Carrier VoIP

USP Performance Management

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No feature changes affect this document in this release.

USP Performance Management

The Universal Signaling Point (USP) uses Operational Measurements (OM) to track activity on the system. The USP also uses special study operational measurements (SSOM). The user can configure a number of SSOMs to study and track system issues not covered by the Nortel -programmed OMs.

USP traffic calculations

Traffic calculations are useful for determining daily traffic patterns and as input for predicting the future needs of network facilities.

Network Planners use the erlang as the unit of traffic measurement. The erlang is a number between zero and one that indicates how busy a telephone facility is over a period of time. A value of one indicates that a telephone circuit is busy 100% of the time. Your USP is engineered to carry 0.4 erlang steady state under no fault conditions and 0.8 erlang under fault conditions on any non-packetized link. Non-packetized links include links terminating on DS0A, V.35 or channelized E1 or T1 connections.

You should analyze link traffic patterns on your USP when planning to expand the number of links and when converting low speed links to high speed links. Regular traffic peaks of 0.4 erlang on a particular link, in either direction, during busy hours over a period of time are usually an indication that you need to increase the link capacity of your system.

Under certain network overload conditions, traffic patterns can peak beyond the engineering limits of the system. The resulting congestion will probably cause the USP or associated offices in the network to generate congestion notification logs.

You can calculate the link occupancy on your USP by performing simple calculations using data available from reports generated by the link occupancy OMs.

Collecting link traffic data

After you collect OM data for a specified time interval, use the application-name Filter and Element Filter to display data for a specific link. Select a value of "Link Traffic" from the application-name filter list and the name of the link that you are interested in from the element filter list.

Collecting link traffic data

Step	Action
	At the OAMP workstation
1	Click **Performance>om**.
2	Click the **Search** tab.
3	In the Retrieval Criteria pane, click the **Field** drop-down menu and select **application-name**.
4	In the Retrieval Criteria pane, click the **Condition** drop-down menu and select **equals**.
5	In the Retrieval Criteria pane, click the **Value** drop-down menu and select **Link traffic**.
6	Click **Retrieve**.

—End—

Performing the calculation

Use the following formula to calculate link occupancy in erlangs (refer to values listed in the table in "Viewing OMs" (page 8))

*octets per period / (link rate [in bytes] * period_interval)*

link rate = the data transfer rate of the link in kilobits per second

register-value = the count value from the "Octets Received Count" or "Octets Transmitted Count" OM registers. Each register value must be applied individually in the formula to calculate the receive and transmit occupancy for that link.

om_period = the OM count collection time period in minutes

Example:

link rate = 56 kbit/sec

register-value = 241996

period interval = 5 minutes

Link Occupancy =.12 erlang

You should calculate both transmit and receive erlang values to determine whether the occupancy for a link exceeds 0.4 erlang. If you need to calculate the average transmit and receive occupancy of a link, simply average transmit and receive erlang values for the link over the same time period.

Displaying, Storing, and Exporting Performance Data

Operational Measurements (OMs) enable you to assess the performance of your system. OMs track the duration and frequency of certain system events at specific time intervals. The Universal Signaling Point client interface enables you to collect and view this data, and to post the data to an HTML, txt, or csv file on your workstation.

Viewing OMs

The following table describes the information collected and displayed for each OM.

OM information

Field Name	Description
Application-name	A grouping of software functionality.
Register_name	A descriptive title of the OM.
OM-type	One of four types: • ACC: accumulation OMs • NOA: no accumulation (the OM is not processed beyond the 5-minute interval) • MAX: the OM with the highest value • MIN: the OM with the lowest value
Element	The origination point of the OM. This can be an IP address, an RTC, CC, or application system node, or another location.
Sub-element	A more specific location within the element.
Register-value	Number of occurrences or duration of each event the system recorded in each OM.
Period-interval	Duration of the OM: 5 minutes, 30 minutes, 1 hour, or 24 hours
Period-start	The date and time the OM interval began.
Period-end	The date and time the OM interval ended.
Period-status	Interval status for the period: Normal, Time-of-day, Start-up, or Shutdown
Period-index	Index of the application name to use on the CLI.

For Carrier Voice over IP Networks equipped with USPs, incoming ISUP OM messages are not pegged on the Core. They are pegged on the USP. Outgoing OM messages are still displayed on the Core.

Refer to the following documents for details:

- for Carrier Voice over IP: *Carrier Voice over IP Performance Management Operational Measurements Reference*(NN10264-709)
- for DMS: *North American DMS-100 Operational Measurements Reference Manual* (297-8021-814P3) in your DMS Helmsman collection
- for USP software: *Logs and Operational Measurement Descriptions*, included with the USP software on your CDs

Storing OMs

The USP system stores a limited number of OMs. The following table details the storage capacity.

OM Storage capacity

Interval	Duration Storage	Number of Intervals Stored
5 minutes	30 minutes	6
30 minutes	6 hours	12
1 hour	24 hours	24
24 hours	12 days	12

Exporting OMs

The following procedure enables you to display and export OMs based on the time interval of collection which can be 5 minutes, 30 minutes, 1 hour, or 24 hours.

Collecting and displaying performance data

Step	Action
	At the OAMP Workstation
1	Click **Performance>om**.
2	Click the **Search** tab.
3	In the Retrieval Criteria pane, click the **Field** drop-down list and select period-interval.
4	In the Retrieval Criteria pane, click the **Condition** drop-down list and select **contains any**.

5 In the Retrieval Criteria pane, click the **Value** drop-down list and select the type of OM collection interval: 5 minutes, 30 minutes, 1 hour, or 24 hours.

6 Click the **Retrieve** button in the Retrieval Criteria pane. The results display in the Retrieval Results pane. This display includes all the time periods for that interval type currently available on your system. Time periods display with several information fields. One of these fields is period-status, containing the interval status for the period. The following table explains the four types of status indicators that appear within the period-status field.

OM period-status indicators

Status	Description
NORMAL	The interval passed with no unusual occurrences.
TOD	A time of day change occurred during the interval. The interval can be more or less than the specified time period.
STARTUP	The first interval recorded after the system starts up.
SHUTDOWN	An interval containing any information that was in the OM database at the last shutdown.

You can change the order in which the OMs you have collected are displayed, post the OMs to a file that can be printed, or display a different OM collection.

ATTENTION

You cannot use the All option on a retrieval of OMs to retrieve a complete set of OMs records. An attempt to do so generates an error. To retrieve a complete set of OM records, go to step 8.

7 The OMs display in order according to the parameter you have chosen. To change the order of the OMs, click within any of the parameter column headings in the Retrieval Results pane. An arrow displays within the column heading indicating the direction of the order, either first to last or last to first. To reverse the order, click within the column heading.

8 You can post a single OM, a selection of OMs, or all of the OMs that display to an HTML, txt, or csv file. To select a single OM, place the cursor over the OM and click. To select a range of contiguous OMs, press the Shift key and hold it down while you move the cursor over the range of OMs that you wish to select, and then release the Shift key; the range of selected OMs is highlighted. To select the entire list of OMs, place the cursor over the first OM in the list and click,

use the scroll bar to scroll to the end of the list, and then press and hold down the shift key while clicking on the last OM in the list; the entire list is highlighted.

To select a range of non-contiguous OMs, press the Ctrl key and hold it down while you click on individual OMs that you want to select. The range of selected OMs is highlighted.

a. After you have selected the OMs to post, click the **Post** button.

b. In the top right-hand corner of the window, click the **Export posted records** icon.

c. In response to the confirmation window that displays, click **Yes**.

d. In the Export window that displays, select a location for the file on your workstation, select a name for the file that will be posted, and then click **Save**.

—End—

Performance Data: Filtering and Sorting OMs

Your system stores OMs in the order in which the system node recorded them. However, you can filter them by application-name, element, and sub-element, or sort them by data field.

To sort OMs by Element, Sub-element, Register-name, Register-value, Period-start, Period-end, or OM-type, perform the following steps:

Sorting OMs by data field

Step	Action
	At the OAMP workstation
1	Click **Performance>om**.
2	Click the **Search** tab.
3	Click the header of the information field you want to use to sort the OMs. The Operational Measurements window refreshes to display OMs associated with the selected field.

—End—

Performance: Database Usage Reports

The USP database usage report details the capacity of your database and the capacity that is currently in use. The database usage report provides this information organized into the following groups:

- security
- om
- administration
- platform
- mtp
- ips7
- gws
- sccp
- gtt
- np
- rm
- np-db
- slr-db

The following table explains the three information fields provided for each report.

Database Usage Report Data

Information Field	Definition
current-records	Number of files or records currently provisioned
maximum-records	Maximum number of files or records you can provision
percentage-used	Percentage of maximum files or records currently provisioned

Viewing the database usage report

Step	Action
	At the OAMP Workstation
1	Click **Administration>database-usage**.
2	Click the **Search** tab.

3 In the Retrieval Criteria pane, click the **Records** drop-down list and select **all**. Ensure that the other fields in the pane are blank. Click the **Retrieve** button.

The usage reports display in the order in which the node recorded them. To change the order of display, click within any of the parameter column headings of the Retrieval Results pane. An arrow displays within the column heading indicating the direction of the order, either first to last or last to first. To reverse the order, click within the column heading.

—End—

Viewing the database usage report associated with a single subsystem name

Step	Action
	At the OAMP Workstation
1	Click **Administration>database-usage**.
2	Click the **Search** tab.
3	In the Retrieval Criteria pane, click the **Field** drop-down list and select a subsystem-name. Click the **Condition** drop-down list and select **equal**. Enter the usage report type (see the list at the beginning of this procedure for valid usage report types; the entry must be made exactly as shown in this list). Click the **Records** drop-down list and select **all**. Click the **Retrieve** button. The usage reports display in order according to the subsystem-name you used for searching. If you wish to change the display order, click within any of the parameter column headings in the Retrieval Results pane. An arrow displays within the column heading indicating the direction of the order, either first to last or last to first. To reverse the order, click within the column heading.

—End—

Posting database usage reports and exporting the posted sets

Step	Action
	At the OAMP Workstation
1	Click **Administration>database-usage**.

2 Click the **Search** tab.

3 You can post a single usage report, a selection of usage reports, or all the usage reports that display to an HTML, txt, or csv file. To select a single usage report, place the cursor over the report and click.

To select a range of contiguous usage reports, press the Shift key and hold it down while you move the cursor over the range of usage reports that you want to select, and then release the Shift key; the range of selected usage reports is highlighted.

To select the entire list of usage reports, place the cursor over the first usage report in the list and click, use the scroll bar to scroll to the end of the list, and then press and hold down the shift key while clicking on the last usage report in the list; the entire list is highlighted.

To select a range of non-contiguous usage reports, press the Ctrl key and hold it down while you click on individual usage reports that you wish to select; the range of selected usage reports is highlighted.

4 After you have selected the usage reports to post, click the **Post** button.

5 In the top right-hand corner of the window, click the **Export posted records** icon.

6 A confirmation window appears. Click **Yes**.

7 Select a location for the file on your workstation, select a name for the file that will be posted, and then click **Save**.

8 Click the **Clear** button.

—End—

Configuring Special Study Operational Measurements

Special Study Operational Measurements (SSOMs) enable you to measure specific traffic and network management messages between nodes in the SS7 network.

SSOMs count incoming and outgoing message signal units (MSUs) and MSU octets that are received and transmitted based on user-defined criteria, such as the OPC and the Destination Point code (DPC) of the MSU.

The USP enables you to provision up to 200 SSOMs. If you attempt to provision more than 200 SSOMs, the system displays a warning message.

You can perform the following tasks with SSOMs:

- Add new SSOMs.
- Enable and disable SSOMs on the designated linksets.
- Collect and view SSOMs.
- Post to an HTML, txt, or csv file.

Adding new SSOMs

Step	Action

At the OAMP workstation

1 Click **Performance>ssom**.

2 Click the **Administration** tab and click **New**.

3 Determine the parameters for the SSOM you want to create. The following table explains the parameters you must define.

SSOM Data

Parameter	Description
system-id	The system identity associated with the selected linkset.
linkset-name	The group of links on which you are measuring messages.
OPC	The originating point code (OPC) of the messages you are measuring.
DPC	The destination point code of the messages you are measuring.

Parameter	Description
network-indicator	One of the three components of the service information octet (SIO) of the messages you are measuring.
congestion-indicator	One of the three components of the service information octet (SIO) of the messages you are measuring.
service-indicator	One of the three components of the service information octet (SIO) of the messages you are measuring.
h0	Heading code valid for signaling network management (SNM) or signaling link test (SLT) messages only. The service-indicator value must be 0, 1, or 2 (from lowest to highest priority).
h1	Heading code valid for signaling network management (SNM) or signaling link test (SLT) messages only. The service-indicator value must be 0, 1, or 2 (from lowest to highest priority).

4 Click the **system-id** drop-down list and select the system identity associated with the linkset you want to monitor.

5 Click the **linkset-name** drop-down list and select the name of the linkset you want to monitor.

6 Enter an originating point code in the **opc** field.

7 Enter a destination point code in the **dpc** field.

8 Click the **network-indicator** drop-down list and select an appropriate network-indicator.

9 Click the **congestion-priority** drop-down list and select an appropriate congestion priority.

To measure traffic with the same parameters but different congestion priorities, you must create an SSOM for each congestion priority setting.

Linksets associated with an ITU 14-bit based system identity can only be provisioned with a congestion priority value of 0 or 1.

10 Click the **service-indicator** drop-down list and select a service-indicator.

If you select a service-indicator of 0, 1, or 2, the h0 and h1 SNM heading fields become active, and you can proceed to step 11; otherwise, proceed to step 12.

11 Enter an appropriate SNM H0 code and SNM H1 code in the h0 and h1 fields, respectively.

The following tables explain the H0 and H1 heading codes for SNM messages that have a service-indicator of 0, and for SLT messages that have a service-indicator of 1 or 2.

12 Click **Add**.

—End—

Enabling and disabling SSOMs on linksets

Step	Action
	At the OAMP workstation
1	Click **Configuration>mtp>linkset**.
2	Click the **Search** tab and double click the linkset you want to modify to transfer to the Administration tab.
3	Click the **ssom-control** drop-down list and make a selection.
4	Click the **Modify** button.

—End—

Collecting and viewing SSOMs

Step	Action
	At the OAMP workstation
1	Click **Performance>om**.
2	Click the **Search** tab and perform the following search: a. Select **application-name** in the **Field** drop-down menu. b. Select **equals** in the **Condition** drop-down menu. c. Select **Special Study Totals** in the **Value** drop-down menu.
3	Click **Retrieve**.

4 To sort the SSOMs data by element, select an element from the Element list or to sort the SSOMs data by sub-element, select a sub-element from the Sub-element list.

5 You can post a single SSOM, a selection of SSOMs, or all of the SSOMs that display to an HTML, txt, or csv file. To select a single SSOM, place the cursor over the OM and click.

To select a range of contiguous SSOMs, press the Shift key and hold it down while you move the cursor over the range of SSOMs that you wish to select, and then release the Shift key; the range of selected SSOMs is highlighted

To select the entire list of SSOMs, place the cursor over the first SSOM in the list and click, use the scroll bar to scroll to the end of the list, and then press and hold down the shift key while clicking on the last SSOM in the list; the entire list is highlighted.

To select a range of non-contiguous SSOMs, press the Ctrl key and hold it down while you click on individual SSOMs that you wish to select; the range of selected SSOMs is highlighted.

6 After you have selected the SSOMs to post, click the **Post** button.

7 In the top right-hand corner of the window, click the **Export posted records** icon. A confirmation window appears.

8 Click **Yes**. The export window appears.

9 Select a location for the file and click **Save**.

10 Click the **Clear** button.

—End—

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