HCLSoftware

HCL Workload Automation
Overview
Version 10.2.6

Note

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

This edition applies to version 10, release 2, modification level 6 of HCL Workload Automation (program number 5698-T09) and to all subsequent releases and modifications until otherwise indicated in new editions.

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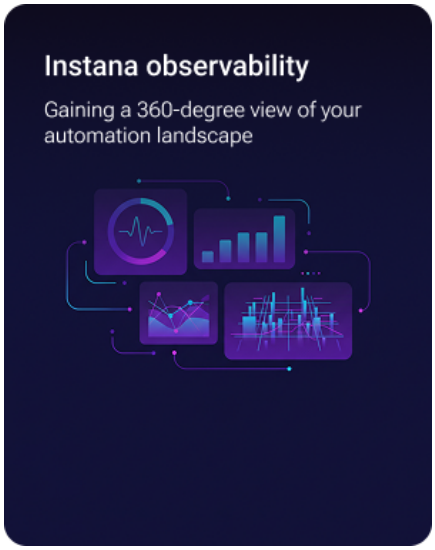

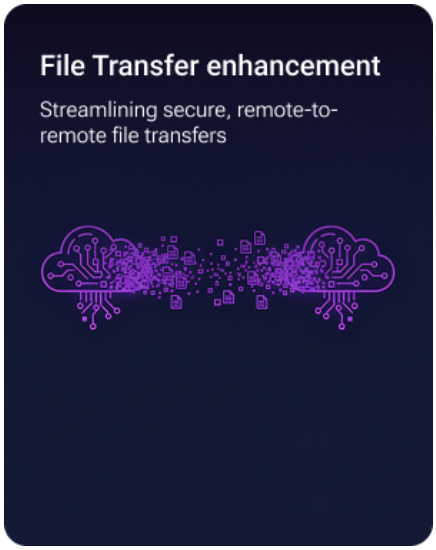

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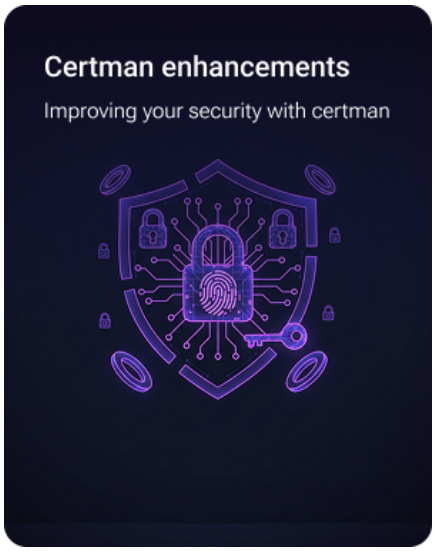

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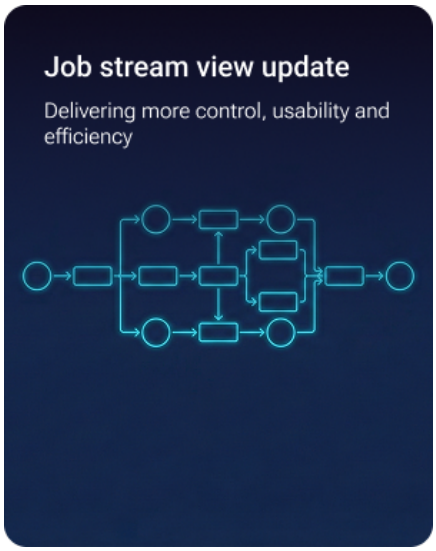

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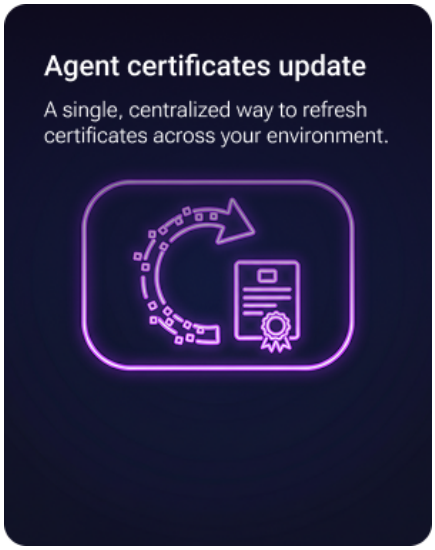

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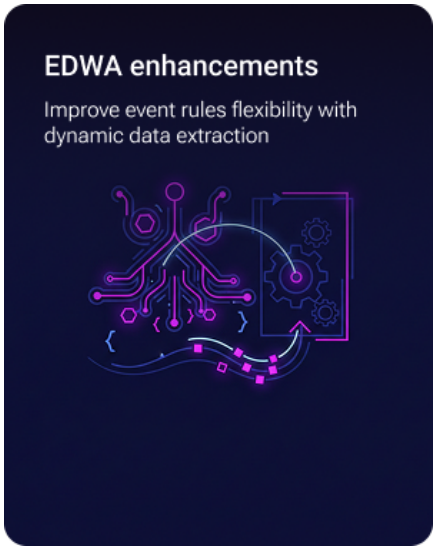

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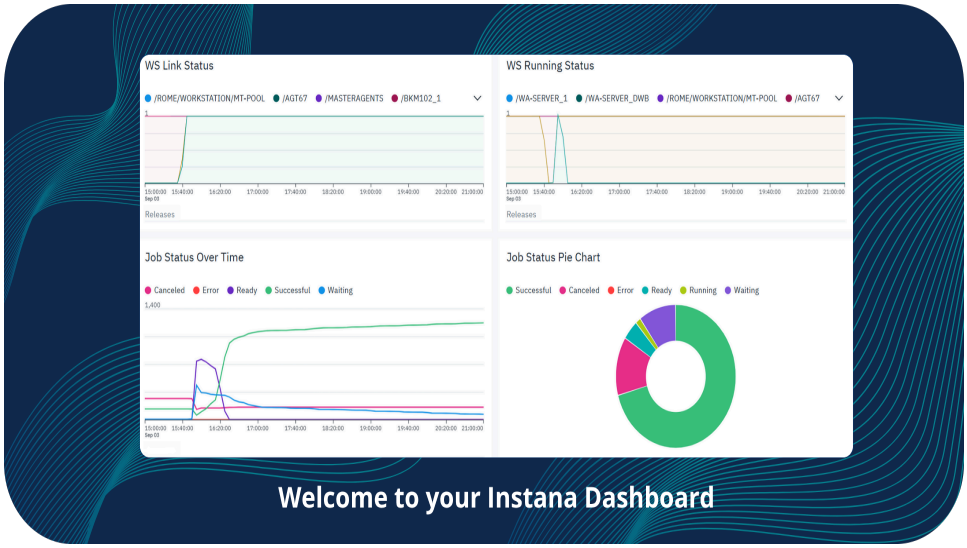
Changed features, improvements, and RFEs

Introducing proactive observability: monitor HCL Workload Automation like never before with Instana

Go beyond traditional monitoring and gain a complete, 360-degree view of your automation landscape.

You can now unlock unparalleled observability for your business processes by integrating HCL Workload Automation with Instana, an observability platform designed for modern, containerized applications. This powerful combination provides the detailed analytics and historical data needed to identify patterns, rapidly troubleshoot issues, and continuously optimize performance.

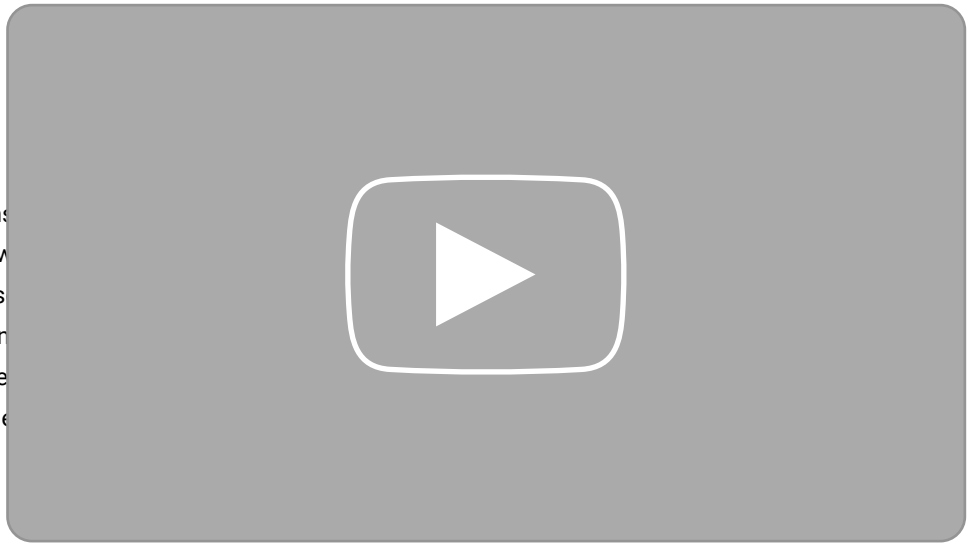
You can finally correlate your workload jobs performance with the real-time health of your underlying infrastructure, turning complex data into clear, actionable insights. Now, you can easily identify patterns, troubleshoot issues with unprecedented speed, and optimize the performance of your most critical business processes.



This integration empowers you to:

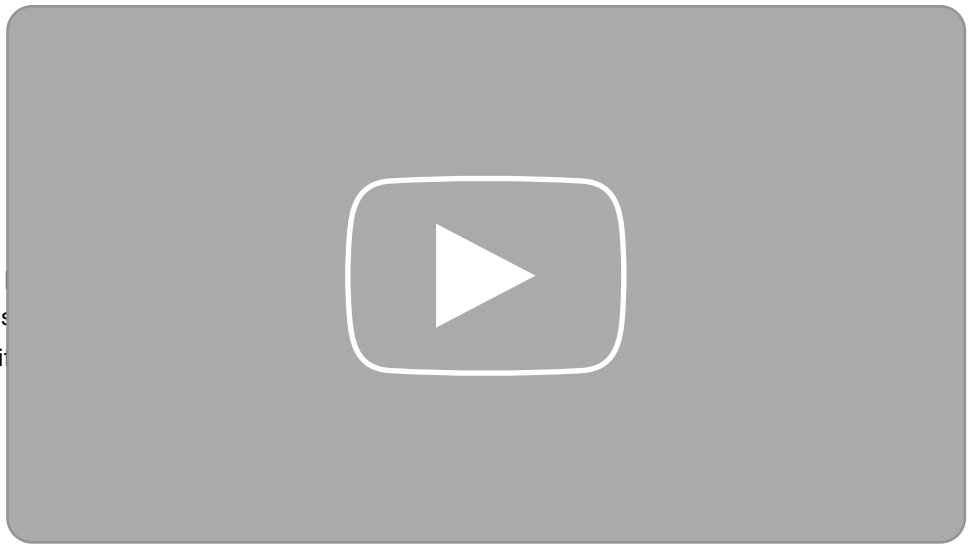
Achieve end-to-end visibility

Track job processing across all systems
applications from a single, unified view, w
even opening the Dynamic Workload Cons
dashboard provides the full context you n
understand dependencies, assess the true
of issues, and make smarter, data-driven de



Solve problems faster

By automatically correlating workload data with infrastructure traces, metrics, and logs, the dashboard can pinpoint the root cause of failures in minutes. This empowers your teams with all the necessary contextual data, ending time-consuming investigations.



Stay ahead of issues

Get real-time alerts for job delays, failures, and
degradations before they impact your business
Ensure service reliability with proactive noti

Visualize success instantly

Get immediate time-to-value with a purpose-built, pre-configured dashboard available directly from Automation Hub. The intuitive widgets are designed to distill complex information, like critical job risks, job status trends, and system health. This clarity can help any team member to gain valuable insights without specific Instana training.

Achieve end-to-end visibility

Track job processing across all systems and applications from a single, unified view, without even opening the Dynamic Workload Console. The dashboard provides the full context you need to understand dependencies, assess the true impact of issues, and make smarter, data-driven decisions.

Solve problems faster

By automatically correlating workload data with infrastructure traces, metrics, and logs, the dashboard can pinp oint the root cause of failures in minutes. This empowers your teams with all the necessary contextual data, ending time-consuming investigations.

Stay ahead of issues

Get real-time alerts for job delays, failures, and performance degradations before they impact your business objectives. Ensure service reliability with proactive notifications.

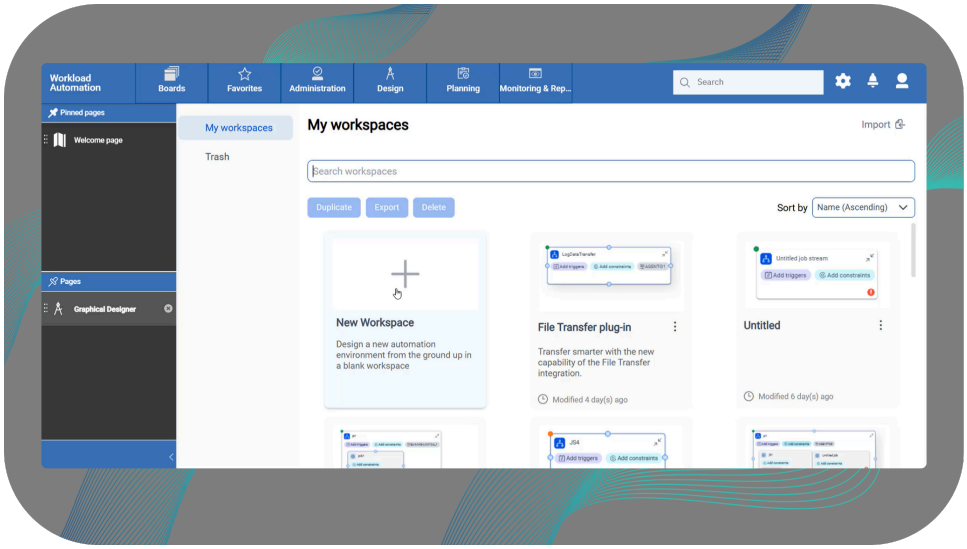
Visualize success instantly

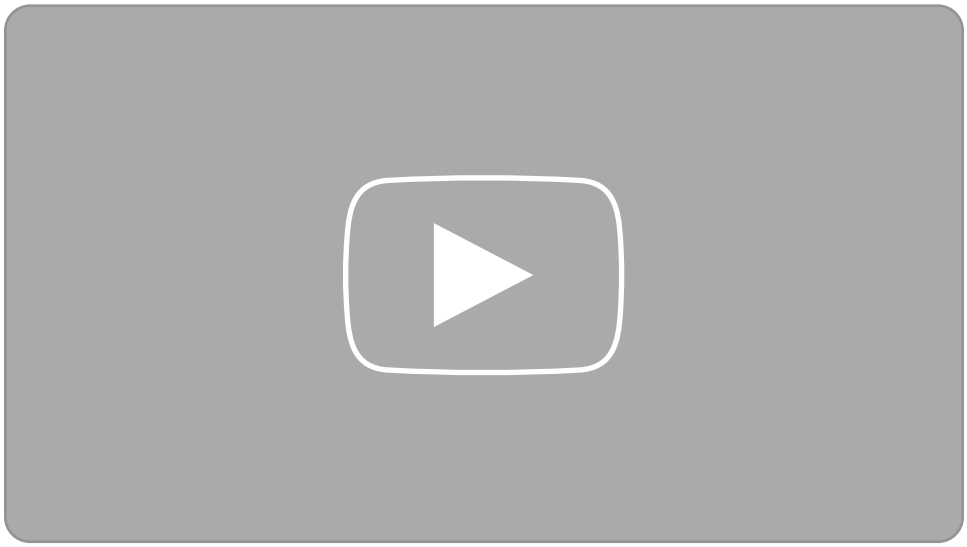
Get immediate time-to-value with a purpose-built, pre-configured dashboard available directly from Automation Hub. The intuitive widgets are designed to distill complex information, like critical job risks, job status trends, and system health. This clarity can help any team member to gain valuable insights without specific Instana training.

Ready to turn complex metrics into clear, actionable insights? Dive into our documentation to learn how to configure this powerful new integration today. See Leveraging Instana for advanced observability.

Multiple workspaces: enhancing design flexibility

The multiple workspaces feature provides a flexible, structured approach to handle different projects and work streams. To support this, the new **My workspaces** page acts as a central interface to manage all your workspaces from a single location.





Multiple workspaces improve project organization by separating work streams. Each workspace functions as a self-contained environment, which helps you:

- **Leverage design flexibility:** Move freely from a design to another and keep up with fast-paced business needs.
- **Improve clarity:** By keeping projects separate, you can start a new design session or continue a specific process without clearing the canvas before starting a new workspace.
- **Organize by context:** Create distinct workspaces for different projects or scenarios.

Centralized oversight with the My Workspaces page

The new **My Workspaces** page is the central hub to easily manage your workspaces:

- **Centralized control:** The **My Workspaces** page displays a list of all existing workspaces, enabling you to find and manage workspaces using search and sort capabilities.
- **Streamlined operations:** Perform actions on individual workspaces or in bulk.
- **Safety Net**: A dedicated **Trash** page enables you to recover accidentally deleted workspaces, preventing permanent data loss.

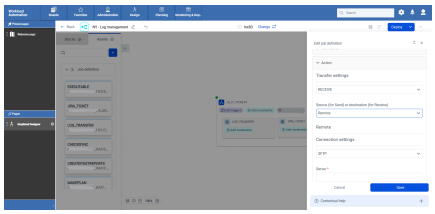
Portable workspace definitions

You can export workspace definitions and import previously exported workspaces to continue working on them. The workspace definitions exported from the Dynamic Workload Console (JSON, YAML) are fully compatible with Orchestration CLI and the REST API. This enables seamless interoperability between visual design and programmatic management.

Find out more about multiple workspaces in Managing your workspaces.

Remote-to-remote File Transfer integration

The new remote-to-remote capability within the File Transfer integration drastically simplifies how your enterprise moves critical data.



This new capability enables the secure, high-efficiency transfer of one or more files directly between two remote server endpoints. In the past, moving files between two external systems (Peer A and Peer B) often required a dynamic agent to be installed on at least one of those systems, or involved complex multi-step intermediary transfers. Now, a single job running on any designated agent can orchestrate the transfer between Peer A and Peer B, dramatically reducing complexity and removing the need for local agents on the source or destination machines.

You can now securely manage external data flow with maximum resource efficiency and significant architectural simplification. All transfer actions are run securely using the robust protocols already available and supported by the File Transfer integration: FTP, FTPS, FTPES, SFTP (previously referred to as SSH), and Windows protocols.

Advanced Features and Usability

The remote-to-remote capability fully supports the advanced functionalities already present in the File Transfer integration, ensuring complete control and reliability:

- **Unified Security:** All file transfers leverage the security and encryption capabilities of the underlying File Transfer protocols.
- **Backward Compatibility:** All existing File Transfer functionalities and job definitions are fully maintained and supported, guaranteeing a smooth transition.
- **Intelligent Workflow Details and Restart:** Retains the powerful ability to view the status of every single transfer and restart the transfer of individual files or groups of files without needing to restart the entire job stream from the beginning, ensuring maximum recovery and integrity.
- **Simplified File Selection:** Despite the systems being remote to the HWA network, the integration provides enhanced usability: you can easily browse and visualize the file system of both the source and destination remote servers directly within the job definition interface, enabling for rapid and effective file selection.

Transfer smarter with the new capability of the File Transfer integration.

For further information about the integration, browse to Automation Hub.

Centralized JWT Signing Key Management

The signing key for JSON Web Tokens (JWTs) is now centrally stored in the database to ensure secure and consistent token validation across HCL Workload Automation components.

Key storage and usage

The master domain manager now generates its own proprietary key, which it uses to sign certificates. This key is now centrally stored in the database and is therefore shared between the master domain manager and the backup master domain manager, ensuring business continuity in case you need to switch the manager. When you rotate the certificates on the master domain manager, the old tokens remain valid because the signing key remains unchanged.

The keystore includes a new certificate with the alias `mpjwtkey`, which contains the server public key (`tls.crt`). To ensure proper product functionality, this alias must remain unchanged and must not be modified under any circumstances.

Benefits of centralized storage

Centralizing the signing key in the database enables seamless distribution and accessibility across all HCL Workload Automation components. This facilitates secure and uniform token validation throughout the environment.

Key validity and stability

The signing key stored in the database is configured with a validity period of 100 years, ensuring long-term stability and uninterrupted operations across your environment.

Upgrade considerations

If you are upgrading from a previous version, the signing key location is automatically managed by the system. No manual intervention is required—the upgrade process preserves and configures the key as needed.

Certman security enhancements: automated validation & OpenSSL integration

Two key enhancements have been made for more reliable and efficient security management:

Automated certificate verification

The `AgentCertificateDownloader` script now automatically verifies certificates using the `certman verify` feature. This change improves security and helps prevent deployment issues.

The script checks that:

- The certificate, private key, and CA are consistent.
- The certificate is not expired.

This verification runs during initial agent setup and automatic renewal, preventing the installation of invalid or inconsistent certificates.

Simplified certificate generation with OpenSSL syntax

Certman now natively supports OpenSSL syntax.

This enables you to use standard OpenSSL commands and parameters (such as `subject`, `expiration`, `key size`) directly when generating new certificates or a Certificate Authority (CA).

These enhancements provide more robust certificate verification and greater control over certificate generation.

Support for Informix database

The Informix database is now supported on UNIX operating systems. Informix is a high-performance relational database management system known for its reliability, scalability, and minimal administrative overhead. It is especially suited for environments requiring high availability, complex data types, and embedded system integration.

Key Advantages

High performance and low latency

Optimized for OLTP workloads with fast data retrieval and minimal tuning.

Seamless replication and high availability

Includes Enterprise Replication (ER) and High Availability Data Replication (HDR) for zero-downtime operations.

Minimal administration

Self-managing features reduce DBA workload with automatic space and performance management.

Flexible data model support

Supports SQL, NoSQL, JSON, TimeSeries, and Spatial data types for hybrid applications.

Embedded and iot-friendly

Compact architecture suitable for edge computing and low-resource devices.

Cross-platform and cloud-ready

Runs on multiple OS platforms and integrates with Docker, Kubernetes, and cloud services.

Strong security features

Includes role-based access control, encryption, and SSL/TLS support.

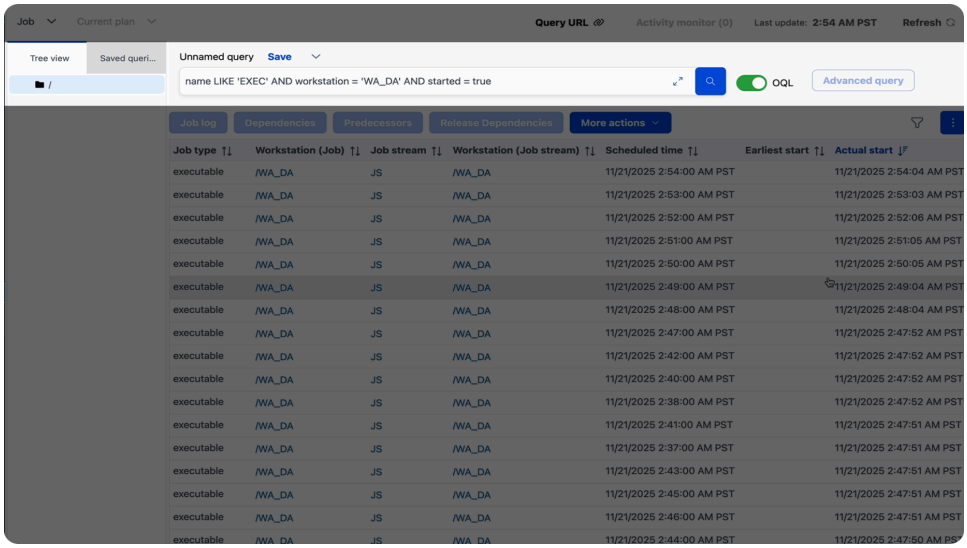
Advanced analytics and integration

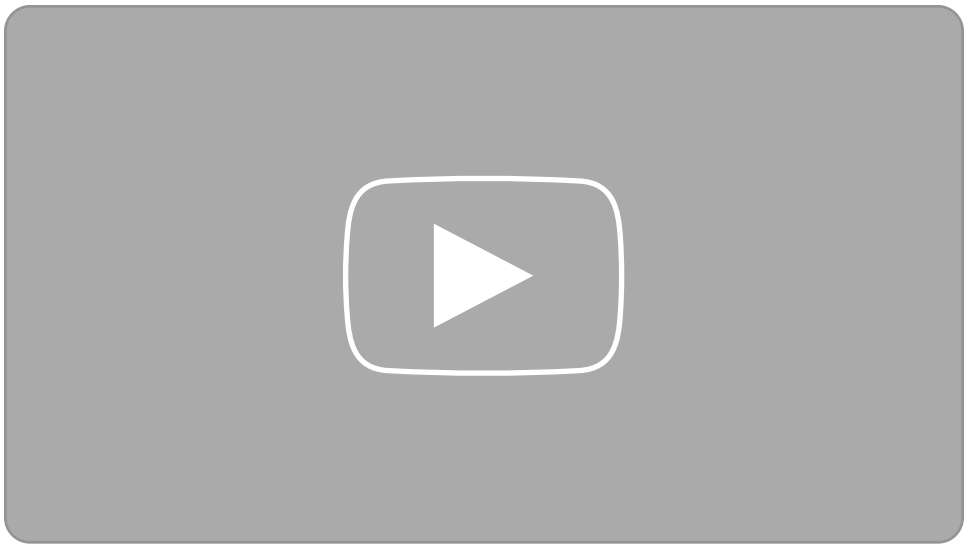
Compatible with IBM Watson, Cognos, SPSS, and popular BI tools via JDBC, ODBC, and REST APIs.

For more information, see Creating the database for Informix for the master domain manager and Creating the database for Informix for the Dynamic Workload Console.

Enhanced OQL filtering: the `STARTED` alias

OQL filtering capabilities are enhanced with the introduction of the new **STARTED** alias for jobs and job streams.





This feature significantly simplifies query writing and improves readability. It streamlines your filtering process by enabling a simple, case-insensitive keyword to replace more complex OQL filter logic.

The `STARTED` alias enables you to directly filter objects based on whether they have an *actual start value*, that is, whether they have started running.

For example, when monitoring jobs in the **Orchestration Monitor**, you can now use a query as simple as `STARTED = true` to find all jobs that have started. Additionally, you can create more refined queries by combining the alias with other OQL syntax keywords and fields for more in-depth filtering:

```
name LIKE '@job1' AND jobOptions.critical = true AND started = false
```

This provides a more intuitive way to check the run status of objects in the plan. For more information, see Using Orchestration Query Language

New in Orchestration Monitor: update agent certificates remotely

The **Update agent certificate** action is now available on the Orchestration Monitor, giving you a single, centralized way to refresh certificates across your environment.

This feature simplifies security maintenance and ensures your dynamic agents can quickly and reliably establish trust.

Key functionality

- **Quick access:** The **Update agent certificate** action is available when you select a dynamic agent workstation running version 10.2.6 or later, and click **Actions**. This enables users to initiate the remote certificate download.
- **Direct download from primary domain manager:** When triggered, this action performs the update of the remote dynamic agent certificates on all eligible workstations. The selected dynamic agent contacts the primary domain manager to directly download new certificates from the master domain manager `<data_dir>/ssl/depot` folder, replacing the existing certificates in the dynamic agent local truststore.

- **Simplified trust for external services:** If you create the sub-folder `<data_dir>/ssl/depot/additionalCAs` on the master domain manager and populate it with public certificates for external services, the agent automatically downloads them and adds them to its local trust store. This ensures simple and immediate trust establishment for any services dependent on those auxiliary certificates.

Automatic recovery and rollback

To guarantee continuity of service, an automatic recovery mechanism has been implemented.

After the agent downloads and imports the new certificates, it attempts a primary connection to the reference primary domain manager. If the connection fails to establish within a period of 5 minutes, or if the downloaded certificates are expired or incorrectly formatted, the agent automatically reverts to the previous functional certificates. This process protects the agent from being permanently isolated due to a failed update.

Verification

You can verify the success of the agent certificate update process by checking the **Certificate expiration** column on the Orchestration Monitor. You can add the **Certificate expiration** column by modifying the table configuration.

For more information, see Orchestration Monitor overview

Referencing operator instructions in event rules

You can use operator instructions as variables for job and job stream events of `TWSObjectsMonitor` type.

By enabling dynamic data extraction from job and job streams definitions, this feature enhances event-driven workload automation (EDWA) processes, significantly improving event rules flexibility and reusability. This enhancement provides greater speed and efficiency in automation, substantially reducing the number of event rules otherwise required to cover multiple objects.

The feature supports the direct use of information contained within the **description** and **documentation** fields of jobs and job streams definitions as variables in EDWA actions. Such operator instructions can include runbook steps, support contacts, and recovery procedures.

The information is accessed via variables specifically available for `TWSObjectsMonitor` event actions related to jobs and job streams. You can choose to retrieve the entire set of instructions or specific, customized key-value pairs.

- **Retrieving the entire field content:** Retrieve the complete text from the operator instructions fields, typically used for sending full recovery procedures:

  ```
  %{<event>.OpInstr}
  ```

- **Retrieving specific key-value pairs:** Extract custom metadata defined within the object description, for example support contacts:

  ```
  %{<event>.OpInstr.<key>}
  ```

Note: The key-value pair must be present within the **description** or **documentation** fields of the job or job stream definition. The syntax requires a key, a separator (either `=` or `:`), and a value. For example:

```
support_team=help@wa.it
```

Key benefits

- **Improved efficiency:** Processes become more rapid due to automated, context-aware actions.
- **Rule consolidation:** The number of unique event rules required is drastically decreased, as one generic rule can cover multiple events across different jobs and job streams.
- **Enhanced recovery:** Provides direct access to operational data and support contacts at the moment an event occurs.

For more information, see TWSObjectsMonitor events.

Job stream view enhancements

Overview of job stream view

The latest enhancements to the job stream view prioritize user control, visual feedback, and operational efficiency. The updated interface provides a more stable and responsive environment for managing complex workloads.

- **View stability**
  - **Layout locking:** Freezes node coordinates to facilitate navigation and panning without causing disorienting layout shifts.
- **Operational efficiency**
  - **Multi-selection mode:** Toggles between single navigation and bulk selection modes. Selected items display with high-contrast highlighting for improved visibility at any zoom level. Users can perform simultaneous actions on multiple jobs with a confirmation summary of the operation status.
- **User feedback**
  - **Visual loading state:** Displays a distinct loading indicator during data-intensive processing. This visual confirmation alerts users that background calculations are active, reducing uncertainty during layout updates.
- **View export accuracy**
  - **SVG export functionality:** Generates scalable vector graphics that accurately reflect the current on-screen layout, operational status, and node positions.

Benefits of job stream view enhancements

These enhancements streamline daily operations and improve the usability of the graphical interface:

1. **Bulk processing:** Users can perform actions on multiple jobs simultaneously within the job stream view, removing repetitive manual tasks. The system provides immediate confirmation upon completion of the bulk action.
2. **Enhanced offline analysis:** The improved SVG export supports extensive graphs containing hundreds of jobs. Text, icons, and dependencies remain fully readable in the exported file, facilitating offline review and documentation.
3. **Navigation control:** Layout locking prevents accidental displacement of items or cells during navigation. Users can explore the job stream structure freely without altering the defined visual arrangement.

Changed features, improvements, and RFEs in version 10.2.6

A list of features changed and improved since the previous release and major improvements.

Changed and improved features

The following features have changed or have been introduced or removed since the previous release:

Support for Oracle PeopleTools 8.62.04

HCL Workload Automation supports Oracle PeopleTools version 8.62.04

Support for Java Runtime Environment version 21 on IBM i agents

IBM i agents now support Java Runtime Environment 21, enabling applications to leverage the latest LTS Java runtime. This update provides enhanced performance, new language features, and improved security. Compatibility with Java Runtime Environment version 11 is seamlessly maintained in both fresh install and upgrade scenarios.

Publications are available in PDF format

From the Documentation Center you can access the publications in PDF format at the following link: Product Library in PDF format.

Requests for enhancements (RFEs)

Requests for Enhancements (RFEs) give customers the opportunity to collaborate directly with the product development team and other users. The team prioritizes and develops new product features based on proposals made by customers.

HCL Workload Automation V 10.2.6 delivers the following RFEs:

Pre-installation disk space validation for all HCL Workload Automation components

To ensure a smooth and successful installation experience, the program now performs an automatic disk space check before the installation begins. This proactive step helps prevent interruptions by verifying that your system meets the minimum disk space requirements upfront.

SSH protocol now renamed to SFTP protocol in the File Transfer integration

In the File Transfer integration, the **SSH protocol** has been renamed to **SFTP** (SSH File Transfer Protocol) for improved clarity. The core functionality is unchanged. For more information, see File Transfer integration.

To submit a new RFE, contact us at HWAinfo@hcl.com

HCL Workload Automation version 10.2.5 enhancements

Learn about the HCL Workload Automation version 10.2.5 features.

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Changed features, improvements, and RFEs

Advancing security with FIPS 140-3 compliance

FIPS is a U.S. government security standard that defines **security requirements for cryptographic modules** used to protect sensitive information. **FIPS 140-3** is the latest version of the U.S. and Canadian government security standard that defines security requirements for cryptographic modules in IT and telecommunications products. Its purpose is to ensure that products handling sensitive data via cryptography are secure and reliable. Federal agencies must use FIPS 140-3 validated modules. It is also widely adopted by defence contractors and financial institutions.

The introduction of FIPS 140-3 compliance ensures a robust and secure automation solution. This significant enhancement enables organizations, particularly those in regulated industries and federal sectors, to leverage HCL Workload Automation while adhering to stringent U.S. government security standards for cryptographic modules.

HCL Workload Automation now natively supports FIPS 140-3 by restricting cryptographic algorithms to the permitted subset, ensuring that data protection mechanisms align with these rigorous specifications, while carefully managing necessary, FIPS-permitted exceptions during transition.

A new and improved version of the secure command empowers administrators to activate or deactivate FIPS compliance post-installation. Key capabilities of secure include:

FIPS activation

Configures the environment for FIPS 140-3 operation. This includes verifying compatibility (for example with Windows users) and converting any existing passwords stored with the older TripleDES algorithm to the FIPS-approved AES encryption standard. It then activates FIPS flags across essential configuration files and restarts the affected components. The activation process can accommodate transitional phases for algorithms like TripleDES, as permitted, before full conversion.

FIPS deactivation

Reverts the FIPS-specific settings in the aforementioned configuration files and restarts the components, should FIPS mode need to be disabled.

The introduction of integrated FIPS 140-3 compliance offers significant advantages:

Enhanced Security Standards

Operate your environment in alignment with rigorous, federally mandated cryptographic standards.

Simplified Regulatory Adherence

Enable organizations in government, finance, healthcare, and other regulated sectors to confidently deploy HCL Workload Automation.

Dedicated Compliance Management

Utilize the secure script for straightforward and centralized control over FIPS activation and deactivation.

Robust Data Protection

Ensure sensitive data, particularly passwords, are protected using FIPS-validated encryption algorithms like AES.

Flexible and Controlled Migration

Benefit from a clear process for enabling FIPS in new or existing environments, with guidance for migrating older FIPS-configured setups.

With FIPS 140-3 compliance, HCL Workload Automation provides an even more secure and trustworthy platform, empowering you to meet demanding security requirements while automating your critical business processes.

To ensure FIPS compliance, all HCL Workload Automation components must meet the following requirements:

- All components must be at version 10.2.5 or later.
- The certificates must employ at least a robust 2K RSA key and use encryption algorithms different from `MD5-RSA` and `SHA1-RSA`.
- The key must be in a format where the algorithms are supported by FIPS. For example, avoid the PKCS1 format with the MD5 algorithm or the PKCS8 format with the 3DES algorithm.

FIPS is supported on all supported operating systems with the exception of IBM i operating systems.

FIPS mode is primarily for meeting specific government security standards. If your organization does not need to enable it, the product continues to deliver robust security without it. If your organization does not requires adhering to FIPS, you can install or upgrade as usual and FIPS will not be enabled in your environment.

When you perform a fresh installation, FIPS is disabled by default: you can enable it by setting the **enablefips** parameter to `true` when running the installation commands. When you upgrade from a previous version, HCL Workload Automation checks your current FIPS settings and applies the same settings in the upgraded environment. Before you start the upgrade, ensure your certificates meet FIPS 140-3 standards. FIPS is supported on all supported operating systems with the exception of IBM i operating systems.

For more information about FIPS, see Enabling and disabling FIPS.

Streamlined engine reporting configuration in administration panel

Discover a more intuitive and controlled method for managing reporting credentials on a per-engine basis. The primary goal is to provide users with a dedicated and user-friendly interface to configure and update database access required for reporting functionalities tied to specific engines.

Previously, managing these specific credentials might have involved less direct methods. Now, administrators can easily handle this task: upon selecting an engine from the Administration Panel and clicking the edit icon, the familiar edit modal appears, now featuring a distinct "Reporting" tab. Within this tab, users can enable reporting for the selected engine and securely input the necessary Database User ID and Password. Successful saving of these credentials is confirmed instantly via a toast notification, ensuring a clear and immediate feedback loop.

This refinement offers clear advantages:

Enhanced User Experience

Provides a dedicated, easy-to-navigate interface for reporting setup.

Centralized Control

Simplifies the management of reporting credentials for each engine directly within its configuration.

Improved Efficiency

Speeds up the process of configuring or updating reporting details.

This focused update improves the administrative experience by making the setup and maintenance of engine-specific reporting credentials more straightforward and secure.

Navigating OQL Queries in the Orchestration Monitor

The Orchestration Monitor OQL query functionality has been significantly enhanced to improve usability and performance. The new design empowers you with greater control and a more intuitive interface for managing your queries.

When interacting with the query input section, you can now:

- Manually trigger searches using a dedicated search icon or by simply pressing Enter. This removes the automatic running of queries while typing.
- Expand or collapse additional filters via an interactive visual icon, enabling a cleaner and more focused workspace.

The ability to precisely control query runs and filter options means you can now craft highly specific queries for workstations, job streams, jobs, and more without interruption. This leads to faster issue resolution and more efficient operational management.

User Object Credential Management - Ensuring operational continuity and security

The User Object Credential Management enables you to securely update the passwords stored within user objects directly from a central point of control. This ensures that changes are applied consistently across both the database and plan instances, guaranteeing operational continuity and better adherence to your security policies.

Previously, updating the credentials stored in user objects was often a manual, multi-step process. These password changes had to be applied separately to the database and then manually propagated to any active plans, a procedure prone to human error and delays. This disconnect could lead to authentication failures for in-flight tasks that rely on these objects, causing unexpected job failures, disrupting critical business processes, and creating potential security compliance gaps.

The introduction of this feature brings significant advantages:

Limit service disruptions

Update credentials for user objects across both the database and all running plan instances with a single action. This prevents authentication failures and ensures your job streams continue to run without interruption.

Strengthen security and compliance

Enforce password policies consistently for the credentials within your user objects and respond quickly to security mandates. Centralized control simplifies audits and demonstrates adherence to your organization's security standards.

Increase operational efficiency

Drastically reduce the time and effort required to manage user object credentials. What was once a complex, multi-system task becomes a single, swift operation, freeing up your team to focus on more strategic initiatives.

User Object Credential Management enables more resilient, secure, and efficient automation.

Monitor certificate expiration - Total certificate control

The Monitor certificate expiration provides a centralized view of your certificates directly within the Orchestration Monitor. This gives you immediate visibility into certificate validity, making it simple to track expiration dates and proactively manage the rotation process to maintain security and service availability.

The introduction of proactive certificate monitoring brings a number of benefits:

Prevent service outages

Gain a clear, at-a-glance view of all monitored certificates and their expiration dates. By receiving advance warning, you can plan and perform certificate rotations with zero downtime, preventing outages caused by expired credentials.

Enhance security and compliance

Ensure your environment is always protected with valid, trusted certificates. Proactive monitoring simplifies security audits and demonstrates a robust, compliant process.

Streamline certificate management

By centralizing certificate information within the Orchestration Monitor, you reduce administrative overhead and simplify the entire lifecycle management for your team.

By integrating certificate oversight directly into your daily monitoring, this feature transforms a manual task into a simple part of your operational routine, bolstering both the security and reliability of your automation.

Changed features, improvements, and RFEs in version 10.2.5

A list of features changed and improved since the previous release and major improvements.

The following features have changed or have been introduced or removed since the previous release:

New command for setting Dynamic Workload Console environment

You can now use the dwc_env command to set the environment on the Dynamic Workload Console. Launch the command as follows: dl

On Windows operating systems

```
dwc_env.cmd
```

On UNIX operating systems

```
. ./dwc_env.sh
```

After setting the environment, you can launch the commands located on the Dynamic Workload Console (secure and certman) without specifying the command path.

The command is located in the installation directory of the Dynamic Workload Console.

The certman command can now verify the security level of certificates in your environment

The check on certificates is performed automatically at installation or upgrade time. If the current certificates are not secure, a warning message is displayed.

New databases supported

The following databases are now supported:

- Amazon RDS for Postgres
- Google Cloud SQL for Postgres

These databases offer a powerful combination of flexibility, scalability, ease of use, and performance together with high availability and reliability.

Requests for Enhancements (RFEs) give customers the opportunity to collaborate directly with the product development team and other users. The team prioritizes and develops new product features based on proposals made by customers.

HCL Workload Automation V 10.2.5 delivers the following RFEs:

User object credential management

The User object credential management enables you to securely update the passwords stored within user objects directly from a central point of control in the Dynamic Workload Console. You can also perform the same action from the Orchestration CLI with a simple command, for more information see altpass.

Monitor certificate expiration

The monitor certificate expiration provides a centralized view of your workstation certificates directly within the Orchestration Monitor. This enables you to track expiration dates and proactively manage the rotation

process to maintain security and service availability. For more information on the Orchestration Monitor, see Orchestration Monitor overview

Loop detection between jobs and job streams in current and trial plans

Ensure robust detection of loops involving nodes (that is jobs and job streams) in both the current and trial plans. By enabling the new property `com.ibm.tws.planner.monitor.verboseLoopLogging=true` in the `TWSConfig.properties` file, the product logs loop-related notifications in the `trace.log` file whenever loops are detected.

To minimize log verbosity, notifications are only generated when there is a change in loop structure—such as a job or job stream entering or exiting the loop.

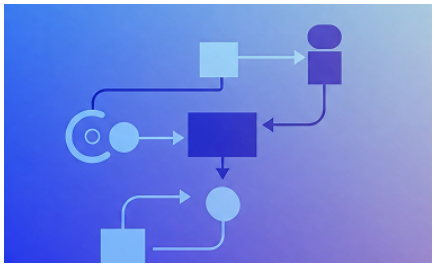
For more information, see Detecting loops between jobs and job streams in current and trial plans

To submit a new RFE, write to us at HWAinfo@hcl.com

HCL Workload Automation version 10.2.4 enhancements

Learn about the HCL Workload Automation version 10.2.4 features.

Table 2.



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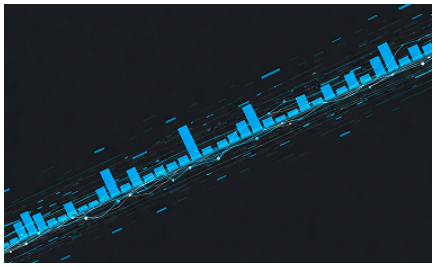
Maximize efficiency with Nesting



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Monitor with OQL

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Operator instructions

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Security - Password vaults

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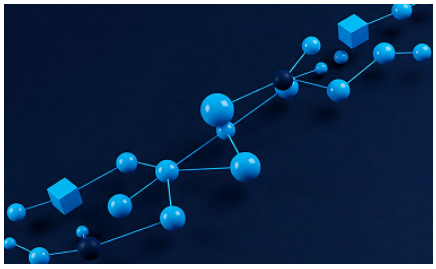
Security - Password encryption



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Security - Certman improvements

Table 2. (continued)

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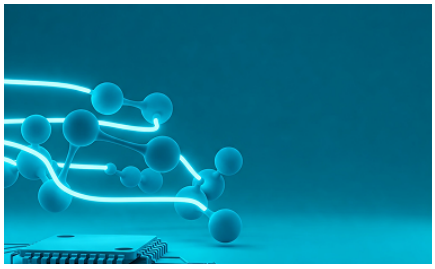
Workstations - Graphical Designer



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RCGs - Graphical Designer

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Resources - Graphical Designer

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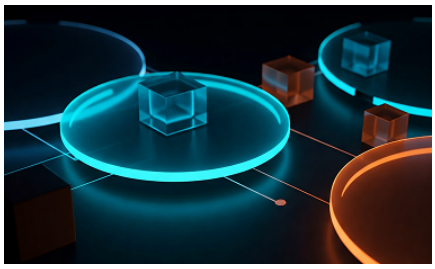
Workflow details available



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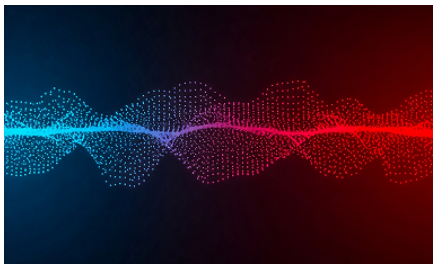
Enhanced job monitoring



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Performance optimization

Learn about the HCL Workload Automation version 10.2.4 enhancements.

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Changed features, improvements, and RFEs

Maximize workflow efficiency with advanced job stream submission and management

Transform the way you handle automated workflows with cutting-edge features designed to streamline submissions, enhance flexibility, and offer greater control over your orchestration processes. To achieve this, you can use the Job Stream Submission job, which is designed to automate the submission of job streams for processing. The new version of this job features the following improvements:

Hierarchical orchestration

Unlock advanced automation scenarios through nested job streams. This powerful feature enables you to build intricate, multi-layered workflows by embedding job streams within others. This enables precise orchestration of complex sequences of interdependent jobs and job streams, providing a structured approach to managing sophisticated processes.

Automated submission efficiency:

Streamline and optimize your operational flow by automating the submission of job streams for processing. This enhancement reduces manual intervention, accelerates workflow initiation, and improves overall efficiency by ensuring timely execution of your automated processes.

Real-time monitoring

Maintain comprehensive awareness of your active workflows with detailed, real-time monitoring accessible via the Workflow details view in the Dynamic Workload Console. This provides immediate insight into the status of each job stream, enabling proactive issue identification and resolution, ensuring smooth and predictable operations.

Flexible management options

Gain granular control over running job streams with enhanced drill-down capabilities within the Workflow details view. This enables you to investigate the status of individual components and, crucially, to restart the Job Stream Submission job as needed. This dynamic management capability ensures operational continuity and enables a swift recovery from unexpected issues.

Customizable Behavior

You can now configure whether the Job Stream Submission job actively monitors the run of the submitted job streams and adjusts its own status based on their final outcome. Alternatively, you can maintain the previous behavior where the submission job completes successfully regardless of the downstream job stream results, providing flexibility in how you track and manage workflow dependencies.

These advancements in job stream submission and management empower you with unparalleled precision, efficiency, and control over your automated workflows. By streamlining submissions, enabling sophisticated nested structures, providing real-time visibility, offering flexible management options, and allowing for customizable behavior, these features simplify even the most complex processes and significantly enhance your orchestration capabilities.

Filtering with Orchestration Query Language in the Orchestration Monitor

Harness the power of OQL for enhanced monitoring.

Experience the power of Orchestration Query Language (OQL) directly in the Orchestration Monitor of the Dynamic Workload Console.

Toggle the OQL button in the Orchestration Monitor and effortlessly filter workstations, jobs, job streams, and resources with comprehensive syntax, tailoring your view for superior monitoring and gaining precise insights for optimal workload management.

Operational efficiency through precise monitoring

By leveraging OQL in the Orchestration Monitor, you can filter workstations, jobs, job streams, and resources with comprehensive syntax. This precise filtering enables operations teams to quickly pinpoint specific areas of interest or concern in your environment, reducing the time spent sifting through irrelevant data and leading to faster identification and resolution of issues.

Faster issue resolution and reduced downtime

OQL empowers you to easily and quickly retrieve required results by writing targeted queries. This rapid access to specific information about the production plan environment enables operations teams to diagnose problems more efficiently, leading to quicker resolutions and minimizing potential downtime, which directly translates to increased system availability and business continuity.

Streamlined operations across multiple interfaces

OQL is not limited to a single interface; it can be used with REST API V2, Orchestration CLI, and the Orchestration Monitor of the Dynamic Workload Console. This consistency across different tools provides flexibility for various user roles and automation needs, streamlining operations and reducing the learning curve for different interaction methods, leading to increased team productivity.

Get access to OQL and enhance your monitoring capabilities, improve operational efficiency, reduce downtime, optimize workload management, and proactively address potential issues. For more information, see Using Orchestration Query Language.

Operator instructions within the Orchestration Monitor

The Orchestration Monitor now features the **Operator instructions** panel.

Operators can now retrieve definition details for jobs and job streams with the new **Operator Instructions** panel within the Orchestration Monitor. The panel displays information from the **Description** and **Documentation** fields of the job or job stream definition, to facilitate a rapid comprehension of item parameters during monitoring activities.

Enhanced operational efficiency

Operators can quickly access crucial definition information about jobs and job streams directly within the Orchestration Monitor. This rapid access to details from the **Description** and **Documentation** fields facilitates a faster comprehension of job or job stream parameters during monitoring activities, leading to more efficient operations.

Reduced downtime

By providing operators with immediate access to relevant information, the **Operator Instructions** panel enables them to better understand the context and purpose of running jobs and job streams. This improved understanding can lead to more effective monitoring, quicker identification of potential issues, and ultimately, a reduction in system downtime.

Faster issue resolution

When an issue arises, operators can instantly retrieve definition details for the affected job, job instance, and the associated job stream. This readily available information can significantly speed up the troubleshooting process, allowing operators to diagnose and resolve problems more quickly, minimizing business impact. This deeper understanding empowers operators to make more informed decisions during monitoring and when taking necessary actions.

Simplified sharing and onboarding

The **Operator Instructions** feature centralizes key information about jobs and job streams, making it easily accessible to all authorized personnel. This can streamline knowledge sharing within operations teams and facilitate the onboarding of new operators by providing them with immediate access to essential details.

The **Operator Instructions** panel gives operators the necessary details to improve their monitoring effectiveness. and achieve a faster comprehension of item parameters, ultimately contributing to a more efficient and informed operational environment.

For more information about OQL syntax, see Orchestration Monitor overview.

Discover the new and improved integration with password vaults

Take password management to a new level with the new integrated capabilities for password storage and management.

You can now configure one or more **dynamic agents, pools, or dynamic pools** to interact with CyberArk or other password vaults and obtain the passwords required to run your jobs. Employing pools or dynamic pools guarantees high availability by automatically selecting the best-suited agent to contact the password vault.

Enhanced security

The new integration provides a centralized and secure solution for managing credentials, significantly reducing the risk of unauthorized access and security breaches.

Reduced operational overhead

Automating password retrieval through integration with password vaults removes the manual effort involved in managing and updating passwords across numerous jobs and systems, freeing up staff for more strategic tasks.

Increased efficiency and reliability

Jobs are less likely to fail due to incorrect or expired passwords, as the system automatically retrieves the current credentials from the vault at runtime. The high availability ensured by using pools or dynamic pools minimizes disruptions.

Flexibility and scalability

The support for multiple password vaults and custom scripts enables integration with existing security infrastructure and easy scaling of automation efforts.

Smooth integration

Dynamic agents, pools, and dynamic pools can be configured to interact with a chosen password vault to obtain necessary passwords at runtime.

Easy configuration

The ability to create multiple profiles on agents provides flexibility for different password vaults or specific queries.

Streamlined upgrade

Existing users on versions 10.2.1 and later benefit from an automatic migration of their CyberArk configurations, simplifying the adoption of the new feature.

This feature requires all HCL Workload Automation components to be at version 10.2.4 or later.

In conclusion, the new password vault integration in HCL Workload Automation offers a compelling value proposition by providing a secure, efficient, and flexible solution for managing passwords in automated workflows, directly addressing key security and operational challenges associated with managing a growing IT landscape.

For more information about configuring dynamic agents to function as proxies by creating a profile, see the topic about configuring the agent to work with a password vault in *Administration Guide*.

For more information about specifying the required information in the job definition, see Obtaining passwords from password vaultsthe topic about obtaining passwords from password vaults in *User's Guide and Reference*.

Improved security for password encryption

Ensure a higher security level with the AES algorithm. This feature is especially convenient for encrypting the passwords stored in `.opts` configuration files used for PeopleSoft and SAP.

The Triple DES encryption algorithm has been deprecated by NIST (National Institute of Standards and Technology) and is no longer recommended for new systems. It has been replaced with the AES (Advanced Encryption Standard) encryption algorithm, which offers the following advantages:

Enhanced Security and Reduced Risk

The latest version uses the Advanced Encryption Standard (AES) algorithm as the default for password encryption, which offers a higher level of security compared to the deprecated Triple DES (3DES). AES supports longer key lengths (128, 192, and 256 bits), making encrypted passwords more resistant to brute-force attacks. This significantly reduces the risk of unauthorized access to sensitive systems integrated with HCL Workload Automation, protecting valuable data and the integrity of critical business processes.

Improved Compliance and Adherence to Modern Standards

NIST now recommends AES as the current encryption standard. By adopting the latest HCL Workload Automation, clients ensure they align with modern security best practices and industry standards, potentially aiding in meeting regulatory compliance requirements.

Increased Efficiency and Reduced Operational Costs

AES is significantly faster and more efficient than 3DES, especially in software implementations. This leads to quicker password encryption and decryption processes, consuming less computational power and memory, potentially resulting in faster processing times and reduced expenses for resources and processing time.

Easier Transition and Minimal Disruption

The upgrade process is designed to be seamless. If clients were previously using 3DES, their encrypted passwords are automatically and seamlessly converted to the new AES algorithm during the upgrade, requiring no manual intervention. This minimizes disruption to existing operations and reduces the burden on staff.

Flexible and Versatile Password Management

A secure script that can be used to optionally encrypt passwords for SAP or PeopleSoft, even after the upgrade. This script offers flexibility, allowing administrators to encrypt passwords used during installation, upgrade, and management processes. Clients can choose to use a custom passphrase for potentially reusable passwords or leverage the standard encryption method with a unique key for each installation, further enhancing security by preventing decryption across different components.

The AES encryption provides stronger security, improved efficiency, better compliance, and a seamless upgrade process, ultimately contributing to a more secure and reliable automation environment for critical business operations. The availability of the secure script further empowers administrators with flexible password management options, reducing potential vulnerabilities and enhancing overall system security.

For further details, see the topic about automatic encryption for key product files in *Administration Guide*.

Unlocking the enhanced capabilities of Certman

Experience a more efficient certificate management, powered by Certman.

The new version of HCL Workload Automation features extended Certman possibilities, including the `delete` command, which provides the capability to remove aliases from a keystore or trustore on a master domain manager, an agent (using the newly implemented `agentscope` keyword), or the Dynamic Workload Console.

Enhanced certificate management

The `certman delete` command enables the removal of aliases from keystores or trustores on various components (master domain manager, agents, Dynamic Workload Console). This streamlines certificate management tasks, saving administrators time and effort compared to potentially more complex manual procedures. Efficient certificate management translates to reduced operational overhead and faster response times for security-related tasks.

Improved security posture

The ability to specifically delete aliases, whether from the keystore, truststore, or both, on different HCL Workload Automation components (including agents via the agentscope keyword) provides more precise control over security certificates. This granular control enables you to maintain a cleaner and more secure certificate environment by removing unnecessary or outdated aliases, reducing potential security vulnerabilities.

Simplified compliance

By enabling the easy removal of unused or expired certificate aliases, the `certman delete` command helps you maintain a more organized and up-to-date certificate inventory. This simplified management contributes to better compliance with security policies and regulations, making audits smoother and less time-consuming**.**

By upgrading to the latest version of HCL Workload Automation, you can leverage these enhanced Certman capabilities to achieve more efficient, secure, and manageable certificate operations, ultimately benefiting from reduced operational costs, improved security, and better compliance.

For more information about the `certman delete` command, see Remove an alias from the keystore or truststore. For further and more general Certman information, see Managing certificates using Certman.

Workstation management within the Graphical Designer

You can now create and manage workstations directly within the Graphical Designer, with a unified and visual approach to your scheduling infrastructure. This provides significant operational advantages:

Centralized workstation control

By creating and managing workstations directly within the Graphical Designer, you gain a consolidated and visual perspective of your entire scheduling environment. This centralized approach minimizes the potential for errors and provides unparalleled control over your automation.

Simplified workstation lifecycle management

The Graphical Designer streamlines the entire workstation lifecycle. Upon initiating creation, the system guides you through selecting the workstation type, including Pool, Dynamic Pool, Extended Agent, and more. After entering the necessary details, the new workstation is added to the Assets list, making it immediately available for scheduling. Furthermore, the Assets tab provides consistent functionality to effortlessly edit, duplicate, or delete workstation definitions, simplifying ongoing maintenance and configuration.

The integrated workstation management within the Graphical Designer delivers a centralized and visual approach to administering your scheduling environment. By providing simplified creation and lifecycle management, this feature minimizes errors and grants you unprecedented control over your automation infrastructure, leading to a new level of operational efficiency.

See Managing workstation definitions to learn how to create workstations from the Graphical Designer interface.

Run cycle groups available as triggers in the Graphical Designer

You can now create and assign run cycle groups as **Triggers** to job streams directly in the Graphical Designer to design a precise, time-driven automation.

This intuitive integration provides significant operational advantages:

Enhanced scheduling precision

By visually defining and managing run cycle groups directly within the Graphical Designer, you gain unprecedented control over when your job streams run. This removes the complexities and potential errors

associated with manual scheduling configurations. The visual interface makes it easy to define intricate scheduling patterns, ensuring that your automation runs exactly when needed, minimizing the risk of incorrect run times.

Streamlined design

Integrating run cycle group creation and assignment into the Graphical Designer simplifies the entire automation design process. You can now define both the tasks and their precise run schedule within a single, intuitive environment. This ease of use empowers you to build and deploy a time-driven automation more quickly and effectively.

The integration of Run cycle groups as **Triggers** within the Graphical Designer offers a powerful and intuitive approach to time-driven automation. By enhancing scheduling precision, streamlining workflow design and freeing up valuable resources, this feature enables you to achieve a greater operational efficiency and focus on strategic growth.

Resources available in the Graphical Designer

You can now associate resources with jobs and job streams directly within the Graphical Designer to build a responsive automation framework attuned to immediate resource accessibility.

This delivers notable operational benefits:

Improved automation responsiveness

By visually linking and managing resource dependencies directly within the Graphical Designer, you achieve superior control over when your jobs and job streams run. The visual interface facilitates the definition of clear resource needs, guaranteeing that your automation operates only when the necessary resources are available, preventing failures due to resource constraints.

Simplified workload creation

Integrating resources into the Graphical Designer streamlines the entire automation design process. You can now define jobs and job streams and their resource dependencies within a unified, user-friendly environment. This ease of use enables you to construct and implement resource-aware automation more rapidly and efficiently. Furthermore, the Orchestration Monitor provides a centralized view for tracking resource status and dependencies, enhancing visibility and control.

The integration of resource management in the Graphical Designer empowers you with a more intuitive, efficient, and agile approach to automation. It simplifies complex workloads, reduces errors, and improves overall productivity.

Workflow details available in the Orchestration Monitor

Elevate your operational efficiency with the introduction of Workflow Details in the Orchestration Monitor. This new feature provides unprecedented real-time visibility into the granular execution of your automation.

Enhanced operational insight and proactive management

Workflow details enable you to track the precise completion percentage of data transfers, monitor the status of individual steps within intricate business processes, and receive immediate updates on key activities. This granular insight empowers your operations teams to proactively manage their workload. Potential bottlenecks

or delays become instantly apparent, enabling swift adjustments and preventing disruptions before they impact critical business outcomes. This proactive approach translates directly into improved service levels and reduced downtime.

Accelerated issue resolution

When issues do arise, Workflow details provide the necessary context for rapid diagnosis and resolution. Instead of sifting through logs, your teams can pinpoint the exact stage where a problem occurred, understand the specific details, and implement corrective actions swiftly. This dramatically reduces the impact of failures on business operations and ensures business continuity.

Optimized resource allocation:

You can identify processes that are taking longer than expected or consuming excessive resources, allowing for optimization efforts. This leads to increased efficiency, reduced operational costs, and the ability to handle a greater volume of work with existing resources.

By providing granular, real-time insights, Workflow details empowers businesses to enhance operational efficiency, accelerate issue resolution, optimize resource utilization, and gain unprecedented control over their integrated environment, ultimately contributing to improved business agility and resilience.

Enhanced job control post-submission

Quick job definition adjustments in the Orchestration Monitor and Job Stream View.

Gain unprecedented control over your jobs with the newly introduced monitoring actions. Directly within the Orchestration Monitor or Job Stream View, you can now control job processing by modifying the job definition without the need to go back to the original database definition. Simply use the following actions to modify the future instances of the selected job definition:

- Set hold for definition
- Remove hold for definition
- Set no operation for definition
- Remove no operation for definition

Increased operational agility and responsiveness

This feature enables you to make quick adjustments to job definitions directly from the Orchestration Monitor or Job Stream View. This removes the time-consuming process of navigating back to the original database definition, enabling faster responses to changing business requirements and immediate control over future job executions.

Improved efficiency and reduced administrative overhead

By enabling modifications from the monitoring interface, you can streamline the job definition adjustment process. Operations teams can save significant time and effort by avoiding the need to access and modify database records, leading to increased efficiency and lower administrative overhead.

Enhanced control

being able to set or remove **Hold** and **No operation** directly from the monitoring views provides unprecedented control over how future instances of jobs are processed. This enables proactive management of the workload based on real-time conditions.

For more information, see Modifying job definitions from job instances.

Performance enhancements

The following improvements have been introduced with the new release:

Improved dynamic agent memory management

HCL Workload Automation version 10.2.4 introduces significant improvements in dynamic agent memory handling. Under substantial workloads of up to 600,000 job submissions, the agent now exhibits negligible memory consumption and efficiently releases resources.

This enhancement provides greater stability and resilience for your workload automation environment, reduces the risk of memory-related issues, and enables higher job throughput without impacting system performance.

Orchestration Monitor query performance boost

The Orchestration Monitor now provides significantly faster access to critical workload information. Query results, based on tests with 250 entries, appear three times as quickly compared to the Workload Monitor.

This improved performance gives you quicker insights into your automation. Faster query times mean less waiting, enabling faster identification of potential issues, quicker decision-making, and improved overall operational efficiency. This enables more proactive monitoring and a more responsive monitoring experience.

Note: Data taken from test environments. The time represents the user process duration, starting from opening the monitor interface to obtaining a query result with 250 entries.

Changed features, improvements, and RFEs in version 10.2.4

A list of features changed and improved since the previous release and major improvements.

The following features have changed or have been introduced or removed since the previous release:

Drivers for Db2 for z/OS no longer shipped with the product

Whereas previously the drivers for Db2 for z/OS were included in the Dynamic Workload Console package, now they must be obtained from your Db2 for z/OS installation. If you use Db2 for z/OS with the Dynamic Workload Console version 10.2.4 or later, transfer the drivers in binary mode from the directory where you installed Db2 for z/OS to a directory of your choice. Specify this directory using the **dbdriverspath** parameter when running the configuredb or dwcinst scripts.

Requests for Enhancements (RFEs) give customers the opportunity to collaborate directly with the product development team and other users. The team prioritizes and develops new product features based on proposals made by customers.

HCL Workload Automation V 10.2.4 delivers the following RFEs:

WAD-I-83

Request: CyberArk and password vault management need to be improved and made more effective.

Resolution: Several improvements have been added in password vault management. For more information, see Discover the new and improved integration with password vaults on page 33.

WAO-466

Request: Remove the 1000-character limit from the `Comment` field of job stream definitions.

Resolution: The `Documentation` field, previously known as `Comment`, has been increased to 4000 characters.

WAO-514

Request: A solution to visually differentiate production and non-production environments.

Resolution: With the `Private Label Settings` page, customers can now personalize environments with custom images. For more information, see Personalizing interfaces with custom images

WAO-544

Request: Add **Operator instructions** for jobs and job streams, as already present on HCL Workload Automation for Z.

Resolution: The Orchestration Monitor now features the **Operator instructions** panel. For more information, see Orchestration Monitor overview

WAO-574

Request: A solution that prevents HCL Workload Automation stored audit files from containing not valid JSON.

Resolution: The content within the audit JSON files is valid JSON. Each individual line now constitutes valid JSON.

WAO-I-3, WAO-I-64, WAO-I-124, WAO-I-190, WAO-423

Request: Enhancing the Dynamic Workload Console with more flexible filtering options, such as combining multiple filter criteria simultaneously, specifying multiple values for a single filter, adding multiple values for the same filter within a widget and so on.

Resolution: The Orchestration Monitor now supports Orchestration Query Language filters to enhance monitoring activities. For more information, see Using Orchestration Query Language.

ZWS-I-238

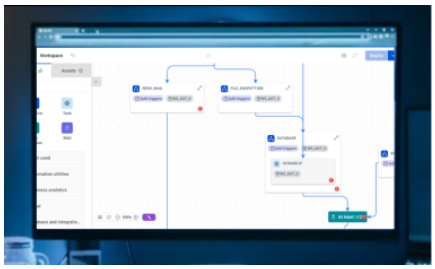
Request: Adding a new administrative role to the Dynamic Workload Console to determine which rights and activities are available to each user.

Resolution: The new **Administration Panel** in the Dynamic Workload Console allows for detailed and granular management of engine settings.

To submit a new RFE, write to us at HWAinfo@hcl.com

HCL Workload Automation version 10.2.3 enhancements

Learn about the HCL Workload Automation version 10.2.3 features.



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Graphical Designer

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PostgreSQL database

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Amazon RDS for MSSQL

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Private Label settings

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Certman

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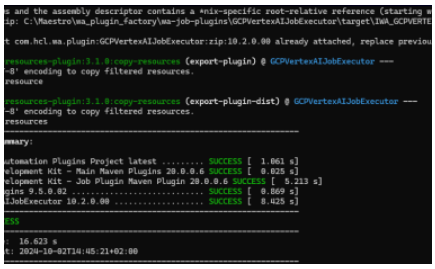
My HCLSoftware portal



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OCLI model commands

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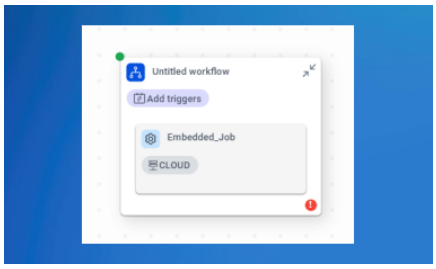
REST API V2



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Embedded jobs

Learn about the HCL Workload Automation version 10.2.3 enhancements.

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Changed features

Discover the Graphical Designer: a brand-new way to design your orchestration

The Dynamic Workload Console version 10.2.6 comes with a brand-new Graphical Designer.

The Graphical Designer introduces drag and drop canvas capabilities that improve and simplify your automation design process. It uses a low-code, streamlined palette-based design and intuitive tabs, making editing your canvas workspace simple and efficient. A mini-map is also available to help you confidently navigate over workspaces that contain multiple complex job streams.

If you enjoy a smooth user experience, intuitive operations and an effective automation, the new Graphical Designer is everything you have been waiting for.

For more information, see Graphical Designer overview.

Elevate your data management with PostgreSQL database

Improve database performance and reliability by implementing the PostgreSQL database in your HCL Workload Automation environment.

You can now use the PostgreSQL database to create the database for the master domain manager and Dynamic Workload Console.

PostgreSQL offers an extensive list of features related to performance, security, and configuration options. It is free and open-source, and its high customizability supports tailoring it to the specific needs of your environment. It also provides scalability, availability, and functionality suitable for large volumes of data.

PostgreSQL replaces OneDB and Informix, which are no longer supported.

For more information about using PostgreSQL to create the database for the master domain manager and Dynamic Workload Console, see the topics about creating and populating the database for the master domain manager and Dynamic Workload Console in *HCL Workload Automation: Planning and Installation*.

Unleash the power of the cloud using Amazon RDS for MSSQL

You can now create the databases for the master domain manager and the Dynamic Workload Console using Amazon RDS for MSSQL.

Amazon RDS for MSSQL is a powerful, scalable managed database service that makes it easier to set up, operate, and scale SQL Server deployments in the cloud. It provides a powerful and convenient option for managing MSSQL databases in the cloud.

Amazon RDS for MSSQL also simplifies database management, enhances security, and provides the flexibility to scale up or down as your needs change.

For more information about creating the database using Amazon RDS for MSSQL, see the topics about creating the database for MSSQL cloud-based databases for the master domain manager and the Dynamic Workload Console.

Customize your interfaces with Private Label Settings

You can now use **Private Label Settings** to enhance your visual identity in HCL Workload Automation.

Your brand visuals are your business signature. You can incorporate your brand visual identity in the Dynamic Workload Console and Self-Service Catalog interfaces by uploading your logo and icon images in just a few clicks from the **Private Label Settings** page.

Your logo is displayed in the login pages of both Dynamic Workload Console and Self-Service Catalog, while the icon is displayed in the navigation bar of the Dynamic Workload Console.

Start customizing your interfaces today to better match your brand personality.

For more information, see Personalizing interfaces with custom images.

Certman: the new tool to manage certificates

Nowadays, having secure communications is paramount for businesses. To satisfy this crucial need, there is a new tool in HCL Workload Automation named Certman.

Certman enables you to quickly generate, extract, verify, and import your custom certificates based on the Secure Socket Layer (SSL) protocol, making the whole process more intuitive and easier to manage. You only need to run a few simple commands, and everything is automatically set.

Simplify your certificate management with Certman, and your communication security will no longer be a chore!

For further information about the usage of Certman, see Managing certificates using Certman.

Effortlessly optimize your license usage with the new My HCLSoftware portal

Unlock seamless license management and unparalleled convenience with the new My HCLSoftware (MHS) portal. Instantly view your license consumption at a glance and effortlessly keep your costs under control.

My HCLSoftware portal offers an intuitive and user-friendly interface, ensuring all the information you need is easily accessible. Designed with enhanced user experience in mind, it simplifies navigation and boosts efficiency.

This new portal replaces the Flexera (FNO) portal used in previous releases.

Configuring the new portal is quick and easy. Once the installation is finished, simply configure the dedicated options using optman, as described in Global options - detailed descriptionthe topic about the detailed description for global options in *Administration Guide*. The dedicated options include:

- **licenseProxyServer**
- **licenseProxyServerPort**
- **licenseProxyUser**
- **licenseProxyPassword**
- **licenseRefreshToken**
- **licenseServerUrl** The URL value is https://api.hcltechsw.com/.

Additional resources

- For a general overview about My HCLSoftware, see My HCLSoftware - an overview.
- For detailed information about My HCLSoftware, see What is My HCLSoftware? and How to register as a Customer on HCLSoftware portals.
- For more information about the criteria used in the license computation process, see the topic about license computation model in *Administration Guide*.
- For more information about enabling license management, see the topic about enabling product license management in *HCL Workload Automation: Planning and Installation*.

Frequently asked questions

Q: Is my Flexera account valid for My HCLSoftware?

A: Customer accounts in Flexera are available on MHS. So whatever account you had in Flexera, you will have that same access in MHS. All customers have access to MHS and should use their same login credentials.

Q: Are the existing licenses already available on MHS or are there some actions to be taken?

A: Customer entitlements are in sync between Flexera and MHS, so you will be able to deploy licenses on MHS.

Q: When I move to MHS, for how long will previous data be stored on Flexera?

A: Flexera will be available until June 30, 2025. It will not be available after that date.

Power your Orchestration CLI model commands with the newly supported items

You can now use Orchestration CLI model commands for new items to design your automation more efficiently.

The Orchestration CLI is a stand-alone command-line application you can download and install independently. It provides an efficient and streamlined interface from which you can design and monitor your automation environments.

The Orchestration CLI now supports model commands for the following items:

- Variables
- Variable tables
- Calendars
- Credentials
- Prompts
- Resources
- Run cycle groups
- Event rules
- Workstation classes
- Domains

You can now use the Orchestration CLI to design more sophisticated automation scenarios from a single point of control, increasing your productivity and efficiency without compromising on quality or scope.

Discover more about the Orchestration CLI and the new model commands.

Explore the new items now available with the scalable and flexible REST APIs V2

The powerful and flexible REST APIs V2 can now be used with more items, making more complex automation scenarios possible.

REST APIs enable the integration of workload scheduling capabilities with external products and solutions. With the implementation of our REST APIs V2, this integration is easier to configure, more powerful and flexible.

You can now use the new, more capable REST APIs V2 in conjunction with more items, including:

- Prompts
- Resources
- Run cycle groups
- Workstation classes
- Domains
- Event rules

The extended API V2 support to these items lets you easily create more complex, highly efficient automated environments, enabling HCL Workload Automation to work seamlessly in concert with all the third party products and solutions you need.

Discover how to drive your automation with REST APIs and find out more about the capabilities of the new APIs V2.

Embedded job definitions for enhanced customization

A job stream embedded job definition is a self-contained job configuration that remains immune to external changes and gives precise control and customization within the job stream.

You can now create job definitions within job streams without referencing task templates. Embedded job definitions do not exist as standalone entities, they are solely manageable by editing job stream definitions: this provides greater control and customization capabilities. Embedded jobs contribute to a clutter-free environment by removing the necessity for single-use job templates. For more information, see Creating an embedded job in a job stream.

Changed features and feature capabilities in version 10.2.3

A list of features changed since the previous release

The following features have changed or have been introduced or removed since the previous release:

OneDB and Infomix databases replaced by PostgreSQL

OneDB and Informix are no longer supported and support for PostgreSQL has been introduced to replace them. PostgreSQL provides a number of advantages, such as enhanced performance, robust features, and seamless scalability, as described in Elevate your data management with PostgreSQL database on page 42. If you are using OneDB or Informix and want to upgrade to version 10.2.3, you can extract all your definitions from OneDB or Informix and import them into a supported database. For more information, see the topics about connecting the Dynamic Workload Console to a new node or database in *HCL Workload Automation: Planning and Installation* and connecting the master domain manager to a new database in *Administration Guide*.

Derby database is no longer supported

Derby database is no longer supported.

If you upgrade from an environment where you are using Derby, you have to install a supported database and extract all your definitions from Derby as described in the topic about connecting the Dynamic Workload Console to a new node or database in *HCL Workload Automation: Planning and Installation*.

FIPS compliance temporarily not supported

FIPS compliance is not supported in the current product version. This is because OpenSSL 3.0 libraries do not provide a FIPS-compliant validation algorithm for P12 certificates. Development is in progress with the aim of supporting FIPS in upcoming releases.

An optional parameter named **enablefips** is available in the serverinst and twsinst scripts to check FIPS settings before you install or upgrade. The default value in a fresh installation is `false`.

If you are upgrading from an environment where FIPS compliance is supported, you should disable FIPS configuration. When upgrading, a check is performed on your settings to ensure FIPS is not enabled. If it is enabled, the upgrade stops and an error message is displayed. To resume the upgrade, set the **enablefips** parameter to `false` when running the serverinst and twsinst scripts. The upgrade proceeds and the configuration files are updated accordingly. For more information, see the FAQ about FIPS compliance in section FAQ - Upgrade procedures in *Planning and Installation Guide*.

Red Hat Enterprise Linux (RHEL) 7 out of support

Red Hat Enterprise Linux (RHEL) 7 went out of support in June 2024. As a result, it is not supported in HCL Workload Automation version 10.2.3.

Certificates now managed using the certman command

While in previous versions it was possible to generate certificates at installation time using the serverinst command, the new certman command can now manage certificates more efficiently and easily. For more information, see Certman: the new tool to manage certificates on page 43.

HCL Workload Automation version 10.2.2 enhancements

Learn about the HCL Workload Automation version 10.2.2 enhancements.

HCL Workload Automation version 10.2.2 includes the following enhancements:

Installation without root privileges extended to all HCL Workload Automation components

You can now install all server components (such as master domain managers, domain managers, dynamic domain managers and so on) and fault-tolerant agents using a user account that does not have root privileges.

On supported UNIX operating systems, you can now choose whether to install server components and fault-tolerant agents using a user account with or without root privileges. This is especially useful if security policies in your organization require not to share the password for root users. This installation method is already available since previous releases for dynamic agents, HCL Workload Automation Agent (also known as the agent with z-centric capabilities), and Dynamic Workload Console.

Note that if you choose this installation method, known as **no-root installation**, only the user who performs the installation can use HCL Workload Automation.

This enhancement applies only to supported UNIX operating systems, while the installation method on Windows operating systems remains unchanged.

For more information, see the topics about user management, agent installation procedure, before upgrading, uninstalling the main components and uninstalling agents using the twsinst script in *HCL Workload Automation: Planning and Installation*. Also see the **uname** parameter in the twinst script and the **wauser** parameter in the serverinst script.

Orchestration CLI extended to include model commands

Orchestration CLI is a stand-alone command-line application that you can download and install independently without requiring any other HCL Workload Automation component. You can install Orchestration CLI on any workstation where you want to manage and control workflows. It is designed to replace the composer and conman commands, by providing a more modern, efficient, and versatile interface. By using Orchestration CLI, you can automate tasks efficiently, reducing manual effort and operational overhead. Orchestration CLI helps you streamline command-line interactions, enhance cross-platform compatibility, and build a more efficient workload automation process. It also simplifies maintenance, lowers costs, and minimizes IT requirements.

Orchestration CLI also provides a more modern and user-friendly interface, and is designed to be intuitive and efficient, making it easier for administrators and users to complete tasks. It combines modernity, compatibility, and enhanced functionality, when compared to the conman and composer command line.

In addition to the plan commands, already available in previous releases, model commands are now available in the Orchestration CLI. You can use these commands to create or modify the object definitions for folders, jobs, job streams, and other scheduling or security items in replacement of the corresponding composer commands.

See the list in the Model commands section in *User's Guide and Reference*.

For more information, see the topic about Orchestration CLI commands in *User's Guide and Reference*.

Easier configuration for Orchestration CLI

You can now easily change the configuration of your Orchestration CLI by switching between multiple configuration files. Use configuration files to establish one or more environments to run HCL Workload Automation. Setting up different environments, with specific configuration settings, helps you tailor your environment, efficiently manage workloads, and utilize resources effectively.

You can create multiple contexts with different configuration settings using Orchestration CLI. This feature allows you to manage various workflow scenarios by changing the context. You can use context commands to manage or switch between multiple contexts and to perform actions in a specific context. The default context is the one that you create initially until you change it using the commands. Unless you explicitly specify the context in the command, all commands are run using the default context.

See the list in the Context commands section in *User's Guide and Reference*.

For more information, see the topic about Orchestration CLI commands in *User's Guide and Reference*.

Automation as code: object definitions in JSON and YAML formats

In addition to the traditional scheduling language used in previous product versions, you can now create, display, and modify object definitions in JSON and YAML formats.

JSON and YAML formats guarantee a large number of advantages; for example, YAML is designed for readability, is intuitive, and easy to write. JSON, on the other hand, is designed to simplify parsing and is natively compatible with JavaScript. Both formats are very useful in DevOps and make manipulating object definitions easier and more immediate. This also enhances flexibility, performance optimization, compliance with standards, and integration ease.

The flexibility to support diverse serialization formats provides you with a range of choices. You can select the most appropriate format for specific use cases, aligning with the requirements of various services and platforms. You can select the one that best fits the requirements for a particular scenario. Some systems or services might use a specific serialization format as a standard. By supporting multiple formats, HCL Workload Automation can integrate easily with different services and platforms. In some scenarios, older systems or external services might still rely on older serialization formats. The support for multiple formats ensures compatibility with diverse platforms and reduces friction in the integration process. For more information, see the topic about managing multiple formats in *User's Guide and Reference*.

Observability with OpenTelemetry

Gain a deeper insight into your environment with OpenTelemetry

Observability has become a key concept in computer science, particularly in the fields of systems and network management, and more recently, in cloud-native applications. It provides a large number of advantages to developers and system administrators, such as:

Improved System Understanding

Observability helps developers and system administrators gain a deep understanding of their environment. By observing the environment state and its changes over time, they can understand tits behavior, identify patterns, and make informed decisions.

Enhanced Debugging

Debugging becomes more efficient with observability. It allows for the identification of anomalies or bugs in the environment. By observing the full environment over time, system administrators can pinpoint where the issue originated, what caused it, and how it affected the system.

Proactive Problem Solving

Observability supports proactive problem solving. Instead of waiting for a component to fail, observability allows issues to be detected and addressed before they cause a failure. This leads to increased reliability and availability.

Informed Decision Making

Observability provides the data necessary for informed decision-making. It provides insights into how changes in the environment affect its performance and behavior. This information is crucial when making decisions about upgrading, scaling, and allocating resources.

Efficient Resource Utilization

Observability can lead to more efficient resource utilization. By understanding the behavior of the environment, administrators can optimize resource allocation, reducing costs and improving system performance at the same time.

You can now use observability to gain insights on the performance and behavior of your HCL Workload Automation environment for monitoring and analysis, and improve overall system reliability and user experience. For example, you can use metrics to analyze **traces**, metrics, and logs and filter the information you are capturing, thus reducing unnecessary noise and excess costs. Additionally, filtering makes it easier to also add custom tags to metrics for streamlined organization and searching.

For more information, see the topic about OpenTelemetry in *User's Guide and Reference*.

CyberArk and Kerberos integrations automatically installed on dynamic agents

CyberArk and Kerberos integrations are now available by default on each dynamic agent. The related documentation is available on Automation Hub, together with the previous versions of the integrations.

This enhancement simplifies installation and configuration for these important integrations which strengthen security, compliance, and efficiency.

Serviceability enhancements

A number of serviceability enhancements have been inserted in the current release. The main items are as follows:

UNIX **Support for populated *DATA_DIR***

On UNIX operating system, you can now specify at installation time a *TWA_DATA_DIR* and *DWC_DATA_dir* folder which is already populated. In previous releases, only an empty *DATA_DIR* was supported.

Improvements in the wa_pull_info script

The wa_pull_info script gathers information about your environment and can be used when requested by Software Support to diagnose and troubleshoot a problem. This script now features a number of usability improvements, such as:

- improved error handling
- higher number of information gathered
- improved video output, displaying only the most important steps and errors found, while the full output is stored in a file.

For more information about the script, see the topic about the wa_pull_info in *User's Guide and Reference*.

Changed features and feature capabilities in version 10.2.2

A list of features changed since the previous release

The following features have changed or have been introduced or removed since the previous release:

FIPS compliance temporarily not supported

FIPS compliance is not supported in the current product version. This is because OpenSSL 3.0 libraries do not provide a FIPS-compliant validation algorithm for P12 certificates. Development is in progress with the aim of supporting FIPS in upcoming releases.

A new optional parameter named **enablefips** is available in the serverinst and twsinst scripts to check FIPS settings before you install or upgrade. The default value in a fresh installation is `false`.

If you are upgrading from an environment where FIPS compliance is supported, you should disable FIPS configuration. When upgrading, a check is performed on your settings to ensure FIPS is not enabled. If it is enabled, the upgrade stops and an error message is displayed. To resume the upgrade, set the **enablefips** parameter to `false` when running the serverinst and twsinst scripts. The upgrade proceeds and the configuration files are updated accordingly. For more information, see the FAQ about FIPS compliance in section FAQ - Upgrade procedures in *Planning and Installation Guide*.

SSL FIPS enabled option removed

The **SSL FIPS enabled** option is no longer present in the `localopts` and `ita.ini` files and has been replaced with the new **SSL FIPS compliance** option.

New SSL configuration options available in `localopts` file

Two new options (**ssl_config file** and **ssl_cipher_suites**) are now available for configuring SSL on dynamic agents and fault-tolerant agents. Use the new options to specify a configuration file for OpenSSL and a list of encryption algorithms for TLS v 1.3. For more information, see the section about setting local options in *Administration Guide*.

Changes in supported operating systems - version 10.2.2

Support for operating systems has been streamlined and rationalized, therefore Linux PPC is no longer supported. For a complete list of supported operating systems, see Supported Operating Systems.

Satisfying Requests for Enhancements (RFEs) in version 10.2.2

HCL Workload Automation satisfies Requests for Enhancements (RFEs).

Requests for Enhancements (RFEs) give customers the opportunity to collaborate directly with the product development team and other users. The team prioritizes and develops new product features based on proposals made by customers.

HCL Workload Automation V 10.2.2 delivers the following RFEs:

Certificate rotation parameters now available in `values.yaml` file in cloud environments

You can now rotate certificates by setting the following new keys in the `values.yaml` file:

- **duration**
- **renewBefore**

This is useful for testing purposes, especially if the master domain manager and agents are in different clusters, and also in production environments, if a different rotation policy exists.

Improvements in job management

With the recent enhancements in job management, when adding a job definition along with its description to a job stream, the description of the job definition remains visible.

To submit a new RFE, write to us at HWAinfo@hcl.com

HCL Workload Automation version 10.2.1 enhancements

Learn about the HCL Workload Automation version 10.2.1 enhancements.

HCL Workload Automation version 10.2.1 includes the following enhancements:

Enhanced security for default certificates

Enhanced security for default certificates.

Certificates, either default or custom, are now required when installing HCL Workload Automation. You can no longer install HCL Workload Automation without securing your environment with certificates.

Default certificates are generated automatically when you install the master domain manager. To generate default certificates, define the password for the certificates using the **sslpassword** parameter when you run the serverinst script. The certificates are generated using a strong 4k encryption key and the password you specified. These certificates feature a long-term expiration date and are unique for each environment you install. Because the certificates are unique for each environment, if you install a new master domain manager and want it to communicate with an existing Dynamic Workload Console, you need to import the certificates from the master domain manager to the Dynamic Workload Console. For more information, see the FAQ about connecting a new or upgraded master domain manager to an existing Dynamic Workload Console.

The certificates are then stored on the master domain manager in the *installation_directory*`/defaultCerts` and *TWA_DATA_DIR*`/ssl/depot` directories. You can use the *TWA_DATA_DIR*`/ssl/depot` folder to retrieve the default certificates for the other product components.

Before you install the other server components (backup master domain manager, domain manager, backup domain manager, dynamic domain manager, backup dynamic domain manager) or the Dynamic Workload Console with the

installation scripts, copy the certificates from the master domain manager to the workstation where you plan to install the component.

When you run the installation script, specify the **sslkeysfolder** and **sslpassword** parameters. These parameters indicate the path on the local workstation where the certificates are stored and the password you defined for the certificates when installing the master domain manager.

When you install a dynamic agent or fault-tolerant agent using the twsinst script, specify the wauser and wapassword parameters. The agent uses these parameters to log in to the master domain manager and download the default certificates from the *TWA_DATA_DIR*`/ssl/depot` directory.

If you are upgrading all your components from earlier versions where you used default certificates, the certificates are updated automatically. Before you upgrade your environment, create an environment variable named `JKS_SSL_PASSWORD` on each server component (with the exception of the master domain manager) and on each Dynamic Workload Console workstation. In the `JKS_SSL_PASSWORD` environment variable store the password for the default certificates. For both fault-tolerant agents and dynamic agents, the updated certificates are downloaded automatically from the master domain manager without user intervention. You can find useful information about upgrading in the topic about FAQ on upgrade procedures in Planning and Installation.

If you plan to upgrade a part of your environment, for example you plan to connect an agent at 10.2.*x* version with a master domain manager at an earlier version, convert the certificates to the new `.PEM` format before the upgrade, as described in the topic about upgrading in a mixed-version environment when using default certificates.

For more information, see the upgrade procedures in the section about upgrading from the CLI in *HCL Workload Automation: Planning and Installation*.

For more information about connection security, see Connection security overviewthe connection security overview in *Administration Guide*.

For more information about using default certificates, see SSL connection by using the default certificatesthe section about SSL connection by using the default certificates in *Administration Guide*.

For more information about all the installation commands, see the reference section about the installation commands in *HCL Workload Automation: Planning and Installation*.

Certificates downloadable to fault-tolerant agents at installation time or later

Download certificates to fault-tolerant agents using the twsinst or AgentCertificateDownloader scripts.

You can now download certificates from the master domain manager to fault-tolerant agents, either at installation time with the twsinst script, or at a later time with the AgentCertificateDownloader script. For more information, see the Reference section in *HCL Workload Automation: Planning and Installation*

New OCLI plan commands supported

New OCLI plan commands supported.

The following new plan commands are now available in the OCLI:

- fence. For more information, see the section about Orchestration CLI commands in *User's Guide and Reference*.
- limit cpu. For more information, see the section about Orchestration CLI commands in *User's Guide and Reference*.
- limit sched. For more information, see the section about Orchestration CLI commands in *User's Guide and Reference*.
- altrpri. For more information, see the section about Orchestration CLI commands in *User's Guide and Reference*.

Support for OpenSSL 3.0.*x* libraries from UNIX operating systems

If you install the master domain manager on recent UNIX operating systems, you can use the OpenSSL 3.0.*x* libraries provided with the operating system. The list of UNIX operating systems whose libraries you can use is as follows:

- Ubuntu 22
- AIX 7.3
- Red Hat 9

This is useful in case a vulnerability is discovered in a library: you can upgrade to a newer version and HCL Workload Automation can work seamlessly with the updated library.

To ensure HCL Workload Automation uses these libraries, always launch the installation or upgrade procedure from a brand new shell. You can also check the OpenSSL library currently in use with the which openssl command and check the OpenSSL version with the openssl version command.

If your operating system does not provide OpenSSL 3.0.*x* libraries, you can use the libraries packaged and installed with HCL Workload Automation.

New actions available in the Orchestration Monitor

Brand-new actions are available in the Orchestration Monitor of the Dynamic Workload Console.

You can now quickly change the priority for jobs and job streams, modify the limit for job streams and workstations, and update the fence value for workstations directly from the Orchestration Monitor. In just few clicks, you can have a granular control on your environment.

Customizing the login page

You can now customize the login page of the Dynamic Workload Console and Self-Service Catalog with personalized labels and logo. For more information, see the topic about personalizing the login page in *Administration Guide*.

Changed features and feature capabilities in version 10.2.1

A list of features changed since the previous release

The following features have changed or have been introduced or removed since the previous release:

Improved performance with asynchronous calls

Asynchronous calls are now supported. This improves performance, responsiveness, and scalability because you can proceed with other tasks, while one or more calls are processed in the background.

Global Security Kit (GSKit) code removed from the product

GSKit is a set of libraries and utilities provided by IBM for SSL or TLS communication. Removal of GSKit does not impair communication in your environment, also in case some of your agents are still at a back-level version.

Communication between components is ensured by the TLS protocol, which leverages OpenSSL 3.0 and supports also agents at back-level versions. GSKit-related options have been removed from the `localopts` file and replaced with the new options listed below, which you can use to define the SSL version and level:

- **SSL Version**
- **SSL Ciphers**
- **CLI SSL Ciphers**
- **CLI SSL Version**

For more information, see the section about setting local options in *Administration Guide*.

Certificates can now be downloaded to fault-tolerant agents using the twsinst and AgentCertificateDownloader scripts

You can now download certificates from the master domain manager to fault-tolerant agents, either at installation time with the twsinst script, or at a later time with the AgentCertificateDownloader script. For more information, see the Reference section in *HCL Workload Automation: Planning and Installation*.

HCL Workload Automation version 10.2.0 enhancements

Learn about the HCL Workload Automation version 10.2.0 enhancements.

HCL Workload Automation version 10.2.0 includes the following enhancements:

Enhanced monitoring

Introducing the new and improved monitoring features.

Discover an enhanced monitoring experience that revolves around a single point of access to control your whole workload.

Tree view

Monitor your workload efficiently with the intuitive tree view navigation system. The tree view keeps the current query and the folder you are exploring synchronized, enabling you to explore the whole of your automated workload going from folder to folder effortlessly.

Saved queries

With just a few clicks, you can now save, edit, and share your queries, transforming the task of monitoring your business processes into a simple and efficient activity. You can also save queries generated while navigating the tree view, making designing your monitoring workflow a seamless experience.

Advanced query

The reworked advanced query tool gives you granular control over your workload, enabling you to find any item in no time. Advanced queries can also be saved, edited and shared.

Dependencies

You can now visualize all the dependencies of a job or job stream at a glance in a new dedicated page. Dependencies are displayed as information cards that you can interact with.

Look and feel

The new graphic interface is easier to read, easier to use and easier to manage. Processes are more streamlined and intuitive, and every activity flows into each other smoothly to guarantee a pleasant monitoring experience.

Self-Service Catalog Approval Flow

Introducing the Self-Service Catalog Approval Flow.

Make the services of your Self-Service Catalog more interactive with the new Approval Flow feature.

With the Approval Flow feature, you can decide the outcome of a request using a human-in-the-loop approach, leveraging the integration with Jira or ServiceNow.

You may need an approval for a specific service on the Self-Service Catalog. For example, a manager may need to approve a new license request for a software to check if such request fits in the budget. With the Approval Flow feature, you can specify the need for an approval in the definition of a specific service.

The Self-Service Catalog user can monitor the status of the service, which changes according to the status of the ticket on Jira or ServiceNow.

Thanks to this new feature, requests that would require many different steps to be approved can be processed in just few clicks!

New enhanced integrations

Empower your workflows with the new enhanced integrations.

HCL Workload Automation V10.2 includes the following enhanced integrations:

- Jira
- ServiceNow
- RESTful
- JSONata
- IBM Robotic Process Automation (IBM RPA) integration

Thanks to Jira and ServiceNow integrations, you can open tickets or service requests on one of these two applications, monitor tickets and requests, or open a ticket and monitor it.

You can also use these integrations to enable human interaction to approve or reject requests or ask for more information.

Thanks to RESTful integration, you can quickly integrate any application that uses REST APIs, call an API and track it directly from the job avoiding the creation of several jobs.

Thanks to JSONata integration, you can easily manipulate data and pass the output properties from one job to another.

Thanks to IBM RPA integration, you can automate UI-based tasks by converting human-based actions in scripts and schedule them with HCL Workload Automation.

Enhanced AI Data Advisor

Introducing AI Data Advisor (AIDA) enhancements.

New Machine Learning engine

Neural Prophet has been adopted as AIDA Machine Learning engine. It enables:

- More accurate predictions.
- Multivariate analysis of data to highlight correlation among KPIs.
- Improved time-to-value due to a faster training with less resource usage.
- Easy of extention to other Machine Learning models.

Metrics aggregation

Dynamic data compression depending on data variance. It enables a huge improvement in storage usage.

Customizable alert detection

Alert detection can be customized to better suit customer needs.

- In the common.env configuration file (or in the value.yaml file for Kubernetes deployments), you can use the PROPHET_ORCHESTRATOR **schedule_alert** parameter to set how often KPIs data must be checked against their prediction to detect anomalies.

Changed features and feature capabilities in version 10.2

A list of features changed since the previous release

The following features have changed or have been introduced or removed since the previous release:

Open Liberty provided with the installation package

Open Liberty is now supported along with WebSphere Application Server Liberty Base. Open Liberty is an open-source Java EE runtime that is lightweight and easy to use. It is designed to be used for microservices and cloud-native applications. Open Liberty has a smaller footprint than WebSphere Application Server Liberty Base, which means it uses less memory and has higher throughput. Open Liberty contains full support for Java EE 7.0 8.0, and MicroProfile features. Note that Open Liberty is available for distributed environments only.

If you perform a fresh installation of HCL Workload Automation, you can choose between installing on an existing WebSphere Application Server Liberty Base instance or install Open Liberty, as described in the typical installation scenario in *Planning and Installation Guide*.

If you have WebSphere Application Server Liberty Base already installed in your environment and plan to continue using it with HCL Workload Automation, you can proceed with the standard installation as described in the typical installation scenario in *Planning and Installation Guide*.

You can also move from WebSphere Application Server Liberty Base to Open Liberty when you upgrade HCL Workload Automation, as described in the section about moving from WebSphere Application Server Liberty Base to Open Liberty in *Planning and Installation Guide*.WebSphere Application Server Liberty refers both to WebSphere Application Server Liberty Base and Open Liberty.

Custom certificates enhancements

Default SSL certificates are no longer provided with the containers of the server, console, and agent components. For more information see HCL Workload Automation

Enabling installation of dynamic agents on container with a remote gateway

It is now possible to deploy a new dynamic agent and enable the communication directly with another agent gateway. For more information see HCL Workload Automation and Workload Automation Dynamic Agent and

HCL Workload Automation version 10.1.0 Fix Pack 4 enhancements

Learn about the HCL Workload Automation version 10.1 Fix Pack 4 enhancements.

HCL Workload Automation version 10.1 Fix Pack 4 includes the following enhancements:

- Changed features and feature capabilities in version 10.1 Fix Pack 4.

HCL Workload Automation version 10.1.0 Fix Pack 3 enhancements

Learn about the HCL Workload Automation version 10.1 Fix Pack 3 enhancements.

HCL Workload Automation version 10.1 Fix Pack 3 includes the following enhancements:

- Exporting variable tables with multiple lines on page 59
- Improved user experience with the new Run Cycle Preview on page 59
- Use of base folder in Orchestration CLI commands on page 59

- HCL Workload Automation Observability for Datadog on page 60
- Improved product quality, thanks to the resolution of many APARs and defects. For the complete list of APARs and defects, see: Fix Pack readmes.

Exporting variable tables with multiple lines

You can now export variable tables with multiple lines.

You can now export a variable with multiple lines in a job stream.

This can be achieved in two ways:

- Add \n into the property value wrapping the value with quotes (works on Windows and Unix platforms).

```
For exmaple:
jobprop VAR1 "line_1\nline_2\nline_3" -> is displayed as
line_1
line_2
line_3
jobprop VAR2 "\"line_1\nline_2\nline_3\"" -> is displayed as
"line_1
line_2
line_3
"
```

- Write the property value starting with quotes, and then press enter when a new line is needed (works only on UNIX platforms).

```
jobprop VAR2 "line_1
line_2
line_3"
-> is displayed as
line_1
line_2
line_3
jobprop VAR2 "\"line_1
line_2
line_3\""
```

Use of base folder in Orchestration CLI commands

Use of base folder in Orchestration CLI commands.

In the configuration of Orchestration CLI, the current folder field has been enhanced with an option to use base folder that helps the user to fetch the result of files specified in that field. For more information refer Configuring Orchestration CLI

Improved user experience with the new Run Cycle Preview

Improved user experience with the new Run Cycle Preview

The Run Cycle Preview is now available for job streams and run cycle groups, showing you the instances generated on a full year basis. With a renewed design, it provides you with accessible calendar and colors and a higher level of detail and control.

Watch a customer scenario that shows how easy is to use the Run Cycle Preview in this video, on the Workload Automation YouTube channel.

HCL Workload Automation Observability for Datadog

HCL Workload Automation Observability for Datadog is available to monitor HCL Workload Automation metrics, events, audit and infrastructure logs.

By integrating with Datadog, one of the market leaders in the Observability space, HCL Workload Automation enhances the concept of Monitoring, enabling complete end-to-end visibility into your workload data, network, infrastructure, and more. HCL Workload Automation Observability for Datadog provides the following set of dashboards reachable from the main **Overview Dashboard**:

Jobs and Job Streams

This dashboard shows the status of Jobs, Critical Jobs, and Job Streams.

KPIs and Workstations

This dashboard shows the HCL Workload Automation KPIs information for each engine and allows drill-down to view KPIs time series in a graphical representation.

Auditing

This dashboard shows audit information such as user actions. You can view audit information for a selected time range, user, and object.

Infrastructure

This dashboard provides infrastructure details of HCL Workload Automation deployment on Kubernetes cluster.

Monitors

You can create your own monitors and alerts. Some predefined monitors are already configured in the Observability Dashboard for Datadog as an example.

For details about deploying and customizing the HCL Workload Automation Observability for Datadog, see this readme file.

You can also read this blog article and watch this video.

HCL Workload Automation version 10.1.0 Fix Pack 2 enhancements

Learn about the HCL Workload Automation version 10.1 Fix Pack 2 enhancements.

HCL Workload Automation version 10.1 Fix Pack 2 includes the following enhancements:

- HCL Workload Automation on Amazon Web Services on page 61
- Improved product quality, thanks to the resolution of many APARs and defects. For the complete list of APARs and defects, see: Fix Pack readmes.

HCL Workload Automation on Amazon Web Services

You can now deploy HCL Workload Automation directly on Amazon Web Services (AWS).

You can find and subscribe to HCL Workload Automation on AWS Marketplace and deploy the product through the Amazon Web Services platform without BYOL license requirements.

You can easily create stacks using AWS CloudFormation and deploy HCL Workload Automation quickly and fast, thanks to the cloud deployment.

By deploying HCL Workload Automation on AWS, you can also experience the AWS meter usage: you only pay for the jobs that you submit, and you can receive the bill directly on your AWS account.

For more information, see Deploying on Amazon Web Services.

HCL Workload Automation version 10.1.0 Fix Pack 1 enhancements

Learn about the HCL Workload Automation version 10.1 Fix Pack 1 enhancements.

HCL Workload Automation version 10.1 Fix Pack 1 includes the following enhancements:

Self-Service Catalog enhancements

Self-Service Catalog: a business-oriented interface to submit on-demand business flow.

A new and improved version of the Self-Service Catalog is available. You can now launch your services quickly and easily and check on them at anytime by accessing the Self-Service Catalog from any device.

To use the Self-Service Catalog you do not need to be a Workload Automation expert, but you can leverage on services based on automation capabilities in no time, provided you are connected to the Dynamic Workload Console in Single Sign-On (SSO). For more information, see Configuring the Dynamic Workload Console for Single Sign-On.

The HCL Workload Automation scheduler or application designer can now define services directly from the Workload Designer marking the job streams as services and specifying service parameters. As part of the job stream definition, the service definitions now can be easily transferred to a different environment

When creating and editing SSC-ready job streams, it is recommended you use the Dynamic Workload Console.

For more information about defining SSC-ready job streams, see the online help for job stream definitions in the Dynamic Workload Console and section about job stream definition in *User's Guide and Reference* for editing the job stream from the command line.

Note: Upgrading to the latest version, the catalogs created in the previous Self-Service Catalog are not visible in the new interface. In the new Self-Service Catalog interface, you can see the catalogs created with the new Workload Designer from the V10.1 Fix Pack 1 or later. Use the previous interface to see the catalogs created with the previous Self-Service Catalog.

Orchestration CLI

The new command line interface to run jobs or job streams and to interact with HCL Workload Automation server.

The installation package for HCL Workload Automation contains the installation files for Orchestration CLI. After downloading the package, you can connect Orchestration CLI to any of the HCL Workload Automation servers by configuring the `config.yaml` file. Orchestration CLI is a stand-alone application that can be used on any desktop or server, or on dynamic agents and replaces conman.

You can use the same Orchestration CLI with multiple servers of HCL Workload Automation. Orchestration CLI is also compatible with later versions of HCL Workload Automation and no need to update each time when the server is updated. For more information, see Orchestration CLI.

Introducing REST API V2

HCL Workload Automation REST API V2 to better integrate workload scheduling capabilities with external products and solutions.

A new version of REST APIs has been introduced to operate on the product from both User Interface and Command Line Interface.

The new features of REST API V2 are designed to make the user experience even smoother:

- Enhanced filtering opportunities: according to how specific your query needs to be, you can decide whether to use planFilter, which is similar to conman syntax and offers the same filtering capabilities, or OQL syntax, which is simpler and allows ordering the results. You can also decide to use both of them, using planFilter for filtering and OQL for ordering.

- Improved payloads for easier consumption: both the hierarchy and the structure of payloads have been revamped to improve their understanding and usage.
- Introduction of efficient multi-item endpoints: each action can be performed by ID and by filter. In this way, you can decide whether to operate on a single item or on multiple items.

Orchestration Query Language (OQL)

Orchestration Query Language: querying has never been so easy.

The Orchestration Query Language (OQL) is a new syntax that applies to REST API V2 and helps you monitoring your HCL Workload Automation production plan environment. .

Creating queries and retrieving items in your database is now quicker and easier than before thanks to the different intuitive OQL keywords at your service.

For more information, see the section about Monitoring your environment in the Dynamic Workload Console User's Guide.

Enhancing authentication using API Keys

Use API Keys to authenticate a command line or application easily and quickly.

You can create both Personal and Service API Keys in the Dynamic Workload Console and easily assign them to either specific users or groups. A comprehensive API Keys monitoring tool gives you full control over every valid, expiring and expired API Key that have been associated with an engine. For more information, see the topic about authenticating the command-line client using API Keys in Dynamic Workload Console User's Guide

You can use API Keys to authenticate the command line. You can use an API Key to get authenticated when you launch composer, conman, wappman, and ocli commands, instead of having to provide username and password as in previous versions.

To use the API Key with these commands, you need to have a specific set of authorizations defined in the security file, so that you can generate and retrieve the key from the Dynamic Workload Console. To find out the required authorizations, see the topic about Object type - file in the Classic security model section of the Administration Guide.

To generate the key from the Dynamic Workload Console, perform the steps listed in the section about accessing HCL Workload Automation from the command-line client using API Keys in *Dynamic Workload Console User's Guide*.

After generating the token, you can either specify it in the command line with the **-jwt** parameter, or add it in the `useropts` file.

For more information about adding JWT in the `useropts` file, see the topic about setting user options in *Administration Guide*.

For more information about using JWT with commands, see the topics about running conman and composer and about the wappman command in *User's Guide and Reference*.

You can also use the API Key to authenticate the master domain manager when installing the agents. This authentication allows the product to download the JWT or the certificates to be used for secure communication between master domain

manager and dynamic agents. If you provide the API Key (with the **apikey** parameter), you no longer need to specify username and password (**wauser** and **wapassword** parameters) as in previous versions.

For more information about using the API Key for authentication purposes, see the topics about the twsinst and AgentCertificateDownloader scripts and about example installation commands in *HCL Workload Automation: Planning and Installation*.

Ensure there are no misalignments in date and time in your network nor significant network delays because this might impact JWT performance.

Enhancing agent authentication using JSON Web Tokens

Use JSON Web Tokens to enhance your agent authentication standard.

A JSON Web Token (JWT) is a standardized, self-contained access token which makes it possible for two parties to securely exchange data. Authentication information, expiry time information, and other user-defined claims are digitally signed, so that no database queries are required and the session does not need to be stored on a server.

JWT is especially suited for authentication purposes. Its short messages can be encrypted and securely convey who the sender is and whether they have the necessary access rights. It is also very useful in REST applications, because it ensures stateless protocols, since the information for the authentication is sent with the request.

JWT ensures mutual authentication between master domain manager and dynamic agents. Using JWT is easier and more immediate than downloading and maintaining certificates and, in a containerized environment, you no longer need to configure the ingress controller for SSL passthrough. For more information about JWT on containers, see the **Ingress controller** section in HCL Workload Automation Server.

To download the JWT on your dynamic agents at installation time, use the **jwt** parameter as explained in the section about the twsinst script in *HCL Workload Automation: Planning and Installation*. You can also download the JWT at a later time as explained in the section about AgentCertificateDownloader script in *HCL Workload Automation: Planning and Installation*.

You can find some installation examples in the section about example installation commands in *HCL Workload Automation: Planning and Installation*

You can also revoke a JWT simply by deleting the workstation definition where the JWT is installed. For more information about deleting a scheduling object from the command line and Dynamic Workload Console, see the section about revoking and reissuing a JSON Web Token in *User's Guide and Reference*.

Ensure there are no misalignments in date and time in your network nor significant network delays because this might prevent JWT from working.

Advanced password encryption

New encryption method for increased security

Security is a major concern in today's interconnected world. Government organizations, financial institutions, healthcare providers, and insurance companies are just a few examples of the types of entities who are taking security seriously.

You can optionally encrypt the passwords that you will use while installing, upgrading, and managing HCL Workload Automation. The secure command uses the AES method and prints the encrypted password to the screen or saves it to a file.

For more information, see the section about encrypting passwords and the secure script in *HCL Workload Automation: Planning and Installation*.

HCL Workload Automation Observability for Splunk

HCL Workload Automation Observability for Splunk is available to monitor HCL Workload Automation metrics, events, audit and infrastructure logs.

By integrating with Splunk, one of the market leaders in the Observability space, HCL Workload Automation enhances the concept of Monitoring, enabling complete end-to-end visibility into your workload data, network, infrastructure, and more. HCL Workload Automation Observability for Splunk provides the following set of dashboards which are deployed on Splunk Enterprise and are reachable from the main **Overview Dashboard**:

Jobs and Job Streams

This dashboard shows the status of Jobs, Critical Jobs, and Job Streams.

KPIs and Workstations

This dashboard shows the HCL Workload Automation KPIs information for each engine and allows drill-down to view KPIs time series in a graphical representation.

Activity Monitoring

This dashboard shows workstation and audit information such as user actions. You can view audit information for a selected time range, user, and object.

Infra Monitoring

This dashboard provides infrastructure details of HCL Workload Automation deployment on Kubernetes cluster.

Alerts

This dashboard provides details about custom alerts created for HCL Workload Automation events. Some predefined alerts are already configured in the Observability Dashboard for Splunk as an example.

For details about deploying and customizing the HCL Workload Automation Observability for Splunk, see this readme file.

You can also read this blog article and watch this video.

HCL Workload Automation Observability for Dynatrace

HCL Workload Automation Observability for Dynatrace is available to monitor HCL Workload Automation metrics, events, audit and infrastructure logs.

By integrating with Dynatrace, one of the market leaders in the Observability space, HCL Workload Automation enhances the concept of Monitoring, enabling complete end-to-end visibility into your workload data, network, infrastructure, and more.

HCL Workload Automation Observability for Dynatrace provides the following set of dashboards reachable from the main **Overview Dashboard**:

Jobs and Job Streams

This dashboard shows the status of Jobs, Critical Jobs, and Job Streams.

KPIs and Workstations

This dashboard shows the HCL Workload Automation KPIs information for each engine and allows drill-down to view KPIs time series in a graphical representation.

Auditing

This dashboard shows audit information such as user actions. You can view audit information for a selected time range, user, and object.

Infrastructure

This dashboard provides infrastructure details of HCL Workload Automation deployment on Kubernetes cluster.

Alerts

This dashboard provides details about custom alerts created for HCL Workload Automation events. Some predefined alerts are already configured in the Observability Dashboard for Dynatrace as an example.

For details about deploying and customizing the HCL Workload Automation Observability for Dynatrace, see this readme file.

You can also watch this video.

Installing the agent on IBM i with a user different from QSECOFR

You can now install dynamic agents on IBM i with a user different from QSECOFR.

You can now use a user different from QSECOFR to install IBM i agents. In this case, the new **allObjAuth** parameter is required when running the twsinst command to indicate that the user has the required ALLOBJ authority. Ensure the user is existing and has ALLOBJ authorization. The agent is started after connecting to the system with the TWSUSER or the user defined at installation time.

When you upgrade or uninstall the agent, a check is performed to ensure you are using the same user that performed the installation. If you used **allObjAuth** parameter at installation time, specify it again when upgrading or uninstalling the agent.

The name of the user used to perform the installation is maintained in the *TWA_DATA_DIR*`/installation/instInfo/instUser` file.

For more information, see the sections about installing, upgrading, and uninstalling agents on IBM i systems and agent installation parameters on IBM i systems in *Planning and Installation Guide*.

Changed features and feature capabilities in version 10.1 Fix Pack 1

A list of features changed since the previous release

The following features have changed or have been introduced or removed since the previous release:

REST APIs documentation automatically integrated into the product documentation

Information about REST APIs is automatically extracted from the code and integrated into the documentation at HCL Workload Automation API for easier reading and increased retrievability.

File Proxies now selected randomly in the Managed File Transfer integration

By default, the integration uses the File Proxy specified by the dynamic domain manager. You can also optionally define a list of preferred File Proxies to be used instead of the default list.

The File Proxy is selected randomly in the list provided by the dynamic domain manager. If you provided a custom list, the random selection is performed only on your list.

The random selection mechanism ensures higher tolerance for peaks in workload and workstation failures. For more information, see File Transfer Integration on Automation Hub.

Default storing mechanism of job log changed

When you perform a fresh installation, by default the job log is stored in memory instead of being stored in a file, as in the previous releases. This ensures compliance with the PCI standard. For more information, see the section about log files and archived files in *Administration Guide*.

Enhanced security with the conn_verify property

You can now optionally set the **conn_verify** property to `1` or `2`, so that the agent must provide valid certificates in order to establish an SSL connection. The default value is **0**, which means that no verification is performed on certificates.

Hostname verification for File Proxy

You can now optionally enable a check on the hostname defined for the certificates used by File Proxy. To enable the verification, create the Java system property named `wa.fileproxy.enforceSSLhostnameVerify` and set it to true.

Hostname verification for the mail sender plug-in

You can now optionally define the **MAILPLUGIN_ENABLE_HOST_VERIFICATION** property in the `TWSConfig.properties` file to enable the verification of the hostname of the SMTP server. If you set the property to **yes**, hostname verification is enabled, if you set it to **no**, no verification is performed. The default value for fresh installations is **yes**.

Higher security for job integrations

The **Verify host name** check box is selected by default in some integrations. Starting from version 10.1 Fix Pack 1, to increase the security standard provided by the product, this selection starts a check on the data contained in the keystore file. Ensure you provide the correct path and credentials to the keystore file in the **Certificates** section for the following integrations:

- JSR 352 Java Batch
- Restful

- Job Management
- Job Stream Submission
- Variable Table

If the information in the **Credentials** section is not correct, this causes the job to fail with an error similar to the following:

```
AWKJMJ041E An error occurred during the Job submission.
The error was "AWKSPI006E Keystore authentication failed. The error message is
"No certificates provided, cannot verify the hostname."
```

If your integrations fail after upgrading to Fix Pack 1, you have the following options:

- deselect the **Verify host name** check box.
- provide the correct path and credentials to the keystore file.

Satisfying Requests for Enhancements (RFEs) in version 10.1 Fix Pack 1

HCL Workload Automation satisfies Requests for Enhancements (RFEs).

Requests for Enhancements (RFEs) give customers the opportunity to collaborate directly with the product development team and other users. The team prioritizes and develops new product features based on proposals made by customers.

HCL Workload Automation V 10.1 Fix Pack 1 delivers the following RFEs:

RFE 149367 - Installation of dynamic agents on Windows operating systems using Local System Account

You can now install dynamic agents on Windows operating systems without providing a specific user. This means that you no longer need to provide **twsuser** credentials to the operator performing the installation. Moreover, the password no longer expires, ensuring a smooth running of your jobs. For more information, see the section about agent installation parameters in *HCL Workload Automation: Planning and Installation*.

RFE 69917, AHA 46 - Interactive jobs supported on dynamic agents installed on Windows operating systems

You can now determine the behavior of native and executable jobs starting interactive programs on dynamic agents installed on Windows operating systems. Interactive programs run only if the job user has an active session open when the job runs. If there is no active session for the job user, the job behavior is defined by the new **RunInteractiveJobOnInvalidSession** property in the `JobManager.ini` file. You can set the property to `true` to enable jobs to start interactive programs even if there is no active session for the job user. Alternatively, set the property to `false` to prevent jobs from starting interactive programs if there is no active session for the job user. This feature was already available for fault-tolerant agents and is now also available by default for dynamic agents. For more information about enabling and disabling this feature, see the section about configuring properties of the native job launcher [NativeJobLauncher] in *Administration Guide*.

For example, consider a job which consists of both interactive instructions (for example, using a text editor), and batch instructions, which run in background when the job is launched. If you set the **RunInteractiveJobOnInvalidSession** property to `true`, batch instructions can run even if the interactive part is not displayed because the user does not have an active session at the moment.

RFE 60060 - dynamic agents to track the workload on the local system

This capability is now available using the Orchestration CLI and REST APIs version 2, as described in Orchestration CLI on page 62 and Introducing REST API V2 on page 62.

To submit a new RFE, write us here: HWAinfo@hcl.com

HCL Workload Automation version 10.1.0 enhancements

Learn about the HCL Workload Automation version 10.1.0 enhancements.

HCL Workload Automation version 10.1.0 includes the following enhancements:

Managed file transfer

The File Transfer integration, already available on Automation Hub, now provides full capabilities for managing and processing all your file transfers using HCL Workload Automation with no need for third-party products. The main enhancements are as follows:

Support for File Proxy

A new component, named File Proxy, is now available by default on each master domain manager. You can use the File Proxy to manage securely files to be transferred with the File Transfer integration available on Automation Hub. All transfer operations are performed by HCL Workload Automation, with no need of third-party products.

You can also optionally install your File Proxy as a stand-alone component on a workstation different from the master domain manager, for example to reduce network traffic and resource usage on the master domain manager. You can configure your stand-alone File Proxy in high availability by defining the URLs of alternate file proxies or a load balancer in the **Broker.fileproxy.urls** property in the `BrokerWorkstation.properties` file. For more information, see the section about the `BrokerWorkstation.properties` file in *Administration Guide*.

Ensure the selected workstation runs a supported version of a Windows or Linux operating system and proceed with the installation and start of the service, as described in the sections about the fileproxyinst and fileproxystart commands in *HCL Workload Automation: Planning and Installation*.

Support for file transfers via the Workstation-to-Workstation internal protocol

You can now easily transfer files to and from agents connected to the same master domain manager. You no longer have to specify the address of the workstations involved in the file transfer, but you can simply define the workstations from the File Transfer integration. Ensure both the master domain manager and agents are at version 10.1. For more information about the integration, see the File Transfer integration on Automation Hub.

Search on remote file systems

You can now perform a search operation on the file system of a remote workstation. On Linux systems, if you do not specify a path, the search is performed on the working directory. On Windows systems, the path is required.

Integrations with Managed File Transfer (MFT) tools as well as Robotic Process Automation (RPA) tools

More integrations with other MFT tools as well as RPA tools to support orchestration of all data transfer using HCL Workload Automation.

Workload Designer: a new concept to manage your workload

Workload Designer: a new concept to manage your workload.

An innovative infrastructure and design have been thought to simplify the user experience and create a more responsive, fast and fluid user interface.

You do not need to switch among the Dynamic Workload Console pages to complete your business workflow anymore. The new Workload Designer contains everything you need. Automate business-critical processes from a single point of access and control.

Automate fast, automate better.

Detecting anomalies in your workload with AI Data Advisor (AIDA)

Starting from this release, a new component is available in HCL Workload Automation - AI Data Advisor (AIDA) - based on Artificial Intelligence and Machine Learning, for early anomaly detection and analysis.

AIDA enables fast and simplified data-driven decision making, for an intelligent workload management. By analyzing historical data and metrics gathered by HCL Workload Automation and predicting their future patterns, AIDA identifies anomalies in the trend of Key Performance Indicators (such as the number of completed jobs in the current plan, the job duration, the job end-time) and sends alerts immediately to anticipate and prevent problems and delays. Alerts show up on the Workload Dashboard and can be notified via email.

For more information, see *AI Data Advisor (AIDA) User's Guide*.

Furthermore, you can always take your environments under control by adding the AIDA widget to your custom dashboard. For further information, see Creating a customized dashboard for monitoring.

For instructions about how to install AIDA, see Deploying AI Data Advisor.

HCL Clara integrated with the Dynamic Workload Console

Starting from this release, HCL Clara is available from the Dynamic Workload Console.

HCL Clara, an Intelligent Virtual Assistant, is the Workload Automation product expert which you can contact directly from the Dynamic Workload Console to learn the product capabilities, execute routine tasks, and get troubleshooting assistance.

Find out more about Clara here: https://help.hcltechsw.com/solutions/clara/index.html.

For instructions about how to add Clara chat box to the Dynamic Workload Console, see Integrating Clara in the Dynamic Workload Console.

Automatic encryption at rest for key product files

Starting from this release, key HCL Workload Automation files are automatically encrypted for all fresh installations using AES-256 or AES-128 cryptography.

Data breaches are becoming more and more common and pervasive in today's business world. Encryption is a key feature when it comes to protect sensitive data, such as the data at rest stored in your Symphony plan or message queues. For this reason, all fresh installations starting from this release automatically encrypt key product files using AES-256 or AES-128 cryptography.

Data at rest means data is not being accessed or used but instead stored on your computer, external hard drive, cloud storage, server, or database. Encryption at rest ensures that this data is protected and encrypted.

If you want HCL Workload Automation to encrypt files such as the Symphony file, messages queues, and the `useropts` file at runtime, you do not need to take any actions. By default, the product is automatically encrypted without your intervention. You can also define the folder containing the certificates and the certificates password using the **sslpassword** and **sslkeysfolder** parameters when installing the master domain manager and agents, both fault-tolerant agents and dynamic agents.

You can optionally avoid the encryption at installation time, by setting the **useEncryption** parameter in the serverinst and twsinst commands to `false`.

For more information, see the section about automatic encryption in *Administration Guide* and the sections about master components installation - serverinst script and agent installation parameters - twsinst script in *HCL Workload Automation: Planning and Installation*.

Automatic SSL configuration for fault-tolerant agents

Configure WebSphere Application Server Liberty Base and fault-tolerant agents in SSL mode

You can now configure WebSphere Application Server Liberty Base and fault-tolerant agents in SSL mode and provide your certificates at installation time using the command-line installation and setting the **sslkeysfolder** and **sslpassword** parameters. This ensures encryption in motion for all data moving within your environment.

Note: You are strongly recommended to customize the default certificates straight after the installation process has completed to ensure your environment is secure.

For more information about installation parameters, see the section about master components installation parameters - serverinst script and agent installation parameters - twsinst script in *HCL Workload Automation: Planning and Installation*.

HCL Workload Automation also generates certificates in GSKit format. To enable FIPS compliance, set the **ssl fips enabled** option to `yes` in the `localopts` file after the installation has completed and restart the product. As a result, options for GSKit are automatically used by HCL Workload Automation.

For more information about the `localopts` file, see the section about setting local options in *Administration Guide*.

Support for Google Cloud SQL for SQL server

You can now install your on-premises HCL Workload Automation environment also on Google Cloud SQL for SQL server, a fully-managed database service that helps you set up, maintain, manage, and administer your relational databases on Google Cloud Platform.

You only need to install your database, then proceed with the command-line installation for master domain manager and Dynamic Workload Console, as always, specifying MSSQL as the database type.

For the complete command-line installation procedure, see the section about the typical installation scenario in *Planning and Installation Guide*

For more information, see the section about Creating Azure SQL or Google Cloud SQL for SQL server databases for the master domain manager and Dynamic Workload Console in *Planning and Installation Guide*.

HCL Workload Automation events now logged for monitoring tools

Increasing observability for HCL Workload Automation events

You can now monitor the availability of your infrastructure and services, monitor performance, and analyze bottlenecks. HCL Workload Automation features an improved mechanism for monitoring and auditing events. The monitoring engine generates a .json file containing all WebSphere Application Server Liberty Base events, a file which is consumable by all applications using .json and meeting the OpenMetrics standard, for example AI Data Advisor (AIDA), Splunk and Fluentd.

By further analyzing these values through a data analytics tool, such as AI Data Advisor (AIDA), you detect anomalies and anticipate failure or degradations. For more information about AIDA and how to use it, see *AI Data Advisor (AIDA) User's Guide*.

You can also install Instana and monitor the whole infrastructure, both on-premises and cloud, on which you have installed HCL Workload Automation.

On the cloud side, within the server and agent containers you have a number of sidecar containers which monitor .json log files. On the on-premises side, you can feed your monitoring tool the .json log files and monitor WebSphere Application Server Liberty Base in your environment by creating custom dashboards in the monitoring tool.

This enhancement grants an immediate deep dive into events generated in the HCL Workload Automation environment.

For more information about the metrics HCL Workload Automation exposes, see the section about monitoring HCL Workload Automation in *User's Guide and Reference*.

To enable logging in .json format, add the **JSON** and **JSON_NO_UTF8** keys, depending on the output format you require, in the `BmEvents.conf` file. For more information, see the section about the `BmEvents` configuration file in *User's Guide and Reference*.

You can also find more information in the video Get your focus right with observability!

Connecting to the license server using a proxy

Connecting to the license server if your master domain manager cannot connect to the Internet

You can now set up a proxy in case the master domain manager is located on a network without Internet access.

You only need to set up a proxy server and indicate the specifics of the proxy server when installing the master domain manager using the serverinst command. For more information, see the FAQ about How do I connect to the license server if the master domain manager using a proxy server? in *HCL Workload Automation: Planning and Installation*.

Changed features and feature capabilities

A list of features changed since the previous release

The following features have changed or have been introduced or removed since the previous release:

Scheduling objects defined using REST APIs

Starting from product version 9.5, Fix Pack 2, a back-level version of the composer command line was provided to create definitions of a subset of scheduling objects which did not support REST APIs. The back-level version was named composer951. This back-level command line is now no longer available because all scheduling objects support REST APIs.

JAVA APIs deprecated

JAVA APIs are deprecated and have been replaced with REST APIs. For more information about REST APIs, see Driving HCL Workload Automation with REST API.

Rationalization of the JobManager.ini file

The contents of the `JobManager.ini` have been trimmed and revised to remove some properties which are reserved for internal use. These properties have been moved to a file named `JobManagerInternal.ini`, which is located in the binary directory and is overridden at each product upgrade. This file is not documented because it is not relevant for the final user. For more information about the `JobManager.ini` file, see the section about configuring the agent in *Administration Guide*.

Ensure higher security and safety of your data with TLS V1.2

HCL Workload Automation no longer supports TLS V1.0 and TLS V1.1. Only TLS V1.2 is supported. This enhancement ensures a higher security level for SSL communication.

Audit file log moved to master domain manager and backup master domain manager

When you choose to keep track of changes to scheduling objects, you can store your audit trails in a file, in the HCL Workload Automation database or in both. While in previous versions, the file was stored on agents, with the current version, the file has been moved to the master domain manager and backup master domain manager. For more information, see the section about enabling and storing audit trails in *Administration Guide*.

enPlanAudit global option is now immediately effective

While in previous versions the **enPlanAudit** global option required to run a JnextPlan command to make changes effective, starting from the current version, changes to **enPlanAudit** global option are immediately effective. For more information, see the summary about global options in *Administration Guide*.

Audit file format changed

The format of the file where you can optionally store the auditing information for your environment has been changed from `.csv` to `.json`. For more information, see the section about enabling and storing audit trails in *Administration Guide*.

Job Duration Predictor job deprecated

The Job Duration Predictor job is now deprecated and has been removed. Instead, a new HCL Workload Automation component is available: AI Data Advisor (AIDA), based on Artificial Intelligence and Machine Learning, for early anomaly detection and analysis. For further information about AIDA, see the *AI Data Advisor (AIDA) User's Guide*.

New and improved command for password encryption

A new command is now available for encrypting and decrypting passwords you use with HCL Workload Automation with the `xor`, `3DES`, and `AES` algorithms. For more information, see the section about encrypting passwords in *Planning and Installation Guide*.

Several integrations now available on Automation Hub

The following integrations are no longer available with HCL Workload Automation and can be installed from Automation Hub:

- Amazon EC2
- Apache Spark
- Enterprise Java Beans (EJB)
- Hadoop Distributed File System
- Hadoop Map Reduce
- IBM BigInsights
- IBM Cloudant
- IBM Cognos
- IBM InfoSphere DataStage
- IBM SoftLayer
- IBM WebSphere MQ
- Informatica PowerCenter
- J2EE (JMS)

- Job Duration Predictor. This job has been replaced by AI Data Advisor (AIDA). For further information about AIDA, see the *AI Data Advisor (AIDA) User's Guide*.
- Microsoft Azure
- MQTT
- Oozie
- Oracle E-Business Suite
- TEC Event Integration Facility (EIF) Event Forwarder, also known as TEC Event Forwarder
- Salesforce
- SAP BusinessObjects BI
- SAP PI Channel
- Web Services

Support for several products and integrations no longer available

The products and integrations listed below are no longer supported and the related documentation has been removed from the library:

- Application Lab
- Application Performance Management (APM)
- Extended agent for Multiple Virtual Storage (MVS)
- IBM Tivoli Monitoring (ITM)
- Option Editor
- OSLC Automation
- OSLC Provisioning
- Provisioning BigInsights
- Remote EJB, also known as EJB APIs. These APIs have been replaced by restful APIs.
- SmartCloud Control Desk (SCCD)
- SOAP WebServices based on WSDL. These services have been replaced by restful APIs.
- Tivoli Business Service Manager (TBSM)
- Tivoli Enterprise Portal (TEP)
- Tivoli Provisioning Manager (TPM)
- Tivoli Storage Manager (TSM)
- Tivoli System Automation for Multiplatforms (TSAMP)
- Tivoli NetView has been replaced with Simple Network Management Protocol (SNMP).
- workload broker jobs

As a result, optman parameters related to OSLC have been removed.

Also, the following **optman** options are no longer supported and are forced to their default value:

enTimezone

Deprecated and forced to `yes`.

enSwfaultTol

Deprecated and forced to `no`.

enRetainNameOnRerunFrom

Deprecated and forced to `no`.

ignoreCals

Deprecated and forced to `yes`.

For more information about **optman** options, see the section about global options in *Administration Guide*.

Satisfying Requests for Enhancements (RFEs) in version 10.2

HCL Workload Automation satisfies Requests for Enhancements (RFEs).

Requests for Enhancements (RFEs) give customers the opportunity to collaborate directly with the product development team and other users. The team prioritizes and develops new product features based on proposals made by customers.

HCL Workload Automation V 10.2 delivers the following RFEs:

datecalc utility is now available also for dynamic agents

You can now use the datacalc utility to resolve date expressions and return dates in the format you choose also on dynamic agents. For more information, see the section about the datacalc utility in *User's Guide and Reference*.

The `init.cfg` file is no longer overwritten during the upgrade phase

The `init.cfg` file is a file available for customization and so it should not be overwritten during the upgrade phase from Version 9.4 Fix Pack *x*. The file has now been moved to the following paths:

UNIX

TWA_DATA_DIR

Windows

`tws_install_dir`

where *`tws_install_dir`* is the directory path where the agent is installed.

If you perform an upgrade from Version 9.4 Fix Pack *x* to Version 10.1, the file is automatically moved to the paths listed above.

For more information about the `init.cfg` file, see the section about rule operation notes in *User's Guide and Reference*.

Modified By and Last Modified have been reintroduced

With the new Workload Designer, the item information regarding who modified it and the last modify has been reintroduced.

To submit a new RFE, write us here: HWAinfo@hcl.com

HCL Workload Automation for Z version 10.2 Fix Pack 3

The following features were provided with HCL Workload Automation for Z Version 10.2 Fix Pack 3 (APAR HC00010).

Specifying matching criteria for a z/OS shadow job to bind a z/OS remote job

When you define a z/OS shadow job to bind a job instance scheduled on another Z controller, the search for the remote job can be made dependent from any of the following matching criteria:

- Closest preceding
- Same scheduled date
- Within a relative interval
- Within an absolute interval

For detailed information, see How a z/OS shadow job is bound with a remote job instancethe topic about how a z/OS shadow is bound with a remote job instance in *Managing the Workload* and watch this video on the Workload Automation YouTube channel.

From the Orchestration Monitor you can set the status of jobs and workstations

From the Orchestration Monitor, the Set Status action now provides more administrative control and flexibility by enabling you to modify the status of jobs and workstations.

CPBPLIM should not be allowed to exceed 50% and all deps nesting level default should be less than 99

To help you set the percentage of CP buffer pool size in the OPCOPTS CPBPLIM and CPDTLIM parameters, you are now provided with relevant information by message EQQN259I.

For details, see OPCOPTS and EQQN000 - EQQN259the topic about the OPCOPTS statement in *Customization and Tuning*.

A new field for occurrences with the original ADID

With the Workload Automation Programming Language you can list the occurrences that were cloned from the AD database into the current plan, based on their original application ID, by specifying the `TMPLADID` argument in the `LIST CPOC` request. For details, see LIST CPOC – Current Plan Occurrencethe topic about the `LIST CPOC` request in the *Workload Automation Programming Language for z/OS User's Guide and Reference*.

Add the JES job number and/or the JOBID to message EQQ8006I

Message EQQ8006I now also provides you with the job ID.

Input file to update the XML used for dataset triggering should not open the file for output

The XML file used as input for the data set triggering function is now accessible only in read mode.

Publications are available in PDF format

From the Documentation Center you can access the publications in PDF format at the following link: Product Library in PDF format.

HCL Workload Automation for Z version 10.2 Fix Pack 2

The following features were provided with HCL Workload Automation for Z Version 10.2 Fix Pack 2 (APAR HC00009).

The Federator component of the Dynamic Workload Console supports Db2 for z/OS

The supported databases where you replicate (mirror) your current plan and run your queries through the Federator now include Db2 for z/OS.

Workflow details for plug-in jobs

You can now monitor the plug-in jobs from the Orchestration Monitor page of the Dynamic Workload Console. For details, see Orchestration Monitor overview.

Additional details related to successor shadow jobs

When you view the list of successor shadow jobs that are bound to a local job, you are provided with additional information related also to the distributed shadow jobs.

For details about viewing the successor shadow jobs, see Listing the shadow jobs bound to a job in the CPthe section about listing the shadow jobs bound to a job in the CP in *Managing the Workload*.

Enriched metrics for monitoring and analyzing your workload

Enhanced metrics now provide you with deeper insights on the performance and behavior of your environment for monitoring and analysis, thus improving overall system reliability and user experience.

New MODIFY command to collect statistics about records in the CP

By issuing the MODIFY command `/F procname,CPRECCNT` the message EQQE171I is logged in the EQQMLOG data set to show the number of occurrences, operations, and workstations currently included in the current plan, along with their status.

Support of IBM® Semeru Runtime Certified Edition V21

The Dynamic Workload Console reporting feature now requires IBM® Semeru Runtime Certified Edition (formerly known as IBM® 64-bit SDK for z/OS®, Java Technology Edition) V17 or V21.

Support of FIPS for distributed components

A new and improved version of the secure command empowers administrators to activate or deactivate FIPS compliance post-installation. Key capabilities of secure include:

FIPS activation

Configures the environment for FIPS 140-3 operation. This includes verifying compatibility (for example with Windows users) and converting any existing passwords stored with the older TripleDES algorithm to the FIPS-approved AES encryption standard. It then activates FIPS flags across essential configuration files and restarts the affected components. The activation process can accommodate transitional phases for algorithms like TripleDES, as permitted, before full conversion.

FIPS deactivation

Reverts the FIPS-specific settings in the aforementioned configuration files and restarts the components, should FIPS mode need to be disabled.

Enhance long duration alert message information

Messages EQQE028I, EQQE038I, and EQQ039I provide you with more detailed information for a more efficient assessment and analysis:

- Job start time
- Job estimated duration
- Current job duration
- Current job status
- Extended job name

WAPL enhancement: List CPSAI

By issuing the LIST CPOPCOM request from Workload Automation Programming Language (WAPL) or the native program interface (PIF) you can now list any available System Automation Information for an operation, enabling you to speed up searching, modifying, and verifying the information itself.

For more details about the arguments added to Workload Automation Programming Language, see LIST CPOPCOM – Current Plan Operationthe section about LIST CPOPCOM in the *Workload Automation Programming Language for z/OS User's Guide and Reference*.

For more details about the arguments added to the program interface, see List CPOPCOM argumentsthe section about the LIST CPOPCOM arguments in the *Developer's Guide: Driving HCL Workload Automation for Z*.

HCL Workload Automation for Z Small Programming Enhancements released in April 2025

The following features were provided with HCL Workload Automation for Z small programming enhancements (SPEs) released for Version 10.2, in April 2025 **(APAR HC00008)**.

Listing the successor shadow jobs bound to a job in your CP

From the ISPF panels you can now list the shadow jobs that are bound to a local job in your current plan, thus enabling you to evaluate the impact of performing the following actions on the local job instance:

- Browsing an occurrence external dependencies
- Browsing an operation dependencies
- Browsing an operation external dependencies
- Deleting an occurrence
- Deleting an operation
- Setting an occurrence to complete

- Rerunning an occurrence
- Setting an occurrence to waiting

For details, see the topic about listing the z/OS shadow jobs in *Managing the Workload*.

A more efficient flow of data between the Z controller and Federator

To enhance the processing of the events sent from the Z controller to the Federator, in the MIRROPTS statement you can now set THREADNUM to define the number of threads used by the DB Filler task and SOCKETNUM to define the number of sockets per thread. For details, see the topic about the MIRROPTS statement in *Customization and Tuning*.

ZWS-I-31 Update sample code in line with product changes

The EQQJVXIT sample exit stored in SEQQSAMP has been updated with the latest DSECT for the current plan record layout.

HCL Workload Automation for Z version 10.2 enhancements

HCL Workload Automation for Z version 10.2 includes the following enhancements.

Enhance the performance of the interfaces by mirroring the current plan on a database

Thanks to the Federator component which is automatically installed with the Dynamic Workload Console V10.2.3, you can now replicate the z/OS current plan on a database. This enables you to query your jobs, job streams, and workstations on the configured database through the Federator, without affecting the Z controller, which results in a performance enhancement of both the Dynamic Workload Console and REST APIs V2.

Find detailed information about activating the replication of data to a database in the topic Mirroring the z/OS current plan to enable the Orchestration Monitorin the section about mirroring the current plan to enable the Orchestration Monitor in the *Dynamic Workload Console User's Guide* and watch the video available in the Workload Automation channel on YouTube.

Have granular control over your workload through the Orchestration Monitor of the Dynamic Workload Console V10.2.3

By registering your z/OS engine to the Federator component of the Dynamic Workload Console V10.2.3, you are enabled to:

- Monitor jobs, job streams, and workstations from the new Orchestration Monitor.
- Perform actions on the monitored objects through the REST APIs V2, with which you can also run OQL queries.

For details about the Orchestration Monitor, see Orchestration Monitor overview. For details about OQL, see Using Orchestration Query Language.

The Event-filtering exit (User Exit 4) has been added to the User Exits Workbench tool

The Event-filtering exit (User Exit 4) has now been added to the list of exits that you can customize with the Workbench tool. For details, see Event-filtering exit (User Exit 4)the section about creating user exits through the User Exits Workbench in *Customization and Tuning*.

Elevate your data management with PostgreSQL database

Improve database performance and reliability by implementing the PostgreSQL database in your HCL Workload Automation environment.

You can now use the PostgreSQL database for creating the database for the Dynamic Workload Console.

PostgreSQL offers an extensive list of features related to performance, security, and configuration options. It is free and open-source, and its high customizability supports tailoring it to the specific needs of your environment. It also provides scalability, availability, and functionality suitable for large volumes of data.

PostgreSQL replaces OneDB and Informix, which are no longer supported.

For more information about using PostgreSQL to create the database for the Dynamic Workload Console, see the topic about creating and populating the database for PostgreSQL for the Dynamic Workload Console in *HCL Workload Scheduler for Z: Planning and Installation*.

Unleash the power of the cloud using Amazon RDS for MSSQL

Amazon RDS for MSSQL is a powerful, scalable managed database service that makes it easier to set up, operate, and scale SQL Server deployments in the cloud. It provides a powerful and convenient option for managing MSSQL databases in the cloud.

Amazon RDS for MSSQL also simplifies database management, enhances security, and provides the flexibility to scale up or down as your needs change.

For more information about using Amazon RDS for MSSQL to create the database for the Dynamic Workload Console, see the topic about creating and populating the database for MSSQL for the Dynamic Workload Console in *HCL Workload Scheduler for Z: Planning and Installation*.

Derby database is no longer supported

Derby database is no longer supported.

If you upgrade from an environment where you are using Derby, you have to install a supported database and extract all your definitions from Derby as described in the topic about connecting the Dynamic Workload Console to a new node or database in *HCL Workload Automation: Planning and Installation*.

Deprecated functions

The following functions were delivered and supported until HCL Workload Automation for Z V10.1, and are now deprecated:

- Open Services for Lifecycle Collaboration (OSLC) integration.
- Direct access storage device (DASD) connection method between the Z controller and trackers.

HCL Workload Automation for Z Small Programming Enhancements released in December 2023

The following features were provided with HCL Workload Automation for Z small programming enhancements (SPEs) released for Version 10.1, in December 2023 (APAR HC00007).

Integrating with IBM Z JCL Expert

By integrating with IBM Z JCL Expert, you can now stop wasting time searching for and fixing errors. You can check multiple JCLs simultaneously and automate the checking process.

From the Dynamic Workload Console V10.2.1 you can:

1. Invoke IBM JCL Expert when a job ends in error.
2. Verify the output of the JCL check in a new panel.
3. Speed up the debug process.
4. Automatically validate your JCL coding to ensure compliance with custom rules.

Keep your environment safe with the power of IBM Z JCL Expert! For detailed information, see the section about integrating with IBM Z JCL Expert in *Managing the Workload*.

Creating exits through the User Exits Workbench

The User Exits Workbench tool enables you to create and customize a number of user exits with the IBM z/OS Metal C language, instead of the Assembler language. You can quickly create, edit, compile, and link-edit the user exits from a single ISPF panel, as an alternative to creating them manually. For more details, see the section about creating user exits through the User Exits Workbench in *Customization and Tuning*.

Time-dependent operations hold on trackers

For trackers using JES2 for z/OS V3.1, or later: When a time-dependent operation scheduled on a tracker is ready to be run and you have set the JESSYMBOL HOLDUNTL parameter in OPCOPTS, the operation will be sent to the tracker at the time resulting from the IA time minus the seconds set in JESSYMBOL HOLDUNTL. On the tracker, JES2 holds the operation until the time dependency is resolved and optimizes the resources required for execution, then the operation is run.

This applies only to jobs that run on computer automatic workstations, except for virtual and started-task workstations.

Increase default MAXREL size for EQQADDS and EQQLTDS (RFE ZWS-I-40)

In EQQPCS01 sample, the maximum record length (MAXRECL) of EQQADDS and EQQLTDS data sets has been increased from 131072 to 400000.

Restore the CP at the moment just before a human error (RFE ZWS-I-178)

If manual actions were performed on some application occurrences by error but the new current plan still exists and is valid, you can have HCL Workload Automation for Z to take over the new current plan again, until the date and time of the latest valid record. This prevents re-creating the CP including *all* the archived JT events, even those that could be invalid or inconsistent after the detected errors.

For more details about the procedure to follow, see Re-creating the current plan from the new-current-plan and EQQJTARC until a specific date.

Java runtime now installed automatically

Java runtime is now installed automatically when you install an agent. For this reason, the -**addjruntime** parameter in the **twsinst** script is ignored when set to `false` and Java runtime is always installed by default. For more information, see the section about the **twsinst** script in *HCL Workload Scheduler for Z: Planning and Installation*.

Improved security for your environment

Custom certificates in `p12` format are now used for ensuring SSL communication in your environment. `p12` certificates are secure and easy to use. Default certificates are no longer supported. For more information about configuring your environment with custom certificates, see the topic about installing a Dynamic Workload Console server in *HCL Workload Scheduler for Z: Planning and Installation* and the topic about customizing the SSL connection between the agents and Z controller when using your certificates (SAF) in *Scheduling End-to-end with z-centric Capabilities*.

HCL Workload Automation for Z Small Programming Enhancements released in July 2023

The following features were provided with HCL Workload Automation for Z small programming enhancements (SPEs) released for Version 10.1, in July 2023 (APAR HC00006).

Opening an incident through ServiceNow

When an anomaly is detected, the faster you react the better! To have the Z controller open incidents through ServiceNow© and manage issues through a ticketing system, now you can:

- Integrate HCL Workload Automation for Z with ServiceNow. For detailed information, see the section about opening incidents through ServiceNow in *Managing the Workload* or the video that summarizes the main integration steps on the HCL Workload Automation YouTube channel.
- Use the Servicenow plug-in, available for z-centric agents on Automation Hub.

Defining jobs outside of EQQJBLIB and job-library-read exit (EQQUX002)

Typically, you define jobs in the concatenated libraries referenced by EQQJBLIB or with the job-library-read exit (EQQUX002). To define operations whose jobs are located outside of both EQQJBLIB and EQQUX002, you are now provided with the JOBLIBRARY user field. By setting this user field, HCL Workload Automation for Z dynamically allocates the specified library when required.

For more detailed information, see the section about defining jobs in *Managing the Workload*.

Provide EXECUTE command for WTO workstations (RFE ZWS-I-95)

You can now issue an Execute command on a WTO general workstation, even if the job submission is deactivated on the Z controller.

EQQAUDIT should include records if operation is manually held (RFE ZWS-I-167)

If you update the Manually Hold or NOP option by using the ISPF fast path 5.3 - Automatic Options, the modified value is displayed in the EQQAUDIT report as "CHANGED VALUE".

Processing applications in batch through the batch loader and BCIT utilities

You are now provided with the batch loader and BCIT programs to perform in the batch environment some of the functions that you would otherwise perform online with the HCL Workload Automation for Z panels, such as creating, updating, and monitoring application descriptions, group definitions, and operator instructions.

For detailed information, see *Managing the Workload*.

HCL Workload Automation for Z Small Programming Enhancements released in November 2022

The following features were provided with HCL Workload Automation for Z small programming enhancements (SPEs) released for Version 10.1, in November 2022 (APAR HC00005).

Self-Service Catalog enhancements

A new and improved version of the Self-Service Catalog is available. You can now launch your services quickly and easily and check on them at any time by accessing the Self-Service Catalog from any device.

To use the Self-Service Catalog you do not need to be a Workload Automation expert, but you can leverage on services based on automation capabilities in no time, provided that you are connected to the Dynamic Workload Console in Single Sign-On (SSO). For more information, see Configuring the Dynamic Workload Console for Single Sign-Onthe section about configuring the Dynamic Workload Console for Single Sign-On on *HCL Workload Scheduler for Z: Planning and Installation*.

The HCL Workload Automation scheduler or application designer creates annotations in the Dynamic Workload Console and marks them as services, so that they are available for managing from the Self-Service Catalog interface.

To create and edit SSC-ready annotations, it is recommended that you use the Dynamic Workload Console. For more information about defining SSC-ready annotations, see the online help for annotation definitions in the Dynamic Workload Console.

Deploying z-centric and dynamic agents on Kubernetes to orchestrate your workload on cloud

A cloud deployment ensures access anytime anywhere and is a fast and efficient way to get up and running quickly. It also simplifies maintenance, lowers costs, provides rapid upscale and downscale, minimizes IT requirements and physical on-premises data storage.

To ensure a fast and responsive experience when using HCL Workload Automation for Z, you can now deploy z-centric and dynamic agents on a Kubernetes cluster. With the sample Helm Chart provided, you install and configure the agent with a single yaml file.

Orchestrating your Kubernetes workload from a containerized agent optimizes allocations of resources in your cluster and reduces the chance of human errors. Find out more in the video Orchestrating Your Workload on Cloud from IBM Z Workload Scheduler on the Workload Automation YouTube channel.

For details, see Deploying z-centric and dynamic agents on Kubernetesthe section about Deploying z-centric and dynamic agents on Kubernetes in *HCL Workload Scheduler for Z: Planning and Installation*.

Better performance and stronger security with TLS V1.3

HCL Workload Automation for Z supports TLS V1.3, which provides a faster and more responsive connection and more secure cipher suites for encryption. By supporting the Server Name Indication (SNI), an extension of the TLS protocol, HCL Workload Automation for Z is enabled to securely connect any z-centric agent deployed on a cloud cluster.

For details about how to configure TLS, see the section about customizing TLS to connect components in *Customization and Tuning*.

Advanced password encryption

Security is a major concern in today's interconnected world. Government organizations, financial institutions, healthcare providers, and insurance companies are just a few examples of the types of entities who are taking security seriously.

You can optionally encrypt the passwords that you will use while installing, upgrading, and managing HCL Workload Automation. The encryption of the passwords performed by the `secure` command is based on the AES method. For details, see the section about encrypting passwords in *HCL Workload Scheduler for Z: Planning and Installation*.

Installing the agents on IBM i with a user different from QSECOFR

You can use a user different from QSECOFR to install z-centric and dynamic agents on IBM i. In this case, the new **allObjAuth** parameter is required when running the **twsinst** command, to indicate that the user has the required ALLOBJ authority. Ensure that the user is existing and is assigned ALLOBJ authorization. The agent is started after connecting to the system with the TWSUSER or the user defined at installation time.

When you upgrade or uninstall the agent, a check is performed to ensure that you are using the same user who performed the installation. If you used **allObjAuth** parameter at installation time, specify it again when upgrading or uninstalling the agent.

The name of the user used to perform the installation is maintained in the `TWA_DATA_DIR/installation/instInfo/instUser` file.

For more information, see Installing agents on IBM i systems, Upgrading agents on IBM i systems, and Uninstalling agents on IBM i systems

Enable SAF Keyring Support for TCPOPTS

Reduce vulnerabilities with TCPIP connections by providing RACF key ring support

To strengthen security, preventing loss of data and service outage, you can now set a single SAF key ring for HTTP and TCP/IP communications. This applies to the communications between:

- Tracker and Z controller
- Data store and Z controller
- Server and remote interface

For details, see the SSLKEYSTORETYPE parameter of the TCPOPTS statement in *Customization and Tuning*.

HCL Workload Automation for Z version 10.1 enhancements

HCL Workload Automation for Z version 10.1 includes the following enhancements.

HCL Clara integrated with the Dynamic Workload Console

HCL Clara, an Intelligent Virtual Assistant, is the Workload Automation product expert which you can contact directly from the Dynamic Workload Console to learn the product capabilities, execute routine tasks, and get troubleshooting assistance.

Find out more about Clara here: https://help.hcltechsw.com/solutions/clara/index.html.

For instructions about how to integrate Clara with the Dynamic Workload Console, see Integrating Clara in the Dynamic Workload Console.

Managed File Transfer

The File Transfer integration, already available on Automation Hub, now features three important enhancements:

- **Support for File Proxy**: A new component, called File Proxy, is now available for you to install. Through the File Proxy you manage securely files to be transferred with the File Transfer integration on any workstation that runs a supported version of Windows or Linux operating system. All transfer operations are performed by HCL Workload Automation for Z with no need of third-party products.
- **Support for file transfers via the Workstation-to-Workstation internal protocol**: You can easily transfer files to and from z-centric agents. You no longer have to specify the address of the workstations involved in the file transfer, but you can simply define the workstations from the File Transfer integration. Ensure that the agents are at version 10.1. For more information about the integration, see File Transfer integration.
- **Search on remote file systems**: You can perform search operations on the file system of a remote workstation. On Linux, if you do not specify a path, the search is performed on the working directory. On Windows, the path is required.

A renewed experience of Workload Designer

Workload Designer: a new concept to manage your workload. An innovative infrastructure and design have been thought to simplify the user experience and create a more responsive, fast and fluid user interface. You do not need to switch among the Dynamic Workload Console pages to complete your business workflow anymore. The new Workload Designer contains everything you need. Automate business-critical processes from a single point of access and control.

Automate fast, automate better.

Detecting anomalies in your workload with AI Data Advisor (AIDA)

Starting from this release, a new component is available in HCL Workload Automation for Z: AI Data Advisor (AIDA), based on Artificial Intelligence and Machine Learning, for early anomaly detection and analysis.

AIDA enables fast and simplified data-driven decision making, for an intelligent workload management. By analyzing historical data and metrics gathered by IBM Workload Scheduler and predicting their future patterns, AIDA identifies anomalies in the trend of Key Performance Indicators (such as the number of completed jobs in the current plan, the job duration, the job end-time) and sends alerts immediately to anticipate and prevent problems and delays. Alerts show up on the Workload Dashboard and can be notified via email.

For more information, see the *AI Data Advisor (AIDA) User's Guide*.

Chatbot based solution to enhance incident management process

When a problem arises, reacting is crucial. Identifying the issue, gathering possible solutions, choosing the best way to proceed are the fundamentals of problem-solving. In this realm, rapid communication becomes critical. By integrating with IBM Z ChatOps, HCL Workload Automation for Z provides you with a chat tool where you are notified about incidents and can share information with other team members. You are alerted through the chat platform of your choice (such as Microsoft Teams, Slack, or Mattermost) and communicate with the other chat users to share data and perform actions. Collaboration becomes easy, immediate, and effective for promoting teamwork and addressing daily issues.

For detailed information, see the section about posting incidents and sharing information through a chat tool in *Managing the Workload*.

For an overview of this feature, watch the video Chatbot based solution to manage incidents on the HCL Workload Automation YouTube channel.

Exposing metrics to monitor your workload

HCL Workload Automation for Z now exposes metrics about the status of your jobs by using OpenMetrics standard. The data collected can be processed by multiple data analytic tools, creating an easy and unified way to control and monitor your workload.

For details, see the section about exposing metrics to monitor your workload in *Managing the Workload*.

Ensure highest security and safety of your data with TLS V1.2

To ensure highest safety of your data, HCL Workload Automation for Z now supports the more secure and modern TLS V1.2.

TLS V1.0 and V1.1 are no longer supported. To communicate with the Dynamic Workload Console, master domain manager, and dynamic domain manager through TLS it is required that you configured secure ciphers, such as ECC or AES-GCM ciphers. For details about how to configure TLS, see .

Job running on a z-centric agent is set to Error if query job status is unknown

When a connection problem occurs between the Z controller and a z-centric agent where a job is running, if the query status for that job is unknown, the job is *not* set to Ready but it is set to Error with UNKN.

Rationalization of the JobManager.ini file

The contents of the `JobManager.ini` file have been trimmed and revised to remove some properties which are reserved for internal use. These properties have been moved to a file named `JobManagerInternal.ini`, which is located in the binary directory and is overridden at each product upgrade. This file is not documented because it is not relevant for the final user. For more information about the `JobManager.ini` file, see the section about configuring the agent in *Scheduling End-to-end with z-centric Capabilities*.

New and improved command for password encryption

A new command is now available for encrypting and decrypting passwords that you use with HCL Workload Automation for Z with the `xor`, `3DES`, and `AES` algorithms. For more information, see the section about encrypting passwords in *HCL Workload Scheduler for Z: Planning and Installation*.

Java software prerequisite changed to version 11

Java is a prerequisite for Java job plug-ins and other Java-based functions. With this release, the supported version has been changed to Version 11. This version of Java is not available on HP-UX and Solaris SPARC operating systems. If you install on these operating systems, use the Java Version 11 provided with the operating systems. This change applies to the **twsinst** script: before launching this command on HP-UX and Solaris SPARC operating systems, provide the path to Java. For more information, see the section about the **twsinst** command in *HCL Workload Scheduler for Z: Planning and Installation*.

SEQQSAMP JCL samples have incorrect or obsolete REGION size (RFE 66985)

The JCL samples with a region different from 0 MB have now a region of 64 MB.

DBGRANT script for DELETE authorization (RFE 103251)

By granting a user access to the reporting tables and views with the **dbgrant** script, users are now enabled to both edit and delete them.

Display USER LEVEL at controller startup (RFE 115863)

At controller and server startup, message EQQZ286I is issued to show the maximum user level supported by the system.

Increasing the limitation of potential successors in the current plan (RFEs 144541, 144596)

Product scalability has been improved by increasing the limitation of potential successors in the current plan from 1000 to 3000.

User-defined JCL skeleton should be available for EQQEMAIL solution (RFE 145320)

You can define your own JCL to be used when an email is sent upon an alert condition, instead of using the predefined EQQEMAIL members. You can use any text for the JCL, no parsing is performed by HCL Workload Automation for Z. For more details, see the section about sending an email when an alert condition occurs in *Managing the Workload*.

DYNAMICDEL(YES) should be the default (RFE 148581)

In *Customization and Tuning*, all users who significantly use the dynamic addition of special resources are recommended to set BATCHOPT DYNAMICDEL(YES). This setting prevents the size of the data space from increasing in time, with an initial performance degradation that worsens until the space available is exhausted and the batch job terminates with Abend 01D. For this reason, the default value of the DYNAMICDEL parameter in the BATCHOPT statement has been changed from NO to YES.

Pool dynamic workstation shows offline status if resources are unavailable to schedule jobs (RFE 150599 Workstation should show offline for agent pools tied to a DDM)

If a pool dynamic workstation is found without available resources, it is set offline until resources become available again; in that case, the workstation becomes active again.

When the PULSEIVL parameter of the HTTPOPTS or ROUTOPTS statement is set to 0 (which is the default), the heartbeat checking:

- Is run for dynamic domain managers according to the policy established by the Z controller.
- Is not run for z-centric agents.

Automatic health check performed periodically. A message is issued if vital services are no longer available. (RFE 151638 Startup message of the controller is needed when every service is available)

On the Z controller and tracker, a periodic check is performed to ensure that the following vital subtasks are active:

For the Z controller

General Service, Normal Mode Manager, Workstation Analyzer, Event Manager, Submit Task, Event Writer

For the tracker

Submit Task, Event Writer

A message is issued every time one of these subtasks is started, ended, or abended.

Enhance description on the number of occurrences (RFE 151653)

When setting the MAXOCCNUM parameter in BATCHOPT statement, it is advisable not to set the parameter to a larger number than required by actual workload needs, because the increased overhead incurred could cause a noticeable performance degradation.

Several integrations now available on Automation Hub

The following integrations are no longer available with IBM® Workload Scheduler and can be installed from Automation Hub:

- Amazon EC2
- Apache Spark
- IBM BigInsights
- IBM Cloudant
- IBM Cognos
- IBM InfoSphere DataStage
- Enterprise Java Beans (EJB)
- Hadoop Map Reduce
- IBM SoftLayer
- Informatica PowerCenter
- J2EE (JMS)
- Microsoft Azure
- MQTT
- Oozie
- Oracle E-Business Suite
- Salesforce
- SAP BusinessObjects BI
- SAP PI Channel
- Web Services
- IBM WebSphere MQ

Chapter 2. HCL Workload Automation

The HCL Workload Automation scheduling features help you plan every phase of production. During the plan processing period, the HCL Workload Automation production control programs manage the production environment and automate most operator activities. HCL Workload Automation prepares jobs for execution, resolves interdependencies, and launches and tracks each job. Because jobs start running as soon as their dependencies are satisfied, idle time is minimized, and throughput improves significantly. Jobs always run in sequence and, if a job fails, HCL Workload Automation handles the recovery process with little or no operator intervention.

Overview

The next sections provide an outline of HCL Workload Automation.

What is HCL Workload Automation

HCL Workload Automation is composed of the following parts:

HCL Workload Automation engine

The scheduling engine. It runs on every computer of a HCL Workload Automation network. During installation, the engine is configured for the role that the workstation will play within the scheduling network, such as master domain manager, domain manager, or agent.

The Dynamic Workload Console

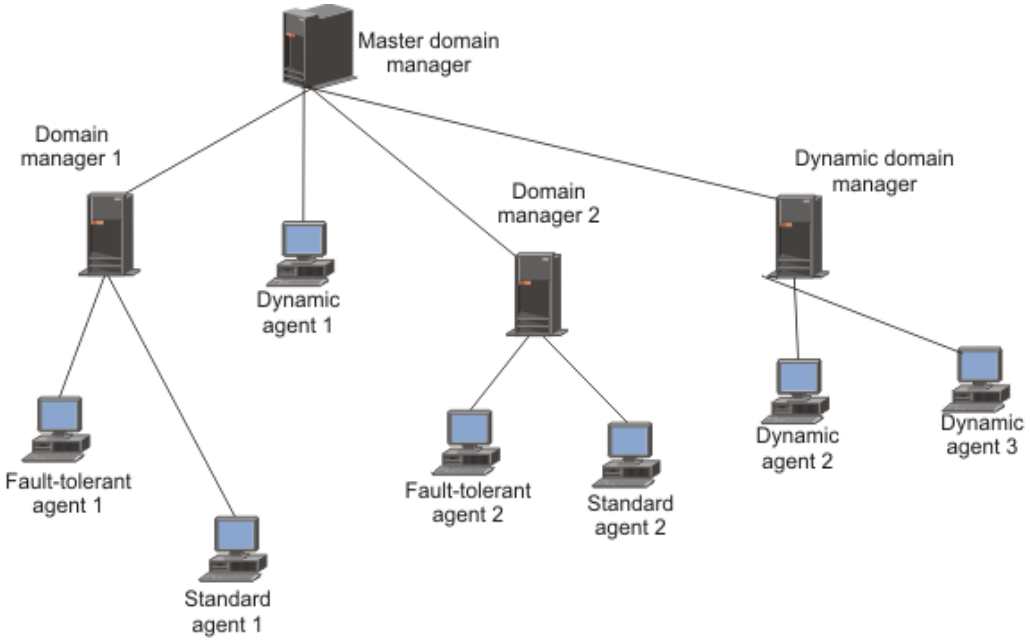
Is Web-based, light, powerful, and user friendly. It can be used on any computer that has a web browser and provides access to all the current HCL Workload Automation functions. It is the strategic graphical user interface for the entire HCL Workload Automation portfolio.

The HCL Workload Automation network

An HCL Workload Automation network is made up of the workstations, or CPUs, on which jobs and job streams are run.

An HCL Workload Automation network contains at least one HCL Workload Automation domain, the master domain, in which the master domain manager is the management hub. Additional domains can be used to divide a widely distributed network into smaller, locally managed groups.

Figure 1. HCL Workload Automation network made up by two domains



Using multiple domains reduces the amount of network traffic by reducing the amount of communication required between the master domain manager and other computers.

In a single domain configuration, the master domain manager maintains communication with all of the workstations in the scheduling network.

In a multi-domain configuration, the master domain manager communicates with the workstations in its domain and with the subordinate domain managers. The subordinate domain managers, in turn, communicate with the workstations in their domains and with their subordinate domain managers. Multiple domains also provide fault-tolerance by limiting the problems caused by losing a domain manager to a single domain. To limit the effects further, you can designate backup domain managers to take over if their domain managers fail.

Every time the production plan is created or extended the master domain manager creates a production control file, named Symphony™. HCL Workload Automation is then restarted in the network, and the master domain manager sends a copy of the new production control file to each of its automatically linked agents and subordinate domain managers. The domain managers, in turn, send copies to their automatically linked agents and subordinate domain managers.

Once the network is started, scheduling messages like job starts and completions are passed from the agents to their domain managers, through the parent domain managers to the master domain manager. The master domain manager then broadcasts the messages throughout the hierarchical tree to update the production control files of domain managers and fault tolerant agents running in Full Status mode.

Manager and agent types

About this task

Primarily, workstation definitions refer to physical workstations. However, in the case of extended and network agents, the workstations are logical definitions that must be hosted by a physical HCL Workload Automation workstation.

HCL Workload Automation workstations can be of the following types:

Master domain manager (MDM)

The domain manager in the topmost domain of a HCL Workload Automation network. It either contains or connects to the relational database that stores the scheduling object definitions. It creates or updates the production file when the plan is created or extended and distributes it in the network. It performs all logging and reporting for the network.

Backup master

A fault-tolerant agent or domain manager capable of assuming the responsibilities of the master domain manager for automatic workload recovery.

Domain manager

The management hub in a domain. All communications to and from the agents in a domain are routed through the domain manager.

Backup domain manager

A fault-tolerant agent capable of assuming the responsibilities of its domain manager.

Dynamic domain manager

An installed component in a distributed HCL Workload Automation network that is the management hub in a domain. All communication to and from the dynamic agents in the domain is routed through the dynamic domain manager.

Backup dynamic domain manager

A workstation which can act as a backup for the dynamic domain manager, when problems occur. It is effectively a dynamic domain manager, waiting to be activated. Its use is optional.

Fault-tolerant agent (FTA)

A workstation capable of resolving local dependencies and launching its jobs in the absence of a domain manager.

Dynamic agent

Dynamic agents run the same types of jobs as fault-tolerant agents. From classic job types such as docommand and scripts, to more specific job types such as Java, database, file transfers, InfoSphere DataStage, Cognos, and OSLC to name a few. Dynamic agents can be defined in pools and dynamic pools.

Run workload dynamically

It communicates with the server the status of its resources. In this way the product is able to dynamically run your workload to the best available resources by:

- Automatically discovering scheduling environment resources.
- Automatically following resource changes

- Requesting additional resources when needed
- Matching job requirements to available resources
- Controlling and optimizing use of resources

The characteristics listed above provides high availability and load balancing potentialities to your environment and well suite virtualized environments.

When a job is submitted, either as part of a job stream in the plan or through ad hoc submission, HCL Workload Automation checks the job requirements, the available resources and the related characteristics and submits the job to the resource that best meets the requirements to run it.

Run both existing job types and job types with advanced options

It can run:

- Existing job types. For example docommand and scripts.
- Job types with advanced options, both those supplied with the product and the additional types implemented through the custom plug-ins. For example, those supplied with the product are DB2®, file transfer, and web services. Those implemented through the custom plug-ins are the ones you developed using the Workload Automation, Lutist Development Kit. To run these job types you must also install the Java™ run time.

Manage dynamic workload broker logical resource

It can remotely run, from the agent, the dynamic workload broker **resource** command on the server. To manage the **resource** command you must also install the Java™ run time.

Pool

Pools are groups in which you add specific dynamic agent workstations according to the requirements of the job. Jobs are assigned dynamically to the best available dynamic agent applying a load balancing policy by choosing the agent with the lesser amount of jobs to run.

Dynamic pool

Dynamic pools are groups in which you specify the requirements and HCL Workload Automation selects the dynamic agents that meet the requirements. Jobs are assigned dynamically to the best available dynamic agent applying an optimization policy to identify the best agent.

Standard agent

A workstation that launches jobs only under the direction of its domain manager. It is not fault-tolerant.

Extended agent

A logical workstation definition that helps you launch and control jobs on other systems and applications, such as PeopleSoft, SAP, and z/OS®.

z-centric agent

Runs jobs scheduled from HCL Workload Automation for Z but is installed in the HCL Workload Automation environment. It has no fault-tolerance and communicates directly with the HCL Workload Automation for Z

controller through the RESTful HTTP interface. In HCL Workload Automation for Z it has the same functionality as a computer automatic workstation even though it runs in the distributed environment.

Network Agent

A logical workstation definition for creating dependencies between jobs and job streams in separate HCL Workload Automation networks.

Topology

About this task

A key to choosing how to set up HCL Workload Automation domains for an enterprise is the concept of localized processing. The idea is to separate or localize the enterprises's scheduling needs based on a common set of characteristics.

Common characteristics are things such as geographical locations, business functions, and application groupings. Grouping related processing can limit the amount of interdependency information that needs to be communicated between domains. The benefits of localizing processing in domains are:

- Decreased network traffic. Keeping processing localized to domains eliminates the need for frequent interdomain communications.
- Provides a convenient way to tighten security and simplify administration. Security and administration can be defined at, and limited to, the domain level. Instead of network-wide or workstation-specific administration, you can have domain administration.
- Network and workstation fault tolerance can be optimized. In a multiple domain HCL Workload Automation network, you can define backups for each domain manager, so that problems in one domain do not disrupt operations in other domains.

Networking

About this task

The following questions will help in making decisions about how to set up your enterprise's HCL Workload Automation network. Some questions involve aspects of your network, and others involve the applications controlled by HCL Workload Automation. You may need to consult with other people in your organization to resolve some issues.

- How large is your HCL Workload Automation network? How many computers does it hold? How many applications and jobs does it run?

  The size of your network will help you decide whether to use a single domain or the multiple domain architecture. If you have a small number of computers, or a small number of applications to control with HCL Workload Automation, there may not be a need for multiple domains.
- How many geographic locations will be covered in your HCL Workload Automation network? How reliable and efficient is the communication between locations?

This is one of the primary reasons for choosing a multiple domain architecture. One domain for each geographical location is a common configuration. If you choose single domain architecture, you will be more reliant on the network to maintain continuous processing.

- Do you need centralized or decentralized management of HCL Workload Automation?

  A HCL Workload Automation network, with either a single domain or multiple domains, gives you the ability to manage HCL Workload Automation from a single node, the master domain manager. If you want to manage multiple locations separately, you can consider the installation of a separate HCL Workload Automation network at each location. Note that some degree of decentralized management is possible in a stand-alone HCL Workload Automation network by mounting or sharing file systems.

- Do you have multiple physical or logical entities at a single site? Are there different buildings, and several floors in each building? Are there different departments or business functions? Are there different applications?

  These may be reasons for choosing a multi-domain configuration. For example, a domain for each building, department, business function, or each application (manufacturing, financial, engineering, etc.).

- Do you run applications, like SAP R/3, that will operate with HCL Workload Automation?

  If they are discrete and separate from other applications, you may choose to put them in a separate HCL Workload Automation domain.

- Would you like your HCL Workload Automation domains to mirror your Windows™ domains?

  This is not required, but may be useful.

- Do you want to isolate or differentiate a set of systems based on performance or other criteria?

  This may provide another reason to define multiple HCL Workload Automation domains to localize systems based on performance or platform type.

- How much network traffic do you have now?

  If your network traffic is manageable, the need for multiple domains is less important.

- Do your job dependencies cross system boundaries, geographical boundaries, or application boundaries? For example, does the start of Job1 on CPU3 depend on the completion of Job2 running on CPU4?

  The degree of interdependence between jobs is an important consideration when laying out your HCL Workload Automation network. If you use multiple domains, you should try to keep interdependent objects in the same domain. This will decrease network traffic and take better advantage of the domain architecture.

- What level of fault-tolerance do you require?

  An obvious disadvantage of the single domain configuration is the reliance on a single domain manager. In a multi-domain network, the loss of a single domain manager affects only the agents in its domain.

HCL Workload Automation components

About this task

HCL Workload Automation uses several manager processes to efficiently segregate and manage networking, dependency resolution, and job launching. These processes communicate among themselves through the use of message queues. Message queues are also used by the Console Manager (conman) to integrate operator commands into the batch process.

On any computer running HCL Workload Automation there are a series of active management processes. They are started as a system service, or by the `StartUp` command. The following are the main processes of a fault-tolerant agent:

Netman

The network management process that establishes network connections between remote `mailman` processes and local `Writer` processes.

Mailman

The mail management process that sends and receives inter-CPU messages.

Batchman

The production control process. Working from Symphony™, the production control file, it runs jobs streams, resolves dependencies, and directs `jobman` to launch jobs.

Writer

The network `writer` process that passes incoming messages to the local `mailman` process.

Jobman

The job management process that launches and tracks jobs under the direction of `batchman`.

The following are the main processes of a dynamic agent:

agent

The network management process that establishes network connections to the master domain manager or the dynamic domain manager.

JobManager

The process that manages all of the dynamic agent operations, such as, sending events, and directing `TaskLauncher` to launch jobs.

TaskLauncher

The job management process that launches and tracks jobs under the direction of `JobManager`.

JobManagerGW

Manages the communication between dynamic agents and the master or dynamic domain manager through a firewall.

Monman

The event management process that turns on the event monitoring engine on the workstation.

In addition, HCL Workload Automation uses two command line interfaces:

Composer

The command-line program used to define, manage, and store scheduling objects in the HCL Workload Automation database. The composer command-line program can be installed and used on any computer connected through TCP/IP to the system where the master domain manager is installed. It does not require the installation of a HCL Workload Automation workstation as a prerequisite. It communicates through HTTP/HTTPS with the master domain manager where the relational database management system (RDBMS) is installed. The HTTP/HTTPS communication setup and the authentication check are managed by the WebSphere® Application Server - Express® infrastructure. The composer uses edit files to update the scheduling database.

Conman

The console manager. It is the user interface for plan running activities by means of the command line interface. `Conman` writes information that is received by either the local `netman` or `mailman` processes.

HCL Workload Automation scheduling objects

About this task

Scheduling with HCL Workload Automation includes the capability to do the following:

- Schedule jobs across a network.
- Group jobs into job streams according, for example, to function or application.
- Set limits on the number of jobs that can run concurrently.
- Create job streams based on day of the week, on specified dates and times, or by customized calendars.
- Ensure correct processing order by identifying dependencies such as successful completion of previous jobs, availability of resources, or existence of required files.
- Set automatic recovery procedures for unsuccessful jobs.
- Forward incomplete jobs to the next production day.

Starting from version 8.3, the HCL Workload Automation scheduling objects are stored in a relational database. This results in a significant improvement, in comparison with previous versions, of how objects are defined and managed in the database. Each object can now be managed independently without having to use lists of scheduling objects like calendars, parameters, prompts and resources. The command syntax used to define and manage these objects has also become direct and powerful.

HCL Workload Automation administrators and operators work with these objects for their scheduling activity:

Workstation

Also referred to as *CPU*. Usually an individual computer on which jobs and job streams are run. Workstations are defined in the HCL Workload Automation database as a unique object. A workstation definition is required for every computer that executes jobs or job streams in the HCL Workload Automation network.

Workstation class

A group of workstations. Any number of workstations can be placed in a class. Job streams and jobs can be assigned to execute on a workstation class. This makes replication of a job or job stream across many workstations easy.

Domain

All workstations in a distributed HCL Workload Automation network are organized in one or more domains, each of which consists of one or more agents and a domain manager acting as the management hub. Most communication to and from the agents in the domain is routed through the domain manager. You can organize all agents in your network in a single domain, or in multiple domains. A single domain network consists of a master domain manager and any number of agents. A multiple domain network consists of a master domain manager, any number of lower tier domain managers, and any number of agents in each domain.

Folder

A smart workflow folder is a container of jobs, job streams, and other folders. Use smart workflow folders to organize your jobs and job streams according to your lines of business or other custom categories. A folder can contain one or more jobs or job streams, while each job stream can be associated to one folder. If no folder is defined for a job stream, the root folder (/) is used by default.

Job

A script or command, run on the user's behalf, run and controlled by HCL Workload Automation.

Job stream

A list of jobs that run as a unit (such as a weekly backup application), along with run cycles, times, priorities, and other dependencies that determine the exact order in which the jobs run.

Calendar

A list of scheduling dates. Each calendar can be assigned to multiple job streams. Assigning a calendar to a job stream causes that job stream to run on the dates specified in the calendar. A calendar can be used as an inclusive or as an exclusive run cycle.

Run cycle

A cycle that specifies the days that a job stream is scheduled to run. Run cycles are defined as part of job streams and may include calendars that were previously defined. There are three types of run cycles: a Simple run cycle, a Weekly run cycle, or a Calendar run cycle (commonly called a calendar). Each type of run cycle can be inclusive or exclusive. That is, each run cycle can define the days when a job stream is included in the production cycle, or when the job stream is excluded from the production cycle.

Run cycle group

A run cycle group is a list of run cycles that are combined together to produce a set of run dates. You can optionally define a run cycle group for your job stream instead of, or in addition to, a number of single run cycles. Unlike run cycles, run cycle groups are not tied to a specific job stream and therefore can be reused in several different job streams to apply the same scheduling rules each time.

Run cycles are organized into subsets within a run cycle groups. The subsets are in a logical OR relationship with each other. They enable you to apply exclusive run cycles to a subset of the inclusive run cycles. The result of the run cycle group is a run date or a set of run dates.

Prompt

An object that can be used as a dependency for jobs and job streams. A prompt must be answered affirmatively for the dependent job or job stream to launch. There are two types of prompts: predefined and ad hoc. An ad hoc prompt is defined within the properties of a job or job stream and is unique to that job or job stream. A predefined prompt is defined in the HCL Workload Automation database and can be used by any job or job stream.

Resource

An object representing either physical or logical resources on your system. Once defined in the HCL Workload Automation database, resources can be used as dependencies for jobs and job streams. For example, you can define a resource named *tapes* with a unit value of two. Then, define jobs that require two available tape drives as a dependency. Jobs with this dependency cannot run concurrently because each time a job is run the *tapes* resource is in use.

Variable and variable table

A variable can be used to substitute values in scheduling objects contained in jobs and job streams; that is, in JCL, log on, prompts dependencies, file dependencies, and recovery prompts. The values are replaced in the job scripts at run time. Variables are global (that is, they can be used on any agent of the domain) and are defined in the database in groups called `variable tables`.

Parameter

A parameter can be used to substitute values in jobs and job streams just like global variables. The difference is that a parameter is defined on the specific workstation where the related job is to run and has no global effect, but only on that specific workstation. Parameters cannot be used when scripting extended agent jobs.

User

On Windows™ workstations, the user name specified in the `Logon` field of a job definition must have a matching user definition. The definitions provide the user passwords required by HCL Workload Automation to launch jobs.

Event rule

A scheduling event rule defines a set of actions that are to run upon the occurrence of specific event conditions. The definition of an event rule correlates events and triggers actions. When you define an event rule, you specify one or more events, a correlation rule, and the one or more actions that are triggered by those events. Moreover, you can specify validity dates, a daily time interval of activity, and a common time zone for all the time restrictions that are set.

Workload application

A workload application is an HCL Workload Automation database object that acts as a container for one or more job streams. You can use workload applications to standardize a workload automation solution so

that the solution can be reused in one or more HCL Workload Automation environments thereby automating business processes.

You prepare a workload application template in a source HCL Workload Automation environment and then export it so that it can be deployed in a target environment. The export process extracts from the source environment all of the elements necessary to reproduce the solution in another environment. It produces a compressed file containing a number of files required to import the workload application into the target environment.

You can control how jobs and job streams are processed with the following attributes:

Dependencies

Conditions that must be satisfied before a job or job stream can run. You can set the following types of dependencies:

- A predecessor job or job stream must have completed successfully.
- One or more specific resources must be available.
- Access to specific files must be granted.
- An affirmative response to a prompt.

Time constraints

Conditions based on time, such as:

- The time at which a job or job stream should start.
- The time after which a job or job stream cannot start.
- The repetition rate at which a job or job stream is to be run within a specified time slot.

Job priority

A priority system according to which jobs and job streams are queued for execution.

Job fence

A filter defined for workstations. Only jobs and job streams whose priority exceeds the job fence value can run on a workstation.

Limit

Sets a limit to the number of jobs that can be launched concurrently on a workstation.

The production process

HCL Workload Automation production is based on a plan that runs in a *production period*. The production period is defined by the user when creating or extending the production plan. It can span from a few hours to some days (by default it is a 24 hours period). Before the start of each production period, HCL Workload Automation executes a program that creates the production plan starting from the modeling data stored in the database and from an intermediate plan called *preproduction*

plan. Then another program includes the uncompleted schedules from the previous production period into the current plan and another different program logs all the statistics of the previous production into an archive.

All of the required information for that production period is placed into a production control file named Symphony™. During the production period, the production control file is continually being updated to reflect the work that needs to be done, the work in progress, and the work that has been completed. A copy of the Symphony™ file is sent to all subordinate domain managers and to all the fault-tolerant agents in the same domain. The subordinate domain managers distribute their copy to all the fault-tolerant agents in their domain and to all the domain managers that are subordinate to them, and so on down the line. This causes fault-tolerant agents throughout the network to continue processing even if the network connection to their domain manager is down. From the graphical interfaces or the command line interface, the operator can view and make changes in the current production by making changes in the Symphony™ file.

HCL Workload Automation processes monitor the production control file and make calls to the operating system to launch jobs as required. The operating system runs the job, and in return informs HCL Workload Automation if the job completed successfully or not. This information is entered into the production control file to indicate the status of the job.

Scheduling

About this task

Scheduling objects are workstations, workstation classes, domains, jobs, job streams, resources, prompts, calendars, variables and variable tables, parameters, event rules, and run cycle groups. Scheduling objects are managed with the Composer program and are stored in the HCL Workload Automation database. To create or modify an object, you can use either the HCL Workload Automation command line interface or one of the graphical interfaces.

Scheduling includes the following tasks:

- Defining and maintaining workstations
- Defining scheduling objects
- Defining job streams
- Starting and stopping production processing
- Viewing and modifying jobs and job streams.

Creating job streams

The primary processing task of HCL Workload Automation is to run job streams. A job stream is an outline of batch processing consisting of a list of jobs. Job streams can be defined using either the command line interface or one of the graphical interfaces. Using either graphical interface you can easily create and modify job streams. You can use their job stream editors to work with the jobs and the `follows` dependencies between the jobs, as well as the job stream run cycles. You can also easily specify time restrictions, resource dependencies, file dependencies, and prompt dependencies at the job stream level.

Job streams can be defined as *draft*. A draft job stream is not considered when resolving dependencies and is not added to the production plan. It becomes actual only after the *draft* keyword is removed from its definition, and the `JnextPlan` command is run to add it to the preproduction plan and so to the production plan.

Setting job recovery

About this task

When defining a job, consider that in some instances it might not complete successfully. The administrator can define a recovery option and recovery actions when defining the job. The following recovery options are available:

- Do not continue with the next job. This stops the execution of the job stream and puts it in the *stuck* state. This is the default action.
- Continue with the next job.
- Run the job again.

Optionally, a recovery prompt can be associated to the job. A recovery prompt is a local prompt to display when the job completes unsuccessfully. Processing does not continue until the prompt is answered affirmatively.

Another option is to define a recovery job that can be run in the place of the original job if it completes unsuccessfully. The recovery job must have been defined previously. Processing stops if the recovery job does not complete successfully.

Defining and managing mission-critical jobs

About this task

Job schedulers can use the HCL Workload Automation command line or the Dynamic Workload Console to flag jobs as mission-critical and specify their deadlines. A critical job and all its predecessors make up what is called a *critical network*. At planning time, HCL Workload Automation calculates the start time of the critical job and of each of its predecessors starting from the critical job deadline and estimated duration. While the plan runs, this information is dynamically kept up-to-date based on how the plan is progressing. If a predecessor, or the critical job itself, is becoming late, HCL Workload Automation automatically prioritizes its submission and promotes it to get more system resources and thus meet its deadline.

You can also customize the **riskConfidence** `optman` parameter to define when a critical job should be flagged as `High Risk`. The job status is calculated comparing the confidence factor of completing before deadline and the percentage specified in this parameter. If the probability of completing before the deadline is below **riskConfidence,** then the critical job is considered at high risk. For more information about the **riskConfidence** `optman` parameter, see the section about global options in *Administration Guide*.

Within a critical network, HCL Workload Automation dynamically identifies the path of predecessors that is potentially most at risk; this is called the *critical path*. HCL Workload Automation calculates the level of risk that each critical job has of missing its deadline; a high risk indicates that the estimated end of the critical job is after its deadline while a potential risk indicates that some predecessors of the critical job have a warning condition, for example are late or in error.

The Dynamic Workload Console provides specialized views for tracking the progress of critical jobs and their predecessors. Job schedulers and operators can access the views from the Dashboard or by creating Monitor Critical Jobs tasks.

The initial view lists all critical jobs for the engine, showing the status: normal, potential risk, or high risk. From this view, an operator can navigate to see:

- The hot list of jobs that put the critical deadline at risk.
- The critical path.
- Details of all critical predecessors.
- Details of completed critical predecessors.
- Job logs of jobs that have already run.

Using the views, operators can monitor the progress of the critical network , find out about current and potential problems, release dependencies, and rerun jobs.

For example:

1. To flag a critical job and follow it up, the Job scheduler opens the Workload Designer on the Dynamic Workload Console, marks the specific job as critical, and sets the deadline for 5 a.m.

   When `JnextPlan` is run, the critical start dates for this job, and all the jobs that are identified as its predecessors, are calculated.

2. To track a specific critical job, the operator proceeds as follows:
   a. The operator checks the dashboards and sees that there are critical jobs scheduled on one of the engines.
   b. He clicks the link to get a list of the critical jobs.

      The specific job shows a `Potential Risk` status.

   c. He selects the job and clicks **Hot List** to see the predecessor job or jobs that are putting the critical job at risk.

      One of the predecessor jobs is listed as being in error.

   d. He selects the job and clicks **Job log**.

      The log shows that the job failed because of incorrect credentials for a related database.

   e. After discovering that the database password was changed that day, he changes the job definition in the symphony file and reruns the job.
   f. When he comes back to the dashboard, he notices that there are no longer any jobs in potential risk. Also, the critical jobs list that was opened when clicking on the potential risk link no longer shows the critical job after the job is rerun.
   g. The job is now running after being automatically promoted, getting higher priority for submission and system resources.
   h. No further problems need fixing and the critical job finally completes at 4.45 a.m.

Scheduling workload dynamically

About this task

You can choose to set HCL Workload Automation to dynamically associate your submitted workload (or part of it) to the best available resources at run time.

The HCL Workload Automation installation process includes the option to install the dynamic scheduling capability. If you select this option, you get the following functionality:

- Automatically discover scheduling environment resources
- Match job requirements to available resources
- Control and optimize use of resources
- Automatically follow resource changes
- Request additional resources when needed

You can submit HCL Workload Automation jobs, including jobs defined to run on extended agents, as well as J2EE applications (if you selected the option to schedule J2EE at installation time). To schedule workload dynamically, you:

1. Use the Dynamic Workload Console to define the agents you want to use for running workload as logical resources or groups of resources.
2. Update your HCL Workload Automation job definitions to make as destination CPU the dynamic workload broker workstation (this workstation works as a bridge between the scheduler engine and the pool of resources)
3. For every HCL Workload Automation job, add a JSDL (Job Submission Description Language) job definition where you match the job with required resources, candidate hosts, and scheduling and optimization preferences. Use the Dynamic Workload Console to do this easily.

When a job is thus submitted, either as part of a job stream in the plan or through ad hoc submission, HCL Workload Automation checks the job requirements, the available resources and the related characteristics and submits the job to the resource that best meets the requirements.

Running production

Production consists of taking the definitions of the scheduling objects from the database, together with their time constraints and their dependencies, and building and running the production control file.

Running the plan

About this task

The production plan contains information about which jobs to run, on which fault-tolerant agent, and what dependencies must be satisfied before each job is launched. HCL Workload Automation creates the production plan starting from the modeling data stored in the database and from an intermediate plan called the preproduction plan. The preproduction plan is automatically created and managed by the product. To avoid problems, the database is locked during the generation of the plan and is unlocked when the generation completes or if an error condition occurs. The preproduction plan is used to identify in advance the job stream instances and the external follows job stream dependencies involved in a specified time period.

You use the `JnextPlan` command on the master domain manager to generate the production plan and distribute it across the HCL Workload Automation network.

To generate and start a new production plan, HCL Workload Automation performs the following steps:

1. Updates the preproduction plan with the objects defined in the database that were added or updated since the last time the plan was created or extended.
2. Retrieves from the preproduction plan the information about the job streams to run in the specified time period and saves it in an intermediate production plan.
3. Includes in the new production plan the uncompleted job streams from the previous production plan.
4. Creates the new production plan and stores it in a file named Symphony™. The production plan data is also replicated in the database.
5. Distributes a copy of the Symphony™ file to the workstations involved in the new product plan processing.
6. Logs all the statistics of the previous production plan into an archive.
7. Updates the job stream state in the preproduction plan.

The copy of the newly-generated Symphony™ file is used starting from the top domain's fault-tolerant agents and domain managers of the child domains and down the tree to all subordinate domains.

Each fault-tolerant agent that receives the production plan can continue processing even if the network connection to its domain manager goes down.

At each destination fault-tolerant agent, HCL Workload Automation performs the following actions to manage job processing:

1. Accesses the copy of the Symphony™ file and reads the instructions about which job to run.
2. Makes calls to the operating system to launch jobs as required.
3. Updates its copy of the Symphony™ file with the job processing results and sends notification back up the tree to the master domain manager and to all full status fault-tolerant agents. The original copy of the Symphony™ file is stored on the master domain manager and the copies stored on the backup master domain managers, if defined, are updated accordingly.

This means that during job processing, each fault-tolerant agent has its own copy of the Symphony™ file updated with the information about the jobs it is running (or that are running in its domain and child domains if the fault-tolerant agent is full-status or a domain manager), and the master domain manager (and backup master domain manager if defined) has the copy of the Symphony™ file that contains all updates coming from all fault-tolerant agents. In this way the Symphony™ file on the master domain manager is kept up-to-date with the jobs still to run, the jobs running, and the jobs already completed.

After the production plan is generated for the first time, it can be extended to the next production period with the `JnextPlan` command. The Symphony™ file is refreshed with the latest changes and redistributed throughout the network.

Running job streams

Depending on their run cycle definition, job streams are taken from the HCL Workload Automation database and automatically inserted into the current production plan.

While the job stream is in the plan, and has not completed, you can still modify any of its components. That is, you can modify the job stream properties, the properties of its jobs, their sequence, the workstation or resources they use, and so on, to satisfy last-minute requirements.

You can also hold, release, or cancel a job stream, as well as change the maximum number of jobs within the job stream that can run concurrently. You can change the priority previously assigned to the job stream and release the job stream from all its dependencies.

Last minute changes to the current production plan include the possibility to submit jobs and job streams that are already defined in the HCL Workload Automation database but were not included in the plan. You can also submit jobs that are being defined ad hoc. These jobs are submitted to the current plan but are not stored in the database.

Starting from version 8.3, you can create and manage multiple instances of the same job stream over a number of days or at different times within the same day. This new feature introduced the possibility to have in the same plan more than one instance of the same job stream with the same name. Each job stream instance is identified by the job stream name, the name of the workstation where it is scheduled to run, and by the start time defined in the preproduction plan.

Monitoring

About this task

Monitoring is done by listing plan objects. Using lists, you can see the status of all or of subsets of the following objects in the current plan:

- Job stream instances
- Job instances
- Domains
- Workstations
- Resources
- File dependencies
- Prompt dependencies

You can use these lists also to manage some of these objects. For example, you can reallocate resources, link or unlink workstations, kill jobs, or switch domain manager.

Reporting

About this task

As part of the preproduction and post-production processes, reports are generated which show summary or detail information about the previous or next production day. These reports can also be generated ad-hoc. The following reports are available:

- Job details listing
- Prompt listing
- Calendar listing
- Parameter listing
- Resource listing
- Job History listing

- Job histogram
- Planned production schedule
- Planned production summary
- Planned production detail
- Actual production summary
- Actual production detail
- Cross reference report

In addition, during production, a standard list file (STDLIST) is created for each job instance launched by HCL Workload Automation. Standard list files contain header and trailer banners, echoed commands, and errors and warnings. These files can be used to troubleshoot problems in job execution.

Auditing

About this task

An auditing option helps track changes to the database and the plan.

For the database, all user modifications, except for the delta of the modifications, are logged. If an object is opened and saved, the action is logged even if no modification is made.

For the plan, all user modifications to the plan are logged. Actions are logged whether or not they are successful.

Audit files are logged to a flat text file on individual machines in the HCL Workload Automation network. This minimizes the risk of audit failure due to network issues and allows a straightforward approach to writing the log. The log formats are basically the same for both the plan and the database. The logs consist of a header portion which is the same for all records, an “action ID”, and a section of data which varies according to the action type. All data is stored in clear text and formatted to be readable and editable from a text editor such as vi or notepad.

Using event-driven workload automation

About this task

Use this optional feature to set up and run rules that perform predefined actions in response to particular events occurring on your agents. Your organization can benefit from using this feature by adding on-demand workload automation to plan-based job scheduling, gaining savings in time and resources.

Event-driven workload automation is based on the concept of event rule. In HCL Workload Automation an event rule is a scheduling object and is made up of events, event-correlating conditions, and actions. When you define an event rule, you specify one or more events, a correlation rule, and one or more actions that are triggered by those events. Moreover, you can specify validity dates, a daily time interval of activity, and a common time zone for all the time restrictions that are set.

You can set up event rules to:

- Trigger the execution of batch jobs and job streams based on the occurrence or combination of real time events
- Reply to prompts

- Notify users when anomalous conditions occur in the HCL Workload Automation scheduling environment or batch scheduling activity
- Invoke an external product when a particular event condition occurs

HCL Workload Automation includes a set of predefined event and action plug-ins, but also provides a software development kit with samples and templates for your application programmers to develop their own plug-ins.

Options and security

The HCL Workload Automation options files determine how HCL Workload Automation runs on your system. Several performance, tuning, security, logging, and other configuration options are available.

Setting the HCL Workload Automation options

About this task

You can set two types of properties to configure your HCL Workload Automation run time environment, properties that are set on the master domain manager and affect processing on all workstations in the HCL Workload Automation network, and properties that are set locally on a workstation and affect processing on that workstation only. The former are managed using the HCL Workload Automation command line program named `optman`, and the latter you define locally on the workstation by customizing the configuration files `useropts`, `localopts`, and `jobmanrc`.

Global options are used to:

- Define if the security files of all the workstations of the network can be created and managed only from the master domain manager or if the root user or administrator of each workstation can create and manage their own.
- Select whether to enable or disable database auditing.
- Control which objects in the plan the user is permitted to list when running a query.
- Select whether to enable plan auditing.
- Select whether to enable strong encryption.
- Enter the number of days for which you want to save job statistics.
- Set the minimum and maximum lengths of the preproduction plan in days.
- Determine if uncompleted job streams are carried forward from the old to the new production control file.
- Remove or clean up job stream instances from the plan that ended in error.
- Define the start time of the HCL Workload Automation processing day.

Local options are used to:

- Specify the name of the local workstation
- Prevent the launching of jobs run by root in UNIX™
- Prevent unknown clients from connecting to the system
- Specify a number of performance options
- Specify a number of logging preferences
- Set SSL security options.

Setting security

About this task

Security is accomplished with the use of a security file that contains one or more user definitions. Each user definition identifies a set of users, the objects they are permitted to access, and the types of actions they can perform.

A template file is installed with the product. Edit the template to create the user definitions and compile and install it with a utility program to create a new operational security file. After it is installed, you make further modifications by creating an editable copy with another utility.

An individual file can be maintained on each workstation, or a single security file can be created on the master domain manager and copied to each domain manager, fault-tolerant agent, and standard agent.

Secure authentication and encryption

About this task

Security is enhanced for connections between protected and non-protected domains by applying the authentication and encryption mechanism based on the Secure Sockets Layer (SSL) protocol. SSL uses digital certificates to authenticate the identity of a workstation.

The HCL Workload Automation administrator must plan how authentication will be used within the network:

- Use one certificate for the entire HCL Workload Automation network.
- Use a separate certificate for each domain.
- Use a separate certificate for each workstation.

SSL support is automatically installed with HCL Workload Automation.

Work across firewalls

About this task

For previous versions of HCL Workload Automation, running the commands to start or stop a workstation or to get the standard list required opening a direct TCP/IP connection between the originator and the destination nodes. In a firewall environment, this forces users to break the firewall to open a direct communication path between the master and each fault-tolerant agent in the network.

HCL Workload Automation provides a configurable attribute, named *behindfirewall*, in the workstation's definition in the database. You can set this attribute to ON to indicate that a firewall exists between that particular workstation and its domain manager, and that the link between the domain manager and the workstation (which can be another domain manager) is the only allowed link between the domains.

Also, for all the workstations having this attribute set to ON, the commands to start or stop the workstation or to get the standard list will be transmitted through the domain hierarchy instead of opening a direct connection between the master (or domain manager) and the workstation.

Centralized security mechanism

About this task

A new global option makes it possible to change the security model in the HCL Workload Automation network. If you use this option, then the security files for the fault-tolerant agents in the network can be created or modified only on the master domain manager. The HCL Workload Automation administrator is responsible for creating, updating, and distributing the security files for all the agents where user access is required. Setting this global option triggers a security mechanism to identify and trust the HCL Workload Automation network corresponding to that master domain manager.

If you prefer the traditional security model, you can still use it by not activating the global variable.

Using time zones

About this task

HCL Workload Automation supports different time zones. Enabling time zones provides you with the ability to manage your workload across a multiple time zone environment. Both the 3-character and the variable length notations are supported with the current version of HCL Workload Automation. The variable length notation format is area/city, for example Europe/Paris as equivalent to ECT (European Central Time). The 3-character notation is supported for capability with earlier versions of the product.

Once configured, time zones can be specified for start and deadline times within jobs and job streams.

Using the access methods of HCL Workload Automation

Access methods are used to extend the job scheduling capability of HCL Workload Automation to other systems and applications. They run on:

- **Extended agents**
- **Dynamic agents** and **HCL Workload Automation for Z agents**

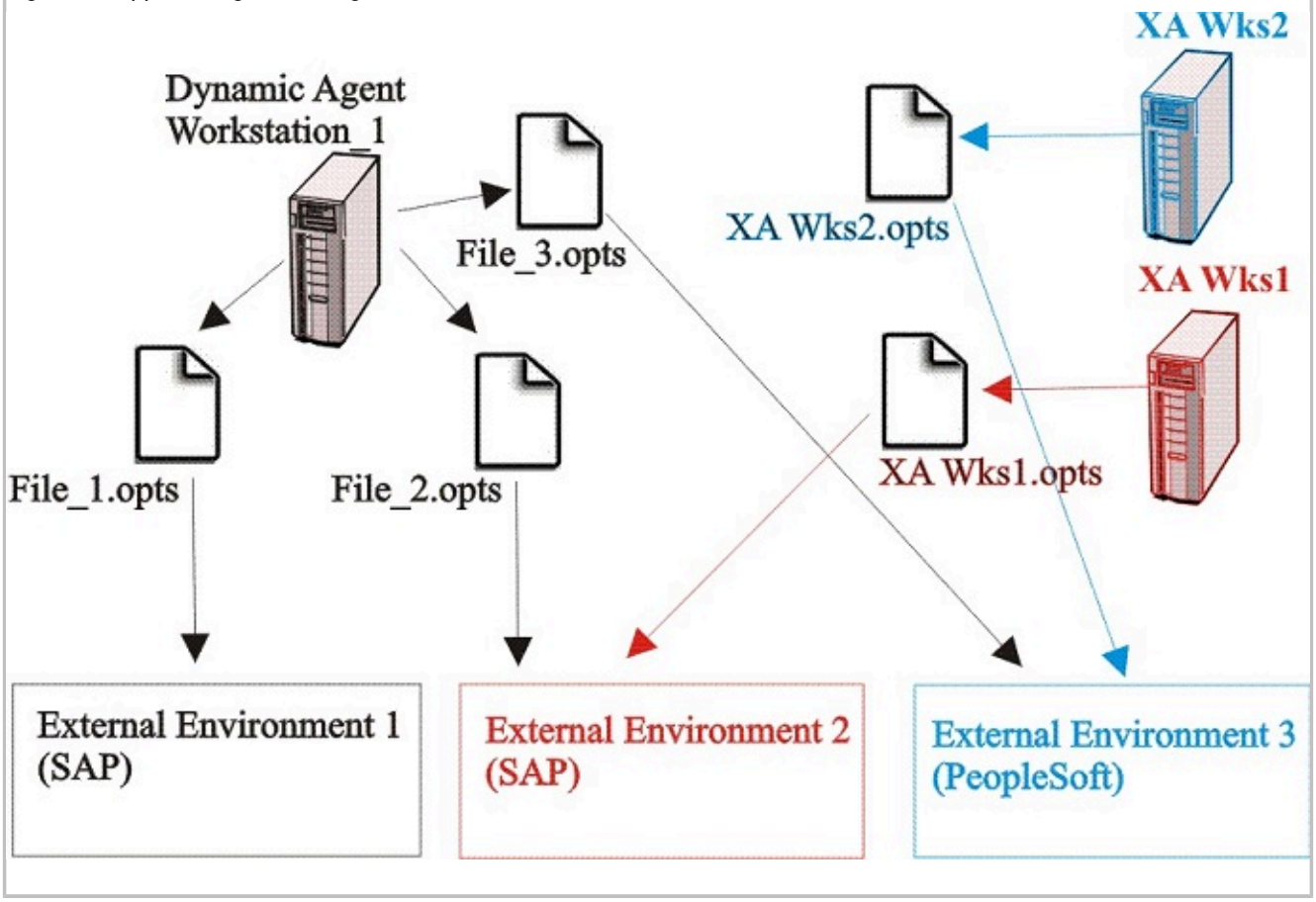
For more details, see Supported agents on page 112.

An access method needs to interact with the external system either through its command line or the Dynamic Workload Console. HCL Workload Automation includes the following access methods:

- PeopleSoft (psagent)
- SAP R/3 (r3batch)

Figure 2: Supported agents configuration on page 112 shows the typical configuration for the extended agent and the dynamic agent.

Figure 2. Supported agents configuration



Supported agents

The HCL Workload Automation access methods can run on extended agents and on dynamic agents (including HCL Workload Automation for Z agents).

You can extend HCL Workload Automation capabilities for scheduling on one or more external applications, such as PeopleSoft and SAP R/3. The agents needed to extend scheduling capabilities on these external applications using HCL Workload Automation are:

Extended agents

Extended agents extend the static scheduling capability. They are logical workstations related to an access method hosted by a physical HCL Workload Automation workstation (not another extended agent). More than one extended agent workstation can be hosted by the same HCL Workload Automation workstation and rely on the same access method. The extended agent is defined in a standard HCL Workload Automation workstation definition, which gives the extended agent a name and identifies the access method. The access method is a program that is run by the hosting workstation whenever HCL Workload Automation submits a job to an external system.

Jobs are defined for an extended agent in the same manner as for other HCL Workload Automation workstations, except for the job attributes that depend on the external system or application.

To launch and monitor a job on an extended agent, the host runs the access method, passing it job details as command line options. The access method communicates with the external system to launch the job and returns the status of the job. To launch a job in an external environment, HCL Workload Automation runs the extended agent access method providing it with the extended agent workstation name and information about the job. The method looks at the corresponding file named `XANAME_accessmethod.opts` (where `XANAME` is the name of the extended agent workstation) to determine which external environment instance it will connect to. The access method can then launch jobs on that instance and monitor them through completion, writing job progress and status information in the standard list file of the job.

A physical workstation can host a maximum of 255 extended agents.

Extended agents can also be used to run jobs in an end-to-end environment, where their scheduling and monitoring tasks are performed by a HCL Workload Automation for Z controller.

Dynamic agents and HCL Workload Automation for Z agents (z-centric)

To run access methods on external applications using dynamic agents, you define a job of type **Access Method**. The access method communicates with the external system to launch the job and returns the status of the job. The method looks at the corresponding file named `optionsfile_accessmethod.opts` (where `optionsfile` is the configuration file that depends on the selected access method). The dynamic agent and the HCL Workload Automation for Z agent can have more than one `.opts` associated file to determine which external environment instance to connect to. The access method can launch jobs on that instance and monitor them through completion, writing job progress and status information in the standard list file of the job.

Chapter 3. Dynamic Workload Console

About this task

The Dynamic Workload Console is a Web-based user interface for:

- HCL Workload Automation

It is the strategic user interface for the HCL Workload Automation suite of products and includes support for the latest functions and enhancements available with the scheduling engines.

The Dynamic Workload Console is a light, powerful and user-friendly single point of operational control for the entire scheduling network. It allows for single sign-on and authentication to one or many schedulers, is highly scalable, and provides real-time monitoring, management and reporting of enterprise workloads. It also greatly simplifies report creation and customization.

With Dynamic Workload Console you can:

- Manage your workload to design objects in the database, handle plans, submit jobs or job streams, and monitor objects in the plan.
- Design and control the topology of your scheduling environment, that is workstations and domains.
- Define and run reports to gather historical data or details about your plans. You can also generate and run customized SQL reports.
- Define and manage logical resources or groups of logical resources for use with dynamic scheduling.

You can access the Dynamic Workload Console from any computer in your environment using a web browser through both secure HTTPS or HTTP protocol.

The first and main actions you perform when you connect to the Dynamic Workload Console are:

Creating a connection to a scheduling engine (HCL Workload Automation)

You type the details (such as IP address, user name, and password) to access a scheduling engine, and, optionally, a database to operate with objects defined in plans or stored in the database. You can also define new scheduling objects in the database.

From the Dynamic Workload Console you can access the current plan, a trial plan, a forecast plan, or an archived plan for the distributed environment or the current plan for the z/OS® environment.

You might want to access the database to perform actions against objects stored in it or generate reports showing historical or statistical data.

In addition, working both on the database and on plans, you can create and run event rules to define and trigger actions that you want to run in response to events occurring on HCL Workload Automation nodes.

Spicifying filtering criteria to manage scheduling objects in the plan

You specify some filtering criteria to query a list of scheduling objects whose attributes satisfy the criteria you specified. Starting from this list, you can navigate and modify the content of the plan, switching between objects, opening more lists and accessing other plans or other HCL Workload Automation environments.

The console provides also the following graphical views tools to manage your workload:

Graphical view (for modeling)

A graphical extension to the Workload Designer that shows graphical representations of job stream definitions in the database. It provides an intuitive way to create and maintain them.

Plan view (for monitoring)

A high-level representation of a plan of any type, showing a filtered set of job streams and their mutual dependencies.

Job stream view (for monitoring, troubleshooting, and impact analysis)

A expansible graphical representation of job streams and jobs in the plan. It provides a straightforward, multilevel analysis of how job and job stream completion affects plan progress and provides a direct way to work with jobs, job streams and their dependencies.

Preproduction plan view (for workload planning)

Contains job stream instances and job stream dependencies to be run during a specified time interval covered by the plan.

From each view, you can take actions on objects, view their properties, and easily switch between the views. Graphics can be exported to PNG and SVG files.

Chapter 4. End-to-end scheduling

About this task

By using end-to-end scheduling, you can schedule and control jobs on mainframe, Windows™, and UNIX™ environments, for truly distributed scheduling. In the end-to-end configuration, HCL Workload Automation for Z is used as the planner for the job scheduling environment. HCL Workload Automation domain managers, standard, fault-tolerant, and z-centric agents are used to schedule on the distributed platforms. The agents replace the use of tracker agents.

HCL Workload Automation for Z also allows you to access job streams (schedules in HCL Workload Automation) and add them to the current plan in HCL Workload Automation for Z. In addition, you can build dependencies among HCL Workload Automation for Z job streams and HCL Workload Automation jobs. From HCL Workload Automation for Z, you can monitor and control the distributed agents.

The benefits that can be gained from using end-to-end scheduling are the following:

- Connecting either fault-tolerant or z-centric HCL Workload Automation agents to HCL Workload Automation for Z.
- Scheduling on additional operating systems.
- Synchronization of work in mainframe and distributed environments.
- The ability for HCL Workload Automation for Z to use multi-tier architecture with domain managers.

You can manage distributed scheduling by activating either of the following features:

- End-to-end scheduling with fault tolerance capabilities on page 116
- End-to-end scheduling with z-centric capabilities on page 118

End-to-end scheduling with fault tolerance capabilities

Learn about End-to-end scheduling with fault tolerance capabilities.

End-to-end scheduling with fault tolerance capabilities directly connects HCL Workload Automation standard agents, fault-tolerant agents, and domain managers (with their underlying agents and domains) to HCL Workload Automation for Z. HCL Workload Automation for Z is seen by the distributed network as the master domain manager.

HCL Workload Automation for Z creates the production plan also for the distributed network and sends it to the domain managers and to the directly-connected agents. The domain managers send a copy of the plan to each of their agents and subordinate domain managers for execution.

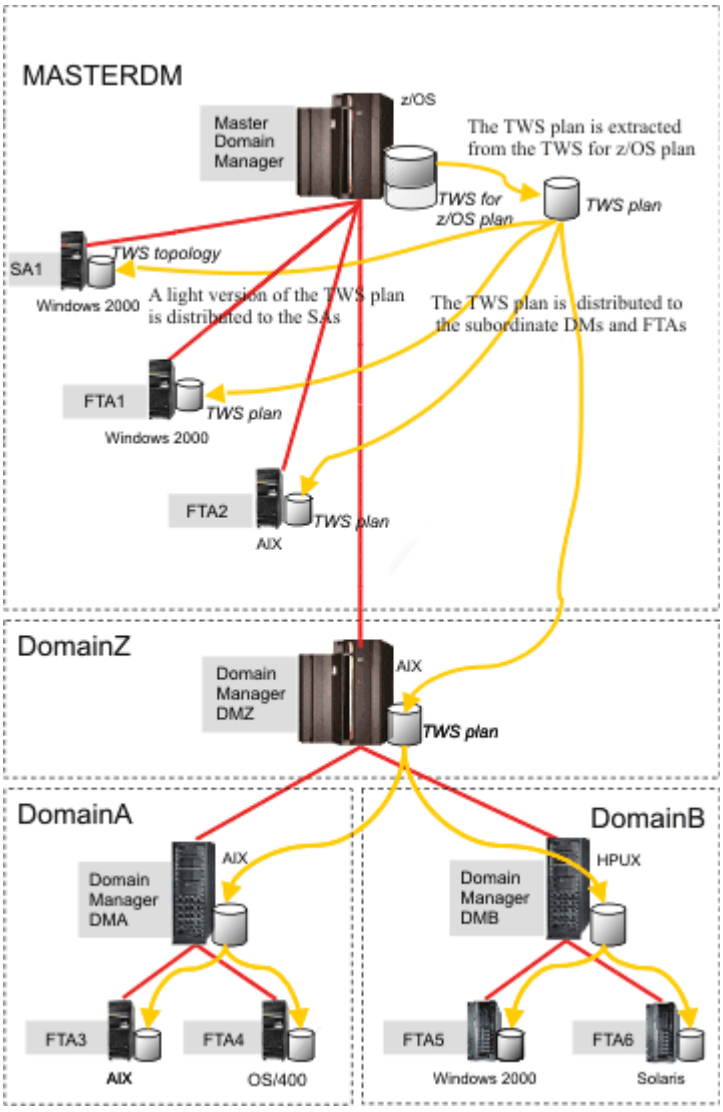
The HCL Workload Automation domain managers function as the broker systems for the distributed network by resolving all dependencies for their subordinate managers and agents. They send their updates (in the form of events) to HCL Workload Automation for Z so that it can update the plan accordingly. HCL Workload Automation for Z handles its own jobs and notifies the domain managers of all the status changes of the HCL Workload Automation for Z jobs that involve the HCL Workload Automation plan. In this configuration, the domain managers and all the distributed agents recognize HCL Workload Automation for Z as the master domain manager and notify it of all the changes occurring in their own plans. At

the same time, the agents are not permitted to interfere with the HCL Workload Automation for Z jobs, because they are viewed as running on the master that is the only node that is in charge of them.

In the HCL Workload Automation for Z current plan, you can specify jobs to run on workstations in the HCL Workload Automation network. HCL Workload Automation for Z passes the job information to the Symphony™ file in the HCL Workload Automation for Z server, which in turn passes the Symphony™ file to the HCL Workload Automation domain managers (DMZ) to distribute and process. In turn, HCL Workload Automation reports the status of running and completed jobs back to the current plan for monitoring in the HCL Workload Automation for Z engine.

Figure 3: End-to-end with fault tolerance capabilities configuration on page 117 shows an HCL Workload Automation network managed by an HCL Workload Automation for Z and the flow of data.

Figure 3. End-to-end with fault tolerance capabilities configuration



End-to-end scheduling with z-centric capabilities

Learn about End-to-end scheduling with z-centric capabilities.

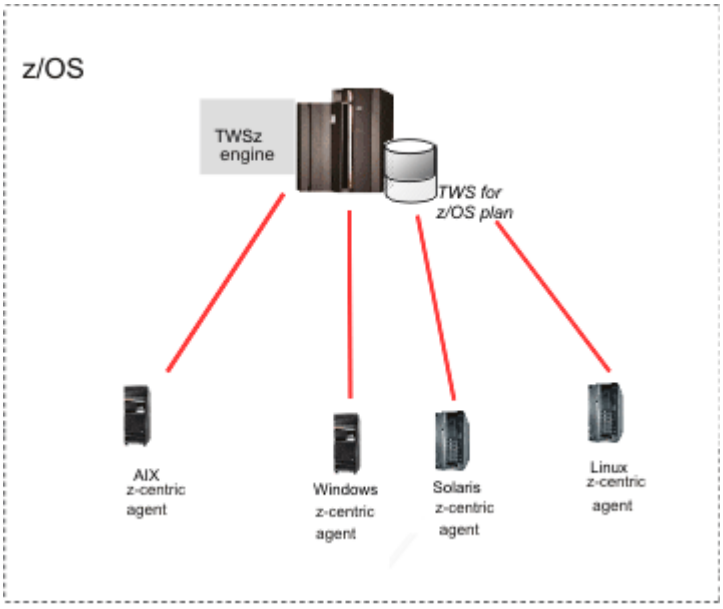
End-to-end scheduling with z-centric capabilities directly connects HCL Workload Automation z-centric agents to HCL Workload Automation for Z, that is the master domain manager for the distributed network.

Powerful mainframe capabilities, such as standard variable substitution, automatic recovery statements and alternate workstation, are supported to manage distributed workload.

Communication between the z-centric agents and HCL Workload Automation for Z controller is direct, through the HTTP or HTTPS protocol.

Figure 4: End-to-end with z-centric capabilities configuration on page 118 shows a network with this configuration.

Figure 4. End-to-end with z-centric capabilities configuration



Distributed agents

About this task

A distributed agent is a computer running HCL Workload Automation on which you can schedule jobs from HCL Workload Automation for Z. Examples of distributed agents are the following: standard agents, extended agents, fault-tolerant agents, and domain managers.

The following is a description of the types of distributed agents:

Domain Manager

The management hub in a domain. All communications to and from the agents in a domain are routed through the domain manager.

Backup Domain Manager

A fault-tolerant agent or domain manager capable of assuming the responsibilities of its domain manager for automatic workload recovery.

Dynamic workload broker

It is installed on the domain manager and performs the job management and resource management activities. It always presides over the dynamic scheduling.

Fault-tolerant Agent (FTA)

A workstation capable of resolving local dependencies and launching its jobs in the absence of a domain manager.

Standard Agent

A workstation that launches jobs only under the direction of its domain manager.

Extended Agent

A logical workstation definition that helps you launch and control jobs on other systems and applications, such as PeopleSoft, SAP, and z/OS® JES2 and JES3.

z-centric Agent

A workstation that runs jobs scheduled from HCL Workload Automation for Z. The controller directly handles the communication with this type of agent.

Pool

Pools are groups in which you add specific dynamic agent workstations according to the requirements of the job. Jobs are assigned dynamically to the best available dynamic agent applying a load balancing policy by choosing the agent with the lesser amount of jobs to run.

Dynamic pool

Dynamic pools are groups in which you specify the requirements and jobs are assigned dynamically to the best available dynamic agent meeting the requirements and applying an optimization policy to identify the best agent.

Distributed agents replace tracker agents in HCL Workload Automation for Z. The distributed agents help you schedule on non-z/OS systems with a more reliable and scalable agent.

In the HCL Workload Automation for Z plan, the logical representation of a distributed agent is called a fault-tolerant workstation or a z-centric workstation.

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