

HP Application Discovery Version 4.0 User's Guide

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About This Document

This document presents procedural and example information to help you become familiar with Application Discovery, how to manipulate the data presentation, and how to manage event notification. It will help you understand how Application Discovery can be useful to you.

Intended Audience

This document is intended for system and application administrators responsible for installing, configuring, and monitoring application health and availability within a network. Administrators are expected to have knowledge of operating system concepts, commands, and configuration. Parts of this document are also intended for data center operators. Operators are expected to be able to identify significant events and communicate them to others. This document is not a tutorial.

New and Changed Information in This Edition

This document is new, and contains conceptual, procedural, and example material to provide detailed information about how to use Application Discovery. It contains the following information:

- *An Introduction to Application Discovery.*
- *Components and Concepts* that underlie the workings of Application Discovery.
- *Procedures* that can be done within Application Discovery to modify the display of data within Application Discovery and to create user-defined application definitions recognized by HP Virtualization Manager, as well as by Application Discovery.
- *Tasks and Examples* that illustrate more complex ways to use Application Discovery.
- *Troubleshooting* instructions for solving errors in the configuration and operation of Application Discovery.

Typographic Conventions

This document uses the following typographical conventions.

<code>audit(5)</code>	A manpage with the name <i>audit</i> , located in Section 5.
Command	A command name or qualified command phrase.
ComputerOut	Text displayed by the computer.
Ctrl-x	A key sequence. A sequence such as Ctrl-x indicates that you must hold down the key labeled Ctrl while you press another key or button.
ENVIRONVAR	The name of an environment variable, for example, <code>PATH</code> .
[ERRORNAME]	The name of an error, usually returned in the <code>errno</code> variable.
Key	The name of a keyboard key. Return and Enter both refer to the same key.
UserInput	Commands and other text that you type.
<i>Variable</i>	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
[]	The contents are optional in formats and command descriptions. If the contents are a list separated by , you must choose one of the items.
{ }	The contents are required in formats and command descriptions. If the contents are a list separated by , you must choose one of the items.
...	The preceding element can be repeated an arbitrary number of times.
Ⓢ	Indicates the continuation of a code example.
	Separates items in a list of choices.

Related Information

The following documents and resources contain useful additional information.

- *HP WBEM Solutions*:
http://h71028.www7.hp.com/enterprise/9920-0-0-225-121.html?jumpid=reg_R1002_USEN
- *PCRE - Perl Compatible Regular Expressions* at <http://www.pcre.org/> for building aggregation rules in application templates.
- *Virtual Server Environment (VSE)* documentation at <http://docs.hp.com/en/vse.html>.
- The *HP VSE Managed Node Software Update* web site (<http://vsegmt.external.hp.com>)

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5992-3838	A.04.00.07	<i>For managed nodes:</i> HP-UX, Linux <i>For CMS:</i> HP-UX, Microsoft® Windows	For information on support for specific operating system versions, please consult the appropriate installation guide viewable at http://docs.hp.com/en/vse.html .	May 2008

HP Encourages Your Comments

Your comments and suggestions regarding product features will help us develop future versions of the Application Discovery and the VSE Management Software. Use the following e-mail address to send feedback directly to the VSE Management Software development team:
vse@hpuxweb.fc.hp.com



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Include the document title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document. Also, please let us know what we did right so we can incorporate it into other documents.

1 Introduction

HP Application Discovery works from within HP Systems Insight Manager (HP SIM) to give you the ability to inventory running and installed applications across your system network and to centrally monitor application activity.

Within VSE Management Software, HP Application Discovery integrates with HP Virtualization Manager to give you the power to group running processes into custom applications that can be added to a workload for more comprehensive resource management.

The HP Application Discovery server and user interface run on the *central management server* (CMS). Working in tandem with the agent that you install on your managed systems, HP Application Discovery gives you access to system and process information captured by the deployed agents.

With Application Discovery, you can do the following:

- Discover the location and number of recognized, running and installed *applications* in your network or data center.
- Monitor the activity and resource usage of running processes and applications.
- Define and adapt application templates to your environment for better discovery of your third-party and custom applications, and to make them available for adding to monitored workloads.
- Select the event types for which you want to receive notifications and set their level of importance.

Features of Application Discovery

You can use Application Discovery to do the following:

- Access application data from within the HP SIM user interface.
- Automate discovery of standard applications supplied with HP operating systems.
- Automate discovery of applications often run on HP operating systems within data centers. For example, Application Discovery includes templates to discover common applications generated by Oracle® and SAP software.
- Find *unmatched processes* that represent third-party or custom software.
- Edit or create an application discovery *template* to make it specific to your environment.
- Determine the location of *running* and installed applications.
- Monitor the activity of running processes and applications.
- Define severity for application-oriented events to trigger notification messages, and control where the messages display (in Application Discovery and/or HP SIM).
- Discover the presence or absence of Application Discovery agents and check their status.
- Monitor the behavior and performance of the Application Discovery server.

2 Components and Concepts

Application Discovery Components

Application Discovery contains these components:

- The Application Discovery *agent*, which discovers the presence of applications and processes on a managed system, collects information about the managed system and its applications, and communicates that information to the Application Discovery server on the central management server.
 - An agent is fully autonomous.
 - An agent is the only component that is platform-specific (by operating system type and version).
- The Application Discovery *server*, which communicates with agents, runs all of the algorithms, tracks events, stores templates, and passes data to the user interface.
- The Application Discovery *WBEM provider*, which provides transport for commands issued by the Application Discovery server from the central management server (CMS) to the agents.
- The Application Discovery *user interface*, which displays collected data and provides mechanisms that allow the user to modify and refine aspects of user interface, agent, and server behavior; and data display.
- *SSL certificate helper files*, which build necessary administrative command files. These files include commands to manage and exchange SSL certificates, allowing the agent and the CMS to authenticate the legitimacy of the transmission.
- The Application Discovery *initialization scripts*, which initialize the database, install the user interface into HP SIM (including the help system for Application Discovery), and set up the conditions for certificate exchange between agent and server.
- The Application Discovery *templates*, which define the objects of discovery for identification and data collection.

Agents and WBEM providers are installed and run on the managed systems where applications are to be discovered and monitored. The Application Discovery server and user interface are installed on the CMS. The templates also reside on the CMS.

The data transmitted by Application Discovery agents includes the following:

- Running process information, including command lines and command-line arguments, working directories, users, and environment variables
- Installed software information
- Operating system and architecture versions

Application Discovery uses installed software registries and templates (user-defined and those provided by HP) to match known attributes to discovered data for analysis and presentation in a user interface.



NOTE: An application inventory in a data center or enterprise setting is sensitive material. Therefore, all communication paths in Application Discovery are encrypted and authenticated to check for proper user authorization. See VSE Management Software Version 4.0 Installation and Update Guide for HP-UX for information about steps that must be taken to ensure that Application Discovery's security measures are in place and functioning correctly. For a discussion of access by user job roles, see "User Authorizations" in the *VSE Software Management Help* online reference. For help with communication problems, see "Introduction" (page 43).

Refining Application Discovery

Refining discovery is the process of optimizing agent and template configurations to enrich data display in HP Application Discovery.

How Discovery Works

HP Application Discovery includes a set of application *templates* that cover a spectrum of typical application types expected to be found on systems operating within a network or data center. A template is a set of rules that defines the matching criteria for the processes that constitute an application. This default set of templates allows HP Application Discovery to find, identify, and display information for a significant percentage of installed packages and *running applications* and processes.

On any one system, a percentage of processes found to be active on a host might not be matched to a provided template or a discovered package. These are referred to as *unmatched processes*. Of these unmatched processes, some may reflect the presence of custom or third-party software.

HP Application Discovery helps you to refine discovery in the following ways:

- It provides a summary view into total discovery across your data center or network.
- It provides a list of candidate servers and indicates whether or not they have HP Application Discovery agents running or installed for discovery.
- It provides a way to edit existing application templates and create new ones. When you modify or add templates to better adapt them to your environment, you refine the ability of HP Application Discovery to report application behavior in your particular network.



TIP: At times, you might simply need to find where an application is running or installed. For this information, click the **Applications** tab to browse current data.

Understand Your Current Discovery State

To view the current state of discovery, click the **Admin/Config** tab, and then the **Discovery** tab.

Discovery Ratio

From the **Discovery** tab, you can see the *discovery ratio* for each managed system running an HP Application Discovery agent, as well as the total discovery of processes and packages for all monitored systems. Use this information to help determine where to expend effort to improve discovery.

The following figure shows a segment of process inventory data.

Figure 2-1 Segment of Process Inventory Data

Tot proc	Sys proc	Match proc	Unmatch proc	Disc ratio
516	40	247	229	55.6%
176	40	134	2	98.9%

For example, if the discovery ratio is low, the number of processes that HP Application Discovery is matching to templates is low. Because more data can be gathered from known relationships, a low ratio indicates that much less can be known and displayed for the processes that are using resources on that host.

Conversely, if the discovery ratio is high, HP Application Discovery can provide extensive amounts of data on system behavior. This information is a richer source for informed decision-making about resource allocation.

Warm-up Ratio

The warm-up ratio indicates the degree to which the HP Application Discovery agent has completed an initial survey of packages on a managed host. Processes that are eventually associated with a package are listed as unmatched processes until the packages are completely catalogued.

A warm-up ratio of 100% indicates that an initial survey of packages has been completed since the last startup of the HP Application Discovery agent on the managed host. A ratio of less than 100% indicates that the agent might still be in the process of cataloguing and displaying packages present on the managed host. It might also indicate that a problem exists in the HP Application Discovery agent/server communication.

The following figure shows a segment of package inventory data.

Figure 2-2 Segment of Package Inventory Data

Tot pkg	Cmplt pkg	Wrmup ratio	Pend pkg
2732	2236	81.8%	496
2542	2542	100%	0

Once you understand the current state of discovery on a managed host or across a network, you can improve the quality of discovery. The next few sections discuss ways to refine discovery.

Refine Discovery by Checking Agent State

HP Application Discovery provides information about the operation of its agents so that you can make decisions about where and when to use them, and so that you can know the state of their health.

To learn about agent status, follow the process for checking agent state as described in the following section.

The information provided can help you decide if you want to do one or more of the following:

- Install an HP Application Discovery agent in order to monitor processes and applications on that host. See *VSE Management Software Version 4.0 Installation and Update Guide for HP-UX* for instructions.
- Start an agent on a system where the agent is installed, but not running.
- Modify the behavior of an agent on a system to affect data freshness and retain history.

Refine Discovery by Creating Application Templates

HP Application Discovery is shipped with a set of default templates that it uses to discover applications that are likely to be present within an extensive network or data center. These templates can be copied and edited to quickly create new, similar templates, or you can create a completely new template that contains no predetermined settings. To see your current list of templates, click the **Admin/Config** tab, then the **AD Templates** tab.

To define an application, you can do the following:

- Edit an existing template to better define the application to which it applies.
- Copy an existing template and modify it to collect a new set of unmatched processes into an application.
- Create a new template to collect a set of unmatched processes into an application.

See “Managing Application Templates” (page 30) for instructions on creating and editing templates.

Understanding Application Templates

HP Application Discovery is shipped with a set of default application templates that it uses to discover applications that are likely to be present within an extensive network or data center. These templates can be copied and edited to quickly create a new, similar templates, or you can create a completely new template that contains no predetermined settings.

Application template storage Template attributes are stored in the form of an XML document. This means that each attribute is encapsulated in XML tags that must be valid in their structure. HP Application Discovery provides a template editor to help you build valid XML template documents.

Application template recognition HP Application Discovery recognizes the uniqueness of a template based on its name and its version, and informs you when you try to use a name and version combination that is already in use by another application template.

Application template precedence On HP-UX, HP Application Discovery looks for templates stored in the `/var/opt/amgr/templates/local` directory before applying the standard templates supplied with HP Application Discovery. Application templates found in the `local` directory have precedence over templates supplied with the product.



On HP-UX:

Supplied templates are stored in `/var/opt/amgr/templates/amgr/` to make it easier to update templates with new releases of HP Application Discovery. New application templates provided by HP can replace templates in this directory. Copies of these templates, which are stored in `/var/opt/amgr/templates/local/`, are unaffected by release updates to the software.

On Microsoft® Windows:

Templates are stored in the VSE install directory (`C:\Program Files\HP\Virtual Server Environment\data\templates\`). For information on where HP VSE is installed by default, see *HP Insight Control Management Quick Setup Poster*.

How Memory Usage is Calculated

Processes have *private* memory, which is owned privately by each process, and they have *shared* memory. Shared memory can be shared (in theory) with none, one, some, or all other processes on the same system.

In Application Discovery memory calculations are made for matched applications and displayed in the detail screen of a host (total memory usage and by application), as shown in the following image.

Stat	Ev	Application	Version	Usr	Pr	Up	Uptime	Stop time	%CPU	pMem	vMem
0		AppDisc/M	3.0.00.00.%20070301	1	1	1	9h53m		0.1%	24.45Mb	29.40Mb
0		CDE	B.11.23	1	1	1	2w4d		0%	8.59Mb	20.61Mb
0		DCE-Core	B.11.23	1	1	1	2w4d		0%	11.76Mb	27.03Mb

In Application Discovery, application memory shown is the sum of all private memory in use by all the processes in that application *and* the sum of all shared memory in use by all the processes in that application. That is, shared memory is displayed as though it is not shared. This means that the totals shown for memory usage are an *overstated approximation* of actual memory usage for any particular application.

Here is why accurately summing memory shared among processes is difficult to do:

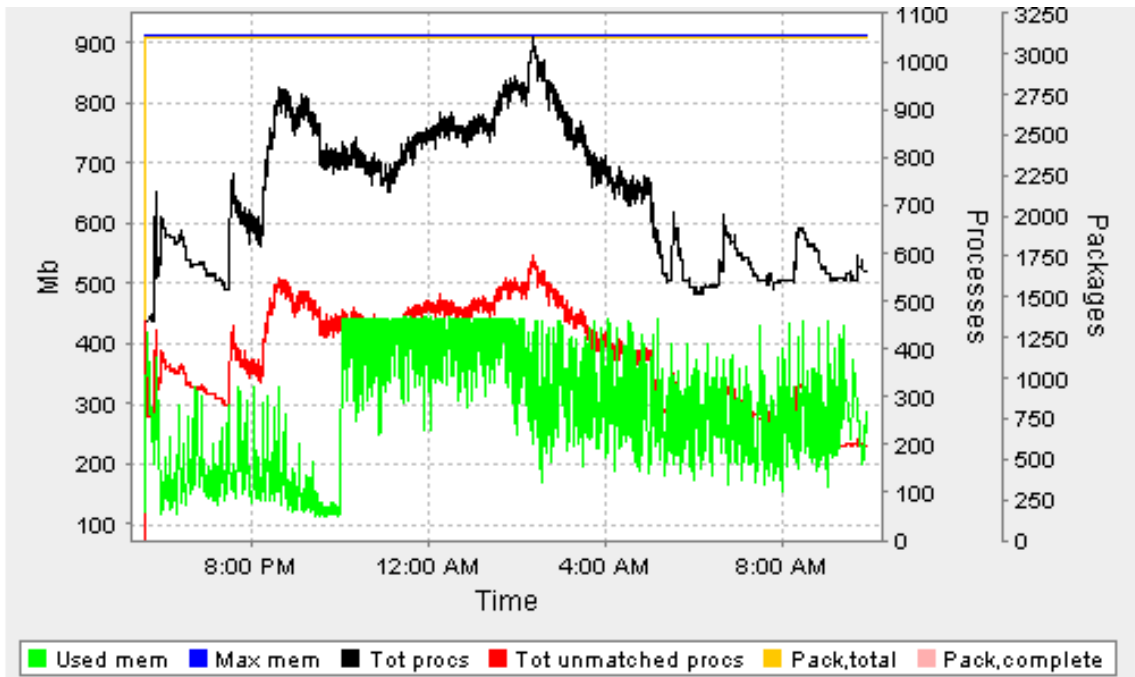
- The degree of sharing among processes is unknown. For a given process, the shared memory can be shared with every process on the system, only some processes on the system, only some processes within the application, or with all of the processes within the application.
- The 'right' answer for how to sum shared memory for processes depends in part on how the individual administrator uses the information for planning. For example, is the administrator thinking of adding an application instance to the host? Is he or she thinking of moving an application instance to another host? Is the administrator thinking of moving the entire application to another host?

To arrive at a usable deterministic answer, all the shared memory for each process is summed. This conservative calculation should allow you to safely estimate resource usage for the applications shown.

Understanding Server Resource Consumption

Application Discovery consumes varying amounts of server resources as it goes about its work of discovering application and system data for display and storage. To monitor this resource usage, select the **Admin/Config** tab and then the **AD Server** tab.

On the **AD Server** tab screen, you can see a graphic display of Application Discovery memory consumption plotted against discovery data for processes and packages. The following figure is an example of what you might see:



The key to the graphic is as follows:

Used mem	Memory usage by the Application Discovery server
Max mem	Maximum memory available for use
Tot procs	Total number of processes found — matched and unmatched to known templates or packages
Tot unmatched procs	Total number of processes found that have not been matched to known templates or packages
Pack, total	Total number of expected packages according to initial survey.
Pack, complete	Total packages found during and on completion of inventory.

3 Procedures

With Application Discovery, you can perform the following tasks:

- Check the progress of discovery.
- Define an application for discovery.
- Modify the behavior of agents running on managed systems.
- Set attributes that determine what events to display, where to display them, and the priority they should have.

Starting Application Discovery

1. Enter your user name and ID into the HP Systems Insight Manager (HP SIM) interface.
2. Accept the certificate required by HP SIM.
3. Select **Tools**→**Integrated Consoles**→**HP Application Discovery**.

HP Application Discovery opens in the main display panel of the Applications view.

Modifying Agent Behavior

Use the information in this section to control the HP Application Discovery agent from the command line and to adapt its behavior to your environment. For ways to manage and monitor the agent from the user interface, see these sections:

- “Setting Data Polling Interval” (page 28)
- “Checking Agent State” (page 22)

Install the HP Application Discovery Agent on a Managed Node

See “Installing VSE Agent Software on Managed Systems” in the *VSE Management Software: Installation and Update Guide* for instructions on how to install the HP Application Discovery agent via the HP Systems Insight Manager (HP SIM) menus or manually. The *VSE Management Software: Installation and Update Guide* is available with the software and on <http://docs.hp.com/>.

Start the HP Application Discovery Agent

You can start the agent from the HP SIM top menu or from the command line.

Using HP SIM to Start the Agent

1. Initiate this task by selecting **Configure** →**Configure VSE Agents**→**Start AD Agents** from the HP SIM top menu.
2. Using the HP SIM system list, select the HP-UX systems where you want to start an agent. Click **Apply**.
3. Verify the system selection and click **Next**.
4. A description of the action about to take place is displayed. When you are sure that you want to complete the action, click **Run now** to start the agent.

Starting the Agent from the Command Line

To start the agent from the command line on the managed node, enter the following command:

```
/opt/amgr/bin/amgrd
```

For the full description of the options available for modifying agent behavior, see “Commands for Controlling HP Application Discovery Agent and Certificates” (page 55).

Stop a Running Agent

You can stop the agent from the HP SIM top menu bar or from the command line.

Using HP SIM to Stop the AD Agent

1. Initiate this task by selecting **Configure** → **Configure VSE Agents** → **Stop AD Agents** from the HP SIM top menu bar.
2. Using the HP SIM system list, select the HP-UX systems where you want to stop an agent. Click **Apply**.
3. Verify the system selection and click **Next**.
4. A description of the action about to take place is displayed. When you are sure that you want to complete the action, click **Run now** to stop the agent.

Stopping the Agent from the Command Line

To stop a running agent, enter the following command:

```
/opt/amgr/bin/amgrd -stop
```

For the full description of the options available for modifying agent behavior, see “Commands for Controlling HP Application Discovery Agent and Certificates” (page 55).

Reconfigure a Running Agent from the Command Line

To change attributes of the agent while it is running, type on the command line:

```
/opt/amgr/bin/amgrd [-option] [-option]
```

For example, the following command illustrates changing the frequency for collecting data about processes and packages.

```
/opt/amgr/bin/amgrd [-procfreq interval{s|m|h}] [-packfreq interval{s|m|h}]
```

where

- `-procfreq interval{s|m|h}` changes the current frequency for collecting process data.
- `-packfreq interval{s|m|h}` changes the current frequency for collecting package data.

and *interval* is the time span between polls. *Interval* may be given in seconds (s), minutes (m), or hours (h).

For example, the following command designates a process collection frequency of 10 minutes and a package collection frequency of 30 minutes:

```
/opt/amgr/bin/amgrd [-procfreq 10m] [-packfreq 30m]
```

For the full range of options, see “Commands for Controlling HP Application Discovery Agent and Certificates” (page 55).

Checking Agent State

To check agent state, find agent state from within HP Systems Insight Manager (HP SIM).

1. Select **Configure** → **Configure VSE Agents** → **Check AD Agent States**.
2. Select the HP-UX systems where you want to find agent status from the HP SIM system list. Click **Apply**.
3. Verify the system selection and click **Next**.
4. You can see a description of the action about to take place. When you are sure that you want to continue with the task, click **Run now** to complete the agent status report.
5. After a short time, the report appears in the main viewing window. It summarizes identifying information and provide the state for the machine(s) that you selected earlier in the process.

6. If desired, scroll down to access a printable copy of the report. Click the **View Printable Report** button to open the printable version of the report.



NOTE: If you find that you are unable to obtain agent status from within HP SIM, check the following:

- That you have the correct permissions associated with your login ID so that you can view Application Discovery agent states. See “User Authorizations” in *VSE Management Software Help* for information on Application Discovery authorizations.
- That the targeted managed node has been authorized to accept remote commands from HP SIM.

To authorize the acceptance of remote commands, on the command line of the CMS, type
`mxagentconfig -a -n managed_system`

where *managed_system* is the name of the target system for which you want to enable remote communication.



Have you recently restored or removed and reinstalled the CMS? :

A restore or removal of the central management server also removes the certificate recognition previously established between Application Discovery server on the CMS and Application Discovery agents on managed nodes. This relationship must be re-established when the CMS is reinstalled or restored by completing the Application Discovery certificate exchange. See “Completing Certificate Exchange” (page 63) for information.

Explanation of Agent States

Table 3-1 shows the possible values for agent state.

Table 3-1 Possible Values for Agent State

Value	Meaning
Connected	Installed, daemon running, connected; able to transfer data
Disconnected	Installed, daemon running, disconnected; unable to transfer data
Agent not running	Installed, daemon not running; unable to collect data
No CMS Cert	No certificates exchanged between Application Discovery server and agent; unable to complete data transfer
Agent not installed	Connected to target system; no agent found
No contact	The server cannot connect to the target system. The target system may be down or not configured for remote command execution from HP SIM.

See *VSE Management Software: Installation and Update Guide* (for HP-UX or for Microsoft Windows) for instructions on how to install an Application Discovery agent. Also see the following:

“Completing Certificate Exchange” (page 63)

“Start the HP Application Discovery Agent” (page 21)

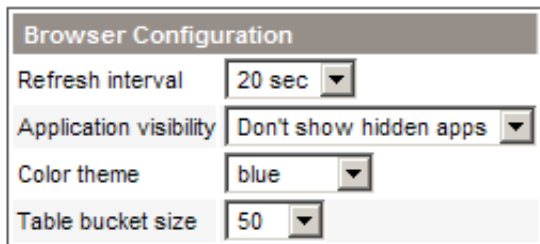
Working With Data Views

For expanded discussions about what can be seen in each Application Discovery data view, see the *Application Discovery Help* reference in the software.

Adjusting the User Interface

You can alter several visual and behavioral aspects of the Application Discovery user interface for the duration of your user session. Application Discovery does not store these changes as user preferences.

To take advantage of these settings, select the following tabs: **Admin/Config**, then **UI**. The following images show the controls available from the **UI** tab.



Set Screen Data Refresh Interval

Application Discovery can refresh data to the interface screens at variable intervals. You can select the interval you prefer, or you can turn the refresh interval off.

To change the refresh interval, use the "Refresh interval" drop-down to select the setting that you prefer.

Your selection is applied automatically and immediately.

See also

["Other Controls Available from Right-Clicking on a View Table" \(page 26\)](#)

Set General Visibility

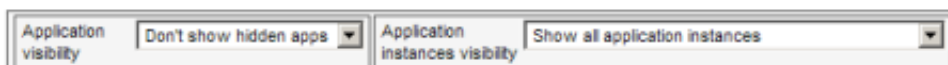
You can alter application visibility by setting this configuration.

Use the "Application visibility" drop-down to affect visibility of applications across your network.

- Use `Don't show hidden apps` when you want to enable the hide functionality for individual applications. This is the default setting.
- Use `Show hidden apps` when you want to quickly locate all discovered applications without changing the hide settings for individual instances.

Your selection is applied automatically and immediately on all data tables in Application Discovery.

Another way to do this is to use the drop-down selector that appears above tables that list applications. The following figure shows these visibility selectors. The visibility setting selected here is also applied to all application tables in Application Discovery screens.



See also

["Set Visibility for Packages on Application Discovery Screens" \(page 27\)](#)

["Set Visibility for Matched Applications" \(page 27\)](#)

["Set Visibility for Hosts on Application Discovery Screens" \(page 26\)](#)

Set Color Theme

Select one of four color choices by setting the "Color Theme" attribute.

Your selection is applied automatically and immediately to the Application Discovery user interface.

Set Number of Table Rows

To help you to view manageable chunks of data, you can select the maximum number of rows to display within an Application Discovery table. Application Discovery apportions the data into separate pages based on the number that you select.

Use the "Table bucket size" drop-down to select the number of rows that you want to appear in each table per page. The default number of rows is set to 50, but you can select more or fewer rows for each table page.

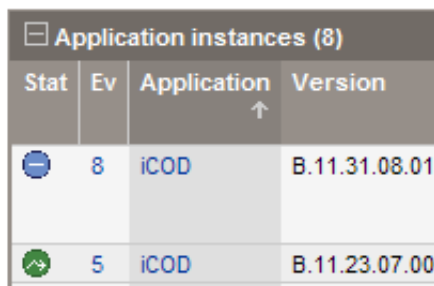
Your selection is applied automatically and immediately to all data tables in Application Discovery.



Change the Data View

Various ways exist to help you sort and filter the data displays so that you can see across application and server activity and drill down to the specifics a particular application or server.

Sort Data in View Tables

The default sort order. Each table displays with one column having a dark grey background in the column heading and an arrow. The dark grey color indicates which column is driving the sort order for all rows of data in the table. The arrow indicates whether the column has been sorted in ascending or descending order. Criteria for the order may be numeric or alphabetical.



Stat	Ev	Application	Version
	8	iCOD	B.11.31.08.01
	5	iCOD	B.11.23.07.00

Changing the sort column. To change which column is driving the sort order for the table, click on or near the title of the column containing the criteria by which you want to sort. The background color of the newly selected column heading changes from medium grey to dark grey, revealing the sort arrow indicator.

Changing the sort order. Click the arrow in the selected column to toggle between ascending and descending order.

Filter Data in View Tables

The default filter The initial filter state of a table is set to 'none' so that all known data for that table view is displayed.

Hiding specific rows by a selected criteria. You can hide specific rows of data by right-clicking on any text in a table row, and choosing to *filter in* or *filter out* a piece of data. For example, you may want to hide all rows containing `server_name_y`. To do so, right-click on `server_name_y` in any table cell containing that server name, and select **Filter out `server_name_y`**. All rows containing that name are no longer be visible in the table when the view refreshes.

Showing hidden rows. To return the table to its original default state (thereby revealing all rows hidden up to this point), right-click on any table row and select **Clear filter**. The table returns to its original state.

**NOTE:**

Hidden applications. Note that the filtering discussed in this section concerns manipulating data that is currently displayed in the tables. Some applications are not shown in the table. They might be common, low-level processes that are hidden by default, or they might have been hidden by a user.

To quickly see how many applications might be hidden from view, look at the upper right hand corner of the application table:

Running application instances (1)		(28 hidden)	
Ev	Application	Sver	Arch
0	Postgres database	1.11.23	ia64



Other Controls Available from Right-Clicking on a View Table

Refresh the page data. Right-click anywhere in the view screen and select **Refresh page**.

Collapse a table. Right-click on any table row and select **Collapse table** to remove the rows of data from view. This function is most useful when multiple tables are present on a screen and you want to quickly move to other tables.

Expand a table. Within a collapsed table, right-click anywhere in the table title bar and select **Expand table** to expose the data for that table.



NOTE: On screens showing multiple tables, the tables have an expand/collapse icon ( or ) in the upper left corner of the table title bar. Click the icon to expand or collapse the table.

Navigate Between Views

Application Discovery provides two navigation aids to help you move from data view to data view.

Navigating with Tabs

Application Discovery provides a set of tabs for navigating among the aggregated data views. At the top level, these views are categorized as **Applications**, **Hosts**, and **Events**. Under the **Admin/Config** tab, you can find additional views for **AD Templates**, **Packages**, and **AD Agents**. Click the tabs to move from view to view.

Navigating with Table Links

As you review the tables in different views, you can see some data entries are linked. In particular, you can see that application name and host name are usually linked. Clicking an application name or host name opens a view showing data for that specific application, application instance, or host. Use these links to find an application- or server-specific view.

Adjusting Visibility of Applications Within Application Discovery Data Tables

Set Visibility for Hosts on Application Discovery Screens

To help you control the amount of data presented to you, Application Discovery provides several ways to modify the visibility of objects in Application Discovery screens. In addition to modifying host visibility (discussed here) you can also change the visibility of packages and applications.

To change visibility of a host:

1. Click the following tabs in Application Discovery: **Admin/Config**, then **Discovery**.

2. In the table listing all hosts, find the column labeled 'Visible'.
3. Click the button to toggle visibility of hosts on Application Discovery screens to yes (Y) or no (N). Select N to prevent the host and its accompanying data from showing in Application Discovery data tables. Select Y to allow the host and its accompanying data to show in Application Discovery data tables.

Set Visibility for Matched Applications

To help you control the amount of data presented to you, HP Application Discovery provides several ways to modify the visibility of objects in HP Application Discovery screens. In addition to modifying application visibility (discussed here) you can also change the visibility of packages and hosts.

To change visibility of a matched application:

1. Click the following tabs in HP Application Discovery: **Admin/Config**, then **AD Templates**.
2. In the table listing all application templates, find the column labeled 'Visible'.
3. Click the button to toggle visibility of applications matched to a template to yes (Y) or no (N). Select N to prevent the applications that match this template from showing in HP Application Discovery data tables. Select Y to allow the applications that match this template to show in HP Application Discovery data tables.



NOTE: When creating a workload in HP Virtualization Manager, you have the option of checking 'Show All Running Applications'. In essence, this check box allows you to reveal all running applications that have been previously marked as hidden in HP Application Discovery by a user or by default. See "Add Selection by Application" in *HP Virtualization Manager Help* for usage instructions.

Set Visibility for Packages on Application Discovery Screens

To help you control the amount of data presented to you, Application Discovery provides several ways to modify the visibility of objects in Application Discovery screens. In addition to modifying package visibility (discussed here) you can also change the visibility of hosts and applications.

To change visibility of a package:

1. Click the following tabs in Application Discovery: **Admin/Config**, then **Packages**.
2. In the table listing all packages, find the column labeled 'Visible'.
3. Click the button to toggle visibility of packages on Application Discovery screens to yes (Y) or no (N). Select N to prevent the package from showing in Application Discovery data tables. Select Y to allow the package to show in Application Discovery data tables.

Modifying the Graphic Display of Application Discovery Server Activity

You can change the time span shown in the graph.

1. Click the **Admin/Config** tab, then the **AD Server** tab.
2. Locate the "Graph Controller" to the right of the graph.
3. Click the drop-down arrow to see the time spans from which to choose.

Time periods are given in minutes (m) and hours (h). Choose auto to see the time span from server startup to now.

The graphic immediately repaints when you change the time span.

The Impact of Discovery on Application Discovery Server Memory Usage

Memory use might be higher during the initial *warmup* period when *application discovery* is at its height, and lessening over time as the majority of discovery is completed.

Modifying the Maximum Size of an Event List

To set event list size, do the following steps.

1. Click the **Admin/Config** tab, then the **AD Server** tab.
2. Locate the drop-down 'Max Events' listed at the bottom of the "Server Configuration" box to the left of the graph.
3. Select the maximum number of events to store in the primary event log.

Server Configuration	
Version	3.0.00.00.%20070227
Protocol version	6
Warmup	100%
Run Aps	61
Inst Aps	660
Packages	6770
Hosts	4
Procs	517
Unmatched procs	144
Active hosts	4
Max Events	500

Event lists are *pruned* periodically to the number set in "Max Events". The new setting is applied the next time the list is pruned.

Setting Data Polling Interval

You can set the frequency at which the Application Discovery agent sends fresh data to the Application Discovery server. You can set polling for processes and for packages separately.

1. Click the following tabs: **Admin/Config**, then **AD Agents**.
2. Find the global settings box on the left of the screen.

Global settings		Global values	
Auto accept agent certificates	off	Connected agents 0%	
Global host/process interval	1m		
Global package interval	5m		

3. Select an interval from the list.

The default settings are every one minute for host/process data transmission and every five minutes for package data transmission.

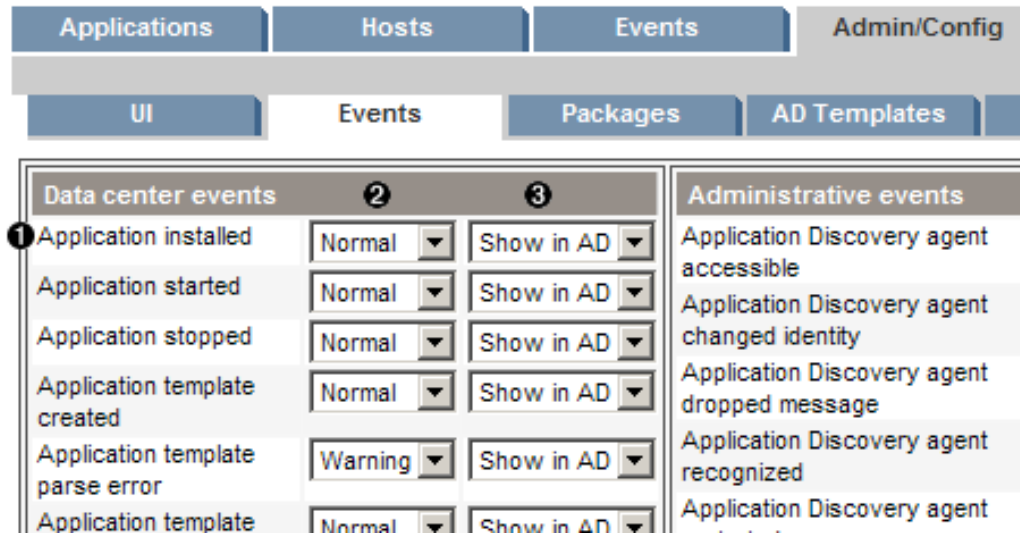
Setting Event Attributes

Introduction to Event Settings in Application Discovery

Application Discovery logs various application and administrative events occurring in the computing network. It records events that occur in association with applications, host machines, agents, and templates. You can set the desired severity for an event type and the location at which the event alert can be seen.

To access and modify the attribute fields for events, click the **Admin/Config** tab, then the **Events** tab. The next figure shows part of the event configuration fields.

Figure 3-1 Event Tab Showing Configuration Fields for Data Center and Administrative Events



The **Events** tab shows two panes: one for data center events and one for administrative events. Each pane contains:

- 1 A list of event types that can be managed,
- 2 Drop-down lists that allow you to set the level of severity for each event type. Each severity has an iconic indicator associated with it that can be seen in Application Discovery (by clicking the **Events** tab) or in HP SIM (by looking at the uncleared events lists).
- 3 Lists that allow you to specify where event notifications shall post for viewing.

Setting Event Severity

1. Click the drop-down arrow to reveal the choices. The choices are displayed in descending order of criticality.
2. Select the level of warning severity desired for each event type.
3. Click **Submit** to save the change.

The new settings are applied immediately.

If needed, you can **Cancel** the changes that you have made. This action returns any changed settings shown in the drop-down to their previous saved state.

See “Key to Event Attributes” (page 67) for an explanation of event types and severity levels.

Setting Alert Location

To set the alert location:

1. Click the drop-down arrow to reveal the choices.

2. Select the location desired for each event type. The default setting is "Show in AD", meaning show this event type in the Application Discovery event tables only. Use "Send to SIM" to show the event type in HP Systems Insight Manager event tables as well as Application Discovery event tables.
3. Click **Submit** to save the change.

The new settings are applied immediately to the data displays.

If needed, you can **Cancel** the changes that you have made. This action returns any changed settings shown in the drop-down to their previous saved state.

See "Key to Event Attributes" (page 67) for the explanation of event types and alert locations.

Managing Application Templates

Find an Application Template

You can access individual application templates by clicking the **AD Templates** tab, then the **Admin/Config** tab.

In the Templates table, click the name of the template that you want to modify.

The data for that template opens in a new screen.



TIP: Another way to get to a template for editing is to click on the associated application name in an application table listing. When the information for the application is displayed, you can see a link to the template for that application in the Application Summary box.

Application Summary	
Name	Postgres database session=128
Version	
Title	Postgres database
OS	
OSver	
Arch	
Template	Postgres database

Change AD Application Template Values

To edit the selected application template, do the following:

1. Click the **Edit** button to reveal the fields that can be edited.
2. Change the field values as desired to describe the processes that constitute this application.
3. Click **Apply** to overwrite the template with the new values. (You might need to scroll to the right to see the **Apply** and **Cancel** buttons.)



NOTE:

HP supplies a default set of application templates with Application Discovery. Editing one of these templates does not actually change the original template. Instead, the original is automatically copied for editing.

On HP-UX

When you edit and save changes to an HP-supplied application template, the resulting values are stored as `/var/opt/amgr/templates/local/filename.atd`, where *filename* is the same as the original template file name.

HP does not support altering the original application templates supplied with Application Discovery in the `/var/opt/amgr/templates/amgr/` directory.

On Microsoft® Windows

When you edit and save changes to an HP-supplied application template, the resulting values are stored in the VSE installed directory `C:\Program Files\HP\Virtual Server Environment\data\templates\local\filename.atd`, where *filename* is the same as the original template file name.

HP does not support altering the original application templates supplied with Application Discovery in the `C:\Program Files\HP\Virtual Server Environment\data\templates\` directory.

Once you apply the application template, a short time passes while Application Discovery attempts to match the newly edited application to discovered processes currently running in the network. As matching completes, applications matching this template description appear in the table called 'Applications affected by this template' (below the template summary), as shown in the following figure at ❶:

Figure 3-2 Template Summary Including Applications Affected by the Template

The screenshot shows the HP Application Discovery interface. At the top, there are navigation tabs: Applications, Hosts, Events, Admin/Config, UI, Events, Packages, AD Templates, and Discovery. The main heading is "AD application template: Postgres database". Below this, it says "Attributes of the processes that constitute this application are summarized here." There are three buttons on the right: Edit, Copy new, and Create new.

Summary		Attributes		Rules
Name	Postgres database	Is visible?	yes	Path =~ postgres:
Version	(none)	Pid scope	session	
Title	Postgres database	User scope	any	
Description	(none)	Is pidtree?	no	
OS	(any)			
OSver	(any)			
Architecture	(any)			

Applications affected by template (3)				
Effect	Application	Version	Host	
defined	Postgres database session=170 ❶		my.system.com	H



NOTE: My application does not appear in the "Applications affected..." table. Why?

There are several possible explanations for this to occur:

- It takes some time for template matching to complete.
Action: Wait a couple of minutes to see whether or not matching occurs.
For a more precise indicator of the matching interval (and therefore, the likely wait-time), click the **Admin/Config** tab, then the **AD Agents** tab, and find the column labeled 'Proc intrvl' (Process interval) for the server where you expect the application to be running. The process interval roughly represents the time needed to refresh the matching data.
- There is an error in the template values such that the application described in the template does not match any currently running processes.
Action: Double-check your template values and edit if necessary.
- The template is correct, but the application described is not currently running.
Action: Ensure that the application designated in the template is running on the host where you expect it to be.

For more information, see "Data Missing in Application Discovery Screens" (page 44).

Create a New Template

The process for creating a new application template is similar to editing an existing template.

1. To start, click the **Admin/Config** tab, then the **AD Templates** tab.
2. Click the **Create New AD Template** button.
The application template editor opens.
3. Fill in the application template values as desired. See "Key to Application Template Values" (page 32).
4. **Apply** the changes. This action saves the new template under the unique name that you have supplied. (You might need to scroll to the right to locate the **Apply** and **Cancel** buttons.)

Your new application template immediately appears in the list of all templates that is displayed when you click the **Admin/Config** tab, then the **AD Templates** tab. The new template definition is applied the next time that matching is compared to the collected data.

Key to Application Template Values

The tables on this page provide the definitions for the editable fields in HP Application Discovery (AD) templates.

Summary Fields These fields let you provide unique identifiers for the template itself. These fields also include options for restricting the application definition to a particular operating environment.

Attribute Fields These fields let you set limits on how many users and how many processes can be associated with the template. You can also set visibility of the resulting application in HP Application Discovery screens.

Rule Fields These fields let you build a rule that describes the process constituents for the resulting application. Regular expressions are allowed in these fields when designating user, executable path, and command line arguments.



Constructing Regular Expressions:

HP Application Discovery recognizes regular expressions constructed using Perl 5 or POSIX syntax and semantics. To learn more, consult *PCRE - Perl Compatible Regular Expressions* at <http://www.pcre.org/>.



NOTE: HP Application Discovery (AD) interprets executable path strings differently than HP Global Workload Manager (gWLM).

HP Application Discovery looks at a process from the perspective of how it is named when it is running. Therefore, to successfully construct an application that HP Application Discovery recognizes, you must provide attributes (data strings) that describe the running process.

Also, when defining an application, keep in mind that HP Application Discovery looks across your entire network for likely matches, and not just on one particular managed node.

It might help to think of the difference between AD and gWLM this way:

- In AD, an executable and arg[0] are compared directly to one another to make a match.
- In gWLM, the inode of an executable and the inode of arg[0] are compared to one another to make a match.

The following examples demonstrate the different results that you can expect when using the same executable and arguments in HP Application Discovery as compared to HP Global Workload Manager (gWLM).

Table 3-2 An Example Comparison of Match Behavior in AD and gWLM for Same Executable Path and Arguments

Example Inputs		AD	gWLM
Executable	Process arg[0]		
/usr/sbin/biod	/usr/sbin/biod	match	match
	biod	no match	match
	./biod	no match	match
biod	/usr/sbin/biod	match	not allowed
	biod	match	not allowed
	./biod	match	not allowed

Summary Fields and Their Descriptions

The following figure shows the Summary portion of an application template. Fields and their descriptions follow the image.

Summary	
Name*	new template
Version*	(none)
Title	(none)
Description	(none)
OS	
OSver	
Architecture	

Fields marked (*) are required.

Field	Description
Name	Required. Unique name given to the template to represent the application.
Version	Required. Version number of the application this template matches.
Title	User-defined name for the template.
Description	User-defined summary describing the template.
OS	Operating system to which the template applies. If this field is left blank, HP Application Discovery tries to match the template within all operating systems for which it has information.
OSver	Operating system version to which the template applies. If this field is left blank, HP Application Discovery tries to match the template against all operating system versions for which it has information.
Architecture	Architecture to which the template applies. If this field is left blank, HP Application Discovery tries to match the template against all architectures for which it has information.



NOTE: If you want to define a template based on where the processes that you want to collect into an application are running, you can check the 'Unmatched procs' table on a particular host screen or the 'Processes not matched by this template' table on a template editing screen to get this information. See "Filling in the Summary Fields Using Table Data" (page 40) for tips on finding specific process attributes for this purpose.

Attribute Fields and Their Descriptions

The following figure shows the Attributes portion of an application template. Fields and their descriptions follow the image.

Attributes	
Is visible?	<input checked="" type="radio"/> yes <input type="radio"/> no
Pid scope	any ▾
User scope	any ▾
Is pidtree?	<input type="radio"/> yes <input checked="" type="radio"/> no

Field	Description
Is visible?	<p>By default during initial discovery, HP Application Discovery sets objects recognized as packages to "no" and objects recognized as templates to "yes". This field designates whether or not the application shall be visible to users of the HP Application Discovery user interface:</p> <ul style="list-style-type: none"> • yes – show the application data associated with this object. • no – hide the application data associated with this object. <p>NOTE: Visibility actually has no affect on template matching, but is included here as a convenience. It is a global setting that allows you to control data presentation in all HP Application Discovery screens. It is not stored as a user preference.</p>
Pid scope	<p>How many process identifiers (pids) are allowed in an application:</p> <ul style="list-style-type: none"> • one – one pid per running application. <i>Effect:</i> Each new concurrent run of this application is shown as a separate instance from the others in HP Application Discovery. • session – any number of pids per application for the duration of one terminal group session. <i>Effect:</i> All associated pids are treated as one running application instance for that session. However, because sessions on HP-UX and Linux are maintained per user, this has the effect of delineating running applications per user. Thus, if you log in twice (two concurrent terminal windows), you can have two separate instances of this running application. This effect is similar to that obtained by setting user scope=session. • any – any number of pids per application. <i>Effect:</i> Pids have no specific effect on defining the application described by this template.
User scope	<p>How many users' processes can be associated with one instance of this application:</p> <ul style="list-style-type: none"> • one – one user's processes per application. <i>Effect:</i> A separate instance of this application will be shown for each different user who runs this application. This effect is similar to that obtained by setting pid scope=session. • any – any number of different users per application. <i>Effect:</i> Number of users has no specific limiting effect on defining the application described by this template. That is, only one instance is recognized, regardless of how many users are running the application concurrently.
is pidtree	<p>Shall child processes spawned by the parent be considered part of the parent application instance or as a separate instance:</p> <ul style="list-style-type: none"> • no – child processes are not considered part of the parent application instance. This is the default value. <i>Effect:</i> Child processes will be shown as separate application instances in HP Application Discovery. • yes – child processes are considered part of the parent application instance. <i>Effect:</i> Child processes will not be shown as separate application instances in HP Application Discovery.



NOTE: If you want to define a template based on ownership or how many instances are currently running, you can check the 'Unmatched procs' table on a particular host screen or the 'Processes not matched by this template' table on a template editing screen to get this information. See for tips on finding specific process attributes.

Rule Fields and Their Descriptions

The following figure shows the Rules portion of an application template. Fields and their descriptions follow the image.

The image shows a dialog box titled "Rules". Inside, there is a section labeled "Type to add:" with four radio button options: "Or", "And", "User", "Group", "Path", and "Cmdline". An "Add Rule" button is located at the bottom right of the dialog.

Field	Description
Rule	<p>Rules can be simple or complex, and are based on types that can be added to or deleted from the rule. Possible type values used to construct a rule include:</p> <ul style="list-style-type: none">• Or Can contain a list of one or more And, Or, User, Group, Path or Cmdline values. <i>Effect:</i> Any one of the rules within this statement can be true to match a process to the application.• And Can contain a list of one or more And, Or, User, Group, Path or Cmdline values. <i>Effect:</i> All of the rules within this statement must be true to match a process to the application.• User Supply the user name associated with the process. In addition to literal names, regular expressions are allowed. <i>Effect:</i> Make matching to a process dependent on a particular user.• Group Supply the group name of the process. Regular expressions are allowed. <i>Effect:</i> Make matching to a process dependent on a particular group.• Path Supply the executable path of the process. Regular expressions are allowed. <i>Effect:</i> Make matching to a process dependent on a particular executable path.• Cmdline Supply the command line arguments used to start the process. Regular expressions are allowed. <i>Effect:</i> Make matching to a process dependent on a particular command line argument.



NOTE: If you want to define your application based on specific ownership, path, or command line arguments, you can check the 'Unmatched procs' table on a particular host screen or the 'Processes not matched by this template' table on a template editing screen to get this information. See "Filling in the Rule Fields Using Table Data" (page 41) for tips on finding specific process attributes for this purpose.

Create an Application Template Rule

Application Discovery provides a set of options and fields that help you to define a valid application template rule. The rule you create governs discovery of the application that you have defined. You can create rules that apply generally or specifically to a process, user, or group.

Create an Aggregation Rule

An aggregation rule is one in which you designate one or more characteristics in order to collect the associated process or processes into an application that can be matched by Application Discovery.

The following procedure assumes that you have opened an application template and are ready to edit the Rules form.

- 1.
2. To add a type within the **And** statement braces, select a type, and click the **Add Rule** button aligned with the dot (.) within the **And** statement. In the example below, a **User** type is added when the button is clicked.

The result when the **Add Rule** button is clicked is as follows:

The screenshot shows the 'Rules' configuration window. At the top, there's a 'Type to add:' section with radio buttons for 'Or', 'And', 'User', 'Group', 'Path', and 'Cmdline'. The 'User' radio button is selected. Below this, there's a dropdown menu set to 'And' followed by an opening curly brace '{'. A single rule is listed: '. User ==' followed by an empty text input field. To the right of this rule are two buttons: 'Add Rule' and 'Del Rule'. Below the rule list, there are two more buttons: 'Add Rule' and 'Del AND'.

3. You can add a new type after "User" within the original **And** statement by clicking the **Add Rule** button at ❶ (below), or you can add additional statements or types *after* the original **And** statement by clicking the **Add Rule** button at ❷.

This screenshot is similar to the previous one, but now there are two rules listed: '. User ==' followed by an empty text input field, and a second empty line for another rule. The 'Add Rule' button next to the first rule is marked with a circled '1' (❶), and the 'Add Rule' button below the second rule is marked with a circled '2' (❷). The 'Del Rule' and 'Del AND' buttons are also present.

4. Continue in this way until you have added all the types that you want in the rule.

This screenshot shows three rules added to the 'And' statement. The rules are: '. User ==' followed by an empty text input field, '. Path =~' followed by an empty text input field, and '. Cmdline =~' followed by an empty text input field. Each rule has its own 'Add Rule' and 'Del Rule' buttons. The 'Del AND' button is also present at the bottom right.

5. Fill in the empty values to complete the rule description for this template, and click **Apply**. (You might need to scroll to the right to locate the **Apply** and **Cancel** buttons.) For guidance on the values that work in each field, see “Key to Application Template Values” (page 32) and “Check Unmatched Processes to Find Application Candidates” (page 40).

Aggregation Rule Examples

The following images demonstrate several ways to construct an aggregation rule in Application Discovery that will collect exactly the processes that you want associated to this template to be defined as an application.

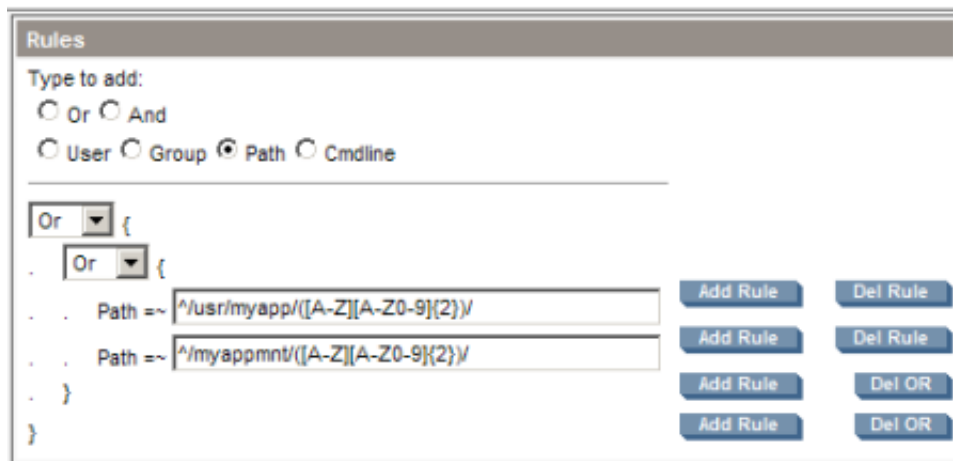
The following figure shows a **simple aggregation rule** that collects processes by specified executable path and command line argument.



The following figure shows **an aggregation of multiple processes** by specified executable path into one application.



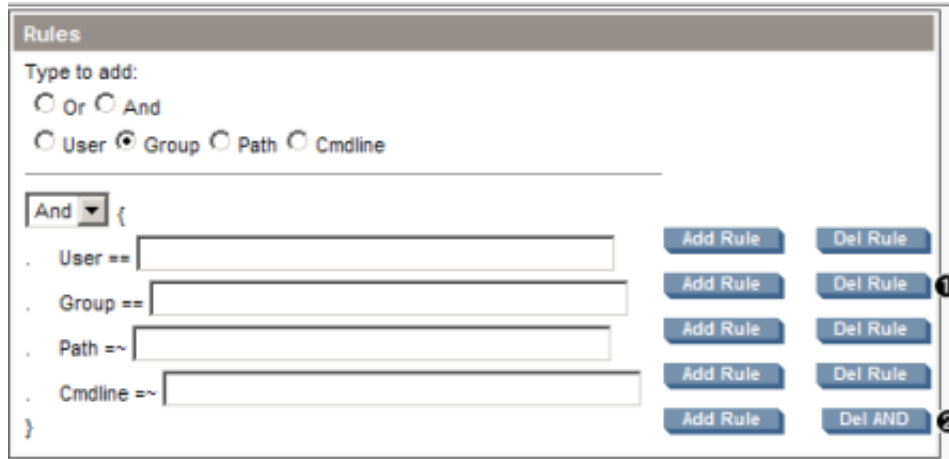
The following figure shows **an aggregation of multiple processes specified using regular expressions**.



How to Remove Types from the Aggregation Rule

You might want to remove types from a rule to correct it or refine it. To remove a type, click the **Del Rule** button to the right of the type field that you want to remove. To delete **And** or **Or** statements, click the **Del AND** or the **Del OR** button to the right of the closing brace for that statement. When an **And** or an **Or** rule is deleted, all the rules that it encloses are deleted also.

This example shows which **Del Rule** button to click to ❶ remove the **Group** type within an **And** statement and ❷ to remove the entire **And** statement.



Check Unmatched Processes to Find Application Candidates

In Application Discovery, processes running on a host system that do not match existing template or package definitions are called *unmatched processes*. Characteristics of unmatched processes can be entered into a template to define an application.

Understanding the Tables Showing Unmatched Processes

The create and edit application template screens show unmatched processes found across the computing network in a table called "Processes not matched by this template". The same data types are also displayed for a particular host on each individual host page in a table called "Unmatched Processes".

Processes not matched by this template (1)												
Host	OS	OSver	Arch	pid	ppid	user	group	sid	ct	path	arguments	cwd
my.system.com	HP-UX	B.11.23	ia64	868	1	root	root	868	-1	/usr/lib/netavc/yp/ypbind	/usr/lib/netavc/yp/ypbind	/

You can sort or filter this table to find processes with which you want to define an application.



TIP:

One way to reduce the amount of 'noise' cluttering your tables is to create a template that collects 'uninteresting' processes into an application that can be hidden.

Using the Table Data to Fill in An Application Template

Find data in the unmatched processes table, and type it into the appropriate fields in an application template to define the constituents of the application template.

Filling in the Summary Fields Using Table Data

In the following image, you can see the columns directly relevant to the *Summary* fields in an application template (dark gray). By entering a specific operating system (**OS**), operating system version (**OSver**), and/or architecture (**Arch**), you can limit the application of the template to particular systems in your network.

Processes not matched by this template (1)					
Host	↑	OS	OSver	Arch	pid
my.system.com		HP-UX	B.11.23	ia64	868

For more details about this part of an application template, see “Summary Fields and Their Descriptions” (page 34).

Filling in the Template Attribute Fields

In the following image, you can see the columns indirectly relevant to the *Attributes* fields in an application template – **pid**, **ppid**, **user**, **sid**, and **ct**. These columns are *indirectly* relevant because you do not use the actual values in the columns to define the Attribute fields. Instead, this information is provided to help you decide which attributes are appropriate to select.

For example, when viewing the data in the table, looking at the relationships among process IDs, users, and sessions can help you determine what relationships you want to define in the application template.

(1)					
pid	ppid	user	group	sid	ct
868	1	root	root	868	-1

For details about setting attributes in an application template, see “Attribute Fields and Their Descriptions” (page 34).

Filling in the Rule Fields Using Table Data

In the following image, you can see the columns directly relevant to the *Rule* fields in an application template. By entering one or more users (**User**), groups (**Group**), paths (**Path**), and/or arguments (**Cmdline**), you can limit the application of the template to particular processes running in your network.

user	group	sid	ct	path	arguments
root	root	868	-1	/usr/lib/netsvc/yp/ypbind	/usr/lib/netsvc/yp/ypbind

For more details about this part of an application template, see “Rule Fields and Their Descriptions” (page 36).

Backing Up Application Discovery Files

Prior to backing up the data store for Application Discovery, stop the Application Discovery service.

**On HP-UX:**

On HP-UX, HP Application Discovery program binaries are installed in `/opt/amgr`. HP Application Discovery data are located in `/var/opt/amgr`. To back up HP Application Discovery, copy the entire contents of these two directories to storage media.

On Microsoft® Windows:

Program binaries are stored in the Virtual Server Environment install directory in `C:\Program Files\HP\Virtual Server Environment\data\`. For information on where HP VSE is installed by default, see *HP Insight Control Management Quick Setup Poster*.

For information on backing up data for all VSE components, see the `vseinitconfig` options in the command reference of the *VSE Management Software Installation and Update Guide* for HP-UX or for Windows, as appropriate for your setup.

4 Troubleshooting and Error Messages

Introduction

This page is organized by symptom, each of which is followed by possible indicators or causes to investigate.

Errors in Installation

Failure message on installation of Application Discovery agent (AppDiscAgent)

1. **Check that OpenSSL is installed on the managed node and that it is free of outstanding security issues.**

To learn about the latest security bulletins, check <http://www.openssl.org/news>.



OpenSSL :

OpenSSL is required on managed systems so that the Application Discovery agent software can securely send application information to the CMS.

To obtain the latest version of OpenSSL for HP-UX, go to the [Security and Manageability](#) page on HP Software Depot web site (<http://software.hp.com/>). Find OpenSSL and click the download link.

On Linux systems, OpenSSL is usually installed by default, or it can be installed from the Linux distribution media.

To avoid a number of known security vulnerabilities, use one of the following versions: 0.9.7l or later for the 0.9.7 branch, or 0.9.8d or later for the 0.9.8 branch. Check the web site <http://www.openssl.org/news> for announcements of OpenSSL security advisories and dates on various historical OpenSSL software releases.

2. **Check that HP WBEM Services software is installed on the managed node and that it is a compatible version.**

To obtain a new version of HP WBEM Services for HP-UX, go to the [Security and manageability](#) page on HP Software Depot web site (<http://software.hp.com/>). Find 'WBEM Services for HP-UX'. For details on which is the appropriate version to download by operating system version, please consult the *VSE Management Software Installation and Update Guide* system requirements for WBEM. AppDiscAgent runs with any 2.x version of HP WBEM Services for HP-UX.

To obtain a new version of HP WBEM Services for Linux, go to the [Internet ready and networking](#) page on HP Software Depot web site (<http://software.hp.com/>). Find HP WBEM Services for Linux, and click the download link.

3. **Check that the Application Discovery WBEM provider has been installed on the managed node.**

Type the following command on the command line of the managed node:

```
# cimprovider -l -m AmgrAgentProviderModule  
AmgrAgentProvider
```

A return of `AmgrAgentProvider` indicates that the WBEM provider is installed.

If this value is not returned, first clean up the provider by typing:

```
# /opt/amgr/bin/agent_wbem_cleanup  
Removing the AmgrAgentProvider
```

Then configure the provider by typing the following on the command line:

```
# /opt/amgr/bin/agent_wbem_config
  Loading Application Discovery schema
  Loading Application Discovery metadata
```

4. Check that the Application Discovery agent certificate has been installed on the managed node.

Type the following on the command line of the managed node:

```
# ls /var/opt/amgr/ssl/agent_cert.pem
  /var/opt/amgr/ssl/agent_cert.pem
```

If `agent_cert.pem` is not listed, you can create the certificate by typing the following on the command line:

```
# /opt/amgr/bin/make_agent_cert
  Host name is xyz.cup.hp.com
  ...
  Finished agent certificate creation.
```

Data Missing in Application Discovery Screens

Issues listed in this section include the following:

- “Applications Not Visible in Application Discovery Screens” (page 44)
- “Host Not Visible in Application Discovery Screens” (page 46)
- “Packages Not Visible in Application Discovery Screens” (page 48)

Applications Not Visible in Application Discovery Screens

1. Check that the application is not hidden from view in the application table.

Tables that list applications are preceded by the 'Application Visibility' drop-down that lets you toggle to `Show hidden apps`. Select this option and scan the table for your application.

Also, check that no filters are in operation in the table. (If one or more filters have been applied to the table, they are listed on the right in the dark gray table header bar.) To remove current filters, right-click anywhere on the table, and select `Clear all filters`.

If you cannot find the application, Application Discovery is not currently recognizing the application as matched to a template.

2. It is possible that certificate exchange has not been completed.

See “Completing Certificate Exchange” (page 63) for instructions on completing the certificate exchange. The Application Discovery agent starts running (and begins sending data to the Application Discovery server) on completion of the certificate exchange.



Have you recently restored or removed and reinstalled the CMS? :

A restore or removal of the central management server also removes the certificate recognition previously established between Application Discovery server on the CMS and Application Discovery agents on managed nodes. This relationship must be re-established when the CMS is reinstalled or restored by completing the Application Discovery certificate exchange.

3. Check that Application Discovery is showing that the discovery ratio is 100%.

- a. Click the following tabs in Application Discovery: **Admin/Config**, then **Discovery**.
- b. Find the following column headings in the data table on this screen. Check that the value for *Discovery ratio* is 100%.

Tot proc	Sys proc	Match proc	Unmatch proc	Disc ratio
516	40	247	229	55.6%
176	40	134	2	98.9%

When the discovery ratio is less than 100%, this may indicate that an inventory is still being taken for that host. Expect the warm-up period for completing the process inventory to take about 20 minutes.

4. Check that any usage of regular expression syntax in the defining application template is correct.

Application Discovery recognizes regular expressions constructed using Perl 5 or POSIX syntax and semantics.

5. Check that any string or regular expression used in the executable path field of the defining application template describes the desired running process.

Application Discovery differs from Global Workload Manager (gWLM) in how it matches user input data to discovered applications. gWLM uses a combination of a fully qualified path and retrieved inode information to find a process on one managed node. Application Discovery does not infer the location of running processes based on the presence or location of installed applications. For broader coverage of all running processes (not just those associated with installed software packages) within a network of machines, Application Discovery matches strings and regular expressions exactly when comparing templates to running processes.

It may help to think of the difference between AD and gWLM this way:

- In AD, an executable and arg[0] are compared directly to one another to make a match.
- In gWLM, the inode of an executable and the inode of arg[0] are compared to one another to make a match.

The following examples demonstrate the different results that you can expect when using the same executable and arguments in Application Discovery as compared to Global Workload Manager (gWLM).

Table 4-1 An Example Comparison of Match Behavior in AD and gWLM for Same Executable Path and Arguments

Example Inputs		AD	gWLM
Executable	Process arg[0]		
/usr/sbin/biod	/usr/sbin/biod	match	match
	biod	no match	match
	./biod	no match	match
biod	/usr/sbin/biod	match	not allowed
	biod	match	not allowed
	./biod	match	not allowed

To check your application template data against the process data that Application Discovery has catalogued, you can consult the following:

- "Processes unmatched by this template" table for a particular host.
- "Processes unmatched by this template" table.
- "Applications affected by this template" table.

Or, to see examples of working templates, click the following tabs: **Admin/Config**, then **AD Templates**. Click a template name to see its attributes.



NOTE: Where large amounts of data are present in tables, it can be useful to sort or filter the data to find the exact process and associated attributes for which you are searching.



NOTE: If none of these measures are sufficient, other underlying problems may be the cause. See also the suggestions in "Host Not Visible in Application Discovery Screens" (page 46).

Host Not Visible in Application Discovery Screens

1. **Check that the host appears on the list of hosts managed via HP Systems Insight Manager.**

An unlisted host is not being managed via HP Systems Insight Manager, and therefore, cannot be discovered by Application Discovery.

To learn how to add a managed system to HP Systems Insight Manager's system list, see "Setting up managed systems" in *HP Systems Insight Manager User Guide*.

2. **Check that the host is marked as 'visible' in Application Discovery.**
 - a. Click the following tabs in Application Discovery: **Admin/Config**, then **Discovery**.
 - b. Find the column heading "Visible". Hosts marked with 'Y' are currently visible in Application Discovery screens. Hosts marked with 'N' are hidden.
3. **Check that no firewall is blocking port 22 (used by SSH) or port 5989 (used by WBEM) on managed systems.**

Unblock the ports.

Once this action is taken, check that Application Discovery is receiving messages from the host. (See #8 in this section.)

4. **Check that the managed node has been configured to allow remote command execution by the CMS.**

To set the managed node to allow remote command execution, type the following:

```
/opt/mx/bin/mxagentconfig -a -n hostname -u root
```

Once this action is taken, check that Application Discovery is receiving messages from the host. (See #8 in this section.)

5. **Check that SSH is configured correctly on the managed node .**

In this case, you may need to repair the HP Systems Insight Manager agent on the managed system. Click the following menu selections: **Configure**, then **Configure or Repair Agents**. Make sure to check the box for 'configure SSH access' before running the repair agent.

To verify that the repair action has resolved any SSH configuration problem, you can issue a remote `ls` command toward the managed system by doing the following:

a. Select **Tools** → **Command Line Tools** → **UNIX/Linux** → **ls...**

b. In the text field, type `/tmp`

If the contents in `/tmp` are visible, then SSH is working correctly.

If the configuration is still not working, you may see an error message:

```
Ssh operation failed for node:managed_node.  
The connection could not be established.  
Reason:Failed to read remote identification
```

In conjunction with this, you may also notice that running `mxagentconfig` and selecting **Configure**→**Configure or Repair Agents** fail on the target managed node.

To reconfigure SSH on the managed node, do the following steps:

1. Log on the managed node as user `root`.
2. `# cd /.ssh /* <root_user_home_directory>/.ssh */`
3. `# rm * /* Erase all possible corrupted contents */`
4. `# ssh-keygen -b 2048 -t rsa /* Generate root ssh key */`
5. `# ps -elf|fgrep sshd /* Find the sshd PID */`
6. `# kill -1 <pid> /* Re-start sshd */`
7. `# mxagentconfig -a -n managed_node`
8. `# amgr_remote_config -a -n managed_node -mx`

Once this action is taken, check that Application Discovery is receiving messages from the host. (See #8 in this section.)

6. **Check that Application Discovery agent is authorized to exchange data with the CMS and that exchange is complete.**

Click through the following HP Systems Insight Manager menus: **Configure**→**Configure VSE Agents** →**Check AD Agent States**. Any status other than `Connected` indicates that a certificate exchange may be necessary.

See “Introduction” (page 63) for completing the certificate exchange. The Application Discovery agent starts running (and begins sending data to the Application Discovery server) on completion of the certificate exchange.

Once this action is taken, check that Application Discovery is receiving messages from the host. (See #8 in this section.)

7. **Check that the WBEM connection is working correctly on the managed node.**

To check the status of the WBEM connection, do the following in Application Discovery user interface:

a. Click the **AD Agents** tab.

b. Look for the `WBEM Stat` column in the 'Hosts/Agents' table.

If the status message for WBEM is 'WBEM down', do the following:

Check that HP Systems Insight Manager CMS has an authorized logon with the managed system.

See “Configuring the WBEM Provider Password” (page 65) to learn how to configure the WBEM provider to complete this authorization.

Alternatively, you can configure the managed system's WBEM authorization to trust the CMS to perform a remote "root" WBEM user logon. Do this by clicking **Configure** → **Configure or Repair Agents**. Make sure to mark the box for 'Configure WBEM client certificate authentication' before you run the tool.

Once this action is taken, check that Application Discovery is receiving messages from the host. (See #8 in this section.)

8. Check that Application Discovery is receiving messages from the host.

- a. Click the following tabs in Application Discovery: **Admin/Config**, then **AD Agents**.
- b. Find the column headings providing message data on the far right of the data table on this screen. Check that the cells have data and that the time stamp is within the period set by the Global Host/Process Interval selector on that screen.

Last	Reads	Avg msg	Intrvl
2007-02-05 04:20 PM	156	42.98Kb	5.9s
2007-02-05 04:20 PM	365	34.31Kb	7s
2007-02-05 04:20 PM	242	30.73Kb	4.5s

Packages Not Visible in Application Discovery Screens

1. **Check that the package is marked as 'visible' in Application Discovery.**
 - a. Click the following tabs in Application Discovery: **Admin/Config**, then **Packages**.
 - b. Find the column heading "Visible". Packages marked with 'Y' are currently visible in Application Discovery screens. Packages marked with 'N' are hidden.
2. **Check that Application Discovery is showing that total packages and completed packages have the same value.**
 - a. Click the following tabs in Application Discovery: **Admin/Config**, then **Discovery**.
 - b. Find the following column headings in the data table on this screen. Check that the values for *Tot Pkg* and *Cmplt Pkg* are the same, and that the *Warmup ratio* is 100%.

Tot pkg	Cmplt pkg	Wrmup ratio	Pend pkg
2732	2236	81.8%	496
2542	2542	100%	0

When the values are not the same and the warm-up ratio is less than 100%, this may indicate that an inventory is still being taken for that host. Expect the warm-up period for completing the package inventory to take about 20 minutes.

3. It is possible that certificate exchange has not been completed.

See Appendix B for instructions on completing the certificate exchange.. The Application Discovery agent starts running (and begins sending data to the Application Discovery server) on completion of the certificate exchange.



Have you recently restored or removed and reinstalled the CMS? :

A restore or removal of the central management server also removes the certificate recognition previously established between Application Discovery server on the CMS and Application Discovery agents on managed nodes. This relationship must be re-established when the CMS is reinstalled or restored by completing the Application Discovery certificate exchange.



NOTE: If none of these measures are sufficient, other underlying problems may be the cause. See also the suggestions in “Host Not Visible in Application Discovery Screens” (page 46).

Application Errors in VSE Workload Screens

Issues listed in this section include the following:

- “Error Message Indicates Application Discovery Server Is Not Available” (page 49)
- “No 'Applications' Icon for System Listed on Virtualization Manager Visualization Tab Screen” (page 49)
- “No 'by application' Entry in VSE Workload Definition Criteria Drop-down” (page 50)
- “No Indicators Showing in VSE Workload Real-Time Utilization Meters” (page 50)
- “Cannot Enter Application Discovery User Interface” (page 51)

Error Message Indicates Application Discovery Server Is Not Available

1. Application Discovery may not be correctly configured.

Run `vseinitconfig -a` on the command line to correct the configuration of Application Discovery. (See also `vseinitconfig(1M)`.)


To identify other configuration problems that may be affecting Application Discovery server, check the “Troubleshooting” notes in the *VSE Management Software Help* instructions, or use `vseassist(1M)`.

2. Check that Application Discovery server is running on the CMS.

Type `ps -elf | grep amgrserver.jar` on the command line of the CMS. You should see a Java process running the Application Discovery server.

If you do not see this Java process, type `/opt/amgr/bin/cms_start`. You must be logged in as user 'root' on the CMS to initiate this command.

No 'Applications' Icon for System Listed on Virtualization Manager Visualization Tab Screen

[The Application Discovery icon  appears on a system shown on the **Visualization** tab when Application Discovery agent and server are running correctly and the host system is known to Application Discovery.]

1. Check that Application Discovery server is running on the CMS.

Type `ps -elf | grep amgrserver.jar` on the command line of the CMS. You should see a Java process running the Application Discovery server.

If you do not see this Java process, type `/opt/amgr/bin/cms_start`. You must be logged in as user 'root' on the CMS to initiate this command.

2. **Check that the host is known to Application Discovery.**
 - a. Click the following tabs in Application Discovery: **Admin/Config**, then **Discovery**.
 - b. Find the column heading "Host". Hosts recognized by Application Discovery are listed here. If the host that you are looking for is not listed here, it may be that you need to deploy an agent on the host and exchange certificates so that the host is recognized and inventoried by Application Discovery.

No 'by application' Entry in VSE Workload Definition Criteria Drop-down

1. **Check that Application Discovery server is running on the CMS.**

Type `ps -elf | grep amgrserver.jar` on the command line of the CMS. You should see a Java process running the Application Discovery server.

If you do not see this Java process, type `/opt/amgr/bin/cms_start`. You must be logged in as user 'root' on the CMS to initiate this command.
2. **Check that the host is known to Application Discovery.**
 - a. Click the following tabs in Application Discovery: **Admin/Config**, then **Discovery**.
 - b. Find the column heading "Host". Hosts recognized by Application Discovery are listed here. If the host that you are looking for is not listed here, it may be that you need to deploy an agent on the host and exchange certificates so that the host is recognized and inventoried by Application Discovery.

No Indicators Showing in VSE Workload Real-Time Utilization Meters

This information applies to workloads associated with Application Discovery applications.

1. **Check that the Application Discovery agent is running.**

Click the following menu choices in HP Systems Insight Manager: **Configure** → **Configure VSE Agents** → **Check AD Agent States**. Follow the instructions for selecting hosts and checking agent state.

If the Application Discovery agent is installed, but *is not running*, click **Configure** → **Configure VSE Agents** → **Start AD Agents** and follow the instructions for selecting hosts and starting agents.
2. **Check that Application Discovery agent is writing process maps for this workload on the managed system.**
 1. Log on to the managed system.
 2. Go to `/var/opt/amgr/procmaps`.
 3. Check for the existence of files. Note that file names are internally generated and do not have a logical correlation with user-known names, specifically user-assigned workload names.
 4. Check the file timestamps. If any file is more than 60 seconds old (this is already conservative), process maps are not being updated.

If you confirm that process maps are not being updated, you can try the following actions to get process maps working correctly.
3. **Check that the workload is defined for this host.**

A workload receives process maps only for the host or hosts for or on which it is deployed. To check that a workload is defined for a host, click the Workloads tab in Virtualization Manager. You may need to modify a workload to include this host or create a new workload for it. For help on this topic, see the *Virtualization Manager Help* reference.

4. Check to see if the workload is parked.

A parked workload does not generate process maps anywhere. Process maps that existed prior to parking the workload are deleted. See the discussion of “General Workload Properties” in *Virtualization Manager Help* and the glossary for information about parked workloads.

5. Check to see that the application associated with the workload is currently running.

In Application Discovery, click the **Applications** tab. Then, under the **Running** tab, sort by host. (Click the 'Host' column header to toggle the list to sort in ascending or descending alphabetical order.) To rule out the possibility that the running application is hidden, click the drop-down menu above the 'Application Instances' to 'Show hidden apps'. If the application that you are looking for is not in this list, you must run the application so that it can be discovered.

6. Check that Application Discovery server is running on the CMS.

Type `ps -elf | grep amgrserver.jar` on the command line of the CMS. You should see a Java process running the Application Discovery server.

If you do not see this Java process, type `/opt/amgr/bin/cms_start`. You must be logged in as user 'root' on the CMS to initiate this command.



NOTE: If none of these measures are sufficient, other underlying problems may be the cause. See also the suggestions in “Host Not Visible in Application Discovery Screens” (page 46) that relate to communication between the Application Discovery server and the WBEM provider and between the WBEM provider and the Application Discovery agent.

Cannot Enter Application Discovery User Interface

You can see this message when this problem occurs:

You are not authorized to view this screen.
Please login with the right credentials.

To gain access to Application Discovery user interface via links in *Virtualization Manager*, you must set your user authorizations to include AD Monitor Tools or AD All Tools, depending on your job role. See “User Authorizations” in *VSE Management Software Help* for more information.

Errors in Application Discovery User Interface Operation

Issues listed in this section include the following:

- “UI “Unable to Connect to Server” Messages” (page 51)
- “Java 'UI exception' Message Displays” (page 52)

UI “Unable to Connect to Server” Messages

1. Application Discovery might not be correctly configured.

Run `vseinitconfig -a` on the command line to correct the configuration of Application Discovery. (See also `vseinitconfig(1M)`.)

To identify other configuration problems that might be affecting Application Discovery server, check the “Troubleshooting” notes in the *VSE Management Software Help* instructions, or use `vseassist(1M)`.



NOTE: Be aware that one possible cause for incorrect configuration is the case where installation and startup deviate from the documented process. In this situation, you might see the following error message:

Application Discovery UI encountered an error: The UI and server are out of sync.

If Application Discovery web application and Application Discovery server are not from the same installation version, you must reinstall Application Discovery before using `vseinitconfig -a`.

2. Check that Application Discovery server is running on the CMS.

Type `ps -elf | grep amgrserver.jar` on the command line of the CMS. You should see a Java process running the Application Discovery server.

If you do not see this Java process, type `/opt/amgr/bin/cms_start`. You must be logged in as user 'root' on the CMS to initiate this command.

Java 'UI exception' Message Displays

'UI exception' errors indicate that a problem internal to the Application Discovery user interface exists. Please contact HP to report the error and receive assistance. See "HP Encourages Your Comments" (page 12).

5 Getting Assistance in Using Application Discovery

The following resources are available to help you learn how to best use Application Discovery or to help you if you encounter difficulties.

Application Discovery Resources

For **expanded discussions** of the topics in this document or for **troubleshooting** information, refer to the *Application Discovery Help* reference in the Application Discovery user interface.

For information on **installing Application Discovery components**, see *VSE Management Software Version 4.0 Installation and Update Guide for HP-UX*

For information on troubleshooting the **configuration of Application Discovery components**, see the 'Troubleshooting' section in *VSE Management Software Help*.

This document is available with the installed software. To check for updated information, look on the Web at <http://docs.hp.com/en/vse>.

For information on **network and browser compatibility**, see *VSE Management Software Help* topics, which are accessible from any VSE product interface help link.

Expect updates to this software release. You can obtain updated versions by visiting HP Software Depot (<http://software.hp.com/>).

A Commands for Controlling HP Application Discovery Agent and Certificates

`amgrd` and `agent_config` can be run on HP-UX and Linux managed systems where the Application Discovery agent is deployed.

`amgr_remote_config` can be run on HP-UX and Microsoft® Windows central management servers.

amgrd

NAME

amgrd - Change Behavior of HP Application Discovery Agent on Managed System

SYNOPSIS

Path: /opt/amgr/bin/amgrd [options]

```
amgrd [-start] [-noreload ]
amgrd [-connectionstatus]
amgrd [-enableRestart]
amgrd [-enableRestart] [-start ]
amgrd [-enableRestart] [-stop ]
amgrd [-disableRestart]
amgrd [-disableRestart] [-start ]
amgrd [-disableRestart] [-stop ]
amgrd [-procfreq interval{s|m|h}]
amgrd [-packfreq interval{s|m|h}]
amgrd [-ping]
```

DESCRIPTION

The `amgrd` command allows you to interact with an HP Application Discovery agent to start or stop its operation, to change its mode of operation, to collect information about it, and to change its data collection frequency on the system where it resides. You will need `root` access to use this command.

You can also execute `amgrd` from the HP SIM graphical user interface by following the Configure > Configure VSE Agents menus to HP Application Discovery options such as “Start AD Agents” or “Stop AD Agents”.

Options

If no options are specified, the agent will start as a daemon with communication type of WBEM, as these are the command defaults. The agent will then look for configuration options in a file `/var/opt/amgr/agent.properties` and run. If `/var/opt/amgr/agent.properties` does not exist or does not contain a `server.name` property, then the agent will run, but it will not know the location of the CMS to which it should send data.

The `amgrd` command recognizes the following options.

<code>-config <i>f</i></code>	Use configuration file <i>f</i> instead of default file.
<code>-configfreq <i>interval</i>{s m h}</code>	Set configuration check frequency to a number <i>t</i> , with <i>s</i> for seconds, <i>m</i> for minutes, or <i>h</i> for hours.
<code>-connectionstatus</code>	Check status of the HP Application Discovery agent.
<code>-disableRestart</code>	By itself, <code>-disableRestart</code> removes any <code>inittab</code> entry for <code>amgrd</code> and exits. With <code>-start</code> , <code>amgrd</code> removes any <code>inittab</code> entry for <code>amgrd</code> and runs the agent. With <code>-stop</code> , <code>amgrd</code> removes any <code>inittab</code> entry for <code>amgrd</code> and stops the agent.
<code>-enableRestart</code>	By itself, <code>-enableRestart</code> adds an <code>inittab</code> entry for <code>amgrd</code> and exits. With <code>-start</code> , <code>amgrd</code> adds an <code>inittab</code> entry for <code>amgrd</code> and runs the agent. With <code>-stop</code> , <code>amgrd</code> adds an <code>inittab</code> entry for <code>amgrd</code> and stops the agent.

- [no] daemon	[Do not] run the agent as a daemon. -daemon is the default setting for amgrd. Use -nodaemon only for triage as the agent will die if the terminal session ends or the terminal is disconnected.
- [no] debug	[Do not] run the agent in debug mode.
-noreload	Do not read in persisted data (used when agent is started or restarted).
-packfreq <i>interval</i> { s m h }	Set the package catalog collection frequency to a number <i>t</i> , with s for seconds, m for minutes, or h for hours.
-procfreq <i>interval</i> { s m h }	Set the process collection frequency to a number <i>t</i> , with s for seconds, m for minutes, or h for hours.
-server <i>s</i>	Connect to, try to connect to, or only communicate with the Application Discovery server on machine <i>s</i> , where <i>s</i> is the address of a machine running a central management server.
-start	Start an agent and read in persisted data. This option is needed explicitly to enable the setting of restart and starting or restarting on the same invocation.
-stop	Stop a running agent.
-u	(usage) Show current usage information and exit.
-v	(version) Show current HP Application Discovery version and exit.
-verbose <i>v</i>	Set log verbose to <i>v</i> , which can have the following values: 0 = Disable log 1 = LOG_FATAL 2 = LOG_ERROR 3 = LOG_WARN 4 = LOG_ALWAYS 5 = LOG_NOTE (default) 6 = LOG_TRACE

Installation

The amgrd command can be installed from a depot available on the HP VSE Managed Node Software Update Web site. For installation instructions, please visit the VSE Management Web site at the following URL:

<http://docs.hp.com/en/vsemgmt/agents.html>

Beginning with VSE Management Software Version A.03.00.00, amgrd is installed on the CMS when the VSE Management Software is installed.

RETURN VALUES

- 0 The command completed successfully; no errors were detected.
- 1 An error occurred, and the command did not complete successfully.

EXAMPLES

Start HP Application Discovery Agent as a daemon, and allow it to run with default options picked from the file `/var/opt/amgr/agent.properties`:

```
# /opt/amgr/bin/amgrd
<timestamp> Starting agent...
```

Check the connection status of HP Application Discovery agent:

```
# /opt/amgr/bin/amgrd -connectionstatus
OK
```

AUTHORS

amgrd was developed by Hewlett-Packard Company.

FILES

<code>/var/opt/amgr/amgrd.log</code>	Has 2 MB limit; then rolls over to alternating backup logs
<code>/var/opt/amgr/amgrd.log.1</code>	First alternate backup log
<code>/var/opt/amgr/amgrd.log.2</code>	Second alternate backup log

SEE ALSO

HP Application Discovery Help Reference

HP Application Discovery Version 4.0 User's Guide

VSE Management Software Version 4.0 Getting Started Guide

VSE Management Software Version 4.0 Installation and Update Guide for HP-UX

<http://docs.hp.com/en/vse>

Related manpage: *agent_config*

agent_config

NAME

agent_config - Access HP Application Discovery Certificate on Managed System

SYNOPSIS

```
Path: /opt/amgr/bin/agent_config
agent_config -a [-dir config_directory]
agent_config -amx
agent_config -c
agent_config -printAgentTrust
agent_config -r
agent_config -start
agent_config -stop
```

DESCRIPTION

The `agent_config` command allows you to interact with an HP Application Discovery agent to print its certificate or to remove a counterpart CMS certificate, and to check the status of the agent, to start an AD agent, or to stop an AD agent.

You can use `agent_config` remotely from the HP SIM graphical user interface or from the command line on a managed system. You will need `root` access to use this command.

Options

If no options are specified, the usage string is printed, and the command exits.

The `agent_config` command recognizes the following options.

<code>-a</code>	Copies CMS certificate from standard input to directory specified by <i>config_directory</i> . First line following this is expected to be the name of the CMS. Agent certificate is printed to standard output.
<code>-amx</code>	Print agent certificate to standard output.
<code>-c</code>	Check agent state on a managed node.
<code>-dir <i>config_directory</i></code>	Destination to which to copy the certificate.
<code>-printAgentTrust</code>	Print the trusted certificate of the HP Application Discovery agent.
<code>-pushWbemAccessList</code>	Store HP Application Discovery WBEM provider access list from standard input.
<code>-r</code>	Remove the target CMS certificate from a managed node.
<code>-start</code>	Start the agent as a daemon on a managed node.
<code>-stop</code>	Stop the agent on a managed node.

Installation

The `agent_config` command can be installed from a depot available on the HP VSE Managed Node Software Update Web site. For installation instructions, please visit the VSE Management Web site at the following URL:

<http://docs.hp.com/en/vsemgmt/agents.html>

Beginning with VSE Management Software Version A.03.00.00, `agent_config` is installed on the CMS when the VSE Management Software is installed.

RETURN VALUES

- 0 The command completed successfully; no errors were detected.
- 1 An error occurred and the command did not complete successfully.
- 3 Unrecognized command parameters are detected.
- 4 Missing post-install configuration of AD agent is detected.

EXAMPLES

Check agent state.

```
# /opt/amgr/bin/agent_config -c
Agent not running
```

Run the agent using *amgrd*.

```
# /opt/amgr/bin/amgrd -start
```

Check agent state again.

```
# /opt/amgr/bin/agent_config -c
Connected
```

AUTHORS

agent_config was developed by Hewlett-Packard Company.

FILES

<i>/opt/amgr/bin/agent_config</i>	agent_config file
<i>/opt/amgr/bin/amgrd</i>	Agent binary file
<i>/var/opt/amgr/ssl/agent_cert.pem</i>	Agent public certificate
<i>/var/opt/amgr/ssl/agenttrust.pem</i>	Agent trust file
<i>/var/opt/amgr/agent.properties</i>	Agent property file

SEE ALSO

HP Application Discovery Help Reference

HP Application Discovery Version 4.0 User's Guide

VSE Management Software Version 4.0 Getting Started Guide

VSE Management Software Version 4.0 Installation and Update Guide for HP-UX

<http://docs.hp.com/en/vse>

Related manpage: *amgrd*

amgr_remote_config (1M)

NAME

amgr_remote_config - Access HP Application Discovery Certificates Remotely from the Central Management Server (CMS)

SYNOPSIS

Path: /opt/amgr/bin/amgr_remote_config

amgr_remote_config -a [-mx] [-n *hostname*] [-u *login*] [-dir *directory*]

amgr_remote_config -c [-mx] [-n *hostname*] [-u *login*]

amgr_remote_config -r [-mx] [-n *hostname*] [-u *login*]

amgr_remote_config -start [-mx] [-n *hostname*] [-u *login*]

amgr_remote_config -stop [-mx] [-n *hostname*] [-u *login*]

DESCRIPTION

From the central management server, the `amgr_remote_config` command allows you to interact with an HP Application Discovery agent on a managed node to print its certificate or to remove a counterpart CMS certificate, and to check the status of the agent on that node.

You can execute `amgr_remote_config` from the HP System Insight Manager graphical user interface or from the command line on the central management system. You will need root access to use this command.

Options

If no options are specified, the usage string is printed and the command exits.

The `amgr_remote_config` command recognizes the following options.

-a	Exchange certificates between the central management server and the managed node.
-c	Check agent state on a managed node. Agent state is printed.
-dir <i>path</i>	Designate the path to the directory where the certificates are located. The default location for certificates is <code>/var/opt/amgr/ssl</code> .
-mx	Use HP Systems Insight Manager's CMS credential to invoke the remote HP Application Discovery agent configuration program. Note: <code>-u</code> and <code>-dir</code> are ignored when <code>-mx</code> is specified.
-n <i>hostname</i>	Name of system where task is to be done.
-r	Remove the target CMS certificate from a managed node.
-start	Start the agent as a daemon on a managed node and enable restart on reboot.
-stop	Stop the agent on a managed node and prevent restart on reboot.
-u <i>login_info</i>	User login information for entry on the managed node. This option is necessary when <i>not</i> using <code>-mx</code> , and user must be root or similarly privileged.

Installation

The `amgr_remote_config` command can be installed from a depot available on the HP VSE Managed Node Software Update Web site. For installation instructions, please visit the VSE Management Web site at the following URL:

<http://docs.hp.com/en/vsemgmt/agents.html>

Beginning with VSE Management Software Version A.03.00.00, `amgr_remote_config` is installed on the CMS when the VSE Management Software is installed.

RETURN VALUES

- 0 The command completed successfully; no errors were detected.
- 1 SSH command shell itself returned with error.

- 2 An error occurred and the command did not complete successfully.
- 3 Unrecognized command parameters are detected.
- 4 Missing post-install configuration of AD agent is detected.
- 5 Missing post-install configuration of AD CMS is detected.
- 6 Specified host name contains invalid characters.

EXAMPLES

Exchange certificates between HP Application Discovery CMS and managed node `foo.hp.com` using HP System Insight Manager `mxexec`:

```
# amgr_remote_config  
-a -mx -n foo.hp.com
```

Exchange certificates between HP Application Discovery CMS and managed node `foo.hp.com` *without* using `-mxexec`.

For example, `aduser` has login access on a managed node with root privileges. CMS certificates are copied into `/var/opt/amgr/ssl` on the managed node:

```
# amgr_remote_config -a -n foo.hp.com  
-u aduser -dir /var/opt/amgr/ssl
```

Check the state of HP Application Discovery agent on managed node `foo.hp.com` using HP System Insight Manager `mxexec`:

```
# amgr_remote_config -c -mx -n foo.hp.com
```

AUTHORS

`amgr_remote_config` was developed by Hewlett-Packard Company.

FILES

<code>/opt/amgr/bin/amgr_remote_config</code>	Remote HP Application Discovery agent configuration program
<code>/opt/amgr/lib/AmgrRemoteConfig.jar</code>	Helper Java program for <code>amgr_remote_config</code>
<code>/var/opt/amgr/ssl/cms.host</code>	CMS host name
<code>/var/opt/amgr/ssl/cms_cert.pem</code>	HP Application Discovery CMS certificate
<code>/var/opt/amgr/ssl/tempcerts/</code>	HP Application Discovery temporary certificate directory

SEE ALSO

HP Application Discovery Help Reference

HP Application Discovery Version 4.0 User's Guide

VSE Management Software Version 4.0 Getting Started Guide

VSE Management Software Version 4.0 Installation and Update Guide for HP-UX

<http://docs.hp.com/en/vse>

Related manual page: `mxexec`

B Completing Certificate Exchange

Introduction

HP Application Discovery uses Secure Sockets Layer (SSL) certificates to authenticate and secure data transmission between HP Application Discovery agents and the HP Application Discovery server. Once HP Application Discovery components are installed, the accompanying certificate information for HP Application Discovery server and for HP Application Discovery agent must be exchanged to allow the server and agents to recognize legitimate transmissions.

Certificate exchange can be done from (HP SIM) within HP Systems Insight Manager (HP SIM) or from the command line on the central management server.

Using HP SIM to Complete Certificate Exchange

1. Initiate certificate exchange by selecting **Configure** → **Configure VSE Agents** → **Exchange AD Agent Certificates** from the HP SIM top menu.
2. Select the HP-UX systems where you want the exchange to occur using the HP SIM system selection list. Click **Apply**.
3. Verify the system selection and click **Next**.
4. A description is displayed of the action about to take place. When you are sure that you want to exchange certificates so that the HP Application Discovery agent can begin reporting data to the server, click **Run now** to complete the certificate exchange.



NOTE: If you find that you are unable to exchange certificates from within HP SIM, check the following:

- That you have the correct permissions associated with your login ID.
- That the targeted managed node is authorized to accept remote commands from HP SIM.

To set the correct SSH configuration that authorizes the acceptance of remote commands, type the following command on the CMS:

```
mxagentconfig -a -n managed_system -u login -p password
```

where *managed_system* is the name of the target system for which you want to enable remote communication, *login* is the user name on the managed system, and *password* is the password of that user on the managed system.

Completing Certificate Exchange from the Command Line

From the command line, you can exchange certificates with one or more managed hosts.

1. Log in as a privileged user on the system hosting the CMS. (See [User Authorizations](#) for tool access information.)
2. Assuming installation to default directories, enter the following command on HP-UX:

```
/opt/amgr/bin/amgr_remote_config -a -mx -n system_name -u root
```

and on Windows:

```
C:\Program Files\HP\Virtual Server Environment\bin\amgr_remot_config.bat -a -mx -n system_name
```

To configure multiple hosts, add *-n system_name* for each host to be configured.

By default, `amgr_remote_config` uses Secure Shell (SSH) to complete this action securely across the network.



-u **option supported on HP-UX only:**

You might be prompted to provide a password for the specified user for each system login. You must supply the password in order to proceed.

3. Once the login is accomplished, the CMS sends its SSL certificate to the agent on the managed host, and the agent supplies its SSL certificate to the CMS. HP Application Discovery agents can now transfer data securely to the CMS, and the CMS can authenticate the transmission.
-



Have you recently restored or removed and reinstalled the CMS? :

A restore or removal of the central management server also removes the certificate recognition previously established between Application Discovery server on the CMS and Application Discovery agents on managed nodes. This relationship must be re-established when the CMS is reinstalled or restored by completing the Application Discovery certificate exchange.

C Configuring the WBEM Provider Password

Introduction

WBEM is a management information retrieval and command protocol. Application Discovery uses a WBEM provider to allow the central management server (CMS) to send commands to agents running on managed nodes. Sending a WBEM command to a managed node requires remote login from the CMS to a managed node.

An authorized user name and matching password are used to log in. The users who are authorized to access the Application Discovery WBEM provider on a managed system are the same users who are registered with HP Systems Insight Manager (HP SIM) to access system metrics.

Ensure that the following WBEM user IDs are registered with HP SIM: `root`, `bin`, and `amgr`. Registering any one of these IDs enables the WBEM provider to be connected to from the Application Discovery CMS. Every registered WBEM user must have a valid password.

To register a WBEM user ID and password with HP SIM, do the following:

- For *global configuration* across multiple machines, select **Options**→**Protocol Settings**→**Global Protocol Settings**.
Find the section "Default WBEM Settings" and edit as needed.
- For an *individual managed node*, select **Options**→**Protocol Settings**→**System Protocol Settings**.
Select the target system.
When the configuration screen is displayed, find the section "WBEM Settings", and edit as needed.

In case of failure Any failed login attempts discovered by the Application Discovery user interface create an entry in the HP SIM audit log. The WBEM provider on each managed system is responsible for logging failed WBEM login attempts.

D Key to Event Attributes







Event Types

Table D-1 Description of Event Types Used in HP Application Discovery

Event Type Name	Description
Data Center Events	
Application installed	An application has been installed on a host.
Application started	An application has been started on a host.
Application stopped	An application has been stopped on a host.
Application template created	A new template has been found on the CMS.
Application template parse error	A template cannot be parsed due to errors in the template.
Application template removed	A template has been removed from the CMS.
Application template updated	A template has changed on the CMS.
Application uninstalled	An application has been uninstalled on a host.
New application type	A new type of application is running on one or more hosts.
Unable to refresh workload	Record of workload data is lost to HP Application Discovery
Administrative Events	
Application Discovery agent accessible	Agent is available for communication and data transfer.
Application Discovery agent changed identity	The agent has registered a change in the host operating system or architecture.
Application Discovery agent dropped message	The agent has dropped a message.
Application Discovery agent inaccessible	The agent is not available for communication and data transfer.
Application Discovery agent recognized	An agent has been found on a server.
Application Discovery agent restarted	The agent has been restarted.
Application Discovery agent started	The agent has sent a transmission.
Application Discovery agent stopped	The agent has stopped sending transmissions.
Application Discovery uncertified agent message	A message not recognized as legitimate (certified) has been received from an agent.
New platform type	A new type of platform has been recognized in the network.





Event Severity Types

Table D-2 Event Severity Types Used in HP Application Discovery

Icon	Meaning
 Critical	Indicates a failure and signals the need for immediate attention.
 Warning	In a state that might become a problem.
 Major	Indicates an impending failure.
 Minor	Indicates a condition that can escalate into a more serious problem.
 Normal	Indicates that this object is behaving as expected.
 Info	Requires no attention; provides useful information.

Additional Event Types Specific to HP Application Discovery

Table D-3 Event Types Specific to HP Application Discovery

Icon	Meaning
 Transitional	Indicates that an activity has not completed.
 Newly Available	Indicates that an object (usually an HP Application Discovery agent) is connected and ready for data transmission.
 Application is running	Indicates that the application is running.
 Application is not running	Indicates that this application has run in the past, but is not running now.

Event Viewing Locations

Table D-4 Event Viewing Location Types Used in HP Application Discovery

Selection	Meaning/Location
Ignore	Do not show this event in event views.
Show in AD	Show this event only in HP Application Discovery event views.
Send to SIM	Show this event in HP Systems Insight Manager event views as well as in HP Application Discovery views.

Glossary

agent	A program with a well-defined task that runs in the background and that is used to capture information or do processing tasks.
aggregate data views	Screens in Application Discovery that display a collection of data about various objects, often including system, application, and event data for all known instances of each in one table, but with emphasis on one aspect of the data.
application	A logically related set of processes active on a host system (a running application) and/or a logically related set of files on a host system disk (an <i>installed</i> application). <i>Application Discovery</i> recognizes applications based on standard package installation, <i>templates</i> that are shipped with the product, and templates that are defined by users.
Application Discovery	HP Application Discovery. The HP VSE Management Software application that inventories running and installed applications in a network and provides application and process map data used for creating <i>workloads</i> in <i>HP Virtualization Manager</i> . <i>See also</i> application discovery.
application discovery	The process of finding applications and gathering performance and location data about them for display and use. <i>See also</i> Application Discovery.
Capacity Advisor	HP Capacity Advisor. The HP VSE Management Software application that performs analysis and planning of <i>workloads</i> on a <i>system</i> or across a set of systems.
central management server	<i>See</i> CMS.
CMS	Central management server. A system in the management domain that executes the HP Systems Insight Manager software. All central operations within HP Systems Insight Manager are initiated from this system.
discovery	In system management applications, the process of finding and identifying network objects. In HP Systems Insight Manager, discovery finds and identifies all the HP systems within a specified network. In Application Discovery, discovery finds and identifies all running and installed applications within a specified network.
discovery ratio	As used by Application Discovery, this is a comparison of matched to <i>unmatched processes</i> running on a host. The ratio is the percentage of processes that can be matched to applications.
Global Workload Manager	<i>See</i> gWLM.
gWLM	HP Global Workload Manager. The HP VSE Management Software application that allows you to centrally define resource-sharing <i>policies</i> that you can use across multiple HP servers. These policies increase system utilization and facilitate controlled sharing of system resources. gWLM's monitoring abilities provide both real-time and historical monitoring of the resource allocation.
host	<ol style="list-style-type: none">1. A system or partition that is running an instance of an operating system.2. The physical machine that is the <i>HP Integrity Virtual Machines VM Host</i> for one or more <i>virtual machines</i>.
host name	The name of a system or partition that is running an OS instance.
host OS	The operating system that is running on the host machine.
HP Virtualization Manager	HP Virtualization Manager. Provides hierarchical visualization of <i>servers</i> and <i>workloads</i> , with seamless access to the management tools of the VSE technologies.
Integrity Virtual Machines	<i>See</i> Integrity VM.
Integrity VM	HP Integrity Virtual Machines. A soft partitioning virtualization product that allows you to install and run multiple systems (<i>virtual machines</i>) on the same physical host system (Integrity server or nPartition). The Integrity server or nPartition acts as a <i>VM Host</i> for the <i>virtual machines</i> (also referred to as guests). The virtual machines share a single set of physical hardware

resources, yet each *virtual machine* is a complete environment in itself and runs its own instance of an operating system (referred to as a guest OS).

See also virtual machine, VM Host.

logical server

A feature provided by *HP Virtualization Manager*, a logical server is a set of configuration and metadata that you create, activate, and assign to operate within a physical or *virtual machine*. An active logical server can be moved from one location to another, and its characteristics can be modified. This feature allows you to populate an enclosure, load balance servers, and evacuate servers in case of disaster; it allows you to provision resources only when needed and increase utilization of limited compute resources.

managed workload

A *workload* that is managed by *HP Global Workload Manager (gWLM)*.

monitored workload

A *workload* that can be monitored by *HP Virtualization Manager* but has no *policy* associated with it. Monitored workloads are not managed by *HP Global Workload Manager (gWLM)*.

node

See system.

nPartition

A partition in a cell-based server that consists of one or more cells, and one or more I/O chassis. Each nPartition operates independently of other nPartitions and either runs a single instance of an operating system or is further divided into *virtual partitions*.

nPartitions can be used as compartments managed by *HP Global Workload Manager (gWLM)* as long as several requirements are met. Refer to the gWLM online help for a description of nPartition requirements.

See also virtual partition.

package

A package groups application services (individual HP-UX processes) together.

parked workload

A *workload* that is not currently associated with a *system*. A workload becomes parked if its system is set to “none” when it is created or later modified. A parked workload that was previously associated with a system may have historical data associated with it from *HP Capacity Advisor* or *HP Global Workload Manager (gWLM)*. As with any workload, the historical data will be lost if the workload is deleted.

When migrating a workload from one system to another, it may be useful to park the workload (removing the association with the original system) until the new system becomes available. This preserves the historical data for the workload across the migration.

partition

1. A subset of *server* hardware that includes core, memory, and I/O resources on which an operating system (OS) can be run. This type of partitioning allows a single server to run an OS independently in each partition with isolation from other partitions.
2. A resource partition, made up of either a Fair-Share Scheduler or a processor set, that runs within a single OS. This type of partitioning controls resource allocations within an OS.

See also nPartition, virtual partition.

percent resident memory

A measure of the fractional amount of physical memory in use by a particular application for a period of time.

policy

A collection of rules and settings that control *workload* resources managed by *HP Global Workload Manager (gWLM)*. For example, a policy can indicate the minimum and maximum amount of CPU resources allowed for a workload, and a target to be achieved.

A single policy can be associated with multiple workloads.

process map

A script residing in `/etc/opt/vse/scripts` that enables you to create output process IDs (PIDs).

processor set

See PSET.

pruned

When a file is reduced to a set number of lines based on criteria determined by the system (application) or the software user.

regular expressions

Application Discovery recognizes regular expressions constructed using Perl 5 or POSIX syntax and semantics.

running application

An application that is continually or intermittently active and able to consume resources.

server	<ol style="list-style-type: none"> Physical server: Hardware that can run one or more operating systems, including a partitionable complex. Also, hardware that can run an instance of the vPars monitor. Server hardware includes one or more cabinets containing all the available processing cores, memory, I/O, and power and cooling components. HP Integrity servers include two types of server hardware: standalone servers and cell-based servers. Virtual server: A software-based virtual environment that can run an operating system. A virtual server includes a subset of the server hardware resources, including cores, memory, and I/O. Virtual servers may be <i>virtual partitions</i> under vPars or <i>virtual machines</i> under <i>Integrity VM</i>. HP Systems Insight Manager uses the term “server” for any standalone server, nPartition, or virtual server that is running an instance of an operating system or an instance of the vPars monitor. <p><i>See also</i> system.</p>
Serviceguard workload	A <i>monitored workload</i> associated with a Serviceguard cluster and a particular Serviceguard package within the cluster. The workload (and the utilization data reported) follows the package it is associated with as it moves between the nodes of the cluster.
SSL	<i>Secure Sockets Layer</i> . Protocol for validating identity and for creating an encrypted connection between a server and a Web browser.
system	<ol style="list-style-type: none"> A <i>server</i>, <i>nPartition</i>, <i>virtual partition</i>, or <i>virtual machine</i> that is running an instance of an operating system. Entities on the network that communicate through TCP/IP or IPX. To manage a system, some type of management protocol (for example, SNMP, DMI, or <i>WBEM</i>) must be present on the system. Examples of systems include <i>servers</i>, workstations, desktops, portables, routers, switches, hubs, and gateways. <p><i>See also</i> server.</p>
template	<p>An HP-supplied or user-defined set of rules, properties, or metadata that describe an object in a computing network.</p> <ul style="list-style-type: none"> In <i>HP Application Discovery</i>, templates specify the data collection and matching rules to be used to define and discover an application. When referring to a <i>logical server</i>, a template is the collection of information that defines the logical server and its attributes. A template logical server has no actual resources associated with it.
unmatched process	A process that Application Discovery can discover that does not match existing templates or packages that Application Discovery is using for discovery and monitoring. Unmatched processes might include custom and third-party applications.
virtual machine	A software entity provided by HP <i>Integrity Virtual Machines</i> , VMware ESX, or Microsoft Virtual Server. This technology allows a single <i>server</i> or (with Integrity Virtual machines) <i>nPartition</i> to act as a <i>VM Host</i> for multiple individual virtual machines, each running its own instance of an operating system (referred to as a guest OS). Virtual machines are managed systems in the HP Virtual Server Environment (VSE).
virtual partition	A software <i>partition</i> of a <i>server</i> , or of a single <i>nPartition</i> , where each virtual partition can run its own instance of an operating system. A virtual partition cannot span an nPartition boundary. <i>See also</i> nPartition, virtual machine.
visibility	Application Discovery makes it possible for you to control the amount of data appearing on user interface screens by letting you determine what applications, packages, or hosts will be visible in the user interface or not. Currently, visibility settings are global in nature, which means they apply to all screens in Application Discovery and are not specific to a particular user or job role.
VM Host	A <i>server</i> running software such as <i>HP Integrity Virtual Machines</i> , VMware ESX, or Microsoft Virtual Server, that provides multiple <i>virtual machines</i> , each running its own instance of an operating system.
warmup	The period of time during which Application Discovery is comparing discovered processes to the known installations of software and to template definitions of applications.

WBEM	Web-Based Enterprise Management. A set of web-based information services standards developed by the Distributed Management Task Force, Inc. A WBEM provider offers access to a resource. WBEM clients send requests to providers to get information about and access to the registered resources.
Web-Based Enterprise Management workload	<p><i>See</i> WBEM.</p> <p>The collection of processes in a standalone server, <i>nPartition</i> compartment, <i>virtual partition</i> compartment, or <i>virtual machine</i> compartment. <i>HP Global Workload Manager (gWLM)</i> extends this concept to include processor set compartments and Fair-Share Scheduler group compartments. gWLM enables you to monitor and manage workloads by automatically adjusting the resource allocations of compartments based on <i>policies</i>.</p> <p><i>See also</i> managed workload, monitored workload, Serviceguard workload.</p>

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