



Managing Faults

This section describes how Prime Central locates, diagnoses, and reports network problems.



Note Prime Central Fault Management uses a very limited version of the IBM Tivoli Netcool/OMNIBus technology. Some of the windows in the Alarm Browser and Alarm Report portlets have a Help button that launches the IBM Tivoli Netcool online help. See the Cisco license agreement for the limitations that apply.

This section contains the following topics:

- [What Is Fault Management?, on page 1](#)

What Is Fault Management?

Fault management is the process of locating, diagnosing, and reporting network problems. This is important for increasing network reliability and effectiveness, and for increasing the productivity of network users. Fault management is more than just handling emergencies. It provides functions for managing problems with services and handling customer-facing service problems.

Efficient fault management can:

- Save repair costs through efficient fault detection, location, and correction
- Improve customer care through efficient trouble administration
- Improve service availability and equipment reliability through proactive maintenance and through measurement, review, and corrective action

One responsibility of fault management is to detect faults. A piece of equipment, a transmission medium, a software module, or a database is said to be in a fault state if it cannot perform its intended function and meet all of the requirements placed on that function. The onset of a fault is called a *failure event* and is usually signaled by one or more alarm reports. The termination of a fault state is called a *clear event*.

Fault management is responsible for determining, from a variety of information sources, the root cause of a fault, and for its repair. In certain cases, the root cause of a fault might be in a connecting network. In such cases, fault management is responsible for reporting the problem through appropriate channels.

The steps for successful fault management are:

1. Identify a problem by gathering data about the state of the network (polling and trap generation).

2. Restore any services that have been lost.
3. Isolate the cause, and decide if the fault should be managed.
4. Correct the fault.

Fault Management Terminology

In Prime Network, an *alarm* represents a scenario that involves a fault in the network, a managed element, or the management system. A *ticket* represents an attention-worthy root cause alarm. A ticket has the same type as the root cause alarm it represents, and it has a status, which represents the entire correlation tree.

In Prime Optical, an *alarm* represents a notification from a managed network element (NE) that a certain fault condition occurred. Alarms usually represent error conditions on NEs. Prime Optical does not use the term *tickets*. NEs managed by Prime Optical perform correlation and suppression and report only root cause alarms.

A *ticket* in Prime Network represents the same information as an *alarm* in Prime Optical.

Prime Central Fault Management uses the term *alarm* to mean a root cause fault condition on which the entire fault lifecycle can be performed.

Alarm Processing

Prime Network receives events (syslogs and traps) from network elements and performs the first level of alarm correlation. Prime Central Fault Management receives correlated alarms from Prime Network and alarms for Prime Optical and performs second-level, cross-domain alarm correlation and deduplication. Prime Central Fault Management provides an aggregated view of correlated and deduplicated alarms to network operation center (NOC) operators.



Note Prime Central Fault Management does not retrieve alarm data for Prime Provisioning or Cisco InTracer.

Prime Central Fault Management:

- Receives alarms from Prime Optical and tickets from Prime Network.
- Receives system alarms and threshold crossing alerts from Prime Performance Manager.
- Normalizes the alarms and tickets to a common alarm representation to perform aggregation, deduplication, correlation, and enrichment.
- Maintains all active alarms in the Fault Management database. The alarms are also copied from the Fault Management database to the Oracle database for archiving and historical reporting.

Alarm Aggregation

Alarm aggregation involves the following functions:

- Receive alarms from Prime Optical—Java and CORBA probes use the CORBA northbound interface (NBI) to get and register for alarms from Prime Optical.
- Receive tickets from Prime Network—SNMP probes use the trap forwarding interface to receive tickets, ticket updates, and ticket severity updates from Prime Network.

- Use the Fault Management SNMP probe and the Prime Performance Manager trap forwarding interface to aggregate Prime Performance Manager alarms.
- Normalize and persist received alarms—Probes perform normalization; the Fault Management component persists normalized alarms.

Alarm Deduplication

Prime Optical and Prime Network manage the same CPT devices and generate the same alarm conditions for CPT managed objects. The following table shows some of the alarm conditions that Prime Optical and Prime Network generate for the same managed objects, and for which Prime Central Fault Management performs deduplication.

Table 1: Deduplication of Alarm Conditions

| Prime Optical Alarm Condition | Prime Network Alarm Condition |
|--|----------------------------------|
| Equipment failure | Card down |
| Equipment unplugged, missing, or removed incorrectly | Card out |
| AIS, LOS, LOF on port | Port/link operational/admin down |

The following example illustrates an alarm deduplication:

Prime Optical Alarm

- Probable Cause—LOS.
- Object Name—ONS-SJC/rack=1/shelf=1/slot=3/port=4.
- Node—209.165.202.129.

Prime Network Alarm

- cenAlarmDescription—Port Down Due to Admin.
- cenAlarmManagedObjectClass—{[ManagedElement(Key=ONS-SJC)][PhysicalRoot][Chassis][Shelf(ShelfNum=1)][Slot(SlotNum=3)][Module][Port(PortNumber=TenGigabitEthernet1/3/4)][PhysicalLayer]}.
- cenAlarmManagedObjectAddress—209.165.202.129.

Alarm Correlation

Prime Central Fault Management correlates Layer 2 or Layer 3 alarms generated by Prime Network to the root cause that Prime Optical detects in the dense wavelength-division multiplexing (DWDM) optical layer. In Prime Central 1.5.2, cross-application correlation is limited to within the same CPT, meaning the root cause alarm and the correlated alarm are on the same CPT device.

Prime Central Fault Management performs correlation of the alarm conditions listed in the following table by Prime Optical and Prime Network.

Table 2: Alarm Correlation

| Prime Optical Alarm | | Prime Network Alarm | |
|-------------------------|------------------------------------|---------------------|----------------------------|
| Probable Cause | Object Name/ Location | cenAlarmDescription | cenAlarmManagedObjectClass |
| FEC-MISM, OTUK-TIM, LOM | MPLS-TP enabled uplink port on CPT | MPLS-TP LSP down | OID of MPLS-TP LSP |

Alarm Aging

Prime Central Fault Management uses the following alarm aging policy:

- By default, cleared alarms are deleted from the Prime Central Fault Management database after 60 minutes.
- Indeterminate and informational alarms that are not being used for service impact analysis or customer impact analysis are deleted after 1 day.
- Warning alarms that are not being used for service impact analysis or customer impact analysis are deleted after 7 days.
- Active alarms that do not meet the preceding criteria persist indefinitely in the database, unless a user clears them manually.
- The Prime Central database mirrors and archives the Prime Central Fault Management database. When you delete an alarm from the Prime Central Fault Management database, it is deleted immediately. However, the Prime Central database retains the deleted alarm for 14 days, and then purges it.



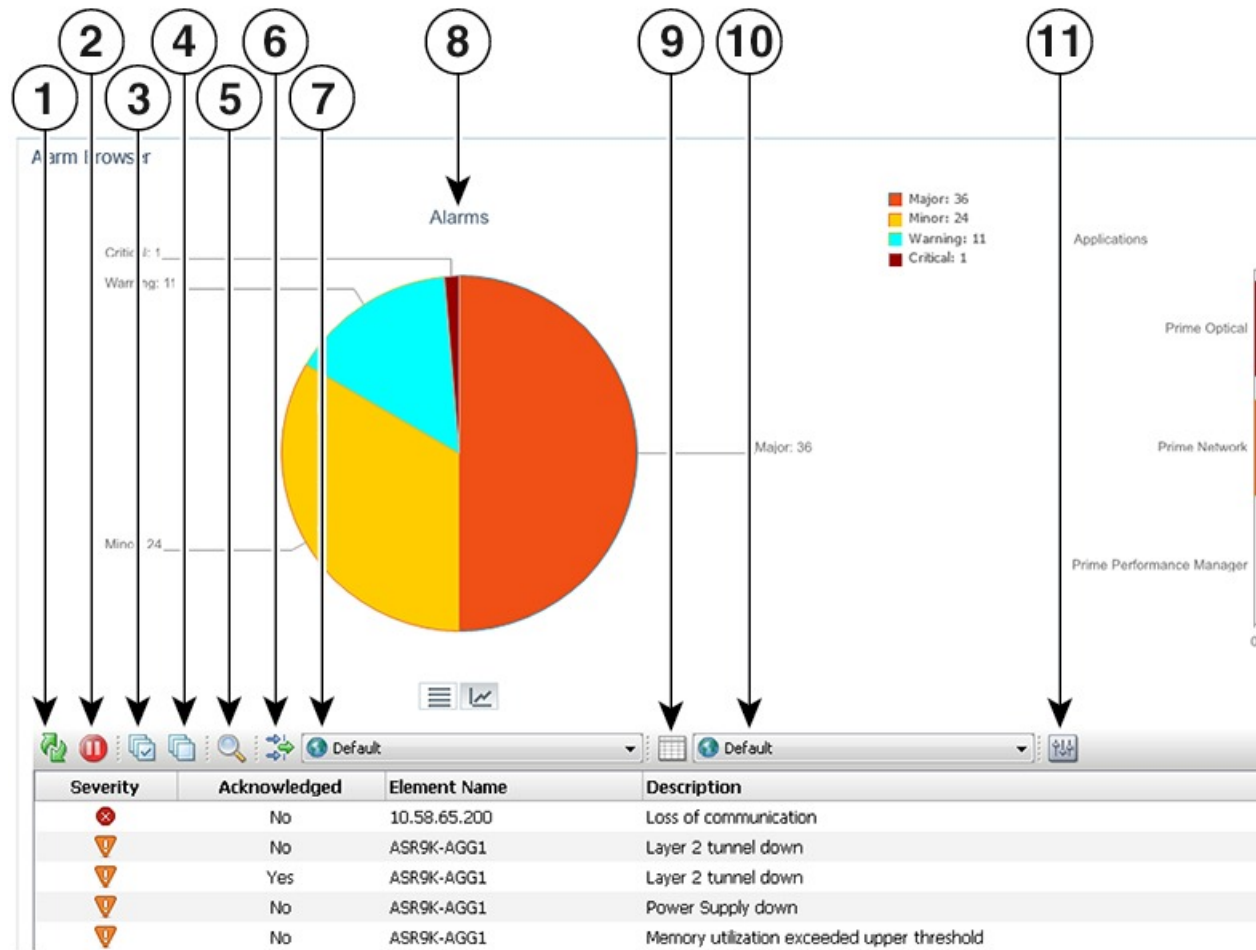
Note User can configure alarm retention period, to configure please refer [Configuring Alarms Retention Period](#).

Monitoring Affected Services and Customers

Prime Central provides an Alarm Browser portlet (see the following figure). Users with the Fault Management role and privileges can use the Alarm Browser to monitor and manage data about faults in the network. Information about alarms is displayed in the portlet according to filters and views:

- Filters let you display a subset of alerts based on specific criteria.
- Views let you choose which alert fields to display.

Figure 1: Alarm Browser Portlet



| | | | |
|---|--|----|------------------------------|
| 1 | Refresh event data icon | 9 | Edit Views ... icon |
| 2 | Freeze/Unfreeze ... icon | 10 | View list |
| 3 | Select all events icon | 11 | Change preferences icon |
| 4 | Deselect all events icon | 12 | Alarms per Application chart |
| 5 | Find ... icon | 13 | Table View icon |
| 6 | Edit Filters ... icon | 14 | Chart View icon |
| 7 | Filter list | 15 | Properties pane |
| 8 | Alarms chart, which lists the number of alarms by severity | — | — |

Opening the Alarm Browser Portlet

To open the Alarm Browser portlet to display aggregated, deduplicated, and correlated active alarms:

Procedure

- Step 1** From the Prime Central menu, choose **Assure > Prime Central Fault Management > Alarm Browser**.
You must have the appropriate role and privileges to open the Alarm Browser. If not, the following message is displayed:

You do not have access privileges to use the Fault Management component. Contact your administrator for access.

- Step 2** The first time you open the Alarm Browser, you must accept the self-signed, untrusted security certificates.

Mozilla Firefox

To accept the security certificates in Firefox, do the following:

- At the “This Connection is Untrusted” security prompt, right-click the frame behind the popup message and choose **This Frame > Open Frame in New Tab**.
The security certificate opens in a new browser tab.
- Click **I Understand the Risks**.
- Click **Add Exception**.
- In the Add Security Exception dialog box, make sure the **Permanently store this exception** check box is checked. (If you leave it unchecked, you will have to reaccept the security certificates the next time you launch the Alarm Browser.) Then, click **Confirm Security Exception**.
- Close the new tab, return to the Prime Central portal tab, and click the **Refresh Current Page** icon.
- In the Warning - Security dialog box, check the **Always trust content from this publisher** check box. (If you leave it unchecked, you will have to reaccept the security certificates the next time you launch the Alarm Browser.) Then, click **Yes** to the following message:

The web site's certificate cannot be verified. Do you want to continue?

Note If you click **No**, the security certificate is denied, and the Alarm Browser displays the error `The application failed to run.`

Microsoft Internet Explorer 10 and 11

Note If you have already applied CA Signed Certificates in Internet Explorer 10 or 11, then do not follow the below mentioned steps.

To accept the security certificates in Internet Explorer, do the following:

- Open Prime Central Fault Management login window in a new tab by entering the following URL:
`http://Fault-Management-server-IP-address:Fault-Management-web-service-listener-port/primefm/console`

Note The Prime Central Fault Management web service listener port is 16311.

- Click **Certificate Error** in the browser's address bar, the Untrusted Certificate dialog box opens.
- Click **View Certificates** and click on **Certification Path** tab.
- The Certificate dialog box opens. Select first certificate (root certificate) and click **View Certificate**.

- e) Click **Install Certificate** to launch the certificate import wizard.
- f) Click **Next**.
- g) Select the **Place all certificates in the following store** radio button option and then click **Browse**.
- h) Navigate to the **Trusted Root Certification Authorities** folder and select it.
- i) Click **OK**.
- j) Click **Next**.
- k) Click **Finish** to complete the wizard.
A security warning appears.
- l) Click **Yes** to confirm that you want to install the certificate.
A message appears, indicating that the certificate import was successful.
- m) Click **OK** to close the message.
- n) Click **OK** to close the Certificate dialog box.
- o) Close the new tab, return to the Prime Central portal tab, and click the **Refresh Current Page** icon.

Note To view Alarm Reports in Internet Explorer 10, perform the following steps:

1. In the Browser window, go to **Tools > F12 Developer Tools**.
2. Change the **Browser Mode** to Internet Explorer 9.
3. Change the **Document Mode** to Internet Explorer 9 standards.

Step 3 (Optional) You can replace the Prime Central certificates with your company's signed, trusted certificates. See [Managing the Self-Signed Certificates](#).

Information Displayed in the Alarm Browser Portlet

The Alarm Browser portlet displays the following charts:

- Alarms—Displays in pie chart format the total number of alarms of each severity (critical, major, minor, and warning) for all applications combined.
- Alarms per Application—Displays in bar chart format the number of critical, major, minor, and warning alarms for individual applications.
 - The vertical axis (y-axis) shows the application.
 - The horizontal axis (x-axis) shows the alarm count.



Note If Prime Performance Manager is registered with Prime Central and sends alarms to Prime Central Fault Management, the Alarms per Application chart includes Prime Performance Manager. If Prime Performance Manager is configured to send alarms directly to Prime Network, there is no bar chart for Prime Performance Manager.

The table on the bottom half of the portlet displays the following information by default.

Table 3: Field Descriptions for the Alarm Browser Portlet

| Field | Description |
|------------------|---|
| Severity | Severity of the selected alarm: |
| | Critical alarm (red) |
| | Major alarm (orange) |
| | Minor alarm (amber) |
| | Warning alarm (turquoise) |
| | Indeterminate alarm (blue) |
| | Cleared, normal, or OK (green) |
| Acknowledged | <p>Whether the selected alarm has been acknowledged in Prime Central. Values are Yes or No.</p> <p>Note Prime Network changes alarm acknowledge state to Modified, if a new event is correlated to an acknowledged ticket. Prime Central GUI shows Yes or No indicating Acknowledged or Unacknowledged respectively (Modified state in Prime Central is internally mapped to Unacknowledged).</p> |
| Element Name | Name of the device where the selected alarm occurred. |
| Description | Error message or condition that is associated with the selected alarm. |
| Location | Physical location of the equipment where the selected alarm occurred, such as chassis, rack, subrack (shelf), slot, and port numbers. |
| Last Occurrence | Time stamp when the alarm last occurred. |
| Customer | Name of the customer affected by the alarm. |
| Service | Name of the service affected by the alarm. |
| Source | Name of the application where the selected alarm originated. |
| Element IP | IP address of the device where the selected alarm occurred. |
| VM Name | Name of the VM where the selected alarm occurred. |
| Host Server Name | Name of the host server where the selected alarm occurred. |
| Count | Number of times the alarm occurred. |
| Has Correlated | Whether the selected alarm has correlated alarms associated with it. |
| EventId | Unique identifier assigned to the selected alarm by the application where the alarm originated. |

| Field | Description |
|--------|---|
| Serial | Unique identifier assigned to the selected alarm by the Fault Management component. Use this value when sending requests via the NBI API. |

The Alarm Browser's right-click menu options provide centralized alarm lifecycle management for the applications listed in the following table.

| Right-Click Menu Option | Supported by... | | | For More Information, See... |
|-------------------------|-----------------|------------------|---------------------------|---|
| | Prime Network | Prime Optical | Prime Performance Manager | |
| — | | | | — |
| Acknowledge | Yes | Yes | Yes | Acknowledging or Deacknowledging an Alarm |
| Deacknowledge | Yes | Yes | Yes | Acknowledging or Deacknowledging an Alarm |
| Clear | Yes | Yes ¹ | Yes | Clearing an Alarm |
| Retire | Yes | No | Yes | Retiring an Alarm |
| Add to Journal | Yes | Yes | Yes | Adding Notes to an Alarm |
| Resync Domain Managers | Yes | Yes | Yes | Resynchronizing Applications |

¹ Please refer to the [Prime Optical 10.0 User Guide](#) for a listing of the alarms that can be cleared.



Note

- If the Alarm Management action you performed is not reflected in the Alarm Browser after refreshing it, review the Message Center for any errors that may have occurred.
- For Prime Network Tickets, Informational Severity is represented as Indeterminate Severity.

Cross-Application Alarm Management

When configured for Suite Mode, previous releases of Prime Central, Prime Network, Prime Optical, and Prime Performance Manager supported the following cross-application alarm management tasks from the Prime Central Fault Management GUI:

- Acknowledge
- Deacknowledge
- Add Notes
- Clear
- Retire

Starting with the latest release of these applications, you can also perform these tasks from Prime Network, Prime Optical, and Prime Performance Manager (again, when configured for Suite Mode).



Note The Retire option is not supported by Prime Optical.

In addition, you have the ability to attach a note to any of these tasks from both the Prime Central Fault Management GUI and NBI. Keep in mind that the applications handle notes differently. Prime Central, Prime Network, and Prime Optical store the notes and actions associated with an alarm as journal entries, logging the creation or modification date and the relevant user's ID for each entry, whereas Prime Performance Manager stores a single note that can be modified as often as needed. Here are some other key differences in the way that the applications handle notes:

- A journal entry with the appropriate action prefix is created for all alarm management tasks performed from the Prime Central Fault Management GUI or NBI. For example, acknowledging an alarm results in a journal entry prefixed with `Acknowledge_Alarm:`.
- A journal entry is not created for any tasks (except for Add Notes) performed from Prime Network, Prime Optical, or Prime Performance Manager.
- When you add a note to an alarm from Prime Network, Prime Optical, or Prime Performance Manager, the corresponding journal entry is not prepended with an action prefix.
- In the alarm notifications sent by Prime Optical, there is no way to distinguish between notes generated in Prime Optical and notes generated in Prime Central. As a result, the journal entries for notes created in Prime Central for Prime Optical alarms are not prepended with an action prefix.
- Unlike Prime Network and Prime Optical, Prime Performance Manager keeps only one note per alarm. Prime Central journals each alarm management action (such as acknowledging or clearing an alarm) that is performed on a Prime Performance Manager alarm, but maintains only one journal entry for each Prime Performance Manager alarm note. For example, when a note is generated by Prime Performance Manager, Prime Central creates a journal entry for that same note. If the note is later modified within Prime Performance Manager, Prime Central overwrites the previous journal entry with the new entry.



Note Prime Performance Manager sends alarm note updates to Prime Central even if the updates are generated for alarm management actions carried out in Prime Central. As a result, it may appear that duplicate notes are listed in the Alarm Browser journal—this is normal. Prime Central maintains a journal entry for each alarm management action note it generates and a separate single journal entry for alarm notes generated by Prime Performance Manager.

For more information on notes, see [Adding Notes to an Alarm](#).

Accessing Additional Alarm Information

From the Alarm Browser portlet, you can access more detailed information for a specific alarm by doing the following:

Procedure

- Step 1** Right-click an alarm and choose **Device Details**. Depending on the alarm source, Prime Optical, Prime Network, or Prime Performance Manager launches, allowing you to view detailed alarm information at the application level.
- For information about using Prime Network to manage alarms and events, see the [Prime Network 4.3.2 Administrator Guide](#).
 - For information about using Prime Optical to view alarm information, see the “Managing Faults” chapter in the [Cisco Prime Optical 10.6 User Guide](#).
 - For information about using Prime Performance Manager to view alarm information, see the “Managing Network Alarms and Events” chapter in the [Cisco Prime Performance Manager 1.7 User Guide](#).
- Step 2** Right-click an alarm and choose **Ticket Details**. Prime Network launches and displays additional information for the ticket associated with the selected alarm. See the "Viewing Ticket Properties" topic in the [Cisco Prime Network 4.3.2 User Guide](#) for a description of the information provided.
- Note** This option is available only when you select an alarm that originated in Prime Network.
- Step 3** Right-click an alarm in the table and choose **Common Inventory**. The Common Inventory portlet launches, where you can view detailed information about the device on which the selected alarm occurred. For more information, see [What is Inventory Management?](#).
- Step 4** Right-click an alarm in the table and choose **Correlated Alarms** to view alarms that are correlated to the selected alarm.
- Prime Central identifies the relationship between a root cause alarm and its consequent alarms. It automatically correlates the consequent alarms as children of the root alarm. The Alarm Browser displays the root cause alarm, the aggregated severity of the alarm, and the severity of the root cause alarm. In addition, the Alarm Browser displays the time at which the original alarm was detected.
- Step 5** Right-click a service-impacting alarm in the table and choose **Symptom Events** to see which symptom events are affected by the service-impacting alarm. The filtered view shows the causal relationship between an event and the consequent events that occurred because of it.
- Step 6** Right-click an alarm and choose **Subtending Events**. The Subtending Events window launches, listing all of the network events associated with the selected alarm and providing information for those events.
- Note** This option is available only when you select an alarm that originated in Prime Network.
- Step 7** Either double-click an alarm or right-click an alarm and choose **Information**. The Alarm Status for Serial Number *x* dialog opens, showing additional fields that are parsed from the alarm.
- Step 8** Right-click an alarm and choose **Journal**. The Journal Information for Serial Number *x* dialog opens, listing all of the notes that have been created for the selected alarm. For more information about notes, see [Cross-Application Alarm Management](#).
-

Viewing Alarms in the Alarm Summary

At the bottom of the Prime Central home page, users with the Fault Management role and privileges can view a summary of the alarm status of the network. Intended as a quick reference, the Alarm Summary shows the

total number of critical, major, minor, and warning alarms in the network—as do the charts in the Alarm Browser portlet.

You can change the rate at which the Alarm Summary refreshes automatically. Do the following:

Procedure

Step 1 Click within the Alarm Summary area.

Step 2 In the Alarm Summary Timer dialog box, enter a refresh rate from 10 to 99,999 seconds. The default is 60 seconds.

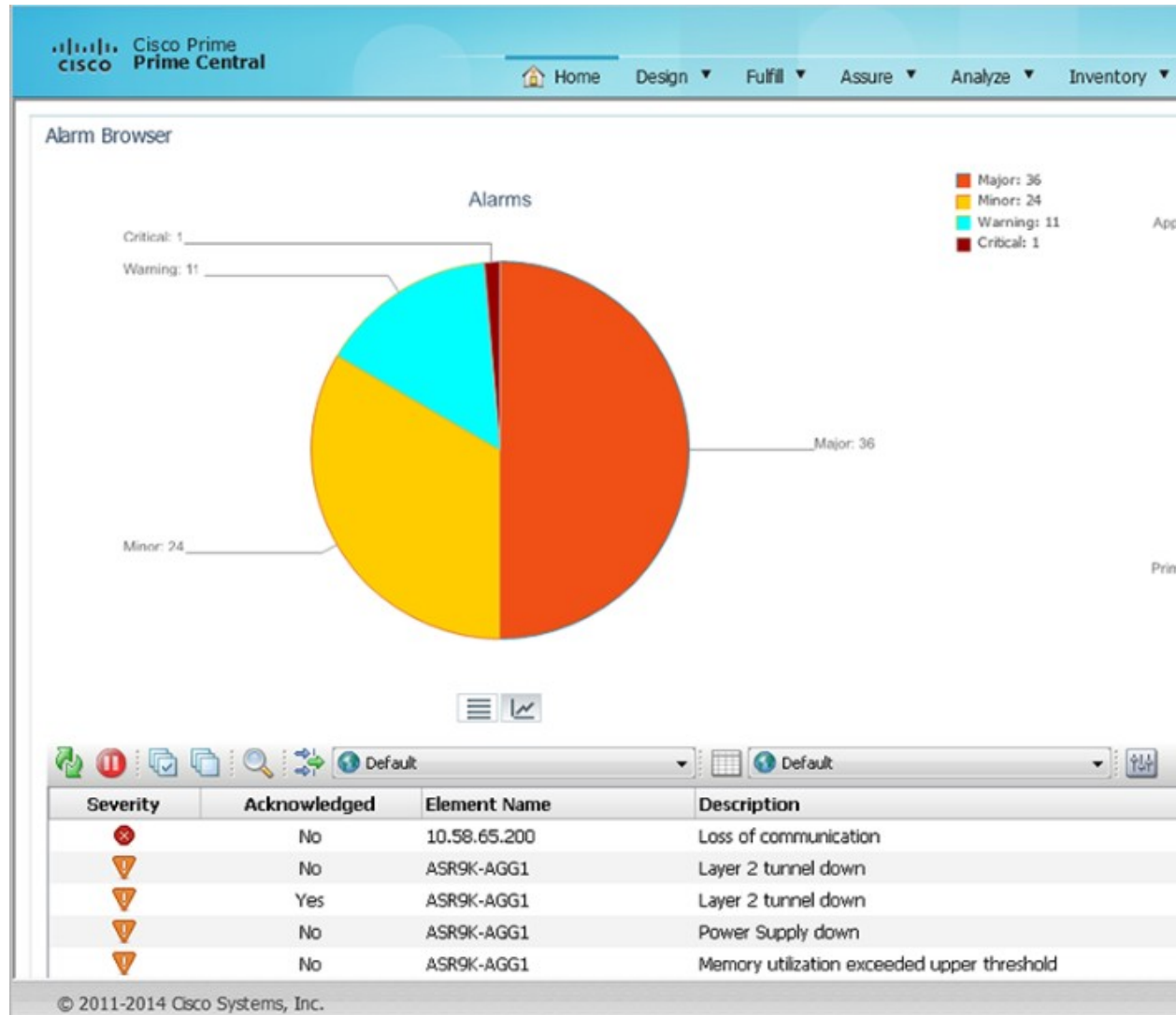
Note If you enter a value (such as 10abc) that cannot be parsed as a number, the refresh rate is reset to the last valid value. If you enter a number less than 10, the refresh rate is set to the lowest minimum, 10 seconds. You cannot enter a value higher than 99,999.

Step 3 Click **Update**. The Alarm Summary refreshes at the rate you entered.

Step 4 To stop the Alarm Summary from refreshing, reopen the Alarm Summary Timer dialog box and click **Stop**. (If later you decide to restart the automatic refresh, click **Start**.)

If you refresh your web browser, or if you log out of Prime Central and log back in, the Alarm Summary refresh rate resumes at the default 60 seconds, even if previously you had changed the refresh rate or stopped it altogether.

Figure 2: Alarm Summary



Acknowledging or Deacknowledging an Alarm

Acknowledging an alarm indicates that you are aware of the issue and are taking ownership of it. The acknowledged alarm remains visible in Prime Central.

To acknowledge or deacknowledge alarms within Prime Central and propagate the change back to the application:

Procedure

- Step 1** To acknowledge an alarm, right-click an alarm in the Alarm Browser and choose **Acknowledge**.

- Step 2** To deacknowledge a previously acknowledged alarm, right-click the alarm and choose **De-acknowledge**.
- Step 3** Refresh the Alarm Browser. The alarm is acknowledged (or deacknowledged) in Prime Central Fault Management, and the change propagates back to the application.
-

Clearing an Alarm

Cleared alarms remain in the Prime Central database, but in the Clear state. You clear an alarm when the condition that caused it no longer exists. A cleared alarm means the alarm should no longer be considered a problem.

To manually clear an active alarm in Prime Central and propagate the change back to the application:

Procedure

- Step 1** Right-click one or more alarms in the Alarm Browser and choose **Clear**.
- Step 2** Refresh the Alarm Browser. The alarm is cleared in Prime Central Fault Management, and the cleared condition propagates back to the application.

When you try to clear certain Prime Optical alarms, the Prime Central Message Center might show the following error message for the clear operation:

```
API_ERROR:clearAlarm operation failed. Reason: Unable to perform action on alarm IDs -
alarm IDs not found.
```

If the alarms exist in Prime Optical, you must clear them manually in Prime Optical. For a list of alarm categories that you must clear manually, see "EMS-Generated Alarms" in the [Cisco Prime Optical 10.6 User Guide](#), Chapter 9, "Managing Faults."

Retiring an Alarm

To retire a cleared alarm in Prime Central and delete that same alarm from the application:

Procedure

- Step 1** Right-click one or more alarms in the Alarm Browser and choose **Retire**. (Alarms must be cleared before they can be retired.)
- Step 2** At the confirmation prompt, click **OK**.
- Step 3** Refresh the Alarm Browser. The retired alarm is deleted from Prime Central and from the application.

Note Deleting an alarm from the Fault Management Alarm Browser will not delete the alarm from corresponding domain managers. It deletes it from only Prime Central and if a resync operation is done, the alarm re-appears in the Fault Management alarm browser.

Adding Notes to an Alarm

You can add and save your own alarm history information. You can maintain a journal for any alarm.

To add notes to an alarm and propagate the note back to the application:

Procedure

- Step 1** Right-click one or more alarms in the Alarm Browser and choose **Add to Journal**. The Journal dialog box opens.
- Step 2** Enter a note of up to 4000 characters.
- Step 3** Click **Save** to save the newly entered text and close the dialog box. The alarm note is saved in Prime Central and propagates back to the application.
- Step 4** To view an alarm note in Prime Central:
- Right-click one or more alarms and choose **Journal**. The journal shows the alarm note, the name of the user who entered it, and the date and time of the entry.
 - If you selected multiple alarms in the alarm list, click **Previous** or **Next** to move to the alarm note for the previous or next alarm in your selection.
 - Click **Close**.

Note For information on how Prime Central and other Prime applications handle notes, see [Cross-Application Alarm Management](#).

Resynchronizing Applications

Complete the following procedure to resynchronize the alarm information provided by Prime Central and the Prime applications associated with it. Before you do so, be aware that:

- This feature is available only for applications that support resynchronization with the Prime Central Fault Management component.
- To initiate resynchronization from the right-click menu, at least one alarm must be reported in the Alarm Browser. If no alarms are present, initiate resynchronization by entering the following commands on the Fault Management server:

```
su - primeusr
```

```
fmctl resync
```

- Resynchronization status is not indicated in either the Message Center or Audit Log.

Procedure

- Step 1** In the Alarm Browser, select an alarm and right-click it to open the right-click menu.
- Step 2** Select **Resync Domain Managers**.
- Step 3** To confirm that resynchronization started and completed, enter the following command on the Fault Management server to view the log file:

```
# tail -f ~/faultmgmt/log/resync.log
```

Sorting Columns

Note the following when you sort columns in the Alarm Browser:

- To sort a column in the Alarm Browser, click the column header once. The rows are sorted in ascending order.
- To sort in descending order, click the column header again.
- To unsort the column, click the column header a third time.
- To sort multiple columns, press **Ctrl** and click the required column headers. The sorting importance of the columns is indicated in square brackets ([]) in the column header. To alternate the sorting of individual columns within the selection between ascending and descending order, keep **Ctrl** pressed and click the column headers. To unsort the columns, release **Ctrl** and click any header from among the sorted columns. The previously sorted columns are unsorted; the column that you clicked is sorted in ascending order.
- To lock a column, right-click the column header and click **Lock Column**. The column is moved to the left side of the portlet, and remains visible when you scroll horizontally. To unlock the column, right-click the column header and click **Lock Column** again.

Refreshing Data

The alarm list refreshes automatically at regular intervals to show all incoming alerts from the Prime Central integration layer. You can choose to refresh the alarm list manually between the configured intervals to view all the latest alerts at the current point in time.

To refresh the Alarm Browser manually between automatic refresh updates, click the **Refresh** icon in the toolbar.

Finding Data

Use the Find dialog box to search for specific text within the data in the Alarm Browser by doing the following:

Procedure

- Step 1** In the Alarm Browser toolbar, click the **Find** icon.
- Step 2** In the Find dialog box, do the following:
- a) In the Column list, select the column to search.
 - b) In the Value field, enter the search value that you want to match. You can enter an exact value to search for or a regular expression.
 - c) In the Options area, specify the type of match required:
 - **Exact Match**—To find rows where the data in the selected column exactly matches the specified search value.
 - **Regular Expression**—To find rows where the data in the selected column matches the specified regular expression.

- Sub String—To find rows where the data in the selected column contains the specified value somewhere within it.
- d) Click **Find** to find the first matching occurrence.
- If a matching row is found in the Alarm Browser, any currently selected rows are deselected, and the matching row is selected. The Find dialog box remains open so that you can view any additional matching occurrences.
- e) Click **Next** to show the next match, and subsequent matches, in the Alarm Browser.
- f) Click **Close** to close the Find dialog box.
-

Changing the Alarm Information Displayed

You can set what alarm information is displayed from the available data by editing the list view, or by selecting and applying a different view. You can also edit the filter criteria used by the current alarm list, or select a different filter to apply to the alarm list.

From the Alarm Browser, do any of the following:

- To select a different view to apply to the alarm list, click the View drop-down list on the toolbar and select from the list of available views.
- To edit the current view and change the columns displayed, click **Edit Views**. The View Builder opens, which you can use to edit the view. See [Creating and Editing Views](#).
- To select a different filter to apply to the alarm list, select an available filter from the Filter list.
For example, from the Filter list, choose **Service Impact Alarms** to view which customers and services are impacted by a specific alarm.
- To edit the current filter, click **Edit Filters**. The Filter Builder opens. See [Filtering Alarms Using the Advanced Filter](#).

Filtering Alarms Using the Quick Filter

You can use the quick filtering facility as a fast way of displaying alarms that match a selected criteria. You can filter for alarm data and display alarms that correspond to the value of a specific cell. For example, you can quickly display only those alarms that occurred at the same time as the selected alarm, or before the selected alarm.

To filter alarms using the quick filter:

Procedure

- Step 1** In the Alarm Browser portlet, right-click a cell that contains a value on which to base the quick filter.
- Step 2** From the right-click menu, choose **Quick Filter** and select a submenu option.
- Step 3** To remove quick filtering and restore the portlet to its original view of all alarms, right-click a cell again and choose **Quick Filter > Off**.
-

Filtering Alarms Using the Advanced Filter

Network alarms typically create many alerts that are not of immediate importance to the personnel monitoring the system. Use advanced filters to control the alarm information that is displayed.

In the Alarm Browser, use the Filter drop-down list to filter alarm data by specific fields, such as Cleared Alarms.

To create and edit advanced filters for alarm data:



Note At the time of Disaster Recovery (DR) configuration, you should create the views manually in the Standby machine.

Procedure

Step 1 In the Alarm Browser toolbar, click the **Edit Filters** icon. The Filter Builder opens.

Step 2 Do one of the following:

- To create a filter, click **New Filter**.
- To edit an existing filter, select the list that contains the required filter. After the list has refreshed, click the filter.

If you are editing an existing filter, skip Step 3.

Caution Do not delete the “Default” filter. Deleting the Default filter generates an error.

Step 3 Select the users to whom you want to grant access to the filter, and click **OK**.

Step 4 Specify the general properties for the filter:

- **Name**—Enter a name for the filter. The name cannot contain the following characters:

\$! % ^ & * () + = ~ ` ~ # @ ' : ; < > { } [] ? / \ | , "

Note that you cannot change the name of a filter after you have created that filter.

- **Default View**—Select the view with which you want to associate the filter, or select the view that is associated with the filter. The default view is applied when you launch an Alarm Browser with the filter but do not specify a view.
- **Collection**—(For global filters and system filters only) Select the filter collection or collections to which you want to add the filter.
- **Description**—Enter a description that explains the purpose of the filter.
- **Data Source**—Select the data source or data sources that contain the fields against which you want to run queries. Click the **Show Data Sources** icon to display a list of available data sources.

If you are editing an existing filter, proceed to Step 8.

Step 5 In the first row of the **Basic** tab, create a filter condition as follows:

- a) From the Field list, select a field from the specified data source.

- b) From the Comparator list, select a comparator.
- c) In the Value field, enter a numeric data type value, or a string data type value. The data types must correspond to those in the ObjectServer field. String data type entries in the Value field must be contained in single quotes.
- d) (Optional) Use the “like” and “not like” comparators for regular expression pattern-matching metacharacters against the entry in the Value field.

Note Do not use the getdate expression in the Value field.

Step 6 To add additional filter conditions, click +. You can add as many filter conditions as required.

Step 7 Use the match options to specify how the filter conditions combine in aggregate:

- Click **All** to trigger the filter only if all the conditions are met.
- Click **Any** to trigger the filter if any of the conditions are met.

Step 8 (Optional) To preview the literal SQL WHERE clause output, click **Advanced**.

Step 9 Click **Metric** and use the following fields to set the metric value:

- Label—Enter a title for the metric.
- Function—Select a function to perform on the field data.
- Field—Select a field on which to perform the chosen function.

Step 10 Click **Save and Close**.

Filter Builder Modes

You can use the following modes to create filters; the Filter Builder displays a tab for each mode after you click **New Filter**.

Basic Mode

Basic mode provides a set of lists and text fields that you use to specify the filter conditions. To build the conditions, select a field from the specified data sources, select a comparator, and enter a numeric data type or string data type value. The data type value is used as the filtering criterion used against the field. If you use basic mode to construct your filter, you can view the resulting SQL in the text field on the Advanced tab.

The fields in the Basic tab map to the following columns in the Alarm Browser default view:

| This field name: | ... Maps to this Alarm Browser column title: |
|------------------|--|
| Severity | Severity |
| Acknowledged | Acknowledged |
| Node | Element IP |
| NodeAlias | Element Name |
| Summary | Description |
| AlertKey | Location |

| This field name: | ... Maps to this Alarm Browser column title: |
|------------------|--|
| LastOccurrence | Last Occurrence |
| Tally | Count |
| Agent | Source |
| Customer | Customer |
| HasCorrelated | Has Correlated |

Advanced Mode

Provides a text field into which you can enter an SQL syntax. If you create a filter in advanced mode, it might not be possible to express the SQL syntax in the fields on the Basic tab. After you have saved a filter created in advanced mode, the Basic tab is removed for that filter.

Dependent Mode

This tab is displayed only for dependent filters. On this tab, use the Search fields to identify the filters that you want to use for the dependencies. After you have identified the required filters, move the filters from the Available filters list to the Selected dependencies list. In a dependent filter, the SQL WHERE statements of each filter are concatenated by using OR statements.

Metric Mode

A metric is an aggregate statistic that can be derived from the alerts that match a filter to display a useful figure; for example, an average, count, or sum of all field values. If a filter is displayed using a monitor box linked to an Alarm Browser, the metric information obtained from the set of alerts that match this filter is used for this display.

Creating and Editing Views

Use the View Builder to create and edit views that are dynamically applied to Alarm Browser data. The views determine what information is displayed from the available alarm data.



Note At the time of Disaster Recovery (DR) configuration, you should create the views manually in the Standby machine.

Procedure

Step 1 In the Alarm Browser toolbar, click the **Edit Views** icon.

Step 2 In the View Builder, do one of the following:

- To create a new view, click **New View**.
- To edit an existing view, select the desired view from the View list. The page updates with the view properties.

If you are editing an existing view, skip Step 3.

Step 3 Select the users to whom you want to grant access to the view, and click **OK**.

Step 4 Use the following fields to set the general properties for the view:

- **Name**—Enter a name for the view. The name cannot contain the following characters:

\$! % ^ & * () + = - ` ~ # @ ' : ; < > { } [] ? / \ | , "

By default, the following characters cannot be used as the initial character of a view name:

/ \ * ? " < > | & .

- **Data Source**—Select the data source or data sources that contain the fields that you want to be displayed in the view. Click the **Show Data Sources** icon to display a list of available data sources.

Step 5 Select the columns you want the Alarm Browser to display, and specify how those columns are ordered.

- In the Display Columns area, use the > and < arrows to move fields between lists. Only those fields in the Event list view list are visible as columns in the Alarm Browser.
- In the Event list view list, select a field.
- Use the arrow buttons to the right of the list to change the display order of the columns in the view:
 - Click **Top** to move the field to the top of the list. In the Alarm Browser, the field is displayed as the column furthest to the left.
 - Click **Up** to move the selected field up one position in the list.
 - Click **Down** to move the selected field down one position in the list.
 - Click **Bottom** to move the selected field to the bottom of the list. In the Alarm Browser, the field is displayed as the column furthest to the right.
- (Optional) Check the **Lock column** check box to lock the selected column at the far left of the Alarm Browser in the view, so that the column is always displayed when you scroll horizontally.
- (Optional) Select a field from the Event list view list and update the corresponding column's title, width, and alignment.

Step 6 Click **Save and Close**.

Freezing and Unfreezing the Alarm Browser

To take a snapshot of alarm information before it is changed by updates from the Prime Central integration layer, you can freeze all the fields on the Alarm Browser by doing the following:

Procedure

Step 1 To freeze the fields, click the **Freeze/Unfreeze** icon in the Alarm Browser toolbar.

The updates from the Prime Central integration layer are suppressed.

Step 2 To unfreeze the fields and obtain updates from the Prime Central integration layer, click the **Freeze/Unfreeze** icon again.

Step 3 (Optional) To force a refresh of the fields independently of the refresh rate, click the **Refresh** icon.

Configuring Email and SMS for Alarm Notifications

You can configure Prime Central Fault Management to notify you whenever a critical or major alarm is generated. You can choose to receive either an email notification or a SMS notification sent to your cell phone.



Note Prime Central Fault Management uses the Linux sendmail function under /usr/sbin, /sbin, /usr/lib, /bin, or /usr/bin to send email notification.

Procedure

Step 1 As the primeusr user, log in to the Prime Central portal with the primeusr password that you specified during installation.

Step 2 Change directories to the *installation-directory/faultmgmt* folder.

Step 3 Open the .primefmmaillist file and add both the email addresses and phone numbers that you want to receive alarm notifications.

You can enter multiple email addresses and phone numbers on a single line, separated by a space. Entries for SMS message recipients should be formatted as follows:

recipient's-mobile-number@carrier's-SMS-gateway-address

Note To determine a carrier's SMS gateway address, either view this [page](#) or contact the carrier directly.

Step 4 Save and close the .primefmmaillist file.

When a critical or major alarm occurs, you will receive an email or SMS message similar to the following:

```
From: PRIMEFM User [mailto:primeusr@cisco.com]
Sent: Monday, February 17, 2014 7:21 AM
To: John Doe
Subject: Prime Central Fault Management Email
This message refers to node <node-ID>, which has the following problem:
Loss of communication
```

```
The severity is Critical
Sent by Cisco Prime Central Fault Management
```

Note Ensure the sendmail and m4 packages are installed. You can install the sendmail and m4 packages using the following commands as root user:

```
# yum install sendmail sendmail-cf
# yum install m4
```

Changing Alarm Browser Preferences

Procedure

-
- Step 1** In the Alarm Browser toolbar, click the **Change preferences** icon.
- Step 2** In the Preferences dialog box, click the **Monitor Boxes** tab and specify what information is displayed by the monitor boxes on the Alarm Browser.
- See [Preferences Dialog Box, on page 23](#) for a description of the options you can set in the Preferences dialog box.
- Step 3** Click the **Notifications** tab and configure preferences for alert notifications when the alarm list is minimized.
- Step 4** Click the **Flashing** tab and specify alarm list preferences for flashing on receipt of new alerts.
- Step 5** Click the **Event List** tab and set other alarm list preferences.
- Step 6** Click **Apply**.
- Step 7** Click **Save**; then, click **Close**.
-

Preferences Dialog Box

The following table describes the options you can set in the Alarm Browser's Preferences dialog box.

Table 4: Preferences Dialog Box

| Option | Description |
|------------------------------|--|
| Monitor Boxes Tab | |
| Show Number of Alerts | Displays the number of alerts that match the filter. |
| Show Highest Severity | Displays the highest severity of the alerts that match the filter. |
| Show Lowest Severity | Displays the lowest severity of the alerts that match the filter. |
| Show Highest Severity Border | Displays a border around the monitor box in the color of the highest-severity alert that matches the filter. |
| Show Metric | Displays the selected filter metric value. |
| Show Highest Color | (Applicable only if you selected the Show Highest Severity option) Displays the highest-severity alert indicator in the color of the alert: for example, in red if the highest-severity alert is critical. |
| Show Lowest Color | (Applicable only if you selected the Show Lowest Severity option) Displays the lowest-severity alert indicator in the color of the alert. |
| Font | Choose the font and the font size for the text on the monitor boxes. |

| Option | Description |
|---------------------------|---|
| Distribution meter | Specify the format for the distribution meter: <ul style="list-style-type: none"> • Show Lava Lamp—Displays the distribution meter as a series of horizontal bars. • Show Histogram—Displays the distribution meter as a bar graph. • Show None—Switches off the distribution meter. |
| Notifications Tab | |
| Enabled | Check this check box to receive notification of new, changed, or deleted alerts when the alarm list is minimized. |
| When Iconized | Click this radio button to receive notification of new, changed, or deleted alerts on iconized desktop environments. An iconized desktop environment displays an icon when the alarm list is minimized. |
| Always | Click this radio button to always receive notification of new, changed, or deleted alerts. |
| When | Check each check box to receive notification as follows: <ul style="list-style-type: none"> • New—You receive a notification when a new alert is added to the alarm list. • Change—You receive a notification when an existing alert changes in the alarm list. • Delete—You receive a notification when an existing alert is deleted from the alarm list. |
| How | Select each option to indicate how a notification should occur: <ul style="list-style-type: none"> • Alert Icon—Flashes the minimized alarm list. • Open Window—Opens the alarm list on the window. • Play Sound—Plays a sound on the workstation. • Open URL—Opens a URL. In the URL Target field, enter the URL that you want to be opened. |
| Flashing Tab | |
| Enable Flashing check box | Check to enable alarm list flashing. |
| Speed slider | Use to indicate how quickly the alarm list flashes. |
| Brightness slider | Use to indicate the degree of brightness of the flashing. |
| Event List Tab | |
| Show Colors | Displays each row of the alarm list with a background color that corresponds to the severity of the alarm. |

| Option | Description |
|-------------------------------|--|
| Show Distribution Summary Bar | Displays the distribution summary bar, which shows the number of alerts that match each severity color. |
| Show Toolbar | Makes the toolbar available on the alarm list. |
| Font Name | Choose a font for your alarm list. |
| Font Size | Choose a font size for your alarm list. |
| Date Format | Choose the required date format. If you select Customize, enter a custom format. |
| Time Zone | Choose a time zone from the available options. |
| Event List Icons | Specify how you want the alarm severity to be depicted in the Severity column: <ul style="list-style-type: none"> • Show—Displays an icon to denote alarm severity. • Show With Text—Displays an icon and text to denote alarm severity. • Don't Show—Displays text to denote alarm severity. |

Customizing the Sound of Alarm Notifications

To set up the Play Sound option for audible notification:

Procedure

-
- Step 1** Prepare the sound file and place it in the following directory on your server:
Fault-Management-installation-directory/faultmgmt/tipv2/profiles/TIPProfile/installedApps/TIPCell/isc.ear/OMNIBusWebGUI.war/sounds.
- Step 2** In the Alarm Browser toolbar, click the **Change preferences** icon.
- Step 3** In the Notification area, check the **Enabled** check box.
- Step 4** In the Preferences dialog box, click the **Notifications** tab.
- Step 5** In the How area, check the **Play Sound** check box.
- Tip** To preview the default sound, click the **Play** button.
- Step 6** To change the default sound to the one you uploaded in Step 1, specify the sound file in the Play Sound field. Use the following format:
\$(SERVER)/sounds/<sound-filename>
For example:
\$(SERVER)/sounds/crash.wav
- Step 7** Click **Apply**.

Step 8 Click **Save**; then, click **Close**. The change takes effect when a new notification appears.

Managing Prime Central Fault Sources

From the Fault Source Management portlet, you can identify and keep tabs on the sources from which Prime Central gathers your network's alarm and trap information. To view this portlet:

1. Ensure that you have have fault management privileges.
2. Add it to the Prime Central home page. See [Adding a Portlet](#) for instructions.

Note the following:

- After a source has been registered with Prime Central's fault management component, fault data for that source is displayed in the Alarm Browser portlet.
- All instances of Prime Network, Prime Optical, and Prime Performance Manager associated with Prime Central are automatically added to the Fault Source Management portlet. Also, these are the only fault sources that cannot be modified or removed from the portlet.

Adding a Fault Source

Procedure

Step 1 From the Fault Source Management portlet, click **Add**.

The Add New Fault Source dialog box appears.

Step 2 Enter the appropriate information and then click **OK**.

Note the following:

- A red asterisk denotes the fields that require user input.
- If you select the Resync Support check box, you will need to enter additional information.

See the [Add New Fault Source Dialog Box](#) for a description of the fields provided here.

Editing a Fault Source

Procedure

Step 1 From the Fault Source Management portlet, select the fault source you want to modify and then click **Edit**.

The Edit Fault Source dialog box appears.

Step 2 Make the necessary changes and then click **OK**.

Note You can edit everything except the source type.

See the [Add New Fault Source Dialog Box](#) for a description of the fields provided here.

Deleting a Fault Source

Procedure

- Step 1** From the Fault Source Management portlet, select the fault source you want to remove.
- Step 2** Click **Delete**.

Add New Fault Source Dialog Box

The following table describes the fields that are provided in this dialog box.

| Field | Description |
|------------------------|---|
| Type | Indicates the fault source type. |
| Display Name | Display name of the fault source, which is listed in the Fault Source Management portlet's Source column. |
| Host Name | Hostname of the fault source. |
| Instance Name | Instance name of the fault source. |
| (Optional) Description | Description of the fault source. |
| Version | Version number of the fault source. |
| (Optional) Patch | Patch number of the fault source. |
| Resync Support | Indicates whether resync is enabled on the fault source. When this option is selected, the data for a particular fault source is automatically synchronized whenever you restart Fault Management. |
| Resync URL | URL of the fault source on which resync is enabled. |
| User Name | Username required to log in to the fault source. |
| Password | Password required to log in to the fault source. |

Analyzing Fault Data

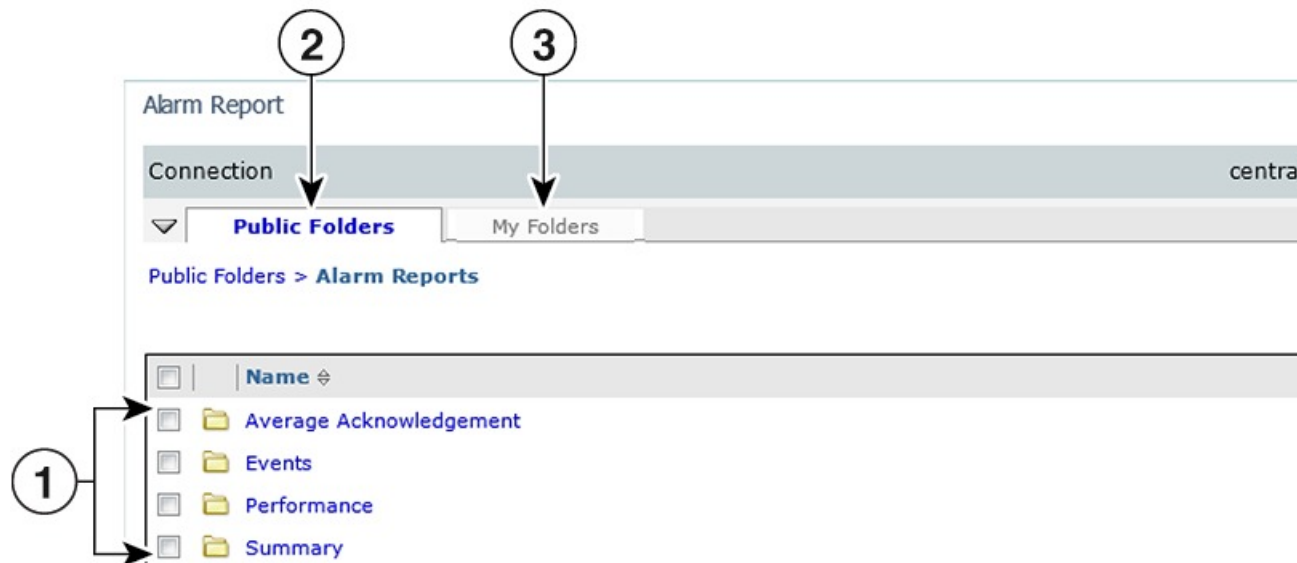
Prime Central provides an Alarm Report portlet (see the following figure) that lets you analyze fault data and help you make informed and timely decisions. Reports can be published to the portlet to ensure that everyone in your organization has accurate and relevant information when they need it.

The Alarm Report portlet shows an alarm summary and details grouped by node, severity, source application, and so on. Users with the appropriate role and privileges can view, customize, and schedule reports for active and historical alarms. You can export the generated reports in HTML, PDF, Excel, and PostScript format.

The Alarm Report portlet displays the following tabs:

- Public Folders—Reports that are placed in Public Folders are of interest to and can be viewed by many users.
- My Folders—You create personal folders and use them to organize reports according to your preferences. My Folders are accessible by you only when you are logged on.

Figure 3: Alarm Report Portlet



| | | | |
|---|--------------------------|---|---------------------|
| 1 | Predefined alarm reports | 6 | Set Properties icon |
| 2 | Public Folders tab | 7 | Launch menu |
| 3 | My Folders tab | 8 | Order icon |
| 4 | Refresh icon | 9 | More link |
| 5 | Delete icon | — | — |



Note Report Studio is not supported in Prime Central 1.4. Also, the links under **Launch** menu are not supported.

Default Alarm Reports

The Alarm Report portlet supports the predefined alarm reports shown in the following table.

Table 5: Default Alarm Reports

| Report Name | Description | Purpose |
|-------------------------------|---|--|
| Average Acknowledgment | | |
| Ack_Events_Details | Shows a detailed breakdown of the average acknowledgment times within a network management environment for a specific user or group. | Assists operators and managers in pinpointing and addressing discrepancies in acknowledgment rates across the network. |
| Ack_Events_Summary | Shows the average acknowledgment times within a network management environment for all users and groups. | |
| Events | | |
| Events_Details | Displays a detailed report of all events of a selected node, class, manager, alert group, or severity over a user-specified time period. | Assists operators and managers in providing coverage for specific criteria in event management. |
| Events_Summary | Displays the highest event-generating elements based on either node, class, manager, alert group, or severity over a user-specified time period. | Helps identify low performance of a system or server over a period of time. |
| Performance | | |
| Perf_Details | Generates a supplementary drill-down report of a selected operator, group, class, or manager over a user-specified time period. | Helps identify the most overloaded owner, class, or event manager, and assists in identifying performance issues. |
| Perf_Summary | Generates a bar chart and supplementary drill-down table displaying the number of events handled by either an owner, class, or manager over a user-specified time period. | |
| Summary | | |
| Get_All_Journals | Retrieves all journal entries associated with a specific node. | Allows users to track journal or state change information about specific nodes and devices that have generated events. |

Opening the Alarm Report Portlet



Tip If multiple users plan to share the same browser instance and use the Alarm Report portlet, it is recommended that those users clear their browser cache before logging in to Prime Central.

To open the Alarm Report portlet:

Procedure

Step 1 From the Prime Central menu, choose **Assure > Prime Central Fault Management > Alarm Report**.

If you do not have the appropriate role and privileges to open the Alarm Report, the following message is displayed:

You do not have access privileges to use the Fault Management component. Contact your administrator for access.

Step 2 The first time you open the Alarm Report, you must accept the self-signed, untrusted security certificates.

Mozilla Firefox

To accept the security certificates in Firefox, do the following:

- a) At the “This Connection is Untrusted” security prompt, right-click the frame behind the popup message and choose **This Frame > Open Frame in New Tab**.
The security certificate opens in a new browser tab.
- b) Click **I Understand the Risks**.
- c) Click **Add Exception**.
- d) In the Add Security Exception dialog box, make sure the **Permanently store this exception** check box is checked. (If you leave it unchecked, you will have to reaccept the security certificates the next time you launch the Alarm Report.) Then, click **Confirm Security Exception**.
- e) Close the new tab, return to the Prime Central portal tab, and click the **Refresh Current Page** icon.
- f) In the Warning - Security dialog box, check the **Always trust content from this publisher** check box. (If you leave it unchecked, you will have to reaccept the security certificates the next time you launch the Alarm Report.) Then, click **Yes** to the following message:

The web site's certificate cannot be verified. Do you want to continue?

Note If you click No, the security certificate is denied, and the Alarm Report displays the error “The application failed to run.”

Microsoft Internet Explorer

To accept the security certificates in Internet Explorer, do the following:

- a) At the security prompt, click **Continue to this website**.
- b) In the Internet Explorer Information Bar, choose **Display Blocked Content**.
- c) In the Warning - Security dialog box, check the **Always trust content from this publisher** check box. (If you leave it unchecked, you will have to reaccept the security certificates the next time you launch the Alarm Report.) Then, click **Yes** to the following message:

The web site's certificate cannot be verified. Do you want to continue?

Note If you click No, the security certificate is denied, and the Alarm Report displays the error “The application failed to run.”

Step 3 (Optional) You can replace the Prime Central certificates with your company's signed, trusted certificates. See [Managing the Self Signed Certificates](#).

Creating a New Report

Procedure

- Step 1** In the Alarm Report portlet, click **Launch > Report Studio**.
- Report Studio is a web product for creating reports that analyze corporate data according to specific information needs.
- Step 2** Click **Create a new report or template**.
- Step 3** Choose the desired report template; then, click **OK**.
- Step 4** Select the data items you want to appear in your report:
- In the Insertable Objects pane, on the Toolbox tab, drag **Singleton** to the report.
An empty data container is created.
 - From the Insertable Objects pane, on the Source tab, drag a data item into the singleton container. To create a singleton, you can also drag a data item anywhere in your report layout.
 - To change the query associated to the singleton object, in the Properties pane, double-click the **Query** property and make changes.
- Step 5** From the **Run** menu, click one of the options to produce the report in the format you want.
- You can produce a report in HTML, PDF, CSV, various Excel formats, and XML. You cannot produce a report in CSV format if you have more than one query defined in the report unless the additional queries are used for prompts.
- The report runs. Once the report has finished running, you can run the report again in the same format or in a different format. If you run the report again in CSV or XLS format, the report will appear in a new browser window.
-

Scheduling a Report

You can set up a schedule to run a report at a later time or at a recurring date and time.

If you no longer need a schedule, you can delete it. You can also disable it without losing any scheduling details. You can then enable the schedule at a later time.

Procedure

- Step 1** Drill down to the report for which you want to set up a schedule; for example, **Public Folders > Alarm Reports > Events > Events_Details**.
- Step 2** Click the **Schedule - report name** icon.
- Step 3** Specify the schedule parameters:
- Under Priority, lower numbers designate higher priority. The default priority setting is 3.
 - To create the schedule but not apply it right away, check the **Disable the schedule** check box. To enable it later, uncheck the check box.

Step 4 Click **OK**.

A schedule is created and the report runs at the next scheduled time.

Step 5 After clicking OK, you might receive the following “Renew the credentials” prompt:

The user or password you provided is not valid. Provide valid credentials.

If you enter the password you used to log in to Prime Central and click **OK**, the dialog box remains open, and the password field becomes blank. If you click **OK** without entering a password, or if you click **Cancel**, the dialog box closes, but the scheduled report fails to run because of a password authentication failure.

Do the following:

1. As the primeusr user, log in to the Prime Central Fault Management server.
2. Change directories to the faultmgmt/prime_integrator/scripts/ directory.
3. Run the updatePasswdForReporting.sh script, which lets you provide the username and password to use for report scheduling.

For example, enter:

```
# updatePasswdForReporting.sh centraladmin Admin
```

where:

- centraladmin is the username to use when scheduling a report.
 - Admin is the password to use when scheduling a report.
4. Return to the “Renew the credentials” prompt and in the Password field, enter the password you configured in the previous step; then, click **OK**.

A schedule is created and the report runs at the next scheduled time.

Step 6 The next time you schedule a report, you do not have to rerun the updatePasswdForReporting.sh script or renew your credentials. However, if *someone else* runs the script and changes the report scheduling password, you must renew your credentials again. To do this:

- a) In the Alarm Report portlet, click the **My Area** icon and then choose **My Preferences**.
- b) In the Set preferences dialog box, click the **Personal** tab.
- c) Scroll down to the Credentials area and click **Renew the credentials**.

A message appears, indicating that the credentials have been renewed with your username and password.

- d) Click **OK**.

Saving or Emailing a Report

You can distribute reports to other users by:

- Saving them where other users can access the reports at their convenience, such as in the public folders. Public folders typically contain reports that are of interest to many users.
- Sending them to users by email. This is especially useful if you want to share the report with a group of people who do not have access to the Alarm Report portlet.

To save or email a report:

Procedure

- Step 1** Open the report that you want to save or email; for example, **Public Folders > Alarm Reports > Average Acknowledgement > Ack_Events_Summary**.
- Step 2** To save the report:
- In the report toolbar, choose **Keep this version > Save as Report View**.
 - Enter a name for the report.
 - Accept the default location, or click **Select another location**.
 - Click **OK**.
- Step 3** To email the report:
- In the report toolbar, choose **Keep this version > Email Report**.
 - Enter the recipient's email address.
 - Check the following check boxes:
 - **Include a link to the report**—To include a URL to the report in the email.
 - **Attach the report**—To attach the report to the email.
 - Click **OK**.
-

Setting Report Properties

You can control the way a report appears and behaves by modifying its properties. To do so:

Procedure

- Step 1** Drill down to the report for which you want to set properties; for example, **Public Folders > Alarm Reports > Events > Events_Summary**.
- Step 2** In the report's Actions toolbar, click **Set properties - report name**.
- Step 3** Click the **General** tab and make any necessary changes to settings such as the report's owner, display icon, and name.
- Step 4** Click the **Report** tab and set the default action that is taken on the report.
- Step 5** Click the **Permissions** tab and specify which users and groups have access to the report, as well as the actions they can perform on the content.
- Step 6** Click **OK**.
-

Specifying the Report Order

You can specify the order of reports in the Alarm Report portlet. You might decide to organize reports by level of usage and place reports that you use daily at the top of the list.

By default, existing reports are sorted alphabetically. Reports added after the order is specified are shown at the end of the list.

Procedure

- Step 1** In the Alarm Report toolbar, click **Order**.
 - Step 2** Select the reports in the “Shown in default order” list box and click the right-arrow button to move them to the “Shown first” list box.
 - Step 3** Click the **Up**, **Down**, **To top**, and **To bottom** links to move the reports within the list.
 - Step 4** Click **OK**.
-

Deleting a Report

Procedure

- Step 1** Drill down to the report that you want to delete; for example, **Public Folders > Alarm Reports > Summary > Get_All_Journals**.
 - Step 2** Check the check box to the left of the report.
 - Step 3** In the toolbar, click **Delete**.
 - Step 4** At the confirmation prompt, click **OK**.
-

Configuring Alarms Retention Period

To retain the historical alarms data for more than 14 days (which is the default period), configure the retention period using **Options** section in **Alarms Report** portlet. After the configuration details are saved, the scheduler is triggered periodically to remove the historical data, which is older than the configured retention period.



Note

- By default, the historical alarms report data is retained for 14 days.
 - Increasing alarm retention period will consume more database resources.
 - The historical data can be retained to any number of days. But, more than 90 days of retention period may lead to performance issues.
-

Procedure

- Step 1** In the **Alarms Report** portlet, at the top right corner, click **Options** and choose **Configuration**.
- Step 2** Click **Edit**.
- Step 3** Specify the retention period and click **Save**.

The allowed retention period range is 1-99999.

Configuring the SNMP Gateway for NBI Integration

Procedure

- Step 1** As the primeusr user, log in to the Prime Central Fault Management server.
- Step 2** Copy the example properties file, NCO_GATE.props, from the \$OMNIHOME/gates/snmp directory to the \$OMNIHOME/etc directory.
- Step 3** In the NCO_GATE.props file, change the values of the gateway-specific properties to suit your operating environment. The gateway-specific properties are listed in the following table:
- Note** A new name has been introduced for SNMP gateway process in which is to change the value of the property "Name" as 'G_SNMP'.
- Step 4** Enter the following command to start the SNMP gateway:
- ```
nco_g_snmp &
```

## Gateway-Specific Properties

The following table lists the properties you can modify when configuring an SNMP gateway for NBI integration.

**Table 6: Gateway-Specific Properties**

| Property Name                             | Command-Line Option                   | Description                                                                                                                                                                                                                                                       |
|-------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gate.SNMPCommunity<br><i>string</i>       | -snmpcommunity<br><i>string</i>       | Community string from SNMP traps. The default is public.                                                                                                                                                                                                          |
| Gate.SNMPEnableLookup<br><i>boolean</i>   | -snmpenablelookup<br><i>boolean</i>   | Whether or not host lookup is enabled. The default is TRUE.                                                                                                                                                                                                       |
| Gate.SNMP.EngineID<br><i>string</i>       | -snmpengineid<br><i>string</i>        | Gateway engine ID, which identifies the gateway as the source of the SNMPv3 traps. The default is 0x0102030405.<br><br><b>Note</b> This property is used only with SNMPv3 traps and must match the engine ID specified in the configuration file of the receiver. |
| Gate.SNMPForwardUpdates<br><i>boolean</i> | -snmpforwardupdates<br><i>boolean</i> | Whether or not the gateway forwards alert updates to the ObjectServer. In effect, the original alert is duplicated but will include the updated data. The default is FALSE.                                                                                       |

| Property Name                            | Command-Line Option                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gate.SNMP.Gateway<br><i>string</i>       | -snmpgateway <i>string</i>          | <p>IP address and port to which the gateway forwards traps. The default is 127.0.0.1:162.</p> <p>If you are operating in an IPv4 environment, specify the location in IPv4 format as <i>address:port</i>. For example:<br/>127.0.0.1:8080</p> <p>If you are operating in an IPv6 environment, specify the location in IPv6 format, preceded by tcp6 or udp6, and followed by the port number, as tcp6 udp6:<i>address:port</i>. For example:<br/>tcp6:[::01]:6666</p> |
| Gate.SNMP.OID<br><i>string</i>           | -snmpoid <i>string</i>              | <p>Object identifier (OID) for traps. The default is 1.3.6.1.4.1.1279 (an IANA-registered Private Enterprise Number).</p> <p>This property can also be defined as @NodeGroup to forward the value of the NodeGroup column in the status table.</p>                                                                                                                                                                                                                    |
| Gate.SNMP.Protocol<br><i>string</i>      | -snmpprotocol <i>string</i>         | <p>Transport protocol that the gateway uses:</p> <ul style="list-style-type: none"> <li>• TCP—Transmission Control Protocol.</li> <li>• UDP—(Default) User Datagram Protocol.</li> </ul> <p><b>Note</b> Store-and-forward mode is not available when the gateway uses UDP.</p>                                                                                                                                                                                        |
| Gate.SNMP.Retries<br><i>integer</i>      | -snmpretries <i>integer</i>         | <p>Number of times that the gateway attempts to retry sending a message on failure. When this number is exceeded, the gateway stops sending messages to the port. The default is 5.</p>                                                                                                                                                                                                                                                                               |
| Gate.SNMP.SecurityLevel<br><i>string</i> | -snmpsecuritylevel<br><i>string</i> | <p>Security level that the gateway uses for SNMPv3 messages:</p> <ul style="list-style-type: none"> <li>• AuthnoPriv—The gateway sends the username and password in encrypted format.</li> <li>• AuthPriv—The gateway transmits the SNMP traps in encrypted format.</li> <li>• noAuthnoPriv—(Default) The gateway does not encrypt the username, password, or SNMP traps.</li> </ul> <p><b>Note</b> This property is used only with SNMPv3 traps.</p>                 |
| Gate.SNMP.SecurityName<br><i>string</i>  | -snmpsecurityname<br><i>string</i>  | <p>Security name for the gateway as defined in the configuration file of the receiver. The default is netcool.</p> <p><b>Note</b> This property is used only with SNMPv3 traps.</p>                                                                                                                                                                                                                                                                                   |

| Property Name                                  | Command-Line Option                                       | Description                                                                                                                                                                                                                |
|------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gate.SNMP.SecurityAuthProtocol <i>string</i>   | <code>-snmpsecurityauthprotocol</code><br><i>string</i>   | Authentication protocol that the gateway uses: <ul style="list-style-type: none"> <li>• MD5—(Default) Message Digest 5 protocol.</li> </ul> <p><b>Note</b> This property is used only with SNMPv3 traps.</p>               |
| Gate.SNMP.SecurityPrivProtocol <i>string</i>   | <code>-snmpsecurityprivprotocol</code><br><i>string</i>   | Privacy protocol that the gateway uses to encrypt data: <ul style="list-style-type: none"> <li>• AES—Advanced Encryption Standard.</li> <li>• DES—(Default) Data Encryption Standard.</li> </ul>                           |
| Gate.SNMP.SecurityAuthPassphrase <i>string</i> | <code>-snmpsecurityauthpassphrase</code><br><i>string</i> | Password used for authentication. The default is password. <p><b>Note</b> The password must be at least eight characters long. This property is used only with SNMPv3 traps.</p>                                           |
| Gate.SNMP.SecurityPrivPassphrase <i>string</i> | <code>-snmpsecurityprivpassphrase</code><br><i>string</i> | Password used for privacy. The default is password. <p><b>Note</b> This property is used only with SNMPv3 traps.</p>                                                                                                       |
| Gate.SNMP.SNMPVersion <i>integer</i>           | <code>-snmpsnmpversion</code><br><i>integer</i>           | Version of the SNMP writer. The default is 2.                                                                                                                                                                              |
| Gate.SNMP.Specific <i>integer</i>              | <code>-snmpspecific</code><br><i>integer</i>              | Trap type value for the specific trap field in forwarded SNMP traps. The default is 1. <p><b>Note</b> This property can also be defined as @Class to forward the value of the Class column in the alerts.status table.</p> |
| Gate.SNMP.StoreAndForward <i>boolean</i>       | <code>-snmpstoreandforward</code><br><i>boolean</i>       | Whether or not the gateway runs in store-and-forward mode. The default is FALSE. <p><b>Note</b> Store-and-forward mode is not available when the gateway uses UDP.</p>                                                     |
| Gate.SNMP.StoreFile <i>string</i>              | <code>-snmpstorefile</code><br><i>string</i>              | Name and location of the storage file that the gateway uses when operating in store-and-forward mode. The default is \$OMNIHOME/var/NCO_GATE_snmp_.store.                                                                  |
| Gate.SNMP.Timeout <i>integer</i>               | <code>-snmptimeout</code><br><i>integer</i>               | Time (in seconds) that the gateway waits for a connection from an SNMP receiver before timing out. The default is 600. <p><b>Note</b> This property is used only when the Gate.SNMP.Protocol property is set to TCP.</p>   |

| Property Name                    | Command-Line Option      | Description                                                                                                                                                                                                  |
|----------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gate.SNMP.Trap<br><i>integer</i> | -snmptrap <i>integer</i> | Trap type value of the generic trap field in forwarded SNMP traps.<br><br><b>Note</b> This property can also be defined as @Severity to forward the value of the Severity column in the alerts.status table. |

## Map Definition Files

Map definition files define how the gateway maps data from the SNMP gateway to the status tables in the Fault Management database. The default map definition file is \$SOMNIHOME/gates/snmp/snmp.map.

When an event is received, it is converted to the trap format defined in the CISCO-EPM-NOTIFICATION-MIB (see the following table). All OSS clients receive the same traps in the same trap format.

**Table 7: CISCO EPM-NOTIFICATION-MIB Summary**

| Trap Name                 | Object ID                     | Type                | Value                                                                                                                                                           |
|---------------------------|-------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cenAlarmVersion           | 1.3.6.1.4.1.9.9.311.1.1.2.1.2 | SnmpAdmin<br>String | MIB version number, in the format <i>major version.minor version</i> .<br><br>Always set to 1.5.2.                                                              |
| cenAlarmTimestamp         | 1.3.6.1.4.1.9.9.311.1.1.2.1.3 | Timestamp           | Time when the alarm was raised.                                                                                                                                 |
| cenAlarmUpdatedTime stamp | 1.3.6.1.4.1.9.9.311.1.1.2.1.4 | Timestamp           | Alarms persist over time and their fields can change values. The updated time indicates the last time a field changed and this alarm updated.                   |
| cenAlarmInstanceID        | 1.3.6.1.4.1.9.9.311.1.1.2.1.5 | SnmpAdmin<br>String | Serial number that uniquely identifies each alarm.                                                                                                              |
| cenAlarmStatus            | 1.3.6.1.4.1.9.9.311.1.1.2.1.6 | Integer32           | Alarm status: <ul style="list-style-type: none"> <li>• 0—Not acknowledged</li> <li>• 1—Acknowledged</li> </ul>                                                  |
| cenAlarmStatusDefinition  | 1.3.6.1.4.1.9.9.311.1.1.2.1.7 | SnmpAdmin<br>String | Alarm status definition, in the format <i>integer,string</i> : <ul style="list-style-type: none"> <li>• 0,Not acknowledged</li> <li>• 1,Acknowledged</li> </ul> |
| cenAlarmType              | 1.3.6.1.4.1.9.9.311.1.1.2.1.8 | Integer             | Not used.                                                                                                                                                       |

| Trap Name                         | Object ID                      | Type                | Value                                                                                                                                                                                                                        |
|-----------------------------------|--------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cenAlarmCategory                  | 1.3.6.1.4.1.9.9.311.1.1.2.1.9  | Integer32           | Alarm category: <ul style="list-style-type: none"> <li>• 0—Unknown</li> <li>• 100—Raw alarm</li> <li>• 101—Root cause alarm</li> <li>• 102—Service alarm</li> </ul>                                                          |
| cenAlarmCategory Definition       | 1.3.6.1.4.1.9.9.311.1.1.2.1.10 | SnmpAdmin           | Alarm category definition, in the format <i>integer,string</i> : <ul style="list-style-type: none"> <li>• 0,Unknown</li> <li>• 100,Raw alarm</li> <li>• 101,Root cause alarm</li> <li>• 102,Service alarm</li> </ul>         |
| cenAlarmServer AddressType        | 1.3.6.1.4.1.9.9.311.1.1.2.1.11 | InetAddress<br>Type | Alarm server address type. Always set to <i>IPv4</i> .                                                                                                                                                                       |
| cenAlarmServerAddress             | 1.3.6.1.4.1.9.9.311.1.1.2.1.12 | InetAddress         | IP address of the application that sent the alarm.                                                                                                                                                                           |
| cenAlarmManaged ObjectClass       | 1.3.6.1.4.1.9.9.311.1.1.2.1.13 | SnmpAdmin<br>String | ID sent from the application to Prime Central Fault Management.                                                                                                                                                              |
| cenAlarmManaged ObjectAddressType | 1.3.6.1.4.1.9.9.311.1.1.2.1.14 | InetAddress<br>Type | Not used.                                                                                                                                                                                                                    |
| cenAlarmManaged ObjectAddress     | 1.3.6.1.4.1.9.9.311.1.1.2.1.15 | InetAddress         | IP address of the application on which the alarm occurred.                                                                                                                                                                   |
| cenAlarmDescription               | 1.3.6.1.4.1.9.9.311.1.1.2.1.16 | OctetString         | Event message text.                                                                                                                                                                                                          |
| cenAlarmSeverity                  | 1.3.6.1.4.1.9.9.311.1.1.2.1.17 | Integer32           | Integer that corresponds to the alarm severity: <ul style="list-style-type: none"> <li>• 0—Clear.</li> <li>• 1—Intermediate.</li> <li>• 2—Warning.</li> <li>• 3—Minor.</li> <li>• 4—Major.</li> <li>• 5—Critical.</li> </ul> |

| Trap Name                   | Object ID                     | Type             | Value                                                                                                                                |
|-----------------------------|-------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| cenAlarmSeverity Definition | 1.3.6.1.4.1.99.311.1.1.2.1.18 | OctetString      | String representation of the alarm severity, in the format <i>number,description</i> ; for example:<br>5,Critical                    |
| cenAlarmTriageValue         | 1.3.6.1.4.1.99.311.1.1.2.1.19 | Integer32        | Not used.                                                                                                                            |
| cenEventIDList              | 1.3.6.1.4.1.99.311.1.1.2.1.20 | OctetString      | Not used.                                                                                                                            |
| cenUserMessage1             | 1.3.6.1.4.1.99.311.1.1.2.1.21 | SnmpAdmin String | Alarm or event name; for example: <ul style="list-style-type: none"> <li>• Vm Powered Off</li> <li>• Host Connection Lost</li> </ul> |
| cenUserMessage2             | 1.3.6.1.4.1.99.311.1.1.2.1.22 | SnmpAdmin String | Service impacted by the alarm.                                                                                                       |
| cenUserMessage3             | 1.3.6.1.4.1.99.311.1.1.2.1.23 | SnmpAdmin String | Not used.                                                                                                                            |
| cenAlarmMode                | 1.3.6.1.4.1.99.311.1.1.2.1.24 | Integer          | Always set to <i>alert</i> .                                                                                                         |
| cenPartitionNumber          | 1.3.6.1.4.1.99.311.1.1.2.1.25 | Unsigned32       | Numerical ID of the service.                                                                                                         |
| cenPartitionName            | 1.3.6.1.4.1.99.311.1.1.2.1.26 | SnmpAdmin String | Service type.                                                                                                                        |
| cenCustomerIdentification   | 1.3.6.1.4.1.99.311.1.1.2.1.27 | SnmpAdmin String | Name of the customer that is impacted by the alarm.                                                                                  |
| cenCustomerRevision         | 1.3.6.1.4.1.99.311.1.1.2.1.28 | SnmpAdmin String | ID of the customer that is impacted by the alarm.                                                                                    |
| cenAlertID                  | 1.3.6.1.4.1.99.311.1.1.2.1.29 | SnmpAdmin String | Not used.                                                                                                                            |

## Gateways and DSAs Used with Prime Central

The Prime Central base application includes two application probes and one Tier 1 SNMP gateway for connection to a third-party OSS.

Prime Central requires a license to connect to and interoperate with other Cisco and third-party systems or components. The following restrictions apply:

- Prime Central Tier 1 and Tier 2 gateways may not be used to connect Prime Central to third-party systems, such as third-party trouble ticketing systems, except through a separately purchased license.



- Prime Central Tier 1 and Tier 3 data source adaptor (DSA) instances may only be used to connect to other Cisco applications or components embedded within Cisco applications, and in addition only if through a separately purchased license.
- Prime Central may not be integrated with an OSS system using an MTOSI interface except through a separately purchased license.
- Prime Central may not be integrated with Cisco applications except through a separately purchased license.

The following table lists the Tier 1 and Tier 2 gateways and the Tier 1 and Tier 3 DSAs that are available for use with Prime Central through a separately purchased license. For more information on Tier 1 gateways, see the [IBM Tivoli Netcool OMNIbus Reference Guides](#).

**Table 8: Gateways and DSAs Used with Prime Central**

| Gateway or DSA Name          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tier 1 Gateways</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Gateway for SNMP writer      | <p>The Gateway for SNMP Writer forwards Netcool alerts as Simple Network Management Protocol (SNMP) traps to an SNMP reader, such as the IBM Tivoli Netcool/OMNIbus SNMP probe. This allows Tivoli Netcool/OMNIbus to generate traps that are forwarded to another management platform such as SunNet Manager or HP Network Node Manager.</p> <p>The Gateway for SNMP Writer supports SNMP versions 1, 2, and 3.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIbus SNMP Writer Gateway Reference Guide</a>.</p> |
| Gateway for socket writer    | <p>The Gateway for Socket Writer uses a TCP connection to forward alerts. Any program that listens to that socket receives the alerts.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIbus Socket Writer Gateway Reference Guide</a>.</p>                                                                                                                                                                                                                                                                         |
| Gateway for flat file writer | <p>The Gateway for Flat File Writer is a unidirectional gateway that reads alerts from the Netcool/OMNIbus object server, and writes the details to a flat file. The gateway can receive insert, update, and delete notification information from multiple tables within the object server.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIbus Flat File Gateway Reference Guide</a>.</p>                                                                                                                        |
| Gateway for ODBC             | <p>The Gateway for ODBC uses a set of Open Database Connectivity (ODBC) libraries and drivers to enable data transfer between the Netcool/OMNIbus object server and Sybase, Microsoft SQL Server, Informix, DB2, and MySQL databases.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIbus Gateway for ODBC Reference Guide</a>.</p>                                                                                                                                                                               |

| Gateway or DSA Name                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gateway for message bus (XML/ESB)      | <p>The Gateway for Message Bus receives Netcool events from the object server, uses a transformer module to transform them to an XML format that can be understood by a destination application, and uses a transport module to send the transformed events to the application.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIBus Gateway for Message Bus Reference Guide</a>.</p>                                                                                                                                                      |
| Gateway for JDBC                       | <p>The Gateway for JDBC uses the standard Java Database Connectivity (JDBC) API to exchange alerts between Netcool/OMNIBus object servers and external databases. It communicates with the supported databases using Java Type 4 JDBC drivers supplied by the database vendors.</p> <p>The Gateway for JDBC can be used as a replacement for the Tivoli Netcool/OMNIBus Gateway for ODBC and the Tivoli Netcool/OMNIBus Gateway for Oracle.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIBus Gateway for JDBC Reference Guide</a>.</p> |
| Gateway for Oracle                     | <p>The Gateway for Oracle writes selected alert details to Oracle databases.</p> <p>The gateway writes to three Oracle database tables (status, journal, and details) to record all transactions that occur within alerts selected by an object server reader.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIBus Gateway for Oracle Reference Guide</a>.</p>                                                                                                                                                                            |
| <b>Tier 2 Gateways</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Gateway for HP OpenView Service Center | <p>The Gateway for HP OpenView Service Center is a fully functional bidirectional gateway.</p> <p>Alerts forwarded from the object server go through the gateway to form HP Service Center/Service Manager incident management tickets. Both systems work together to create and update alerts and tickets.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIBus Gateway for HP OpenView Service Center/Service Manager Reference Guide</a>.</p>                                                                                           |
| Gateway for Remedy ARS                 | <p>The Gateway for Remedy ARS is a help desk system that operates on UNIX platforms. The gateway converts alerts into Remedy help desk trouble tickets. Trouble tickets are updated according to a predefined mapping throughout the lifetime of the alert.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIBus Gateway for Remedy ARS Reference Guide</a>.</p>                                                                                                                                                                           |

| Gateway or DSA Name | Description                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gateway for TSRM    | <p>The Gateway for TSRM provides bidirectional communication between Netcool/OMNIbus and Tivoli Service Request Manager (TSRM).</p> <p>The gateway supports TSRM version 7.1 (Fix Pack 4 and later), TSRM version 7.2, and IBM Maximo Base Services (MBS) version 7.1.1.5.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/OMNIbus Gateway for TSRM Reference Guide</a>.</p> |
| <b>Tier 1 DSAs</b>  |                                                                                                                                                                                                                                                                                                                                                                                                  |
| LDAP DSA            | <p>The LDAP DSA is used to access information stored in an LDAP server.</p> <p>This type of DSA is read-only. You cannot use Netcool/Impact to insert new LDAP data into the server data store. The LDAP DSA is built in and does not require additional installation or configuration.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/Impact DSA Reference Guide</a>.</p>  |
| Socket DSA          | <p>The socket DSA provides an interface between Tivoli Netcool/Impact and a socket server.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/Impact DSA Reference Guide</a>.</p>                                                                                                                                                                                               |
| XML DSA             | <p>The XML DSA reads and extracts data from any well-formed XML document.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/Impact DSA Reference Guide</a>.</p>                                                                                                                                                                                                                |
| DB2 DSA             | <p>For more information, see the <a href="#">IBM Tivoli Netcool/Impact DSA Reference Guide</a>.</p>                                                                                                                                                                                                                                                                                              |
| Flat File DSA       |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Generic SQL DSA     |                                                                                                                                                                                                                                                                                                                                                                                                  |
| HSQLDB DSA          |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Informix DSA        |                                                                                                                                                                                                                                                                                                                                                                                                  |
| MS-SQL Server DSA   |                                                                                                                                                                                                                                                                                                                                                                                                  |
| MySQL DSA           |                                                                                                                                                                                                                                                                                                                                                                                                  |
| ObjectServer DSA    |                                                                                                                                                                                                                                                                                                                                                                                                  |
| ODBC DSA            |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Oracle DSA          |                                                                                                                                                                                                                                                                                                                                                                                                  |
| PostgreSQL DSA      |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Sybase DSA          |                                                                                                                                                                                                                                                                                                                                                                                                  |

| Gateway or DSA Name | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tier 3 DSAs</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| JMS DSA             | <p>The JMS DSA sends and receives Java Message Service (JMS) messages from within a policy.</p> <p>The JMS DSA is installed automatically when you install Netcool/Impact.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/Impact DSA Reference Guide</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Web services DSA    | <p>The web services DSA is a direct-mode DSA that Netcool/Impact automatically loads during application runtime.</p> <p>You do not have to start or stop this DSA independently of the application. The web services DSA is installed with Netcool/Impact and does not require additional installation or configuration.</p> <p>The web services DSA is compatible with its older versions in Netcool/Impact 3.x and 4.x. This means that your old IPL policies developed on Netcool/Impact 3.x and 4.x will continue to run without modification in the current version.</p> <p>The web services DSA provides support for WSDL version 1.1 and 2.0, and SOAP version 1.1.</p> <p>For more information, see the <a href="#">IBM Tivoli Netcool/Impact DSA Reference Guide</a>.</p> |