Oracle® Fusion Middleware

Oracle Process Manager and Notification Server Administrator's Guide

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Oracle Fusion Middleware Oracle Process Manager and Notification Server Administrator's Guide, Release 11*g* (11.1.1.2.0)

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Contents

5 Using OPMN

Preface

This guide describes how to administer Oracle Process Manager and Notification Server (OPMN) for management of Oracle Fusion Middleware components.

This preface contains these topics:

Audience

The *Oracle Process Manager and Notification Server Administrator's Guide* is intended for administrators of Oracle Fusion Middleware.

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Related Documentation

For more information, see these Oracle resources:

- Oracle Fusion Middleware Documentation Library
- Oracle Fusion Middleware Platform-Specific Documentation

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

What's New in OPMN?

This chapter describes the new features of Oracle Process Manager and Notification Server (OPMN) available in Oracle Fusion Middleware Release 11*g* (11.1.1.2.0).

This chapter includes the following topics:

1.1 Integration with Oracle Instance

Each *ORACLE_HOME* can support multiple instances, each with its own configuration and diagnostic directory tree (*ORACLE_INSTANCE*). OPMN now operates from within an *ORACLE_INSTANCE*.

There are two basic subdirectories within the *ORACLE_INSTANCE* base directory: *ORACLE_INSTANCE*/config and *ORACLE_INSTANCE*/diagnostics/logs. Within each of these two directories each component has a specific directory tree with the format: component type/component name where component type is either the OPMN type value configured for the ias-component or the process-type id for the component, and component name is the id value configured for the ias-component.

For example, the default Oracle HTTP Server (OHS) install log configuration directory would therefore be:

ORACLE_INSTANCE/config/OHS/ohs1 (UNIX)

ORACLE_INSTANCE\config\OHS\ohs1 (Microsoft Windows)

The OPMN component type is always OPMN and component name is always opmn.

1.2 Support with Oracle WebLogic Server

In most Oracle Fusion Middleware installations an Oracle instance is associated with a Oracle WebLogic Server domain for management of system components using the Oracle Enterprise Manager Fusion Middleware Control Console (Fusion Middleware Control Console). In these deployments, OPMN is integrated with the WebLogic domain to provide remote management of system components.

Unlike prior releases of Oracle Fusion Middleware, OPMN not only manages system components in the local Oracle instance but it is also integrated with the WebLogic domain to provide remote system component management using either the Fusion Middleware Control Console and or the WLST command line.

Note: For more information about Oracle Fusion Middleware management concepts refer to the *Oracle Fusion Middleware Administrator's Guide*.

2

OPMN: Overview

This chapter provides an overview of OPMN for Oracle Fusion Middleware. It includes the following topics:

- What is OPMN?
- How OPMN Works
- What System Components Does OPMN Manage?

2.1 What is OPMN?

OPMN is installed and configured with the following installation types:

- Web Tier Installation: OPMN manages Oracle HTTP Server and Oracle Web Cache
- Oracle Portal, Forms, Reports, and Discoverer Installation: OPMN manages Oracle Portal, Oracle Forms Services, Oracle Reports, Oracle Business Intelligence Discoverer, and Oracle EM Agent and Service Manager
- Oracle Identity Management Installation: OPMN manages Oracle Internet Directory and Oracle Virtual Directory

OPMN features the following functionality:

- Provides a command-line interface for process control and monitoring for single or multiple system components.
- Provides an integrated way to manage system components.
- Enables management of system subcomponents and sub-subcomponents.
- Channels all events from different system component instances to all system components that can utilize them.
- Solves interdependency issues between system components by enabling you to start and stop components in order.
- Enables customizing of enterprise functionality by using event scripts.
- Enables gathering of host and system process statistics and tasks.
- Provides automatic restart of system processes when they become unresponsive, terminate unexpectedly, or become unreachable as determined by ping and notification operations.
- Provides automatic death detection of system processes.
- Enables you to control an Oracle instance through modifications to the `opmn.xml` file.

An Oracle instance is a directory that contains a set of system components managed by a common OPMN.

The OPMN server should be started as soon as possible after turning on the computer. OPMN must be running whenever system components are turned on or off.

On Microsoft Windows, OPMN is created as a service for each Oracle instance.

Oracle Fusion Middleware components that are managed by OPMN should never be started or stopped manually. Do not use command line scripts or utilities from previous versions of Oracle Fusion Middleware for starting and stopping system components. OPMN must be the last service turned off whenever you restart or turn off your computer.

Use the Fusion Middleware Control Console and the `opmnctl` command line utility to start or stop system components.

Note: Refer to Chapter 4 for more information about the `opmnctl` command.

2.2 How OPMN Works

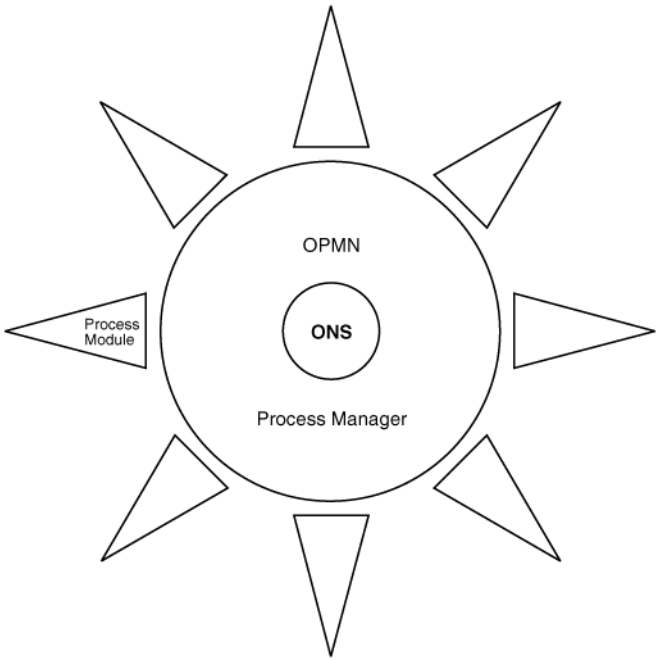
OPMN consists of a core grouping of three components that interpret and convey notification information sent between system processes within the same or different OPMN servers.

The core of OPMN consists of the following three components:

- Oracle Notification Server
- Oracle Process Manager
- PM Modules

Figure 2–1 shows the architecture of the core of OPMN.

Figure 2–1 OPMN Architecture



OPMN consists of Oracle Notification Server, Oracle Process Manager, and Process Modules

****

2.2.1 Oracle Notification Server

Oracle Notification Server (ONS) is the transport mechanism for failure, recovery, startup, and other related notifications between components in Oracle Fusion Middleware. It operates according to a publish-subscribe model: a system component receives a notification of a certain type for each subscription to ONS. When such a notification is published, ONS sends it to the appropriate subscribers.

Unlike previous versions of Oracle Fusion Middleware, ONS is not configured to discover other OPMN servers. OPMN does not need to connect to other OPMNs for normal operation because all administration is centralized in the WebLogic domain. The WebLogic domain establishes remote client connections to each OPMN server as needed.

2.2.2 Oracle Process Manager

Oracle Process Manager (PM) is the centralized process management mechanism used to manage system processes. The PM is responsible for starting, restarting, stopping, and monitoring every process it manages. The PM handles all requests sent to OPMN associated with controlling a process or obtaining status about a process. The PM is also responsible for performing death-detection and automatic restart of the processes it manages. The system processes that PM is configured to manage are specified in the `opmn.xml` file.

The PM waits for a user command to start a specific, or all system processes. When a process is stopped, the PM receives a request as specified by the request parameters.

The OPMN server consists of 2 processes. The first OPMN server process has only one purpose: to start the second OPMN server process when necessary. The second OPMN server process handles all request traffic and does all the work. If the second OPMN server process goes down as part of an `opmnctl reload` command or an unexpected crash it is restarted by the first OPMN server process.

On Microsoft Windows, the second OPMN server process is not restarted if it is deliberately terminated. Instead, the first OPMN server process exits as well. Recovering from this situation is accomplished by restarting the OPMN server from the command line or service manager.

The Fusion Middleware Control Console also uses PM to manage processes.

The PM uses the ONS to:

- detect that a process has completed initialization and is ready to receive requests
- determine what ports are in use
- obtain component specific runtime information

2.2.3 PM Modules

The Oracle Process Manager Modules (PM Modules) implement system component-specific process management functionality. The PM Modules pass notification information returned by other system component PM Modules within the same or different OPMN servers.

The PM Modules:

- handle any communications originating from the running component.
- construct system component specific control information (how to start, stop, restart the component).
- test responsiveness in an system component specific manner to determine if a component is responding to requests.

> **See Also:** Chapter 6 for the common configuration of the `opmn.xml` file.

2.3 What System Components Does OPMN Manage?

OPMN manages all system components including the Oracle EM Agent and Service Manager.

You can also configure OPMN to manage other processes (including Oracle and other third-party products) using the Custom PM Module. See Appendix A for more information about configuring a custom process.

OPMN manages the following Oracle Fusion Middleware components:

- OHS
- Oracle Web Cache
- Oracle Internet Directory
- Oracle Virtual Directory
- Oracle Forms

- Oracle Reports
- Oracle Business Intelligence Discoverer

2.3.1 Oracle Enterprise Manager Fusion Middleware Control Console

In addition to OPMN, you can also manage your enterprise using the Fusion Middleware Control Console. The Fusion Middleware Control Console leverages the functionality of OPMN to manage your Oracle Fusion Middleware enterprise. Using a Web browser, Fusion Middleware Control Console provides a graphical interface that enables management of all system components in your network and enterprise.

> **See Also:** *Oracle Fusion Middleware Administrator's Guide* for more information about Oracle Fusion Middleware management.

3

The opmn.xml File

This chapter provides an overview of the `opmn.xml` file for Oracle Fusion Middleware. It features the following topics:

- opmn.xml
- Automatic Restart
- OPMN Log Files
- Security
- IPv6 Support

3.1 opmn.xml

The *ORACLE_INSTANCE*`/config/OPMN/opmn/opmn.xml` file is the main configuration file for OPMN. The `opmn.xml` file contains information for PM and system component specific configuration. The `opmn.xml` file shows you which system components OPMN is managing on your system.

The `opmn.xml` file is divided into three main sections: log files, notification-server, and process-manager.

- **log files**: The log files configuration by default fully enables the standard log but disables the debug log
- **notification server:** The notification-server configuration includes the OPMN listener ports as well as secure connection definition. Optional `<topology>` `opmn.xml` file element can be manually added for OPMN discovery.
- **process manager**: The process-manager configuration includes all information required for each managed component.

The `opmn.xml` file does not contain component-specific element names. Component specific management code is located in the PM modules which are loaded by OPMN at startup according to what has been specified in the `modules` section of the `opmn.xml` file.

Each level has a specific set of configurations. In addition, there are several configuration elements that are accepted at more than one level to provide the flexibility of applying a configuration across an entire system component or just part of a component.

```
<ias-component>
   <process-type>
      <process-set>
```

<ias-component>: This entry represents the system component. It enables management of the component for processes such as starting and stopping.

<process-type>: This subcomponent of the <ias-component> entry declares the type of process to run by association with a specific PM module.

<process-set>: This sub-subcomponent of the <ias-component> entry enables you to declare different sets of optional runtime arguments and environments for the system component. <process-set> is an optional configuration element.

The opmn.xml file contains system component entries arranged in the hierarchical structure shown in the following Example 3–1.

Example 3–1 Element Entries in opmn.xml File

```
<ias-component id="ohs1">
   <process-type id="OHS">
      <process-set id="OHS">....
```

3.2 Automatic Restart

OPMN gives the user control over automatic death detection and restart of components; you can configure the parameters by which OPMN determines a process has died and disable automatic restart for individual components.

OPMN monitors the operation of its managed processes by the following methods:

- Operating system level detection of system process death
- Periodic ping requests to system processes
- Periodic status notification from system processes (reverse-ping)

The ping and notification functionality is only used where appropriate according to the functionality of the system component.

OPMN automatically restarts system components that terminate unexpectedly. OPMN also restarts processes that are unresponsive according to the result of notification and ping operations.

> **See Also:** Chapter 6 for more information about the common configuration of the opmn.xml file.

3.3 OPMN Log Files

The log files generated by OPMN provide important information that can help you identify and diagnose performance and configuration issues. The Fusion Middleware Control Console makes reviewing these log files easier by helping you locate and view system component log files.

> **See Also:**
>
> - *Oracle Fusion Middleware Administrator's Guide* for additional diagnostic utilities
> - Section B.2.1 for more information about OPMN log files

3.4 Security

The OPMN local listener port used by ONS clients and PM administrative processes do not use Secure Socket Layer (SSL) encryption for security, but rely on two other mechanisms to ensure authorized access to the OPMN server:

- OPMN binds the local listener port to the local host. Users on the local system can connect to this port and issue OPMN process control requests. Information requests are allowed on the OPMN request port, which is bound to the system IP. The request port does not have SSL encryption.
- When the OPMN server process first starts up and successfully binds to the local port, it creates a string of printable ASCII characters which it uses as a key for local connections. All connection attempts on the local port must include this key or the connection is closed by the OPMN server. The ASCII character string is written into the *ORACLE_HOME*/opmn/.formfactor file. Processes that cannot access the .formfactor file are not permitted to interact with the OPMN server.

For security reasons, the OPMN server logs any attempts to connect to its local port with an invalid form factor key (a key that does not match the value written by this OPMN process into the .formfactor file). You may encounter the following:

- You attempt to run the OPMN client manually with the wrong user identification. Only the application server user can read the value from the .formfactor file, and so requests or processes run as the wrong user is not able to provide the correct key to the OPMN server.
- You attempt to run an OPMN client from the wrong Oracle instance. (It is possible to have multiple Oracle instances set up on the same system.) If the other Oracle instances have OPMN configured to use the same local port then the system process request from the wrong Oracle instance reads the wrong .formfactor file.
- You have manually changed the local port configuration in the opmn.xml file and started a new OPMN server without first stopping the previous OPMN server. The new OPMN server runs, binds to the new port, and overwrites the .formfactor file. The previous OPMN server is now unreachable through the local port, and can only be shutdown through remote OPMN requests (if SSL and authentication are configured) or by manually stopping the previous OPMN server.
- Oracle Fusion Middleware and the Oracle Database both use ONS. When these two products are installed onto the same host, an ONS port conflict may arise if the port values configured for ONS are the same for both the Oracle Database and the Oracle Fusion Middleware component.

  ONS with the Oracle Database is only used for special configurations and therefore is typically never started. However, the database listener attempts to connect to the Database ONS server but ends up connecting to the ONS server that was installed with Oracle Fusion Middleware. ONS (as part of OPMN) is always started whenever Oracle Fusion Middleware is started.

  Because the Oracle Database is installed in a different location than that of Oracle Fusion Middleware, the Database ONS does not have access to the .formfactor file that was created when OPMN started up with the Oracle Fusion Middleware. As a result, the database listener attempts to connect to OPMN; the DB listener interprets it as a its standalone ONS) without a form factor string. OPMN logs an error similar to the following in the ons.log file:

  ```
  04/11/15 18:43:32 [4] Local connection 0,127.0.0.1,6100 invalid form factor
  ```

This is expected OPMN behavior; preventing client access to the ONS server unless they possess the correct formfactor string.

To avoid having the Oracle Database listener contact the system OPMN server, change the default local and remote port values for the ONS server that was installed with the Oracle Database.

3.5 IPv6 Support

ONS is able to concurrently support the IPv4 and IPv6 network interfaces.

IPv4 is version 4 of the Internet Protocol (IP). It was the first version of the Internet Protocol to be widely deployed, and forms the basis for most of the current Internet (as of 2004).

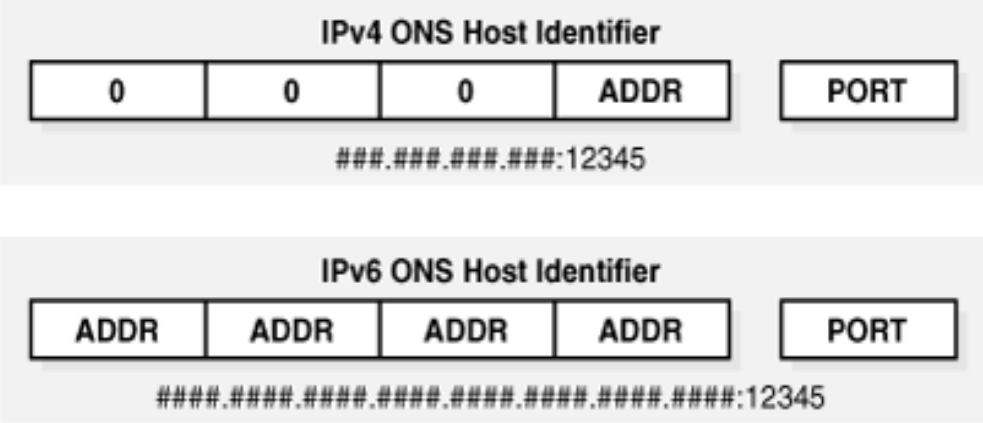
IPv4 uses 32-bit addresses, limiting it to 4,294,967,296 unique addresses, many of which are reserved for special purposes such as local networks or multicast addresses, reducing the number of addresses that can be allocated as public Internet addresses.

IPv6 is intended to address the concern that there are too few IP addresses available for the future demand of device connectivity (especially cell phones and mobile devices). IPv6 supports 340 undecillion (3.4 × 1038) addresses.

As shown in Figure 3–1, for output, such as debug or log records, each IPv4 identifier is displayed as four, eight bit fields for the address (each a three digit decimal format) and a single 16 bit field for the port (a five digit decimal format).

Each IPv6 identifier is displayed as eight 16 bit fields for the address (each a four digit hexidecimal format) and a single 16 bit field for the port (the five digit decimal format).

Figure 3–1 IPv4 and IPv6 Host Identifier



As shown in the graphic, for output, such as debug or log records, each IPv4 identifier is displayed as four, eight bit fields for the address (each a three digit decimal format) and a single 16 bit field for the port (a five digit decimal format).

****

4

opmnctl Commands

This chapter provides an overview of `opmnctl` commands for Oracle Fusion Middleware components managed by OPMN. It features the following topics:

- opmnctl
- opmnctl Command Quick Reference
- opmnctl Detailed Command Description

4.1 opmnctl

`opmnctl` is the supported tool for starting and stopping all components in an Oracle instance, with the exception of the Fusion Middleware Control Console. `opmnctl` provides a centralized way to control and monitor system components from the command line.

If OPMN is configured to discover other Oracle instances, you can use `opmnctl` to execute control and monitoring commands across multiple Oracle instances simultaneously.

The location of the opmnctl script determines which opmnctl commands you can use.

The `opmnctl` command exists in two distinct directory location paths:

- *ORACLE_HOME*`/opmn/bin/opmnctl`: The `opmnctl` command *ORACLE_HOME*`/opmn/bin/opmnctl` location can only be used to create an Oracle instance or a component for an Oracle instance on the local system. `opmnctl` commands generated from this location cannot be used to manage system processes
- *ORACLE_INSTANCE*`/bin/opmnctl`: The other `opmnctl` command which is located in the *ORACLE_INSTANCE*`/bin/` directory location provides a per Oracle instance instantiation of `opmnctl`. The `opmnctl` command in this location must be used for managing processes for this Oracle instance and can also be used for creating components for the Oracle instance.

> **Note:** Oracle Fusion Middleware components managed by OPMN should never be started or stopped manually. Do not use command line scripts or utilities from previous versions of Oracle Fusion Middleware for starting and stopping system components. Use the Fusion Middleware Control Console and the `opmnctl` command line utility to start or stop system components.

Note: Oracle recommends starting OPMN as the user that has installed Oracle Fusion Middleware.

4.1.1 opmnctl Syntax

The following command shows an example of the syntax of the `opmnctl` command:

```
opmnctl [verbose] <command> [<options>]
```

Table 4–1 provides a description about `opmnctl` syntax.

Table 4–1 opmnctl Syntax

Syntax	Description
verbose	Prints detailed execution message, if available.
command	Specifies an `opmnctl` command. Refer to Example 4–1 for a list of commands.
options	Specifies options for the command. Refer to Section 4.3.5.1.1 for a list of command options.

4.2 opmnctl Command Quick Reference

Example 4–1 lists `opmnctl` commands for quick reference. You can obtain the same output information by executing the `opmnctl help` command.

Example 4–1 opmnctl Commands

```
opmnctl help

usage: opmnctl [verbose] [<scope>] <command> [<options>]

verbose: print detailed execution message if available

Permitted <scope>/<command>/<options> combinations are:

scope     command    options
-------  ---------   ---------
          start                         - Start opmn
          startall                      - Start opmn & all managed processes
          stopall                       - Stop opmn & all managed processes
          shutdown                      - Shutdown opmn & all managed processes
[<scope>] startproc   [<attr>=<val> ..] - Start opmn managed processes
[<scope>] restartproc [<attr>=<val> ..] - Restart opmn managed processes
[<scope>] stopproc    [<attr>=<val> ..] - Stop opmn managed processes
[<scope>] reload                        - Trigger opmn to reread opmn.xml
[<scope>] status      [<options>]       - Get managed process status
[<scope>] metric      [<attr>=<val> ..] - Get DMS metrics for managed processes
[<scope>] dmsdump     [<dmsargs>]       - Get DMS metrics for opmn
[<scope>] debug       [<attr>=<val> ..] - Display opmn server debug information
[<scope>] set         [<attr>=<val> ..] - Set opmn log parameters
[<scope>] query       [<attr>=<val>]    - Query opmn log parameters
          launch      [<attr>=<val> ..] - Launch a configured target process
          phantom     [<attr>=<val> ..] - Register phantom processes
          ping        [<max-retry>]     - Ping local opmn
          validate    [<filename>]      - Validate the given opmn xml file
          help                          - Print brief usage description
          usage       [<command>]       - Print detailed usage description
          createinstance                - Create an Oracle Instance
```

```
createcomponent              - Create a specified component
deleteinstance               - Delete an instance and components
deletecomponent              - Delete a specified component
registerinstance             - Register with admin server
unregisterinstance           - Unregister with admin server
updateinstanceregistration   - Update instance registration
updatecomponentregistration  - Update component registration
```

4.3 opmnctl Detailed Command Description

The following sections contains detailed descriptions of the `opmnctl` commands listed in Example 4–1. The `opmnctl` commands are displayed in the following sections:

- Command Definitions
- Server Control Commands
- Process Control Commands
- Provisioning Commands
- Status Commands
- Help Commands

4.3.1 Command Definitions

`opmnctl` features command definitions that enable you to further define the action you would like to execute with OPMN.

This section describes the command definitions available with the `opmnctl` command. It includes the following sections:

- Scope
- Attributes
- Verbose

4.3.1.1 Scope

The scope option specifies which Oracle instance the `opmnctl` command applies to. Unlike prior releases of Oracle Fusion Middleware, the force option in this release is not used and kept here for backward compatibility.

4.3.1.2 Attributes

syntax: `<attribute>=<value>`

The `opmnctl` attributes enable you to apply process control operations to specific system components.

For example, the following command starts all system processes configured for Oracle Web Cache:

```
opmnctl startproc ias-component=webcache1
```

Refer to Chapter 5 for additional `opmnctl` command examples.

Table 4–2 lists the attribute names and values that can be used with the `opmnctl` command:

Table 4–2 opmnctl Attribute Names and Values

Attribute Name	Attribute Values
ias-instance	Value should be the same as the value for the id attribute for the <ias-instance> element in the opmn.xml file.
ias-component	Value should be the same as the value for the id attribute for the <ias-component> element in the opmn.xml file.
process-type	Value should be the same as the value for the id attribute for the <process-type> element in the opmn.xml file.
process-set	Value should be the same as the value for the id attribute for the <process-set> element in the opmn.xml file.
mode	Value can either be sync or async. The default value is "sync, meaning that this request operates synchronously, and waits for the operation to complete before returning. "async indicates that the request returns immediately, while OPMN continues to perform the request until the operation finishes.
timeout	This can only be specified in sync mode. The value is in seconds. After this timeout expires, OPMN does not continue to perform the request for startproc operations. The request does continue for restartproc and stopproc operations. The timeout attribute overrides the configured timeout value for the request to take for each ias-instance, ias-component, process-type, and process-set value.
uniqueid	This value is assigned by OPMN after starting up. You can use this value when you execute the opmnctl restartproc and opmnctl stopproc commands.
sequential	If the value of the sequential attribute is true, each process or application targeted by the request is acted upon sequentially (one at a time). The request order of affected managed-process dependencies is honored.
report	If the value of the report attribute is true, OPMN reports the results of each part of the request as it completes (as each process starts, for example). The default behavior is for OPMN to wait until the entire request has completed before sending all of the results at once.

The target attributes of ias-instance, ias-component, process-type, and process-set may be specified in a hierarchical manner, with an ias-instance, a single ias-component within that ias-instance, a single process-type within the ias-component, and a single process-set within the process-type. Any of these attributes may be omitted, and treated as a wild card (process-set is omitted, for example, then all process-sets under the specified process-type matches the request).

The target attributes may also be specified in a list of a single hierarchical type (a list of ias-components, for example).

Note: If Oracle Internet Directory is managed by OPMN and an Oracle Internet Directory dependency (not a managed-process dependency for Oracle Internet Directory) is encountered as part of the request, and the request is expected to start both Oracle Internet Directory processes (such as an opmnctl startall request), the Oracle Internet Directory process *will not* start unless it has been configured in the opmn.xml file previously. Otherwise, the request times out with an Oracle Internet Directory dependency failure.

See Also: Chapter 5 for OPMN command-line examples

4.3.1.3 Verbose

Syntax: `opmnctl verbose command`

The `opmnctl verbose` option enables you to obtain detailed information about the command you are executing.

For example, the following command outputs the information shown in Example 4–2:

```
prompt> opmnctl verbose startproc ias-component=ohs1
```

Example 4–2 opmnctl verbose output

```
opmnctl startproc: starting opmn managed processes...

HTTP/1.1 200 OK
Content-Length: 661
Content-Type: text/html
Response: 1 of 1 processes started.

<?xml version='1.0' encoding='WINDOWS-1252'?>
<response>
<opmn id="stapk08:6704" http-status="200" http-response="1 of 1 processes
 started.">
  <ias-instance id="instance1">
    <ias-component id="ohs1">
      <process-type id="OHS">
         <process-set id="OHS">
            <process id="1792746301" pid="5106" status="Alive" index="1"
             log="/scratch/lbottlem/product/11.1.1/as
             1/instances/instance1/diagnostics/logs/OHS/ohs1/console~OHS~1.log"
             operation="request" result="success">
            <msg code="0" text="">
          </msg>
         </process>
        </process-set>
       </process-type>
      </ias-component>
    </ias-instance>
   </opmn>
 </response>
```

4.3.2 Server Control Commands

The `opmnctl start, startall, reload, stopall,` and `shutdown` commands enable you to control the OPMN server.

- Server Control Commands on Microsoft Windows
- opmnctl start
- opmnctl startall
- opmnctl stopall
- opmnctl shutdown
- opmnctl reload

Output is not generated for the successful execution of an `opmnctl` server control command. Refer to Appendix B if you receive any error messages during `opmnctl` command execution.

4.3.2.1 Server Control Commands on Microsoft Windows

On the Microsoft Windows operating system, OPMN is installed as a Windows service `(Oracle<OracleHomename>ProcessManager)` and it starts up automatically when you restart your computer. When you start or stop OPMN using Microsoft Windows Services you start or stop *all* system components on the local Oracle instance.

Use the Fusion Middleware Control Console and the `opmnctl` command line utility to start or stop system components.

4.3.2.2 opmnctl start

Syntax: `opmnctl start`

Use this command to start the OPMN server for a local Oracle instance without starting system processes.

Note: OPMN starts up automatically on Microsoft Windows when you start or restart your computer. All system component processes are also started.

See Also: Chapter 5 for OPMN command-line examples

4.3.2.3 opmnctl startall

Syntax: `opmnctl startall [timeout=<seconds>]`

Use this command to start OPMN as well as the system processes for a local Oracle instance. The `startall` is equivalent to the `start` command and the `startproc` command without arguments. Oracle recommends using the `start` or `startproc` command.

This command operates synchronously and waits for the operation to complete before returning. To set a timeout for the request, specify the timeout value in seconds.

Components with `id-matching="true"` will not start.

Enter the following command for additional detailed information:

```
opmnctl usage startall
```

On Microsoft Windows, you can also perform an `opmnctl startall` by starting the `Oracle<OracleHomename>ProcessManager` service in the Windows services control panel. The `Oracle<OracleHomename>ProcessManager` starts automatically when you start or restart your computer.

4.3.2.4 opmnctl stopall

Syntax: `opmnctl stopall`

Use the `opmnctl stopall` command to shut down the OPMN server as well as the system processes for the local Oracle instance. This request operates synchronously; it waits for the operation to complete before returning.

Shutting down the OPMN server is not necessary during normal operation. Shutting down the OPMN server prevents remote commands to OPMN from executing on the Oracle instance until OPMN is restarted.

The `opmnctl stopall` command should only be executed prior to shutting down OPMN and your computer. This request first tries to stop all system components gracefully. Processes which will not stop gracefully is forcefully shutdown. After stopping all managed processes, the OPMN daemon shutdowns itself.

The `opmnctl stopall` command should only be used when it is necessary to stop the OPMN daemon quickly in case of an emergency. Once started, the OPMN daemon should remain up until it is necessary to restart the computer or some other unforeseen administrative event occurs.

To stop all system components without stopping the OPMN daemon, consider using the `opmnctl stopproc` command without any arguments.

To restart the OPMN daemon without restarting any system components, consider using the `opmnctl reload` command. The `opmnctl reload` command is the appropriate command to use when the only goal is to restart the opmn daemon with a new configuration.

Use the `opmnctl stopproc` command if you want to stop all system processes.

Use the `opmnctl reload` if you want OPMN to reread its configuration.

Enter one of the following commands to obtain additional information:

```
opmnctl usage stopall
```

or

```
opmnctl usage shutdown
```

4.3.2.5 opmnctl shutdown

Syntax: `opmnctl shutdown`

Use the `opmnctl shutdown` command to shut down the OPMN server as well as the system processes for the local Oracle instance.

The `opmnctl shutdown` command quickly shutdowns the OPMN daemon and system components for the local Oracle instance.

The `opmnctl shutdown` command is similar to the `opmnctl stopall` command but waits less time before initiating a forceful termination of system components. After all of the system components are stopped, the OPMN daemon shutdowns itself.

The `opmnctl shutdown` command should only be performed when it is necessary to stop the OPMN daemon. Once started, the OPMN daemon should remain up until it is necessary to restart the computer or some other unforeseen administrative event occurs.

To stop all system components without stopping the OPMN daemon, consider using the `opmnctl stopproc` command without any arguments.

To restart the OPMN daemon without restarting any system components, consider using the `opmnctl reload` command. The `opmnctl reload` command is the appropriate command to use when the objective is to restart the OPMN daemon with a new configuration.

On Microsoft Windows, you can also perform an `opmnctl shutdown` by stopping the `Oracle<OracleHomename>ProcessManager` service in the Windows services control panel.

Use the `opmnctl stopproc` command if you want to stop all system component processes.

Use the `opmnctl reload` if you want OPMN to reread its configuration.

Enter one of the following commands to obtain additional information:

```
opmnctl usage stopall
```

or

```
opmnctl usage shutdown
```

4.3.2.6 opmnctl reload

Syntax: `opmnctl reload`

Use this command to trigger the OPMN to reread its configuration files. This command restarts the OPMN server without restarting any system processes managed by OPMN. The OPMN server for the Oracle instance must be up and running.

Note: On Microsoft Windows, you can highlight the `Oracle<OracleHomename>ProcessManager` in the services control panel and select **Restart**. The restart of the service is not equivalent to an `opmnctl reload`, however. This action is equivalent to an `opmnctl shutdown` followed by an `opmnctl startall`. It is a much slower operation than `opmnctl reload` because it restarts OPMN and all the processes managed by OPMN.

Enter the following command for additional detailed information:

```
opmnctl usage reload
```

See Also: Section 4.3.1 for OPMN command definitions

4.3.3 Process Control Commands

The `opmnctl` process control commands enable you to start, stop, or restart single or multiple system components. You can control a system component at the `<ias-component>`, `<process-set>`, or `<process-type>` level.

This section describes the process control commands available with `opmnctl`. It includes the following process control commands:

- opmnctl startproc, opmnctl restartproc and opmnctl stopproc
- Progressive Request Reports
- Sequential Requests

Output is not generated for the successful execution of an `opmnctl` process control command. Refer to Appendix B if you receive any error messages during `opmnctl` command execution.

4.3.3.1 opmnctl startproc, opmnctl restartproc and opmnctl stopproc

Syntax: `opmnctl startproc [<attr>=<value>...]`

`opmnctl restartproc [<attr>=<value>...]`

`opmnctl stopproc [<attr>=<value>...]`

Use these commands to start, restart, or stop system processes. The OPMN server for the Oracle instance must be up and running.

You can use attributes for these commands. If no attribute is supplied when executing `startproc, stopproc,` and `restartproc`, all system processes except components with `id-matching="true"` in the `opmn.xml` file is started.

The following attributes and values can be used with the `startproc, stopproc,` and `restartproc` commands:

- `ias-component, process-type,` and `process-set:` The values for these attributes should be the same as the `id` value specified in the `opmn.xml` file. If no attribute is supplied, the command is applied to all system component processes other than those that are configured in the `opmn.xml` file with `id-matching="true"`. To execute commands on components configured with `id-matching="true"`, it is necessary to specify the `ias-component` argument.
- `mode`: The `mode` attribute value can be either `sync` or `async`; the default value is `sync`. The `sync` value for mode causes the `opmnctl` command to operate synchronously and wait for the command to be executed completely before a return prompt is displayed. The timeout element can only be specified when the value of mode is `sync`. The value is specified in number of seconds. After the specified timeout expires, the operation is aborted for `startproc` but not for `restartproc` or `stopproc`. The `opmnctl` command prompt returns, the OPMN server continues to perform the `opmnctl restartproc` or `stopproc` command request until the operation is finished.

  The `async` value for mode causes the return prompt to be displayed immediately, while the OPMN server continues to perform the `opmnctl` command request until the operation is finished.
- `uniqueid:` This value is assigned by OPMN after starting up. You can use this value when you execute the `restartproc` and `stopproc` commands. You can obtain this value by entering the following command and obtaining the unique number for the system component in the `uid` column of the generated output:

  ```
  opmnctl status -l
  ```

Attribute names other than those listed may be specified for some types of system processes managed by OPMN. Unique attribute name should be specific to each type of system process.

Using the `opmnctl startproc, restartproc,` or `stopproc` commands and attributes enables control of specific processes in your Oracle instance. You can execute the `opmnctl startproc, restartproc,` or `stopproc` commands at the `<ias-component>`, `<process-type>` and the `<process-set>` level.

The following command restarts Oracle Web Cache at the `<process-type>` level:

```
opmnctl restartproc ias-component=webcache1 process-type=WebCache
```

The following command stops Oracle HTTP Server at the `<ias-component>` level:

```
opmnctl stopproc ias-component=ohs1
```

Enter one of the following commands to obtain additional information:

```
opmnctl usage startproc
```

or

```
opmnctl usage restartproc
```

or

```
opmnctl usage stopproc
```

See Also:

- Section 4.3.1 for OPMN command definitions
- Chapter 5 for OPMN command-line examples

4.3.3.2 Progressive Request Reports

The `report=true` attribute when used with `startproc`, `restartproc`, or `stopproc` enables OPMN to report back on each part of a request as it completes. For example, if an `opmnctl startproc` request attempts to start 4 processes, OPMN reports back to the user the result of each process start attempt as soon as it completes.

4.3.3.3 Sequential Requests

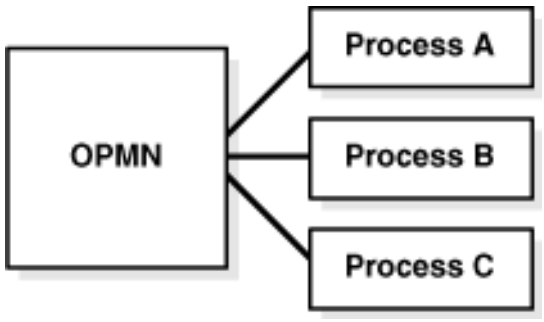
By default an OPMN request is run for all affected processes at the same time, unless a dependency dictates a specific ordering. If the attribute `sequential=true` is specified when used with the `startproc`, `restartproc`, or `stopproc` command, then OPMN runs the request on a single process at a time, waiting for the request to complete on the first before running the request on the second. When the request has finished on one process, it works on the next.

Note that dependencies are still honoured, and take part in the request sequentially as well.

As shown in Figure 4–1, by default OPMN issues jobs for all processes in parallel such that they run at the same time (except when honoring dependencies). For example, with the following command:

```
> opmnctl startproc
```

Figure 4–1 Processes in Parallel



As shown in the graphic, by default OPMN issues jobs for all processes in parallel such that they run at the same time (except when honoring dependencies).

****

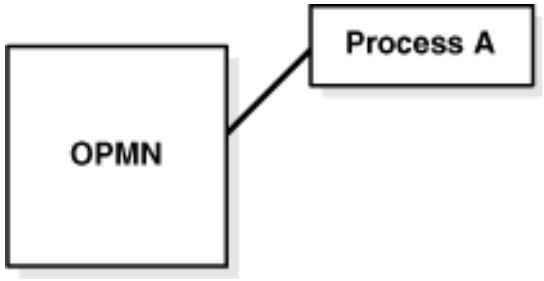
If the sequential attribute is set to true, OPMN performs the request upon one process at a time (shown in Figure 4–2).

For example the following command:

```
% opmnctl startproc sequential=true
```

starts all of the managed system processes sequentially.

Figure 4–2 Managed Process Sequential Request #1



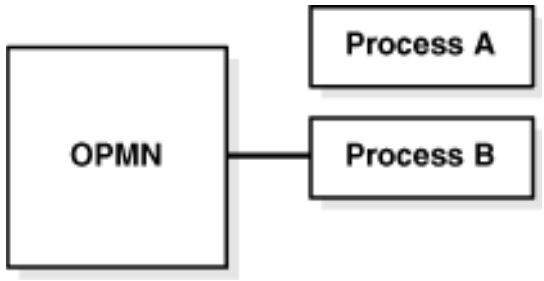
In the graphic, if the sequential attribute is set to true, OPMN performs the request upon one process at a time.

****

OPMN is processing one managed process, before moving on the next shown in Figure 4–3.

As shown in Figure 4–3, when the request completes for the first managed process, the request starts on the next managed process.

Figure 4–3 Managed Process Sequential Request #2

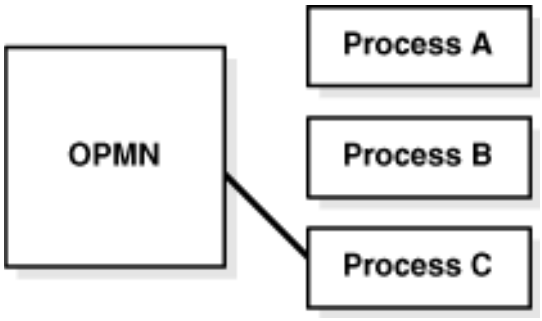


As shown in the graphic, when the request completes for the first OC4J process, the request starts on the next OC4J process.

****

As shown in Figure 4–4, all affected managed processes have completed the request.

Figure 4–4 Managed Process Sequential Request #3



As shown in the graphic, all affected OC4J processes have completed the request.

****

4.3.4 Provisioning Commands

The `opmnctl` provisioning commands are used for provisioning system components within an Oracle instance. Use these commands to:

- create and delete an Oracle instance or system component.
- register and unregister an Oracle instance with a WebLogic domain for management using the Fusion Middleware Control Console.
- update an Oracle instance or system component registration with the WebLogic domain.

This section includes the following topics:

- General Syntax
- Alternative Syntax for Provisioning Commands
- Common Arguments
- Commands

4.3.4.1 General Syntax

`opmnctl` provisioning commands are invoked using the following syntax:

```
opmnctl command [-argName1 value1] [-argName2 value2] ...
```

The following provisioning commands are supported:

- `createinstance`
- `createcomponent`
- `deleteinstance`
- `deletecomponent`
- `registerinstance`
- `unregisterinstance`
- `updateinstanceregistration`
- `updatecomponentregistration`

4.3.4.2 Alternative Syntax for Provisioning Commands

Provisioning commands can also be invoked with the syntax used by other `opmnctl` commands:

```
opmnctl command [argName1=value1] [argName2=value2] ...
```

This alternate syntax follows the Attributes style (refer to Section 4.3.1.2) and accepts argument names presented in lower case. The alternate syntax is provided to allow greater uniformity between `opmnctl` commands.

Any `opmnctl` provisioning commands can be entered using either syntax.

For example, the following commands are equivalent:

```
opmnctl createcomponent -componentType OHS -componentName ohs1
opmnctl createcomponent componenttype=OHS componentname=ohs1
```

Both syntax styles can be combined within the same command.

4.3.4.3 Common Arguments

The following arguments generally apply to all provisioning commands, with the exception with component specific arguments that apply only to component-related commands:

- Adminserver Arguments
- Logging Arguments
- Oracle Instance Arguments
- Component Specific Arguments

4.3.4.3.1 Adminserver Arguments administrative server (Adminserver) arguments denote how `opmnctl` should contact the Adminserver of the Oracle WebLogic Server domain.

The Adminserver values are stored in the Oracle instance as defaults for subsequent commands. `opmnctl` does not use or require the Adminserver values for a non-registered Oracle instance. See Section 4.3.4.4.1 about the `createinstance` command for creating a non-registered instance.

The Adminserver arguments are:

- **`-adminHost`** : the Weblogic Adminserver host. The default value is the last successful command for the Oracle instance or local host.
- **`-adminPort`**: the Weblogic Adminserver port. The default value is the last successful command for the Oracle instance; or 7001.
- **`-adminProtocol`**: Weblogic Adminserver protocol. The default value is the last successful command for the Oracle instance; or t3.
- **`-adminUsername`**: the Weblogic Adminserver login user name. The default value is the last successful command for the Oracle instance; otherwise you are prompted to type in their login user name.
- **`-adminPasswordFile`**: the location of the file containing the administrative user (admin user) password. The default value is the last successful command for the Oracle instance; otherwise you are prompted to type in your admin user password.

4.3.4.3.2 Logging Arguments

By default, `opmnctl` logs the detailed provisioning errors and exceptions in the *`ORACLE_INSTANCE`*`/diagnostics/logs/OPMN/opmn/provision.log` file. For certain errors during execution of the `createinstance` command, specifically when the `provision.log` file has not been created yet, the detailed exception is indicated on the console. Log file locations can be specified using the `-logFile` argument.

- **`-logFile`**: the location of provisioning log file.
- **`-logLevel`**: the logging level of provisioning log. For example, `INFO` or `FINER`.

4.3.4.3.3 Oracle Instance Arguments

The `-oracleInstance` and `-instanceName` arguments are used primarily for the `createinstance` command. After the Oracle instance is created, the *`ORACLE_INSTANCE`*`/bin/opmnctl` directory provides a default Oracle instance home. The Oracle instance name is determined automatically.

The Oracle instance arguments are:

- **`-oracleInstance`**: the Oracle instance root directory. This directory is only required when the `opmnctl` command is not executed from the Oracle instance home.
- **`-instanceName`**: this command option is used for assigning an Oracle instance name when the Oracle instance is created or to verify the Oracle instance name afterward.

For the `createinstance` command, if the `instanceName` is not provided directly, the last directory name of the `-oracleInstance` is used as the Oracle instance name.

4.3.4.3.4 Component Specific Arguments

Commands that target a single component can accept arguments specific to the component type. For example, the `-wcAdminPasswordFile` argument is accepted when creating an Oracle Web Cache component but not when creating an OHS component.

These arguments are syntactically optional but must be understood to ensure proper configuration.

For details covering these specific arguments and how they should be used, refer to the *Oracle Fusion Middleware Administrator's Guide*.

A list of the arguments applicable to a system component can be displayed by including the component type when executing the `opmnctl usage` command.

For example:

```
opmnctl usage createcomponent -componentType OHS
```

4.3.4.4 Commands

This section describes the create series of commands. It includes the following sections:

- createinstance
- createcomponent
- deleteinstance
- deletecomponent
- registerinstance
- unregisterinstance
- updateinstanceregistration

- updatecomponentregistration

4.3.4.4.1 createinstance The `createinstance` command creates an Oracle instance and registers It uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**
- **`-adminRegistration`**: the registration status for the created Oracle instance. Supported values are `ON` (registered) and `OFF` (non-registered). The default value is `ON`.
- **`-opmnRemoteHost`**: the OPMN remote host. The default value is the computer canonical host name.
- -**`opmnLocalPort`**: the OPMN local port value. The default port value is 6700 if the port is available.
- **`-opmnRemotePort`**: the OPMN remote port value. The default port value is 6701 if the port is available.

For example:

```
opmnctl createinstance -oracleInstance /foo/bar/inst1 -adminHost myadminserver
-adminPort 7001
```

or

```
opmnctl createinstance -oracleInstance /foo/bar/inst1 -adminRegistration OFF
```

4.3.4.4.2 createcomponent The `createcomponent` command creates a component within an Oracle instance. The created component is consistent with the Oracle instance in regard to its registration state.

The `createcomponent` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**
- **`Component Specific Arguments`**
- **`-componentType`** : the system component type
- **`-componentName`** : the system component name

For example:

```
opmnctl createcomponent -componentType OHS -componentName ohs1 -proxyPort 8888
```

It is important to note that different system components feature different sets of arguments that are available for configuration. In the above command example, the `-proxyPort` usage is specific to the OHS component. For more information about component specific arguments refer to Section 4.3.4.3.4.

4.3.4.4.3 deleteinstance The `deleteinstance` command deletes an Oracle instance and unregisters the Oracle instance and associated system components. A successful Oracle instance deletion removes all files of the Oracle instance except for the default `provision.log` file.

For example:

```
opmnctl deleteinstance
```

The `deleteinstance` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**
- **`-force`**: The `-force` argument forces the `opmnctl deleteinstance` command to proceed regardless of discrepancies in the Oracle instance. The command is enabled only with a value of `true`. The default value is `false`.

  Please note that the `-force` option circumvents most pre-validation checks. Therefore, Oracle recommends using the `-force` option with caution. An example is shown in section Force deleteinstance.

Force deleteinstance

The `deleteinstance` command operates in a forced mode if the option `-force true` is included in the command. When used, this option directs `opmnctl` to proceed with the operation regardless of warnings and errors detected for the Oracle instance. Because the Oracle instance may be in a bad or non-responsive state, Oracle recommends explicitly providing non-required values that are associated and appropriate for the Oracle instance (for example, `-instanceName`, `-adminHost`, `-adminPort`) to ensure that the proper values are used.

During the course of cleanup, the forced `deleteinstance` command displays warnings and exceptions consistent with the damaged state of the Oracle instance. These warnings and exceptions are provided as visual feedback for the inconsistencies encountered and do not necessarily indicate that further corrective action is needed.

For example:

```
opmnctl deleteinstance -force true -instanceName instance1 -adminHost
myadminserver -adminPort 7001
```

or

```
opmnctl deleteinstance -force true -instanceName instance1
```

4.3.4.4.4 deletecomponent The `deletecomponent` command deletes a system component.

The `deletecomponent` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**
- **`-componentName`**: The system component name.

For example:

```
opmnctl deletecomponent -componentName ohs1
```

4.3.4.4.5 registerinstance The `registerinstance` command switches the Oracle instance to a registered state and updates the Adminserver value.

The `registerinstance` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**

For example:

```
opmnctl registerinstance -adminHost myhostname -adminPort 8000
```

4.3.4.4.6 unregisterinstance The `unregisterinstance` command switches the Oracle instance to a non-registered state and updates the Adminserver value.

For example:

```
opmnctl unregisterinstance
```

The `unregisterinstance` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**
- **`-force`**: directs the `opmnctl unregisterinstance` command to proceed regardless of discrepancies in the Oracle instance. This option is only enabled with a value of `true`. The default value is `false`.

  Please note that the `-force` option circumvents most pre-validation checks. Therefore, Oracle recommends using the `-force` option with caution. An example is shown in section Forced unregisterinstance

Forced unregisterinstance

The `unregisterinstance` command can operate in a forced mode when the option `-force true` is included.

This option directs `opmnctl unregisterinstance` to unregister the Oracle instance but limits the scope of these changes exclusively to the Adminserver. In other words, it unregisters an Oracle instance name from the Adminserver without examining or interacting with an Oracle instance (except optionally for writing to the `provision.log` file).

This mode can readily break registration associations. For example, executing this command with the name of a operational registered Oracle instance would put Adminserver and the Oracle instance out of synchronization. Afterward, the Adminserver no longer lists the Oracle instance or associated system components; however, in this example, the Oracle instance would still be configured as registered and but would fail most provisioning commands. Therefore, Oracle recommends using the `-force` option with caution.

For example:

```
opmnctl unregisterinstance -force true -instanceName instance1 -adminHost
myadminserver -adminPort 7001
```

4.3.4.4.7 updateinstanceregistration The `updateinstanceregistration` command updates information registered on the Adminserver for the Oracle instance. Specifically, the `updateinstanceregistration` command updates the registered

OPMN remote port, OPMN remote host and OPMN wallet from the current OPMN settings.

The `updateinstanceregistration` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**

For example:

```
opmnctl updateinstanceregistration
```

4.3.4.4.8 updatecomponentregistration The `updatecomponentregistration` command updates settings registered on the Adminserver for the subject system component. These settings include the component proxy port, component proxy wallet, component `mbean` properties and Fusion Middleware Control Console component properties, plus other values specific to the type of component.

The `updatecomponentregistration` command uses the following arguments:

- **`Adminserver`**
- **`Logging`**
- **`Oracle Instance`**
- **`Component Specific Arguments`**
- **`-componentName`**: the system component name

For example:

```
opmnctl updatecomponentregistration -componentName ohs1 -proxyPort 8889 ....
```

4.3.5 Status Commands

The `opmnctl status` commands enable you to determine the status of system component processes.

This section describes the command options available with the `opmnctl` command. It includes the following sections:

- opmnctl status
- opmnctl metric
- opmnctl dmsdump
- opmnctl ping
- opmnctl set
- opmnctl query

See Also:

- Section 4.3.1.2 for information about attributes
- Section 4.3.5.1.1 for information about the options for the status command of `opmnctl`
- Section 4.3.5.1.2 for information about the `opmnctl status -port` command

4.3.5.1 opmnctl status

Syntax: `opmnctl status [<options>]`

The `status` command enables you to obtain information on the system processes managed by OPMN.

The output is a text table. Each row in the table represents one system process.

You can customize the status command in the following ways:

- Change the information displayed about each system process
- Remove the table headers from the output
- Change the field separator
- Change the record separator
- Change the width of individual columns
- Change the justification of the data in an individual column

Enter the `opmnctl usage status` command to obtain full details on how to use the status command.

Example 4–3 shows the output after entering the `opmnctl status` command for the `AppSrv1` Oracle instance on host `comp1` for the domain `yourcompany.com`:

Example 4–3 opmctl Status Output

```
opmnctl status

Processes in Instance: Instance1
------------------------+-----------------+--------+---------
Monitor                 | MONITOR         |   6720 | Alive
webcache1               | WebCache-admin  |    N/A | Down
webcache1               | WebCache        |    N/A | Down
ohs1                    | OHS             |   5106 | Alive
```

4.3.5.1.1 Options for the Status Command of opmnctl

The following are the options you can specify for the `<options>` parameter:

- **`-l`:** Use this option to obtain the `uniqueid (uid)` value and other specific process parameter information.

  ```
  opmnctl status -l
  ```

  For example, the command outputs the information shown in Example 4–4 *(some columns are not shown to improve readability).*

Example 4–4 opmnctl status -l output

```
Processes in Instance: instance1
--------------------+---------------+---------+---------+------------+----------+-----------+------
ias-component       | process-type  |     pid | status  |        uid |  memused |   uptime  | ports
------------------------------------+---------+---------+------------+----------+-----------|------
webcache1           | WebCache-admin|    1544 | Alive   | 1133202830 |   44216  |   0:04:39 | http_
admin:7779
webcache1           | WebCache      |    1545 | Alive   | 1133202829 |   64056  |   0:04:39 | http_
stat:7780,http_invalidation:7781,https_listen:7782,http_listen:7778
ohs1                | OHS           |    1543 | Alive   | 1133202828 |   348664 |   0:04:39 | https
:8889,https:4443,http:8888
```

The `uid` information enables you to stop or restart an individual Oracle Fusion Middleware process.

For example, the following command stops the `OHS process-type`:

```
opmnctl stopproc uniqueid=1792746301
```

- **`-fsep <string>`**: Use this option to assign a field separator value for your `opmnctl status` output. The default value is `|`.
- **`-rsep <string>`**: Use this option to assign a record separator value for your `opmnctl status` output. The default value is **`\n`**.
- **`-noheaders`**: Use this option if you do not want a header displayed after you run the `opmnctl status` command.
- **`-fmt <fmtlist>`**: This is a single string containing one or more statistic identifiers connected together where each identifier has the following format: `<statname>[<width>{<justification>]`. The default value is: `%cmp18%prt18%pid5R%sta8`.

  Table 4–3 lists the format string syntax for the `<fmtlist>` option:

Table 4–3 Format String Syntax

Format String Syntax	Description
`<statname>`	This must be one of the following: ▪ `clu`: system farm name ▪ `ins`: Oracle instance name ▪ `cmp`: system component ID ▪ `prt`: `process-type` ID ▪ `prs`: `process-set` ID ▪ `idx`: index of process in `process-set` ▪ `pid`: operating system process ID ▪ `uid`: OPMN `uniqueid` ▪ `typ`: name for this kind of process ▪ `sta`: process status ▪ `stm`: start time (ms) ▪ `utm`: up time (ms) ▪ `cpu`: cpu time (ms) ▪ `mem`: memory used (in KB) ▪ `por`: port list ▪ `fpr`: full detail port list
`<width>`	Specifies the size for the field. Output shorter than this value receives padding according to the specified <justification>. Output longer than this value is truncated, and terminated with '~'. Default: width of each datum.
`<justification>`	Specifies the justification for the field. This enables you to justify output when it is less than the width. It is `L`, `R`, or `C` (left, right, or center justification). Default: `L`

For example, the following command displays the output shown in Example 4–5:

```
prompt> opmnctl status -noheaders -fsep @ -fmt %cmp%prt%pid%sta
```

Example 4–5 opmnctl status -noheaders output

```
webcache1@WebCache-admin@1544@Alive
webcache1@WebCache@1545@Alive
ohs1@OHS@1543@Alive
```

See Also: Section 4.3.1 for command definitions

Enter the following command for additional detailed information:

```
opmnctl usage status
```

4.3.5.1.2 opmnctl status -port

The `opmnctl status -port` command enables you to display the request connect string used to connect to the OPMN daemon. For example, the command:

```
opmnctl status -port
```

displays:

```
123.your_company.com:6200
```

This `opmnctl status -port` command is a convenient shortcut that replaces the need to look inside of the `opmn.xml` file to determine the request access port.

4.3.5.2 opmnctl metric

The `opmnctl metric` command enables you to print the DMS statistics for a system component process. The `opmnctl` metric has the following command and argument structure:

```
opmnctl metric op=<op> [<identifier>=<value>] dmsarg=<dmsargs>]
```

The opmnctl metric command uses the following command arguments:

- **`op=<op>`**: Specifies the operation, where `<op>` can be either `list` or `query`.

  A `list` operation does not use additional arguments. The target OPMN returns a list of managed system processes for which DMS metrics are available through the metric request.

  A `query` operation returns the metric tree for the managed process or processes qualified by the `<identifier>=<value>` arguments (all available processes are assumed if no identifier arguments are specified).

- **`local=<bool>`**: When set to `true`, this option limits the command to operate within the local Oracle instance. This is useful when OPMN has been configured to discover other Oracle instances.

- **`<identifer>=<value>`**: Specifies which managed process or processes to query for DMS metrics. Multiple identifiers can be specified, and each is used to match the managed process with address properties (the list is inclusive).

  The four standard properties are:

  - **PROCESS_UID=<uid>:** Where <uid> is the unique id for the target process. This value is obtained by the metric list operation, the opmnctl status command, or any similar method that is used to display OPMN DMS metrics.
  - **PROCESS_UID=0**: This property always specifies OPMN itself.
  - **INSTANCE_UID=<instance>@<uid>**: Where <instance> is the Oracle instance name for the target Oracle instance and <uid> is the unique id for the target process on the Oracle instance. This identifier is only valid if <instance> is the local Oracle instance name, or all OPMN servers in the farm are configured to connect to one another.
  - **COMPONENT_NAME=<component-name>**: Where <component-name> is the id value for the <ias-component> in the opmn.xml file. COMPONENT_NAME=opmn always specifies OPMN itself.
  - **COMPONENT_TYPE=<component-type>:** Where <component-type> is the type value for the <ias-component> in the opmn.xml file, or if that is not defined, the id value for the <process-type> element. COMPONENT_TYPE=OPMN always specifies OPMN itself.

- **dmsarg=<dmsargs>:** Specifies the DMS specific options for the metric query. <dmsargs> is a single argument that may include multiple options for the DMS layer, each following the <attr>=<value> format, and each option seperated by an &.

  For example: format=raw, format=xml&name=/ProcessInfo

  Refer to the *Oracle Fusion Middleware Performance Guide* for additional metric options.

4.3.5.3 opmnctl dmsdump

Syntax: opmnctl dmsdump [<attr>=<value>[&<attr>=<val>...]]

The opmnctl dmsdump command enables you to print the Oracle Dynamic Monitoring Service (DMS) statistics for OPMN. You can obtain a printout of process control operations for specific system components. If no attributes are specified, performance data for all system component processes for your system components are printed out.

DMS enables you to monitor a specific performance metric, a set of performance metrics, or all performance metrics. Options allow you to specify a reporting interval to report the requested metrics.

Multiple <attr>=<value> pairs must be separated by an &. For example, the following opmnctl command:

```
opmnctl dmsdump "table=opmn_ons&format=xml"
```

outputs the set of statistics that are gathered for ONS. The output includes the ports that ONS listens on and the number of notifications that ONS has processed. The output is in .xml format rather than text. If you want to review the output in text format do not include &format=xml on the command line.

For more information about DMS performance metric attributes and values refer to the *Oracle Fusion Middleware Performance Guide*.

4.3.5.4 opmnctl ping

Syntax: opmnctl ping [<max_retry>]

The opmnctl ping command enables you to contact the local OPMN server to verify operation. <max_retry> specifies the maximum number of retry times. If <max_retry> is specified, the local OPMN is pinged every one second, until the command execution succeeds or <max_retry> is reached.

For example, the following command,

```
opmnctl ping 10
```

designates pinging of OPMN 10 times until the ping command succeeds

4.3.5.5 opmnctl set

Syntax: opmnctl set [<attr>=<value> ...]

The opmnctl set command sets the logging configuration for OPMN.

An attribute name must be specified along with an attribute value. The following attribute names are required by OPMN for this command:

- target: the value for target can be either log or debug, which refer to the standard.log or the debug.log. The standard log is configured to include all possible log messages by default and it is recommended that users not change its settings. Refer to Appendix B for more information about OPMN troubleshooting.

  Note: Enable usage of the debug.log file only after conferring with Oracle Support. The debug.log file is used by Oracle Support to debug and diagnose OPMN issues. Messages that are contained in the debug.log file are typically not readily comprehensible to the user.

- comp: specifies the OPMN internal components and subcomponents

4.3.5.5.1 The comp Attribute

The value for the comp attribute can be either ons or pm. Additionally, the attribute value can be a specific set of sub-components for either the ons or pm attributes.

The following values for comp specify the OPMN internal components and subcomponents:

- internal: specifies the common internal information for OPMN
- ons:specifies the ONS component information for OPMN
- pm: specifies the PM component information for OPMN

Both the ons and pm components consist of subcomponents which may be specified using the component[subcomponents] syntax where component can be either ons or pm. If both ons and pm are specified together they must be separated by a semicolon in the opmn.xml file. If subcomponents are listed, the listed items must be separated by a comma.

Table 4–4 ONS Component Codes

ONS element	Definition
all	all subcomponents
local	local information
listener	listener information
discover	discover (server or multicast) information

Table 4–4 (Cont.) ONS Component Codes

ONS element	Definition
servers	remote servers currently up and connected to the farm
topology	current farm wide server connection topology
server	remote server connection information
client	client connection information
connect	generic connection information
subscribe	client subscription information
message	notification receiving and processing information
deliver	notification delivery information
special	special notification processing
internal	internal resource information
secure	SSL operation information
workers	worker threads

Table 4–5 PM Component Codes

PM element	Definition
all	all subcomponents
requests	HTTP (user) requests
remote	remote HTTP requests
scheduler	scheduler thread and resource information
monitor	monitor thread information
workers	worker threads
process	managed processes
depend	dependency processing
rmd	RMD directives
fos	service failover information
internal	internal resources
schedjobs	periodic scheduled jobs
procjobs	for each process scheduled jobs
fos	service failover processing
dms	DMS processing
modules	`process module` information. Only modules which call the `modLog()` (or `modDebug` for the debug log) function yields output. A specific module or list of modules may be specified with modules(`module-ids`). `module-ids` can be specified with a colon seperated list of `module-ids` to be displayed: modules (`module1-id:module2-id`). `module-ids` that do not match a configured and enabled module are not processed.

Each subcomponent for ons and pm may be prefaced with the negation character,!, which deselects the subcomponent. By using all with negated sub-components, specific subcomponents can be easily eliminated from the display.

Components and subcomponents are set or negated in the order in which they are encountered. Therefore:

```
ons[all,!topology]
```

yields all ons subcomponents excluding topology, while the following:

```
ons[!topology,all]
```

yields all ons subcomponents including topology.

4.3.5.6 opmnctl query

Syntax: opmnctl query [<attr>=<value> ...]

The opmnctl query command enables you to query the logging configuration for OPMN.

The attribute name of target must be specified along with an attribute value. The value for target can be either log or debug, which refer to the opmn.log file or the opmn.dbg file, respectively. Refer to Section B.2.1, "OPMN log Files" for more information.

4.3.6 Help Commands

The opmnctl help commands enable you to obtain additional information regarding OPMN.

This section describes the help command options available with the opmnctl command. It includes the following sections:

- Section 4.3.6.1, "opmnctl help"
- Section 4.3.6.2, "opmnctl usage"
- Section 4.3.6.3, "opmnctl validate"

4.3.6.1 opmnctl help

Syntax: opmnctl help

Use this command to print a short syntax description of opmnctl commands.

Example 4–6 shows the output from the opmnctl help command.

Example 4–6 opmnctl help Output

```
opmnctl help

usage: opmnctl [verbose] [<scope>] <command> [<options>]

verbose: print detailed execution message if available

Permitted <scope>/<command>/<options> combinations are:

  scope      command      options
_________   __________   _________
            start                          - Start opmn
            startall                       - Start opmn & all managed processes
```

```
            stopall                       - Stop opmn & all managed processes
            shutdown                      - Shutdown opmn & all managed processes
[<scope>]   startproc   [<attr>=<val>..]  - Start system managed processes
[<scope>]   restartproc [<attr>=<val>..]  - Restart managed processes
[<scope>]   stopproc    [<attr>=<val>..]  - Stop managed processes
[<scope>]   reload                        - Trigger opmn to reread opmn.xml
[<scope>]   status      [<options>]       - Get managed process status
[<scope>]   dmsdump     [<attr>=<val>&..] - Get DMS stats
[<scope>}   set         [<attr>=<val> ..] - Set opmn log parameters
[<scope>]   query       [<attr>=<val> ..] - Query opmn log parameters
            launch      [<attr>=<val> ..] - Launch a configured target process
            phantom     [<attr>=<val> ..] - Register phantom processes
            ping        [<max_retry>]     - Ping local opmn
            validate    [<filename>]      - Validate the given xml file
            config      [<options>]       - Modify the opmn xml file
            help                          - Print brief usage description
            usage       [<command>]       - Print detailed usage description
            createinstance                - Create an Oracle Instance
            createcomponent               - Create a specified component
            deleteinstance                - Delete an instance and components
            deletecomponent               - Delete a specified component
            registerinstance              - Register with admin server
            unregisterinstance            - Unregister with admin server
            updateinstanceregistration    - Update instance registration
            updatecomponentregistration   - Update component registration
```

4.3.6.2 opmnctl usage

Syntax: `opmnctl usage [<command>]`

The `usage` command displays help for any one specified `opmnctl` command. With no argument the `opmnctl usage` command displays the same information as `opmnctl help`.

The command can be one or more of the following:

- `start`
- `startall`
- `startproc`
- `stopall`
- `stopproc`
- `restartproc`
- `reload`
- `shutdown`
- `ping`
- `status`
- `metric`
- `dmsdump`
- `debug`
- `set`
- `query`
- `launch`

- phantom
- ping
- validate
- help
- usage
- createinstance
- createcomponent
- deleteinstance
- deletecomponent
- registerinstance
- unregisterinstance
- updateinstanceregistration
- updatecomponentregistration
- help

For example, enter the following command to receive the output shown in Example 4–7:

```
opmnctl usage stopall
```

Example 4–7 opmnctl usage stopall output

```
opmnctl stopall [sequential=true] [report=true]
Stop opmn daemon and managed processes for local Oracle instance.

This request first tries to stop all managed processes gracefully.
Processes which will not stop gracefully will be forcefully shutdown.  After
stopping all managed processes, the opmn daemon will shutdown itself.

This request should only be performed when it is necessary to stop the opmn
daemon.  Once started, the opmn daemon should remain up until it is necessary to
restart the computer or some other rare administrative event occurs.

To stop all managed processes without stopping the opmn daemon, consider
using the stopproc command without any target arguments.

If the value of the sequential attribute is "true", each process will be stopped
upon sequentially (one at a time).

If the value of the report attribute is "true", opmn will report the results of
the attempt to stop each processes as it completes.
The default behavior is for opmn to wait until the entire request has completed
before sending all of the results at once.

To restart the opmn daemon without restarting any managed processes, consider
using the the reload command.  The reload command is the appropriate command to
use when the only goal is to restart the opmn daemon with a new configuration.

This request operates synchronously and will wait for the operation to complete
before returning.
```

4.3.6.3 opmnctl validate

Syntax: `opmnctl validate` [<filename>]

The `opmnctl validate` command validates the XML syntax of the `opmn.xml` file. The default *ORACLE_INSTANCE*`/config/OPMN/opmn/opmn.xml` is validated when *ORACLE_INSTANCE*`/bin/opmnctl` is used. The <filename> can be specified by either the relative or absolute path.

5 Using OPMN

This chapter provides command-line examples on how to use OPMN for Oracle Fusion Middleware. It features the following topics:

- Starting OPMN
- Starting and Stopping All System Components
- Starting and Stopping a System Component
- Starting and Stopping all System Components of the Same Type

5.1 Starting OPMN

OPMN does not depend on any other system component being up and running before it can be started and used. The OPMN server should be started as soon as possible after turning on the host.

Use the following command to start OPMN without starting other system components:

```
opmnctl start
```

5.2 Starting and Stopping All System Components

Use the following command to **start** all system components of an Oracle instance:

```
opmnctl startproc
```

Use the following command to **stop** all system components of an Oracle instance:

```
opmnctl stopproc
```

5.3 Starting and Stopping a System Component

Use the following command to **start** a system component named `ohs1`:

```
opmnctl startproc ias-component=ohs1
```

Use the following command to **stop** a system component named `ohs1`:

```
opmnctl stopproc ias-component=ohs1
```

5.4 Starting and Stopping all System Components of the Same Type

Use the following command to **start** all system components of the type `OID` in an Oracle instance:

```
opmnctl startproc process-type=OID
```

Use the following command to **stop** all system components of the type `OID` in an Oracle instance:

```
opmnctl stopproc process-type=OID
```

6

opmn.xml Common Configuration

This chapter provides common configuration examples, and descriptions of elements and attributes for the OPMN `opmn.xml` file.

It contains the following topics:

- Example of opmn.xml Elements and Attributes
- opmn.xml Element and Attribute Descriptions

6.1 Example of opmn.xml Elements and Attributes

Example 6–1 shows all possible elements and attributes that may appear in an `opmn.xml` file that are not specific to any system components.

6.1.1 Global Definitions and Syntax

All paths, module data values, and environment values may reference the following global variables, which is expanded to their platform specific values:

Table 6–1 Global Variables and Definitions

Global Variable	Definition
ORACLE_HOME	Full path to *ORACLE_HOME*
ORACLE_INSTANCE	Full path to *ORACLE_INSTANCE*
:	The library path (or class path) separator (":" on Linux or ";" on Microsoft Windows, for example).
EXE_EXT	The executable file extension ("" on Linux or ".exe" on Microsoft Windows, for example)
SO_EXT	The shared library extension (".so" on Linux or ".dll" on Microsoft Windows, for example)
SHELL_EXT	The shell file extension (".sh" on Linux or ".bat" on Microsoft Windows, for example)

Each of the variables defined above must be referenced using the same syntax as an environment variable in Linux or Windows. For example any of these references, `ORACLE_HOME`, `{ORACLE_HOME}`, or `%ORACLE_HOME%` yields the full path to *ORACLE_HOME*.

OPMN also automatically converts path separators in any path, module data value, or environment value based upon the platform on which OPMN is running. For example, `/oracle/instances/ias1` would remain the same on Linux, but on Microsoft Windows OPMN would convert it to `\oracle\instances\ias1`.

OPMN uses the ^ character as an escape character to disable path separator conversion for the following character, and so "^/" always yields "/" in the parsed string. Two ^ characters yields a single ^.

Example 6–1 Common Configuration Elements and Attributes

```
<opmn>
<log path="path" comp="comp-codes" rotation=-size="kBytes" rotation-hour="HOD"/>
<debug="path" comp="comp-codes" rotation-size="kBytes" rotation-hour="HOD"/>
   <notification-server interface="type">
      <ipaddr remote="ip; ip" request="ip; ip"/>
      <port local="port" remote="port" reqest="port"/>
      <ssl enabled="boolean" wallet-file="path" wallet-password="password" openssl-certfile="path"
       openssl-keyfile="path open" openssl-password="password" openssl-lib="path"/>


      <tune io-timeout="timeout" io-idle="interval" timeout="timeout"/>
   </notification-server>
   <process-manager insecure-remote-requests="boolean">
      <process-modules>
         <module path="path" tag="tag-id" status="state" cron="interval">
            <module-data>
               <category id="id">
                  <data id="id" value="value" process-conversion="boolean"/>
               </category>
            </module-data>
         <module-id id="module-id"/>
   </module>
</process-modules>
<ias-instance="id="ias-instance-name"" name="ias-instance-name"ORACLE_HOME="path">
   <environment>
      <variable id="id" value="value" append="boolean" process-conversion="boolean"/>
   </environment>
<!-- module-data-->
<ias-component id="component-id" id-matching="boolean" status="state">
   <!-- environment-->
   <!-- module-data-->
   <dependencies>
      <database db-connect-info="connect" infrastructure-key="key"timeout="depend-timeout"
       cache-timeout="cache-timeout"/>
      <OID address="address" infrastructure="boolean" timeout="depend-timeout"
       cache-timeout="cache-timeout">
         <ssl enabled="boolean" wallet-file="path" wallet-password="password">
      </OID>
      <OSSO host="hostname" port="port" URI="uri" timeout="depend-timeout"
       cache-timeout="cache-timeout">
         <ssl enabled="boolean" wallet-file="path" wallet-password="password">
      </OSSO>
      <managed-process ias-instance="ias-instance-id" ias-component="ias-component-id"
       process-type="process-type-id" process-set="process-set-id" autostart="boolean"
       autostop="boolean" timeout="depend-timeout"cache-timeout="cache-timeout"/>
   </dependencies>
   <process-type="process-type-id" module-id="module-id" status="state" working-dir="path">
      <!-- environment-->
      <!-- module-data-->
      <!-- dependencies-->
      <event-scripts>
         <pre-start path="path">
         <pre-stop path="path">
         <post-crash path="path">
```

```
      </event-scripts>
      <start timeout="timeout" retry="num"/>
      <stop timeout="timeout"/>
      <restart timeout="timeout" retry="num"/>
      <ping timeout="timeout" retry="num" interval="interval"/>
      <port id="id" range="range"/>
      <process-set id="process-set-id" restart-on-death="boolean" numprocs="num" minprocs="min"
       maxprocs="max" status="state" working-dir="path" parallel-requests="boolean">
         <!-- environment-->
         <!-- module-data-->
         <!-- dependencies-->
         <!-- event-scripts-->
         <!-- start:-->
         <!-- stop-->
         <!-- restart-->
         <!-- ping-->
         <!-- port-->
      </process-set>
      </process-type>
      </ias-component>
      </ias-instance>
      <launch-targets>
      <launch-target id="id">
      <exec path="path"/>
      <argument value="argument"/>
      <timeout value="seconds"/>
      <max-concurrency value="number"/>
      </launch-target>
      </launch-targets>
   </process-manager>
</opmn>
```

6.2 opmn.xml Element and Attribute Descriptions

This section describes the elements and attributes in the `opmn.xml` file that are not specific to any system components. This section also provides attribute descriptions of the elements.

opmn

Required: true
Default: none
Parents: none
Attributes: none

<opmn> is the top-level element in the `opmn.xml` file.

log

Required: false
Default: *see attributes*
Parents: <opmn>
Attributes: `path`, `comp`, `rotation-size`, `rotation-hour`

The configuration definitions for the OPMN log mechanism.

path="path"
Required: true

Default: *ORACLE_INSTANCE*/diagnostics/logs/OPMN/opmn/opmn.log
Valid Values: The path name for the OPMN log file.

comp="comp-codes"

Required: true
Default: internal, ons, pm
Valid Values: A list of comp-codes. A semi-colon must be used to separate the items on the comp-codes list.

The comp attribute specifies the component codes for logged events. These codes can be viewed and changed dynamically at OPMN run-time using the following commands:

```
> opmnctl query target=log
> opmnctl set target=log comp=<comp-codes>
```

The default comp-codes for log already include all possible log messages, and it is recommended that you do not change the value.

The following comp-codes are displayed in the log and debug elements of the opmn.xml file:

- internal: a log for the common internal information for OPMN
- ons: a log for the ONS component information for OPMN
- pm: a log for the PM component information for OPMN

Both the ons and pm components consist of subcomponents which may be specified using the component[subcomponents] syntax. The component can be either ons or pm (separated by a semicolon if both are specified). The list of valid subcomponents for the given component are each separated by a comma. For example, comp="ons[local,listener];pm".

The following Table 6–2 lists the ONS component codes.

Table 6–2 ONS Component Codes

ONS Attribute	Definition
all	all subcomponents
local	local information
listener	listener information
discover	discover (server or multicast) information
servers	remote servers currently up and connected to the farm
topology	current farm wide server connection topology
server	remote server connection information
client	client connection information
connect	generic connection information
subscribe	client subscription information
message	notification receiving and processing information
deliver	notification delivery information
special	special notification processing

Table 6–2 (Cont.) ONS Component Codes

ONS Attribute	Definition
internal	internal resource information
secure	SSL operation information
workers	worker threads

The following Table 6–3 lists the PM component codes.

Table 6–3 PM Component Codes

PM Attribute	Definition
all	all subcomponents
requests	HTTP (user) requests
remote	remote HTTP requests
scheduler	scheduler thread and resource information
monitor	monitor thread information
workers	worker threads
process	managed processes
depend	dependency processing
internal	internal resources
schedjobs	periodic scheduled jobs
procjobs	for each process scheduled jobs
dms	DMS processing
modules	`process module` information. Only modules which call the `modLog()` (or `modDebug` for the debug log) function yields output. A specific module or list of modules may be specified with modules(`module-ids`). `module-ids` can be specified with a colon separated list of `module-ids` to be displayed: modules (`module1-id:module2-id`). `module-ids` that do not match a configured and enabled module are not processed.

Each subcomponent (for `ons` or `pm`) may be prefaced with the negation character **!** which deselects the subcomponent. By using the term "**all**" with negated sub-components, specific subcomponents are eliminated from the display.

Components and subcomponents are set or negated in the order in which they are encountered. The `ons[all,!topology]` yields all `ons` subcomponents excluding `topology`, while `ons[!topology,all]` yields all `ons` subcomponents including `topology`.

rotation-size="kBytes"

Required: false
Default: none
Valid Values: An integer.

The `rotation-size` is the maximum size in kilobytes of the log file. When the log file reaches the configured size, the OPMN logging mechanism closes the log, rename it with a time stamp suffix, and then create a new log file. This attribute may be used with `rotation-hour`.

rotation-hour="HOD"

Required: false
Default: none
Valid Values: An integer value between 0 to 23.

At the given hour of the day, the OPMN logging mechanism closes the log, renames it with a time stamp suffix, and then creates a new log file. This attribute may be used with `rotation-size`.

debug

Required: false
Default: *see attributes*
Parents: <opmn>
Attributes: `path`, `comp`, `rotation-size`, `rotation-hour`

The `debug` element contains the configuration definitions for the OPMN debug log mechanism.

> **Note:** Enable usage of the `opmn.debug` file only after conferring with Oracle Support. The `opmn.debug` file is used by Oracle Support to debug and diagnose OPMN issues. Messages that are contained in the `opmn.debug` file are typically not readily comprehensible to the user.

path="path"

Required: true
Default: *`ORACLE_INSTANCE`*`/diagnostics/logs/OPMN/opmn/opmn.log`
Valid Values: The path name for the OPMN debug log file.

comp="comp-codes"

Required: true
Default: none
Valid Values: A list of `comp-codes`. A semi-colon must be used to separate the items on the `comp-codes` list.

The `comp` attribute specifies the component codes for logged events. These codes can be viewed and changed dynamically at OPMN run-time using the following commands:

```
> opmnctl query target=log
> opmnctl set target=log comp=<comp-codes>
```

The values revert back to the configured values in the `opmn.xml` file when OPMN is reloaded.

The following comp-codes are displayed in the log and debug elements of the `opmn.xml` file:

- `internal`: a log for the common internal information for OPMN
- `ons`: a log for the ONS component information for OPMN
- `pm`: a log for the PM component information for OPMN

Both the `ons` and `pm` components consist of subcomponents which may be specified using the `component[subcomponents]` syntax. The component can be either `ons` or

pm (separated by a semicolon if both are specified). The list of valid subcomponents for the given component are each separated by a comma. For example, comp="ons[local,listener];pm".

The following Table 6–4 lists the ONS component codes.

Table 6–4 ONS Component Codes

ONS Attribute	Definition
all	all subcomponents
local	local information
listener	listener information
discover	discover (server or multicast) information
servers	remote servers currently up and connected to the farm
topology	current farm wide server connection topology
server	remote server connection information
client	client connection information
connect	generic connection information
subscribe	client subscription information
message	notification receiving and processing information
deliver	notification delivery information
special	special notification processing
internal	internal resource information
secure	SSL operation information
workers	worker threads

The following Table 6–5 lists the PM component codes.

Table 6–5 PM Component Codes

PM Attribute	Definition
all	all subcomponents
requests	HTTP (user) requests
remote	remote HTTP requests
scheduler	scheduler thread and resource information
monitor	monitor thread information
workers	worker threads
process	managed processes
depend	dependency processing
internal	internal resources
schedjobs	periodic scheduled jobs
procjobs	for each process scheduled jobs
dms	DMS processing

Table 6–5 (Cont.) PM Component Codes

PM Attribute	Definition
modules	`process module` information. Only modules which call the `modLog()` (or `modDebug` for the debug log) function yields output. A specific module or list of modules may be specified with modules(`module-ids`). `module-ids` can be specified with a colon separated list of `module-ids` to be displayed: modules (`module1-id:module2-id`). `module-ids` that do not match a configured and enabled module are not processed.

Each subcomponent (for `ons` or `pm`) may be prefaced with the negation character **!** which deselects the subcomponent. By using the term "**all**" with negated sub-components, specific subcomponents are eliminated from the display.

Components and subcomponents are set or negated in the order in which they are encountered. The `ons[all,!topology]` yields all `ons` subcomponents excluding `topology`, while `ons[!topology,all]` yields all `ons` subcomponents including `topology`.

rotation-size="kBytes"

Required: false
Default: none
Valid Values: An integer.

The `rotation-size` is the maximum size in kilobytes of the log file. When the log file reaches the configured size, the OPMN logging mechanism closes the log, renames the log with a time stamp suffix, and then creates a new log file.

The rotation-size attribute may be used with the `rotation-hour` attribute.

rotation-hour="HOD"

Required: false
Default: none
Valid Values: An integer value between 0 to 23.

The `rotation-hour` attribute for use with the log file at the specified time of day, the OPMN logging mechanism closes the log file, renames it with a time stamp suffix, and then creates a new log file. This attribute may be used with the `rotation-size` attribute.

notification-server

Required: true
Default: none
Parents: <opmn>
Attributes: interface

The `notification-server` element configures or, contains the elements to configure the ONS portion of OPMN.

interface="type"

Required: false
Default: any
Valid Values: any, IPv6, or IPv4

By default, OPMN supports both the IPv6 and IPv4 network interfaces (see Section 3.5 for information about IPv6 support). OPMN binds to both interfaces for its listener ports and attempts connections using either interface. OPMN always attempts to use the IPv6 interface first, if such an address is available. This behavior is the same as the default behavior for the Sun Java Virtual Machine (JVM).

Both IPv4 and IPv6, require that you use the same network for connection to other OPMN servers. For example, IPv6 forces OPMN to only use the IPv6 network interface even if the IPv4 interface is available. This means that OPMN is only be able to connect to (and be connected from) other OPMN servers that can use the same network interface. If you configure IPv6 or IPv4 on a system that does not provide the same network interface support, OPMN will not start.

ipaddr

Required: true
Default: none
Parents: <notification-server>
Attributes: `remote, request`

The `iapddr` element specifies host information for ONS listener threads and host port bindings.

remote="ip; ip"

Required: false
Default: none
Valid Values: an IP address (in the IPv4 or IPv6 format) or host name to which ONS binds its remote port. A list of IP values may be configured to force ONS to bind to a specific set of IP addresses. Each IP value must be separated by a semi-colon on the list.

The `remote` attribute is the IP address or host name to which ONS binds its remote port. The remote port is used for ONS to ONS communication. Notifications pass from ONS to ONS through the remote port, and OPMN uses ONS to route remote requests to other OPMN servers through the remote port.

request="ip; ip"

Required: false
Default: IP address for default system host name
Valid Values: an IP address (in IPv4 or IPv6 format) or host name to which ONS binds its request port. A list of IP values may be configured to force ONS to bind to a set of specific IP addresses. The values on the list must be separated by a semi-colon.

The `request` attribute is for the IP address or host name to which ONS binds its remote port. This port can only be used for obtaining status information.

port

Required: true
Default: none
Parents: <notification-server>
Attributes: `local, remote, request`

The `port` element contains configuration information for ONS listener threads host and port bindings.

local="port"

Required: true
Default: none
Valid Values: A valid port number.

The `local` attribute is for the ONS local port value.

remote="port"

Required: false
Default: none
Valid Values: A port number.

The `remote` attribute is for the ONS remote port value.

request="port"

Required: false
Default: none
Valid Values: A port number.

The `request` attribute is for the ONS request `port` value.

ssl

Required: false
Default: none
Parents: <notification-server>
Attributes: `enabled, wallet-file, wallet-password`, `openssl-certfile`, `openssl-keyfile`, `openssl-password`, and `openssl-lib`

The `ssl` element is used for ONS to ONS security and authentication configuration. You may configure either the Oracle SSL layer (`wallet-file` and `wallet-password`) or the Open SSL layer (`openssl-certfile`, `openssl-keyfile`, `openssl-password`, and `openssl-lib`). You cannot use both. If you configure both Oracle and Open SSL layers within the same `opmn.xml` file, the server will not start.

The Oracle SSL layer uses the libraries shipped with either the Oracle Fusion Middleware or Oracle Database products. The Oracle SSL layer uses the standard Oracle wallet.

The Open SSL layer provides better performance, documentation, and support for encryption hardware. It also has uses less hardware space within OPMN. Open SSL is an open source tool kit to develop security protocols. You can find more information at:

`http://www.openssl.org`

enabled="boolean"

Required: true
Default: none
Valid Values: `true` or `false`

If the `enabled` value is set to true, it enables SSL connections for ONS.

wallet-file="path"

Required: false (for Oracle SSL only)

Default: none
Valid Values: The path name to the Oracle wallet.

wallet-password="password"

Required: false (for Oracle SSL only)
Default: none
Valid Values: A string for the wallet password.

The `wallet-password` attribute is the password string for the specified Oracle wallet.

openssl-certfile="path"

Required: true (for Open SSL only)
Default: none
Valid Values: The path name to the Open SSL cert file.

openssl-keyfile="path"

Required: true (for Open SSL only)
Default: none
Valid Values: The path name to the Open SSL key file.

openssl-password="password"

Required: true (for Open SSL only)
Default: none
Valid Values: A string for the `openssl-keyfile` password.

The `openssl-password` attribute is the password string for the specified `openssl-keyfile`.

openssl-lib="path"

Required: false (for Open SSL only)
Default: none
Valid Values: The path name to the Open SSL library.

tune

Required: false
Default: *See attributes*
Parents: <notification-server>
Attributes: `io-timeout`, `io-idle`, `timeout`

The `tune` element contains the information for the Tuneable Notification Server ONS parameters.

io-timeout="timeout"

Required: false
Default: 30
Valid Values: 0 or an integer value >= 4 and <= 3600

The `io-timeout` is the socket read timeout value in seconds used by each remote OPMN (or ONS) server directly connected to the local server. If the remote server does not receive any data across the connection with the local server in the configured `io-timeout` period, the remote server times-out the connection and close the socket.

The `io-timeout` value is the timeout period remote OPMN (or ONS) servers uses for the local server.

The `io-timeout` value is also used as a timeout for resource cleanup after an ONS connection has disconnected. If the connection is reestablished before the timeout period, the resources are transferred to the new connection. Otherwise the resources are released after the timeout period has expired.

The `io-timeout` parameter should be increased for servers running on very busy or overloaded systems.

A value of 0 disables `io-timeout` checking on remote servers for the local server. The `io-timeout` disables cleaning up of failover participant state, duplicate notification detection state, and notifications queued for the down connection. Notifications continues to be queued until the connection is reestablished, which can consume an ever expanding amount of memory on the remote OPMN or ONS servers if the timeout check is disabled and the connection never comes back. The `io-timeout` parameter should only be set to 0 for debug purposes.

A configured non- zero value that is less than the minimum value is set to the minimum, and a value greater than the maximum is set to the maximum.

io-idle="interval"

Required: false
Default: `io-timeout` - (`io-timeout` / 3)
Valid Values: an integer value >= 2 and <= (`io-timeout` - 2)

The interval in seconds between sending a message to each remote server to which the local server is directly connected. If no normal network traffic is sent from the local server to any remote server in the configured interval, a message is sent to the remote server.

The `io-idle` parameter ensures that an idle but responsive OPMN server does not have its connection timed out when with a remote server. On busy systems, this value should be far enough below the `io-timeout` value such that there is enough time for the local server to queue and send the idle message to the remote server before the remote server detects the timeout.

If the `io-timeout` is 0, the `io-idle` attribute is ignored. A configured value that is less than the minimum value is set to the minimum, and a value greater than the maximum is set to the maximum.

timeout="timeout"

Required: false
Default: 20
Valid Values: an integer value >= 1 and <= 3600

The `timeout` parameter is the socket timeout value in seconds used for the local OPMN server for connection attempts and client connection writes. If the connection handshake to the local OPMN server takes longer than the configured timeout value, then the socket is closed and the connection resources are available. If a write on a client connection socket takes longer than the configured timeout value, then the socket is closed and the connection resources are available.

process-manager

Required: true
Default: none

Parents: <opmn>
Attributes: `insecure-remote-requests`

The `process-manager` contains the configuration definitions for the PM portion of OPMN.

insecure-remote-requests="boolean"

Required: false
Default: false
Valid Values: `true` or `false`

The `insecure-remote-request` attribute is a security check which disables requests until security features are configured. By default OPMN only allows start, stop, restart, shutdown and reload requests rerouted from remote OPMN servers if ONS SSL is `enabled` and a wallet file is configured for authentication.

Note: Setting the `insecure-remote-request` attribute to `true` overrides that security check and enables these requests to be issued remotely with no security features configured.

Setting the insecure-remote-request attribute to `true` is a major security risk and should only be done for testing purposes with all connected OPMN servers behind a well secured fire wall or completely disconnected from any external network.

---

process-modules

Required: true
Default: none
Parents: <process-manager>
Attributes: none

Each `process module` is designed to support a specific set of `process-type` elements; it is only required if the `process-type` elements are configured. The PM dynamically loads in a library for each specified `process module`.

module

Required: true
Default: none
Parents: <process-modules>
Attributes: `path, tag, status, cron`

The `module` element is used to provide `process-type` specific support for the PM. Each module is implemented as a shared library. The module exports a set of standard functions and uses the PM `process module` API. A module must provide a list of the `process-types` it supports. Only one configured `process module` may list a specific `process-type`. No two modules can list the same `process-type`.

path="path"

Required: true
Default: none
Valid Values: The path name for the module shared library.

The `path` attribute must specify the path name of the shared library file. The library file has the system suffix of `.so` for Linux and `.dll` for Microsoft Windows. The suffix may be omitted and OPMN automatically appends it. *`ORACLE_HOME`* may be used when specifying the path name.

tag="tag-id"

Required: false
Default: The value specified by the path element.
Valid Values: A string uniquely identifying the module.

The tag attribute identifies the module. A module may report its tag value when logging errors to the PM log file or as part of the response to a request. While optional, it is a good idea to set this attribute to a meaningful value to help track any issues with process management.

status="state"

Required: false
Default: `enabled`
Valid Values: `critical, enabled, or disabled`

A module may be `enabled`, in which case PM loads in its shared library when it starts and calls the module's initialization functions, or `disabled` in which case the module entry is completely ignored. If the module `process-types` are configured in the `opmn.xml` file they must also be `disabled`. The `critical` state is the same as `enabled`, except that OPMN terminates with a fatal error code if the module initialization fails.

cron="interval"

Required: false
Default: none
Valid Values: An integer.

Specify the interval in seconds between calls to the module's `cron` callback function. Configuring a `cron` interval for a module that does not support the `cron` callback is not allowed. Unless you have designed the module, you should neither add nor alter this attribute.

module-data

Required: false
Default: none
Parents: <module>, <ias-instance>, <ias-component>, <dependencies>, <process-set>
Attributes: none

The `module-data` blocks are used to define module specific name-value pairs that are meaningful only to a specific module. Each `module-data` block is organized into categories, which contain the name-value data pairs.

The `module-data` blocks can be defined for multiple elements within the `opmn.xml` file, and OPMN creates an aggregate `module-data` block at the `process-set` level that contains all values defined at or above it. If multiple definitions exist in this hierarchy with the same `category id` and `data id`, the value defined at the lowest level is used.

Table 6–5 illustrates the `module-data` defined at each level in the hierarchy (with the highest level displayed at the top) and the resultant union at the `process-set` level of all of the `module-data` definitions:

Table 6–6 module-data Hierarchy

Module	Definition

`ias-instance`	`<category id="CatA">`
	`  <data id= "DataAA" value="aaaa"/>`
	`</category>`

`ias-component`	`<category id="CatA">`
	`  <data id= "DataAB" value="abab"/>`
	`</category>`
	`<category id="CatB">`
	`  <data id= "DataBA" value="baba"/>`
	`</category>`

`module`	`<category id="CatA">`
	`  <data id= "DataAC" value="acac"/>`
	`</category>`

`process-type`	`<category id="CatA">`
	`  <data id= "DataAA" value="XXXX"/>`
	`</category>`

`process-set`	`<category id="CatB">`
	`  <data id= "DataBB" value="bbbb"/>`
	`</category>`

`RESULT`	`<category id="CatA">`
	`  <data id= "DataAA" value="XXXX"/>`
	`  <data id= "DataAB" value="abab"/>`
	`  <data id= "DataAC" value="acac"/>`
	`</category>`
	`<category id="CatB">`
	`  <data id= "DataBA" value="baba"/>`
	`  <data id= "DataBB" value="bbbb"/>`
	`</category>`

category

Required: true
Default: none
Parents: module-data
Attributes: `id`

The `category` element is an organizational level within a `module-data` block.

id="id"

Required: true
Default: none
Valid Values: A string.

This `id` string identifies a data category. Each `category id` within a single `module-data` block must be unique, but multiple `module-data` blocks may contain the same `data category ids`, in which case the categories are considered to be related.

data

Required: true
Default: none
Parents: <category>
Attributes: `id, value, process-conversion`

A data name value definition within a `module-data` category.

id="id"

Required: true
Default: none
Valid Values: A string.

This string identifies a data attribute. Each `data id` within a single category must be unique, but multiple categories may contain the same data identifications. Data elements with the same identification as other data elements, that are defined in different categories with the same identification, are related.

value="value"

Required: true
Default: none
Valid Values: A string.

The value string associated with the data element `id`. Any environment variable defined anywhere within the `process-set` (any level at or above the `process-set`) in which the data value is defined (again, any level at or above the `process-set`) referenced within the value string as `$variable` or `%variable%` is expanded to the variable value.

process-conversion="boolean"

Required: false
Default: `true`
Valid Values: `true` or `false`

The `process-conversion` attribute enables you to set the separator character. By default OPMN converts slashes in the data value string to be those of the directory path separator character for the system on which OPMN is running (on UNIX each `\` character is converted to `/` and on Windows each `/` is converted to `\`). Set this attribute to false to disable this conversion.

Note that if process-conversion is true, OPMN uses the ^ character as an escape character to disable process conversion for the following character, and so ^/ on a Windows system yields a "/" in the string. Specify two ^ characters if you need to specify the ^ character in the resultant string: ^^ yields ^.

module-id

Required: true
Default: none
Parents: <module>
Attributes: `id`

The `module-id` name defines the type of process and associates the configuration with a `process module`.

This identifier is used by each `process-type` to specify which module supports it. A module may be configured with multiple `module-ids`.

id="module-id"
Required: true
Default: none
Valid Values: A string.

ias-instance

Required: true
Default: none
Parents: <process-manager>
Attributes: `id`

The configuration definitions for an Oracle instance. Only one `ias-instance` is supported for each OPMN.

`id = ias-instance-id; name = ias-instance-name`

id="ias-instance-name"
Required: true
Default: none
Valid Values: A string.

The string specifies the `ias-instance` id.

name="ias-instance-name"
Required: false
Default: `ias-instance-id`
Valid Values: A string.

The `name` string specifies the `ias-instance` name, and it is this value that is used to identify the Oracle instance.

environment

Required: true
Default: *Refer to the following paragraph.*
Parents: <ias-instance>, <ias-component>, <process-type>, <process-set>
Attributes: none

Like `module-data` blocks, `environment` blocks can be defined for multiple elements within the `opmn.xml` file, and OPMN creates an aggregate `environment` block at the `process-set` level that contains all values defined at, or above it. If multiple definitions exist in the hierarchy with the same `id`, the value defined at the lowest level is used.

OPMN provides a default set of environment variables for each managed process, and a set of Java system properties for managed Java processes.

Environmental variables are described in Table 6–7:

Table 6–7 Environmental Variables

Environmental Variable	Definition
`ORACLE_HOME`	Full path to the oracle home

Table 6–7 (Cont.) Environmental Variables

Environmental Variable	Definition
ORACLE_INSTANCE	Full path to the Oracle instance home
INSTANCE_NAME	The name of the Oracle instance
PROCESS_UID	The unique process id
OPMN_UID	Synonym of PROCESS_UID
PROCESS_INDEX	The index of the process
OPMN_INDEX	Synonym of PROCESS_INDEX
COMPONENT_NAME	The name of the component
COMPONENT_TYPE	The type of the component
COMPONENT_CONFIG_PATH	Absolute path to the configuration files on disk for your component
COMPONENT_LOG_PATH	Absolute path to the log files on disk for your component
ORACLE_NLS	Defaults to ORACLE_NLS from the OPMN environment.
OPMN_ENV_LC_ALL	Defaults to OPMN_ENV_LC_ALL from the OPMN environment
OPMN_ENV_LANG	Defaults to OPMN_ENV_LANG from the OPMN environment.
OPMN_ENV_NLS_LANG	Defaults to OPMN_ENV_NLS_LANG from the OPMN environment.
LD_LIBRARY_PATH	By default this contains ORACLE_HOME/lib (not Microsoft Windows)
SHELL	By default /bin/sh (not MicrosoftWindows).
PATH	Linux default: ORACLE_HOME/bin:ORACLE_HOME/jdk/bin:/bin:/usr/bin:/usr/local/bin Microsoft Windows default: %ORACLE_HOME%\lib;%ORACLE_HOME%\bin;%ORACLE_HOME%\jdk\bin;%SystemRoot%;%SystemRoot%\system32
COMSPEC	Defaults to %ComSpec% value from system. Microsoft Windows only.
SystemRoot	Defaults to %SystemRoot% value from the system. Microsoft Windows only.
SystemDrive	Defaults to %SystemDrive% value from the system. Microsoft Windows only.
ORACLE_ADMIN_REGISTERED	"true" if the Oracle instance is registered with an admin server
ORACLE_ADMIN_HOST	The associated admin host ("N/A" if not available)
ORACLE_ADMIN_PORT	The associated admin port ("N/A" if not available)
ORACLE_ADMIN_PROTOCOL	The associated admin protocol ("N/A" if not available)
ORACLE_ADMIN_USERNAME	The associated admin username ("N/A" if not available)

System Properties set for all managed Java processes (flagged as such to OPMN by the process module) are described in Table 6–8:

Table 6–8 System Properties

Environmental Variable	Definition
`oracle.process.uid`	The unique process id
`oracle.opmn.uid`	Synonym of `oracle.process.uid`
`oracle.process.index`	The index of the process
`oracle.opmn.index`	Synonym of `oracle.process.index`
`oracle.home`	Full path to the oracle home
`oracle.instance`	Full path to the Oracle instance home
`oracle.instance.name`	The name of the Oracle instance
`oracle.component.name`	The name of the component
`oracle.component.type`	The type of the component
`oracle.component.configpath`	Absolute path to the configuration files on disk for your component
`oracle.component.logpath`	Absolute path to the log files on disk for your component
`oracle.admin.registered`	"true" if the Oracle instance is registered with an admin server
`oracle.admin.host`	The associated admin host ("N/A" if not available)
`oracle.admin.port`	The associated admin port ("N/A" if not available)
`oracle.admin.protocol`	The associated admin protocol ("N/A" if not available)
`oracle.admin.username`	The associated admin username ("N/A" if not available)

variable

Required: true
Default: none
Parents: <environment>
Attributes: `id, value, append, process-conversion`

The variable element defines the environment variable name and value.

id="id"

Required: true
Default: none
Valid Values: A string.

The `id` is the environment variable name. An `environment id` may be duplicated within an `environment` block, with the last defined value taking priority over earlier definitions. The same `environment id` may be defined within `environment` blocks for different elements, and the value defined at the lowest level takes priority over values defined at higher levels.

value="value"

Required: true

Default: none
Valid Values: A string.

The environment value. Environment variables referenced within the value string as `$variable` or `%variable%` is expanded to the variable value. The same environment variable may reference itself to use a definition defined at a higher level, or earlier within this same `environment` block or from the environment of OPMN.

You may use the Linux shell syntax for referencing an environment variable, `$variable` or `${variable}`, or the Microsoft Windows format *`%variable%`*. Referenced variables that have not been defined remain in place as referenced, and so `value="_notdefined_"` would remain unchanged.

For example, the following environment block yields a value for `accumulate` of "`foobar`".

```
<environment>
   <variable id="accumulate" value="foo">
   <variable id="accumulate" value="${accumulate}bar">
</environment>
```

append="boolean"

Required: false
Default: false
Valid Values: `true` or `false`

You can force OPMN to append the new environment variable value to the previously defined value, with the system library delimeter placed in between the two values (':' for Linux and ';' for Microsoft Windows) by specifying a value of `true` for this attribute. This is useful when assembling a value for a variable such as `CLASSPATH`.

For example, the following `environment` block yields a value for `CLASSPATH` of "`/foo:/bar`" on a Linux system.

```
<environment>
   <variable id="CLASSPATH" value="/foo">
   <variable id="CLASSPATH" value="/bar" append="true">
</environment>
```

process-conversion="boolean"

Required: false
Default: `true`
Valid Values: `true` or `false`

ias-component

Required: true
Default: none
Parents: <ias-instance>
Attributes: `id, id-matching, status,type`

An `ias-component` is a logical grouping of `process-type` for administrative purposes.

id="component-id"

Required: true
Default: none
Valid Values: a string

The `id` attribute uniquely identifies the `ias-component` within the `ias-instance`.

id-matching="boolean"

Required: false
Default: false
Valid Values: `true` or `false`

By default OPMN requests that do not specify `ias-components` match all configured `ias-components`, unless the `id-matching` attribute for a component is set to `true`, in which case the request must explicitly include the `ias-component id` in order to affect the `ias-component` or any `process-type` or `process-set` configured for that `ias-component`.

status="state"

Required: false
Default: `enabled`
Valid Values: `enabled` or `disabled`

An `ias-component` may be `enabled`, in which case OPMN parses all of its configured attributes and elements and enables requests to operate upon it, or `disabled`, in which case the `ias-component` entry is completely ignored.

type="component-type"

Required: false
Default: none
Valid values: A string.

The type attribute allows you to specify a relationship among `ias-components` within the same `ias-instance`.

When configured the `component-type` is used for the value of the per process `COMPONENT_TYPE` environment variable (or the `oracle.component.type` system property for Java processes), and for the type element of the paths specified by `COMPONENT_CONFIG_PATH` and `COMPONENT_LOG_PATH` (`oracle.component.configpath` and `oracle.component.logpath`). If `component-type` is not configured, then the `process-type id` attribute is used in the composition of these strings.

dependencies

Required: false
Default: none
Parents: <ias-component>, <process-type>, <process-set>
Attributes: none

OPMN uses `dependencies` to determine if a process should be started or not. Like `module-data` and `environment` block, dependencies blocks can be defined for multiple elements within the `opmn.xml` file, and OPMN creates an aggregate dependency list at the `process-set` level that contains all dependencies defined at or above it. If duplicate dependencies are defined at different levels, then duplicate

checks on that dependency is made before starting a process. OPMN creates an aggregate dependency list at the `process-set` level that contains all dependencies defined at or above it. If duplicate dependencies are defined at different levels, then duplicate checks on the dependency is made before starting a process.

There are two primary types of dependencies: external and internal. External dependencies are for those resources not managed by OPMN. For example: Fusion Middleware Control Console.

An external program is executed by OPMN to perform the check on the resource. Internal dependencies are for system component processes (unit), which may include processes managed on a remote OPMN.

OPMN maintains a cache of dependency states which contains the last known state of each dependency, and the time it was last checked. A `cache-timeout` parameter for each dependency enables users to specify how long to use its state in the cache, or if it should be used at all. Similarly, a general timeout parameter for each dependency determines how long OPMN waits for a status update from that dependency before aborting the dependency check and the process start.

OPMN checks dependencies in the order in which they are declared. The traversal of the list of dependencies concludes either with the full sequence of successful checks, the dependency is available, or the first check failure, the dependency is not available, or the dependency check timed out.

database

Required: false
Default: none
Parents: <dependencies>
Attributes: `db-connect-info, infrastructure-key, timeout, cache-timeout`

The `database` element specifies the database to check. Either `db-connect-info` or `infrastructure-key` is used to identify the database.

db-connect-info="connect"

Required: true if `infrastructure-key` is not specified.
Default: none
Valid Values: A string

The `db-connect-info` attribute is the string required to connect to the database. The string can be in either of the following formats:

- `<host>:<port>/<service name>`
- `(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=<host>) (PORT=<port>)) (CONNECT_DATA=(SERVICE_NAME=<service name>)))`

For example:

```
pdsundev7:1521/asdb.us.oracle.com
```

infrastructure-key="key"

Required: true if `db-connect` is not specified.
Default: none
Valid Values: A string

The `infrastructure key` attribute is required to identify the database.

timeout="depend-timeout"

Required: false
Default: `1200`
Valid Values: An integer

The `timeout` attribute specifies in seconds how long OPMN waits for a dependency check to complete. If the check takes longer than the configured timeout, then OPMN considers the check to have failed.

cache-timeout="cache-timeout"

Required: false
Default: `600`
Valid Values: An integer

The `cache-timeout` attribute specifies how long in seconds OPMN uses the current "up" status for the dependency entry in the cache. If the last successful dependency check was within the prescribed number of seconds from the current check, then the dependency check is instantly flagged as successful, otherwise another dependency check is performed. Note that the `cache-timeout` is only for the last successful check of the dependency, and if the previous check failed, another access of the dependency is performed for this check. A value of 0 indicates OPMN always performs the check.

OID

Required: false
Default: none
Parents:<dependencies>
Attributes: `address, infrastructure, timeout, cache-timeout`

The `<OID>` element specifies the Oracle Internet Directory service to check an address string for a specific Oracle Internet Directory. This value is set to `true` to use the default Oracle Internet Directory.

address="address"

Required: true
Default: none
Valid Values: A string

The `address` element is the address string required to connect to Oracle Internet Directory.

infrastructure="boolean"

Required: true if `address` is not set.
Default: none
Valid Values: `true` or `false`

Use the default infrastructure Oracle Internet Directory for the Oracle instance.

ssl

Required: false
Default: none
Parents: <OID>
Attributes: `enabled, wallet-file, wallet-password`

The SSL information for the Oracle Internet Directory connection.

enabled="boolean"
Required: true
Default: none
Valid Values: `true` or `false`

To enable SSL on the Oracle Internet Directory connection, set the `enabled` attribute to `true`.

wallet-file="path"
Required: true
Default: none
Valid Values: A valid path name

The path name to the wallet file for authentication of the Oracle Internet Directory connection.

wallet-password="password"
Required: false
Default: none
Valid Values: A string

The `wallet-password` attribute is the password for the specified wallet-file.

timeout="depend-timeout"
Required: false
Default: `1200`
Valid Values: An integer

The `timeout` attribute specifies in seconds how long OPMN waits for a dependency check to complete. If the check takes longer than the configured timeout, then OPMN considers the check to have failed.

cache-timeout="cache-timeout"
Required: false
Default: `600`
Valid Values: An integer

The `cache-timeout` attribute specifies how long in seconds OPMN uses the current "up" status for the dependency entry in the cache. If the last successful dependency check was within the prescribed number of seconds from the current check, then the dependency check is flagged as successful. Otherwise, OPMN performs another dependency check. The `cache-timeout` is only for the last successful check of the dependency. If the previous check failed, OPMN performs another access of the dependency check. A value of 0 indicates OPMN always performs the check.

OSSO

Required: false
Default: none
Parents: <dependencies>
Attributes: `host, port, URI, timeout, cache-timeout`

The `OSSO` element specifies the Oracle Single Sign-On service to check.

host="hostname"
Required: true
Default: none
Valid Values: A string

The `host` attribute is the host name for the Oracle Single Sign-On connection.

port="port"
Required: true
Default: none
Valid Values: A port number

The `port` attribute is the port for the Oracle Single Sign-On connection.

URI="uri"
Required: true
Default: none
Valid Values: A string

The `URI` attribute is the URI for the Oracle Single Sign-On connection.

ssl

Required: false
Default: none
Parents: <OSSO>
Attributes: `enabled, wallet-file, wallet-password`

The `ssl` element is the SSL information for the Oracle Single Sign-On connection.

enabled="boolean"
Required: true
Default: none
Valid Values: `true` or `false`

The `enabled` attribute enables the SSL connection to Oracle Single Sign-On. To enable the connection set this attribute to `true`.

wallet-file="path"
Required: true
Default: none
Valid Values: A path name

The `wallet-file` attribute is the path name to the wallet file for authentication of the Oracle Single Sign-On connection. The *`ORACLE_HOME`* value may be used.

wallet-password="password"
Required: false
Default: none
Valid Values: A string

The `wallet-password` is the password for the specified wallet-file.

timeout="depend-timeout"

Required: false
Default: `1200`
Valid Values: An integer

The `timeout` attribute specifies in seconds how long OPMN waits for a dependency check to complete. If the check takes longer than the configured timeout, then OPMN considers the check to have failed.

cache-timeout="cache-timeout"

Required: false
Default: `600`
Valid Values: An integer

The `cache-timeout` attribute specifies how long in seconds OPMN uses the current "up" status for the dependency entry in the cache. If the last successful dependency check was within the prescribed number of seconds from the current check, then the dependency check is flagged as successful. Otherwise, OPMN performs another dependency check. The `cache-timeout` is only for the last successful check of the dependency. If the previous check failed, OPMN performs another dependency check. A value of 0 indicates OPMN always performs the check.

managed-process

Required: false
Default: none
Parents: <dependencies>
Attributes: `ias-instance, ias-component, process-type, process-set, autostart, autostop, timeout, cache-timeout`

The `managed-process` attribute specifies the managed process to check. A process for `process-type` or `process-set` does not start unless the specified dependency managed process is active. Circular dependencies are detected and rejected for local managed processes, but not for remote managed processes; this may result in a dependency check deadlock, which times out.

ias-instance="ias-instance-id"

Required: false
Default: The `ias-instance` of the current `process-type` or `process-set`.
Valid Values: A string

The `ias-instance` for the managed process dependency. If the specified `ias-instance` is not managed by the current OPMN, it is assumed to be a remote managed process dependency.

ias-component="ias-component-id"

Required: true
Default: none
Valid Values: A string

The `ias-component` for the managed process dependency.

process-type="process-type-id"
Required: true
Default: none
Valid Values: A string

The `process-type-id` for the managed process dependency.

process-set="process-set-id"
Required: true
Default: none
Valid Values: A string

The `process-set-id` for the managed process dependency.

autostart="boolean"
Required: false
Default: false
Valid Values: `true` or `false`

The `autostart` attribute is used for the managed process dependency. If the process is not running when the check is performed, the `autostart` element tries to get OPMN to attempt to start it.

autostop="boolean"
Required: false
Default: false
Valid Values: `true` or `false`

When the managed process dependency is stopped, then stop the managed process. The attribute is always `false` for remote managed process dependencies.

timeout="depend-timeout"
Required: false
Default: `1200`
Valid Values: An integer

The `timeout` attribute specifies, in seconds, how long OPMN waits for a dependency check to complete. If the check takes longer than the configured timeout, then OPMN considers the check to have failed.

cache-timeout="cache-timeout"
Required: false
Default: `600`
Valid Values: An integer

The `cache-timeout` attribute is only used for a process managed by a remote OPMN. The `cache-timeout` attribute specifies how long in seconds OPMN uses the current "up" status for the dependency entry in the cache. If the last timeout dependency check was within the prescribed number of seconds from the current check, then the dependency check is instantly flagged as successful, otherwise OPMN performs another dependency check. Note that the `cache-timeout` is only for the last successful check of the dependency, and if the previous check failed, OPMN

access of the dependency is performed for this check. A value of 0 indicates OPMN always performs the check.

> **Note:** The `cache-timeout` is only for the last successful check of the dependency, and if the previous check failed, OPMN performs another dependency check.

process-type

Required: true
Default: none
Parents: <ias-component>
Attributes: `id, module-id, status, working-dir`

A `process-type` is a grouping of `process-sets` that are supported by the same module.

id="process-type-id"

Required: true
Default: none
Valid Values: a string

The `id` attribute uniquely identifies the `process-type` within the `ias-component`.

module-id="module-id"

Required: true
Default: none
Valid Values: a string

The `module-id` attribute must map directly map to the `module-id` attribute that supports the `process-type`.

status="state"

Required: false
Default: `enabled`
Valid Values: `enabled` or `disabled`

A `process-type` may be `enabled`, in which case OPMN parses all of its configured attributes and elements and enables requests to operate upon it, or `disabled`, in which case the `process-type` entry is completely ignored and treated as if it were not listed in the `opmn.xml` file.

working-dir="path"

Required: false
Default: none
Valid Values: A path name

The `working-dir` path name specifies the working location that is set for managed processes created by the `process-type` element. If a `process-set` also defines a `working-dir` attribute, then the process-set path name takes precedence over the `process-type` path name.

event-scripts

Required: false
Default: none
Parents: <process-type>, <process-set>
Attributes: none

A configured `event script` is executed when a specific process related event has occurred. OPMN waits until the script completes or times out before proceeding with the next `action` for the process.

Table 6–9 shows event script arguments.

Table 6–9 Event Script Arguments

Option Name	Option Argument	Description
`-timeStamp`	`<time>`	An integer value for the current `time` on the system (in seconds).
`-instanceName`	`<instance-name>`	The `instance-name` of the managed process.
`-componentId`	`<component-id>`	The `component-id` of the managed process.
`-processType`	`<process-type-id>`	The `process-type` of the managed process.
`-processSet`	`<process-set-id>`	The `process-set` of the managed process.
`-processIndex`	`<index>`	The `process-index` of the managed process.
`-stderr`[1]	`<path>`	The path name for the `stderr` file pointer of the process.
`-stdout`[1]	`<path>`	The path name for the `stdout` file pointer of the process. Note: this argument is only given for a pre-start script if the start is part of a process restart request.
`-reason`	`<reason>`	A string indicating the reason script was executed. The `http_request` indicates the process `action` is the result of the user HTTP request to OPMN. The `non_http_request` indicates the process `action` was initiated by OPMN itself.
`-pid`[2]	`<process-id>`	The operating system integer value given for the `process-id`.
`-startTime`[2]	`<time>`	An integer value for the system start time of the process (in seconds).

[1] This argument is only given for a pre-start script if the start is part of a process restart request. The pre-start event is triggered only prior to performing a start. A restart operation may be composed of a stop operation followed by a start operation. A start operation can occur as an operation all by itself or as a sub-operation of a restart.

[2] This argument is only available with pre-stop or post-crash event scripts.

pre-start

Required: false
Default: none
Parents: <event-scripts>
Attributes: `path`

OPMN runs the `pre-start` script after any configured dependency checks have been performed (and passed) and before the process is actually started. The timeout for the `pre-start` script is the timeout value configured for starting the process itself, and

any time consumed by the execution of this script counts toward the process start timeout. If the script times out, the process is not started and any associated HTTP request fails.

Be cautious when you execute any OPMN process requests such as `start`, `stop` or `restart` within an event script. These requests are serialized at the `process-set` level. If the script invokes a request on a `process-set` on which the current request (or another already queued request) is operating, then the script hangs until it times out.

path="path"

Required: true
Default: none
Valid Values: The path name to the executable script.

The path name must specify either an executable program for which OPMN has execute permission, or a script file for which OPMN has both read and executable permission.

pre-stop

Required: false
Default: none
Parents: <event-scripts>
Attributes: `path`

OPMN runs the specified script before stopping the associated process. The timeout for the script is the value configured for stopping the process itself. Any time consumed by the execution of the script counts toward the process stop timeout. If the script times out, any associated HTTP request fails. However, OPMN proceeds with stopping the process.

Be cautious when you execute any OPMN process requests such as `start, stop,` or `restart`. These requests are serialized at the `process-set` level. If the script invokes a request on a `process-set` on which the current request (or another already queued request) is operating, then the script hangs until it times out.

path="path"

Required: true
Default: none
Valid Values: The path name to the executable script.

The `path` attribute must specify either an executable program for which OPMN has execute permission, or a script file for which OPMN has both read and executable permission.

post-crash

Required: false
Default: none
Parents:<event-scripts>
Attributes: `path`

OPMN runs the specified script after the associated process has terminated unexpectedly. The timeout for the script is the timeout value configured for stopping the process itself. After the script has terminated OPMN schedules a replacement of the terminated process.

Be cautious when you execute any OPMN process requests such as `start`, stop or restart. These requests are serialized at the `process-set` level. If the script invokes a request on a `process-set` on which the current request (or another already queued request) is operating, then the script hangs until it times out.

path="path"

Required: true
Default: none
Valid Values: The path name to the executable script.

The `path` attribute must specify either an executable program for which OPMN has execute permission, or a script file for which OPMN has both read and executable permission.

start

Required: false
Default: Refer to the values in the following paragraphs.
Parents: <process-type>, <process-set>
Attributes: `timeout, retry`

The `start` attribute contains the start parameters for a managed processes.

timeout="timeout"

Required: false
Default: `60`
Valid Values: An integer

The `timeout` attribute specifies the timeout value in seconds for the start of a managed process.

retry="num"

Required: false
Default: `0`
Valid Values: An integer

The `retry` attribute specifies the number of consecutive attempts that is made to start the process for a single request.

stop

Required: false
Default: Refer to the values in the following paragraphs.
Parents: <process-type>, <process-set>
Attributes: `timeout`

The `stop` attribute specifies the stop parameters for managed processes.

timeout="timeout"

Required: false
Default: `30`
Valid Values: An integer

The `timeout` value in seconds for the stopping a managed process.

restart

Required: false
Default: Refer to the values in the following paragraphs.
Parents: <process-type>, <process-set>
Attributes: `timeout, retry`

The `restart` parameters for managed processes.

timeout="timeout"

Required: false
Default: `90`
Valid Values: An integer

The `timeout` value in seconds for the restart of a managed process.

retry="num"

Required: false
Default: `0`
Valid Values: An integer

The `retry` attribute is the number of consecutive attempts that is made to restart the process for a single request.

ping

Required: false
Default: Refer to the values in the following paragraphs.
Parents: <process-type>, <process-set>
Attributes: `timeout, retry`

The `ping` element is the ping parameters for managed processes.

timeout="timeout"

Required: false
Default: `20`
Valid Values: An integer

The `timeout` value in seconds for the ping of a managed process. Each module specifies a ping timeout.

retry="num"

Required: false
Default: `0`
Valid Values: An integer

The `retry` attribute is the number of consecutive ping failures that is tolerated before the module declares the process unreachable and restarts it. Each module specifies ping retries.

interval="interval"

Required: false
Default: `20`
Valid Values: An integer

The `interval` attribute is the interval, in seconds, between each ping of a managed process.

port

Required: false
Default: none
Parents: <process-type>
Attributes: `id, range`

The `port` element provides a port management mechanism for modules to use. Each module uses the ports configured with `id`.

id="id"

Required: true
Default: none
Valid Values: A string

The `id` attribute identifies the range of ports for the `process-type`. Each module has its own list of required or optional `port` ids.

range="range"

Required: true
Default: none
Valid Values: A port range

The `port range` specifies which ports to use for the `id`.

Upon request from a module for a port number from the `id`, OPMN checks if a port in the range has been bound on the local system, and if it has not, it returns that port number back to the module. Syntax of the `port range` is a comma separated list of individual port numbers or a low-high range specification.

Examples:

Specify ports 5555, 6666, 7777, 8888, and 9999:

```
range="5555,6666,7777,8888,9999"
```

Specify ports 4000 through 4250 (inclusive):

```
range="4000-4250"
```

Specify ports 7000 through 7049, 7775, 7785, and 8050 through 8099:

```
range="7000-7049,7775,7785,8050-8099"
```

process-set

Required: false
Default: `id="component-id" numprocs="1"`
Parents: <process-type>
Attributes: `id, restart-on-death, numprocs, minprocs, maxprocs, status, working-dir, parallel-requests`

A `process-set` is the abstraction of a process within OPMN. All `module-data`, environment variables, and other configuration parameters are resolved into their final values at the `process-set` level.

If a `process-set` is not configured, then one is automatically created using the same `id` as the `ias-component` and `numprocs` of 1.

id="process-set-id"

Required: true
Default: none
Valid Values: A string

The `id` attribute uniquely identifies the `process-set` within the `process-type`.

restart-on-death="boolean"

Required: false
Default: true
Valid Values: `true` or `false`

If a managed process terminates unexpectedly, that is, not stopped by a request, then OPMN will not automatically restart it. To disable automatic restarting of terminated managed processes set the attribute to `false`.

numprocs="num"

Required: true unless `minprocs` is configured; otherwise false
Default: none
Valid Values: An integer

Specifies the number of processes for OPMN to start for the `process-set`.

minprocs="min"

Required: true unless `numprocs` is configured; otherwise false
Default: none
Valid Values: An integer

Specifies the default number of processes for OPMN to start for this process set. If `minprocs` is configured, then `maxprocs` must be set with a value greater than or equal to the value for minprocs. If minprocs and `maxprocs` are configured, a specific number of processes may be given in an OPMN request for this process set. This attribute may not be specified if `numprocs` has been configured.

maxprocs="max"

Required: true if minprocs is configured; otherwise false
Default: none
Valid Values: An integer

The `maxprocs` attribute must be specified if minprocs has been configured, but cannot be specified if numprocs has been configured.

status="state"

Required: false.
Default: `enabled`
Valid Values: `enabled` or `disabled`

A `process-set` may be `enabled`, in which case OPMN parses all of its configured attributes and elements and enables requests to operate upon it, or `disabled`, in

which case the process-set entry is complete ignored and treated as if it were not even listed in the opmn.xml file.

working-dir="path"

Required: false.
Default: *ORACLE_INSTANCE*
Valid Values: A path name

The working-dir path name specifies the working directory set for the managed processes created that belong to the process-set.

parallel-requests="boolean"

Required: false
Default: false
Valid Values: true or false

OPMN serializes requests at the process-set level, such that only one request can execute on a given process-set at a time: each subsequent request must wait until the previous request completes before it can execute. This default behavior is disabled for a process-set when parallel-requests is set to true.

> **Note:** When the parallel-requests attribute is enabled OPMN performs **no** serialization on requests for the process-set at all, which means conflicting requests may be issued and execute at virtually the same time, thus leaving processes in the process-set in unpredictable states; therefore when parallel-requests is set to true you must verify that conflicting requests are not issued at the same time for the process-set (this includes requests with implicit wild-cards for matching process-sets).

launch-targets

Required: false
Default: none
Parents: <process-manager>
Attributes: none

The launch-targets block is composed of a list of launch-target definitions. There can be only one launch-targets block.

launch-target

Required: false
Default: none
Parents: <launch-target>
Attributes: id

The definition of a process which OPMN starts via the launch request.

id="id"
Required: true
Default: none
Valid values: A string.

The identifier for this launch-target. Each launch-target must have a unique id. This identifier is specified by the target argument of the launch request.

exec

Required: true
Default: none
Parents: <launch-target>
Attributes: path
The executable path for the launch-target. Only one exec element may be configured per launch-target.

path="path"

Required: true
Default: none
Valid values: A path to an executable.
Specify the full path to the executable file.

argument

Required: false
Default: none
Parents: <launch-target>
Attributes: value

An argument always passed to the configured executable process. Multiple argument elements may be configured per launch-target, and the arguments are passed to the executable in the order in which they are configured.

Any additional arguments passed in via the launch request are passed in after the configured arguments.

value="argument"

Required: true
Default: none
Valid values: A string.

Specify a single argument for the executable; spaces are not argument delimeters-use multiple argument elements to define multiple arguments.

timeout

Required: false
Default: 120
Parents: <launch-target>
Attributes: value

The timeout used for each io made from the launch request thread. Only one timeout element may be configured per launch-target.

value="seconds"

Required: true
Default: none
Valid values: An integer value between 5 and 3600.

The io timeout value in seconds.

max-concurrency

Required: false
Default: 5
Parents: launch-target
Attributes: value

The maximum number of concurrent processes for this launch-target. Only one max-concurrency element may be configured per launch-target.

value="maximum"

Required: true
Default: none
Valid values: An integer value between 1 and 250.

The maximum number of concurrent processes for this launch-target.

A

Configuring Custom Process

This chapter describes custom process configuration in the OPMN `opmn.xml` file.

It features the following topics:

- Custom Process Module Configuration
- Custom Process Minimum Configuration
- Custom Process Complete Configuration
- Custom Process Attribute Descriptions

A.1 Custom Process Module Configuration

The following lines load and identify the custom process module. Management of custom processes by the process module are identified by the `module id`.

```
<module path="ORACLE_HOME/opmn/lib/libopmncustom.so">
   <module-id id="CUSTOM" />
</module>
```

A.2 Custom Process Minimum Configuration

The following lines represent the minimum configuration for a custom process. Default values are assigned to all other configuration elements and attributes for the custom process.

```
<ias-component id="Custom">
   <process-type id="Custom" module-id="CUSTOM">
   <process-set id="Custom" numprocs="1">
      <module-data>
         <category id="start-parameters">
            <data id="start-executable" value="Your start executable here" />
         </category>
      </module-data>
   </process-set>
   </process-type>
</ias-component>
```

A.3 Custom Process Complete Configuration

Example A–1 show a complete configuration for a custom process. It contains all possible configuration elements and attributes for a custom process.

A custom process can be part of any other system component. In such cases, the `process-type` element in Example A–1 must be part of the component configuration.

A.3.1 Ping

The custom module provides the framework for pinging a custom process in one of two ways:

- HTTP ping
- script ping

The type of ping can be configured by specifying the appropriate data in the `ping-parameters` category. The sample configuration example Example A–1 shows a custom process using HTTP ping. Example A–1 is an example of script ping that you can substitute into the component configuration.

Example A–1 Custom Process Complete Configuration

```
<ias-component id="Custom" status="enabled" id-matching="false">
   <environment>
      <variable id="TEST_ENV_VARIABLE" value="/your/test/value"
      append="false"/>
   </environment>
   <process-type id="Custom" module-id="CUSTOM">
   <process-set id="Custom" restart-on-death="true" numprocs="1">
      <module-data>
         <category id="start-parameters">
            <data id="start-executable" value="Your start executable here" />
            <data id="start-args" value="Your start args here" />
            <data id="append-req-args" value="Arguments appended to the end of the
             start command"/>
            <data id="java-proc" value="true"/>
         </category>
         <category id="stop-parameters">
            <data id="stop-executable" value="Your stop executable here" />
            <data id="stop-args" value="Your stop args here" />
            <data id="append-req-args" value="Arguments appended to the end of the
             stop command"/>
         </category>
         <category id="restart-parameters">
            <data id="restart-executable" value="Your restart executable here"/>
            <data id="restart-args" value="Your restart args here" />
            <data id="append-req-args" value="Arguments appended to the end of the
             restart command"/>
         </category>
         <category id="ping-parameters">
            <data id="ping-type" value="http" />
            <data id="ping-url" value="/your/ping/url" />
            <data id="ping-host" value="abc.company.com" />
            <data id="ping-port" value="7777" />
            <data id="ping-limit" value="3" />
            <data id="ping-timeout" value="300" />
         </category>
         <category id="ready-parameters">
            <data id="use-ping-for-ready" value="false" />
         </category>
      </module-data>
   </process-set>
   </process-type>
```

```
</ias-component>
```

Pinging with a script can be configured as shown in Example A–2.

Example A–2 Ping Type Script

```
<category id="ping-parameters">
   <data id="ping-type" value="script" />
   <data id="script-executable" value="Ping executable here" />
   <data id="script-args" value="Ping arguments here " />
</category>
```

You can use pinging (when available) for determining the readiness of a process. This indicates that OPMN needs confirmation that a managed process has started successfully after creation. Processes can inform OPMN of their ready status in various ways. The custom module enables these processes to communicate readiness through pinging. If you configure pinging for a custom process, you can also use this mechanism to determine if the process is ready. You can choose not to configure any mechanism for determining readiness in which case the custom module just assumes that the process started successfully.

Note: The ready ping, if configured, is created soon after the process is created. If the process takes a while to initialize and respond to pings, then using pinging for determining readiness is not appropriate. This is because if the process does not respond to the "ready ping", OPMN determines that the process did not start correctly and stop it.

A.4 Custom Process Attribute Descriptions

This section describes the attributes that are specific for a custom process. This section also provides attribute descriptions of the attributes.

The custom process attributes are described with the following format:

- **Title**: This is the attribute name and value being defined. For example, **id="Custom"**.
- **Required**: This field defines whether or not the attribute is required in the component definition.
- **Default**: This defines the default value assigned to the attribute. The default value appears in the installed version of the `opmn.xml` file or is assigned internally if the attribute is not present.
- **Valid values:** If applicable, this field defines the valid values for the attribute. For example, `custom`.
- **Path**: This field defines in which elements the attribute can appear. For example, `ias-component`.

id="Custom"

Required: true
Default: none
Valid values: Any `id` of your choice
Path: `ias-component`
Path: `ias-component/process-type`
Path: `ias-component/process-type/process-set`

This `id` is required and can be any name you choose. The `id` cannot be a duplicate of existing names.

module-id="CUSTOM"

Required: true
Default: none
Valid values: The same as the `module-id` specified in Appendix A for configuring a custom process.
Path: `ias-component/process-type`

The `module-id` associates the process with a module. For Custom processes, this `id` has to match the `module-id` specified in Process Module Configuration for the Custom module.

id="start-parameters"

Required: true
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

The `start-parameters` category contains child elements specifying the start executable and start arguments.

id="java-proc"

Required: false
Default: false
Valid values: true or false
Path:
`ias-component/process-type/process-set/module-data/category/data`

This data element specifies if the process is a Java process. If set to true, OPMN adds the default managed process system properties to the `start-args`.

id="start-executable"

Required: true
Default: none
Valid values: a valid executable to run
Path:
`ias-component/process-type/process-set/module-data/category/data`

This data element specifies the name of the executable to be started.

id="start-args"

Required: false
Default: none
Valid values: Valid arguments to the executable specified by start-executable data element.
Path:
`ias-component/process-type/process-set/module-data/category/data`

The value of this data element should be a string containing all the arguments for the start executable. Multiple data elements with this `id` should not be specified.

id="append-req-args"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

The value of `append-req-args` is appended to the end of the constructed start command.

id="stop-parameters"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

The `stop-parameters` category contains child elements specifying the stop executable and stop arguments. If this category is not configured, OPMN stops the process with the kill command.

id="stop-executable"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category/data`

This data element specifies the name of the executable to be used for stopping the process.

If custom process is a C or Java process that uses the OPMN Integrator API to stop the process, then set `stop-executable` to `integrator`.

id="stop-args"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category/data`

The value of this data element should be a string containing all the arguments to the stop executable. Multiple data elements with this `id` should not be specified.

id="restart-parameters"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

The `restart-parameters` category contains child elements specifying the restart executable and restart arguments. This category needs to be configured if the process

has an explicit restart command. In the absence of a restart command, a stop followed by the start command executes whenever the process needs to be restarted.

When restart data is specified, OPMN assumes that the process ID of the process remains the same after a restart. If there is no explicit restart command available for the process, a stop followed by a start is issued. In this scenario, a process ID change is acceptable.

If custom process is a C or Java process that uses the OPMN Integrator API to stop the process, then set `restart-executable` to `integrator`.

id="restart-executable"

Required: false
Default: none
Valid values: A valid restart executable name
Path:
`ias-component/process-type/process-set/module-data/category/data`

This data element specifies the name of the executable to be used for restarting the process.

If custom process is a C or Java process that uses the OPMN Integrator API to stop the process, then set `stop-executable` to `integrator`.

id="restart-args"

Required: false
Default: none
Valid values: valid arguments to the restart executable
Path:
`ias-component/process-type/process-set/module-data/category/data`

The value of this data element should be a string containing all the arguments to the restart executable. Multiple data elements with this `id` should not be specified.

id="append-req-args"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

The value of `append-req-args` is appended to the end of the constructed restart command.

id="ping-parameters"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

Custom processes that are pinged through the HTTP protocol must specify this category. This `module data` category consists of all the data required to perform such a ping.

id="ping-type"

Required: false
Default: none
Valid values: `http`, `script`, `integrator`
Path:
`ias-component/process-type/process-set/module-data/category/data`

Custom processes that wish to be pinged have to specify this `module data`.

If custom process is a C or Java process that uses the OPMN Integrator API to ping the process, then set `ping-type` to `integrator`.

See Also:

- Example A–1 for information about complete custom process configuration
- Example A–2 for information about the ping type script

id="ping-url"

Required: false
Default: /
Valid values: Any valid URL
Path:
`ias-component/process-type/process-set/module-data/category/data`

This data element is used to specify the URL at which the process is pinged. The listed parameters are used for HTTP pings.

id="ping-host"

Required: false
Default: none
Valid values: A valid hostname to which a custom process is bound.
Path:
`ias-component/process-type/process-set/module-data/category/data`

This data element is used to specify the host name to which a custom process is bound. If this data is not specified, pinging is not performed. If an invalid hostname is specified, the `process-set` is `disabled`.

id="ping-port"

Required: false
Default: none
Valid values: A valid port at which a custom process is listening for HTTP requests
Path:
`ias-component/process-type/process-set/module-data/category/data`

The port at which a custom process is listening. If this data is not specified, pinging is not performed. If an invalid port is specified, the `process-set` is `disabled`.

id="ping-limit"

Required: false
Default: `3`
Valid values: Any reasonable value that reflects the tolerance that OPMN should have for failed pings. This tolerance is used by OPMN to determine when the process should be declared unresponsive and restarted.
Path: `ias-component/process-type/process-set/module-data/category/data`

This `module data` element defines the tolerance for failed pings. After the number of ping failures reaches this limit, the process is deemed unresponsive and restarted by OPMN.

id="ping-timeout"

Required: false
Default: `300 seconds`
Valid values: Any reasonable timeout value
Path: `ias-component/process-type/process-set/module-data/category/data`

The timeout value specified with this data element is used as the maximum time OPMN waits for a ping response. If a response is not obtained within the timeout period, the ping attempt is considered a failure.

id="script-executable"

Required: false
Default: none
Valid values: A valid script executable
Path: `ias-component/process-type/process-set/module-data/category/data`

This data element specifies the name of the executable to be used for pinging the process. An exit value of 0 from this executable is considered success. All other values indicate a ping failure.

id="script-args"

Required: false
Default: none
Valid values: valid arguments to the ping executable
Path: `ias-component/process-type/process-set/module-data/category/data`

The value of this data element should be a string containing all the arguments to the ping executable. Multiple data elements with this id should not be specified.

id="ready-parameters"

Required: false
Default: none
Path: `ias-component/process-type/process-set/module-data/category`

The `module data` category to indicate if pinging should be used to determine that a custom process started successfully.

id="use-ping-for-ready"

Required: false
Default: false
Valid values: `true` or `false`
Path: `ias-component/process-type/process-set/module-data/category/data`

The value of this data element determines if pinging should be used to determine if a process is available.

B

OPMN Troubleshooting

This chapter describes some troubleshooting tips for OPMN. It features the following topics:

- Problems and Solutions
- Diagnosing OPMN Problems
- Need More Help?

B.1 Problems and Solutions

This section describes some of the common problems encountered when using OPMN. It features the following topics:

- System Process Does Not Start
- Determining if System Processes are Dying or Unresponsive
- opmnctl Command Execution Times Out
- System Component Automatically Restarted by OPMN
- Unexpected opmnctl start Behavior
- Disabled Element in the opmn.xml File
- Unable to Start OHS
- Unable to Stop Component
- globalInitNLS Error
- OPMN Start Up Consumes CPU Processing Capability
- Error Messages During Start-up of OPMN
- Increasing Size of opmn.log File
- Cleanup of Oracle Instance or Component If It is in a Bad State

B.1.1 System Process Does Not Start

Problem

Unable to start a system process using OPMN.

Solution

Try the following if you are unable to start a system process using OPMN:

- Verify and if necessary, correct, the command input. Confirm the spelling and choice of option for the command you are entering.

  Note: Do not use command line scripts or utilities from previous versions of Oracle Application Server or Oracle Fusion Middleware for starting OPMN or system components.

- Most managed processes now have their own log directory, and OPMN uses that if it is present as the location for the process log file.

  `ORACLE_INSTANCE/diagnostic/logs/<type>/<ias-component>/`

  If the default directory for a managed process does not exist, OPMN places the console log in its own log directory:

  `ORACLE_INSTANCE/diagnostics/logs/OPMN/opmn/`

  For example, the standard output log for Oracle HTTP Server may be `ORACLE_INSTANCE/diagnostics/logs/OHS/ohs1/console~OHS~1.log`

- Verify the dependency requirements for the system process you are attempting to start.
- Verify the element values for the system component in the `opmn.xml` file. Use the `opmnctl validate` command to verify configuration of `opmn.xml` file. You may have mis-configured the `opmn.xml` for the system component you are attempting to start.

B.1.2 Determining if System Processes are Dying or Unresponsive

Problem

Your system processes are dying or unreachable.

Solution

If your system processes are dying or unreachable:

- Review the system component specific output in the *ORACLE_INSTANCE*`/diagnostics/logs/OPMN/opmn`.

  Look at the *ORACLE_INSTANCE*`/diagnostics/logs/OPMN/opmn/opmn.log` for system processes. Look for `process crashed` or `process unreachable` messages. OPMN automatically restarts system processes that die or become unresponsive.

  See Also: Section B.2.1 for more information about OPMN log files

- Create event scripts for any pre-stop or post-crash events. The event scripts could be used to create a specific log file or send you an email about a failure.

  See Also: Section B.2.4 for information about troubleshooting with event scripts

B.1.3 opmnctl Command Execution Times Out

Problem

The time it takes to execute an `opmnctl` command is dependent on the type of system process and available computer hardware. Because of this the time it takes to execute an `opmnctl` command may not be readily apparent.

Solution

To verify successful execution of the `opmnctl` command, try the following:

1. Increase the `start` element `timeout` attribute for the component that is not starting. Set the timeout in the `opmn.xml` file at a level that allows OPMN to wait for process to come up. This functionality is available with the `startproc` command which starts all the relevant processes configured in the `opmn.xml` file.
2. Check the `start` element in the `opmn.xml` file and change the `retry` attribute to a higher increment of time.
3. Look at the *`ORACLE_INSTANCE`*`/diagnostics/logs/` for the system process that is not starting.
4. Review the component-specific log file for the system component that is not starting. For example, *`ORACLE_INSTANCE`*`/diagnostics/logs/OHS/ohs1/console~OHS~1.log`.

> **See Also:** Chapter 6 for more information about the common configuration of the `opmn.xml` file

B.1.4 System Component Automatically Restarted by OPMN

Problem

A system component is automatically restarted by OPMN.

Solution

If a system component is automatically restarted by OPMN, try the following:

- Review the message for the system component in the *`ORACLE_INSTANCE`*`/diagnostics/logs/OPMN/opmn/opmn.log` file.
- Verify that the ping timeout for the system component is sufficient. A system component that receives a lot of activity may require an increase in the length of time for the timeout. Increase the ping timeout element in the system component `opmn.xml` file.

B.1.5 Unexpected opmnctl start Behavior

Problem

Occasionally, there is unexpected behavior when you use the `opmnctl start` command to start OPMN; either only OPMN is started or OPMN makes a best effort to start system processes. Typically, this unexpected behavior is due to turning-off or rebooting your computer without first shutting down OPMN. When you restart your computer, all system component processes are started.

Solution

Oracle recommends that you shutdown OPMN before shutting down your computer. Use the `opmnctl stopall` command to stop OPMN and system component processes.

On the Microsoft Windows operating system, you can use the Windows services control panel to stop OPMN and system components.

Note: OPMN keeps a record on disk of the expected status of the processes it manages. If a computer goes down while OPMN is running, upon restart OPMN uses the information cached on disk and make a best effort attempt to automatically restart all processes that were running at the time the system went down. This may catch some users off guard who start only OPMN and notice that processes managed by OPMN have also been started even though an explicit request to start those processes has not been issued.

You can suppress this automatic process recovery by setting the following attribute for the `process-manager` element in the `opmn.xml` file:

```
restore-procs-on-reboot="true"
```

B.1.6 Disabled Element in the opmn.xml File

Problem

Unable to start an system process.

Solution

If you are unable to start an system process, check if an element in the system `opmn.xml` file is `disabled`. If an element in the `opmn.xml` file is `disabled` OPMN generates an output message of `"Missing"` or `"Disabled"`.

B.1.7 Unable to Start OHS

Problem

If you have multiple Oracle Fusion Middleware installations on one host and you start them at the same time (for example, to start a farm), OPMN may become unresponsive. You may receive an error message such as:

```
"failed to restart a managed process after the maximum retry limit"
```

This may occur when two Oracle instances on the same host use the same ports. An OHS component in one Oracle instances is trying to use the same port as an OHS component in a different Oracle instance. When two OPMN processes on a host start at the same time, there is no coordination between them on port usage.

Port allocation for all OHS instances within Oracle Fusion Middleware is controlled by OPMN; there can be overlapping port ranges within a single `opmn.xml` file. However, when two OPMN processes on a host start at the same time, there is no coordination between them on port usage.

Solution

Make sure the ports assigned to OHS in each Oracle instance are unique and not used by any other process on the computer.

It is also recommended that you increase the maximum number of retries for starting Oracle instances. If you have identical port ranges in two Oracle homes and increase the number of times OPMN attempts to restart a process, OPMN eventually selects a port that works. This technique ultimately does not eliminate the problem, because there is the possibility that OPMN will not find a port that works in the number of port connection attempts that you have specified in the opmn.xml file.

B.1.8 Unable to Stop Component

Problem

If you are unable to stop system components using the `opmnctl stop` or `opmnctl stopall` commands, the component or process was most likely not started using OPMN. The component or process might have been started using a startup script or utility.

Solution

System components should never be started or stopped manually. Do not use command line scripts or utilities from previous versions of Oracle Application Server or Oracle Fusion Middleware for starting and stopping system components.

Use the Fusion Middleware Control Console and the `opmnctl` command line utility to start or stop system components.

See Also: Chapter 5 for OPMN command-line examples

B.1.9 globalInitNLS Error

Problem

You may receive a `globalInitNLS` error when executing the `opmnctl` command. The following error message is displayed:

```
"globalInitNLS: NLS boot file not found or invalid -- default linked-in boot block
used XML parser init: error 201."
```

Solution

This error occurs when the `ORA_NLS33` environmental variable is set. This environmental variable should not be set.

B.1.10 OPMN Start Up Consumes CPU Processing Capability

Problem

On some computers, when OPMN starts up, it consumes large amounts of CPU processing capability. This can vary from approximately 50% to 60% of your computer's CPU processing capabilities. In affected computers, the OPMN CPU processing consumption continues until OPMN is shutdown.

Solution

One of the possible cause for the excessive CPU processing consumption is the installation environment used multibyte text character sets such as Japanese.

B.1.11 Error Messages During Start-up of OPMN

Problem

When trying to start OPMN using the `opmnctl start` or `opmnctl startall` commands you receive the following error messages:

```
pingwait exits with 1220384
```

or

```
pingwait exits with 1220396
```

These error messages are generated when there are syntax errors in the *ORACLE_INSTANCE*`/config/OPMN/opmn/opmn.xml` that need to be corrected.

Solution

If you encounter these error messages do the following:

- run the following command (with the complete directory path to the `opmn.xml` file):

  ```
  opmnctl validate opmn.xml
  ```

- remove all empty tags from the `opmn.xml` file.

B.1.12 Increasing Size of opmn.log File

Problem

If you install Oracle Fusion Middleware on a computer that contains a previous installation of the Oracle Database or Oracle Fusion Middleware, the *ORACLE_INSTANCE*`/diagnostics/logs/OPMN/opmn/opmn.log` file increases in size to over 4100000 KB due to continuous logging. The file may contain the following error message:

```
"[ons-connect] Local connection 127.0.0.1,6100 invalid form factor "
```

Solution

Change the request port for the `opmn.xml` file to a value greater than the 6100. For example:

```
<port local ="6202" remote="6302" request="6105"/>
```

This error is most often caused by a conflict with a previous Oracle Database or Oracle Fusion Middleware installation on the same computer. The above occurs due to entries in the `oraInventory` directory of an existing or previous installation of Oracle Database or Oracle Fusion Middleware.

B.1.13 Cleanup of Oracle Instance or Component If It is in a Bad State

Problem

Your Oracle instance or component is providing some incorrect defaults for your `opmnctl` commands.

Solution

Use the `opmnctl deleteinstance` command with the `-force` true option to clean up the Oracle instance or component.

For example:

```
opmnctl deleteinstance -oracleInstance /scratch/bsong/demo1/inst1 -instanceName
inst1 \ -adminHost myhost -adminPort myport -force true
```

Use discretion when utilizing the `-force` option. When you use this option with the `opmnctl deleteinstance` command a number of safeguards that protect the integrity of the Oracle instance or component are overruled. Misuse of this option may produce undesirable results.

Explicitly listing all applicable arguments (for example, `oracleInstance`, `instanceName`, `adminHost`, and `adminPort`) with the `opmnctl deleteinstance` command can help attain the desired results.

During the course of executing cleanup, a forced command displays warnings or exceptions consistent with the damaged state of the Oracle instance or component. These warning are provided as visual feedback for the inconsistencies encountered and do not necessarily indicate that further corrective action is needed.

B.2 Diagnosing OPMN Problems

There are several methods for troubleshooting any problems you may have using OPMN:

- OPMN log Files
- opmnctl debug
- Oracle Enterprise Manager Fusion Middleware Control Console
- Troubleshooting with Event Scripts
- opmn.xml Environment Variables

B.2.1 OPMN log Files

The OPMN log files enable you to troubleshoot difficulties you might have in execution and use of OPMN and system component processes. OPMN and system component processes generate log files during processing. You can review the following generated log files to verify successful or unsuccessful execution of an OPMN command:

- *`ORACLE_INSTANCE`*`/diagnostics/OPMN/opmn/opmn.out`: contains the standard output (`stdout`) and standard error (`stderr`) logs of OPMN. Also referred to as the OPMN "console log". After a certain point in OPMN initialization, nothing else is written to this file. Only a small set of messages ever appears in this file; therefore, this file may not be present if you conduct a search through the log file directories.

- *ORACLE_INSTANCE*/opmn/logs/opmn.log: tracks command execution and operation progress. It contains messages useful for monitoring the operations of the OPMN server. Output written to the opmn.log file contains the exit status of a child OPMN process. A status code of 4 indicates a normal reload of OPMN. All other status codes indicate an abnormal termination of the child OPMN process. The opmn.log file is configured using the <log> attribute in the opmn.xml file. Refer to Chapter 6 for more information about the common configuration of the opmn.xml file.
- *ORACLE_INSTANCE*/diagnostics/logs/OPMN/opmn/debug.log: contains OPMN debug log messages (English only) for ONS and PM. Review the error codes and messages that are shown in the debug.log file. The PM portion of OPMN generates and outputs the error messages in this file. The debug.log file tracks command execution and operation progress. The level of detail that gets logged in the debug.log can be modified by configuration of the <debug> element in the opmn.xml file.

  Refer to Chapter 6 for examples of debug levels.

  Use the debug.log file to debug the ONS portion of OPMN or for early OPMN errors. The ONS portion of OPMN is initialized before PM. Therefore, errors that occur early in OPMN initialization shows up in the debug.log file.

  Enable usage of the debug.log file only after conferring with Oracle Support. The debug.log file is used by Oracle Support to debug and diagnose OPMN issues. Messages that are contained in the debug.log file are typically not readily comprehensible to the user.

B.2.1.1 opmn.log and debug.log File Rotation

OPMN enables you to rotate the opmn.log and debug.log files based on parameters of file size, specific time, or both, as a basis for file rotation. You can enable rotation by configuring the rotation-size and rotation-hour attributes of the <log> and <debug> tags in the opmn.xml file. When either the log file grows to a specified size or the specified time of the day is reached, or a combination of both parameters, the OPMN logging mechanism closes the file, rename the file with a unique time stamp suffix, and then create a new opmn.log or debug.log file.

The OPMN console log file (opmn.out) is not rotated; this file is typically very small in size. Once OPMN surpasses an point of initialization, output is no longer generated to the console output file; therefore, only a relatively small set of messages appears in this file.

B.2.1.2 Process Console log File Rotation

At process startup, before handing off an existing console log file to a managed process, OPMN checks the size against a configured limit (rotation-size attribute of the <log> tag). If the file size exceeds the limit, OPMN renames the existing file to include a time stamp, and then create a new file for the managed process. If the rotation-size attribute is not configured, OPMN is not able rotate the process console log file.

B.2.2 opmnctl debug

Use the opmnctl debug command to verify the status of an system process and whether any actions are pending. This command generates output that can be used in conjunction with contact to your local Oracle support to diagnose your OPMN problem.

The syntax for the `opmnctl debug` command is:

```
opmnctl debug [comp=pm|ons] [interval=<secs> count=<num>]
```

Output is generated following execution of the `opmnctl debug` command. Oracle recommends that you contact Oracle support to use the generated output to assist in diagnosis of your problem.

The attributes (`<attr>`) name for this command are either `comp`, `interval`, or `count`. The value for comp can be either `ons` or `pm`, representing ONS and PM, respectively. If `comp` is not specified, then both `ons` and `pm` debug information is reported. For example, the following command outputs debug information for ONS.

```
opmnctl debug comp=ons
```

You can specify the interval in seconds and number of requests sent to OPMN to assist in the debugging process. The values of <interval> and <count> must always be specified together. Values for them should be integers greater than 0. For example, the following command, outputs debug information at an interval of 5 seconds 3 times.

```
opmnctl debug comp=pm interval=5 count=3
```

Contact your local Oracle support to assist you in using the `opmnctl debug` command to diagnose your OPMN problem.

B.2.3 Oracle Enterprise Manager Fusion Middleware Control Console

Fusion Middleware Control Console provides a graphical interface that enables diagnosis of system components in your network and enterprise. Fusion Middleware Control Console features a log page. The log page enables you to view all of the system log files in one place and trace problems across multiple log files. Fusion Middleware Control Console uses an API that contacts OPMN.

See Also: *Oracle Fusion Middleware Administrator's Guide*

B.2.4 Troubleshooting with Event Scripts

You can create your own event scripts that record system process event activities. You can create a script that records events prior to the start or stop of system processes, as well as an unscheduled system crash.

Refer to the event-scripts element description in Chapter 6.

Example B–1 shows a pre-start event script.

Example B–1 Pre-start Event Script

```
#!/bin/sh
echo
echo =------==========----------=-----=----------==========---=
echo =------========== PRE-START EVENT SCRIPT ==========---=
echo =------==========----------=-----=----------==========---=

timeStamp="N/A"
instanceName="N/A"
componentId="N/A"
processType="N/A"
processSet="N/A"
processIndex="N/A"
stderrPath="N/A"  # not available w/pre-start unless part of restart
stdoutPath="N/A"  # not available w/pre-start unless part of restart
```

```
reason="N/A"
pid="N/A"         # only available with pre-stop, post-crash
startTime="N/A"   # only available with pre-stop, post-crash

while [ $# -gt 0 ]; do
     case $1 in
        -timeStamp)    timeStamp=$2; shift;;
        -instanceName) instanceName=$2; shift;;
        -componentId)  componentId=$2; shift;;
        -processType)  processType=$2; shift;;
        -processSet)   processSet=$2; shift;;
        -processIndex) processIndex=$2; shift;;
        -stderr)       stderrPath=$2; shift;;
        -stdout)       stdoutPath=$2; shift;;
        -reason)       reason=$2; shift;;
        -pid)          pid=$2; shift;;
        -startTime)    startTime=$2; shift;;
        *) echo "Option Not Recognized: [$1]"; shift;;
        esac
        shift
done

echo timeStamp=$timeStamp
echo instanceName=$instanceName
echo componentId=$componentId
echo processType=$processType
echo processSet=$processSet
echo processIndex=$processIndex
echo stderr=$stderrPath
echo stdout=$stdoutPath
echo reason=$reason
echo pid=$pid
echo startTime=$startTime
```

Note: The pre-start event script example, Example B–1, will not work for the Microsoft Windows operating system; however, you can create a script, with a `.bat` suffix, with similar functionality.

Use the full path to the `.bat` file when adding the necessary configuration information to the `opmn.xml` file,.

B.2.5 opmn.xml Environment Variables

The environment variable used to launch OPMN server is not inherited by the system process started by OPMN server. OPMN sets the environment variables at the `ias-instance` level, with the values extracted either from the `ias-instance` configuration or from the OPMN run time environment.

> **See Also:** Chapter 6 for more information about the common configuration of the `opmn.xml` file

B.3 Need More Help?

You can find more solutions on Oracle *MetaLink* (`http://metalink.oracle.com`). If you do not find a solution for your problem, log a service request.

See Also:

- *Oracle Fusion Middleware Release Notes*, available on the Oracle Technology Network:

  http://www.oracle.com/technology/documentation/

Index

J

L

M

N

O

P

Q

R

S

T

U

V

W