com].
alertSmtpPassword	The password associated to the sender email account.
smtpPasswordEncrypted	Set encryption for the alertSmtpPassword. Can be "true" or "false". If smtp is configured through HERO installation script, the value of smtpPasswordEncrypted parameter is set to "true" (default value). If you configure smtp manually, you must set smtpPasswordEncrypted to "false".
alertSmtpServer	Fully qualified hostname of the SMTP Server that will be used by HERO to send alerts by email [Example: smtp.gmail.com].
alertSmtpPort	The port of the SMTP mail server.
smtpTlsEnabled	Set the TLS enablement for smtp client while establishing a connection from HERO. Can be "true" or "false". Default value is "true".
maxLogsShown	Maximum number of visualized logs.
licenseServer	The URL of HCL License Portal, for license validation.
licenseID	The HERO license.
pwdNeedsEncryption	Require that alertSmtpPassword must be encrypted on the first execution of SMTP application.
taskSchedulerThreadPoolSize	Max number of threads for scheduled monitors.
predictionIndexMapping	Template to create the prediction index on ES.
deployPath	Home directory in which monitoring scripts are deployed.

The **ui.properties** file configures the connection to the HERO web application services:

ip	The hostname or IP address of the HERO server.
port	The port of the HERO server.
kibanaHost	The hostname of the dashboarding service (Kibana) that is reachable by the browser.
kibanaPort	The port of the dashboarding service (Kibana) that is reachable by the browser.
protocol	The protocol to be used (http or https).
wsProtocol	The protocol used for the shell inside HERO, this protocol should be ws if the protocol property is http, otherwise this should be wss.
sshPort	The ssh port for the connection to other machines (usually 22).
keycloak	Used to configure the connection to Keycloak. Set this variable to the same value at which you set the Keycloak_URL parameter in the .tomcat.env file. For details, see Configuring Security.
roles	Available roles in the HERO Keycloak security configuration, separated by comma.

clientSecret	Used to configure HERO with a new secret in place of the default one. For details, see Configuring Security.

If a re-configuration is done on dynamic files, such as **dashboard.properties** or **ui.properties**, restart docker-compose by running the following commands:

- **docker-compose stop**
- **docker-compose start**

Upgrading HERO

You can upgrade your HERO installation only to V1.0.0.4 while you can get a fresh install of HERO V1.0.0.5 or V1.0.0.6.

To upgrade your HERO installation to V1.0.0.4, run the following procedure.

1. From Keycloak administration console, in the left side navigation bar, select **Clients > nginx**. From the tab **Credentials**, copy the content of the field **Secret** and save it

2. Backup the content of the build folder of the previous HERO installation and keep track of the value assigned to the parameters asked in prompts by the installation script

3. From <HERO_installation_dir> directory, run the command **rm -rf * && rm .tomcat.env**

4. Unzip V1.0.0.4 HERO package in the same <HERO_installation_dir> directory

5. Edit the following files:

   ui.properties in <hero_home>/CONFIGURATION/HERO/>

   .tomcat.env in <hero_home>/

   and replace the secret key with the value you saved in step 1

6. Launch the installation (see Installing and Configuring HERO) and reply with 'n' when the installation procedure prompts you the question "Do you want to prune Hero volumes [y/n]:"

7. Log into HERO UI and for all the already existing HERO servers click the gear button and select **Refresh Server**

Configuring Alerts

To enable alert generation, HERO uses a built-in alerting framework that can be customized with different logics. For example, you can decide that an alert is generated when one of the environments is in error or warning status.

The customization is managed by a JavaScript file in which your can develop the logic for triggering an alert, and the action that the alert must run like, for example, sending an email, or executing a command on the machine that generated the alert.

To configure alerts, run the following steps:

1. To enable alerts by email, add the following settings to the **dashboard.properties** file located in the <BUILD_DIR>\CONFIGURATION\HERO directory:

alertSmtpEmail	The sender email account [Example: username@gmail.com] .
alertSmtpPassword	The password associated to the sender email account.
smtpPasswordEncrypted	Set encryption for the alertSmtpPassword. Can be "true" or "false". If smtp is configured through HERO installation script, the value of smtpPasswordEncrypted parameter is set to "true" (default value). If you configure smtp manually, you must set smtpPasswordEncrypted to "false".
alertSmtpServer	Fully qualified hostname of the SMTP Server that will be used by HERO to send alerts by email [Example: smtp.gmail.com]
alertSmtpPort	The port of the SMTP mail server.
smtpTlsEnabled	Set the TLS enablement for smtp client while establishing a connection from HERO. Can be "true" or "false". Default value is "true".

2. You can implement the alert logic by properly setting the file **Alert.js** located in the <BUILD_DIR>\CONFIGURATION\HERO\Alerting. The file is composed of three sections:

   - **Alerts**
   - **doStandardAlerts** function
   - **doAlerts** function

   The Alerts section is a list of objects that define different kind of alerts and is used by the **doStandardAlert** function.

   The **doStandardAlert** function checks the alerts. When it finds the alert matching with the just happened event, it returns the alert and the framework runs the action that has been defined for that alert.

Alerts structure:

```
[

{

      "component": "ENV",         //Only works with ENV,

      "state": "ERROR",           //The trigger state, this can be: ERROR, WARNING, or SUCCESS

      "action": "SEND_EMAIL",     //Only works with SEND_EMAIL

      "subject": "Environment in error",       //the email subject

      "message": "message1",      //the email message

      "targets": user1@email.com;user2@email.com            // the addresses to which the email must be sent

},

{

      "component": "ENV",

      "state": "WARNING",

      "action": "SEND_EMAIL",

      "subject": "Environment in warning",

      "message": "message2",

      "targets": "user3@email.com"


},

{….

 ….

}

]
```

For each alert, the **message** element contains specific variables that are replaced automatically by the system. For example, by setting:

```
          "message": "The environment %ENV_NAME% type %ENV_TYPE% is in error"
```

the target user will receive an email containing the name and type of the environment in error.

The **doStandardAlerts** function has the following parameters:

- **componentType**: the type of the component
- **oldStatus**: the previous status of the component
- **newStatus**: the current status of the component
- **Variables**: an object containing a list of useful information for the alerts

3. You can optionally configure Alerts in an advanced way, by using the **doAlerts** function. The **doAlerts** function has the same parameters of the **doStandardAlerts** function. However, it is not used to return alert objects but to execute the alerts directly from the **.js** file. The d**oAlerts** function exposes two actions:

   - **AlertManager.runAction(command, machineId)** which runs the shell command on the machine identified by the machineId
   - **AlertManager.sendEmail(subject, targets, message)** which sends an email to all the targets defined by its parameters, where:
     - **targets** is a string with all the email addresses separated by semicolon: "user1@email.com; user2@gmail.com"
     - **subject** is the subject of the email that will be sent
     - **message** is the email content and can be written in html

Creating Runbooks

To create a Runbook, add a file with name **RunbookName.js** in the folder <BUILD_DIR>\CONFIGURATION\HERO\runbook (spaces in the file name are not allowed).

The file content must be the following:

```
function getRunBook() {

    var returnValue = {};

    returnValue = {

        actionID: "RunbookName",

        author: "John Nash",

        name: "Cool RunBook",

        description: "This runbook is very cool,

        component: "component_name",

        summary: "This is a test runbook",

        commands: "a command %HOME_DIR% with the first parameter = %PARAM1%, the second one = %PARAM2%
and the last one=

         %PARAM1%__%PARAM1% - - %PARAM_LIST% and that's it",

        os: "linux",

        rating: 0,

        docLink: "http://www.google.com",

        readonly:true,

        parameters: [

                        {

                        "name": "PARAM1",

                        "type": "string",

                        "value":"",

                        "default":"my_name"

                        },

                        {

                        "name": "PARAM2",

                        "type": "number",
                        "value": "",

                        "default": "123"

                        },

                        {

                        "name": "PARAM_LIST",

                        "type": "collection",

                        "value": "",

                        "default": "two",

                        "options": ["one","two","three"]

                        }

                    ]

        }

    return JSON.stringify(returnValue);

}
```

Note: returnValue is where you define the runbook json.

You must define the following parameters:

actionID	The unique ID of the runbook. It must be equal to the name of the file. Spaces are not allowed
author	The author of the runbook
name	The name of the runbook
description	The description of the runbook
component	The list of the components where the runbook can run
summary	An explanation of what the runbook does
commands	A list of commands that will run on the machine
os	Tthe operative system where the runbook can run
rating	The runbook usefulness. It is updated by the users
docLink	Link to the documentation
readonly	If true, the runbook script cannot be modified. Variables and parameters still work

parameters	The list of the parameters (name and type) inserted by the users from the UI

After a new Runbook is added, run the following commands from the <BUILD_DIR> directory:

1. **docker stop hero-tomcat**
2. **docker rm hero-tomcat**
3. **docker volume rm <BUILD_DIR>_hero-home   (to remove the configuration volume)**
4. **docker-compose up --build -d**

Training and Prediction

Training and prediction processes run automatically inside the hero-predictor container every 6 hours.

By default, predictions are made for the next 24 hours and requires at minimum 20 mins. To obtain meaningful predictions, it is recommended to have at least 10 hours of KPI collection.
User has the option to manually trigger predictions for individual machines.

Configuring Security

HERO user authentication is managed by Keycloak.

In Keycloak, each application has its own Realm with different users and authorization settings. HERO authorization settings are stored in a Realm named HERO.

In HERO Realm, the nginx client uses Keycloak to manage user authentication to the remote machines providing a single sign-on solution.

For details about Keycloak, see Keycloak documentation.

The steps to configure the security for your HERO installation, including the generation of a new secret, and the customization of SSL certificates, are run automatically by the installation script.

The installation script generates two HERO users:

- userid **test**, password **test**, with user role
- userid **admin**, password **admin,** with administrator role

To add additional users, roles, or to change the default passwords, see the steps in Creating a new user below.

Configuring Security manually

To properly customize Keycloak in your environment, run the following steps:

1. In the <BUILD_DIR> directory, find the .tomcat.env file.
2. In the .tomcat.env file, find the variables:
   - CLIENT_SECRET
   - KEYCLOAK_URL
3. In the KEYCLOAK_URL {"realm": "hero","url": "https://hero.hcltech.com/keycloak/auth","clientId": "nginx"}, replace the hero.hcltech.com part with <IP>:<PORT> of the host machine.

   If the port used in the docker-compose.yml file is the default one (443), only the <IP> value must be added.
4. In the <BUILD_DIR>\CONFIGURATION\HERO\ui.properties configuration file (see Installing and Configuring), set the variable keycloak to the same value assigned to KEYCLOAK_URL in step 3.
5. After the execution of the docker-compose up --d command, the user test, with password test, is automatically created and authorized to access the HERO dashboard **https://<your_host_machine_address:port>/Dashboard.**
6. To create a user with administrator role, see the steps in Creating a new user below.

Creating a new user

The installation process generates a Keycloak default realm named **HERO** and a default client named **nginx.**

For additional information about Keycloak realms and clients, see Keycloak documentation.

Use the Keycloak administration console to define new users, new roles, or change user passwords.

For example, to create a new HERO user with administrator role, run the following steps:

1. Access Keycloak administration console **https://<IP:PORT>/keycloak/auth/admin** by using the following credentials:
    - userid=**admin**
    - password=**password**
2. If you want, you can change Keycloak default password:
    a. From Keycloak administrator console, in the upper right corner, click **Admin**:
    b. Select **Manage account -> password**
3. Under **Clients -> nginx -> roles tab,** click the **Add role** button
4. Provide the role name **admin** and click **save**
5. Under **users,** click the **add user** button
6. Provide a user name and click **save**
7. Under **Credentials**, provide a password for the user, turn the **temporary** field to Off, click the **Reset Password** button and confirm
8. Under **Role Mappings,** in the **Client Roles** dropdown, select **nginx**. Some boxes appear on the right
9. Under **Available Roles**, select **admin** and click the **Add Selected** button. The **admin role** appears in the **Assigned Roles** box
10. On the left navigation bar, select the **Realm Settings** page and go to the **Themes** tab
11. In the **Login Theme** parameter, select the **Keycloak** theme, then click save

Generating a new secret

For security reasons, you are recommended to generate a new client secret, in place of the default one. To generate a new client secret and customize HERO accordingly, run the following steps:

1. From Keycloak administration console, in the left side navigation bar, select **Clients->nginx.**
2. From the tab **Credentials**, click **Regenerate Secret.**
3. Copy the content of the field **Secret.**
4. From the <BUILD_DIR> directory, run the commands:
    - **docker-compose down**
    - **docker volume rm <BUILD_DIR>_hero-home** (to remove the configuration volume)
5. In the <BUILD_DIR>\CONFIGURATION\HERO directory, find the .tomcat.env file.
6. Paste the content you copied from the field **Secret** into the **CLIENT_SECRET** parameter.

7. In the <BUILD_DIR>\CONFIGURATION\HERO\ui.properties configuration file, paste the same content into the **clientSecret** parameter.

8. From the <BUILD_DIR> directory, run the commands **docker-compose up --build**

Customizing SSL certificates

To install your own SSL certificates, run the following procedure:

1. In the <BUILD_DIR>\config folder, replace the hero.key and hero.crt default certificate files with your own files (do not change the default names).

2. Complete the installation procedure, or run the following command from the <BUILD_DIR> directory to update a pre-existing installation:

docker-compose up -d –build

Customizing Keycloak for AppScan

In the Keycloak administration console, selecting **Client -> nginx**, the parameter **Redirect URIs** has a default value set to **"*"**, which means that the login can be redirected to every URI. To avoid this is identified as an issue by AppScan, modify the **Redirect URIs** parameter by adding only the URIs requested by HERO:

HOSTNAME\Dashboard

HOSTNAME\tomcat

HOSTNAME\keycloak

HOSTNAME\elasticsearch

HOSTNAME\kibana

HOSTNAME\prediction

where HOSTNAME is the hostname of the machine where HERO is installed.

Licensing

To use HERO, the license key must be inserted into the **licenseID** field, in the **<BUILD_DIR>\CONFIGURATION\HERO\dashboard.properties** file.

This step is automatically executed by the installation script. If you run a manual installation, take care of updating the **licenseID** field properly.

Appendix

This Appendix contains:

1. A procedure to install Docker and Docker Compose.
2. A manual procedure to install HERO: it guides you to manually execute the steps run by the automatic installation script.
3. Information about using DB2 database instead of Derby.
4. NGINX configuration example.

Installing Docker and Docker Compose

To remove any previous installation and reinstall Docker, run the following commands as a user with root privileges (i.e. sudo):

1. systemctl stop docker
2. yum remove docker docker-client docker-client-latest docker-common docker-latest docker-latest-logrotate docker-logrotate docker-selinux docker-engine-selinux docker-engine
3. rm /etc/yum.repos.d/docker*.repo
4. yum install -y yum-utils device-mapper-persistent-data lvm2
5. yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo
6. yum install docker-ce docker-ce-cli containerd.io
7. systemctl start docker
8. usermod -aG docker YOUR_DOCKER_USER_HERE
9. systemctl enable docker.service
10. systemctl daemon-reload

For Docker Compose, run the following commands:

1. curl -L https://github.com/docker/compose/releases/download/1.24.0/docker-compose-`uname -s`-`uname -m` -o /usr/local/bin/docker-compose
2. chmod +x /usr/local/bin/docker-compose
3. sudo ln -s /usr/local/bin/docker-compose /usr/bin/docker-compose

Installing HERO manually

To manually install HERO, run the following procedure:

1. Unzip the HERO Docker build file in the <BUILD_DIR> directory.
2. In the <BUILD_DIR>\CONFIGURATION\HERO directory, locate the dashboard.properties and ui.properties configuration files and customize the following properties with the external hostname and ip address of the workstation where HERO is being installed:

- **dashboard.properties**
  - IPdashboard
  - elasticsearch_external
  - LaunchInContextUrl
- **ui.properties**
  - IP
  - kibanaHost
  - keycloak

3. Configure HERO Security as described in Configuring Security.

4. From the <BUILD_DIR> directory, type **docker-compose up -d** to start HERO.

5. Type **https://<your_host_machine_address>/Dashboard** to access HERO dashboard (can be default access port 443, or your custom port).

6. Before adding environments to HERO dashboard, create a Kibana default index pattern by running the following steps:

   a. Connect to Kibana console by typing: **<kibana host:port>/kibana/**

   b. On the navigation bar, click **Dev Tools**

   c. On the left text area, write the following text: “PUT default”

   d. Click the green arrow

   e. On the navbar, enter **Management**

   f. Click **Index Patterns**

   g. In the index pattern field write default* then, click **Next Step**

   h. Click the **Create Index Pattern** button

   i. Now that you have created the index pattern, verify that Kibana uses it as a default: on the left list, if the index pattern presents a star, the configuration is complete

   j. If the star is not present, select the index pattern and click the star button at the top right of the page

7. Hero installation has been completed: you can start adding environments.

8. To stop HERO, from the <BUILD_DIR> directory, type **docker-compose stop**

9. To restart HERO, from the <BUILD_DIR> directory, type **docker-compose start**

Using DB2 database instead of Derby

If you want to use DB2 database instead of Derby, run the following steps:

1. Create the database instance

2. Run the following scripts on the database instance:
    - dashboard.sql (to create the default schema)
    - componentActions.sql (default data)
    - componentGlobalAction.sql (default data)
    - scripts.sql
3. Add the JDBC driver jar files in the <BUILD_DIR>\CONFIGURATION\HERO\lib directory
4. In the <BUILD_DIR>\CONFIGURATION\HERO\conf directory, edit the **context.xml** file and add the following text in the <Context> tag:

```
<Resource name="jdbc/console"
    global="jdbc/console"
    auth="Container"
    type="javax.sql.DataSource"
    driverClassName="com.ibm.db2.jcc.DB2Driver"
    url="jdbc:db2://<host-machine-db2>:<port_db2>/console"
    username="<username_db2>"
    password="<password_db2>"/>
```

NGINX configuration example

The following example shows how to configure an NGINX server for providing authentication and using the HTTPS protocol without configuring each node:

```
upstream tomcat {
   server tomcat:8080 fail_timeout=0;
}
upstream elasticsearch {
  server elasticsearch:9200 fail_timeout=0;
}
```

```
upstream kibana {
  server kibana:5601 fail_timeout=0;
}
server { # simple reverse-proxy
      listen       443 ssl default_server;
      ssl_certificate     /usr/share/cert/localhost.cert;
      ssl_certificate_key /usr/share/cert/localhost.key;
      auth_basic_user_file /etc/nginx/.htpasswd;
      auth_basic "Access restricted";

      location /Dashboard {
        proxy_pass      http://tomcat;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto https;
      }
      location /ES {
        rewrite /ES/(.*) /$1  break;
        proxy_pass      http://elasticsearch;
      }
      location /kibana {
        proxy_pass      http://kibana;
      }
}
```

User's Guide

About the User's Guide

The User's Guide provides information about how to use HCL HERO.

Getting started with HERO

Adding servers to your environment

Scheduling Maintenance

Auditing

Log Parsing and Alert Setting

For detailed how-to user scenarios, see the video HERO for Workload Automation.

Getting started with HERO

After the installation has completed successfully, you need to add the servers to be monitored. Run the following steps:

1. Access the HERO dashboard at the following link: **https://<hostname_or_ip>/Dashboard/**.
2. Login with userid **admin**, password **admin.**
3. From the main page, create an environment.
4. Click on the just created environment and add a new server by specifying the required information. For details, see: Adding Servers to your environment.
5. For the discovered server, activate the monitors. Run the following steps::
   a. Click the **monitors** link on the server card.
   b. Activate the selected monitors.
   c. Wait for a few minutes and verify that all the selected monitors become green, red, or yellow.
6. The monitoring scripts are automatically scheduled by HERO on a regular basis.

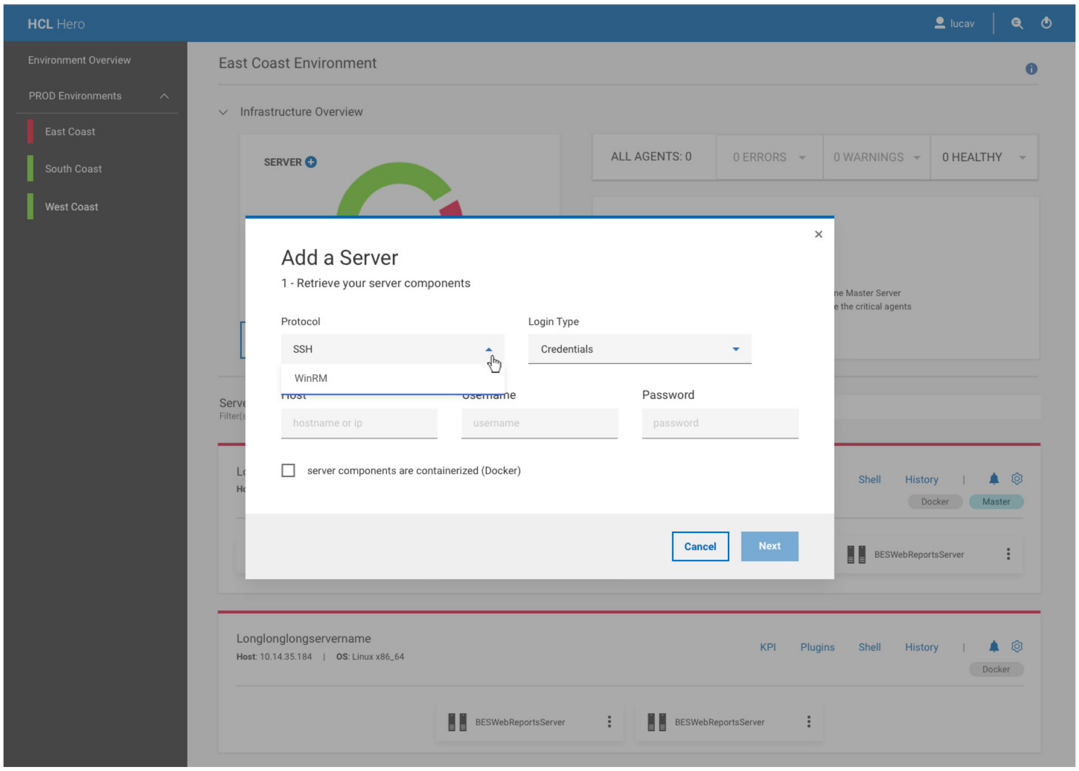
Adding Servers to your environment

From the Server section of your environment, click **Add Server** to add a new server and retrieve the server components.

You can login to the remote machine in two different ways:

1. **Login with credentials, through SSH or WinRM protocol**

   In this case, enter the server hostname or ip address, the username and password of the owner of the product instance installed on the server.



Add a Server

1 - Retrieve your server components

Protocol: SSH (WinRM)

Login Type: Credentials

Host: hostname or ip

Username: username

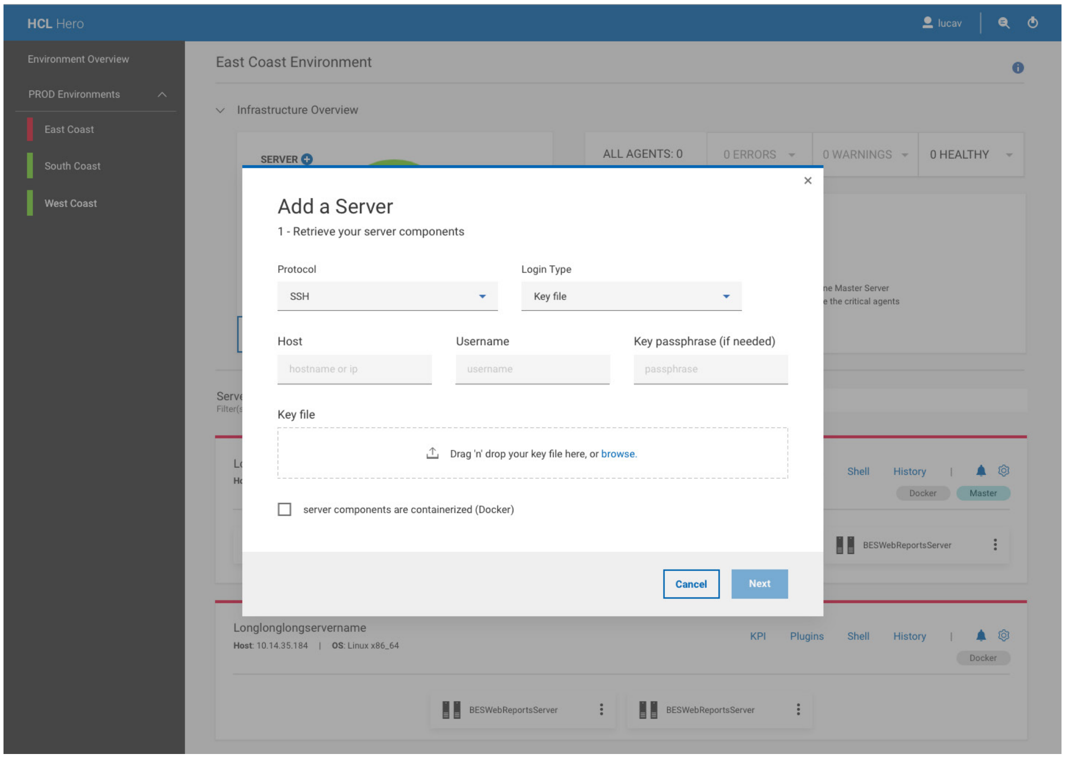
Password: password

□ server components are containerized (Docker)

2. **Login with SSH Key**

   In this case, enter the server hostname or ip address, the username of the owner of the product instance installed on the server and, optionally, a key passphrase. The passphrase is needed if your private key is passphrase protected. In the dotted area, drag and drop your SSH key file or click **browse** to search the file system. Once you have inserted your SSH key file, you can delete and/or replace it, if needed. The SSH key file can be of any supported format and must contain only the key string.

   Your private key is **temporarily** saved by HERO and used only to add the server. After that, your certificate is deleted and replaced by a HERO certificate.



Add a Server

1 - Retrieve your server components

Protocol: SSH

Login Type: Key file

Host: hostname or ip

Username: username

Key passphrase (if needed): passphrase

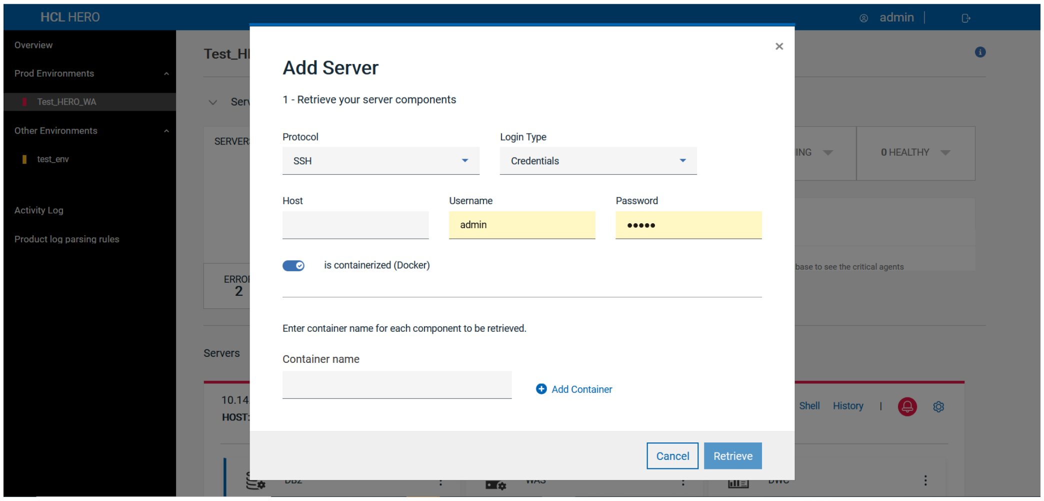
Key file

Drag 'n' drop your key file here, or browse.

□ server components are containerized (Docker)

Cancel Next

3. If the server that you want to add contains containerized components, you must check the related box in the Add Server panel, and provide the container name for each component to be retrieved.



Add Server

1 - Retrieve your server components

Protocol: SSH

Login Type: Credentials

Host:

Username: admin

Password: •••••

● is containerized (Docker)

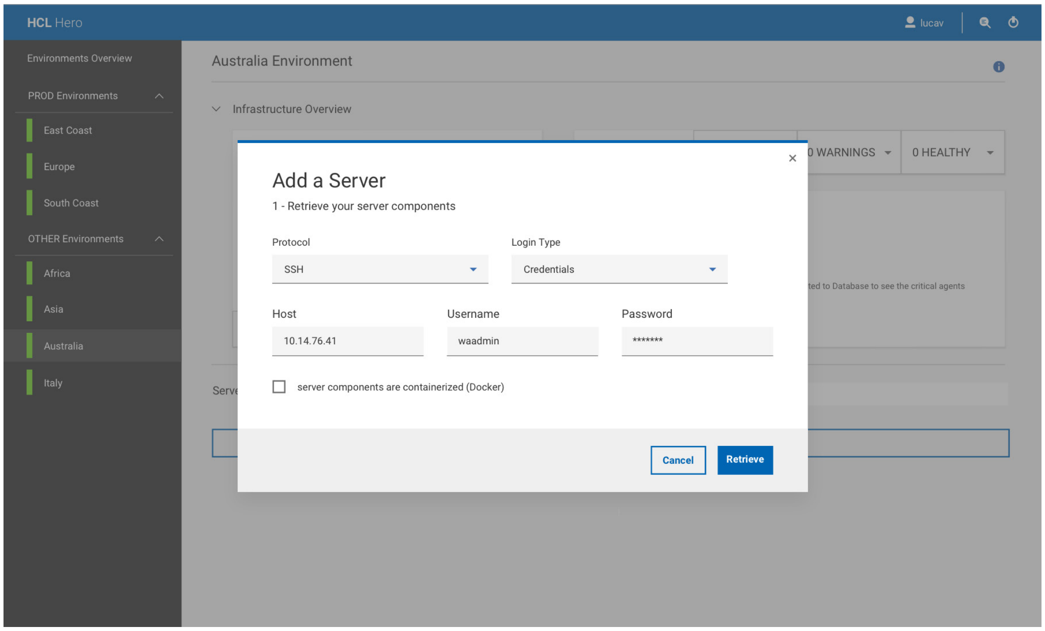
Enter container name for each component to be retrieved.

Container name

Add Container

Cancel Retrieve

4. After you have successfully logged in to your server, click **Retrieve.** HERO will automatically discover the Workload Automation components deployed on the server.



Add a Server

1 - Retrieve your server components

Protocol: SSH

Login Type: Credentials

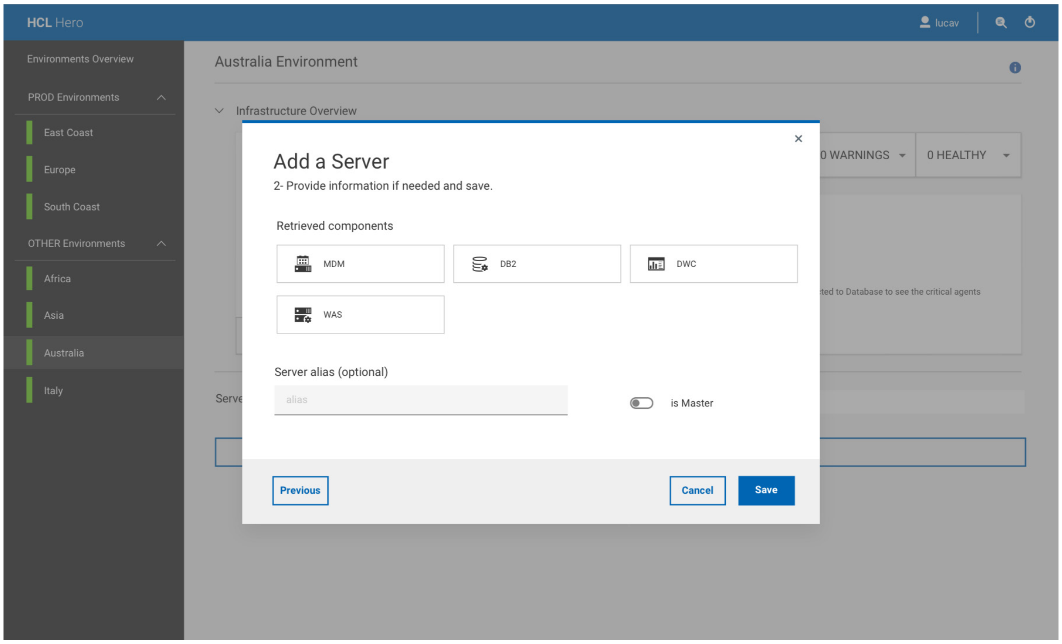
Host: 10.14.76.41

Username: waadmin

Password: *******

□ server components are containerized (Docker)

5. If you flag the server as "Is master", a form will appear to specify the parameters needed to retrieve the list of the critical Agents. Provide the engine hostname, and the username and password of the user enabled to run Workload Automation Rest APIs.



Add a Server

2- Provide information if needed and save.

Retrieved components

MDM

DB2

DWC

WAS

Server alias (optional)

alias

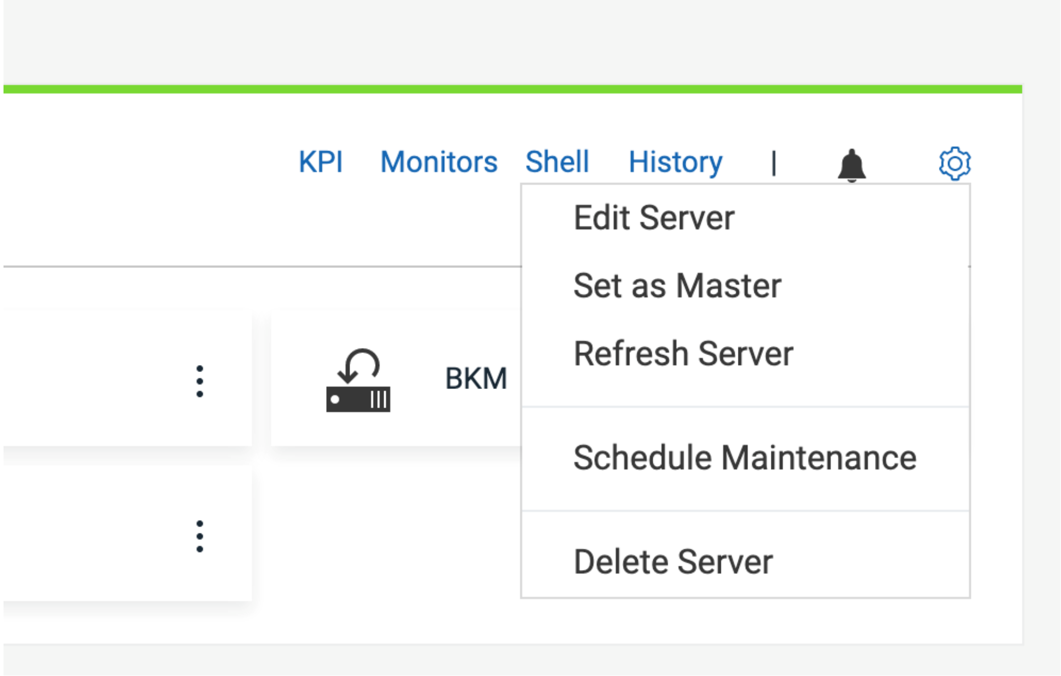
○ is Master

6. Click **Save** to add the server to your environment.

Refreshing Server information

After you have added a server to your environment, you might want to refresh the server information. Run the following steps:

1. From the server drop-down menu, select **Refresh Server**.



2. The retrieve process is run again over the existing server connection.

3. When the retrieve process has been completed, the Save Server panel is shown with updated information from the server.

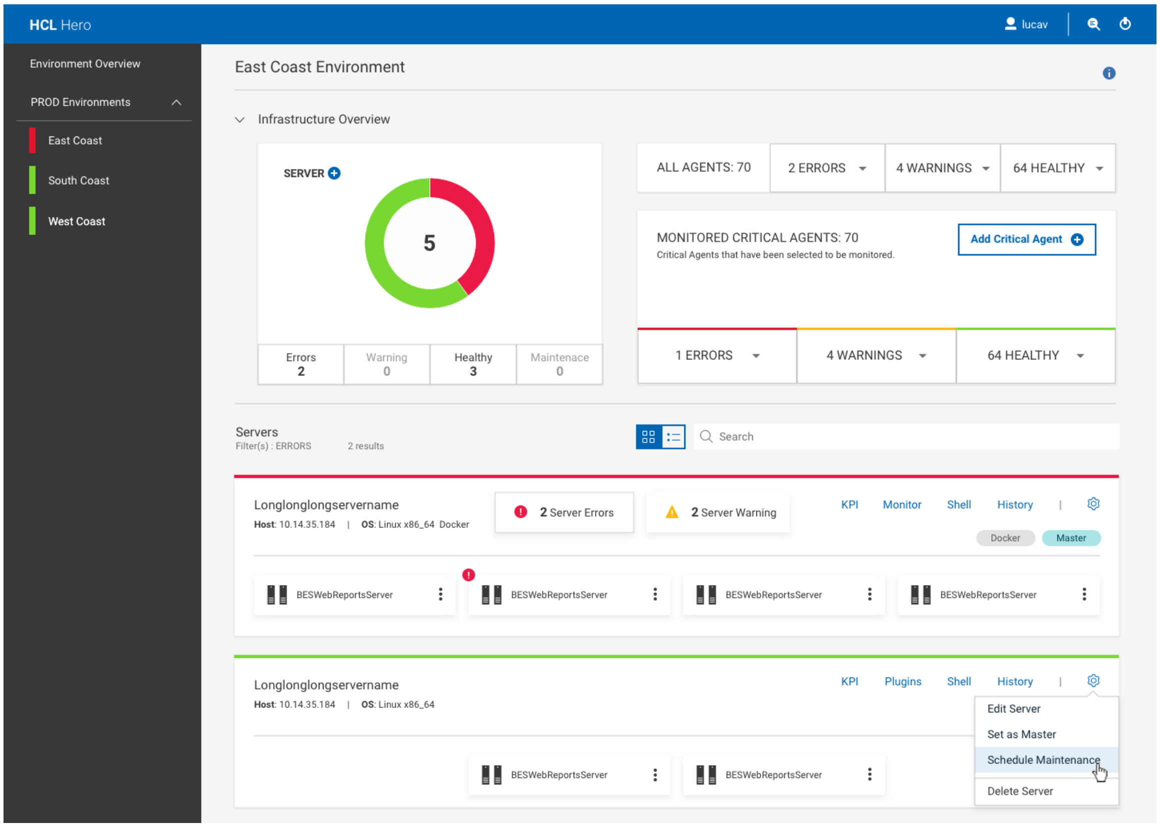
4. You can edit information, such as: server alias, "is Master" flag, and database information, just like during the usual retrieve process.

5. Save the server with the updated information in your environment.

Scheduling Maintenance

You can schedule server maintenance from the server drop-down menu.

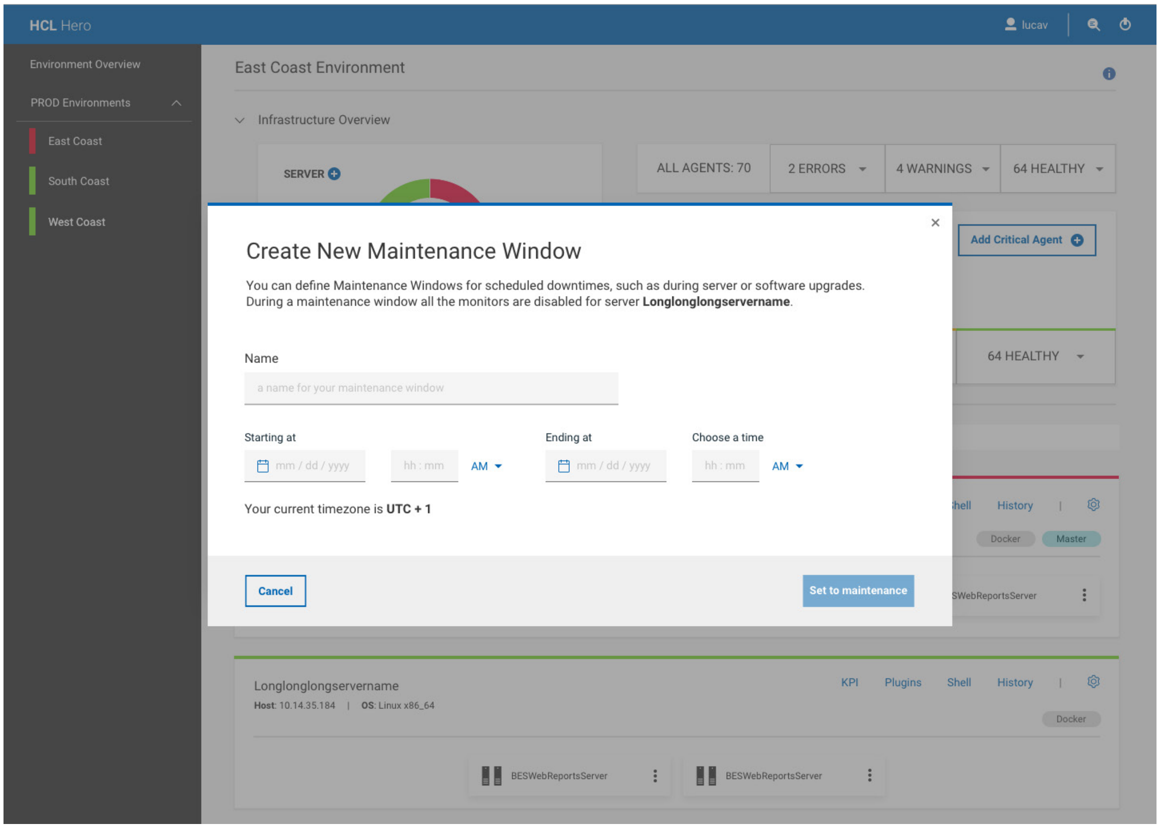
Note: During a maintenance window, all the server monitors are disabled.



In the **Create New Maintenance Window** page, you can set :

- The name of the maintenance window
- The start date and time, the end date and time

Click **Set to maintenance** to enable the maintenance window.



Create New Maintenance Window

You can define Maintenance Windows for scheduled downtimes, such as during server or software upgrades. During a maintenance window all the monitors are disabled for server **Longlonglongservername**.

Name: a name for your maintenance window

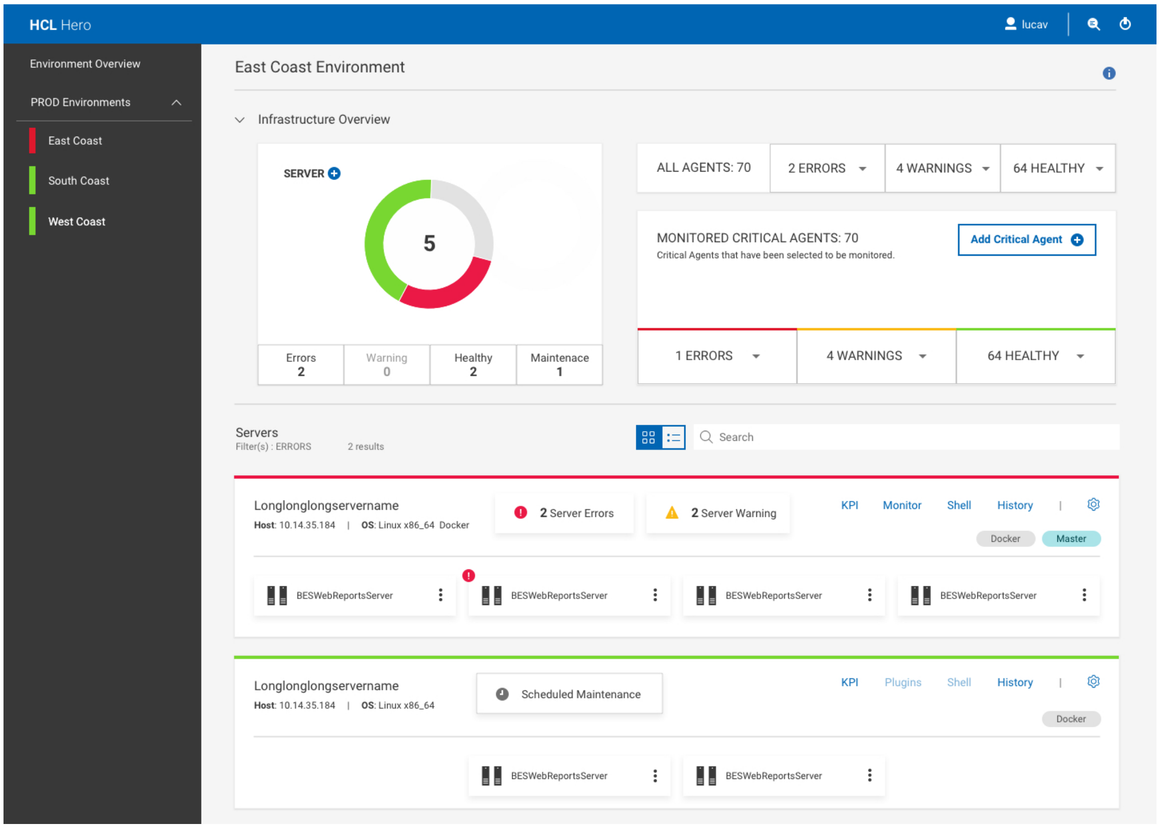
Starting at: mm / dd / yyyy hh : mm AM

Ending at: mm / dd / yyyy

Choose a time: hh : mm AM

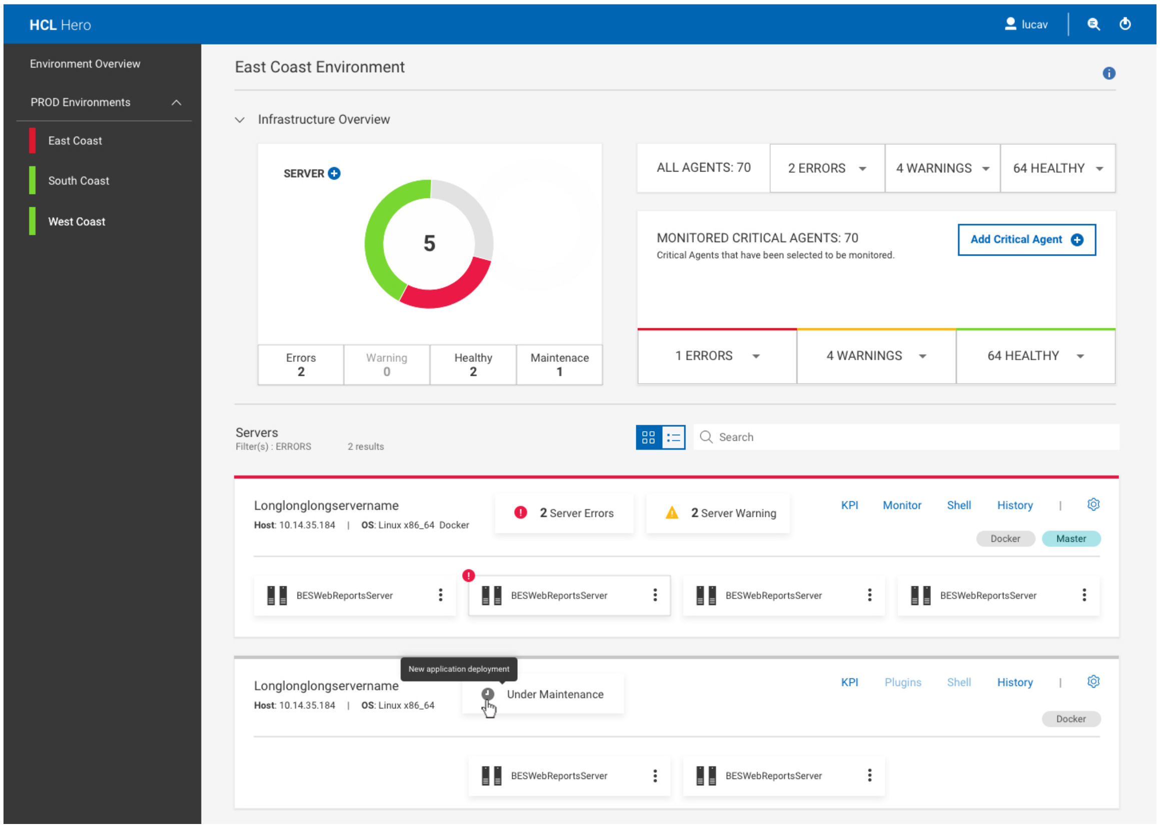
Your current timezone is **UTC + 1**

To update the maintenance window, click on the **Scheduled maintenance** card.

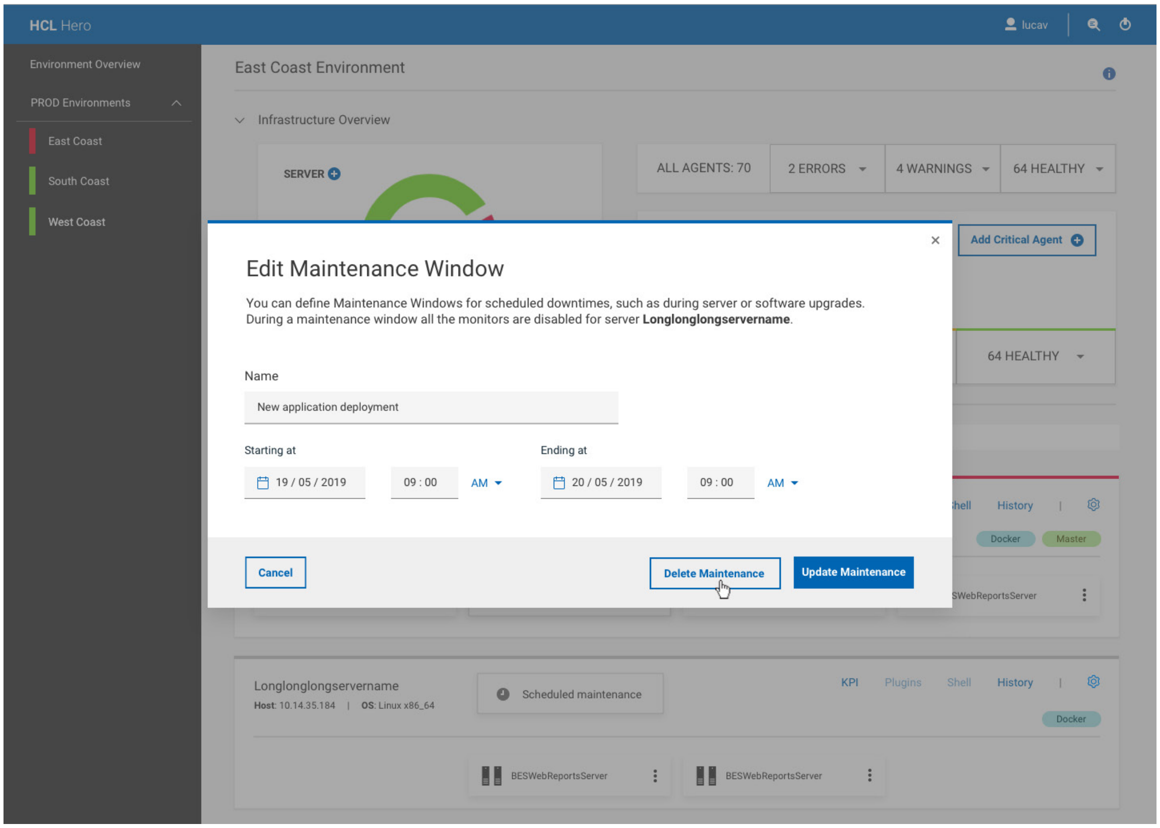


Critical Agents that have been selected to be monitored.

When the maintenance is started, the card indicates an **Under maintenance** status. You can still update the maintenance window by clicking the **Under maintenance** card.



You can also delete a scheduled maintenance.



Edit Maintenance Window

You can define Maintenance Windows for scheduled downtimes, such as during server or software upgrades. During a maintenance window all the monitors are disabled for server **Longlonglongservername**.

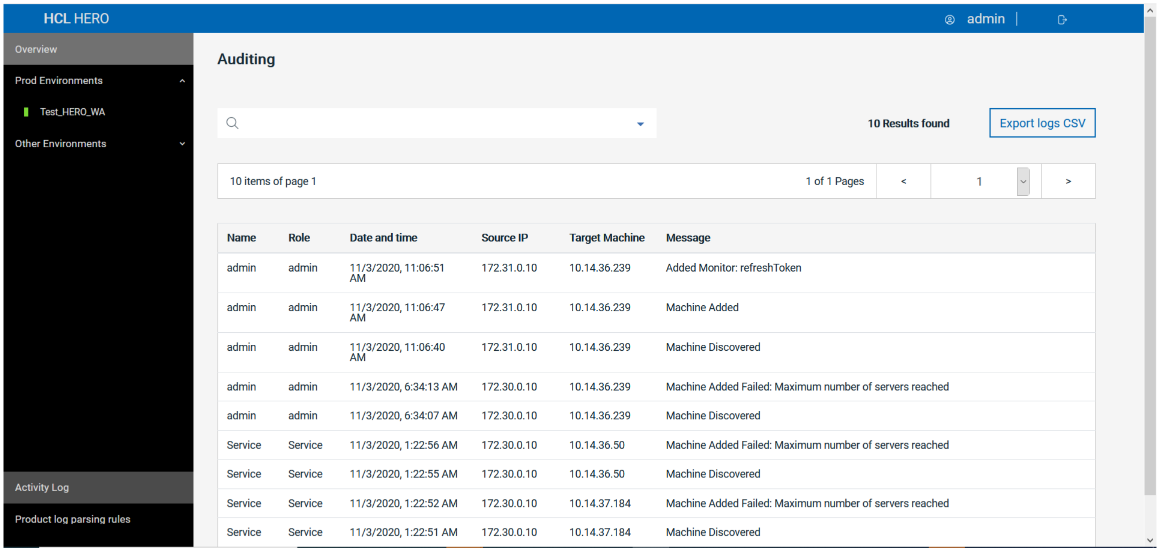
Name: New application deployment

Starting at: 19 / 05 / 2019 09 : 00 AM

Ending at: 20 / 05 / 2019 09 : 00 AM

Auditing

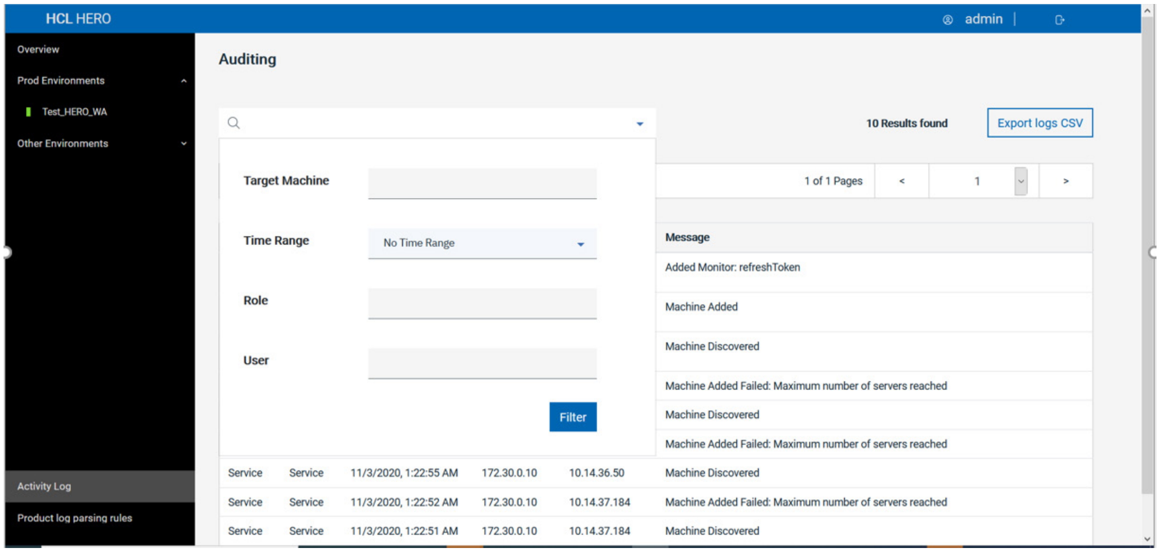
By selecting **Activity Log** on the left hand menu, you can find information about all changes and actions made in HERO.



Name	Role	Date and time	Source IP	Target Machine	Message
admin	admin	11/3/2020, 11:06:51 AM	172.31.0.10	10.14.36.239	Added Monitor: refreshToken
admin	admin	11/3/2020, 11:06:47 AM	172.31.0.10	10.14.36.239	Machine Added
admin	admin	11/3/2020, 11:06:40 AM	172.31.0.10	10.14.36.239	Machine Discovered
admin	admin	11/3/2020, 6:34:13 AM	172.30.0.10	10.14.36.239	Machine Added Failed: Maximum number of servers reached
admin	admin	11/3/2020, 6:34:07 AM	172.30.0.10	10.14.36.239	Machine Discovered
Service	Service	11/3/2020, 1:22:56 AM	172.30.0.10	10.14.36.50	Machine Added Failed: Maximum number of servers reached
Service	Service	11/3/2020, 1:22:55 AM	172.30.0.10	10.14.36.50	Machine Discovered
Service	Service	11/3/2020, 1:22:52 AM	172.30.0.10	10.14.37.184	Machine Added Failed: Maximum number of servers reached
Service	Service	11/3/2020, 1:22:51 AM	172.30.0.10	10.14.37.184	Machine Discovered

The logs can be exported into a **.csv** file.

In the **Search bar** you can refine your search by specifying query parameters.



Target Machine

Time Range: No Time Range

Role

User

					Message
					Added Monitor: refreshToken
					Machine Added
					Machine Discovered
					Machine Added Failed: Maximum number of servers reached
					Machine Discovered
					Machine Added Failed: Maximum number of servers reached
Service	Service	11/3/2020, 1:22:55 AM	172.30.0.10	10.14.36.50	Machine Discovered
Service	Service	11/3/2020, 1:22:52 AM	172.30.0.10	10.14.37.184	Machine Added Failed: Maximum number of servers reached
Service	Service	11/3/2020, 1:22:51 AM	172.30.0.10	10.14.37.184	Machine Discovered

Log Parsing and Alert Setting

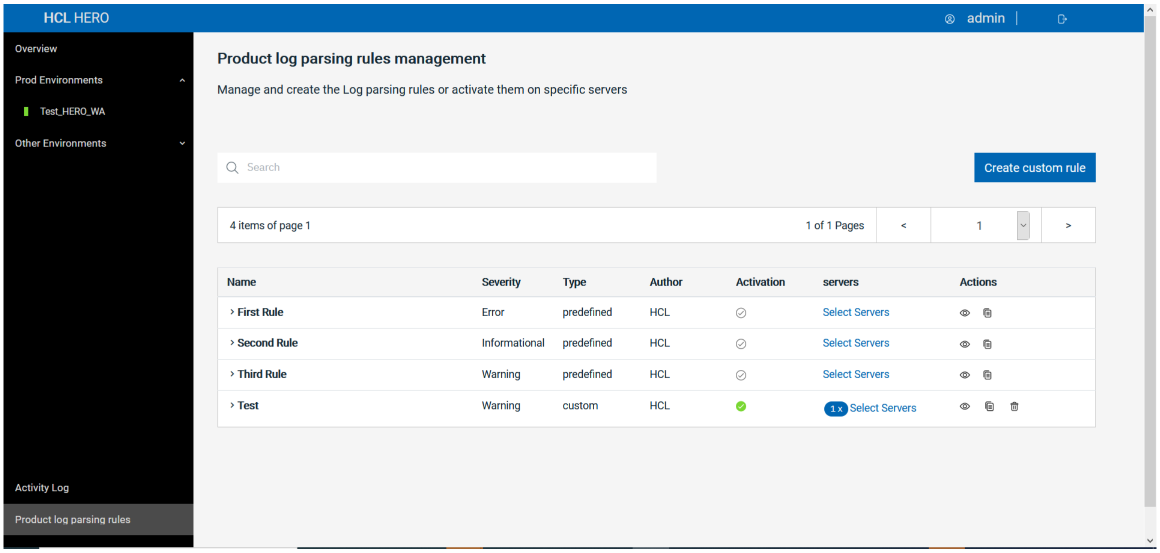
With HERO, Workload Automation log files can be parsed for an easier and faster analysis. You can activate this feature on all WA servers, **except AIX servers**. See Enabling Log Parsing.

From the **Product log parsing rules management** interface, you as an **Administrator** can create, edit, and delete log parsing rules, and activate them on selected servers. Alerts can be automatically set up according to your needs.

Log parsing rules can also be activated/deactivated at server level, in the server card. See Activating rules from the server card.

When an issue is detected into a log file, the bell on the server card turns into color (blue, yellow, or red) depending on the issue severity (informational, warning, or error). Click the bell to get information about the issue. See Monitoring Log Parsing rules.

On the HERO main page sidebar, select **Product log parsing rules**.



Product log parsing rules management

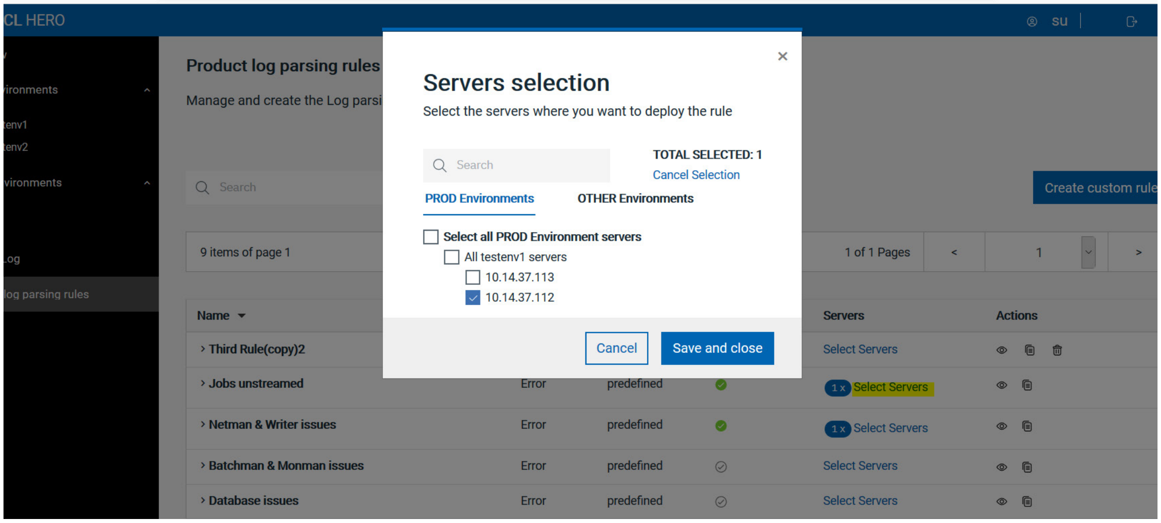
Manage and create the Log parsing rules or activate them on specific servers

4 items of page 1 | 1 of 1 Pages | < | 1 | >

Name	Severity	Type	Author	Activation	servers	Actions
› First Rule	Error	predefined	HCL	○	Select Servers	👁 ⧉
› Second Rule	Informational	predefined	HCL	○	Select Servers	👁 ⧉
› Third Rule	Warning	predefined	HCL	○	Select Servers	👁 ⧉
› Test	Warning	custom	HCL	✓	1 x Select Servers	👁 ⧉ 🗑

Here you can find **predefined log parsing rules** provided by HCL, that cover the most common issues with Workload Automation. Predefined rules can be viewed, or duplicated to obtain custom rules. Custom rules can be viewed/edited, duplicated, or deleted. With custom rules you can monitor any log file in your file system, not only WA log files.

You can activate each rule on one or multiple servers by clicking **Select Servers**. You can also select all servers in PROD or OTHER type environments with a single check mark.



Product log parsing rules

Manage and create the Log parsi

Servers selection

Select the servers where you want to deploy the rule

Search

TOTAL SELECTED: 1

Cancel Selection

PROD Environments | OTHER Environments

- □ Select all PROD Environment servers
  - □ All testenv1 servers
    - □ 10.14.37.113
    - ☑ 10.14.37.112

Cancel | Save and close

9 items of page 1 | 1 of 1 Pages | < | 1 | >

Name				Servers	Actions
› Third Rule(copy)2				Select Servers	👁 ⧉ 🗑
› Jobs unstreamed	Error	predefined	✅	1 x Select Servers	👁 ⧉
› Netman & Writer issues	Error	predefined	✅	1 x Select Servers	👁 ⧉
› Batchman & Monman issues	Error	predefined	✓	Select Servers	👁 ⧉
› Database issues	Error	predefined	✓	Select Servers	👁 ⧉

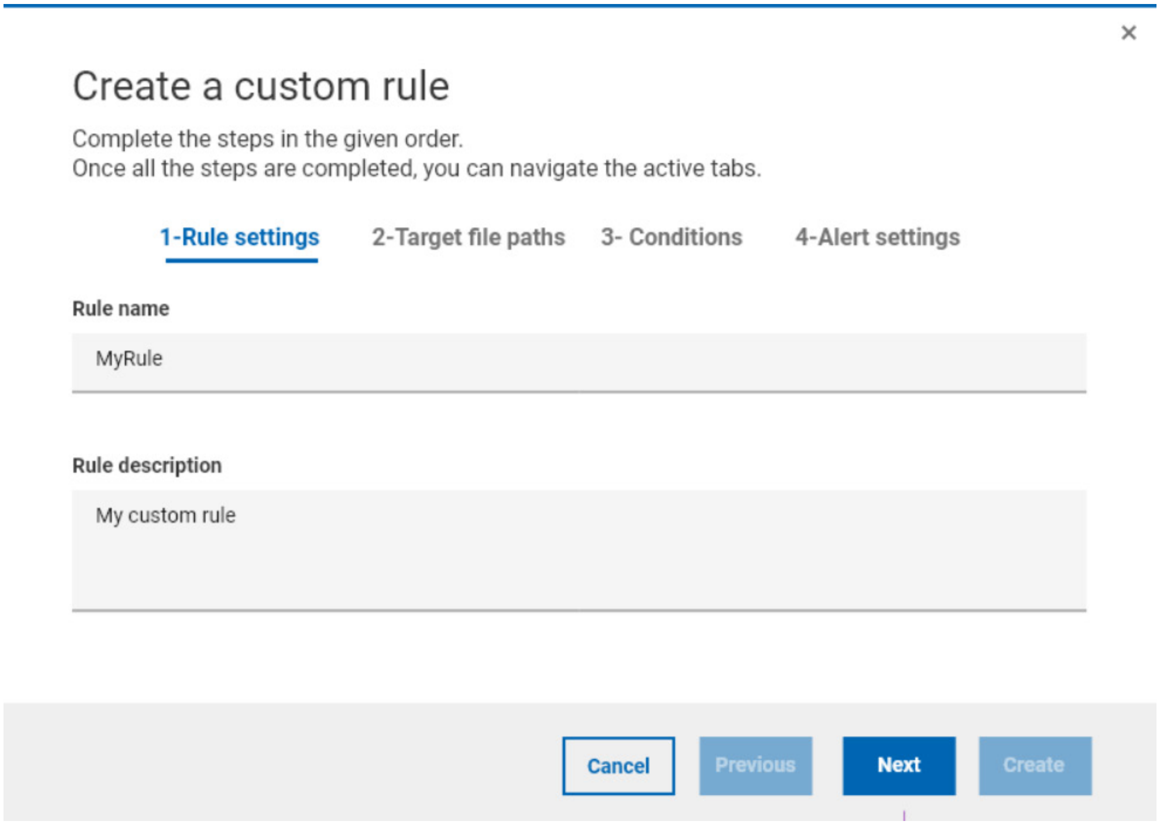
When you activate a rule on a server (master or backup master), the rule applies to all the server components.

For each rule, the following information is displayed:

- Rule name and description
- Severity - can be Informational, Warning, Error
- Type - can be Predefined or Custom
- Author - name of the user who created the rule (HCL for predefined rules)
- Activation - indicates if the rule has been activated or not
- Servers - for activated rules, it indicates the number of servers on which the rule has been activated.

Creating custom rules

On the Log Parsing main page, click the button **Create custom rule** and complete the steps in the given order.



Create a custom rule

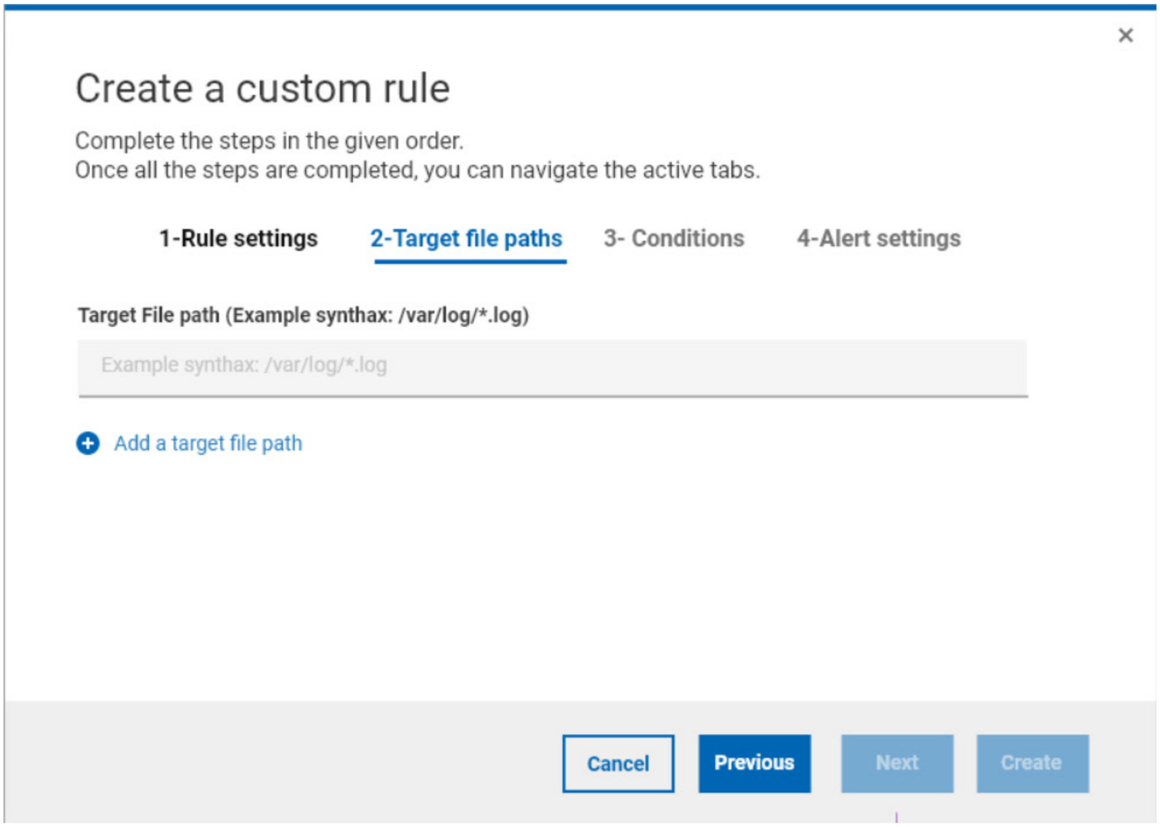
Complete the steps in the given order.
Once all the steps are completed, you can navigate the active tabs.

Rule name: MyRule

Rule description: My custom rule

In the **Rule settings tab**, specify:

- Rule name
- Rule description (optional)

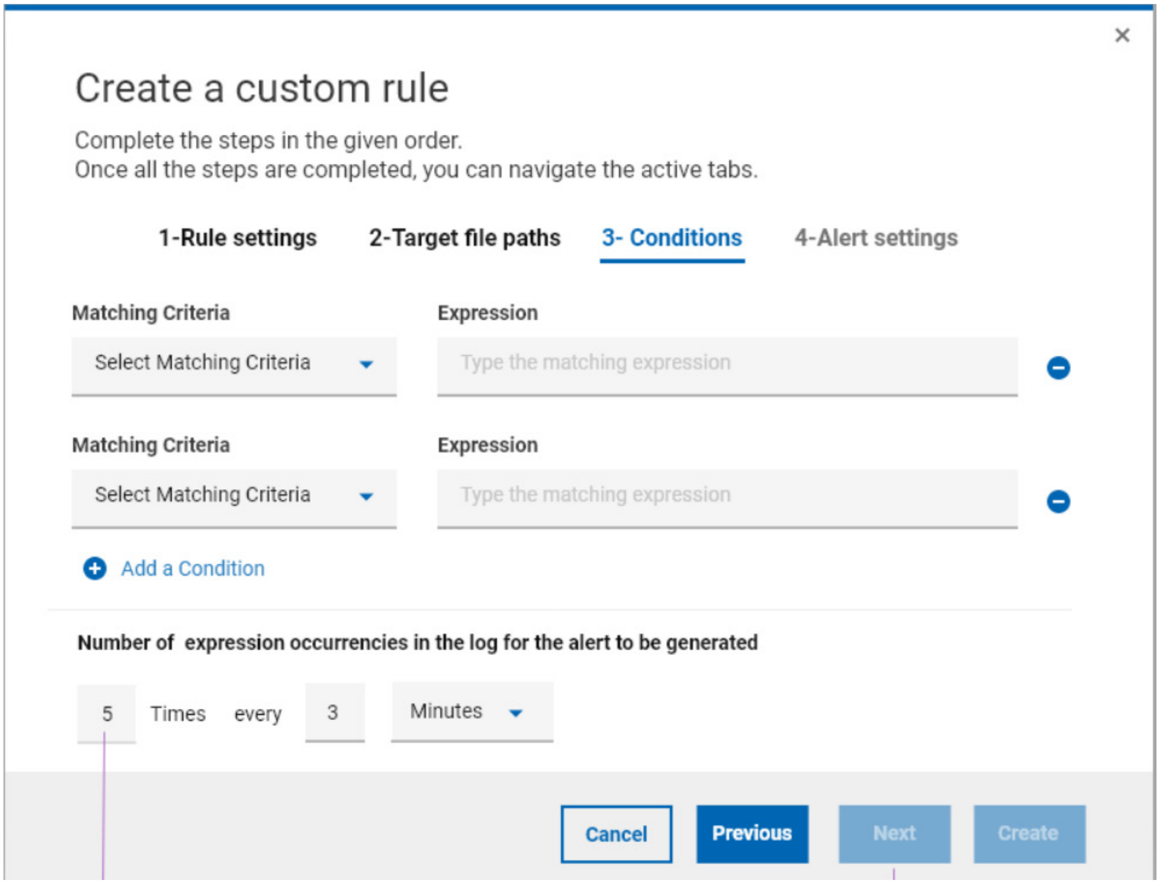


Create a custom rule

Complete the steps in the given order.
Once all the steps are completed, you can navigate the active tabs.

Target File path (Example synthax: /var/log/*.log)

In the **Target file paths** tab, specify the file path (one or more) for the log file(s) that you want to monitor in the file system.



Create a custom rule

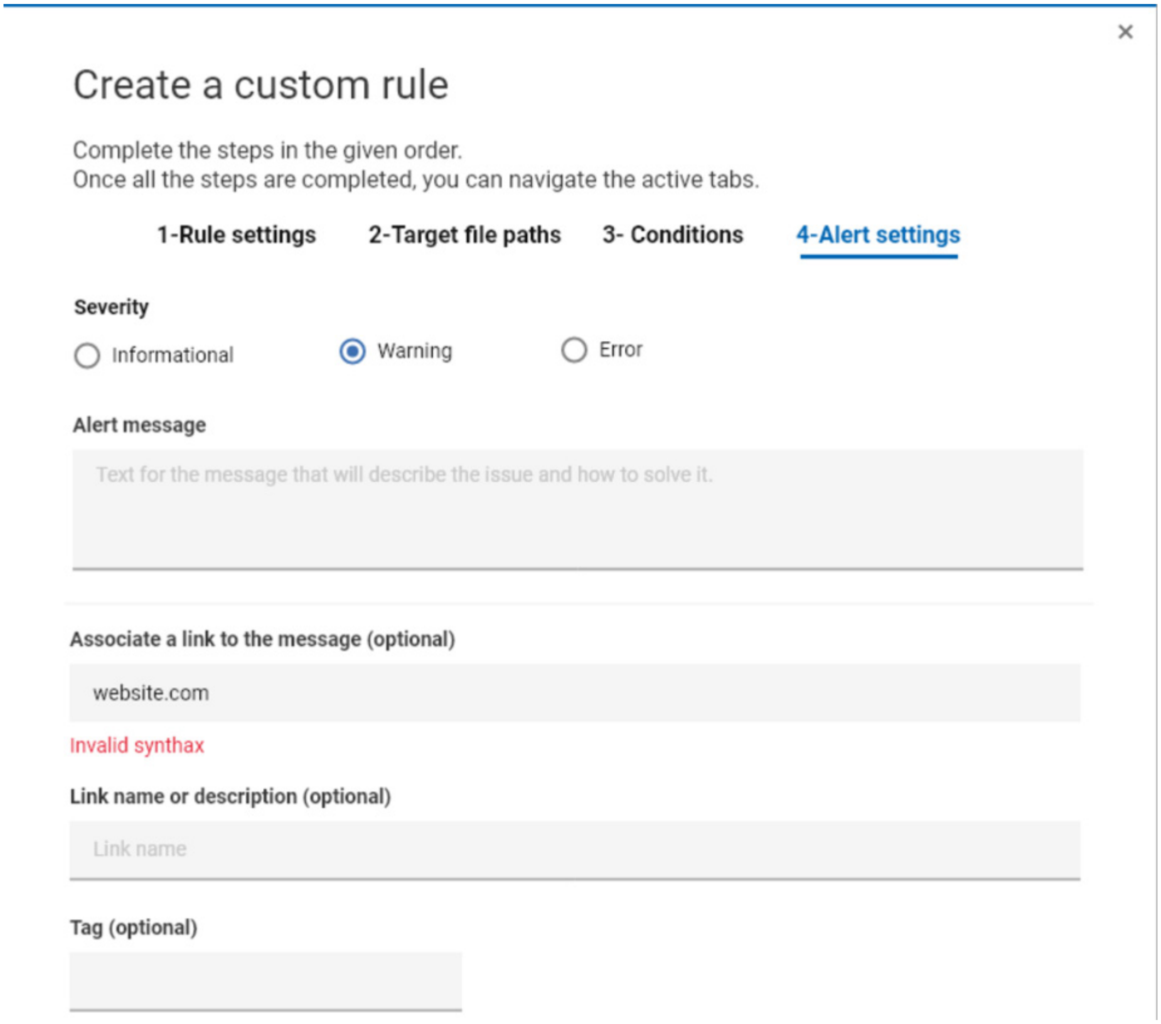
Complete the steps in the given order.
Once all the steps are completed, you can navigate the active tabs.

Number of expression occurrencies in the log for the alert to be generated

5 Times every 3 Minutes

In the **Conditions** tab, specify one or more expression(s) that you want to match inside log files, and the related matching criteria(s) (if regular or wildcard based).

Set also the number of expression occurrences in the log for the alert to be generated.



Create a custom rule

Complete the steps in the given order.
Once all the steps are completed, you can navigate the active tabs.

Severity

○ Informational ● Warning ○ Error

Alert message

Text for the message that will describe the issue and how to solve it.

Associate a link to the message (optional)

website.com

Invalid synthax

Link name or description (optional)

Link name

Tag (optional)

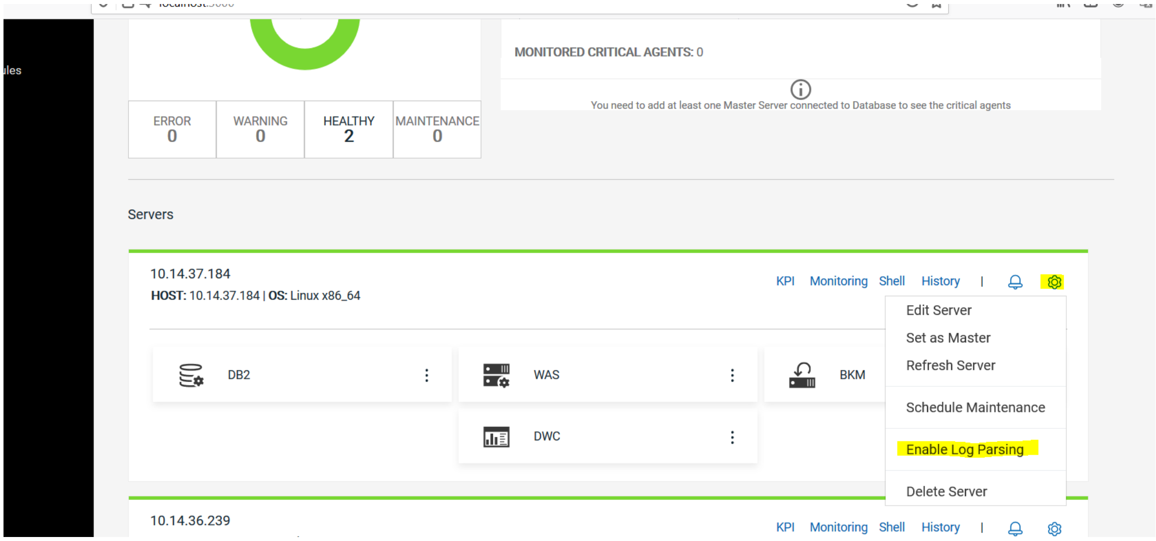
In the **Alert settings** tab, specify information needed to generate the alert in HERO UI and to notify the alert via email:

- Alert severity - can be Informational, Warning or Error
- Alert message - to describe the issue and how to solve it (optional)
- Link - where users can find more info about the issue (optional)
- Link description (optional)
- Tag - to insert one or more tags for the rule. Useful also to categorize the issue when generating a ticket (optional)

Enabling Log Parsing

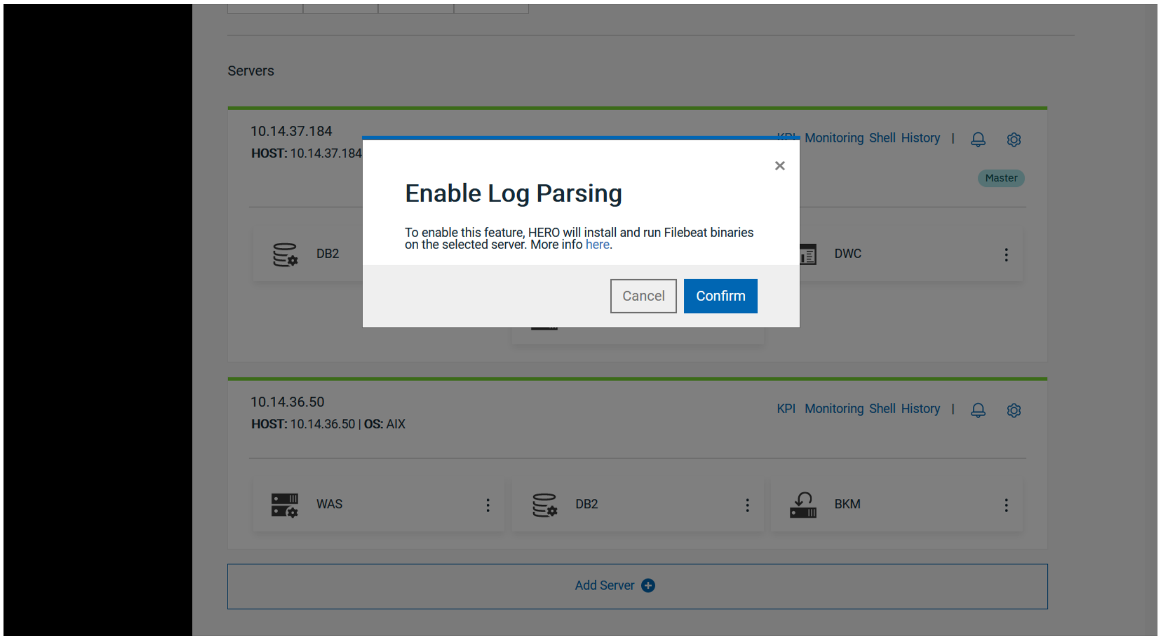
You can enable Log Parsing on all WA servers, except AIX servers, in different ways:

- For a WA server that is already monitored by HERO, click on the gear icon on the server card and select **Enable Log Parsing** from the menu. You can also disable Log Parsing from here, if it is already enabled.



MONITORED CRITICAL AGENTS: 0

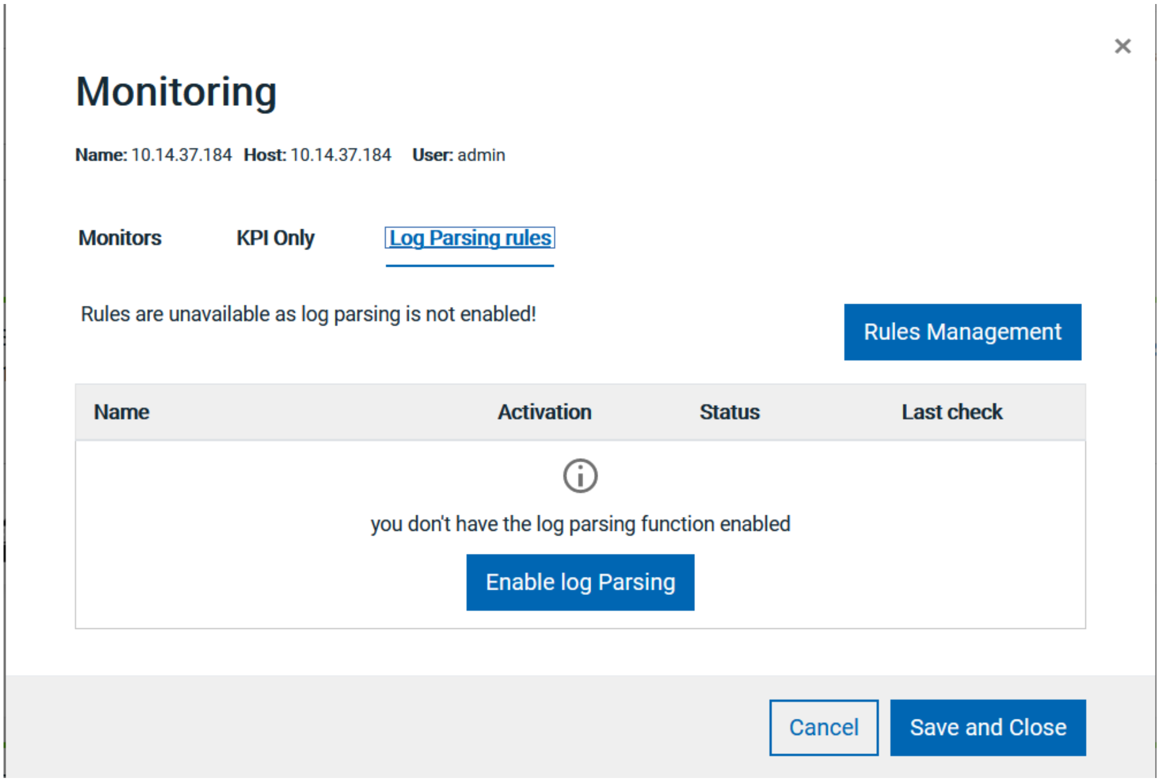
You need to add at least one Master Server connected to Database to see the critical agents



Enable Log Parsing

To enable this feature, HERO will install and run Filebeat binaries on the selected server. More info here.

- Alternatively, from the server card select **Monitoring > Log Parsing rules** and click **Enable Log Parsing.**



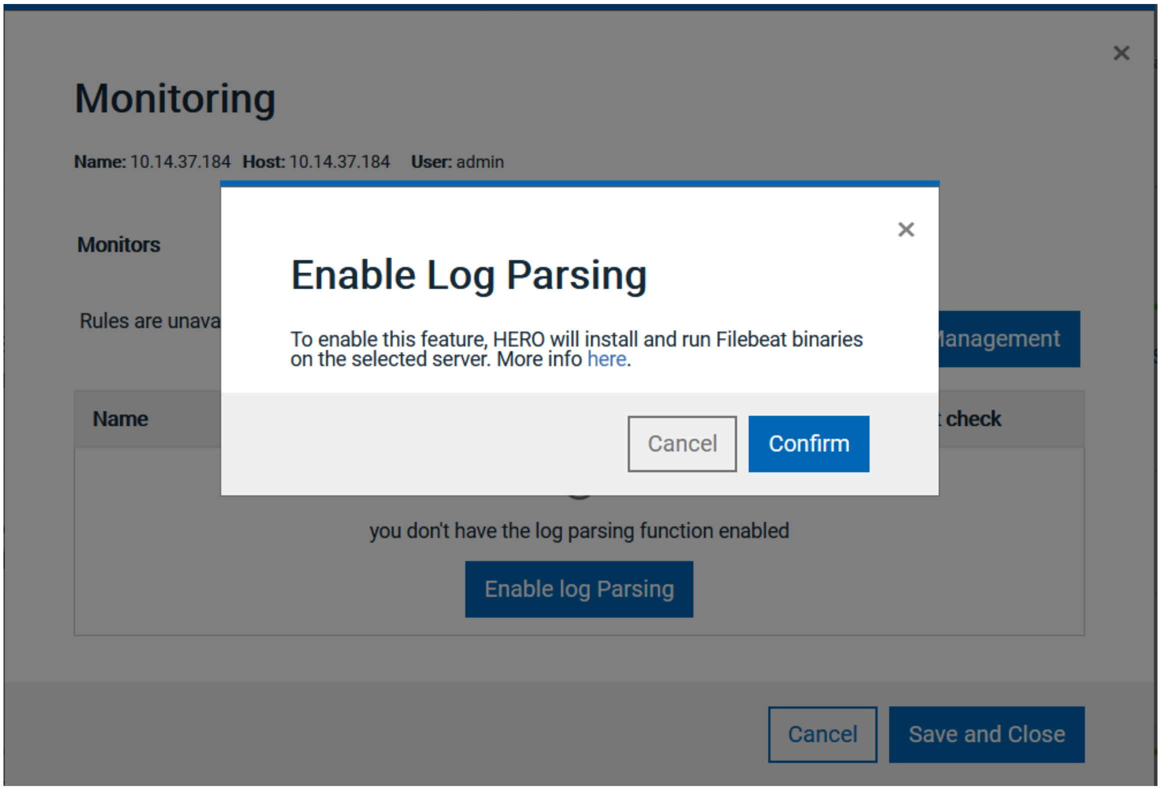
Monitoring

Name: 10.14.37.184 **Host:** 10.14.37.184 **User:** admin

Rules are unavailable as log parsing is not enabled!

Name	Activation	Status	Last check

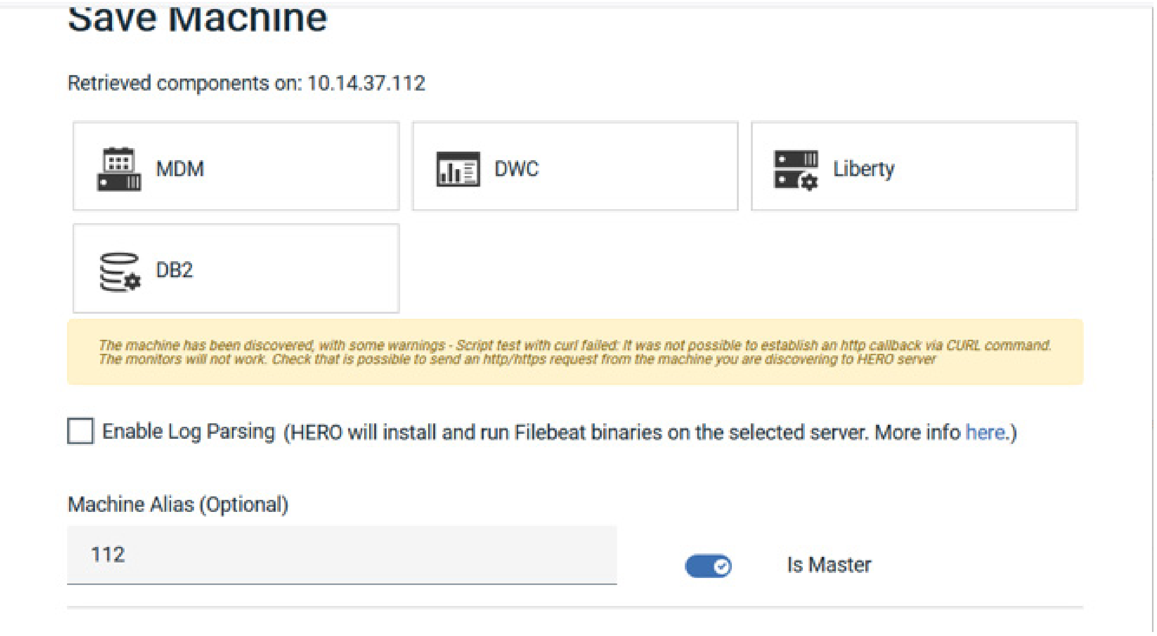
you don't have the log parsing function enabled



Enable Log Parsing

To enable this feature, HERO will install and run Filebeat binaries on the selected server. More info here.

- If you are **adding a new server** to your environment, you can automatically enable this feature by flagging the **Enable Log Parsing** checkbox on the **Save Machine** panel.



Save Machine

Retrieved components on: 10.14.37.112

The machine has been discovered, with some warnings - Script test with curl failed: It was not possible to establish an http callback via CURL command. The monitors will not work. Check that is possible to send an http/https request from the machine you are discovering to HERO server

☐ Enable Log Parsing (HERO will install and run Filebeat binaries on the selected server. More info here.)

Machine Alias (Optional)

112

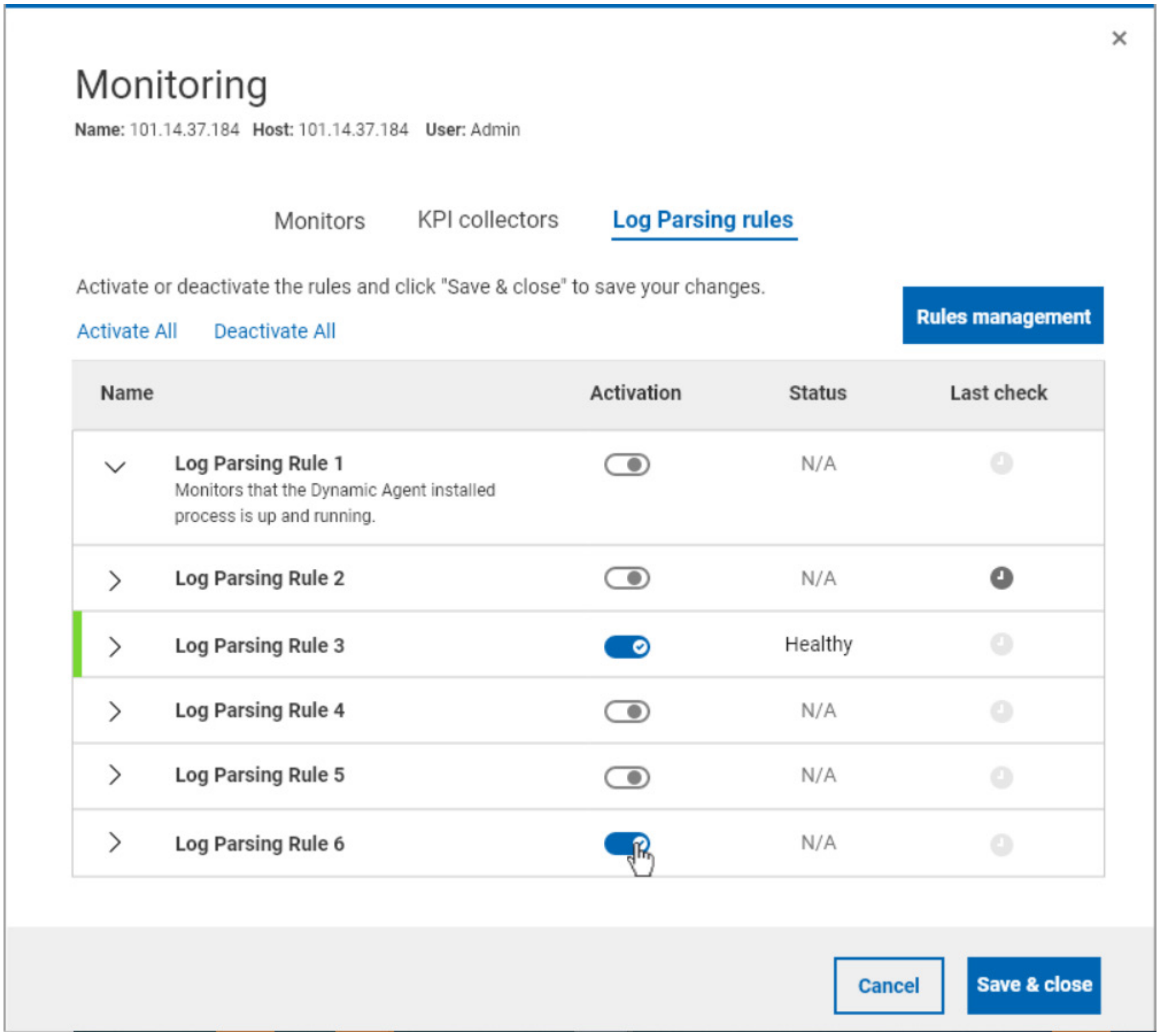
Is Master

In any case, to enable Log Parsing, HERO will install and run **Filebeat** binaries on the selected server.

Note: Filebeat is an open source data shipper for forwarding and centralizing log file data.

Activating rules from the server card

From the server card, under **Monitoring > Log parsing rules**, you can find all the available rules and verify which rules have been activated for your server.



Monitoring

Name: 101.14.37.184 **Host:** 101.14.37.184 **User:** Admin

Activate or deactivate the rules and click "Save & close" to save your changes.

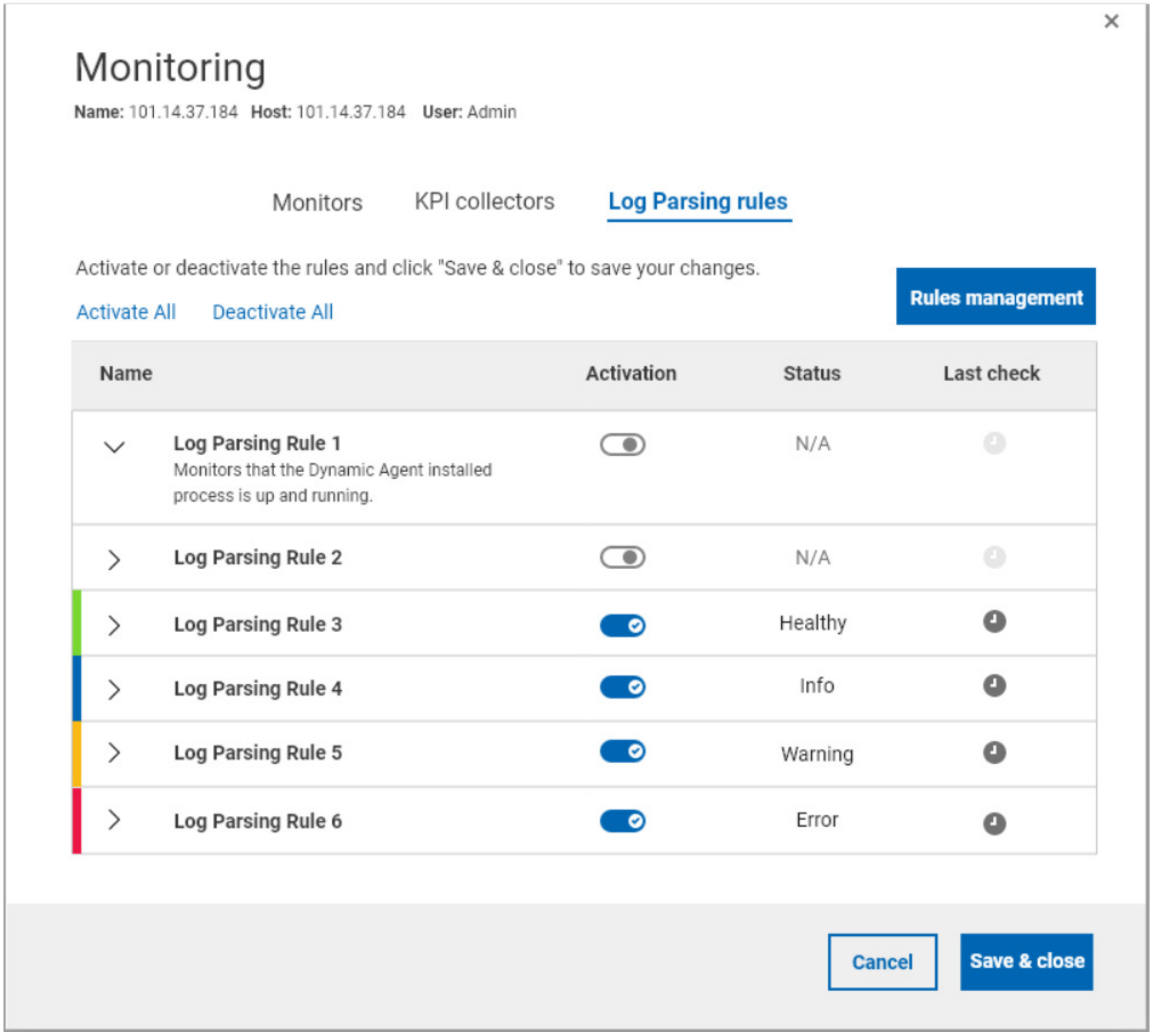
Name	Activation	Status	Last check
Log Parsing Rule 1 Monitors that the Dynamic Agent installed process is up and running.	○	N/A	🕓
Log Parsing Rule 2	○	N/A	🕓
Log Parsing Rule 3	✓	Healthy	🕓
Log Parsing Rule 4	○	N/A	🕓
Log Parsing Rule 5	○	N/A	🕓
Log Parsing Rule 6	✓	N/A	🕓

You can activate/deactivate rules from here.

Click the **Rules Management** button to return to the Log Parsing main page.

Monitoring log parsing rules

From the server card, under **Monitoring > Log Parsing rules**, you can view the current status of the active Log Parsing rules.



Monitoring

Name: 101.14.37.184 **Host:** 101.14.37.184 **User:** Admin

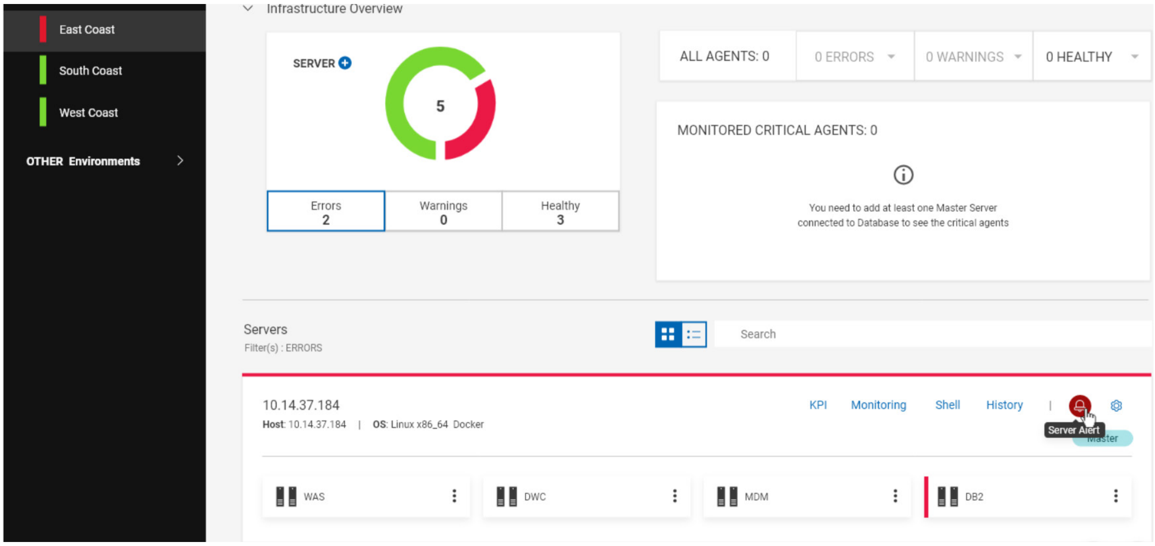
Activate or deactivate the rules and click "Save & close" to save your changes.

Name	Activation	Status	Last check
Log Parsing Rule 1 Monitors that the Dynamic Agent installed process is up and running.	○	N/A	
Log Parsing Rule 2	○	N/A	
Log Parsing Rule 3	✓	Healthy	
Log Parsing Rule 4	✓	Info	
Log Parsing Rule 5	✓	Warning	
Log Parsing Rule 6	✓	Error	

Depending on the alert settings, the status of each rule for the server can be:

- Healthy, if no issue has been detected by the rule
- Info, marked in blue
- Warning, marked in yellow
- Error, marked in red

Log Parsing alerts are managed by HERO as server alerts: when an issue is detected in a log file, the bell on the server card turns into color (blue, yellow, or red) depending on the issue severity (informational, warning, or error).



You need to add at least one Master Server connected to Database to see the critical agents

Click the bell to get information about the alert.

In the **Server Alerts** panel, you can easily identify Log Parsing alerts because they are always assigned to the **Server** component and the description field contains information about the referenced log entry.

On the same panel, HERO might suggest runbooks to solve the issue.

Troubleshooting Guide

About the Troubleshooting Guide

The Troubleshooting Guide provides information about how to collect logs and resolve problems in HCL HERO.

Collecting logs and activating traces

Troubleshooting HERO

Collecting logs and activating traces

Log files for HERO components are located inside the respective containers.

In case of issues, it is recommended to check the status of the containers. Run the following command:

```
docker ps -a
```

If you find containers that are in a non-running or restarting status, download the respective log files.

The list of HERO containers follows:

HERO Container	Description
keycloak	HERO security server. It manages all the user logins and info
keycloak-db	Keycloak container database
hero-elasticsearch	noSQL database for KPIs, prediction data, and runbook information
hero-kibana	Dashboard visual service: displays charts with actual and estimated KPIs
hero-licensesrv	Microservice for HERO license check
hero-tomcat	Tomcat server that runs HERO war files and exposes the Web UI
hero-prediction	Container managing KPIs prediction, based on a Python process
hero-nginx	HERO reverse-proxy container, managing all the external connections to HERO

To extract all the available log files from a container, run the command:

```
docker logs [container_name]
```

For additional details and options, see Docker documentation.

Usually, the log files extracted from each container will be sufficient to troubleshoot the component issues.

For hero-prediction container, for a more detailed problem determination you can run the additional command:

docker exec hero-prediction cat out_WA.txt (you can run this command only if the container is running)

To download the log files from containers, see Docker documentation.

To **activate HERO traces**, run the following steps:

1. From the directory where HERO has been installed, type docker ps
2. Identify the Tomcat container hero-tomcat and type **docker exec -it hero-tomcat bash**
3. Run the following command: **apt-get install vim**
4. Go to /deployments/apache-tomcat/webapps/Dashboard/WEB-INF/classes folder and open **log4j.properties** file
5. If you want to change from DEBUG level to TRACE level, uncomment **log4j.logger.com.hcl=DEBUG** removing the #, and write TRACE instead of DEBUG
6. From the directory where HERO has been installed, type **docker restart hero-tomcat**

Troubleshooting HERO

Symptom

The KPI dashboard is not displayed.

Cause and solution

Verify that the Kibana service is up and that the browser can reach it.

Symptom

Queue data is not shown.

Cause and solution

Verify that ElasticSearch is up and reachable from the workstation.

Symptom

Environment and workstations are not displayed.

Cause and solution

Verify that the HERO server is up and that the connection to derby instance is working fine.

Symptom

The discovery of a server fails, even with correct user and password.

Cause and solution

1. Check that the user can run SSH on the workstation. From HERO server, run the command:

   ```
   ssh <server_to_discover>
   ```

   and verify that it works.

2. Check if the following message is logged in the Tomcat output: *ERROR SSHConnection:469 - com.jcraft.jsch.JSchException: 4: Received message is too long*.

   In this case, the issue is related to the output written by the .bashrc script. Move any script or instruction that writes output to the .bash_profile.

3. If using dockerized version of WA, check that user can create a docker image. If not, add the user to the “docker” group.

4. If you are discovering a Windows machine, check that all the prerequisites are met. Check that Pyhton has the correct version and is 64-bit.

Symptom

A machine cannot be retrieved.

Cause and solution

If a machine cannot be retrieved, run the following actions:

1. Verify that the connection between HERO and the machine is up and no firewall block is active. To verify the connection, use the **ping** and/or **ssh** command from the HERO machine.
2. Verify that the machine to be retrieved has Workload Automation installed and compatible with HERO version.
3. Verify that the machine to be retrieve is up and running.
4. Remove any login welcome message from the **.bashrc** file.

Symptom

HERO is not starting.

Cause and solution

If the HERO server (Dashboard.war) is not starting, check the following conditions:

1. If the following line shows up in the log:

springSecurityFilterChain' threw exception; nested exception is java.lang.NoClassDefFoundError: javax/xml/bind/JAXBException,

it means that you are trying to start HERO server with Oracle Java/OpenJDK version 9 or 10, which is not supported. You must use either OpenJDK 8 or Oracle Java 8.

2. If you installed HERO on a SELinux machine such as RHEL or CentOS, make sure you set the hostname to the Fully Qualified Domain Name of the machine. To identify it, run the command **hostname --fqdn**.

Symptom

ElasticSearch does not start, and the log shows the following error:

```
2018-09-21T14:11:16,039][INFO ][o.e.b.BootstrapChecks ] [qVAFkOU] bound or publishing to a non-loopback address, enforcing bootstrap checks

ERROR: [2] bootstrap checks failed

[1]: max file descriptors [4096] for elasticsearch process is too low, increase to at least [65536]

[2]: max virtual memory areas vm.max_map_count [65530] is too low, increase to at least [262144]
```

Cause and solution

To solve this problem, run the following procedure.

How to verify and set ulimit parameter:

1. Check the maximum number of open files for the current user by running the command **ulimit -n**
2. Verify that the number of allowed open files for the current user is at least 65536
3. Check the Hard limit for the current user, by running the command **ulimit -n -H**
4. Check the Soft limit for the current user, by running the command **ulimit -n -S**
5. In case the value of Hard or Soft limit is lower than 65536, increase its value, by editing the file:

/etc/security/limits.conf

[domain] [type] [item] [value]

where:

- [domain] can be a username, a group name, or a wildcard entry
- [type] is the type of the limit and can have the following values:
  - soft: a soft limit which can be changed by user
  - hard: a cap on soft limit set by super user and enforced by kernel
- [item] is the resource for which you are setting the limit

For example, for a user with id hmuser run the following steps:

1. Add or modify soft and hard limits as follow:
   - hmuser soft nofile 65536
   - hmuser hard nofile 65536
2. Activate the new values by running the following command **sysctl -p**
3. Update the following files:
   - /etc/systemd/user.conf
   - /etc/systemd/system.conf

   by adding the following line:

   ```
   DefaultLimitNOFILE=65536
   ```
4. Login again with user hmuser and verify the new limits before starting any process

Symptom

The log shows the following error: [1]: max virtual memory areas vm.max_map_count [65530] is too low, increase to at least [262144].

Cause and solution

On Linux, run the following procedure.

How to verify and set the available virtual memory

1. To verify the available virtual memory, run the following command as the user that started the Docker deamon:

   ```
   sysctl vm.max_map_count
   ```
2. If the command output shows a value lower than 262144, run the command:

   ```
   sysctl -w vm.max_map_count=262144
   ```
3. To set this value permanently, edit the vm.max_map_count setting in /etc/sysctl.conf.
4. Add the following as last row, or edit the row if present:

```
vm.max_map_count=262144
```

5. Verify the new value after reboot.

Symptom

Keycloak container restarts, or the log shows the following error:

"Security-Enhanced Linux (SELinux) on the hypervisor must be disabled or the permissions must be set up correctly".

Cause and solution

To set SELinux to permissive, run the following procedure.

How to set SELinux to permissive

1. Run the following commands:

   ```
   sed -i s/^SELINUX=.*$/SELINUX=permissive/ /etc/selinux/config

   setenforce 0

   sed -i s/^SELINUX=.*$/SELINUX=disabled/ /etc/selinux/config
   ```

2. Restart the system to save the changes permanently.

3. After you restart the system, you can use the getenforce command to check the SELinux status.

Symptom

Kibana is not creating the default index pattern.

Cause and solution

Delete the Kibana index (by putting the command “DELETE .kibana” inside Kibana dev tools) and try to create the index pattern again.

Symptom

The discovery process shows the following warning message: The machine has been discovered, with some warnings - No such file: It was not possible to establish an http callback via CURL command. The monitors will not work. Check that is possible to send an http/https request from the machine you are discovering to HERO server.

Cause and solution

Login to the target machine and run the command: curl www.hcl.com.

If you receive the following command output: *curl: (2) Failed initialization,* the problem is related to the configuration of **LD_LIBRARY_PATH** variable.

Correct the **LD_LIBRARY PATH** so that the curl command works correctly. For example, you might need to change the .bashrc and include system libraries path in that library.

Symptom

Monitors do not activate.

Cause and solution

If the monitors do not activate, it means that the monitored server is not connecting back to HERO.

Manually connect to the remote machine being monitored via ssh client and run the monitors manually. Monitors are located under deployPath (usually userHome\<ip/hostname>\HERO\). Check for any error.

Be sure HERO server is reacheable, https port is opened, and curl is working. The https is configurable, so it is the one specified at installation time.

Symptom

While creating Kibana index pattern to retrieve data from Elasticsearch, the following warning message is displayed: Warning - No default index pattern. You must select or create one to continue.

Cause and solution

To solve this problem, run the following CURL commands on the machine that hosts HERO docker installation:

1. docker exec hero-tomcat curl -k -XDELETE "http://elasticsearch:9200/.kibana" -H 'Content-Type: application/json'

2. docker exec hero-tomcat curl -k -XPOST -H "kbn-xsrf: reporting" "http://kibana:5601/api/saved_objects/index-pattern" -H 'Content-Type: application/json' -d' {\"attributes\":{\"title\":\"run*\"}}'

3. docker exec hero-tomcat curl -k -XPOST -H "kbn-xsrf: reporting" "http://kibana:5601/api/kibana/settings/defaultIndex" -H 'Content-Type: application/json' -d' {\"value\":\"run*\"}'

Symptom

Failed to fetch http://archive.ubuntu.com/ubuntu/dists/bionic/InRelease Temporary failure resolving 'archive.ubuntu.com'.

Cause and solution

To solve this problem, run the following steps:

1. edit /etc/default/docker and add the following line:

```
DOCKER_OPTS="--dns <your_dns_server_1> --dns <your_dns_server_2>"
```

You can add as many DNS servers as you want to this config.

2. Once saved, restart your Docker service:

```
sudo service docker restart
```

Symptom

During HERO online installation, Docker fails to download HERO images from repository.

Cause and solution

If you are using a proxy connection to the internet, the same proxy must be configured in Docker. For details, see: Docker documentation.

Symptom

HERO Web page keeps reloading or blinking.

Cause and solution

Check if keycloak or hero-nginx container log files show "host unreachable" or "unknown host" error messages. The issue might have different causes and solutions:

1. If HERO server is using a proxy connection to the internet, you must configure the same proxy in Docker. For details, see: Docker documentation.
2. Add <hero external port> to your OS firewall. For instance, for RHEL OS run the following commands:
    a. sudo firewall-cmd --zone=public --add-port=<hero external port>/tcp --permanent
    b. sudo firewall-cmd --reload

Symptom

HERO UI login and logout repeatedly

Cause and solution

Ensure that the **secret key** value is the same in the Keycloak UI, in the **ui.properties** file and in the **.tomcat.env** (<HERO_HOME>/CONFIGURATION/HERO) file.

In case of mismatch:

1. Get the **secret key** value from Keycloak UI (Client > nginx > Credentials (tab) > Secret)
2. Update the **ui.properties** file.
3. Remove the configuration volume by running: **docker volume rm <BUILD_DIR>_hero-home**
4. Run **docker-compose up --build -d**

Symptom

Alerts by email are not sent and docker logs the message "Hero-tomcat shows app security exceptions from a gmail account".

Cause and solution

The mail account must be properly configured. See Google account help: Sign in with App Passwords.

Symptom

The **Final job stream** monitor discovers an error even if the Final job stream correctly started at the scheduled time.

Cause and solution

Check if HERO time zone (default is UTC) is different from the WA server time zone.

If it is different, run the following steps:

1. Update HERO time zone by changing the docker-compose.yml file. For details, see step 6 of HERO Installation procedure.
2. From <BUILD_DIR> directory, run the command:

    docker-compose up -d –build

Symptom

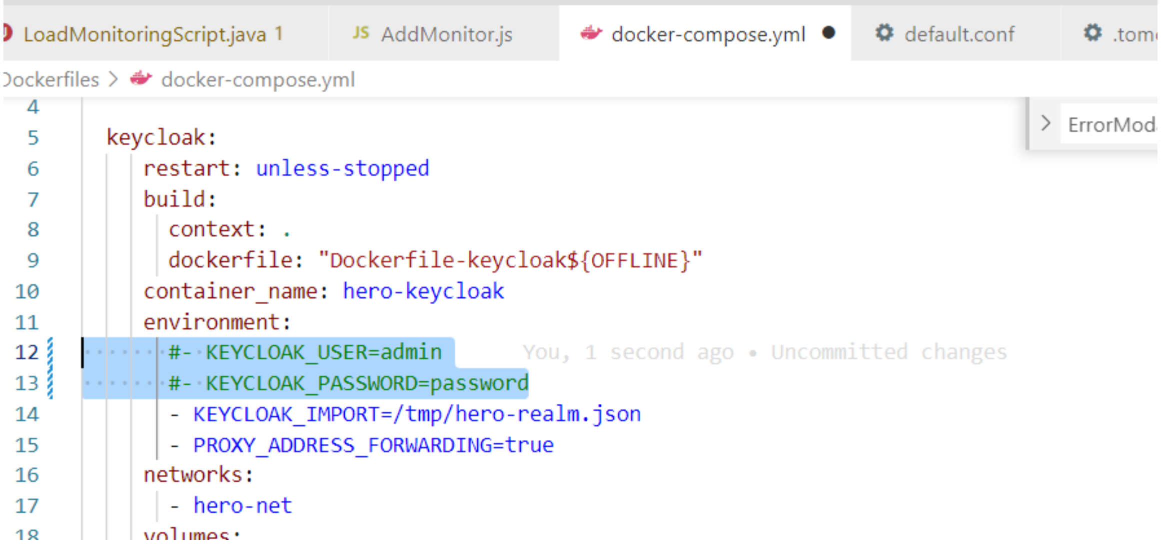
After you run the command **docker-compose up**, keycloak container starts to crash, and docker tries to re-launch it in endless loop.

Cause and solution

To solve this issue, run the following steps:

1. Run the command **docker-compose down**.

2. Edit the docker-compose.yml file and comment out the KEYCLOAK_USER and KEYCLOAK_PASSWORD parameters, like in the following example:


LoadMonitoringScript.java 1
AddMonitor.js
docker-compose.yml
default.conf
.tom
Dockerfiles > docker-compose.yml
ErrorMod
You, 1 second ago • Uncommitted changes

```
  keycloak:
    restart: unless-stopped
    build:
      context: .
      dockerfile: "Dockerfile-keycloak${OFFLINE}"
    container_name: hero-keycloak
    environment:
      #- KEYCLOAK_USER=admin
      #- KEYCLOAK_PASSWORD=password
      - KEYCLOAK_IMPORT=/tmp/hero-realm.json
      - PROXY_ADDRESS_FORWARDING=true
    networks:
      - hero-net
    volumes:
```

3. Run the command **docker-compose up**.