**Oracle® Communications**
**Offline Mediation Controller**

System Administrator's Guide

Release 6.0

**E28286-04**

December 2015

**ORACLE**®

Oracle Communications Offline Mediation Controller System Administrator's Guide, Release 6.0

E28286-04

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# Preface

This guide provides instructions for administrating Oracle Communications Offline Mediation Controller.

## Audience

This guide is intended for system administrators, database administrators, and developers who maintain and manage Offline Mediation Controller.

This guide assumes that you:

- Have a working knowledge of the UNIX operating system
- Understand your network configuration and the equipment from which Offline Mediation Controller collects data

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## Document Revision History

The following table lists the revision history for this book.

| Version | Date | Description |
|---|---|---|
| E28286-01 | April 2012 | Initial release. |
| E28286-02 | September 2012 | Added the "Managing Nodes Using NMShell Command-Line Components" chapter. |
| E28286-03 | May 2014 | Documentation updates for Offline Mediation Controller 6.0 Patch Set 2.<br><br>■ Updated the following section:<br><br>About Users in Offline Mediation Controller<br><br>■ Added the following sections:<br><br>Setting the Reporting Level for Logging Messages<br><br>Updating Multiple Records<br><br>Deleting Multiple Records<br><br>Working with NAR Archive Files and XML Files |
| E28286-04 | December 2015 | Updated the "Starting and Stopping Offline Mediation Controller by Using the ProcessControl Script" section. |

# 1

## Offline Mediation Controller System Administration Overview

This chapter provides an overview of Oracle Communications Offline Mediation Controller and basic administration tasks.

## About Offline Mediation Controller

Offline Mediation Controller is a mediation application designed for multi-service, IP, VoIP, and 3G wireless networks. It delivers pre-integrated mediation solutions that provide all network-to-OSS data collection, aggregation, and correlation required for billing, service-level agreement (SLA) management, and performance management.

In addition, Offline Mediation Controller:

- Enables rapid implementation with decreased cost and risk through pre-integrated solutions

- Delivers a convergent mediation solution for multi-vendor, multi-service networks

- Supports the differentiation of service offerings to attract and retain customers

- Drives information consistency across applications, ensuring that customer invoices match performance and SLA reports

- Offers scalability and reliability to prevent revenue losses caused by missing data

- Offers a Cartridge Development Kit (CDK) that enables the development of nodes to support new network elements (NEs), billing systems, and other operational support systems (OSS).

- Supports secure communication between the mediation components and role based user management.

## About the Offline Mediation Controller Architecture

Offline Mediation Controller provides a flexible and scalable architecture for the collection, aggregation, enhancement, and distribution of network data. It can accommodate multiple collection requirements and distribute the data to billing systems.

Offline Mediation Controller consists of several components that work together to process network data. Table 1–1 describes each component.

*Table 1–1    Offline Mediation Controller Components*

| Component | Description |
|---|---|
| Functional nodes | Software modules that collect and perform specific tasks on network data. The basic node types are: collection cartridge (CC), enhancement processor (EP), aggregation processor (AP), and distribution cartridge (DC). You connect a series of nodes to form a node chain. |
| Node chains | Series of functional nodes in which the output from each node (except the DC) becomes the input for another node. |
| Mediation hosts | Servers on which the functional nodes run. |
| Node manager | Background process that manages the nodes on the mediation host. |
| Local data manager | Background process that moves data between processing nodes on the same mediation host. |
| Remote data manager | Background process that moves data from a functional node on one mediation host to a functional node on another mediation host. |
| Administration client | GUI that administers the Offline Mediation Controller system. |
| Administration server | Background process that communicates between Administration Client and the functional nodes. |
| Oracle Unified Directory server | Stores user account data that Offline Mediation Controller uses to authenticate user login attempts. |
| SNMP trap host | IP host designated to receive SNMP trap messages from Offline Mediation Controller. |

Figure 1–1 shows the relationship of the Offline Mediation Controller components.

*Figure 1–1    Offline Mediation Controller System*
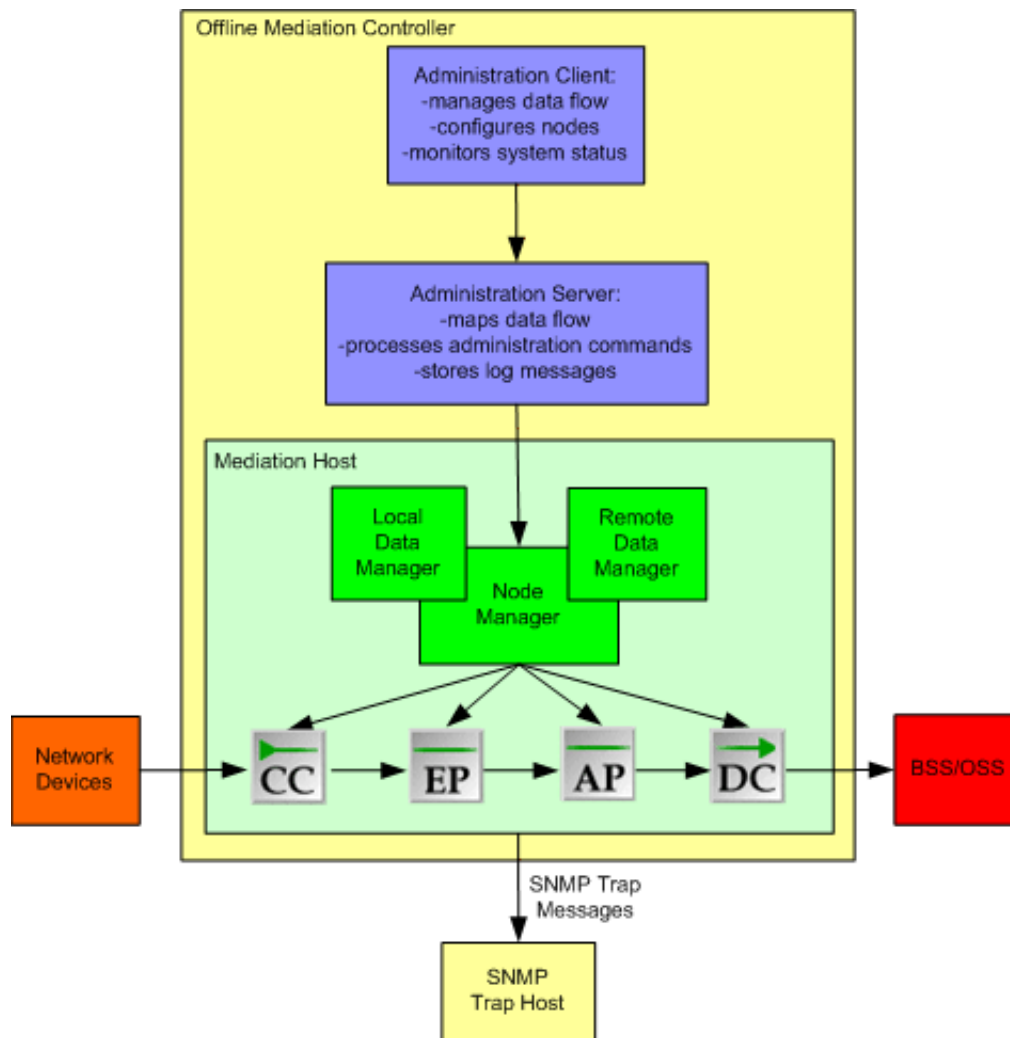


## About the Standard Offline Mediation Controller Features

Offline Mediation Controller offers the following standard features:

- **Distributed data components:** Allows components to be distributed in the network, providing greater flexibility and scalability.

- **Multiple data sources:** Allows data collection from multiple data sources of different types, located on different NEs.

- **Node-based design:** Allows simple and direct monitoring of the Offline Mediation Controller processes. The nodes are chained together so the output from one node becomes the input to another node.

- **Flexible distribution formats:** Distributes data in a wide variety of user-selected data types.

- **Network Accounting Record (NAR) distribution and routing modes:** You can achieve greater flexibility, selectivity, and load balancing by using one or more of the following distribution modes: **multicast**, **directed**, **round-robin**, and **modulus**.

- **Ability to run multiple Administration Servers:** Allows redundant control of Offline Mediation Controller systems and prevents an Administration Server from

being the single point of failure in such systems. If you use more than one Administration Server, they must run on separate mediation servers.

- **Ability to run multiple Node Managers on the same mediation server:** Allows you to manage a mediation server from different administration domains.

- **System utilization notification:** You can configure Node Manager to supervise disk and CPU usage and send warnings to Administration Client when disk utilization reaches specified thresholds.

- **File-based EP:** Finds a key attribute (or a set of key attributes) in an incoming NAR and matches this value against an entry in a simple lookup table. The EP can then retrieve any information contained in the entry and add it to the incoming NAR.

- **LDAP EP:** Accesses information from an LDAP directory and use the retrieved information to modify incoming NARs.

- **Security protected GUI access:** Access to Administration Client has two security levels based on user roles: administrator and general user. The administrator has total access on the Offline Mediation Controller system and can create general users. General users have restricted access to the Offline Mediation Controller system. See "About Users in Offline Mediation Controller" for more information.

- **FTP push/pull capabilities:** If an NE does not have the capability to send data to the Offline Mediation Controller system, many CCs are able to pull data directly from the NE. Also, if a billing system does not have the capability to fetch the output data from the Offline Mediation Controller system, many DCs are able to push their output files to the billing system.

- **Infrastructure for sharing configuration information:** A centralized shared data dictionary (a persistent storage mechanism) that contains attributes from applicable service solutions that can appear in the system, along with additional information about those attributes. The data dictionary is used as a reference tool when modifying node behavior using NPL.

> **Note:** The data dictionary is not used for the Wireless service solution.

- **Drag-and-drop GUI:** Administration Client provides a graphical display of all the nodes in the system and shows connectivity between the nodes. Administration Client also provides a window of available node types that can be used to create new nodes for various service solutions.

## About the Record Editor

The Offline Mediation Controller Record Editor allows you to edit NARs and submit them to the node chain to be processed and distributed to downstream applications.

Figure 1–2 displays the role of the Record Editor.

*Figure 1–2   Record Editor Architecture*
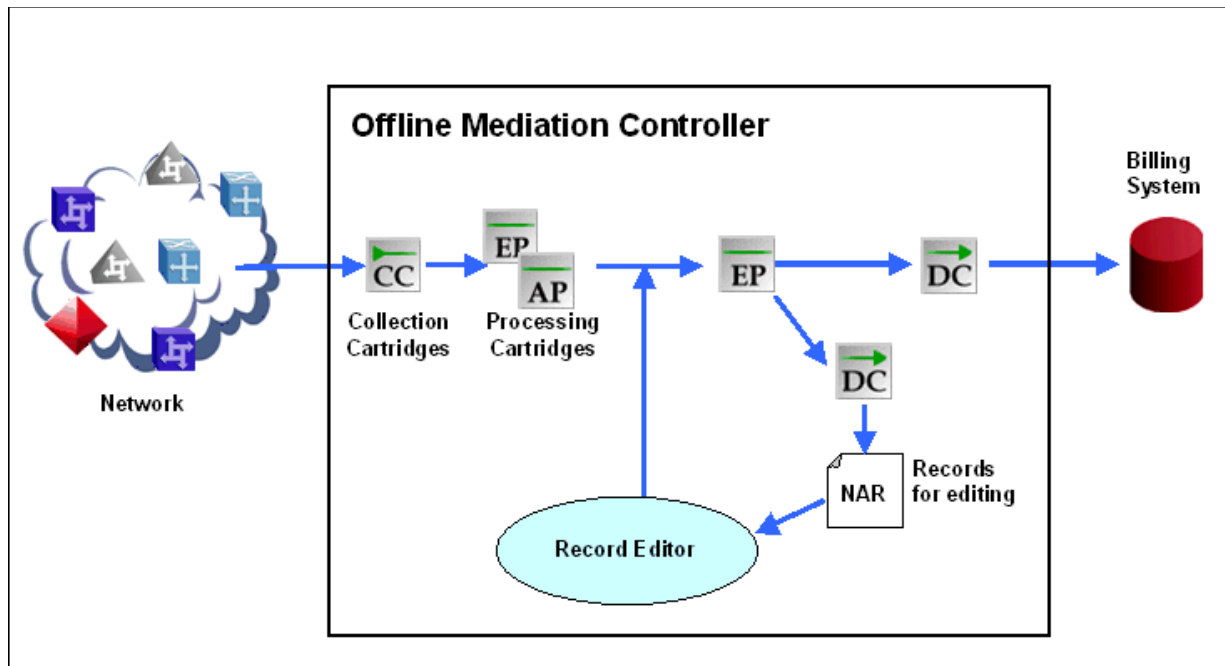


Records in Offline Mediation Controller are stored and processed in a NAR format. When processing is complete, NARs are converted to an external format and distributed to one or more downstream OSS applications, such as a Billing Centre.

## Overview of Offline Mediation Controller Administration Tasks

The Offline Mediation Controller system administrator is responsible for the day-to-day tasks of maintaining and managing Offline Mediation Controller, its users, its components, and its database.

The system administrator performs the following tasks:

- Configuring the Offline Mediation Controller system. See "Configuring Offline Mediation Controller".

- Managing Offline Mediation Controller security. See "Managing Offline Mediation Controller Security".

- Backing up and restoring data. See "Backing Up and Restoring Offline Mediation Controller".

# 2

# Configuring Offline Mediation Controller

This chapter explains how to start, stop, and monitor Oracle Communications Offline Mediation Controller components.

## Configuring the offline_mediation.conf File

To start, stop, and monitor the Offline Mediation Controller components using the **ProcessControl** script, define the components that are running, the installation they run from, and the ports and IP addresses they use in the **offline_mediation.conf** file. The **ProcessControl** script uses the information in the **offline_mediation.conf** file to start, stop, and monitor multiple servers from multiple Offline Mediation Controller installations.

To configure the **offline_mediation.conf** file:

1.  Open the *OMC_home*/**offline_mediation/offline_mediation.conf** file in a text editor, where *OMC_home* is the directory in which Offline Mediation Controller is installed.

2.  Specify the Offline Mediation Controller components to start or stop using the following syntax:

    ```
    daemon_name:OMC_home:port:[IP_Address]:{Y|N}
    ```

    where:

    -   *daemon_name* is the name for the Offline Mediation Controller component:

        -   **admnsvr** (Administration Server)

        -   **nodemgr** (Node Manager)

    -   *port* is the port on which the server component runs. The port number range is between **49152** and **65535**.

    -   *IP_Address* is the IP address for the host computer to start, stop, and monitor multiple servers from multiple Offline Mediation Controller installations.

    -   *Y/N* indicates whether this component is started when the system starts or not.

    For example:

    ```
    admnsvr:/OMC_home:55105::Y
    nodemgr:/OMC_home:55109::Y
    ```

3.  Save and close the file.

# Starting and Stopping Offline Mediation Controller

You can start and stop Offline Mediation Controller by using the following methods:

- The **ProcessControl** script. See "Starting and Stopping Offline Mediation Controller by Using the ProcessControl Script."

- The individual component commands. See:
  - Starting and Stopping Node Manager
  - Starting and Stopping Administration Server

## Starting and Stopping Offline Mediation Controller by Using the ProcessControl Script

You can start or stop Offline Mediation Controller by using the **ProcessControl** script. This script preserves the node status when you restart Node Manager.

> **Important:** Before running the **ProcessControl** script, ensure that you have run the **configure** script. For more information, see the discussion about adding Offline Mediation Controller service to system startup in *Offline Mediation Controller Installation Guide*.

To start and stop Offline Mediation Controller by using the **ProcessControl** script:

1. Go to the *OMC_home*/**bin** directory.

2. Run the following command, which starts the Offline Mediation Controller components that are defined in the **offline_mediation.conf** file on the appropriate ports:

   **./ProcessControl start**

3. Run the following command, which stops the Offline Mediation Controller components that are defined in the **offline_mediation.conf** file:

   **./ProcessControl stop**

## Starting and Stopping Node Manager

To start and stop Node Manager:

1. Go to the *OMC_home*/**bin** directory.

2. Run the following command, which starts Node Manager:

   **./nodemgr** [**-d** | **-f** | **-F** | **-j**] [**-p** *port*] [**-i** *IP_Address*]

   where:

   - **-d** runs Node Manager in the background with debug output redirected to *OMC_home*/**log/nodemgr_***port***.out**.

     This option uses a large amount of the CPU during its processes.

   - **-f** runs Node Manager in the foreground.

   - **-F** runs Node Manager in the foreground with debug output.

   - **-j** runs Node Manager, with the just-in-time (JIT) compiler enabled, in the background with debug output redirected to *OMC_home*/**log/nodemgr_***port***.out**.

- **-p** *port* runs Node Manager on *port*.

- **-i** *IP_Address* specifies the IP address of the host computer on which Node Manager is installed. Use this parameter to start Node Manager installed on multiple computers.

If you run this command with no options, Node Manager starts in the background with no debug output.

3. Run one of the following commands, which stops Node Manager:

- To shut down Node Manager:

    **./nodemgr -s** [**-p** *port*]

- To stop the Node Manager process:

    **./nodemgr -k** [**-p** *port*]

## Starting and Stopping Administration Server

To start and stop Administration Server:

1. Go to the *OMC_home*/**bin** directory.

2. Run the following command, which starts Administration Server:

    **./adminsvr** [**-d** | **-f** | **-F** | **-j**] [**-x**][**-p** *port*][**-i** *IP_Address*]

    where:

- **-d** runs Administration Server in the background with debug output redirected to *OMC_home*/**log/adminsvr_**port**.out**.

- **-f** runs Administration Server in the foreground.

- **-F** runs Administration Server in the foreground with debug output.

- **-j** runs Administration Server, with the JIT compiler enabled, in the background with debug output redirected to *OMC_home*/**log/adminsvr_** *port***.out**.

- **-x** disables user authentication.

- **-p** *port* runs Administration Server on *port*.

- **-i** *IP_Address* specifies the IP address to be used. It is used for multi-home systems.

If you run this command with no options, Administration Server starts in the background with no debug output.

3. Run one of the following commands, which stops Administration Server:

- To shut down Administration Server:

    **./adminsvr -s** [**-p** *port*]

- To stop the Administration Server process:

    **./adminsvr -k** [**-p** *port*]

## Starting Administration Client

To start Administration Client:

1. Go to the *OMC_home*/**bin** directory.

2. Run the following command:

   **./gui** [**-d** | **-f** | **-F**]

   where:

   - **-d** runs Administration Client in the background with debug output redirected to *OMC_home*/**log/gui_*port*.out**.

   - **-f** runs Administration Client in the foreground.

   - **-F** runs Administration Client in the foreground with debug output.

   If you run this command with no options, Administration Client starts in the background with no debug options.

## Running the ProcessControl Script to Monitor Offline Mediation Controller Components

You can use the **ProcessControl** script to monitor Offline Mediation Controller components to ensure they are still running and to restart the server.

To run the **ProcessControl** script to monitor Offline Mediation Controller components:

1. Stop all Offline Mediation Controller components.

2. Open the **/etc/inittab** file in a text editor.

3. Add the following entry:

   **NT:3:respawn:/etc/init.d/ProcessControl monitor**

4. Save and close the file.

5. Run the following command, which periodically monitors the status of the Offline Mediation Controller components that are defined in the **offline_mediation.conf** file:

   **./ProcessControl monitor**

## Setting System Monitoring Options

This section explains the system-monitoring options for the *OMC_home*/**config/nodemgr/nodemgr.cfg** file. If you do not modify the **nodemgr.cfg** file, Offline Mediation Controller uses the default threshold values.

You can modify **nodemgr.cfg** to manage your threshold options to monitor disk, memory, and CPU usage levels. You can set a warning threshold and an error threshold for these areas. You must decide what action to take if the thresholds are crossed.

- To monitor disk errors, see "Using the Disk Status Monitor".

- To monitor memory errors, see "Using the Memory Monitor".

- To monitor CPU usage levels, see "Using the CPU Usage Monitor".

By default, Offline Mediation Controller generates a single alarm for each error condition, even if the error condition occurs multiple times. To generate an alarm or trap for every error occurrence, open the **nodemgr.cfg** file and change the SUPPRESS_MULTIPLE_ALARMS parameter value to **No**.

## Using the Disk Status Monitor

You use the disk status monitor to alert you to potential disk issues, so you can take action to avoid unrecoverable errors.

> **Note:** The disk status monitor runs only on Solaris workstations that have the Sun Solstice DiskSuite **metastat** command installed.

Table 2–1 lists the parameters you can add or modify in the **nodemgr.cfg** file.

*Table 2–1    Disk Status Monitor Parameters*

| Parameter | Description |
| --- | --- |
| DISK_STATUS_CMD | The full path to the **metastat** command. The default is **/usr/sbin/metastat**. |
| DISK_STATUS_POLLTIME | Amount of time to wait between polling intervals. |

## Using the Memory Monitor

You use the memory monitor to alert you when memory usage exceeds a specified threshold. In addition to the threshold, you can configure the memory monitor to log memory usage statistics.

Table 2–2 lists the parameters you can add or modify in the **nodemgr.cfg** file.

*Table 2–2    Memory Monitor Parameters*

| Parameter | Description |
| --- | --- |
| LOG_MEMORY_USAGE | Set to **Y** to log memory usage statistics. The default is **N**. |
| MEMORY_MAJOR_THRESHOLD | The level at which a major alarm is raised, as a percentage. The default is **85**. |
| MEMORY_WARNING_THRESHOLD | The level at which a warning alarm is raised, as a percentage. The default is **70**. |
| MEMORY_SAMPLE_TIME | A time interval, in seconds, during which the memory usage must be above a specific threshold level before an alarm is raised. The default is **60**. |
| MEMORY_SAMPLE_FREQ | The number of polls that are taken during each sample period. The default is **4**. |

For example, using the default values for MEMORY_SAMPLE_TIME (60 seconds) and MEMORY_SAMPLE_FREQ (4), the memory usage polls would occur every 15 seconds (60 seconds divided by 4). In this case, an alarm would be generated if the memory usage level was above the specified threshold for 4 consecutive polls.

## Using the CPU Usage Monitor

The CPU usage monitor generates a critical or major alarm if the CPU usage level reaches a specified value.

Table 2–3 lists the parameters you can add or modify in the **nodemgr.cfg** file.

*Table 2–3    CPU Usage Monitor Parameters*

| Parameter | Description |
| --- | --- |
| CPU_REDTHRESHOLD | The percentage of CPU in use that will generate a critical alarm. The default is **90**. |
| CPU_ YELLOWTHRESHOLD | The percentage of CPU in use that will generate a major alarm. The default is **80**. |
| CPU_SAMPLETIME | The period, in seconds, in which to poll a fixed number of times. The default is **60**. |
| CPU_SAMPLEFREQ | How often to poll during the fixed period. The default is **3**. |

For example, using the default values for CPU_SAMPLETIME (60 seconds) and CPU_SAMPLEFREQ (3), a poll will take place every 20 seconds (60 seconds divided by 3).

# Managing Ports

Offline Mediation Controller uses specific ports to send data to and to receive data from external devices and applications. Use the port information in Table 2–4 when you are planning the network and configuring routers and firewalls that communicate between Offline Mediation Controller components.

*Table 2–4    Port Information*

| Application | Protocol | Source | Source Port | Destination | Destination Port |
| --- | --- | --- | --- | --- | --- |
| GTP | UDP | GSN | 1024 or higher | Offline Mediation Controller | 3386 |
| Open FTP and FTP | TCP | MSC, Application Server or Offline Mediation Controller | 20 or 21 | Application Server or Offline Mediation Controller | 20 or 21 |
| SNMP | UDP | Offline Mediation Controller | 161 | EMS | 162 |
| RADIUS | UDP | GSN or RADIUS Server | 1814 | Offline Mediation Controller | 1813 |
| DBSR | TCP | Offline Mediation Controller | 1521 | Oracle database | 1521 |

# Managing Mediation Host Security

By default, all Administration Servers can connect to the mediation host (also called a node manager). You can limit access to a mediation host by using its associated *OMC_ home***/config/nodemgr/nodemgr_allow.cfg** file. The file lists the IP addresses for all

Administration Servers that are allowed to connect to the mediation host. You can edit the list at any time to allow or disallow Administration Server access to the mediation host.

## Setting Up an Offline Mediation Controller Administration Server Firewall

You can set up a network firewall between the Offline Mediation Controller servers and the corporate intranet or external Internet. Administration Client can connect with and operate the Offline Mediation Controller servers through this firewall.

To set up a firewall, perform the following tasks:

- Defining Administration Server Port Number
- Defining Administration Client Port Numbers

These port numbers are defined during the installation process but can be modified to accommodate your particular firewall configuration.

## Defining Administration Server Port Number

To change the default Administration Server's port number for the firewall:

1. Stop all Offline Mediation Controller components.

2. Open the *OMC_home*/**config/adminserver/firewallportnumber.cfg** file in a text editor.

3. Change the value of the following entry:

   **AdminServer=***port*

   where *port* is the port on which Administration Server runs. The suggested port number range is between **49152** and **65535**. The default port number in the configuration file is **55110**.

4. Save and close the file.

## Defining Administration Client Port Numbers

To change the default firewall port number range values:

1. Stop all Offline Mediation Controller components.

2. Open the *OMC_home*/**config/GUI/firewallportnumber.cfg** file in a text editor.

3. Change the values of the following entries:

   **RangeFrom=***port*
   **RangeTo=***port*

   where *port* is the port on which Administration Client runs. The suggested port number range is between **49152** and **65535**. The default port number range in the configuration file is **55150** to **55199**.

4. Save and close the file.

## Configuring Node Manager Memory Limits

To configure Node Manager memory limits:

> **Note:** The performance of the system can be affected by changing these settings, which by default are optimized for most Offline Mediation Controller applications.

1. Go to the *OMC_home*/**customization** directory and verify that the **nodemgr.var** file exists. On a newly installed system, the **nodemgr.var** file may not yet exist.

   If the file does not exist, run the following command, which creates the file:

   ```
   cp OMC_home/config/nodemgr/nodemgr.var.reference OMC_
   home/customization/nodemgr.var
   ```

2. Open the **nodemgr.var** file in a text editor.

3. Specify the upper memory size by modifying the NM_MAX_MEMORY parameter. The default is 3500 megabytes.

   - The valid range for a Solaris installation is from **500** to **3500**.

   - The valid range for an Oracle/Red Hat Enterprise Linux installation is from **500** to **3500**.

4. Specify the lower memory size by modifying the NM_MIN_MEMORY parameter. The default is 1024 megabytes.

   - The valid range for a Solaris installation is from **50** to **3500**.

   - The valid range for a Oracle/Red Hat Enterprise Linux installation is from **50** to **3500**.

5. Save and close the file.

6. Restart Node Manager.

# Using Logs to Monitor Offline Mediation Controller Components

Offline Mediation Controller records system activity in log files. One log file is generated for each Offline Mediation Controller component and for each node on the mediation host. Review the log files daily to monitor your system and detect and diagnose system problems.

## Types of Log Files

Offline Mediation Controller generates log files for Offline Mediation Controller components and for the nodes you create.

### Log Files for Offline Mediation Controller Components

For Offline Mediation Controller components such as Administration Server, Node Manager, and Administration Client, log files are named *component*.**log**; for example, **nodemgr.log**, **adminserver.log**, and **GUI.log**.

### Log Files for Offline Mediation Controller Nodes on the Mediation Host

For each node on the mediation host, the log file is named *nodeID*.**log**, where *nodeID* is the unique ID that is assigned by Administration Server when you create a node on a mediation host; for example, if the unique ID of the node is **2ys4tt-16it-hslskvi1**, the log file name is **2ys4tt-16it-hslskvi1.log**.

## Location of Log Files

The following are the minimum Offline Mediation Controller log files:

- **nodemgr.log**
- **adminserver.log**
- **GUI.log**

Depending on the number of nodes you create, your installation will have one or more node log files.

### Default Log File Locations

The log files for Offline Mediation Controller components are stored in the *OMC_home*/**log**/*component* directory; for example, the Node Manager log file is in the *OMC_home*/**log/nodemgr** directory.

The log files for the nodes are stored in the *OMC_home*/**log**/*nodeID* directory; for example, if the node ID of the node is **2ys4tt-16it-hslskvi1**, the node log file is in the *OMC_home*/**log/2ys4tt-16it-hslskvi1** directory.

> **Note:** Oracle recommends that you not change the default location of the log files. If you change the location of the log files, you cannot access the log information from Administration Client.

Table 2–5 lists the components and their corresponding log file locations:

*Table 2–5    Offline Mediation Controller Components and Log File Locations*

| Component | Log File Locations |
|---|---|
| Node Manager | *OMC_home*/**log/nodemgr/nodemgr.log** |
| Administration Server | *OMC_home*/**log/adminserver/adminserver.log** |
| Administration Client | *OMC_home*/**log/gui/GUI.log** |
| Node | *OMC_home*/**log**/*nodeID*/*nodeID*.**log** |

### About the Logger Properties Files

Each Offline Mediation Controller component or node has its own logger properties file. When an Offline Mediation Controller component or a node is started for the first time, the logger properties file is dynamically created in the *OMC_home*/**config**/*component* directory. By default, the logger properties file is set to the default logging level.

Table 2–6 lists the components and their corresponding logger properties file locations:

*Table 2–6    Offline Mediation Controller Components and Logger Properties File Locations*

| Component | Logger Properties File Locations |
|---|---|
| Node Manager | *OMC_home*/**config/nodemgr/nodemgrLogger.properties** |
| Administration Server | *OMC_home*/**config/adminserver/adminserverLogger.properties** |
| Administration Client | *OMC_home*/**config/GUI/GUILogger.properties** |
| Node | *OMC_home*/**config**/*nodeID*/*nodeID***Logger.properties** |

## Setting the Reporting Level for Logging Messages

By default, Offline Mediation Controller components report information messages. You can set Offline Mediation Controller to report or to not report information messages. The following levels of reporting are supported:

- **NO** = no logging
- **WARN** = log only warning messages
- **INFO** = (default) log information messages
- **DEBUG** = log debug messages
- **ALL** = log warning, information, and debug messages

> **Important:** To avoid performance degradation, use INFO level logging for debugging.

To change the severity level for logging:

1. Open the logger properties file for the component in a text editor. See "About the Logger Properties Files".

2. Search for the following entry:

   **log4j.logger.***componentName.component***=***severity***,***component***Appender**

   where:

   - *componentName* is the name of the Offline Mediation Controller component.
   - *component* is the Offline Mediation Controller component or the node ID.
   - *severity* is the current severity level for the logging.

   For example:

   **log4j.logger.NodeManager.nodemgr=WARN,nodemgrAppender**

3. Change the entry to the desired severity level for logging.

   For example, to change the log level from WARN to INFO for Node Manager:

   **log4j.logger.NodeManager.nodemgr=INFO,nodemgrAppender**

4. Save and close the file.

> **Note:** You do not need to restart the running process to enable the changes in the logging level. A predefined delay of two minutes is set before the changed logger configuration takes effect.

# 3

# Managing Offline Mediation Controller Security

This chapter describes security fundamentals for Oracle Communications Offline Mediation Controller.

## About Offline Mediation Controller Security

Offline Mediation Controller security includes the following aspects:

- Secure communication
- User and password management
- Secure centralized storage for users and user's role information

## About Secure Communication Using Secure Sockets Layer

Secure Sockets Layer (SSL) enables secure communication between applications. SSL enables authentication, data integrity, and data encryption. It helps to secure transmitted data using encryption.

By default, Administration Client communicates with Administration Server through SSLs. Administration Server communicates with Node Manager through SSL. During authentication, Administration Server provides the information using a certificate. It also provides data integrity through an integrity check value.

### Creating Secure Connections

In Offline Mediation Controller, one-way SSL is used to create secure connections before sharing any data between the components. To use one-way SSL from a client to a server, configure identity for the server and trust store for the client. The trusted Certification authority (CA) certificates need to include the trusted CA certificate that issued the peer's identity certificate. This certificate does not necessarily have to be the root CA certificate.

In the communication between Administration Client and Administration Server, Administration Server has its own certificate in a secure keystore. This certificate will have a private and public key pair. Administration Server will share the certificate containing only the public key with all its known Administration Clients. Administration Client adds the server's certificate to its trust store, indicating that Administration Server is added to the trusted list.

In the communication between Administration Server and Node Manager, Node Manager acts as the server. Node Manager creates the key pair and store in a secure keystore. Node Manager shares its public key to the known Administration Server to

ensure a secure communication. Administration Server adds Node Manager's certificate to its trust store.

To acquire a digital certificate for your server, generate a public key, a private key, and a Certificate Signature Request (CSR), which contains your public key. You send the CSR request to a certificate authority and follow its procedures for obtaining a signed digital certificate.

After you have your private keys, digital certificates, and any additional trusted CA certificates that you may need, store the private keys and certificates in keystores.

See the discussion on creating certificates in *Offline Mediation Controller Installation Guide*.

## Enabling and Disabling SSL Mode

By default, Offline Mediation Controller runs in SSL mode, but the provision for enabling and disabling SSL communication is provided in a common configuration parameter.

> **Note:** If one of the Offline Mediation Controller components is running in SSL mode, the other components must be in SSL mode.

To enable or disable SSL mode for Offline Mediation Controller:

1.  Open the *OMC_home*/**bin/UDCEnvironment** script in a text editor, where *OMC_home* is the directory in which Offline Mediation Controller is installed.

2.  Add or modify the following entry:

    **SSL_ENABLED** = *value*

    where *value* is:

    -   **TRUE** to enable SSL mode.

    -   **FALSE** to disable SSL mode.

3.  Save and close the file.

4.  Restart Offline Mediation Controller.

## Securely Connecting Administration Server to Other Node Manager Instances

You can securely connect Administration Server to other Node Manager instances or node hosts to collect data from Node Manager instances.

To securely connect Administration Server to other Node Manager instances:

1.  Log on to the system on which Administration Server is installed.

2.  Securely copy Node Manager's **nodeManager.cer** file from the machine on which Node Manager is installed to a temporary directory.

3.  Run the following command:

    *OMC_home*/**jre/bin/keytool -import -v -trustcacerts -alias** *alias_name* **-file** *File_path* **-keystore** *OMC_home*/**config/adminserver/adminServerTruststore.jks**

    where:

   ■ *alias_name* is the name of the new keystore entry. You must specify a different alias for each Node Manager.

   ■ *File_path* is the path to the temporary directory and **nodeManager.cer** file that you securely copied.

   Administration Server's truststore password prompt appears.

4. Enter Administration Server's truststore password.

   The **Trust this certificate** prompt appears.

5. Confirm to trust the certificate.

   The certificate is successfully imported into Administration Server's truststore.

6. Restart Administration Server and Administration Client.

## Configuring Session Timeout Between Administration Server and Administration Client

The session timeout depends solely on the type of components between which the connection is established. Only the session between Administration Client and Administration Server supports session timeout after a preconfigured idle time. The session should never expire between an Administration Server and Node Manager, where user intervention is not expected.

To set the session timeout:

1. Open the *OMC_home***/web/htdocs/AdminServerImpl.properties** file in a text editor.

2. Add or modify the following entry:

   **com.nt.udc.admin.server.AdminServerImpl.timeoutVal** *value*

   where *value* specifies a timeout value in minutes. The default is **30**.

3. Save and close the file.

4. Restart Administration Server and Administration Client.

## About Users in Offline Mediation Controller

Offline Mediation Controller provides the following user roles:

   ■ Administrator

   ■ Designer

   ■ Operator

   ■ Guest

Table 3–1 lists the Offline Mediation Controller functions and user access based on the role.

*Table 3–1    Role-Based Access to Functions*

| Functions | Administrator | Designer | Operator | Guest |
|---|---|---|---|---|
| Change the node/node host configuration | Yes | Yes | No | No |
| Start or stop any node | Yes | Yes | Yes | No |
| Create or delete any node host, node chain, or individual node | Yes | Yes | No | No |

*Table 3–1   (Cont.)  Role-Based Access to Functions*

| Functions | Administrator | Designer | Operator | Guest |
|---|---|---|---|---|
| Add, change, and delete an SNMP host | Yes | Yes | No | No |
| Add, change, and delete users | Yes | No | No | No |
| Change own details | Yes | Yes | Yes | Yes |
| View alarms and alarm's level for both Node Manager and individual node | Yes | Yes | Yes | Yes |
| View the log details for messages, exceptions, etc. | Yes | Yes | Yes | Yes |
| Export configurations | Yes | Yes | No | No |
| Import configurations | Yes | Yes | No | No |
| Import customizations | Yes | Yes | No | No |
| Launch Record Editor | Yes | Yes | Yes | No |
| Manage poll list | Yes | Yes | No | No |
| Manage statistics reporting | Yes | Yes | No | No |
| View Administration Server log | Yes | Yes | Yes | Yes |
| Create or delete or edit routing between the nodes | Yes | Yes | No | No |
| Clear alarms | Yes | Yes | No | No |

> **Caution:**   When you start Administration Server with the **-x** parameter, user authentication is disabled and you cannot perform the user management operations in Administration Client.

## About Managing Users in Offline Mediation Controller

You manage Offline Mediation Controller users by using Administration Client.

### Creating Users

To create a new user:

1. Ensure that the Oracle Unified Directory server instance is running.

2. Go to the *OMC_home*/**bin** directory.

3. Run the following command:

   **./adminsvr**

   > **Note:**   Do not start Administration Server using the **-x** parameter. The **-x** parameter disables authentication and you will not be able to perform user management operations in Administration Client.

   Administration Server is started.

4. Run the following command:

   **./gui**

Administration Client is started.

5.  Log on to Administration Client as a user with administrator privileges.

> **Note:**  You can create, modify, or delete users only as the administrator user.

The Node Hosts & Nodes (logical view) screen appears.

6.  Do one of the following:

    - From the **Administrative Function** list, select **User Administration**.

    - Click the **User Administration** icon.

    The User Administration screen appears.

7.  Click **New**.

    The Add New User dialog box appears.

8.  Do the following:

    a.  In the **Name** field, enter the name for the user.

    b.  In the **User ID** field, enter the user ID.

    c.  From the **Select Role** list, select the user role.

    d.  In the **Password** field, enter the new password. See "About the Default Password Policy" for more information about the password policies.

    e.  In the **Re-type Password** field, enter the password again.

    f.  Click **Save**.

    The new user is created.

## Changing User Details

To change the user details:

1.  Ensure that the Oracle Unified Directory server instance is running.

2.  Go to the *OMC_home*/**bin** directory.

3.  Run the following command:

    ```
    ./adminsvr
    ```

> **Note:**  Do not start Administration Server using the **-x** parameter. The **-x** parameter disables authentication and you will not be able to perform user management operations in Administration Client.

Administration Server is started.

4.  Run the following command:

    ```
    ./gui
    ```

Administration Client is started.

5.  Log on to Administration Client as a user with administrator privileges.

> **Note:** You can create, modify, or delete users only as the administrator user.

The Node Hosts & Nodes (logical view) screen appears.

6. Do one of the following:

   ■ From the **Administrative Function** list, select **User Administration**.

   ■ Click the **User Administration** icon.

   The User Administration screen appears.

7. From the **User List** section, select a user, and click **Change**.

   The Modify User dialog box appears.

8. Do any of the following:

   a. To change the name of the user, in the **Name** field, enter the new name.

      > **Note:** You cannot change the user ID of the user.

   b. To change the role of the user, from the **Select Role** list, select the new user role.

   c. To change the password of the user, select the **Change Password** check box.

      In the **Password** field, enter the new password. See "About the Default Password Policy" for more information about the password policies.

      In the **Re-type Password** field, enter the new password again.

9. Click **Save**.

   The user details are changed.

## Deleting Users

To delete a user:

1. Ensure that the Oracle Unified Directory server instance is running.

2. Go to the *OMC_home*/**bin** directory.

3. Run the following command:

   **./adminsvr**

   > **Note:** Do not start Administration Server using the **-x** parameter. The **-x** parameter disables authentication and you will not be able to perform user management operations in Administration Client.

   Administration Server is started.

4. Run the following command:

   **./gui**

   Administration Client is started.

5. Log on to Administration Client as a user with administrator privileges.

> **Note:** You can create, modify, or delete users only as the administrator user.

The Node Hosts & Nodes (logical view) screen appears.

6. Do one of the following:

   ■ From the **Administrative Function** list, select **User Administration**.

   ■ Click the **User Administration** icon.

   The User Administration screen appears.

7. From the **User List** section, select a user, and click **Delete**.

   The Delete User dialog box appears.

8. Click **Yes**.

   The user is deleted.

## About Managing the Administrator User Password in Oracle Unified Directory

You can modify the administrator user password by accessing the Oracle Unified Directory server. For information regarding managing users in Oracle Unified Directory, see the Oracle Unified Directory documentation.

# Password Management

Passwords are very important for security of the system. So, the provided password should be strong and not hard-coded for users like Administrator.

By default, the password management policy is applied to users in Offline Mediation Controller. Disabling of user authentication is possible by starting Administration Server using the **-x** parameter.

## Storage of Passwords

Offline Mediation Controller stores account passwords (for administrator and general users) in encrypted form in Oracle Unified Directory.

The Offline Mediation Controller installer stores account passwords in encrypted form in Oracle Unified Directory.

By default, the passwords in Oracle Unified Directory are encrypted in the salted SHA-256 format.

## About the Default Password Policy

When you create a user account in Offline Mediation Controller, it assigns a default password policy to that user account. The default password policy includes the following rules:

■ Passwords expire automatically after 90 days.

■ The last three passwords cannot be reused during a password change.

■ The password must comply with the following standards:

- – Contain at least six characters

- – Contain at least one lowercase letter

- – Contain at least one uppercase letter

- – Contain at least one special character (for example, $)

- – Contain at least one number

■ The user is locked out for 10 minutes after three consecutive failed login attempts.

■ The user must change the password after the first successful authentication after a password is set or reset by the administrator.

## Modifying the Default Password Policies

The default password policy is assigned to user accounts during Offline Mediation Controller installation. You can modify the default password policies for the user accounts by modifying the parameters in the *OMC_home***/bin/createPasswordPolicy** file.

To modify the default password policy:

1. Ensure that the Oracle Unified Directory server instance is running.

2. Open the *OMC_home***/bin/createPasswordPolicy** file in a text editor.

3. Enter or modify the values in the parameters. See the Oracle Unified Directory documentation for information about the parameters and values in the **createPasswordPolicy** file.

4. Save and close the file.

5. Go to the *OMC_home***/bin** directory.

6. Run the following command:

   ```
   ./createPasswordPolicy -p OUD_password
   ```

   where *OUD_password* is the Oracle Unified Directory server instance administrator password.

7. Restart Administration Server and Administration Client.

# 4

# Managing Nodes Using NMShell Command-Line Components

This chapter provides an overview of managing nodes using Oracle Communications Offline Mediation Controller NMShell command-line components.

Using NMShell, you can perform the following tasks at the command line:

- Adding Mediation Hosts to Node Manager
- Exporting Node Configuration and Node Customization
- Importing Node Configuration and Node Customization
- Starting All Nodes

## Adding Mediation Hosts to Node Manager

Before you import the node configuration or customization into a mediation host, you must first add the mediation host to Node Manager.

To add a mediation host to Node Manager:

1. Start Administration Server and Node Manager daemons. See the discussion about starting component daemons in *Offline Mediation Controller Installation Guide*.

2. Go to *OMC_home*/**bin/tools**, where *OMC_home* is the directory in which Offline Mediation Controller is installed and enter the following command:

   **./NMShell**

   The prompt changes to **nmsh>**.

3. Enter the following command:

   **login** *server_hostname port*

   where:

   - *server_hostname* is the IP address or host name of the computer on which Administration Server is running.
   - *port* is the Administration Server port number.

4. When prompted, enter the user name and password.

   You are connected to Administration Server.

5. Enter the following command:

   **addhost -n** *mediation_name* **-ip** *node_mgr_hostname* **-p** *port*

where:

- *mediation_name* is the name of the mediation host you are adding to Node Manager.

- *node_mgr_hostname* is the IP address or host name of the computer on which Node Manager is running.

- *port* is the port number at which the mediation host communicates with Node Manager.

The mediation host is added to Node Manager.

# Exporting Node Configuration and Node Customization

To export the mediation host's node configuration and customization:

1. Start Administration Server and Node Manager daemons. See the discussion about starting component daemons in *Offline Mediation Controller Installation Guide*.

2. Go to *OMC_home***/bin/tools** and enter the following command:

   **./NMShell**

   The prompt changes to **nmsh>**.

3. Enter the following command:

   **login** *server_hostname port*

   where:

   - *server_hostname* is the IP address or host name of the computer on which Administration Server is running.

   - *port* is the Administration Server port number.

4. When prompted, enter the user name and password.

   You are connected to Administration Server.

5. Enter the following command:

   **export** [**-n ALL** | **-n** *mediation_name***@***host_name***:***port*] **-f** *filename* [**-c** *value*]

   where:

   - **-n ALL** specifies to export from all the mediation hosts configured in Node Manager. This is default.

     **-n** *mediation_name***@***mediation_hostname***:***port* exports the mediation host's node configuration or node customization.

     where:

     – *mediation_name* is the mediation host's name configured in Node Manager.

     – *mediation_hostname* is the mediation host's IP address or host name.

     – *port* is the port number at which the mediation host communicates with Node Manager.

     To export multiple hosts, enter the mediation hosts separated by comma (,).

   - **-f** *filename* specifies the name and path of the output files. Do not include the file extension.

- **-c** *value* specifies whether to export both the node configuration and customization or only the node configuration.

  where *value* is:

  - **Y** to export both the node configuration and node customization. Two files are generated; a *filename*.**xml** file with the node configuration and a *filename*.**nmx** file with the node customization. This is default.

  - **N** to export only the node configuration. One file is generated: a *filename*.**xml** file with the node configuration.

For example:

```
export -n linux1@10.10.10.111:55109,linux2@10.10.10.112:55110 -f export -c N
```

Only the node configuration from the mediation hosts (**linux1@10.10.10.111:55109** and **linux2@10.10.10.112:55110**) is exported to the **export.xml** file.

## Importing Node Configuration and Node Customization

To import the mediation host's node configuration and customization:

1. Start Administration Server and Node Manager daemons. See the discussion about starting component daemons in *Offline Mediation Controller Installation Guide*.

2. Go to *OMC_home*/**bin/tools** and enter the following command:

   **./NMShell**

   The prompt changes to **nmsh>**.

3. Enter the following command:

   **login** *server_hostname port*

   where:

   - *server_hostname* is the IP address or host name of the computer on which Administration Server is running.

   - *port* is the Administration Server port number.

4. When prompted, enter the user name and password.

   You are connected to Administration Server.

5. Enter the following command:

   **import -n** *mediation_name***@***mediation_hostname***:***port* **-f** *filename* **-c** *value*

   where:

   - **-n** *mediation_name***@***mediation_hostname***:***port* specifies the mediation host configured in Node Manager.

     where:

     - *mediation_name* is the mediation host's name configured in Node Manager.

     - *mediation_hostname* is the IP address or host name of the mediation host you are importing to.

     - *port* is the port number at which the mediation host you are importing to communicates with Node Manager.

The command verifies whether the mediation host exists in Node Manager. If the mediation host does not exist, the command generates an error.

- **-f** *filename* specifies the name and path of the input file. Use *filename*.**xml** file to import the node configuration and use *filename*.**nmx** file to import the node customization.

- **-c** *value* specifies whether to import the node customization or the node configuration.

  where *value* is:

  – **Y** to import only the node customization. Use this value with the *filename*.**nmx** file.

  – **N** to import only the node configuration. Use this value with the *filename*.**xml** file.

The node configuration and node customization are imported into the specified mediation host.

For example:

```
import -n linux1@10.10.10.111:55109 -f import.xml -c N
```

The node configuration is imported from the **import.xml** file into the specified mediation hosts (**linux1@10.10.10.111:55109**).

## Starting All Nodes

To start all nodes:

1. Start Administration Server and Node Manager daemons. See the discussion about starting component daemons in *Offline Mediation Controller Installation Guide*.

2. Go to *OMC_home*/**bin/tools** and enter the following command:

   **./NMShell**

   The prompt changes to **nmsh>**.

3. Enter the following command:

   **login** *server_hostname port*

   where:

   - *server_hostname* is the IP address or host name of the computer on which Administration Server is running.

   - *port* is the Administration Server port number.

4. When prompted, enter the user name and password.

   You are connected to Administration Server.

5. Enter the following command:

   **startNodes**

   All the nodes for the currently running mediation host are started.

# 5

# Backing Up and Restoring Offline Mediation Controller

This chapter describes the tasks that you perform to back up and restore Oracle Communications Offline Mediation Controller.

## About Backup and Restore Options

After installing or upgrading an Offline Mediation Controller system, perform one or both of the following backups as a safety measure:

- Standard configuration backup
- Complete system backup

Repeat the backups whenever you make incremental changes to the system configuration or rule files.

If you have not backed up the system regularly, reinstall and reconfigure a system corrupted by an operational error such as an AC power interruption or a disk full condition. Reinstalling and reconfiguring eliminates any chance of recovering and reprocessing mediation data transitioning through the system at the time of the operational error.

## About Standard Configuration Backups

The standard configuration backup captures the configuration of an entire Offline Mediation Controller host, provided that you have not made any modifications to it other than those possible through Administration Client.

Perform this backup as soon as you have configured Offline Mediation Controller, even if you have performed a complete system backup.

When you complete a standard configuration backup, you can use the backup configuration directory to restore the Offline Mediation Controller system.

You restore an Offline Mediation Controller system by replacing the damaged configuration directory with a copy of the backup configuration directory. In this circumstance, you restore the system with the same node IDs and data directory structure, and with user data retained in **input**, **output**, and **scratch** directories at the time of the operational error.

> **Note:** If you require Offline Mediation Controller technical support, email a copy of your backup configuration directory to your Oracle Global Support representative. If you want to send a copy of your configuration directory, use the UNIX **tar** command to create an archived version of that directory.

## About Complete System Backups

The complete system backup backs up the configuration of an Offline Mediation Controller host that you have modified extensively by a means other than Administration Client. For example, you may want to perform this procedure if you modified rule files and applied software patches.

Perform this backup as soon as you have configured Offline Mediation Controller. After you perform this backup, use the resulting **tar** file to fully restore your customized Offline Mediation Controller system. You can use the restoration procedure to restore an existing system or to install the same Offline Mediation Controller system configuration on another host.

For information on complete system backups, refer to your operating system documentation.

## Backing Up a Standard Configuration

To back up a standard Offline Mediation Controller system configuration:

> **Note:** This procedure backs up node chain configurations; it does not back up data.

1. Stop all functional nodes in the system:

   a. In Administration Client, select all nodes.

   b. Right-click and select **stop node(s)**.

2. Go to *OMC_home*, where *OMC_home* is the directory in which Offline Mediation Controller is installed.

3. Copy the directory configuration with a new name:

   **cp -r config** *DirectoryName*

4. Create an archive of the entire directory:

   **tar cvf** *DirectoryName***.tar** *DirectoryName*

5. Store the backup copy in a location outside of the Offline Mediation Controller system:

   **mv** *DirectoryName***.tar** *new_directory*

6. Restart the nodes:

   a. In Administration Client, select all nodes.

   b. Right-click and select **start node(s)**.

# Backing Up a Complete System

This procedure backs up node chain configurations and data in transit, but it does not back up processed data outside of the installation directory.

To back up a complete system:

1. Ensure the disk partition in which your Offline Mediation Controller system resides has more than 70 percent of its total reserved space still available.

2. Go to *OMC_home*/**bin** and run the following command, which shuts down the entire system:

   **./ProcessControl stop**

3. Create a copy of the installation directory.

   This operation may take a few minutes to finish.

4. Go to the copy of the installation directory.

5. In the copy of the installation directory, remove the **input**, **output**, and **scratch** subdirectories:

   **rm -r input output scratch**

   This prevents the restoration of old and duplicate billing records when you restore a full installation.

6. Create an archive of the duplicate installation directory.

   This operation may take a few minutes to finish.

7. Store a copy of the **tar** file image of your Offline Mediation Controller system at a different location.

8. Remove the copy of the installation directory.

9. Restart Offline Mediation Controller.

# Restoring Offline Mediation Controller

This section outlines how to restore Offline Mediation Controller for standard configuration backups and complete system backups.

> **Note:** You must shut down all Administration Clients before performing a restore operation to ensure the restored configuration is accurate. Failure to shut down Administration Clients before performing a restore operation can result in overwriting the restored configuration.

If you customized any part of Offline Mediation Controller by a means other than Administration Client and the system is corrupt, restore the system as a standard configuration. If that procedure does not restore the system, restore it as a complete system.

If the disk partition in which Offline Mediation Controller resides is full, you must create, at the same level as the existing installation directory, enough space to restore your system. The amount of space that you create depends on whether you need to save data from the **input**, **output**, and **scratch** subdirectories.

- If you do not need to save data from the **input**, **output**, and **scratch** subdirectories, create at least three times the disk space normally occupied by your archived installation directory.

- If you need to save data from the **input**, **output**, and **scratch** subdirectories, create at least three times the disk space collectively occupied by your archived installation directory plus **input**, **output**, and **scratch** subdirectories.

In the following sample system restoration, you must create space within the installation directory **/ocomc**. The archive file containing the installation directory is **ocomcbackup.tar**.

## Restoring a Standard System Configuration

To restore a standard system configuration:

1. Obtain the backup copy of your system **/config** directory.

2. If you retrieved a **tar** file copy of the backup configuration directory, extract the configuration directory.

   **tar xvf** *DirectoryName***.tar**

   The *DirectoryName* directory and structure is created.

3. Go to *OMC_home* and run the following command, which stops Offline Mediation Controller:

   **./ProcessControl stop**

4. Go to *OMC_home* and remove the damaged configuration directory:

   **rm -r config**

5. Copy the backup configuration directory into the system installation directory:

   **cp -r** *DirectoryName* **config**

6. Restart the Offline Mediation Controller system:

   **cd /***OMC_home***/bin**
   **./ProcessControl start**

## Restoring a Complete System Backup

To restore a full Offline Mediation Controller system:

1. At the command prompt, run the following command to shut down the Offline Mediation Controller system:

   **cd /***OMC_home***/bin**
   **./ProcessControl stop**

2. Retrieve the backup **tar** file of your system installation directory.

3. Extract from the **tar** file the backup copy of your installation directory:

   **tar xvf /ocomcbackup.tar**

   The command re-creates the duplicate installation directory, in this example, **/ocomctmp**.

4. To save as much data as possible from Offline Mediation Controller, go to the existing installation directory.

5. If you determine the directory is not corrupt, copy the **input**, **output**, and **scratch** subdirectories into the duplicate installation directory.

```
cp -r input /ocomctmp/
cp -r output /ocomctmp/
cp -r scratch /ocomctmp/
```

> **Note:** Duplicate records may occur because you do not know which records have already been sent to the billing system.

6. Delete or rename the corrupted installation directory.

   - To delete, run the following command:

     ```
     rm -r /ocomc
     ```

   - To rename, run the following command:

     ```
     mv /ocomc /ocomcdata
     ```

7. Rename the restored installation directory:

   ```
   mv /ocomctmp /ocomc
   ```

8. Go to **/ocomc/bin** directory and run the following command to restart the system:

   ```
   ./ProcessControl start
   ```

9. The system recreates the **input**, **output**, and **scratch** directories in your restored installation directory, unless you have already copied them over.

## Preserving Data When No Backup Exists

Oracle does not support any procedure for restoring an Offline Mediation Controller system that has not been backed up. If you have no backup and you want to save as much existing NAR data as possible, Oracle recommends the following procedure.

To preserve data:

1. Stop all functional nodes in the system:

   a. In Administration Client, select all nodes.

   b. Right-click and select **stop node(s)**.

2. Restart one node at a time, beginning with the node at the end of the corrupted chain.

   A node may be unable to read corrupt NARs from its **input** directory and may stall during restart. After you finish observing the behavior of one node, stop it and move on to the next node in the chain.

3. Run the following command:

   ```
   iostat int 1
   ```

   The output resembles the following listing:

   ```
   iostat int 1
   tty sd0 sd1 sd2 cpu
   tin tout Kps tps serv Kps tps serv Kps tps serv us sy wt id
   1 0 1 0 64 0 0 274 0 0 486 0 0 0 100
   ```

```
0 66 0 0 0 0 0 0 0 0 0 0 0 0 0 100
0 66 0 0 0 0 0 0 0 0 0 0 0 0 0 100
0 66 0 0 0 0 0 0 0 0 0 0 0 0 0 100
```

The last column on the right represents the percentage of total CPU idle time. The lower the number in this column, the more CPU time is being used to service functional nodes running in the system. When a node stalls, the CPU idles more frequently, causing the idle percentage value to rise.

4. Periodically list or monitor the number of NAR files in the node input directory by running one of the following commands:

   **ls | wc**

   While a functional node runs, it consumes at least 50 percent of the CPU idle time on a dual processor machine. If the CPU percentage idle is near 100 percent and the number of NAR files in the **input** directory is not going down, then it is possible that the NAR file currently being read by the functional node from its **input** directory is corrupt. The NAR file currently being processed is the one with the oldest time stamp in its name.

5. Stop the node and use the **rm** or **mv** command to remove the suspect NAR file from the **input** directory.

6. Restart the node.

   If the CPU idle percentage number decreases, then there is an increased level of CPU usage for node processing. If you do not observe this, then the NAR file you removed probably was not corrupt. In this case, stop the node, remove the contents of its **scratch** directory, and restart the node. The node resumes processing the NAR files from its **input** directory.

   If the node continues to stall, stop it, and remove the entire contents of its **input** directory. Restart the node and it resumes processing the NAR files from its **input** directory.

7. Repeat these actions for each node in the chain, as necessary, to identify the corrupt NAR files and to restore system operation.

Call Oracle Global Support for further assistance restoring an Offline Mediation Controller system that has not been backed up.

## Backing Up and Restoring NAR Files

If an adverse operational event, such as AC power interruption, mediation host failure, or a hardware or software error corrupts NAR data or prevents one or more processed NARs from being delivered to their destinations, you can restore and reprocess the previously backed up NAR files. You can also engage safe mode on an E250 workstation.

The NAR file backup is available for certain nodes and is enabled through the node configuration window.

During a NAR backup, the system moves each processed NAR file from the **input** directory to the backup directory of a node and changes the NAR file extension from **.arch** to **.archbkup**.

When you restore a backed-up NAR file, you change its file extension from **.archbkup** to **.arch** in the backup directory and move or copy the renamed file into the node's **input** directory. Then, the node processes the NAR file and returns it to the backup directory with the file's last-modification date or timestamp intact. The system

processes the NAR files according to their last-modification timestamp, starting with those having the earliest timestamp.

How you restore a backup file determines when the file is reprocessed by the node and the length of time that the file remains in the backup directory after reprocessing.

- If you restore a NAR file by moving it from the backup directory to the **input** directory, the file's last modification time does not change.

- If you restore a NAR file by copying it from the backup directory to the **input** directory, the system creates a new file with a modification time set to the current system time.

## Backing Up NAR Files

To restore NAR files backed up for a specific node, you must enable and configure the node's automated NAR file backup feature.

1. After you detect corrupted NAR data in the downstream mediation or OAM system, determine:

   - The time the problem began

   - The effect of the problem on your system

   - The source of the problem if possible

2. Before you restore any NAR files, identify and repair the source of the problem.

3. Clean up any suspect downstream data. You may need to delete some or all of the affected data.

4. Determine which backup NAR files need to be restored by comparing the time the problem began to the timestamp contained in the name of each backup NAR file associated with the affected node chains.

   The NAR file timestamp indicates the moment the backup file was created. The file contains data captured from that time forward, up to the configured NAR file size. Restore the sequence of backup NAR files that covers the full interval during which the problem occurred. See "Restoring Offline Mediation Controller" for more information.

## Restoring NAR Files

To restore NAR files:

1. Log on to Administration Client and determine the ID of the node with the NAR file that you want to restore.

2. Select the mediation server on which the node that you want to examine resides.

3. Select the functional node and click **Edit**.

   The Node dialog box opens displaying the node ID.

4. Stop the node.

5. Go to *OMC_home* and run the following command:

   **ls input backup**

   A list of subdirectories named for the ID of each node appears.

   For example:

   ```
   backup:
   ```

```
1hb48pz-8ha-cdyeaz08 1hb48pz-8ha-cdyex5zr 1hb48pz-8ha-cdyf91bt
1hb48pz-8ha-cdyek5tl 1hb48pz-8ha-cdyf5xxu 1hb48pz-8ha-cdyfabet
1hb48pz-8ha-cdyel3we 1hb48pz-8ha-cdyf7gvb 1hb48pz-8ha-cdynof9c
1hb48pz-8ha-cdyetth6 1hb48pz-8ha-cdyf8a5n
input:
1hb48pz-8ha-cdyeaz08 1hb48pz-8ha-cdyex5zr 1hb48pz-8ha-cdyf91bt
1hb48pz-8ha-cdyek5tl 1hb48pz-8ha-cdyf5xxu 1hb48pz-8ha-cdyfabet
1hb48pz-8ha-cdyel3we 1hb48pz-8ha-cdyf7gvb 1hb48pz-8ha-cdynof9c
1hb48pz-8ha-cdyetth6 1hb48pz-8ha-cdyf8a5n
```

6. Go to the **backup** directory that contains a NAR file that you want to restore.

   For example:

   **cd 1hb48pz-8ha-cdyeaz08**

7. Move or copy the NAR file from the node's backup directory to its **input** directory:

   **mv** *NAR_file_name* **.archbkup ../input/** *NAR_file_name* **.arch**

8. Rename the file:

   *filename*.archbkup to *filename***.arch**

9. Start the node.

   The node reprocesses the NAR file.

# 6

# Offline Mediation Controller Record Editor

This chapter describes how to use Oracle Communications Offline Mediation Controller Record Editor.

## Opening Record Editor

To open Record Editor:

1. Ensure that the Oracle Unified Directory server instance is running.

2. Start Node Manager and Administration Server.

3. Run the following command:

   ```
   ./gui
   ```

   Administration Client starts.

4. Log on to Administration Client as the Administrator, Designer, or Operator user.

   The Node Hosts & Nodes (logical view) screen appears.

5. From the **Admin** menu, select **NAR Editor**.

   The Record Editor window appears.

## About Viewing and Editing Records

Records in Offline Mediation Controller are stored and processed in network accounting record (NAR) format. Record Editor allows you to edit NARs and submit them to the node chain. The node chain processes the NARs and distributes them to downstream applications.

A NAR contains attributes that contain values. Table 6–1 lists the supported attribute types.

*Table 6–1   Attribute Types*

| Attribute Type | Description |
| --- | --- |
| String | Accepts ASCII characters |
| Short | Accepts an integer up to 16 bits |
| Integer | Accepts range from 0 to 9 up to 32 bits |
| Long | Accepts range from 0 to 9 up to 64 bits |
| Byte | Accepts range from 0 to 127 |

*Table 6–1  (Cont.)  Attribute Types*

| Attribute Type | Description |
|---|---|
| Bytes | Accepts two-character hexadecimal format separated by spaces. For example, 3A 5C 9D. |
| Time in seconds or Time in milliseconds | Accepts date and time values. You select the value from a dialog box. |
| Map | Hash map, accepts a key and value associations |
| List | Accepts a list of any supported fields |
| IP | Accepts an IP address |
| Double | Accepts a double value |
| Float | Accepts a float value |

## Viewing Records

Record Editor allows you to view the NARs in a NAR archive file, view the NAR attributes, and view their related values.

To view records:

1. In the Record Editor window, from the **File** menu, select **Open**.

   The Open File dialog box appears.

2. Search for the NAR archive file you want to view and click **Open**.

   The NARs appear in the left pane.

3. Expand a NAR.

   The attribute list appears.

   > **Note:** **No element** appears when a NAR has no attributes associated with it.

4. Select an attribute.

   The attribute values appear in the right pane.

## Editing Records

To edit records:

1. In the Record Editor window, from the **File** menu, select **Open**.

   The Open File dialog box appears.

2. Search for the NAR archive file containing the NARs and click **Open**.

   The NARs appear in the left pane.

3. Expand a NAR.

   The list of NAR attributes appears.

   > **Note:** **No element** appears when a NAR has no attributes associated with it.

4. Select an attribute.

   The attribute values appear in the right pane.

5. You can edit records by editing the attribute values:

   ■ When an attribute value appears in red, you can edit the value at the current level.

   ■ When an attribute value appears in black, it is a complex field and you cannot edit the value at the current level. Go to the left pane and expand the attribute further to view the editable values.

6. In the right pane, double-click the data in the **Value** column and change it to the desired value.

   When you edit an attribute value, Record Editor automatically updates the **Length** column with the corresponding character length of the value.

   To edit the **Time in seconds** or **Time in milliseconds** values, double-click the attribute value and then click the button that appears, which brings up the Select Datetime Value dialog box. Edit the values and click **Apply**.

   > **Note:** You cannot add new attributes in records. You can only modify or delete attribute values.

7. Save the file.

## Modifying Attribute Names Displayed in Record Editor

By default, Record Editor uses the name **Network Accounting Record** for each NAR in your system. This means that each NAR will be displayed as **Network Accounting Record** in the left pane of the Record Editor window. When you expand a NAR, the NAR attribute names are listed.

To modify the attribute name:

1. Open the *OMC_home*/**datadict/Data_Dictionary.xml** file in a text editor, where *OMC_home* is the directory in which Offline Mediation Controller is installed.

2. Search for the attribute ID.

3. Change the **<Attr>** element to **<Attr tagForName="true">**.

   The **tagForName** option overrides the default attribute name.

4. Set the **<Name>** element to the attribute name you want to display in Record Editor.

   > **Note:** If you leave the **<Name>** element blank, Record Editor displays the attribute ID as the attribute name.

5. Save the file.

6. Restart Record Editor.

## Searching for NARs

To search for a NAR:

1. In the Record Editor window, from the **Search** menu, select **Search Records**.

   The Search Network Accounting Record dialog box appears.

2. From the **Attribute** list, select an attribute and enter a value.

   If you do not know the exact value to search for, select **contains** and enter a partial value. This search returns all values that contain the partial value you entered.

   > **Note:** When searching for a value in a **List** attribute, you must select **contains**. When searching for attributes of the **Bytes** field type, use a comma to separate the values; for example, **2f,62,68,bf**.

3. Click **Search**.

   The results are displayed in the table.

## Updating Multiple Records

To update multiple records:

1. Search for NARs by doing the following:

   a. In the Record Editor window, from the **Search** menu, select **Search Records**.

      The Search Network Accounting Record dialog box appears.

   b. From the **Attribute** list, select an attribute and enter a value.

      If you do not know the exact value to search for, select **contains** and enter a partial value. This search returns all values that contain the partial value you entered.

      > **Note:** When searching for a value in a **List** attribute, you must select **contains**. When searching for attributes of the **Bytes** field type, use a comma to separate the values; for example, **2f,62,68,bf**.

   c. Click **Search**.

      The results are displayed in the table.

2. Select the records you want to modify and click **Update**.

   The Update Dialog dialog box appears.

   > **Note:** To update a complex field, select the field to be updated in the Field selector Dialog dialog box and click **OK**. The Update Dialog dialog box appears.

3. Do one of the following:

   ■ To update the values by overwriting the existing values:

      a. Select **Absolute Update**.

      b. Do one of the following:

         To update a simple value, enter the value in the **Value** field.

To update an IP Address, MAC Address, or Bytes, enter the value in the dialog box that appears.

    **c.** Click **Update**.

    The values are updated.

- To update the values by incrementing or decrementing the value relative to the existing value:

    **a.** Select **Relative Update**.

---

**Note:** Relative update can be performed only in String, Time, and Integer attributes. For a String attribute, the new value is appended to the existing value.

---

    **b.** In the **Value** field, enter the value.

    **c.** Do one of the following:

    To increase the existing value by the value entered in the **Value** field, select **Increment**.

    To decrease the existing value by the value entered in the **Value** field, select **Decrement**.

    **d.** Click **Update**.

    The values are updated.

## Deleting Multiple Records

To delete multiple records:

1. Search for NARs by doing the following:

    **a.** In the Record Editor window, from the **Search** menu, select **Search Records**.

    The Search Network Accounting Record dialog box appears.

    **b.** From the **Attribute** list, select an attribute and enter a value.

    If you do not know the exact value to search for, select **contains** and enter a partial value. This search returns all values that contain the partial value you entered.

---

**Note:** When searching for a value in a **List** attribute, you must select **contains**. When searching for attributes of the **Bytes** field type, use a comma to separate the values; for example, **2f,62,68,bf**.

---

    **c.** Click **Search**.

    The results are displayed in the table.

2. Select the records you want to delete and click **Delete**.

The Delete Confirmation dialog box appears.

3. Click **OK**.

The selected records are deleted.

# Working with NAR Archive Files and XML Files

Record Editor allows you to convert the NAR archive file to an XML file. You can use the XML file to simplify manual searching, editing, and deleting NAR records. After modifying the NAR records in the XML file, you can convert the XML file to a NAR archive file and open the NAR archive file in Record Editor.

## Converting a NAR Archive File to an XML File

To convert a NAR archive file to an XML file:

1. In the Record Editor window, from the **File** menu, select **Open**.

   The Open File dialog box appears.

2. Search for the NAR archive file you want to convert and click **Open**.

   The NAR archive file appears.

3. From the **File** menu, select **NarToXml**.

   The NAR archive file is saved as an XML file in the *OMC_home***/export** directory.

   > **Note:** The name of the XML file is the same as the name of the NAR archive file with the **.xml** file extension.

You can open the generated XML file in a text editor and search, edit, or delete the records.

## Converting an XML File to a NAR Archive File

To convert an XML file to a NAR archive file:

1. In the Record Editor window, from the **File** menu, select **XMLToNar**.

   The Import File dialog box appears.

2. Search for the XML file you want to convert and click **XmlToNar**.

   > **Note:** Only files with the **.xml** file extension are displayed.

   The XML file is saved as a NAR archive file in the *OMC_home***/import** directory, and the NAR archive file is opened in Record Editor.

   > **Note:** The name of the NAR archive file is the same as the name of the XML file with the **.arch** file extension.

# Submitting the Edited NAR Archive Files to the Data Stream

After editing the NAR archive files, you must submit the edited NAR archive files to the data stream for processing.

If the modified NAR archive file does not reside on the Offline Mediation Controller server, do the following:

1. Send the NAR archive file by FTP to the Offline Mediation Controller server in an intermediate directory.

2. Copy the NAR archive file to the input directory of the node where you would like the data to be processed. The file that is placed in the input directory must have an **.arch** extension.

3. The NAR archive file is picked up by the node and submitted for processing.

# 7

# Troubleshooting Offline Mediation Controller

This chapter provides guidelines to help you troubleshoot problems with Oracle Communications Offline Mediation Controller.

## Troubleshooting Checklist

When any problems occur, it is best to do some troubleshooting before you contact Oracle Global Support:

- You know your installation better than Oracle Global Support does. You know if anything in the system has been changed, so you are more likely to know where to look first.

- Troubleshooting skills are important. Relying on Oracle Global Support to research and solve all of your problems prevents you from being in full control of your system.

If you have a problem with your Offline Mediation Controller system, ask yourself these questions first, because Oracle Global Support will ask them of you:

- What exactly is the problem? Can you isolate it?

  Oracle Global Support needs a clear and concise description of the problem, including when it began to occur.

- What do the log files say?

  This is the first thing that Oracle Global Support asks for. Check the error log for the Offline Mediation Controller component you are having problems with.

- Has anything changed in the system? Did you install any new hardware or new software? Did the network change in any way? Does the problem resemble another one you had previously? Has your system usage recently jumped significantly?

- Is the system otherwise operating normally? Has response time or the level of system resources changed? Are users complaining about additional or different problems?

## Using Error Logs to Troubleshoot Offline Mediation Controller

Offline Mediation Controller error log files provide detailed information about system problems. If you are having a problem with Offline Mediation Controller, look in the log files.

Offline Mediation Controller logs specific details about actions performed in the Offline Mediation Controller GUI in Administration Server log files.

# Getting Help for Offline Mediation Controller Problems

If you cannot resolve the Offline Mediation Controller problem, contact Oracle Global Support.

Before you contact Oracle Global Support, try to resolve the problem with the information logged in the log files. If this does not help to resolve the problem, note the following information:

- A clear and concise description of the problem, including when it began to occur.

- Relevant portions of the relevant log files.

- Relevant configuration files.

- Recent changes in your system after which the problem occurred, even if you do not think they are relevant.

- List of all Offline Mediation Controller components and patches installed on your system.

When you are ready, report the problem to Oracle Global Support.

# Common Problems and Their Solutions

This section describes common problems found when running Offline Mediation Controller and their solutions.

## Problem: ps: illegal option

When you start Node Manager or the Administrative Server, you receive a "ps: illegal option" error message.

**Possible Cause**

The **ps** script from the **ucb** package is used. You must use the **ps** script in the **/usr/bin** or **/bin** directory.

**Solution**

In the PATH environment variable, make sure that **/usr/bin** and **/bin** appear before **/usr/ucb**.

## Problem: keytool error: java.io.FileNotFoundException While Creating Administration Server Certificate

After installing only Administration Server, when you run the **createAdminSvrCert** script to create Administration Server certificate, you receive the "keytool error: java.io.FileNotFoundException: *OMC_home***/config/GUI/adminClientTruststore.jks** (No such file or directory) " error message, where *OMC_home* is the directory in which Offline Mediation Controller is installed.

**Possible Cause**

The *OMC_home***/config/GUI/adminClientTruststore.jks** does not exist.

**Solution**

You must manually import Administration Server's public certificate into Administration Client's truststore.

To manually import Administration Server's public certificate into Administration Client's truststore:

1. Log on to the system on which the Offline Mediation Controller is installed.

2. Run the following command:

   *OMC_home***/jre/bin/keytool -import -v -trustcacerts -alias adminServer -file** *OMC_*
   *home***/config/adminserver/adminServer.cer -keystore** *OMC_*
   *home***/config/GUI/adminClientTruststore.jks**

   The **Enter keystore password** prompt appears.

3. Enter Administration Client's truststore password.

   The **Trust this certificate** prompt appears.

4. Enter **y**, which trusts the certificate.

   Administration Server's public certificate is imported to Administration Server's truststore.

## Problem: keytool error: java.io.FileNotFoundException While Creating Node Manager Certificate

After installing only Node Manager, when you run the **createNodeMgrCert** script to create Node Manager certificate, you receive the "keytool error: java.io.FileNotFoundException: *OMC_home***/config/adminserver/adminServerTuststore.jks** (No such file or directory) " error.

**Possible Cause**

The *OMC_home***/config/adminserver/adminServerTuststore.jks** does not exist.

**Solution**

You must manually import Node Manager's public certificate into Administration Server's truststore.

To manually import Node Manager's public certificate into Administration Server's truststore:

1. Log on to the system on which the Offline Mediation Controller is installed.

2. Run the following command:

   *OMC_home***/jre/bin/keytool -import -v -trustcacerts -alias nodeManager -file** *OMC_*
   *home***/config/nodemgr/nodeManager.cer -keystore** *OMC_*
   *home***/config/adminserver/adminServerTuststore.jks**

   The **Enter keystore password** prompt appears.

3. Enter Administration Server's keystore (truststore) password.

   The **Trust this certificate** prompt appears.

4. Enter **y**, which trusts the certificate.

   Node Manager's public certificate is imported to Administration Server's truststore.