



OMi Management Pack for Apache Web Server

Software Version: 1.00

Operations Manager i for Linux and Windows® operating systems

User Guide

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Chapter 1: OMi Management Pack for Apache Web Server

The OMi Management Pack for Apache Web Server (OMi MP for Apache Web Server) works with Operations Manager i (OMi) that enables you to monitor the Apache Web Servers and the virtual hosts configured on the Apache Web Server in your environment. It includes Health Indicators (HIs), Event Type Indicators (ETIs), and Correlation Rule that analyze the events that occur on the Apache Web Servers and reports the health status. It also provides an out-of-the-box Management Template for monitoring the response time, loads, system usage, and availability of the Apache Web Servers and virtual hosts configured on the Apache Web Servers.

The Management Template can be seamlessly deployed by administrators for monitoring your Apache Web Server environment. Subject Matter Experts (SMEs) and developers can easily customize the Apache Web Server Management Template to suit their monitoring requirements.

OMi MP for Apache Web Server works with OMi and provides the following additional functionality to support a unified monitoring solution:

- Apache Web Server instance-based deployment and simplified configuration.
- Supports agent based monitoring of Apache Web Server instances.

Chapter 2: Getting Started


The following section provides information about the tasks required to monitor Apache Web Server instances using OMi MP for Apache Web Server. It also provides information about monitoring Apache Web Server environments using the BSM 9.2x or OMi 10.x console.

Task 1: Adding Nodes to the BSM 9.2x or OMi 10.x Console

Note: If the Apache Web Server that you want to monitor is already being monitored by Smart Plug-in (SPI) for Apache Web Server, then remove the SPI artifacts and data sources from the managed node hosting the Apache Web Server before proceeding.

Note: If the node already exists in RTSM, you can skip this step and proceed to Task 2.

Before you begin monitoring, you need to add the nodes to the BSM console.

1. Open the Monitored Nodes pane:
On BSM 9.2x, click **Admin > Operations Management > Setup > Monitored Nodes**.
On OMi 10.x, click **Administration > Setup and Maintenance > Monitored Nodes**.
2. In the Node Views pane, select **Predefined Node Filter > Monitored Nodes**, click  and then select **Computer > Unix**. The Create New Monitored Nodes dialog box appears.
3. Specify the Primary DNS Name, IP Address, Operating System, and Processor Architecture of the node, and then click **OK**.

The newly created node is saved as a Configuration Item (CI)s instance in RTSM.


Note: The node with Operations Agent needs to be activated on OMi Server and certificate must be granted.

Task 2: Enabling the Enrichment Rules

You must enable the following enrichment rules to populate the CI's display label with additional information about container or the hostname:

- `SoftwareElementDisplayLabelForNewHost`
- `SoftwareElementDisplayLabelForExistingHost`
- `SoftwareElementDisplayLabelPopulator`

To enable the Enrichment Rules, follow these steps:

1. Open the Enrichment manager:
On BSM 9.2x, click **Admin > RTSM Administration > Modeling > Enrichment manager**
On OMi 10.x, click **Administration > RTSM Administration > Modeling > Enrichment manager**
2. In the Enrichment Rules pane, select **SoftwareElementDisplayLabelForNewHost** from the list.
3. Right-click and select **Properties**. The Enrichment Rule Properties window appears.
4. Click **Next**.
5. Select **Rule is Active**.
6. Click **Finish**.
7. In the Enrichment Rules pane, click  to save the changes.
8. Select **SoftwareElementDisplayLabelForExistingHost** and repeat steps 3 to 7.
9. Select **SoftwareElementDisplayLabelPopulator** and repeat steps 3 to 7.

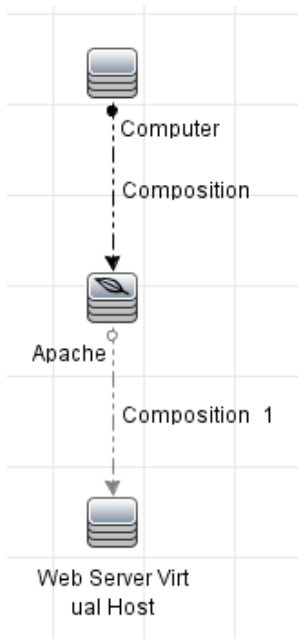
Task 3: Deploying the Apache Web Server Discovery Aspect

Ensure the `httpd.config` file is configured according to the prerequisite. For more information about editing the file, see the section [Modify the Apache Web Server Configuration File](#).

The Apache WS Discovery Aspect enables you to discover Apache Web Server instances in your environment. To discover the Apache Web Server CIs on the added managed nodes, you must deploy the Apache WS Discovery Aspect to a Computer CI.

The Apache WS Discovery Aspect deployment discovers the CIs of the following CI types (CITs):

- Apache
- Web Server Virtual Host
- Computer




1. Open the Management Templates & Aspects pane:

On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

Click **Configuration Folders > Web Server Management > Apache Web Server Management > Aspects**.

3. In the Management Templates & Aspects pane, click **Apache WS Discovery** Aspect, and then click  **Assign and Deploy Item**. The Assign and Deploy Item wizard opens.

4. In the **Configuration Item** tab, select the configuration item to which you want to deploy the Apache WS Discovery Aspect and then click **Next**. The **Required Parameters** tab opens.

5. (Optional). In the **Required Parameters** tab, click **Next**.

Note: Apache WS Discovery Aspect does not have mandatory parameters. You will get a notification stating the following:

There are no parameters that require editing for this Assignment.

6. (Optional). In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.
7. (Optional). If you do not want to enable the assignment immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignment later using the Assignments & Tuning pane.
8. Click **Finish**.

Note: After the Apache Web Server Aspect is deployed, the following message appears:
Assignment and deployment jobs created. To check the status of the deployment job, go to the following location:

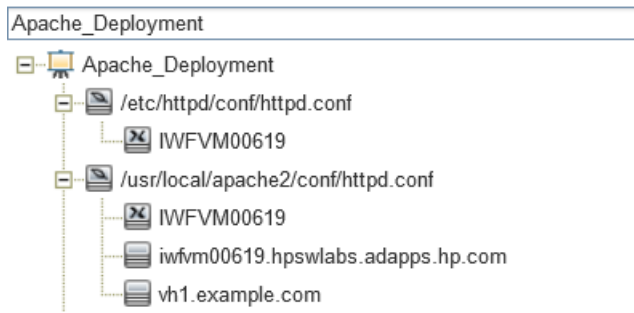
On BSM 9.2x, click **Admin > Operations Management > Monitoring > Deployment Jobs**.

On OMi 10.x, click **Administration > Monitoring > Deployment Jobs**.

Task 4: Verifying Discovery

After you deploy the Apache WS Discovery Aspect, you must verify if the CIs are populated in the View Explorer.

1. Open the Event Perspective pane:
 - On BSM 9.2x, click **Applications > Operations Manager > Event Perspective**.
 - On OMi 10.x, click **Workspaces > Operations Console > Event Perspective**.
2. In the **Browse Views** tab, select the **Apache_Deployment** View.



Task 5: Deploying Apache Web Server Management Template or Aspects

This section provides information about the data collection, deploying Management Template and aspects. For more information about deploying the Apache Web Server Management Templates, go to ["Task 5a: Identifying and Deploying Management Template"](#). For more information about deploying the Apache Web Server Aspects, go to ["Task 5b: Deploying Apache Web Server Aspects"](#).

Data Collection

Frequency (polling interval) at which each Aspect must be monitored is predefined with a default value in a specific frequency parameter. Frequency parameter is an expert parameter that is defined for each of the metrics regardless of whether they are for generating events or not.

Following are the four predefined frequency parameters:

Parameter	Frequency
Very High	5 mins
High	15 mins
Medium	1 hour
Low	24 hours

After Management Templates and Aspects are deployed, the collector is triggered based on the predefined frequency parameter in a specific Aspect. You can modify the default value of the parameter at following two levels:


- During deployment of the Management Template or Aspects using the Management Templates & Aspects pane.
- After deployment using the Assignments & Tuning pane.

For more information about how to modify the parameter values, see section [Tuning Parameters](#).

Task 5a: Identifying and Deploying Management Template

You can deploy the Apache Web Server Management Template to monitor the features such as the performance and availability of the Apache Web Server instances.

To deploy the Apache Web Server Management Template to the CIs, follow these steps:

1. Open the Management Templates & Aspects pane:
 - On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.
 - On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.
2. In the Configuration Folders pane, click **Configuration Folders > Web Server Management > Apache Web Server Management > Management Templates**.
3. In the Management Templates & Aspects pane, click the **Essential Apache Web Server Management Template**, and then click  **Assign and Deploy Item**. The Assign and Deploy wizard opens.
4. In the **Configuration Item** tab, select the Apache CI to which you want to assign the Management Template, and then click **Next**.
5. *(Optional)*. In the **Required Parameters** tab, click **Next**.

Note: Apache Web Server Management Template does not have mandatory parameters.

You will get a notification stating the following message:

There are no parameters that require editing for this Assignment.

6. *(Optional)*. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.
7. *(Optional)*. In the **Configure Options** tab, if you do not want to enable the assignment

immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignment later using the Assignments & Tuning pane.

8. Click **Finish**.

Note: The Apache WS Discovery Aspect is a part of the Essential Apache Web Server Management Template.


Task 5b: Deploying Apache Web Server Aspects

To deploy Apache Web Server Aspects to the CIs, follow these steps:

1. Open the Management Templates & Aspects pane:

On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Web Server Management > Apache Web Server Management > Aspects**.
3. In the Management Templates & Aspects pane, select the Aspect you want to deploy, and then click  **Assign and Deploy Item**. The Assign and Deploy wizard opens.
4. In the **Configuration Item** tab, select the Computer CI to which you want to assign the Aspect and then click **Next**.

Note: If you want to deploy Aspects to Node CIs, select **Show All CIs of Type Node** check box.

5. *(Optional)*. In the **Required Parameters** tab, click **Next**.

Note: Apache Web Server Aspects do not have mandatory parameters. You will get a notification stating the following message:

There are no parameters that require editing for this Assignment.

6. *(Optional)*. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.
7. *(Optional)*. In the **Configure Options** tab, if you do not want to enable the assignment

immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignment later using the Assignments & Tuning pane.

8. Click **Finish**.

Monitoring Apache Web Server Environment

After you deploy Management Template and Aspects, you can view the health of the CIs from the following perspectives:

- [Event Perspective](#)
- [Health Perspective](#)
- [Performance Perspective](#)

Event Perspective

After you deploy the Apache WS Discovery Aspect and Apache Web Server Management Template (s), you can view the events of the Apache Web Server CIs that are monitored by OMi MP for Apache Web Server.

To view the Event Perspective of Apache Web Server and its corresponding CIs, follow these steps:

1. Open the Event Perspective pane:

On BSM 9.2x, click **Applications > Operations Management > Event Perspective**.

On OMi 10.x, click **Workspaces > Operations Console > Event Perspective**.

The View Explorer pane appears.

2. In the **Browse Views** tab, select **Apache_Deployment** View that contains the Apache, Web Server Virtual Host and Computer CIs for which you want to view the events. Alternatively, you can use **Search** tab to find the CI.
3. Select the CI for which you want to view the Event Perspective. The list of events for the selected CI appears on the Event Browser pane:

When you select an event from the Event Browser, the Event Details pane opens where you can view following details:

- a. **General** - Displays the detailed information about the selected event such as Severity, Lifecycle State, Priority, Related CI and so on.

- b. **Additional Info** - Displays more detailed information about the attributes of the selected event.
- c. **Source Info** - Displays an overview of the information available about the source of the selected event.
- d. **Annotations** - Displays a list of the annotations attached to the selected event.
- e. **Related Events** - Displays an overview of all the events that are related to the event selected in the Event Browser.
- f. **History** - Displays the history of the selected event.
- g. **Resolver Hints** - Displays the information used to identify the node and CI associated with an event.
- h. **Instructions** - Displays instruction information designed to help operators handle the associated event.
- i. **Forwarding** - Displays the transfer of ownership details if any, for the events.

Health Perspective

After you deploy the Apache WS Discovery Aspect and Apache Web Server Management Template (s), you can view the events related to the health of the Apache Web Server CIs that are monitored by OMi MP for Apache Web Server.

To view the Health Perspective of Apache Web Server CIs, follow these steps:

1. Open the Health Perspective pane:

On BSM 9.2x, click **Applications > Operations Management > Health Perspective**.

On OMi 10.x, click **Workspaces > Operations Console > Health Perspective**.

The View Explorer pane appears.

2. In the **Browse Views** tab, select **Apache_Deployment** View that contains the Apache, Web Server Virtual Host and Computer CIs for which you want to view the health related events. Alternatively, you can use **Search** tab to find the CI.
3. Select the CI for which you want to view the Health Perspective. The list of health related events for the selected CI appears on the Event Browser pane.

When you select an event from the Event Browser pane, the following panes appear:

- a. **Health Top View** - Displays the health Top View of the selected event.
- b. **Health Indicators** - Displays the Key Performance Indicators (KPIs) and Health Indicators

(HIs) related to the CI that you select from the Health Top View pane.

- c. **Actions** - Displays the list of actions available for a selected event.

Performance Perspective

Performance Perspective enables you to populate graphs from existing graph templates. You can also plot customized graphs by selecting the required metrics for a selected CI.


To view the Performance Perspective of Apache Web Server CIs using graphs, follow these steps:

1. Open the Performance Perspective pane:

On BSM 9.2x, click **Applications > Operations Management > Performance Perspective**.

On OMi 10.x, click **Workspaces > Operations Console > Performance Perspective**.

The View Explorer pane appears.

2. In the **Browse Views** tab, select **Apache_Deployment** View. The performance pane appears, which lists the default graphs available for the Apache_Deployment View.
3. Select the graph you want to plot from the **Graphs** tab, and then click  **Draw Graphs**. The selected graph is plotted on the right pane.

Note: For more information about Managing Events, see the *Operations Manager i Concepts Guide*.

Chapter 3: Components

The OMi MP for Apache Web Server includes the following components for monitoring Apache Web Servers in your environment:

- [Apache Web Server Management Template](#)
- [Apache Web Server Aspects](#)
- [Parameters](#)
- [Configuration Items](#)
- [Run-time Service Model View](#)
- [Health Indicators](#)
- [Event Type Indicators](#)
- [Topology Based Event Correlation \(TBEC\) Rule](#)
- [Graph Templates](#)
- [Tools](#)

Apache Web Server Management Template

The Apache Web Server Management Template provides a complete monitoring solution for monitoring the availability, health, and performance of the Apache Web Servers in an environment.

By default, the OMi MP for Apache Web Server consists of a Management Template. You can deploy this Management Template and seamlessly monitor the Apache Web Server instances in your environment. The Apache Web Server Management Template consists of several Aspects which enable you to monitor Apache Web Servers in an environment.

Overview

The OMi MP for Apache Web Server consists of the Essential Apache Web Server Management Template.

How to Access Apache Web Server Management Template

1. Open the Management Templates & Aspects pane:
On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.
On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.
2. In the Configuration Folder pane, click **Configuration Folders > Web Server Management > Apache Web Server Management > Management Template**.


Tasks

How to Deploy the Management Templates

For more information about deploying Apache Web Server Management Templates on BSM 9.2x or OMi 10.x, see [Task 5: Deploying the Apache Web Server Management Template or the Aspects](#).

How to Display an Inventory Report for Management Template

The Inventory Report displays the Management Templates, Aspects, and Policy Templates that are available on a server. To display an Inventory Report for Apache Web Server Management Template, follow these steps:

1. Select the Management Template for which you want to create the report.
2. In the Management Template & Aspects pane, click  **Generate Assignment Reports**.

The preconfigured Assignment Report appears.

You can display additional types of reports from the Assignments & Tuning pane.

Essential Apache Web Server Management Template

The Essential Apache Web Server Management Template can be used to monitor the basic features of Apache Web Servers in an environment. The Essential Apache Web Server Management Template contains the primary features for monitoring the availability and performance of Apache Web Servers.

You have Apache Web Server setup in your environment, and want to check the availability of the Apache Web Servers, the Virtual hosts and monitor the important performance metrics of Apache Web Server- response time, memory usage, busy process rate, and so on. In such a scenario, you can deploy Essential Apache Web Server Management Template on all the Apache CIs.

How to Access the Essential Apache Web Server Management Template

1. Open Management Templates & Aspects pane:
On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.
On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.
2. In the Configuration Folder pane, click **Configuration Folders > Web Server Management > Apache Web Server Management > Management Template**.
3. In the Management Templates & Aspects pane, click **Essential Apache Web Server Management Template**.

User Interface Reference

Management Template - General

UI Element	Description
Name	Essential Apache Web Server Management Template
Description	Monitors the performance metrics of Apache Web Servers, the availability of Apache Web Server process and the availability of Virtual Hosts hosted on the web server
ID	A unique identifier for this version of the Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.0.
Change Log	Text that describes what is new or modified in this version of the Management Template.

Management Template - Topology View

UI Element	Description
Topology View	Apache_Deployment is the Topology View for Essential Apache Web Server Management Template.
CI Type	Type of configuration items that the Essential Apache Web Server Management Template enables you to manage. Apache is the type of CI to which the Management Template can be assigned.

The Essential Apache Web Server Management Template consists of the following Aspects to monitor these features:

- [Apache WS Availability](#)
- [Apache WS Discovery](#)
- [Apache WS Performance](#)
- [Apache WS Log File Monitoring](#)

Apache Web Server Aspects

Apache Web Server Aspect comprises policy templates, instrumentation, and parameters for monitoring the health and performance of Apache Web Servers. Each Apache Web Server Aspect can be used to monitor individual units of Apache Web Servers.

How to Access Apache Web Server Aspects

1. Open Management Templates & Aspects pane:

On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Web Server Management > Apache Web Server Management > Aspects**.

Tasks

How to Deploy Apache Web Server Aspects

For information about deploying Apache Web Server Aspects on BSM 9.2x or OMi 10.x, see "*Task 5b: Deploying Apache Web Server Aspects*" in the [Getting Started](#) chapter.

User Interface Reference

General	Provides an overview of the general attributes of the Apache Web Server Aspects.
CI Type	The type of configuration items that the Aspect can be assigned to. This is the type of CI to which the Aspect can be assigned. All Apache Web Server Aspects

	can be deployed only on the Computer CI type.
Instrumentation	Provides a single package which contains the binaries for discovery, data collection and alerting, and data logging. All OMi MP for Apache Web Server- Instrumentation is linked to policies and not to Aspects.
Policy Templates	Provides an overview of the policy templates that the Apache Web Server Aspect contain. You can expand each item in the list to see more details about the policy template.

The OMi MP for Apache Web Server comprises the following Apache Web Server Aspects:

Apache WS Availability

The Apache WS Availability Aspect monitors the availability of Apache Web Servers processes running on the system and its associated Virtual Hosts.

CI Type	Policy Template	Indicator	Description	Policy Type
Computer	ApacheWS-ProcMon	Process Availability	Monitors the availability of Apache Web Server process.	Measurement Threshold
	ApacheWS-VHAvailability	Virtual Host Availability	Monitors the availability of Virtual Hosts configured on a Apache Web Server.	

Apache WS Discovery

The Apache WS Discovery Aspect discovers the Apache Web Server instances running on a system and its associated Virtual Hosts.

CI Type	Policy Template	Indicator	Description	Policy Type
Computer	ApacheWS-Discovery	NA	Discovers the Apache Web Server processes running on a system and its associated Virtual Hosts.	Service Auto-Discovery

Apache WS Performance

The Apache WS Performance Aspect monitors the Apache Web Server performance indicators such as response time, bytes per second, request per second, bytes per request, percentage CPU utilization of the web server process, memory utilization of the web server process, status of the worker threads and also stores the collected performance metrics in the Agent datastore.

CI Type	Policy Template	Indicator	Description	Policy Type
Computer	ApacheWS-BusyProcessRate	Process Rate	Monitors the percentage of Apache Web Server worker processes that are busy serving incoming requests.	Measurement Threshold
Computer	ApacheWS-BytesPerReq	Bytes Per Request	Monitors the average number of bytes of data in the incoming requests.	Measurement Threshold
Computer	ApacheWS-NUMRequests	Request Rate	Monitors the frequency of incoming requests to the Apache Web Server.	Measurement Threshold
Computer	ApacheWS-MEMUsage	Memory Usage	Monitors the Memory usage by the Apache Web Server processes.	Measurement Threshold
Computer	ApacheWS-BytesPerSec	Bytes Per Sec	Monitors the average number of bytes served by the Apache Web Server per second.	Measurement Threshold
Computer	ApacheWS-CODALOG	NA	Collects and stores the Apache Web Server performance metrics to the Agent datastore.	Scheduled Task
Computer	ApacheWS-CPUUsage	CPU Usage	Monitors the percentage CPU utilization by Apache Web Server processes.	Measurement Threshold
Computer	ApacheWS-ResponseTime	Response Time	Monitors the average response time (in micro seconds) of the Apache Web Server.	Measurement Threshold

Apache WS Log File Monitoring

The Apache WS Log File monitoring Aspect monitors the Apache Web Server ErrorLog files for specific

patterns of text that indicate an error condition.

CI Type	Policy Template	Indicator	Description	Policy Type
Computer	ApacheWS-LogMon	NA	Monitor the log file of Apache Web Server periodically. Identify and alert on error patterns.	LogFile Entry

Parameters

Parameters are variables that are an integral component of Apache Web Server Management Templates, Aspects, and Policy Templates. Each parameter corresponds to a variable. Parameters contain default values that are used for monitoring different components of Apache Web Servers. You can also modify the values of the variables to suit your monitoring requirements.

OMi MP for Apache Web Server Parameters

The OMi MP for Apache Web Server consists of the following parameters:

Parameter	Type	Description	Default Value
Apache ProcMon: Polling interval (mins)	Expert	The frequency at which the Apache Web Server process is monitored for availability.	5
VHAvailability: Polling Interval (mins)	Expert	The frequency at which the virtual hosts configured on an Apache Web Server are monitored for availability.	4
Apache CPUUsage: Major Threshold (%)	Mandatory	Threshold limit for percentage of CPU used by Apache Web Server which if exceeded will generate a major alert.	5
ApacheCPUUsage: Polling Interval(mins)	Expert	Frequency in minutes at which the CPU load caused by Apache Web Server is monitored.	6
ApacheCPUUsage: Warning Threshold (%)	Mandatory	Threshold limit for percentage of CPU used by Apache Web Server which if exceeded will generate a Warning.	3
ApacheMEMUsage: Major Threshold (MB)	Mandatory	Threshold limit for memory used by Apache Web Server in MB, which if	2048

Parameter	Type	Description	Default Value
		exceeded will generate a Major alert.	
ApacheMEMUsage: Polling Interval (mins)	Expert	Frequency in minutes at which the memory usage by Apache Web Server is monitored.	5
ApacheMEMUsage: Warning Threshold (%)	Mandatory	Threshold limit for memory used by Apache Web Server in MB, which if exceeded will generate a Warning.	1024
BusyProcessRate: Major Threshold (%)	Mandatory	Percentage of Apache processes that are busy, which if exceeded will generate a Major Alert.	75
BusyProcessRate: Polling Interval (mins)	Expert	Frequency in minutes at which the busy and idle processes of Apache Web Server are monitored.	10
BusyProcessRate: Warning Threshold (%)	Mandatory	Percentage of Apache processes that are busy, which if exceeded will generate a Warning.	50
BytesPerSec: Major Threshold	Mandatory	Threshold limit for number of bytes served by the Apache Web Server, which if exceeded will generate a Major alert.	1024000
BytesPerSec: Polling Interval (mins)	Expert	The frequency in minutes at which the number of bytes served by Apache Web Server per second is monitored.	7
BytesPerSec: Warning Threshold	Mandatory	Threshold limit for number of bytes served by the Apache Web Server, which if exceeded will generate a Warning.	512000
BytesPerReq: Major Threshold	Mandatory	Threshold limit for the average number of bytes per incoming request, which if exceeded will result in a Major alert.	102400
BytesPerReq: Polling Interval (mins)	Expert	Frequency in minutes at which the average number of bytes per incoming request is monitored.	7
BytesPerReq: Warning Threshold	Mandatory	Threshold limit for the average number of bytes per incoming request, which if exceeded will result	512000

Parameter	Type	Description	Default Value
		in a Warning alert.	
DataLogging Frequency (mins)	Expert	Frequency at which Apache Web Server performance metrics are collected and stored in the Agent CODA data store.	5
NumRequests: Polling Interval (mins)	Expert	Frequency in minutes at which the number of incoming requests per second to the Apache Web Server is monitored.	8
NumRequests: Major Threshold	Mandatory	Threshold limit for the number of incoming requests per second to the Apache Web Server, which if exceeded will generate a Major alert.	100
NumRequests: Warning Threshold	Mandatory	Threshold limit for the number of incoming requests per second to the Apache Web Server, which if exceeded will generate a Warning alert.	50
Response Time: Major Threshold (micro sec)	Mandatory	Apache Web Server response time in micro seconds, which if exceeded will generate a Major alert.	500
Response Time: Polling Interval (mins)	Expert	Frequency at which the average response time of the Apache Web Server is monitored.	10
Response Time: Warning Threshold	Mandatory	Threshold limit for the Apache Web Server response time in micro seconds, which if exceeded will generate a Warning.	350



Tuning the Parameters

You can edit the parameters of the Apache Web Server Management Templates that are already deployed to the CIs. To edit the parameters, follow these steps:

1. Open the Assignments & Tuning pane:

On BSM 9.2x, click **Admin > Operations Management > Monitoring > Assignments & Tuning**.

On OMi 10.x, click **Administration > Monitoring > Assignments & Tuning**.

2. In the **Browse Views** tab, select the **Apache_Deployment** View that contains the CI for which you want to tune parameters. Alternatively, you can use the **Search** tab to find a CI.
3. In the list of Apache Web Server CIs, select a CI. The Assignment Items pane shows details of any existing Aspects assignments for the Apache CI.
4. You can modify the default parameter values by using of the following methods:
 - In the Assignments pane:
 - i. Select the Aspect for which you want to tune the parameters and then click . The Tune Assignment pane shows the current parameter values.
 - ii. Select the parameter you want to tune and click . The Edit Parameters dialog box opens.
 - In the Assignment Details pane:
 - i. Double-click a parameter in the list. The Edit Parameter dialog box opens.
5. Change the value and click **OK**. The new parameter values are deployed to the relevant CIs.

Configuration Items

Configuration Items (CI) are component that need to be managed in order to deliver an IT Service. CIs typically include IT Services, hardware, and software. Configuration Item Types (CIT) describes the type of CI and its attributes. The OMi MP for Apache Web Server comprises of the following CITs:

- Apache
- Web Server Virtual Host
- Computer

Run-time Service Model View

An Run-time Service Model (RTSM) View enables you to visualize the context of an event. A typical RTSM View shows a subset of Apache Web Server CIs and their relationships with other neighboring CIs. Using the Views, you can visualize the topology of an Apache Web Server environment. In addition, Views can be used to do the following:

- Manage the Event Perspective of Apache Web Server CIs
- Manage the Health Perspective of Apache Web Server CIs
- Assigning and tuning the Management Template, Aspects, and Policy Templates

How to Access RTSM View

1. Open Modeling Studio pane:

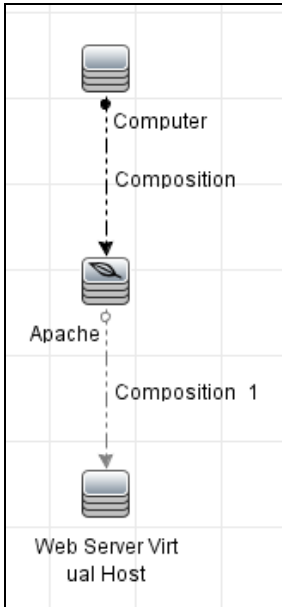
On BSM 9.2x, click **Admin > RTSM Administration > Administrator > Modeling > Modeling Studio**.

On OMi 10.x, click **Administration > RTSM Administration > Modeling > Modeling Studio > Resources**.

2. Click **Resource Type** as Views.
3. Click **Operations Management > WebServer** from the list.
4. Double-click or you can drag-and-drop the Resource to the modeling canvas.

By default, the OMi MP for Apache Web Server contains the following view:

Apache_Deployment: This view displays various components such as Apache, Web Server Virtual Host, and Computer CI type. The following image shows the relationship among the CI types:



Health Indicators

Health Indicators (HI) analyze the events that occur in Apache Web Server CIs and report the health of the Apache Web Server CIs. The OMi MP for Apache Web Server includes the following HIs to monitor the Apache Web Server-related events:

How to Access HIs

1. Open Indicators pane:

On BSM 9.2x, click **Admin > Operations Management > Monitoring > Indicators**.

On OMi 10.x, click **Administration > Service Health > CI Status Calculation > Health- and Event Type Indicators**.

2. In the CI Type pane, click **InfrastructureElement > RunningSoftware > WebServer > Apache**.

CI Type	HI	Description	Value/Severity
Apache	Process Availability	Availability of Apache Web Server process.	Up/NORMAL, Down/CRITICAL
	Memory Usage	Apache Web Server memory utilization.	Normal/NORMAL, High/WARNING

CI Type	HI	Description	Value/Severity
Web Server Virtual Host	Virtual Host Availability	Availability of Apache Web Server Virtual Hosts.	Up/NORMAL, Down/CRITICAL
Apache	Response Time	Number of requests served per second by Apache Web Server.	Normal/NORMAL, High/WARNING
	CPU Usage	Apache Web Server CPU utilization.	Normal/NORMAL, High/WARNING

Event Type Indicators

Event Type Indicators (ETI) are categorization of events based on the type of occurrence. The OMi MP for Apache Web Server includes the following ETIs to monitor Apache Web Server-related events:

How to Access ETIs

- Open Indicators pane:
 On BSM 9.2x, click **Admin > Operations Management > Monitoring > Indicators**.
 On OMi 10.x, click **Administration > Service Health > CI Status Calculation > Health- and Event Type Indicators**.
- In the CI Type pane, click **InfrastructureElement > RunningSoftware > WebServer > Apache**.

CI Type	ETI	Description	Value/Severity
Apache	Bytes Per Sec	Kilo bytes of data per sec in the incoming requests.	Normal/NORMAL, High/WARNING
Apache	Request Rate	The number of incoming requests per second.	Normal/NORMAL, High/WARNING
Apache	Process Rate	Number of Apache Web Server busy processes.	Normal/NORMAL, High/WARNING
Apache	Bytes Per Request	Kilo bytes of data per incoming requests of the Apache Web Server.	Normal/NORMAL, High/WARNING

Topology Based Event Correlation (TBEC) Rule

The OMi MP for Apache Web Server includes the following rules to correlate Apache Web Server-related event:

For more information about how the correlation rule work, see the *Operations Manager i Concepts Guide*.

How to Access TBEC Rule

- Open Correlation Rules pane:
 - On BSM 9.2x, click **Admin > Operations Management > Event Correlation > Topology-Based Event Correlation**.
 - On OMi 10.x, click **Administration > Event Processing > Correlation > Topology-Based Event Correlation**.

ApacheWebserver::Apache:Process Availability >> Virtual Host Availability

Description: Apache Web Server availability impacts availability of the Virtual Host hosted by Apache Web Server		
Cause		
CIT: Apache	HI: Process Availability	Value: Down
Symptom		
CIT: Web Server Virtual Host	HI: Virtual Host Availability	Value: Down

Graph Templates

OMi MP for Apache Web Server is packaged with pre-defined graph templates to analyze the performance perspective of the Apache Web Servers. The graph templates are mapped to the Computer CI type. The following section provides information about the graph family, graph templates

and the metrics associated with the graph templates. It also provides information about accessing the graph templates and viewing the graphs.

How to Access Graph Templates

1. Open Performance Graph Mapping pane:
On BSM 9.2x, click **Admin > Operations Management > Operation Console**.
On OMi 10.x, click **Administration > Operations Console > Performance Graph Mappings**.
2. In the CI Types pane, select **InfrastructureElement > RunningSoftware > WebServer > Apache**.


The following table lists the graph templates available in the OMi MP for Apache Web Server:

Graph Templates	Description	Metric Name	Table in Data Store
Apache Busy Process Rate versus Response Time	Plots a graph of percentage of process busy serving incoming request against the response time.	PROC_RATE; RESP_TIME_MICROSEC	APACHE_DATA
Apache CPU Usage versus Response Time	Plots a graph of percentage of CPU utilized by Apache Web Server the processes against the response time.	PERC_CPU_USAGE; RESP_TIME_MICROSEC	APACHE_DATA
Apache Load Statistics	Plots a graph of bytes per request, incoming request per second and request processed in bytes per second.	BYTES_PER_REQ; REQS_PER_SEC BYTES_PER_SEC	APACHE_DATA
Apache Memory Usage versus Response Time	Plots a graph of percentage of memory used by the processes against the response time.	MEM_USAGE_MB; RESP_TIME_MICROSEC	APACHE_DATA

How to View Graphs

Performance Perspective enables you to populate graphs from existing graph templates. You can also plot customized graphs by selecting the required metrics for a selected CI.

To view the Performance Perspective of Apache Web Server CIs using graphs, follow these steps:

1. Open the Operations Console Management window:
On BSM 9.2x, click **Applications > Operations Management**.
On OMi 10.x, click **Workspaces > Operations Console > Performance Perspective**.
2. In the Operations Management/Console window, click **Performance Perspective** tab. The View Explorer pane appears.
3. In the **Browse Views** tab, select **Apache_Deployment** View. The default graphs available for the **Apache_Deployment** View appears in the performance pane.
4. In the **Graphs** tab, select the graph you want to plot, and then click  **Draw Graphs**. The selected graph is plotted on the right pane.

Note: For more information about Managing Events, see the *Operations Manager i Concepts Guide*.

Tools

The OMi MP for Apache Web Server is packaged with tools which enables administering, monitoring, and troubleshooting the Apache Web Server CIs.

How to Access Tools

1. Open Tools pane:
On BSM 9.2x, click **Admin > Operations Management > Operations Console > Tools**.
On OMi 10.x, click **Administration > Operations Console > Tools**.
2. In the CI Types pane, click **ConfigurationItem > InfrastructureElement > RunningSoftware > WebServer > Apache**.

The OMi MP for Apache Web Server comprises the following tools:

CI Type	Tool	Description
Apache	Apache Webserver - Display Access Log	Displays the last 1000 lines of the access log file of the selected Apache CI

CI Type	Tool	Description
Apache	Apache Webserver - Display Config Info	Displays the important configuration information discovered by OMi MP for Apache Web Server, which are used for monitoring the Apache CI
Apache	Apache Webserver - Display Error Log	Displays the last 1000 lines of the error log file of the selected Apache CI
Apache	Apache Webserver - Performance and Availability snapshot	Displays a snapshot of all the Apache CIs performance and availability metrics monitored.
Apache	Apache Webserver - Restart Apache Webserver	Re-starts the Apache Web Server instance corresponding to the Apache CI
Apache	Apache Webserver - Start Apache Webserver	Starts the Apache Web Server instance corresponding to the Apache CI
Apache	Apache Webserver - Stop Apache Webserver	Stops the Apache Web Server instance corresponding to the Apache CI
Apache	Apache Webserver - Update server-status configuration in httpd.conf	<p>Appends the sever-status enablement block for loop address (127.0.0.1) to the end of the Apache Configuration file (httpd.conf)</p> <p>Note: This tool is a simple append command and it does not support IPv6 loopback ::1</p>

How to Launch Tools

As an administrator, you want to configure and manage tools. To launch a tool, follow these steps:

1. Open Browse Views pane:

On BSM 9.2x, click **Applications > Operations Management > Event Perspective > Browse Views**.

On OMi 10.x, click **Workspaces > Operations Console > Event Perspective > Browse Views**.

2. Select a View. A list of CIs are shown under the view you select.
3. Select a CI and right-click and select **Launch Tool**.
4. Click **Next**. You can preview the execution of the tool.
5. Click **Run Tool**.



The tool runs in the background and displays the result in the **Execution Result** tab.

Chapter 4: Troubleshooting

RTSM View is not available on the HP OMi Server

Problem: Apache_Deployment RTSM View is not available on the OMi Server.

Solution: To resolve this problem, you can manually upload the RTSM View by following these steps:

1. Open Package Manager pane:
On BSM 9.2x, click **Admin > RTSM Administrator > Administration > Package Manager**.
On OMi 10.x, click **Administration > RTSM Administration > Package Manager**.
2. Click . The Deploy Package for Server dialog box appears.
3. Click  to upload the package. The Deploy Package to Server (from the Local Disk) dialog box appears.
4. Select the HP0prWeb.zip file from your local disk and click **Open**.

Note: The RTSM View will be loaded with a time delay.

Apache WS Discovery Aspect fails on nodes

Problem: Apache WS Discovery is not working.

Solution: To resolve this problem, follow these steps:

Note: Apache WS Discovery must be successful after performing every step. If the error does not resolve, you can redeploy Apache WS Discovery Aspect after that step and verify.

1. Verify if the `httpd.conf` file is configured according to the prerequisite mentioned in the Installation Guide. For more information about configuring the file, see the section "[Modify the Apache Web Server Configuration File](#)".
2. To check if `ApacheWS-Discovery` policy is available and enabled on the monitored node, run the following command:

```
ovpolicy -l
```

You must be able to view the following text in the output:

```
svcdics "ApacheWS-Discovery" enabled 0001.0000
```

3. Check if the Instrumentation is successfully deployed on the node by verifying the following:

- a. You can view the following files under `/var/opt/OV/bin/instrumentation` folder:

```

apache_cmd
Apache_ParseConfig.pm
apache_ws_coda.spec
apache_ws_getcfginfo.sh
apache_ws_show.pl
oa_cntrl
Socket6.so

ApacheCreateConfig.pm
ApachePerlModules.tar
apache_ws_collector.pl
apache_ws_getconfig.pl
apache_ws_updateApacheConfig.pl
PostDeployActions.pl

Apache_DCT_Input.xml
ApacheProcessHandler.pm
apache_ws_discovery.sh
apache_ws_servertool.pl
apache_ws_writediscxml.pl
ProcessTable.so

```

- b. You can view the following files under `/var/opt/OV/conf/apachemp/lib` folder:

```

ApacheCreateConfig.pm
ApacheParseConfig.pm
ApacheProcessHandler.pm
HTML
HTTP
IO
LWP
LWP.pm
Net
Proc
ProcessTable.so
Socket6
Socket6.pm
Socket6.so

```

4. To manually run the Apache WS Discovery Aspect from the console, run the following

commands:

```
/var/opt/OV/bin/instrumentation/apache_ws_discovery.sh
```

Note: If there is a running instance of Apache, the discovery XML file will be displayed on the console.

5. Check if ApacheWS-Discovery policy is successful by verifying the following:
 - a. Check for the following file and contents: `/var/opt/OV/conf/apachemp/apachecfg.cfg`
 - b. Check for the following file and contents: `/var/opt/OV/conf/apachemp/apache_discovery.xml`

Note: Details of the file contents are as mentioned below:

```
BEGIN:::CONFIG <Beginning of the section of an Apache Web Server
instance>
SERVERID=<Full path the httpd.conf file>
IPADDRESS=<IP Address of the node>
SERVERNAME=<ServerName as configured in the http.conf. Empty if not
configured>
SERVERROOT=<ServerRoot of the Apache Web Server>
SERVERBIN=<The Apache Web Server executable>
WEBSERVER=<The Apache Web Server Version. This is not mandatory field>
CONFIGFILE=<Full path to the httpd.conf file>
PIDFILE=<Full path to the Apache Web Server PidFile>
ERRORLOG=<Full path to the ErrorLog of Apache Web Server>
ACCESSLOG=<Full path to the CustomLog of the Apache Web Server>
DOCUMENTROOT=<DocumentRoot of the Apache Web Server. This field is not
mandatory>
PORT=<One or more Listen ports configured for the Apache Web Server>
END:::CONFIG <Ending of the section of an Apache Web Server instance>
```

- c. If the mentioned files are not available, then redeploy Apache WS Discovery Aspect.
 - d. If the content of the files are incorrect, verify if the `httpd.conf` file is configured according to the prerequisite mentioned in the Installation Guide.

For more information about configuring the file, see the section "[Modify the Apache Web Server Configuration File](#)".

6. Review the Apache Discovery and Configuration log files at the following locations:
 - `/var/opt/OV/log/apachemp/apache_discovery.log`
 - `/var/opt/OV/log/apachemp/apachemp_config.log`

7. Run the following command to rerun the ApacheWS-Discovery policy manually: `ovagtrep -run "ApacheWS-Discovery"`.

Alerts are not generated

Problem: Alerts for Apache Web Server performance metrics are not seen in the Event Browser.

Solution: To resolve this problem, follow these steps:

1. Verify if Apache WS Discovery Aspect is deployed successfully on the node.

If the problem is not resolved, run the following command to rerun ApacheWS-Discovery policy manually: `ovagtrep -run "ApacheWS-Discovery"`.

2. Check if the following collection policies are available and enabled on the node:

monitor	"ApacheWS-BusyProcessRate"	enabled	0001.0000
monitor	"ApacheWS-BytesPerReq"	enabled	0001.0000
monitor	"ApacheWS-BytesPerSec"	enabled	0001.0000
monitor	"ApacheWS-CPUUsage"	enabled	0001.0000
monitor	"ApacheWS-MEMUsage"	enabled	0001.0000
monitor	"ApacheWS-NUMRequests"	enabled	0001.0000
monitor	"ApacheWS-ProcMon"	enabled	0001.0000
monitor	"ApacheWS-ResponseTime"	enabled	0001.0000
monitor	"ApacheWS-VHAvailability"	enabled	0001.0000

3. Check the following collector log file to verify if the policies logging correct data:

`/var/opt/OV/log/apachemp/apachemp_collector.log`

4. To check the current state of data collection, run the tool **Apache Webserver- Performance and Availability snapshot**.
5. Check if the value exceeds the threshold set for the alert generation.
6. Verify the value with configured threshold limit.

No Data for Performance Manager i (PMi) Graphs

Problem: OMi MP for Apache Web Server performance graphs do not display data.

Solution: To resolve this problem, follow these steps:

1. Verify if Apache WS Discovery Aspect is deployed successfully on the node.

If the problem is not resolved, run the following command to rerun ApacheWS-Discovery policy manually: `ovagtrep -run "ApacheWS-Discovery"`

2. Run the **Apache WebServer - Performance and Availability snapshot** tool and verify if alerts are generated when the threshold value is exceeded.

3. To check if the graph data sources are created, run the following command:

```
ovcodautl -obj
```

- a. Verify the list of data sources and ensure APACHE_DATA data source is created.

Note: The data source is created as part of ApacheWS-Discovery policy.

- b. If data source is not available, run the ApacheWS-Discovery policy manually using the command `ovagtrep -run "ApacheWS-Discovery"`

4. To verify if data is getting stored correctly, dump the data from the data source to the CODA DB by running the following command:

```
ovcodautl -dumpds APACHE_DATA
```

5. To verify if the latest data is available in the data source, check the **Timestamp** of the data.
6. If the latest data is not available in the data source, run the following data log command and verify again.

```
/var/opt/OV/bin/instrumentation/apache_ws_collector.pl ApacheWS-CODALOG
```

Appendix 1: Metrics and Data Sources

The metric data is logged into specific data sources for generating reports and graphs.

Generic Data Source

The generic data source reserves a column for the database instance name and labeled instance name. This column also contains the information that differentiates the data collected for each instance.

The APACHE_DATA is the data sources for Apache Web Server.

Table in Data Store	Aspect	Policy Template / Collection Name	Metrics	Data Type
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	BUSY_WORKERS	Integer 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	BYTES_PER_REQ	Real 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	BYTES_PER_SEC	Real 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	IDLE_WORKERS	Integer 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	IP_ADDRESS	UTF8
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	MEM_USAGE_MB	Real 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	PERC_CPU_USAGE	Real 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	PORT	Integer 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	PROC_RATE	Real 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	REQS_PER_SEC	Real 64

Table in Data Store	Aspect	Policy Template / Collection Name	Metrics	Data Type
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	RESP_TIME_MICROSEC	Real 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	SERVER_NAME	UTF8
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	TOTAL_ACCESS	Integer 64
APACHE_PERF	Apache WS Performance	Apache WS-CODALOG	TOTAL_KBYTES	Integer 64

Appendix 2: Modify the Apache Web Server Configuration File

To monitor the Apache Web Server in your environment, you must edit the main Apache Web Server configuration file.

Note: The changes mentioned in the prerequisites (steps 1 - 6) must be performed on the main `httpd.conf` file. The current version of Apache Web Server does not support `include` directives in the `httpd.conf` file.

To configure the `httpd.conf` file, follow these steps:

1. The Apache Web Server parses the `Listen` directive to identify the port through which monitoring is performed.

For example, `Listen 80`

Note: IPv6 addresses must be enclosed in square brackets, as in the following example:

```
Listen [2001:db8::a00:20ff:fea7:ccea]:80
```

The monitoring solution connects to the port mentioned in the `Listen` directive to collect Apache Web Server performance metrics.

Caution: It is mandatory to specify the `Listen` directive with a valid port number for the Apache Web Server to function.

2. To compute the Apache Web Server response-time, you must suffix the `CustomLog` file entry with `###%D###` as mentioned in the following example:

```
<IfModule log_config_module>
LogFormat "%h %l %u %t \"%r\" %>s %b ###%D###" common
CustomLog "logs/access_log" common
</IfModule>
```

Apache Web Server logs the response time in micro seconds when the `%D` entry is provided. Apache Web Server parses the pattern mentioned to compute the response time.

3. To get the server-status information, you must provide access to the loop-back server address as mentioned in the following example:

Loop-back address:

For IPv4:

127.0.0.1

For IPv6:

::1

Note: The monitoring solution connects to the loop-back address and port specified in the `Listen` directive to collect the performance metrics. It is important to turn ON the **ExtendedStatus** directive to enable collection of all the performance metrics.

```
<Location /server-status>
SetHandler server-status
Order Deny,Allow
Deny from all
Allow from 127.0.0.1
</Location>
ExtendedStatus On
```

Note: You must ensure that the `mod_status` module is loaded as part of Apache Web Server configuration. This is required to retrieve the performance metrics from Apache Web Server using the `ExtendedStatus On` flag.

4. To monitor the ErrorLog for server errors using the Apache Web Server log monitoring policy, you must have an entry for ErrorLog in the `httpd.conf` file.

For example, `ErrorLog "logs/error_log"`

5. Apache Web Server identifies the virtual hosts configured using the `ServerName` directive in the virtual host block as shown in the following example:

```
<VirtualHost *:80>
ServerName vh1.example.com
DocumentRoot /srv/www
</VirtualHost>
```

6. Save the configuration file changes. Restart the Apache Web Server.

Send documentation feedback

If you have comments about this document, you can [contact the documentation team](#) by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on User Guide (OMi Management Pack for Apache Web Server 1.00)

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