

BMC Atrium Orchestrator System Administrator Guide



Supporting

BMC Atrium Orchestrator version 7.6.00

December 2009

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Overview

This chapter provides a high level view of the BMC Atrium Orchestrator product.

It also provides a more detailed overview of BMC Atrium Orchestrator Grid Manager, the component that provides most of the administrative tools for managing BMC Atrium Orchestrator.

Who should read this document

This document is intended for administrators of a BMC Atrium Orchestrator solution, such as virtualization infrastructure managers, system administrators, or BMC Atrium Orchestrator account managers.

BMC Atrium Orchestrator solution overview

BMC Atrium Orchestrator empowers operators with process-based control. By delivering workflow-based process templates, BMC Atrium Orchestrator helps you rapidly adapt and deploy functional design, ensuring consistent and appropriate, policy-based response across the enterprise. BMC Atrium Orchestrator provides a workflow design modeling studio to easily and efficiently build, test, and maintain operational activities that are customized to specific IT environments.

BMC Atrium Orchestrator provides the following:

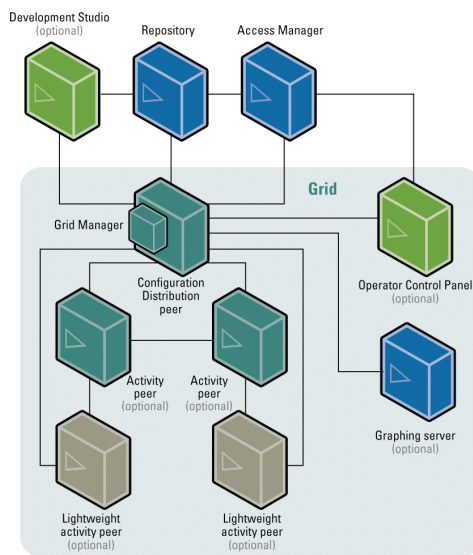
- Information Technology Infrastructure Library (ITIL)-based business process design and development using the graphical BMC Atrium Orchestrator Development Studio
- Technology-agnostic, seamless, standards-based integration with all of your existing IT system investments
- Automation of operations activities, using your business processes

- A highly available, highly scalable, operations-activity automation environment using grid technology

BMC Atrium Orchestrator architecture

The BMC Atrium Orchestrator system is a load-balancing, high-availability computer cluster architecture in which available servers or peers process requests. It is referred to as a grid architecture, which you should not confuse with true computer or data grids. The graphic below illustrates the architecture.

Figure 1: Architecture diagram



Typically, clusters employ homogeneous nodes; however, BMC Atrium Orchestrator uses a heterogeneous set of nodes, or peer types. Each peer type has a specific purpose and hosts a particular set of applications and services. The following descriptions of the peer types and components, and the distinctions between them, can help you plan and deploy them into your environment.

Configuration distribution peer

The configuration distribution peer (CDP) is the overall configuration manager for the BMC Atrium Orchestrator grid. A CDP houses the grid manager and manages overall distribution of software components to the peers across one or multiple grids. The CDP provides the same types of services and capabilities of those as the activity peer (AP), and it provides a central point of administrative control and content distribution for all distributed components in a grid. The CDP is a required component, and typically, only one CDP in each grid can service multiple APs. Configuration information is centralized in the CDP. The CDP stores and distributes the configuration information and content for the grid.

Activity peer

The activity peer (AP) handles workflow processing load distribution. The AP accepts and executes workflows and hosts external application adapters, providing both the core workflow engine and a web container. An activity peer joins a grid upon startup to communicate with the other peers.

Lightweight activity peer

The lightweight activity peer (LAP) installs on a third-party systems server. It is useful when a third-party system requires an adapter to execute locally or the adapter requires libraries in a third-party application whose libraries cannot be installed outside of that application. The LAP extends the grid communication to the third-party system. Unlike the other peer types, the LAP executes no workflows. Graphing components cannot be installed on an LAP.

High-availability configuration distribution peer

When you deploy multiple CDPs you create a high availability environment. The high-availability configuration distribution peer (HACDP) is effectively a mirrored instance of a primary CDP. The HACDP is not idle and participates in workflow execution so it provides active high availability capabilities for the grid in which it is operating.

BMC Atrium Orchestrator Grid Manager

The BMC Atrium Orchestrator Grid Manager component resides on the CDP server and provides a user interface to add and maintain grids, peers, adapters, and process schedules. It also helps you to manage module deployment and activation.

You can configure multiple databases in BMC Atrium Orchestrator Grid Manager to store audit records, grid metrics, process metrics, and business metrics. The database configuration requires an initialized instance of a database, designated for records or metrics collection. Audit records, process metrics, grid metrics, and business metrics can be collected in a single database or in two databases.

BMC Atrium Orchestrator Development Studio

BMC Atrium Orchestrator Development Studio is the integrated development environment in which you design, develop, and test workflows. You set rules, schedules, and configuration of workflows in BMC Atrium Orchestrator Development Studio. It is a stand-alone application that is installed on a Microsoft Windows or Macintosh computer. You can configure it to communicate with the grid. BMC Atrium Orchestrator Development Studio uses the grid repository to store and access content.

You can use Source Code Management (SCM) systems like CVS with BMC Atrium Orchestrator Development Studio. In BMC Atrium Orchestrator Development Studio you can check workflow into and out of the SCM system.

BMC Atrium Orchestrator Operator Control Panel

BMC Atrium Orchestrator Operator Control Panel enables you to execute operator processes in an automated or semi-automated mode.

BMC Atrium Orchestrator Access Manager

BMC Atrium Orchestrator Access Manager is the security component of BMC Atrium Orchestrator. BMC Atrium Orchestrator Access Manager is an identity manager that provides single sign-on services as well as authorization policy administration and enforcement. It also provides an interface to manage configurations with external LDAP directories.

Repository

The repository stores BMC Atrium Orchestrator content such as adapters and modules. Content stored in the repository is accessed by multiple developers through either BMC Atrium Orchestrator Grid Manager or BMC Atrium Orchestrator Development Studio. You can set the version number on content and the repository maintains the revision numbers. The repository uses BMC Atrium Orchestrator Access Manager to set content read and write privileges, so the access manager must be installed in order to use the repository.

Graphing server and graphing components

The graphing server and graphing components render graphical representations of process metrics contained in the databases configured in BMC Atrium Orchestrator Grid Manager.

BMC Atrium Orchestrator Grid Manager functions

The BMC Atrium Orchestrator platform is the backbone of the BMC Atrium Orchestrator solution. BMC Atrium Orchestrator Grid Manager is a key platform component.

It resides on the configuration distribution peer (CDP) server, and can be used to:

- Create, manage, and remove grids, peers, adapters, and process schedules

- Activate and deactivate modules
- Provide an audit trail for all workflow processes on the grid
- Display information about the running state for all configured grids
- Capture key system performance indicators for grids, peers, and workflows
- Centralize administrative tasks including managing backups
- Provision a database for audit tracking
- Schedule processes
- Manage dynamic load distribution

Using BMC Atrium Orchestrator Grid Manager, IT administrators gain with real-time views of and control over grid components. BMC Atrium Orchestrator Grid Manager houses all grid component configuration files, enabling easy distribution and updates of configuration information. The administration and management of operations process modules also resides within BMC Atrium Orchestrator Grid Manager. Administrators can control or terminate scheduled processes, manage peers, peer components, and adapters to accommodate for issues or maintenance windows that arise.

BMC Atrium Orchestrator Grid Manager interface overview

BMC Atrium Orchestrator Grid Manager is a web-based application with the following functional areas: Status, Manage, and Administration, each of which is accessed through tabs at the top of the BMC Atrium Orchestrator Grid Manager window.

Status tab

The **Status** tab provides a visual indication of the condition of peers and adapters configured on specific grids.

The **Status** tab provides links to the adapters, components, and processes pages for each grid displayed. The manual configuration file for BMC Atrium Orchestrator Development Studio is accessed through the **Status** tab. Grid performance metrics are accessed through the **Status** tab.

Manage tab

The **Manage** tab of BMC Atrium Orchestrator Grid Manager provides access to manage aspects of grids, peers, adapters, schedules, modules, and metrics, as well as to run configuration reports.

Grid, peer, and adapter configurations are created, edited, and deleted through their respective screens. Configuration item (CI) values and schedules for active modules can be edited using the modules and schedules screens. Peer rankings for CDPs are managed on the Peers screen. The database connection for process metrics collection is configured and maintained through the Metrics screen. The manual peer configuration file is accessed through the Peers screen. When auditing is enabled (through the **Administration** tab), grid configuration reports can be run through the Config Reports screen, providing deployment and configuration information for peers and adapters.

Note

Accounts with the designer role do not have access to the **Manage** tab.

Administration tab

The **Administration** tab enables you to configure a repository database connection for audit records and grid performance metrics.

Within the Metrics screen, you determine which grid performance metrics will be captured.

Note

Accounts with the roles of grid_admin or designer do not have access to the **Administration** tab.

Starting the CDP

The Configuration Distribution Peer (CDP) must be running to use BMC Atrium Orchestrator Grid Manager. You can set the CDP to start automatically after installation finishes, or you can use these procedures to start the CDP.

The procedures for starting the CDP depend on the operating system where the CDP server is installed.

To start the CDP on a Windows computer

- 1 Use **Control Panel => Administrative Tools => Services** to start the **BMC Atrium Orchestrator Configuration Distribution Peer** service.

To start the CDP on a Linux or UNIX computer

- 1 Open a terminal on the computer.
- 2 Change to the **Applications/BMC/AO/bin** directory.
- 3 Type **sh ./server.sh start**

Tomcat displays messages indicating that the server started.

If a problem occurs

If the CDP does not start properly, consider the following tips:

- If you get a message saying the server is not found, make sure you are in the correct directory.
- Verify that the Java version you are using is 1.6_16. If you have the incorrect Java version you must install the correct version and in your environment add the path to `jvm 1.6_16` before any older versions of Java. If necessary, edit the **BMC Atrium Orchestrator CDP.lax** file to add the correct Java path to the `LAX.NL.CURRENT.VM` section.

Example

```

# LAX.NL.CURRENT.VM
# -----
#   the VM to use for the next launch
lax.nl.current.vm=C:\\Program Files\\Java\\jre6\\bin\\java.exe

```

- Check the **grid.log** file to see if there is a port conflict. If there is a port conflict, edit the **PlatformInstalledConfiguration.xml** file to change the port to an available port.

Starting BMC Atrium Orchestrator Grid Manager

Use this procedure to start BMC Atrium Orchestrator Grid Manager.

Before you begin

The following web browsers are supported:

- Microsoft Internet Explorer
- Mozilla Firefox

For more information about supported web browsers and other system requirements, see the *BMC Atrium Orchestrator Installation Guide*. For information about configuring the CDP to enable an HTTPS connection, see the *BMC Atrium Orchestrator Security Guide*.

To start BMC Atrium Orchestrator Grid Manager

- 1 From within a web browser, navigate to the appropriate URL:

Protocol you want to use URL to use

HTTP **http://<host name or IP>: <CDP web server port> /
baocdp/gm**

HTTPS **https://<host name or IP>: <CDP web server port> /
baocdp/gm**

In the preceding URL, *<host name or IP>* represents the IP address or host name of the server where the CDP is installed (for example, localhost, server1, 192.168.1.123) and *<CDP web server port>* represents the actual web server port defined during the CDP server installation. (The default port number is 8080.)

The BMC Atrium Orchestrator Access Manager logon page will be displayed.

- 2 Log on using your BMC Atrium Orchestrator Grid Manager user name and password.

The default user name is **admin** and the default password is **admin123**.

Security is provided through user accounts in BMC Atrium Orchestrator Access Manager. BMC Atrium Orchestrator Access Manager defines the grid administrator role and assigns roles to user accounts as needed. The grid administrator role covers most of the actions that you can perform in BMC Atrium Orchestrator Grid Manager, except creating grids and editing module execution policies. For more information about logging on to BMC Atrium Orchestrator applications, see the *BMC Atrium Orchestrator Security Guide*.

Managing grids and peers

This chapter provides information about managing grids and peers. A grid is a group of servers, called peers, where the BMC Atrium Orchestrator platform is installed. The peers execute processes. Unless otherwise noted, all the procedures in this chapter are performed using BMC Atrium Orchestrator Grid Manager.

About grids

A grid is a logical collection of peers, usually located on different physical host computers. The peers are running a J2SE Java Virtual Machine (JVM) and a minimal set of BMC Atrium Orchestrator components.

The peers within the grid can communicate with each other and work as a group. They communicate concurrently to every other peer in the group, and can detect which peers are running as well as the load on those peers.

Roles associated with a login ID determine which tabs display on the screen.

If the **Grids** list is empty, the **Grids** tab will be the default tab available when you click **Manage**. You might need to select **Manage => Grids** to access the grid list.

Creating grids

Before you can configure peers, adapters, or modules in your environment, you must create a grid.

To create a grid

- 1 Click the **Manage => Grids** tab.
- 2 Click **Add** to the right of the **Grids** list.
- 3 Enter a name for the grid.

Use alphanumeric characters in the grid name. Special characters, such as an underscore `_`, an asterisk `*` or a space cannot be used in a grid name.

- 4 (optional) Provide a description for the grid (up to 300 characters).

You can use special characters in the grid description, including spaces, underscores, asterisks and other punctuation marks.

- 5 Select the grid type from the list provided. Choices are as follows:

Grid type	Description
Development	(default selection) Appropriate for grids to be used in development environments
QA Test	For grids that will be used in quality assurance and/or testing environments
Pre-production	For grids that will be used in pre-production environments
Production	For grids that will be used in production environments

- 6 Select the logging level performed for processes running on all peers in this grid. Choices are as follows:

Logging level	Description
DEBUG	(default selection) The most detailed logging level. Logs low-level messages, normal execution, recoverable erroneous conditions, and non-recoverable erroneous conditions
INFO	Logs normal execution, recoverable erroneous conditions, and non-recoverable erroneous conditions
WARN	Logs recoverable erroneous conditions and non-recoverable erroneous conditions
ERROR	The least detailed logging level; logs only error conditions that are not usually recoverable
OFF	Turns off process logging on the grid; process logs will not be created for any peer on this grid

The process log is located in the `$AO_HOME/tomcat/logs/process.log` file on each peer. The grid log is located in the `$AO_HOME/tomcat/logs/grid.log` file on each peer.

- 7 Click **OK**.

WARNING

Once the grid is saved, you cannot change the grid name.

It might take a few minutes for the screen to refresh after clicking **OK** to create a grid.

BMC Atrium Orchestrator Grid Manager creates a unique ID number when you first save a grid configuration. This ID number is not editable.

Changing and removing grids

The **Manage => Grids** tab enables you to change or remove grids.

To change a grid

- 1 Select **Manage => Grids**.
- 2 Select the grid you want to change; then click the **Edit** icon.
- 3 Enter changes to the grid configuration properties; then click **OK** to save the changes.

Note

- You can change any grid property except the grid name and the grid ID.
 - To return to the Grids list without saving the changes, click **Cancel**.
-

To remove a grid

- 1 Select **Manage => Grids Manage => Grids**.
- 2 Select the grid you want to change; then click the **Delete** icon.
- 3 Click **OK** to remove the grid.

WARNING

- When you delete a grid, you also remove all peers and components configured for the grid.
 - Peers and components associated with a deleted grid cannot be transferred to either existing or new grids.
-

Reviewing grid history

The **History** tab displays the recent history of module transactions for the current grid. The transactions include deploying, activating, deactivating and copying modules on the grid. The tab shows the history for a period of 12 hours to 1 week.

To view the history of a grid

- 1 Select **Manage => History**.

By default, library actions for the last two days will be displayed on the **History** tab.

- 2 (Optional) Select **Show Last** to select a different time period.
- 3 Select the time period you want.

Click the **Refresh** icon to manually refresh the **History** information for the selected time period . Alternatively, you can check the auto-refresh check box to automatically refresh the status view every 10 seconds.

Monitoring grid status

When you log on to the application, BMC Atrium Orchestrator Grid Manager displays the status screen. The status screen can also be accessed by clicking the **Status** tab at the top of the BMC Atrium Orchestrator Grid Manager window.

This screen provides a visual indication of the condition of peers and adapters enabled on specific grids. The Status screen provides tabs where you can view the status of the adapters, components, and processes for each grid displayed. Using the icons on this screen, you can start and stop peers and adapters on the selected grid, but you cannot stop the CDP. Scheduled processes can also be started and stopped on the grid. A link to the grid performance metrics is provided on this screen. Additionally, the manual configuration file for BMC Atrium Orchestrator Development Studio is accessed through the Status screen.

Grid status

On the Status screen, on the upper left corner of each grid status table, BMC Atrium Orchestrator Grid Manager displays the grid name in blue, with the grid description in parentheses to the right of the grid name.

Each peer configured on the grid is displayed in the grid status table. The peer name is indicated in bold text, the peer description is to the right of the peer name. Each grid contains at least one CDP peer. The Status icon to the left of the peer name indicates the condition of the peer. The status of a peer can be fully running (green), partially running (yellow), or stopped (red).

The right side of the grid status table indicates the overall status of the adapters enabled on each peer and the overall status of the components of the peer. The status detail is indicated using an X/Y format where X indicates the number of adapters or components that are active or running and Y indicates the total number of adapters or components for that peer.

Click the **Refresh** icon to manually refresh the Status screen information. Alternatively, you can check the auto-refresh check box to automatically refresh the status view every 10 seconds.

The Grid Metrics screen provides real-time metrics data about the grid and any peers on the grid. If threshold color-coding is configured for grid performance metrics, then the metrics displayed would reflect the threshold color-coding settings.

The BMC Atrium Orchestrator Development Studio icon on the right at the top of the screen provides access to the BMC Atrium Orchestrator Development Studio manual configuration file.

Pause grid

You can pause a grid from the Status screen.

This feature is not a frequently used function. It is most often employed during an event storm to prevent the grid from being consumed with processing erroneous events. The grid is capable of processing events from an event storm, but this feature enables you to choose not to process those events. Restarting will be quick, because component startups or elections are not involved.

When a grid is paused, you cannot add or edit peers, adapters, schedules, or modules. You cannot edit the grid, although you can create a new grid. You can view adapters, components, and grid metrics for the grid that is paused.

Pausing and restarting a grid

You can pause a grid during an event storm to prevent the grid from being consumed with processing erroneous events.

To pause a grid

- 1 Click the **Status** tab to display the Status screen.
- 2 Select the grid to be paused from the grid list; then click the Pause icon.
- 3 Enter your password; then click **OK**.

To resume a grid

- 1 Click the **Status** tab to display the Status screen.
- 2 Click the Resume icon to resume activity on the paused grid.

About peers

Use the **Manage => Peers** tab to add, change, or remove peers.

Peers that are not actively being used can be deleted. However, the deletion of a peer configuration in BMC Atrium Orchestrator Grid Manager is irreversible. Upon deletion of the peer configuration, the peer will cease to communicate with the grid. The peer should be uninstalled from the computer where it was installed. The server files will not be functional and cannot be re-used after the peer configuration is deleted in BMC Atrium Orchestrator Grid Manager.

By default, a CDP is included for each grid. Any of the adapters assigned to a specific grid can be enabled on peers on that grid. Peers must be configured in BMC Atrium Orchestrator Grid Manager prior to installation of the peer on a server.

Types of peers

BMC Atrium Orchestrator has three different types of peers.

- Configuration distribution peer (CDP) - Overall configuration manager for the BMC Atrium Orchestrator grid. A CDP houses BMC Atrium Orchestrator Grid Manager and manages overall distribution of software components to the peers across one or more grids. Adapters are enabled on and workflow are deployed from the CDP. The CDP can perform any task that an activity peer can perform. When multiple CDPs are installed on a grid, high availability configuration distribution peers (HACDP) are created.
- Activity peer (AP) - Server software that runs a suite of BMC Atrium Orchestrator software for the execution of automated workflow and facilitates bi-directional

communication between adapters and third-party applications or external systems. An AP joins a grid upon startup to communicate with the other peers.

- Lightweight activity peer (LAP) - BMC Atrium Orchestrator peer that facilitates bi-directional communication between adapters and third party applications or external systems. This peer cannot execute processes or serve as a master for any component; its function is to service adapter requests and events.

To capture metrics data, at least one peer must be designated as a sync point. A sync point peer uploads metrics data to the metrics database. The peers upload the metrics data through the designated sync point. Any peer that has network access to the metrics database can be designated as a sync point. A peer that does not have network access to the metrics database should not be checked to be a sync point.

BMC Atrium Orchestrator processes can be exposed as SOAP. Peers are designated as SOAP endpoints to indicate they can service SOAP requests to run BMC Atrium Orchestrator processes. At least one peer should be designated as a SOAP endpoint if SOAP requests will be issued to execute workflows.

Adding, changing, and removing peers

You can use the **Manage => Peers** screens to add, change, or remove peers.

To add a peer to a grid

- 1 Select **Manage => Peers**.
- 2 Click the **Add a Peer** icon.
- 3 Enter a name for the peer.
- 4 *(optional)* Provide a description.
- 5 Select a **Type** from the list.

Note

Once a peer is configured, the Type cannot be changed. This field will change from a selection list to text.

- 6 *(optional)* If the peer will be used as a synchronization point for uploading metrics, select **Sync Point**.
- 7 *(optional)* If this peer will service SOAP requests to run BMC Atrium Orchestrator workflow, select **SOAP Endpoint**.

- 8 (optional) Click **Enable** to add adapters to the peer.
- 9 Click **OK**.

To change an existing peer

- 1 Select **Manage => Peers**.
- 2 Select a peer; then click the **Edit selected Peer** icon.
- 3 Make any changes to the peer configuration; then click **OK**.

To remove an existing peer

- 1 Select **Manage => Peers**.
- 2 Select the peer you want to remove; then click the **Delete selected Peer** icon.
- 3 Click **OK**.

WARNING

Once deleted, the peer cannot be transferred to an existing grid or re-enabled. When you delete a peer, all adapters and components on the peer are disabled.

Starting and stopping peers

You can use the **Status** tab to start and stop peers.

To start a peer

- 1 Select **Manage => Components**.
- 2 Click the check box in the peer column below the peer name; then click the peer **Start** icon.

To stop a peer

- 1 Select **Manage => Components**.
- 2 Click the check box in the peer column below the peer name; then click the peer **Stop** icon.

High Availability (HA) environments

You can create a high availability (HA) environment with high availability configuration distribution peers (HACDPs) by installing multiple CDPs on a grid.

A CDP acts as a discovery server, which enables peers that are not directly connected to discover and communicate with each other. A HACDP provides redundancy for this feature. When an environment does not contain any HACDPs, the single CDP is a single point of failure.

When a second CDP is configured on a grid, the peer type for each CDP configured on the grid changes from configuration distribution peer to HA configuration distribution peer. In an HA environment, CDPs are ranked. By default, the rank assignment corresponds with the order of installation. The rank can be changed by the user at any time, provided all configured CDPs are in a fully running state.

All CDPs in a HA environment can manage grids, control peer and adapter functions, configure the repository connections, as well as all manage module and administration functions. In the event the primary ranked CDP is not operational, changes to the grid can still occur using a secondary CDP; however, any changes can be overwritten when the primary CDP becomes operational, if conflicting changes were made using the primary CDP.

Tip

Best practice tip: Launch the BMC Atrium Orchestrator Grid Manager from one CDP and perform administrative functions (adding accounts, configuring e-mail, auditing, and metrics) from this CDP.

About peer ranking

In an HA environment, CDPs are ranked. In the event that there is a network outage that prevents the CDPs from communicating, and each CDP experiences separate conflicting changes, the rank is used to determine which CDP's information takes precedence when the CDPs are able to communicate again.

By default, the rank assignment corresponds with the order of installation. You can change the rank at any time, provided all configured CDPs are in a fully running state.

In the event that configuration changes done on two different CDPs conflict with one another, any changes initiated by the higher-ranking CDP always assume precedence over changes initiated by a lower ranking CDP.

Example

Two CDPs (CDP A and CDP B) are running on a grid, with CDP A outranking CDP B.

- A network outage external to BMC Atrium Orchestrator prevents communication between the CDPs.
 - One user logs in to BMC Atrium Orchestrator Grid Manager on CDP A and modifies adapter X, and another user logs in to BMC Atrium Orchestrator Grid Manager on CDP B and also modifies adapter X.
 - In this scenario the user on CDP B will be warned that any changes made through BMC Atrium Orchestrator Grid Manager can be overwritten and a password is required to initiate the changes.
 - When the network connection is restored, and CDP A and CDP B can communicate again, the changes to adapter X made on CDP A will take precedence, because it outranks CDP B.
-

Editing peer ranking

You can use **Manage => Peers** to change the ranking of a peer.

To edit peer rankings

- 1 Select **Manage => Peers** to display the Peers screen.

The Peers screen displays an additional option to modify HA configuration distribution peer rankings when all HA configuration distribution peers are fully running.

- 2 Select **click here** to display the HA Configuration Distribution Peer Ranking screen.

Note

The option to modify HA configuration distribution peer (HACDP) rankings appears only if all CDPs are fully running.

- 3 Click the blue arrows to promote or demote a CDP; then click **OK** to save the changes.

Peer configuration files

During installation, peers can be configured to communicate with a CDP through a network connection or with a manual configuration file. Peers can also be configured after installation with a manual configuration file.

This XML configuration file is accessed from the **Manage => Peers** tab of BMC Atrium Orchestrator Grid Manager. The XML file is used to enable communications between the peer and a CDP.

Manually creating peer configuration files

Use these procedures to manually create a configuration file.

To create a peer configuration file

- 1 Select **Manage => Peers**.
- 2 The current grid is displayed in the upper left corner of the page. If the peer you want resides on a grid other than the one displayed, use the **Select grid** menu to choose an alternate grid.
- 3 Select the peer; then click the **View selected Peer configuration XML** button.
- 4 If the host for the CDP server has multiple IP addresses, a window with a list of IP Addresses is displayed. Select the IP address you want; then click **Proceed**.

Note

The IP address of this CDP server is written to the peer configuration file. This address is used by the peer when communicating with this CDP server; an IP address that is accessible to the peer server should be selected. Multiple configuration files can be created, each with a different IP address. This enables configuration files to be customized to accommodate the structure of the existing networks.

The XML for the peer configuration file for the selected peer will be displayed.

- 5 Highlight the entire XML text and copy it to a clipboard.
- 6 Create a text file named **peer_Config_peer_identifier.xml**.

Note

This file should be saved to a location accessible to the computer on which the peer will be installed.

- 7 Paste the XML into a text file, and save the file.

Note

This file should be saved to a location accessible to the computer on which the peer will be installed.

Component status

The Components screen displays the grid components for an individual grid and indicates the status of those components for each peer on that grid.

Component descriptions

Each grid contains the following components:

- **Activity processor:** Responsible for executing processes. Each process consists of a collection of activities that can be executed conditionally, in series, or in parallel.
- **Adapter Manager:** Manages the adapters configured on the peer and serves as a proxy for any remote calls to adapters located on other peers.
- **Configuration:** Maintains the current configuration as defined by the CDP and distributes that information to all components.
- **Context:** Acts as a memory space for processes running on this peer.
- **Health:** Manages status information reported in the Status tab. Peers are polled periodically to determine health.
- **Job Manager:** Monitors the pending queue and assigns processes to an activity processor on a specific peer.
- **Library Manager:** Supports all functions in the **Library** tab.
- **Metrics:** Records process metrics locally then uploads them to the repository.
- **Scheduler:** Maintains the schedule of jobs to run on a given system.

All applicable peer components need to be in a running state for the peer to be fully operational. Activity peers and CDPs contain all components. Lightweight activity peers contain the following components: Adapter Manager, Configuration, Health, and Library Manager.

The Components screen can be manually refreshed by clicking the **Refresh** icon. Alternatively, the auto-refresh check box can be checked to automatically refresh the status view every 10 seconds.

Clicking the **Back to Main Status** text link, located in the upper right corner of the screen, will return the display to the Status screen.

Component status – view mode

You can access the Components screen by clicking a specific grid name on the Status screen and then clicking the **Components** tab in the center of the screen.

The grid containing the displayed peers is indicated in gray in the upper left corner of the screen. The peer components are listed in rows along the left. The peers configured for this specific grid are shown in columns to the right. Peer components can have a status of Running, Stopped, or Not Applicable. The Not Applicable status applies to lightweight activity peers (LAPs); these streamlined peers do not contain all BMC Atrium Orchestrator components. The condition of the peer components for peers on the selected grid will be displayed.

The Master components for the Context, Health, Job Manager, Library Manager, and Scheduler are indicated with an asterisk (*) to the left of the column for the peer that is currently serving that role.

Note

You cannot assign a Master role for a peer component. Through normal grid operations, the role of Master is automatically assigned to a specific peer for one or more components. These assignments are dynamic and will change as needed based on the status of grid and its peers. One component can be the master on one peer while another component is master on a different peer.

Immediately after creation of the first grid, the **Master** icons might not be present when drilling down to the component level. It takes a few moments for the Masters to be elected. After they are elected, their icons will be displayed.

Component status - modify mode

You can access the components screen by clicking a specific grid name on the status screen and then clicking the **Components** tab in the center of the screen.

The grid containing the displayed peers is indicated in gray in the upper left corner of the screen.

The peer components are listed in rows along the left. The peers configured for this specific grid are shown in columns to the right. Peer components can have a status of Running, Stopped, Fault State, or Not Applicable. The Not Applicable status applies to Lightweight Activity Peers; these streamlined peers do not contain all BMC Atrium Orchestrator components. The condition of the peer components for peers on the selected grid will be displayed.

The master components for the Activity Watch Dog, Context, Health, Job processor, Library Manager, Pending Queue, and Scheduler are indicated with an asterisk (*) to the left of the column for the peer that is currently serving that role.

All applicable peer components need to be in a running state for the peer to be fully operational. Activity peers contain all components. Lightweight activity peers contain the following components: Adapter Manager, Configuration, Health, Library Manager, and Pending Queue.

Click the **Refresh** icon to refresh the components screen. Alternatively, you can check the auto-refresh check box to automatically refresh the status view every 10 seconds.

Click the **Back to Main Status** text link, located in the upper right corner of the screen, to return the display to the status screen.

Processes status

The Processes screen displays the processes currently running on the selected grid. Processes that have recently completed can also be displayed, prior to the screen refreshing.

Based on the roles assigned to your account, you will see the Processes screen in either the view or modify mode.

Note

Processes must have been picked up for execution by the Job Manager in order to appear in the Processes screen.

Processes status - view mode

In the view mode of the Processes screen, the processes currently running on the selected grid will be displayed. The processes can be viewed along with the process description, status, and peer information for each process.

The Processes screen is accessed from the Status screen by clicking a specific grid name and then clicking the **Processes** tab in the center of the screen.

Processes are displayed in a tabular format grouped by module name. If there are multiple processes within a module, a plus sign is displayed. You can click the plus sign to expand the selection. The process version and status (such as In Progress or Completed) are listed in parentheses next to the process name. The process information appears in columns to the right of the process name.

Click the **Browse** icon to view the process details. The Process Details screen shows the process ID and job ID generated in BMC Atrium Orchestrator Development Studio. Click **Close** to exit the Process Details screen.

To refresh the Processes screen, click the **Refresh** icon. Alternatively, you can check the auto-refresh check box to automatically refresh the status view every 10 seconds.

Clicking the **Back to Main Status** text link, located in the upper right corner of the screen, will return the display to the Status screen.

Processes status – modify mode

In the modify mode of the Processes screen, the activated processes can be viewed and terminated. Detailed process descriptions are also provided.

The Processes screen is accessed from the Status screen by clicking a specific grid name; then clicking the **Processes** tab.

Click the **Browse** icon to view the process details. The Process Details screen shows the process ID and job ID generated in BMC Atrium Orchestrator Development Studio. Click **Close** to exit the Process Details screen.

The Processes screen can be manually refreshed by clicking the **Refresh** icon. Alternatively, the auto-refresh check box can be checked to automatically refresh the status view every 10 seconds.

Clicking the **Back to Main Status** text link, located in the upper right corner of the screen, will return the display to the Status screen.

Terminating a process

Processes can be terminated from the **Processes** screen on the selected grid. Use the following steps to terminate a process:

To terminate a process

- 1 Click the **Status** tab; then select a grid.
- 2 Click the **Processes** tab.
- 3 Check the box next to the name of the process to be terminated.
- 4 Select the option you want in the **Terminate Option** box; then click **Stop**.

WARNING

Processes can be terminated with or without compensation. Terminating with compensation enables the server to terminate the process and start compensation. Terminating without compensation forces BMC Atrium Orchestrator Grid Manager to terminate processes immediately without waiting for any outstanding activities or related processes.

A message will be displayed indicating the status of the Terminate request. If the process terminates within five seconds, a message indicating a successful process termination will be displayed. If the termination takes longer than five seconds, a message will be displayed stating that the termination request was submitted but that the process has not yet terminated. The refresh controls can be used to monitor the process status.

Note

When terminating a process, it cannot stop immediately. The approximate time necessary to stop a process depends on your environment.

Managing users

Most user management tasks are performed in BMC Atrium Orchestrator Access Manager, the security component for BMC Atrium Orchestrator. For detailed information about default roles, creating roles, and assigning users to roles, see the *BMC Atrium Orchestrator Security Guide*. This chapter contains general information about roles and procedures for applying permissions to modules.

User roles

When BMC Atrium Orchestrator Access Manager is installed, four default user roles are created: ADMIN, USER, DESIGNER, and GRID_ADMIN.

In secure BMC Atrium Orchestrator environments, only users assigned the GRID_ADMIN role can logon to BMC Atrium Orchestrator Grid Manager.

After you are logged on to BMC Atrium Orchestrator Grid Manager, you can control access to individual modules by account role by using the **Administration => Permissions** tab.

Once you implement module permissions, login accounts will be able to use the modules to which you have enabled access. Other modules will not appear for login accounts associated with roles that have not been granted access.

When you first activate a module, it activates without permissions. Assign permissions to the module before attempting to use it in workflows. If you update a module on a grid, the permissions assigned to the older version will carry forward.

You can create additional access roles in BMC Atrium Orchestrator Access Manager; for more information about creating and managing roles, see the *BMC Atrium Orchestrator Security Guide*.

Assigning modules permissions

As a default, users with assigned either the ADMIN or GRID_ADMIN role have access to all modules.

You can use the **Administration => Permissions** tab to assign access to modules for users assigned the DESIGNER role or a role created in BMC Atrium Orchestrator Access Manager. When you assign permissions in a multi-grid environment, the permissions apply to the module in every grid in the environment, not just the grid that was current at the time you assigned the permissions.

To assign permissions to a module

- 1 Select **Administration => Permissions**.
- 2 Expand the **Process** tree to locate the module or process that you want to assign permissions to.
- 3 Click the appropriate check box under the role and module where you want to provide access; then click **OK**.

Tip

To remove access from a module for a specific role, simply clear the corresponding box.

Managing content

Content is a general term applying to modules and adapters that are added to grids, activated, and configured.

Repository overview

Information about modules and adapters is stored in a central location called the repository. This information is available to every grid.

Modules and adapters are imported into BMC Atrium Orchestrator Development Studio from the repository. You can revise or reconfigure the modules and adapters, and then, as you export them back to the repository, they are assigned versions. In BMC Atrium Orchestrator Grid Manager, you can access any of the saved versions and activate them on the grid.

Managing adapters

Adapters are configured on specific grids, using predefined adapter types. Any of the adapters configured on a specific grid can be enabled on a peer on that grid. Any adapter that has been enabled on a grid can be disabled from that grid.

In addition to configuring adapters with adapter types installed, you can implement custom adapters by uploading information to define a new adapter type.

Adapters provide the interface between workflow processes and external systems and applications. Adapters are configured in BMC Atrium Orchestrator Grid Manager to establish connections and facilitate communications. Adapters are available in BMC Atrium Orchestrator Development Studio so they can be used when creating and testing processes.

There are two categories of adapters:

- Base adapters, which interface to systems using standard protocols such as JDBC, Telnet, SSH, JMS, and so on.

- Application adapters which interface to a specific product.

Within these categories, there are two types of adapters:

- Actor adapters. These are adapters that serve as an interface to interact with external systems, sending commands or requests and, in some cases, receiving responses to the requests. An example would be a mail actor adapter. This adapter would be used to send an e-mail.
- Monitor adapters. Monitor adapters listen on external systems and, based on their configuration, generate an event message. A mail monitor adapter would monitor an e-mail account on a specified server and generate an event when a specific message is received. This event could be used to trigger a process in a workflow.

You can use BMC Atrium Orchestrator Grid Manager to configure adapters for specific grids and then enable the adapters on peers on that grid. Any adapter that will be used in a process must be enabled on at least one peer on a grid. The configuration is referenced when adapters are called within processes.

You configure adapters in BMC Atrium Orchestrator Grid Manager using an XML document or form to define the connection details and adapter properties. The Properties XML document or the form provides specific configuration information for an adapter, also referred to as the configuration node. Each adapter requires specific information in the configuration node to enable communications between systems or applications.

The Java Archive (JAR) files required for the BMC Atrium Orchestrator Base adapters, and any installed application adapters are contained in the **BAO_HOME/lib/shared** directory. If additional or alternate JAR files are required for proper adapter function, these JAR files should be placed in the **BAO_HOME/lib/add-ons** directory of each CDP server and any peer that will call this adapter. To enable the new adapter, restart the CDP and peer servers that contain the new JAR file. Adapters that use the standard BMC Atrium Orchestrator JAR files are automatically enabled when they are created.

When a process makes an adapter request, the peer that handles the request is determined based on the value for the peer location set in the adapter request. In order for the process to execute successfully, the adapter must be enabled on that peer. This may require that the adapter be enabled on multiple peers in the grid. [Table 1 on page 34](#) provides details about how adapters should be enabled, based on the value for the peer location in the adapter request.

Table 1: Enabling adapters based on peer location

Peer location	Description	Adapter enabled on
any	Adapter request can be serviced by any peer in the grid.	At least one peer on the grid.

Peer location	Description	Adapter enabled on
this	The adapter needs to be located on the same peer as the calling process.	The CDP and all activity peers on the grid.
best	The grid will determine the best peer to service the request, based on health metrics for each peer.	At least one peer on the grid.
peer	You can specify the exact peer to service the adapter request.	The peer specified in the adapter request.

Adding and removing adapters

You can use the **Manage => Adapters** tab to add or remove adapters from the grid.

To add an adapter to a grid

- 1 Select **Manage => Adapters**.

The **Adapters in Repository** table on the left of the screen displays all the adapters in the repository.

- 2 (Optional) If you want to activate the adapters on a grid other than the one displayed, use the **Select grid** list to choose the alternate grid.
- 3 (Optional) Click the plus sign to expand the listing for an adapter to show previous versions of the adapter.
- 4 Select the adapters you want to add to the grid.

Note

You can select more than one adapter, but you can only select one version of any adapter.

If you select a previous version of an adapter and then close the parent node on the tree, the adapter is de-selected. You must leave the tree expanded if you want to select any version of the adapter prior to the latest.

- 5 Click **Add to Grid**.

The adapter or adapters are added to the grid. The adapter names are added to the **Adapters on Grid** table on the right of the screen.

Note

You must configure the adapters before they can be used on the grid.

To remove an adapter

- 1 Select **Manage => Adapters**.
- 2 Select the adapter or adapters you want to remove on the **Adapters on Grid** table on the right of the screen. In the **Adapters** list, select the adapter you want to remove; then click the **Delete** icon.
- 3 Click **Remove**.
- 4 Click **OK** to confirm you want to remove the adapter.

The adapters are removed from the grid and the names are removed from the **Adapters on Grid** table on the right of the **Manage => Adapters** screen. The adapters are still available in the repository and are shown in the **Adapters in Repository** table on the left of the screen.

Adding a prepackaged adapter

You can upload an adapter that has been packaged as an .aroar file.

To upload a prepackaged adapter

- 1 Select **Manage => Adapters**.
- 2 Click **Upload adapter**.
- 3 Select **Pre-packaged adapter (.aroar file)**.
- 4 Browse to select the .aroar file you want to upload.
- 5 Click **OK**.

Implementing custom adapters

You can implement a custom adapter by uploading the information required to define an adapter type. This new type can then be used to configure an adapter on a grid.

To implement a custom adapter

- 1 Select **Manage => Adapters**.

- 2 Click **Upload adapter**.
- 3 Select **Custom adapter**.
- 4 Enter the adapter type you want in the **Type** field.
- 5 Enter the version for this adapter type.
- 6 Enter a description for the custom adapter type.
- 7 Click **Browse** or the Folder icon next to the **JAR File** field.
- 8 Navigate to the location of the JAR file to be used by the custom adapter; then click **Open** to select the file.
- 9 Enter the classname for the custom adapter.

WARNING

This classname must refer to a valid class within the specified JAR file.

If a valid classname is not provided, an adapter that uses this type will fail to start when enabled on a peer. Even though an upload is successful, if the information provided is not correct, the use of this adapter type will result in a non-functional adapter when it is enabled on a peer.

If the custom adapter requires additional files to function properly, they can be added as dependent files.

To add dependent files to the custom adapter

- 1 Click the **Browse** button adjacent to the **Dependencies** field.
- 2 Navigate to the location of the dependent file for the custom adapter; then click **Open** to select the file.
- 3 (Optional) If more than one additional file is required, click the **More Dependencies** text.

The first file will be moved into the **Dependencies** table, which is below the **Dependencies** field.

- 4 Click the **Browse** button adjacent to the **Dependencies** field.
- 5 Navigate to the location of the additional dependent file for the custom adapter; then click **Open** to select the file.

Note

An unlimited number of dependent files can be added in the same manner. Files in the **Dependencies** table can be disassociated with the adapter by clicking the **Delete** icon.

- 6 If platform-specific libraries are required by the custom adapter, follow these steps to upload the platform-specific libraries:
 - a Click the **Browse** button adjacent to the **Platform Libraries** field.
 - b Navigate to the location of the zip file containing the libraries for the custom adapter; then click **Open** to select the file.

Note

All required platform libraries must be contained in a single zip file.

- 7 When all upload information has been entered, click **OK**.

The specified information will be uploaded to the CDP and available for use to configure an adapter. The upload process does not create an adapter configuration; it adds the custom adapter type to the CDP where it can be selected for configuring an adapter on a specific grid.

- 8 Do one of the following steps:
 - To facilitate adding an adapter configuration for the newly uploaded adapter, click **Continue**.
 - To return to the main Adapters screen without adding a configuration, click the bottom option and then click **Continue**.
- 9 (Optional) Proceed with the configuration as described in [To add an adapter to a grid on page 35](#).

Adapter status

The Adapters screen displays the adapters configured on an individual grid and indicates the peers on which the adapters have been enabled.

Adapter status—view mode

The Adapters screen is the default view of the Grid Status detail screens.

It is accessed from the Status screen by clicking a specific grid name on the Status screen. The grid containing the displayed adapters is indicated in gray in the upper left corner of the screen.

The adapter names are listed in rows on the left. The peers configured for this specific grid are shown in columns to the right of the adapter names. Peer adapters can have a status of Running, Stopped, Not Enabled, or Fault State. The condition of adapters enabled on peers on the selected grid will be displayed.

Click the **Refresh** icon to refresh the Adapter Status screen . Alternatively, check the auto-refresh check box to automatically refresh the status view every 10 seconds.

Clicking the **Back to Main Status** text link, located in the upper right corner of the screen, will return the display to the main Status screen.

Adapter status - modify mode

You can stop and start adapters on specific peers from the **Adapters** screen.

Starting and stopping an adapter

You can use the **Status** tab to start and stop an adapter.

To start an adapter

- 1 Click the check box in the peer column associated with the adapter to be started.
- 2 Click the **Adapter Start** icon.

To stop an adapter

- 1 Click the check box in the peer column associated with the adapter to be stopped.
- 2 Click the **Adapter Stop** icon.

Configuring adapters

You can use the **Manage => Adapters** tab to configure adapters.

To configure an adapter

- 1 Select **Manage => Adapters**.

- 2 In the **Adapters on Grid** table, click **Configure** for the adapter you want to configure.

The **Adapter Configuration** page is displayed.

- 3 Enter the adapter name and description in the appropriate fields.
- 4 Select the adapter type from the selection list.

The rest of the **Adapter Configuration** page is different depending on the adapter you are configuring.

- The **Adapter Configuration** page for some adapters contains one **Properties** field.
 - The **Adapter Configuration** page for some adapters contains several different fields and other controls for you to enter the adapter configuration properties.
- 5 Perform the appropriate action:
 - If the **Adapter Configuration** page for the adapter you want to configure contains the **Properties** field, enter the XML configuration document as specified for the adapter.

For specific configuration requirements, see the *BMC Atrium Orchestrator User Guide* for the adapter. If the adapter does not require a specific configuration, enter the XML text `<config/>` in the **Properties** field.
 - If the **Adapter Configuration** page for the adapter you want to configure contains separate fields to enter the properties, provide the required information in accordance with the *BMC Atrium Orchestrator User Guide* for the adapter.
 - 6 Click **OK**.

Managing modules

Modules are the basic units of work within BMC Atrium Orchestrator. Modules can be independent units of work or they can have dependencies on processes in other modules. Use BMC Atrium Orchestrator Development Studio to create the modules, and use BMC Atrium Orchestrator Grid Manager to activate and deactivate them.

Related documentation

For information about specific modules, see the following publications:

- *BMC Atrium Orchestrator Development Studio Users Guide*
- *BMC Atrium Orchestrator Operation Actions Management Users Guide*
- AD-Utilities section of the *BMC Atrium Orchestrator Base Adapters Users Guide*
- *BMC Atrium Orchestrator run book documentation*

Module deployment and activation

Activating a module deploys it to the grid and triggers the schedules established for the processes contained in that module. Peers begin executing workflows according to the schedules defined in the activated modules.

When BMC Atrium Orchestrator Grid Manager activates a modules it distributes the corresponding ROAR files to the peers and triggers the schedules.

During the activation process, the specific version of the module to be activated is selected. Only one version of a module can be active at a time.

Activating modules

You can use the **Manage => Modules** tab to select the version of module you want to activate.

To activate a module

- 1 Select **Manage => Modules**.

The table on the left of the screen displays all the modules in the repository.

- 2 (Optional) Click the plus sign to expand the listing for a module to show previous versions of the module.
- 3 Select the module or modules you want to activate to the grid.

Note

You can select more than one module, but you can only select one version of any module.

If you select a previous version of a module and then close the parent node on the tree, the module is de-selected. You must leave the tree expanded if you want to select any version of the module except the most recent.

- 4 Click **Activate**.

The modules you selected are activated on the grid. The **Manage => Modules** page displays the modules that are active on the grid and their version numbers in the **Modules** table on the right.

Deactivating modules

Deactivating a module triggers the peers to stop performing workflow processes in specified modules. Schedules defined in a deactivated module will no longer appear on the **Schedules** screen.

To deactivate modules

- 1 Select **Manage => Modules**.
- 2 Select the module or modules you want to deactivate from the Modules list on the right side of the screen.
- 3 Click **Deactivate**.

The modules are deactivated from the grid and are removed from the **Modules** table on the right of the **Manage => Modules** screen. The modules are still available in the repository and are shown in the **Modules** table on the left of the screen.

Viewing active modules

To view the modules that are active in the grid, select **Manage => Modules**.

The active modules for the current grid will be displayed, along with the active version.

Tip

If the module you want resides on a grid other than the one displayed, use the **Select grid** list to choose an alternate grid.

To edit module configuration items

- 1 Select **Manage => Modules**.
- 2 Click the name of the module that houses the configuration item (CI) you want to edit.

- 3 Expand the configuration tree to until you navigate to the CI you want to modify.
- 4 Edit the current value. For strings, to expand the single line display to a multi-line display, click **Convert to multi-line**.
- 5 When the value you want is displayed in the **Value** field, click **OK**.

Note

The value type cannot be changed within BMC Atrium Orchestrator Grid Manager. To change a value type, the change must be made within BMC Atrium Orchestrator Development Studio. The module with the changed type must then be exported to a grid's library and activated on that grid for the change to take effect.

Managing schedules

Schedules control the time and frequency of process execution.

You can create the initial schedules for workflow processes in BMC Atrium Orchestrator Development Studio as part of a module. Once the module has been activated on the grid, you can use BMC Atrium Orchestrator Grid Manager to review the schedules or modify existing schedules, create additional schedules, and delete schedules. You can also run a process on demand, outside a defined schedule.

Use the **Manage => Schedules** tab to review or modify schedules. If a module is deactivated, the **Manage => Schedules** tab does not display any of the modules schedules.

Editing, executing, and deleting schedules

You can use the **Manage > Schedules** tab to manage when processes are executed.

To execute a process on demand

Note

The process you want to execute on demand must have a schedule.

- 1 Select **Manage => Schedules**.
- 2 (Optional) If the process is on a grid other than the one displayed, use the **Select grid** list to choose the alternate grid.

- 3 Click the check box next to the schedule containing the process you want to be executed now; then click **Run Now**.

BMC Atrium Orchestrator Grid Manager displays a message at the top of the screen indicating that the selected processes were queued to run immediately.

To edit an existing process schedule

- 1 Select **Manage => Schedules**.
- 2 Click the name of the schedule to be edited.
- 3 Use the entry fields on the Edit Schedule screen to make the changes to the schedule.
- 4 Provide general information for the schedule.

Field Name	Description
Description	Type a description for the schedule.
Comment	Select the Process ID for the job you want to run.

- 5 Specify the peer on which you want the job to run:

Field Name	Description
Peer Location	Select the peer on which the job should run. There are two options: any and peer. <ul style="list-style-type: none"> ■ any-The process can run on any peer in the grid. The master job processor will distribute the process to the next available peer. ■ peer-The process runs on the peer on you specify in the Peer Name field.
Peer Name	Select the name of the peer you want the job to run on. The name must match a peer on the grid on which the module is activated. This field is required if you choose peer in the Peer Location field.

- 6 Choose one of the following to specify when to start the job:
 - Click **Start immediately** to start the process when the module is activated.
 - Click **Start On** to specify a specific time to start the process, and then provide the date and time.

- 7 Set how often you want the job to run. The job will run at the specified frequency until the designated end point.
 - Click **Run every** to set a frequency to be set in units of minutes and seconds.
 - Click **Run once every** to be set a frequency in units of hours, days, weeks or months. To set a frequency with the **Run once every** option, you must have designated a specific start time or you must specify **Start immediately**.
- 8 Select when you want the job to end.
 - Click **Run forever** if you want the job to run as designated without a defined termination point.
 - Click **Stop on** if you want to set a specific date and time on which to stop the job. When you select this option, the current date and time populate the entry. Use the MM/DD/YYYY format to change the value.
 - Click **After N runs** if you want to designate a fixed number of occurrences for the job.
- 9 Click **OK** to save the changes to the job schedule and return to the Schedules screen.

To add a new process schedule

- 1 Select **Manage => Schedules**.
- 2 Click **Add** to open the **Add Schedule** screen.
- 3 Provide general information about the schedule.

Field Name	Description
Name	Type the name for the schedule.
Description	Type a description for the schedule.
Process ID	Select the Process ID for the job you want to run.

- 4 Use these fields to specify the peer on which you want the job to run:

Field Name	Description
Peer Location	Select the peer on which the job should run. There are two options: any and peer.

Field Name	Description
	<ul style="list-style-type: none"> ■ any-The process can run on any peer in the grid. The master job processor will distribute the process to the next available peer. ■ peer-The process runs on the peer on you specify in the Peer Name field.
Peer Name	Select the name of the peer you want the job to run on. The name must match a peer on the grid on which the module is activated. This field is required if you choose peer in the Peer Location field.

- 5 Choose one of the following to specify when to start the job:
 - Click **Start immediately** to start the process when the module is activated.
 - Click **Start On** to specify a specific time to start the process, and then provide the date and time
- 6 Set how often you want the job to run. The job will run at the specified frequency until the designated end point.
 - Click **Run every** to set a frequency to be set in units of minutes and seconds.
 - Click **Run once every** to be set a frequency in units of hours, days, weeks or months. To set a frequency with the **Run once every** option, you must have designated a specific start time or selected Start immediately.
- 7 Select when you want the job to end.
 - Click **Run forever** if you want the job to run as designated without a defined termination point.
 - Click **Stop on** if you want to set a specific date and time on which to stop the job. When you select this option, the current date and time populate the entry. Use the MM/DD/YYYY format to change the value.
 - Click **After N runs** if you want to designate a fixed number of occurrences for the job.
- 8 Click **OK** to save the job schedule and return to the Schedules screen.

To delete a schedule

- 1 Select **Manage => Schedules**.
- 2 Click the check box next to the schedule you want to delete; then click **Delete**.

- 3 Click **OK** in the confirmation dialog box.

Managing metrics and audit records

BMC Atrium Orchestrator Grid Manager can track performance metrics and audit records about grids and peers. It can also track business metrics generated by the processes.

In order to collect the metrics information, you must configure the appropriate database and turn on metrics collection.

Managing information about grids and peers

The information that BMC Atrium Orchestrator Grid Manager can track about grids and peers consists of metrics about performance and audit records. This information is stored in a single metrics database.

Audit records include information about grid configuration such as details about additions, updates, and changes to any configuration on the grid.

Performance metrics include information about both peers and grids such as the number of active processes on a grid, or the number of adapters in a fail state on a peer.

The **Database Configuration** tab is used to configure the database connection to the audit records and grid performance metrics database. Upon configuration, all audit information pertaining to additions, updates, and changes to any configuration on the grid will be uploaded to the metrics database. Specific grid performance metrics are uploaded through a synchronization point to the metrics database.

Audit records

Audit records are created for:

- Installation of a BMC Atrium Orchestrator CDP

- Creation of grids (logged as CDP creation in the tables, attaching to the newly created grid)
- Creation and deletion of peers
- Adapter creation (listed as deployed), enable (listed as activated) and disable (listed as deactivated)
- Module deployment, activation, and deactivation
- Application adapter installation
- BMC Atrium Orchestrator Development Studio logon
Logged as configured with the first successful logon for each BMC Atrium Orchestrator Development Studio workstation. This logon is associated with the IP address of the workstation. If the IP address changes on the workstation, multiple records will be created.

Audit records data store

Audit records are captured in a local data store on each configuration distribution peer (CDP) and are uploaded to the database after the database is configured. Information is written to the local store beginning with the installation of the CDP.

The database configuration is entered for the entire environment and is shared among the CDPs in that environment. All the audit data uploaded from any of the CDPs goes to the same database.

Audit records information continues to be collected in the local data stores on each CDP. It is uploaded from the local data store on the CDP to the database in accordance with the upload interval set in the auditing configuration, generally within a few seconds.

Synchronization points are not used to transfer audit records to the database.

The audit records can be accessed from the following places:

- The **Status => Metrics View** tab (adapter and module metrics only)
- The **Manage => Config Report** tab
- The audit records database

Audit table information

The auditing data is contained in three tables within the database. The **amp_audit**, **amp_audit_action** and **amp_audit_detail** tables are created as needed at the time of

the first data upload from the local data store on a CDP to the database. The **amp_audit** table is the master table. The **amp_audit_action** table contains time stamps and joins with **amp_audit** on **AUDIT_ID**. The **amp_audit_detail** table contains name/value pairs and also joins with **amp_audit** on **AUDIT_ID**. Details about the fields for each table and sample values are shown in the tables that follow.

Table 2: amp_audit table fields and sample values

Field	Description and sample values
ID	Unique record identifier and primary key
Entity_Category	Indicates the type of BMC Atrium Orchestrator component being audited Values include: RBA, PEER, ADAPTER, MODULE, DEV_STUDIO, DATA_DATABASE.
Entity_Name	Indicates the specific BMC Atrium Orchestrator component being audited
Grid_Name	The name of the grid on which the BMC Atrium Orchestrator component resides. Note: The BMC Atrium Orchestrator entity name CDP indicates the grid creation. Grid creation does not generate a separate entry.
Peer_Name	The name of the peer on which the BMC Atrium Orchestrator component resides.
GRID_ID	Identification number assigned to the grid on which the BMC Atrium Orchestrator component resides
PEER_ID	Identification number assigned to the peer on which the BMC Atrium Orchestrator component resides

Table 3: amp_audit_detail fields and sample values

Field	Description and sample values
ID	Unique record identifier and primary key
NAME	Audit item for which a VALUE is captured Valid values: GRID_TYPE, PEER_NAME, PEER_TYPE, ADAPTER_TYPE, ADAPTER_CATEGORY, MODULE_CATEGORY, MODULE_CHILDREN, STATUS, LAST_STATUS_BY_USER, SOFTWARE_NAME, SOFTWARE_VERSION, HOST_NAME, IP_ADDRESS, GRID_NAME, DATABASE_TYPE, DATABASE_LICENSE, DEVSTUDIO_ID, DEVSTUDIO_VERSION
VALUE	Audited value that corresponds to the NAME value
AUDIT_ID	Cross-referenced value for the ID in the amp_audit table
SEQUENCE_NUM	Reference used in the event a NAME is longer than 255 characters If a NAME exceeds the column width, a second record will be created and this value will be used to sequence the entries.

Table 4: amp_audit_action fields and sample values

Field	Description and sample values
ID	Unique record identifier and primary key
ACTION_SEQ_NUM	Reserved for future functionality Currently, the value is always 1.
ACTION	The audited action performed Valid values: DATE_ACTIVATED, DATE_DEACTIVATED, DATE_DEPLOYED, DATE_UNDEPLOYED, DATE_INSTALLED, DATE_CONFIGURED
ACTION_TIME	Time at which the action was performed The format is YYYY-MM-DD HH:MM:SS.
ACTION_USER	User name on the account that performed the action
AUDIT_ID	Cross-referenced value for the ID in the amp_audit table

About configuration reports

You can use the **Manage => Config Report** tab to generate reports about the configuration of the grid audit records

The data for these reports is obtained from the database. The reports are available when auditing is turned on. Configuration data is captured in a local data store from point of installation and will populate audit tables of the database with all configuration information after the first upload time has elapsed.

There are two report options:

- Configuration Snapshot - displays the configuration state as of a specified date and time, noting the last action performed for each configurable item.
- Time Range - displays three segments of data: a configuration snapshot at the specified start time, the activity between the start and end times, and a configuration snapshot at the specified end time.

Note

The **Manage => Config Report** tab can read information only from the database; no data will be available until the audit records collection has been turned on.

Generating configuration reports

You can use **Manage => Config Report** to generate reports about grid configurations.

To run a configuration report

- 1 Select **Manage => Config Report**.
- 2 Select **Configuration Snapshot** or **Time Range** as the report type.
- 3 Enter the time range.
- 4 In the **Peer Types** list, select the peer types you want to be included in the report. Multiple peer types can be selected. If you want all types, leave the entire list unselected. By default, if no selections are made, all types will be displayed.
- 5 Select the adapter types to be included in the report.
- 6 Click **Show Report**.

Note

After the report is displayed, you can click **Modify Parameters** to modify the report parameters.

If the database connection for the auditing database has not been successfully configured, data will not be written to the audit tables and data will not be available for display in the configuration report.

Using the History tab

The **Manage=>History** tab displays recent audit history for modules.

If the database connection has not been configured, the tab displays information from the local store. After the database connection is configured, the **History** tab displays information from the database.

Immediately after you configure the database, there will be a delay equal to the upload interval set in the configuration before the **History** tab can display information from the database.

Note

In an HA environment, only the data from the CDP on which BMC Atrium Orchestrator Grid Manager was launched will be displayed if audit records collection is not turned on.

Performance metrics

Performance records contain information about how the grid or peer is performing.

About grid performance metrics

Grid performance metrics are historical records of the grid and peer environment. The grid performance metrics collected provide detailed information about BMC Atrium Orchestrator. Grid performance metrics collection can be global or set for individual metrics data.

Before you can capture grid performance metrics data, complete the following steps:

- 1 Configure the database connection to the audit and grid management metrics database.
- 2 Designate a synchronization point.
- 3 Configure system metrics to collect.

Grid performance data

After the database connection has been configured and data has been uploaded, reports can be generated with the standard database tools.

Grid performance metrics are recorded after being configured in the **Administration => Grid Metrics** screen. Data is on each peer and uploaded from the peer to the database through a synchronization point, per the upload interval set in the metrics configuration. Grid metrics data is collected for all peers on a grid. The database configuration is entered for the entire environment and is shared among the grids and peers in that environment, ensuring all the data uploaded from any of the grids and peers goes to the same database.

The grid performance metrics data can be viewed from **Status => Grid metrics** page.

Note

Parameters set in the threshold configuration affect the data color-coding displayed on the **Status => Grid metrics** page.

Collecting metrics

Peers that have been designated as synchronization points will upload grid performance metrics data to the database. Data is captured on a peer and uploaded from a peer to the database according to the upload interval set in the database configuration. For successful metrics collection, the grid must have a database connection to the database configured and at least one peer on that grid must be designated as a synchronization point. All data uploaded from a peer on any grid will go to the same database.

There are a number of metrics that can be selected by the user to capture data at both the grid and peer level.

Grid performance table information

The grid performance metrics data is contained in three tables within the database. There is no master table.

The **metric_fact**, **metric_scoped_path**, and **metric_storage_duration** tables are created after grid performance metrics configuration. The **metric_fact**, and **metric_storage_duration** tables have a foreign key relationship to the **metric_scoped_path** table. The **metric_fact** table contains the actual recorded management metrics and basic metrics information. The **metric_storage_duration** table contains the storage duration values associated with each metric type and path, as well as the scoped path for which the duration applies. The **metric_scoped_path** table contains information about the scoped paths that are referenced by the records in the **metric_fact** and **metric_storage_duration** tables. A scoped path describes the type of the scope, environment, grid, peer, component, or adapter and the names that describe the path to that scope.

The following series of tables offers details about the fields for each grid performance metrics table, and grid performance metrics collections at the grid and peer levels.

Table 5: Metric_scoped_path table field

Field	Description
ID	Unique record identifier and primary key
ENVIRONMENT_NAME	The name of the BMC Atrium Orchestrator environment
GRID_NAME	The name of the grid for which the metric was collected Note: this value will be NULL if the Scope value is not grid.
PEER_NAME	The name of the peer for which the metric was collected Note: This value will be NULL if the Scope is not a peer, component, or adapter scope.
COMPONENT_NAME	The adapter name for which the metrics was collected Note: This value will be NULL if the Scope is not component.
ADAPTER_NAME	The name of the adapter for which the metrics was collected Note: This value will be NULL if the Scope is not adapter.
SCOPE	The scope type Valid values: Environment, grid, peer, Component, adapter.

Table 6: Metric_fact table fields

Field	Description and sample values
ID	Unique record identifier and primary key
TIME	Time at which the metric was recorded. The format is YYYY-MM-DD HH:MM:SS.
TYPE	A string containing the metric type Sample values: NUMBER_OF_QUEUED_WORKFLOWS, NUMBER_OF_FAILED_ADAPTERS, NUMBER_OF_RUNNING_PROCESSES, NUMBER_OF_RUNNING_ADAPTERS, MEMORY_USE, NUMBER_OF_ACTIVE_MODULES
VALUE	The actual value of the metric that was recorded Note: This is a string representation of the value, though the value itself can be numeric, string, or a format defined by the system.
SCOPED_PATH_ID	The scoped path for which the metric was recorded Note: This field is a foreign key to the metric_scoped_path table.

Table 7: Metric_storage_duration table fields

Field	Description and sample values
ID	Unique record identifier and primary key.
DURATION	The storage duration in milliseconds
TYPE	A string containing the metric type for which the storage duration applies These values correspond to enumeration values defined by the system. Sample value: "NUMBER_OF_RUNNING_PROCESSES"
SCOPE	The scope for which the duration applies
SCOPED_PATH_ID	A foreign key to the SCOPED_PATH table The scoped path referred to by this reference describes the scope and names associated with the scope for which the storage duration applies.

Table 8: Grid performance metrics description

Level / Metric	Description
grid / Active Modules	The number of modules active on the current grid
grid / Adapter Status - Fail	The number of adapters in a fail state for a grid
grid / Failed Workflows	The number of workflows that have compensated on the grid within a specified timeframe
grid / peer Failures	The sum of peer communication link disconnects on a grid
grid /peer Disconnects	The number of times a peer disconnects for a specified timeframe from the grid

Level / Metric	Description
grid / Workflow Queue	The number of workflows waiting for execution on a grid
grid / Adapter Status - Pass	The number of adapters in a pass state for a grid
grid / Active Processes	The number of concurrently running processes at the present time on the grid
peer / Memory Use	The amount of Java memory in use by the program
peer / Adapter Status Fail	The number of adapters in a fail state for a peer
peer / peer Failures	The number of peer communication link disconnects for a component on the peer
peer / Adapter Status - Pass	The number of adapters in a pass state for a peer.
peer / Active Processes	Number of concurrently running processes at present time on the peer.
peer / Active Threads	The number of currently active threads on a peer
peer / Failed Processes	The number of failed processes on a peer over a specified time period

Managing grid performance records

You can use **Administration => Metrics** to add, configure, edit, and delete performance records.

To select the grid performance metrics

- 1 Select **Administration => Metrics**.
- 2 Expand the list to open the **Global Settings** panel.

The **Global Settings** screen contains the settings that govern grid performance metrics collection and display. By default, **Enable Global Collection** and **Enable threshold Color-coding** are selected. The default setting for the **Status Metrics Auto-refresh Period** is 60 seconds.

- 3 To disable a setting, click the selection box of the corresponding setting to be disabled.

If **Enable Global Collection** and **Enable threshold Color-coding** are not selected, then global collection of metrics will not occur. Metrics will only record for the individual metrics that have collection and threshold enabled.

- 4 To change the Status Metrics Auto-Refresh Period, type a numeric value in the **Auto-refresh** box; then click **OK**.

Note

The Enable Global Collection setting and the Enable threshold Color-coding setting, when selected, takes precedence over the individual collection enabled and threshold enabled settings on enabled metrics.

Global Setting	Description	Default
Enable Global Collections	Enables the collection of metrics for a grid and any peer on a grid If not selected, this setting overrides the collection setting. The individual metrics are only in effect if global collection is enabled.	Enabled
Enable Threshold Color-Coding	Enables threshold color-coding for all metrics on a grid and any peer on a grid If not selected, this setting overrides the threshold color-coding setting. The individual metrics are only in effect if global collection is enabled.	Enabled
Status Metrics Auto-refresh period	Specifies the time interval, in seconds, used to retrieve and apply in changes in grid performance metrics	60 seconds

To add a metric configuration

- 1 Select **Administration => Metrics**.
- 2 Click **Add** to add a metric.
- 3 Select the level on which metrics will be configured.
- 4 Select the metric to be configured.
- 5 Enter the options described in the table; then click **OK** to save the Metric Configuration.

Option	Description	Required
Collection	Enables data collection for the selected metric Enter the frequency value and select the frequency intervals you want to set the frequency with which data will be collected. Default value: enabled	No
Storage Duration	The number of days the data is retained in the database	Yes
Thresholds	Used to alert the user if a grid or a peer metric exceeds the defined values	No

Option	Description	Required
Minor	The lowest threshold variable that alerts from the specified value to the value below the specified Major value On the View Grid Metrics window, the violation is displayed in the color yellow.	No
Major	A variable higher than the Minor value and lower than the Critical value On the View Grid Metrics window, the violation is displayed in the color orange.	No
Critical	A variable higher than the Major value On the View Grid Metrics window, the violation is displayed in the color red.	No

Thresholds relate only to the metrics for which they are created. They are configured based on the your environment. The **Minor**, **Major**, and **Critical** fields that you define specify the threshold variables for the metrics. The color-coding provides a means to graphically alert you to possible problems. The values in the thresholds **Minor**, **Major**, and **Critical** fields will be highlighted if the specified value for the adapter - fail metric is exceeded. If threshold color-coding is enabled, then metric threshold violations will be highlighted in the Grid Metrics screen with the appropriate color based on the severity of the violation.

The Metrics screen will be displayed with a details table that contains a row with the newly configured metric.

Example

For example, a grid level metric indicates an adapter status failure with the displayed thresholds. When viewed in the Status Metric View screen, if two adapters are in a fault state, the metric will be yellow; if three to four adapters are in a fault state, the metric will be orange; and if five or more adapters are in a fault state, the metric will be red.

- 6 (Optional) Repeat Steps 2-5 to add more metrics.

To edit a metric configuration

- 1 Select **Administration => Metrics**.
- 2 Click **Level => Metric** to edit the metric.
- 3 Highlight the default value and enter the information you want; then click **OK**.

To delete a metric configuration

- 1 Select **Administration => Metric**.
- 2 Click the **Delete** icon that corresponds to the metric to be deleted.

Managing process metrics

You can configure the connection to a database to collect metrics data from processes running on that grid. Process metrics data is generated by schedules and through the execution workflow processes that have been set to collect metrics.

Peers that have been designated as synchronization points (sync points) will upload process metrics data to the database. For successful process metrics collection, the grid must have a database connection to the database configured and at least one peer on that grid must be designated as a sync point.

The first time process metrics data is uploaded to the database, a check will be conducted to ensure that tables exist to contain the data. If the tables do not exist, they will be created automatically.

Working with the metrics databases

Performance metrics and audit records are stored in separate tables in one metrics database. Business or process metrics are stored in a different database.

BMC Atrium Orchestrator can interface with many database types. Prior to configuring the database connection through BMC Atrium Orchestrator Grid Manager, the database must be created. A user with permissions to create tables and to insert records in those tables must exist for this database. This user is specified during the database connection configuration.

Configuring the database

To gather and store metric information, you must configure the database connection. A different database connection is required for process metrics than for grid metrics and audit records.

To configure the database connection to the database

- 1 Perform the appropriate step.
 - To collect grid performance metrics or audit records, select **Administration => Database Configuration**
 - To collect business or process metrics, select **Manage => Process Metrics**.

The current collection status will be indicated in bold. Use the **metrics collection is currently** check box to toggle the status between off and on.

- 2 Select the database type you want.

Note

Databases listed in the **Supported** section of the list are supported by BMC Customer Support. Databases listed in the **Other** section can interface with BMC Atrium Orchestrator but are not supported by BMC Customer Support.

Once you select a database type, the URL field populates with a default value. The URL will be used to establish JDBC connectivity to the database; the default value can be changed as needed. To change the URL, replace the default URL.

Note

The database name, which is part of the URL, is required to match the text entered in the **User** field.

The Driver field will also be populated with a default value upon selection of a database type. This value can be changed as needed to reflect the fully qualified classname for the JDBC driver used to connect with the metrics database.

The JAR file for the driver for databases in the **Other** section of the **Database Type** menu must reside in the **AO_HOME/lib/add-ons** directory on the CDP server as well as on each peer designated as a sync point. Drivers for databases in the **Supported** section of the **Database Type** menu are placed in the **AO_HOME/lib/shared** directory during installation of the CDP and APs.

BMC Atrium Orchestrator Grid Manager will look first in the **AO_HOME/lib/shared** directory and then in the **AO_HOME/lib/add-ons** directory for a driver.

In the **User** field, type the name of a database user for the database. This user should have permissions to create tables and to insert records into those tables.

Note

The user name needs to match the database name in the URL.

- 3 Enter and confirm the database user password.
- 4 Select the frequency with which to upload metric data using the **Upload Once Every** menu.
- 5 Click **OK** to save the database connection configuration.

Database URLs and drivers

BMC Atrium Orchestrator Grid Manager requires a URL and a driver to identify the database management system.

The default URL and driver for each of the databases that can be interfaced with BMC Atrium Orchestrator are provided in the tables that follow. The default database name is “amp.”

Table 9: Supported databases

Database	URL	Driver
Hypersonic	dbc:hsqldb:hsq://localhost:9001:amp	org.hsqldb.jdbcDriver
Oracle	jdbc:oracle:thin:@localhost:1521:amp	oracle.jdbc.driver.OracleDriver
Oracle9i	jdbc:oracle:thin:@localhost:1521:amp	oracle.jdbc.driver.OracleDriver
PostgreSQL	jdbc:postgresql://localhost:5432/amp	org.postgresql.Driver
Sybase	jdbc:sybase:Tds:localhost:2638/amp	com.sybase.jdbc3.jdbc.SybDriver

Note

For Hypersonic and PostgreSQL databases BMC recommends that you create the schema prior to setting parameters in the **Database Configuration** tab. In addition, the schema name should be the same value as the user name.

In the URL templates, in terms shown in the form <a>, the “a” must be replaced with a value. For terms shown in the form [a], the value for “a” is optional. For terms shown in the form {a | b}, a value must be provided for either “a” or “b”.

Table 10: Other databases

Database	URL template	Driver
DB2	jdbc:db2://localhost[:<port>]/amp	com.ibm.db2.jcc.DB2Driver
DB2 AS/400	jdbc:db2://localhost[:<port>]/amp	com.ibm.db2.jcc.DB2Driver
DB2 OS 390	jdbc:db2://localhost[:<port>]/amp	com.ibm.db2.jcc.DB2Driver
Firebird	jdbc:firebirdsql://localhost[:<port>]/amp	org.firebirdsql.jdbc.FBDriver

Database	URL template	Driver
FrontBase	jdbc:FrontBase://localhost/{amp :<port>}	com.frontbase.jdbc.FBJDriver
Informix	jdbc:informix-sqli:// [localhost:<port>]amp: INFORMIXSERVER=<server name>;	com.informix.jdbc.IfxDriver
Ingres	jdbc:ingres://localhost:<port>/amp	ca.ingres.jdbc.IngresDriver
Interbase	jdbc:interbase://localhost[:<port>]/amp	interbase.interclient.Driver
Mckoi SQL	jdbc:mckoi://localhost[:<port>][/<amp>]/	com.mckoi.JDBCDriver
Microsoft SQL Server	jdbc:microsoft:sqlserver:// localhost[:<port>]	com.microsoft.jdbc.sqlserver.SQLServerDriver
MySQL	jdbc:mysql://localhost[:<port>]/amp	com.mysql.jdbc.Driver
MySQL with InnoDB	jdbc:mysql://localhost[:<port>]/amp	com.mysql.jdbc.Driver
MySQL with MyISAM	jdbc:mysql://localhost[:<port>]/amp	com.mysql.jdbc.Driver
Pointbase	jdbc:pointbase:server://localhost/amp	com.pointbase.jdbc.jdbcUniversalDriver
Progress	jdbc:jdbcprogress:T:localhost:{<port> <service-name>}:amp	com.progress.sql.jdbc.JdbcProgressDriver
SAP DB	jdbc:sapdb:[//localhost/]amp	com.sap.dbtech.jdbc.DriverSapDB
Sybase Anywhere	jdbc:sybase:Tds:localhost:2638/amp	com.sybase.jdbc3.jdbc.SybDriver

Note

For MySQL, the database name must be the same as the user name.

Troubleshooting

This chapter provides information to help resolve problems with BMC Atrium Orchestrator. It also describes the log files created by BMC Atrium Orchestrator.

If a problem occurs

Use the information in this section to try to resolve problems before you contact BMC Customer Support.

The issues that you may encounter with BMC Atrium Orchestrator fall within three categories based on when they occur.

Issue type	Where to look for information
During installation	The BMC Atrium Orchestrator Installation Guide
During setup and initial run	The BMC Atrium Orchestrator Installation Guide
After setup and initial run	The BMC Atrium Orchestrator System Administrator Guide

Using the log files to troubleshoot

Log files are the one of the primary sources of information used to troubleshoot issues in BMC Atrium Orchestrator.

For most issues, the **grid.log** file is the most helpful. The **grid.log** file is located in **\$AO_HOME/tomcat/logs**.

If you experience an issue when creating your own workflows, the **processes.log** may be the most useful in diagnosing the issue. The **processes.log** file is located in **\$AO_HOME/tomcat/logs**.

If the server has stopped or will not come up, the **catalina.log** (for Windows) or **catalina.out** (for Linux or UNIX) file may be the most helpful. The catalina files are located in `$AO_HOME/tomcat/logs`.

What to look for in the logs

In each of the logs there are certain key words or phrases to search for. If you find the word or words, look for the time stamp on the same line as or just before the word or phrase. Look also for the next timestamp after the word or phrase. The information between the time stamps contains details about the problem.

Note

There may be several lines of text between the timestamps.

In the **grid.log** file search for FATAL, ERROR, MessageNum, and Adapter-Request.

What to search for	What it means
FATAL	There is either an adapter error or a grid error.
ERROR	There is either an adapter error or a grid error.
MessageNum	The error occurred in BMC Remedy IT Service Manager.
Adapter-Request	An adapter request was sent out. Look to see if the request succeeded or failed.

In the **processes.log** file, search for ERROR and MessageNum.

What to search for	What it means
ERROR	There is either an adapter error or a grid error.
MessageNum	The error occurred in BMC Remedy IT Service Manager.

In the **catalina.log** file or the **catalina.out** file, search for SEVERE, and java.lang or java stack dump.

What to search for	What it means
SEVERE	There is a problem with java.
java.lang(java stack dump)	There is a problem with java.

What to do next

After you search for the key words, review the information on the lines closest to the key words. Look for any error messages or other distinctive information. Then use the BMC Knowledge Base to search for information relevant to the error message you find.

You can access the BMC knowledge base from the BMC Support web page at <http://www.bmc.com/support>.

grid.log example

```
05 Nov 2009 06:52:35,279 ERROR DefaultListableBeanFactory : Destroy method
on bean with name '_filterChainProxyPostProcessor' threw an exception
java.lang.OutOfMemoryError: PermGen space
```

In this example, you would search the knowledge base for the phrase "OutOfMemoryError" or "PermGen Space."

catalina.log example

```
Nov 2, 2009 5:07:47 PM org.apache.coyote.http11.Http11Protocol init
SEVERE: Error initializing endpoint
java.net.BindException: Address already in use<null>:8080
```

In this example, you would search the knowledge base for the phrase "Error initializing endpoint" or "Address already in use."

Sending troubleshooting logs to BMC Software

When you contact BMC Customer Support for help with an issue, BMC Customer Support may request specific log files such as the **grid.log**, catalina logs, or **processes.log**.

Follow the instructions from BMC Customer Support for preparing the log files for transmitting to BMC.

Troubleshooting procedures when the CDP fails to start

Use these steps if the configuration distribution peer (CDP) does not start.

- 1 Ensure you installed BMC Atrium Orchestrator on a supported platform and operating system and that the system meets the minimum requirements as specified in the *BMC Atrium Orchestrator Installation Guide*.
- 2 Ensure you are using jvm 1.6_16. BMC Atrium Orchestrator only supports Java version 1.6 update 16.
- 3 Ensure you can communicate with the server. For example, ping the server.
- 4 Ensure jvm1.6_16 is in the environment path. If the jvm 1.6_16 is not in the path then the server will not start.
- 5 Ensure that the server is properly stopped before restarting.
On Windows, check the services list or the Task Manager.
On UNIX or Linux, enter `ps -ef | grep java` and look for an entry with the BMC Atrium Orchestrator installation path.
- 6 Look for port conflicts in the grid.log.
Search for `ERROR` messages like `java_bind` which indicates that the port is already in use by another application.
- 7 Search for common peer startup messages like `No store configured`.
- 8 Examine the `catalina.out` or `catalina.log` file for server errors.

Log file descriptions

This section contains information about the log files that BMC Atrium Orchestrator creates.

Log file overview

BMC Atrium Orchestrator uses log files to record grid, process, configuration, and installation information.

Log files are stored on the computer where the service is running in the BMC Atrium Orchestrator home directory, the tomcat directory, or the directory where you store BMC Atrium Orchestrator Development Studio information.

Log file names and locations

File	Location	Description
grid.log	<code>\$AO_HOME/tomcat/logs</code>	BMC Atrium Orchestrator creates the grid.log file shortly after the peer is started for the first time. If a peer is running for five minutes, and this file does not appear, then there is probably something wrong with the default logging, or there has been a change to the logging configuration. This is the most important log file that BMC Atrium Orchestrator generates. If you report an issue, it is useful to have an excerpt of this log, starting from the point that the process started, to the point that the failure occurred.
processes.log	<code>\$AO_HOME/tomcat/logs</code>	Contains logging generated by BMC Atrium Orchestrator workflows.
catalina.log or catalina.out	<code>\$AO_HOME/tomcat/logs</code>	Contains log messages on actions by the container actions on startup and shutdown, and any actions taken to load a web application.
am.log	<code>\$AO_HOME/am/logs</code>	Contains logging information for BMC Atrium Orchestrator Access Manager.
repository.log	<code>\$AO_HOME/repository/logs</code>	Contains logging information for the repository.
aoocp.log	<code>\$AO_HOME/tomcat/logs</code>	Contains logging information for BMC Atrium Orchestrator Operator Control Panel including connectivity and user interface errors.
Installation logs		If the installation is successful, BMC Atrium Orchestrator copies installer logs to the \$AO_HOME directory. However, if the installation is not successful, the installation log file stays in the temporary directory. For more information, see the <i>BMC Atrium Orchestrator Installation Guide</i> .
BAO_install_log.txt		Platform installer log
BAO_studio.txt		BMC Atrium Orchestrator Development Studio installer log
BAO_content.txt		Content installer log When you install a solution, the content installer creates BMC Remedy logs in the <code><install folder>/import-logs</code> directory.

Logging Levels

The log files record information in chronological order. The log filename matches the name of the component installer.

Logging Level	Description
DEBUG	(Default for processes.log) The most detailed logging level. Logs low-level messages, normal execution, recoverable erroneous conditions, and non-recoverable erroneous conditions.
INFO	Logs normal execution, recoverable erroneous conditions, and non-recoverable erroneous conditions.
WARN	(Default for grid.log) Logs recoverable erroneous conditions and non-recoverable erroneous conditions.
ERROR	The least detailed logging level. Logs only error conditions that are not usually recoverable.
OFF	Turns off logging on the grid. Logs will not be created for any peer on this grid.

The grid.log

The **grid.log** is the most important log file that BMC Atrium Orchestrator generates.

The **grid.log** file constantly receives information and can become large. Once the file reaches 4 Mb the file is archived to a sequentially numbered file, **grid.log.#** where # is a single digit from 1 to 9, and BMC Atrium Orchestrator creates a new **grid.log**. The rolled over file, **grid.log.#** no longer receives logging information. Over time, it is normal to see many **grid.log.#** files in the **[AO_HOME]/tomcat/logs** directory.

Tomcat logs

Tomcat logging is useful when troubleshooting issues such as the container fails to start, a web application does not seem to come up, or if the server crashes unexpectedly. Information about the failure may be logged in the **catalina** or the **localhost** logs. Tomcat is a servlet container. By default a Tomcat server is installed in the **[PEER_HOME]/tomcat** directory. Tomcat logs are recorded in the directory **[PEER_HOME]/tomcat/logs**. The **PEER_HOME** directory is the **AO_HOME** directory on the computer where the peer is installed.

Tomcat logs include:

- **admin.<date>.log**

- catalina.<date>.log or catalina.out
- host-manager.<date>.log
- localhost.<date>.log
- manager.<date>.log

catalina log

The catalina log contains log messages on actions by the container actions on startup and shutdown, and any actions taken to load a web application. The example below shows a catalina log message for a failure to start a web application.

```
SEVERE: Error initializing endpoint  
java.net.BindException: Address already in use<null>:8080
```

Web contexts are used to identify the BMC Atrium Orchestrator applications in the catalina log files. You will not see terms like CDP, activity peer, or Grid Manager. During installation you can specify alternate names for the web context, which are reflected in the catalina log reflects. The default web context names are:

- **baocdp** for a configuration distribution peer (CDP)
- **baoap** for an activity peer (AP)
- **baolap** for a lightweight activity peer (LAP)
- **baoam** for BMC Atrium Orchestrator Access Manager
- **baooop** for BMC Atrium Orchestrator Operator Control Panel
- **baograph** for the graphing server component

The localhost logs

The localhost logs are used to troubleshoot startup and shutdown errors. The localhost logs appear in the same directory as catalina logs. By default, the localhost logs are logged with a date in the file name; for example: **localhost.2008-12-12.log**.

Logging configuration files

BMC Atrium Orchestrator uses the log4j logging framework. You can review the logging properties for the components in these files.

The table below shows where you can find the logging configuration files for each component. For server components the log paths in the table are given relative to [TOMCAT_HOME], and assume that the default context name is used. The path is [TOMCAT_HOME] [AO_HOME]/tomcat.

WARNING

Do not change the settings in the log4j files without assistance by BMC Customer Support. To adjust logging levels use BMC Atrium Orchestrator Grid Manager.

Component	Configuration file
BMC Atrium Orchestrator Development Studio	[STUDIO_HOME]/log4j.xml
CDP, BMC Atrium Orchestrator Grid Manager, Reporting JSP	webapps/baoctp/WEB-INF/classes/log4j.properties
AP	webapps/baoap/WEB-INF/classes/log4j.properties
LAP	webapps/baolap/WEB-INF/classes/log4j.properties
BMC Atrium Orchestrator Operator Control Panel	webapps/baoocp/WEB-INF/classes/log4j.properties
BMC Atrium Orchestrator Access Manager	webapps/baoam/WEB-INF/classes/log4j.properties

Reference material for troubleshooting

This section contains reference material that may be helpful when resolving issues.

Time synchronization

Verify that the date and time values for the servers housing BMC Atrium Orchestrator components are synchronized within a tolerance of five seconds. BMC Software recommends a network time protocol (NTP) server to manage synchronization.

Communication ports requirements

Peer communications are established through HTTP and TCP ports. BMC Atrium Orchestrator communications require unique port assignments, and each component has specific port requirements. The web server requires two ports: one for standard communications, and a second to receive shutdown commands. Different

components can use the same port, provided they are installed on separate servers. A port number must be available exclusively on a server. The table below lists the default ports for BMC Atrium Orchestrator.

Note

Port 1089, the JMX RMI service port, is set at installation prior to starting BMC Atrium Orchestrator. It is a hardcoded port value in the platform installation. Prior to installing BMC Atrium Orchestrator, ensure that port 1089 is not in use.

Port description	Protocol	Components	Default port
HTTP port	HTTP	BMC Atrium Orchestrator Access Manager, repository, CDP, AP, graphing components ^a	8080
Shutdown port	HTTP	CDP, Repository ^a	8005
Peer communications port	JMS with SSL	CDP ^a	8081
		HACDP ^b	8083
		AP -- Listens on the first port available in the range. The first available port in the range becomes the default port. ^b	8083-8339
		LAP -- Listens on the first JMS port available in the range. The first available port in the range becomes the default port. ^b	8083-8339
Communications port	SSL or TCP	BMC Atrium Orchestrator Access Manager ^a	61616

a You can set this port value during installation.

b You cannot set this port value during installation.

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