HP Network Node Manager i Software Smart Plug-in Performance for Quality Assurance

For the Windows®, HP-UX, Linux, and Solaris operating systems

Software Version: 9.00

Online Help: Help for Reports

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HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Reports

After you install the NNM iSPI Performance for QA extension-pack, you can view the Quality Assurance (QA)-related attributes in the HP NNM iSPI Performance for Metrics Software console.

NNM iSPI Performance for QA enables you to view the following categories of reports:

- Calendar Report
- Chart Detail Report
- Heat Chart Report
- Managed Inventory Report
- Most Changed Report
- Top N Report

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Topology Filters

The following table discusses the topology filters that the NNM iSPI Performance for QA uses:

NNM iSPI Performance for QA Topology Elements

Filter	Description
QA Probe Name	QA probe names that the HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) discovered in the network.
QA Probe Type	Type of the discovered QA probe. The NNM iSPI Performance for QA discovers the following types of QA probes can be of the following types: • **UDP**[1] • **UDP Echo**[2] • **TCP Connect**[3] • **ICMP Echo**[4] • **VoIP**[5]
Node Name	Node from which at least one QA probe was initiated
Destination Node	Node on which at least one QA probe was run

[1]The User Datagram Protocol (UDP) is one of the core members of the Internet Protocol Suite. UDP service type in QA SPI uses the UDP protocol and provides jitter measurements. With UDP protocol, computer applications can send messages, in this case referred to as datagrams, to other hosts on an Internet Protocol (IP) network without requiring prior communications to set up special transmission channels or data paths.

[2]A UDP Echo is a server program that gives you an echo of a text string that you send using a UDP client.

[3]TCP Connect scans a normal TCP connection to determine if a port is available. This scan method uses the same TCP handshake connection that every other TCP-based application uses on the network.

[4]ICMP Echo is a method used to test whether a particular host is reachable across an IP network; it is also used to self test the network interface card of the computer, or as a latency test. It measures the round-trip time and records any packet loss, response packets received, the minimum, mean, maximum and the standard deviation of the round trip time.

[5]Voice over Internet Protocol (VoIP) is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or other packet-switched networks. VoIP converts an analog voice signal to digital format and compresses the signal into Internet protocol (IP) packets for transmission over the Internet.

Filter	Description
Source Site	Site from which at least one QA probe was initiated
Destination Site	Site on which at least one QA probe was run
Site[1] Name	Source or destination site for the QA probes.
	Displays QA Probes where either the source or the destination site matches the site name(s) selected.
Class of Service[2]	Pre-assigned class of service values for the discovered QA probes
Node **ODBID**[3]	ODBID for the discovered nodes
Interface ODBID	ODBID for an interface
QA Probe UUID	Universally Unique Identifier for the discovered QA probes
Node UUID	Universally Unique Identifier for a source node available in the network.
Period Length	Fixed time range for the type of the report selected.
	For example, if you selected Weekly report, the period length displays data for past seven days.
	The period length is calculated as the sum of seconds in the time range.
	For more information on this metric, see *HP NNM iSPI Performance for Metrics Software Online Help*

NNMi Topology Elements

Topology Element Name	Description
Interface Name	Name of the interface
Interface UUID	Universally Unique Identifier for a interface
Interface Alias	The ifAlias value assigned to the interface by the device administrator

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[1]A logical organization of networking devices. In the scope of enterprise networks, a site can be a logical grouping of networking devices generally situated in similar gegraphic location. The location can include a floor, building or an entire branch office or several branch offices which connect to head quarters or another branch office via WAN/MAN. Each site is uniquely identified by its name. In case of the service provider networks the Virtual Routing and Forwarding (VRF) on a Provider Edge (PE) router or a Customer Edge (CE) routers can be defined as a site.

[2]Class of Service (CoS) is a way of managing traffic in a network by grouping similar types of traffic (for example, e-mail, streaming video, voice, large document file transfer) together and treating each type as a class with its own level of service priority. The priority value can be between 0 and 7 that can be used by Quality of Service (QoS) disciplines to differentiate traffic.

[3]ODBID is a custom attribute that the HP Network Node Manager i-Series Software(NNMi) topology uses to integrate the NNMi topology with Business Service Management(BSM) software suite. The Smart Plug-Ins (SPIs) get this attribute from NNMi during the discovery and keep a reference. You can use ODBID as a report toplogy filter.

Topology Element Name	Description
Interface Type	The physical link protocol type of the interface
	Possible values used by HP Network Node Manager i-Suite Software (NNMi) include Ethernet and frameRelay.
	Note: Interfaces on non-SNMP nodes have an interface type of **other**.
Interface Speed	The interface's bandwidth in bits per second
	Depending on the device vendor, this value may indicate current speed or potential speed.

For more information on the common metrics used by HP NNM iSPI Performance for Metrics Software and NNM iSPI Performance for QA, see HP NNM iSPI Performance for Metrics Software *Online Help*.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Metrics

The following table discusses the metrics that the NNM iSPI Performance for QA uses:

Metric Name	Description
Reachability (Average, Maximum, and Minimum)	Total percentage of time the destination **network element**[1] was reachable from the source network element
	Measures the physical connectivity between two network elements
Round Trip Time (msecs) (Average, Maximum, and Minimum)	Round Trip Time required for the data packet to travel between the selected source and destination network element
	Displayed if you configure the QA probe precision to milliseconds or microseconds
	Displayed in milliseconds

[1]Examples of network elements are; source node, destination node, QA probe name, QA probe type, source site, destination site, class of service, QA probe UUID, node UUID, etc.

Metric Name	Description
Round Trip Time (μsecs) (Average, Maximum, and Minimum)	Round Trip Time required for the data packet to travel between the selected source and destination network element Displayed only if you configure the QA probe precision to micro seconds Displayed in microseconds
Positive Jitter[1] Source to Destination (Average, Maximum, and Minimum)	Positive jitter for the data packet to be delivered from the source network element to the destination network element
Positive Jitter Destination to Source (Average, Maximum, and Minimum)	Positive jitter for the data packet to be delivered from the destination network element to the source network element
Negative Jitter[2] Source to Destination (Average, Maximum, and Minimum)	Negative jitter for the data packet to be delivered from the source network element to the destination network element
Negative Jitter Destination to Source (Average, Maximum, and Minimum)	Negative jitter for the data packet to be delivered from the destination network element to the source network element
Two Way Jitter[3] (Average, Maximum, and Minimum)	Jitter for the data packet to travel from the source network element , destination network element and back again
Packet Loss Source to Destination Percentage (Average, Maximum, and Minimum)	Percentage of data loss while the data packet was traveling from the source network element to the destination network element
Packet Loss Destination to Source Percentage (Average, Maximum, and Minimum)	Percentage of data loss while the data packet was traveling from the destination network element to the source network element
Two Way Packet Loss (Average, Maximum, and Minimum)	Average of the following: ● Percentage of data loss while the data packet was traveling from the source network element to the destination network element. ● Percentage of data loss while the data packet was traveling from the destination network element to the source network element.

[1]When the delay variance in sending the data packet from the source network element is more than the predefined inter-packet delay. For example, If packets are sent with 10 ms interval, positive jitter means they were received with more than 10 ms interval.
[2]When the delay variance in sending the data packet from the source network element is less than the predefined inter-packet delay. For example, If packets are sent with 10 ms interval, positive jitter means they were received with less than 10 ms interval.
[3]The two way jitter is the average of the upstream positive, upstream negative, downstream positve, and downstream negative jitter.

Metric Name	Description
Mean Opinion Scores(MOS)[1] (Average, Maximum, and Minimum)	Grade of quality of the media received after being transmitted and eventually compressed using codecs. Expressed in one number, from 1 to 5, 1 being the worst and 5 the best.
Round Trip Time - Exception (Sum)	Number of round trip time exceptions for the selected network element. Displays the number of times the round trip time for the selected network element crossed the threshold value.
Round Trip Time - Exception Rate (Average, Maximum, and Minimum)	Rate of round trip time exceptions for the selected network element. Displays the following value: Sum of Round Trip Time - Exception/Sum of Sample Counts
Two Way Jitter- Exception (Sum)	Number of two way jitter exceptions for the selected network element. Displays the number of times the two way jitter amount for the selected network element crossed the threshold value.
Two Way Jitter- Exception Rate (Average, Maximum, and Minimum)	Rate of two way jitter exceptions for the selected network element. Displays the following value: Sum of Two Way Jitter - Exception/Sum of Sample Counts
Positive Jitter from Source to Destination - Exception (Sum)	Number of positive jitter from source to destination exceptions for the selected network element. Displays the number of times the amount of positive jitter from source to destination for the selected network element crossed the threshold value.
Positive Jitter from Source to Destination - Exception Rate (Average, Maximum, and Minimum)	Rate of positive jitter from source to destination exceptions for the selected network element. Displays the following value: Sum of Positive Jitter from Source to Destination - Exception/Sum of Sample Counts
Positive Jitter from Destination to Source - Exception (Sum)	Number of positive jitter from destination to source exceptions for the selected network element. Displays the number of times the amount of positive jitter from destination to source for the selected network element crossed the threshold value.

[1]A measurement of the subjective quality of human speech, represented as a rating index. MOS is derived by taking the average of numerical scores given by juries to rate quality and using it as a quantitative indicator of system performance.

Metric Name	Description
Positive Jitter from Destination to Source - Exception Rate (Average, Maximum, and Minimum)	Number of positive jitter from destination to source exceptions for the selected network element.
	Displays the following value:
	Sum of Positive Jitter from Destination to Source - Exception/Sum of Sample Counts
Negative Jitter from Source to Destination - Exception (Sum)	Number of negative jitter from source to destination exceptions for the selected network element.
	Displays the number of times the amount of positive jitter from destination to source for the selected network element crossed the threshold value.
Negative Jitter from Source to Destination - Exception Rate (Average, Maximum, and Minimum)	Rate of negative jitter from source to destination exceptions for the selected network element.
	Displays the following value:
	Sum of Negative Jitter from Source to Destination - Exception/Sum of Sample Counts
Negative Jitter from Destination to Source - Exception (Sum)	Number of negative jitter from destination to source exceptions for the selected network element.
	Displays the number of times the amount of negative jitter from destination to source for the selected network element crossed the threshold value.
Negative Jitter from Destination to Source - Exception Rate (Average, Maximum, and Minimum)	Number of negative jitter from destination to source exceptions for the selected network element.
	Displays the following value:
	Sum of Negative Jitter from Destination to Source - Exception/Sum of Sample Counts
Two Way Packet Loss - Exception (Sum)	Total number of two way packet loss exceptions for the selected network element.
	Displays the number of times the two way packet loss percentage for the selected network element crossed the threshold value.
Two Way Packet Loss- Exception Rate (Average, Maximum, and Minimum)	Rate of two way packet loss exceptions for the selected network element.
	Displays the following value:
	Sum of Two Way Packet Loss - Exception/Sum of Sample Counts

Metric Name	Description
Packet Loss from Source to Destination - Exception (Sum)	Total number of source to destination packet loss exceptions for the selected network element.
	Displays the number of times the source to destination packet loss percentage for the selected network element crossed the threshold value.
Packet Loss from Source to Destination - Exception Rate (Average, Maximum, and Minimum)	Rate of source to destination packet loss exceptions for the selected network element.
	Displays the following value:
	Sum of Packet Loss from Source to Destination - Exception/Sum of Sample Counts
Packet Loss from Destination to Source - Exception (Sum)	Total number of destination to source packet loss exceptions for the selected network element.
	Displays the number of times the destination to source packet loss percentage for the selected network element crossed the threshold value.
Packet Loss from Destination to Source - Exception Rate (Average, Maximum, and Minimum)	Rate of destination to source packet loss exceptions for the selected network element.
	Displays the following value:
	Sum of Packet Loss from Destination to Source - Exception/Sum of Sample Counts
Mean Opinion Scores - Exception (Sum)	Total number of destination to source packet loss exceptions for the selected network element.
	Displays the number of times the destination to source packet loss percentage for the selected network element crossed the threshold value.
Mean Opinion Scores - Exception Rate (Average, Maximum, and Minimum)	Rate of destination to source packet loss exceptions for the selected network element.
	Displays the following value:
	Sum of Mean Opinion Scores - Exception/Sum of Sample Counts
Sample Count	Total number of polled samples

For more information on the common metrics used by HP NNM iSPI Performance for Metrics Software and NNM iSPI Performance for QA, see HP NNM iSPI Performance for Metrics Software *Online Help*.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA)Metrics: MPLS Specific

The following table discusses the metrics that the NNM iSPI Performance for QAses, while it is integrated with NNMi Smart Plug-in for MPLS(MPLS iSPI).:

Note: These are the additional metrics that QA SPI uses, while integrated with MPLS iSPI. See, NNM iSPI Performance for QA Metrics for the list of metrics used by QA SPI.

Metric Name	Description
QA MPLS UUID	Universally Unique Identifier for the discovered QA extension pack integrated to MPLS.
VRF Name	Name of the Virtual Routing and Forwarding (VRFs) table that belong to one of the Virtual Private Networks (VPN) that the MPLS manages
VRF UUID	Universally Unique Identifier for a VRF
VPN Name	Name of the VPN

For more information on the metrics used by NNMi Smart Plug-in for MPLS , see NNMi Smart Plug-in for MPLS *Online Help*.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA)Calendar Report

Quality Assurance (QA) Calendar report enables you to monitor the network performance between the selected nodes, or the set of nodes defined either as node groups, or as sites for a specific time range.

It displays a comparative study of the selected metrics for a specific time range.

Using this report you can:

- Monitor the network performance between multiple sets of nodes, node groups, or sites.
- Analyze the network performance statistics based on various time ranges.
- Compare network performance of two nodes, node groups, or sites based on historical QA data.

NNM iSPI Performance for QA Calendar Report Options

The Calendar report displays the following options:

- Primary Metric[1]
- Secondary Metric[2]

For information on metrics used by NNM iSPI Performance for QA. see NNM iSPI Performance for QA Metrics.

For information on user scenarios on QA Calendar report, see User Scenarios for NNM iSPI Performance for QA Calendar Report.

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[1]Enables you to select the main metric based on which you want to generate the report. The primary metric that you select is displayed on the left Y axis of the report.
[2]Enables you to select the metric that would overlay the primary metric. The secondary metric that you select is displayed on the right Y axis of the report.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA)Chart Detail Report

Quality Assurance (QA) Chart Detail report enables you to perform a trend analysis for the network performance based on historical QA probe data.

The Chart Detail report displays a comparative analysis of the selected metrics for each time unit.

For example, if you need to compare how the Round Trip Time was affected by variance in the Two Way Packet Loss for each day of the week, you can generate the weekly Chart Detail report for the selected sites.

You can also select two or more QA nodes, or the set of nodes defined either as node groups, or as sites to generate Chart Detail report.

Using this report you can:

- Analyze the trend of network performance for multiple nodes, node groups, or sites based on one unit of time. Each unit of time is called as a **Display Grain**. Each Display Grain is measured as follows:
    - Five minutes for Hourly report
    - One hour for daily report
    - One day for weekly report
    - One day for monthly report
- Analyze the reason for any ups and downs in the network performance.
- Detect any persistent problem in the network performance .
- Compare network performance of more than two nodes, node groups, or sites based on historical QA data.

NNM iSPI Performance for QA Chart Detail Report Options

The Chart Detail report displays the following options:

- Primary Metric[1]
- Secondary Metric[2]

For information on metrics used by NNM iSPI Performance for QA. see NNM iSPI Performance for QA Metrics.

For information on user scenarios on QA Chart Detail report, see User Scenarios for NNM iSPI Performance for QA Chart Detail Report.

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[1]Enables you to select the main metric based on which you want to generate the report. The primary metric that you select is displayed on the left Y axis of the report.
[2]Enables you to select the metric that would overlay the primary metric. The secondary metric that you select is displayed on the right Y axis of the report.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA)Heat Chart Report

Quality Assurance (QA) Heat Chart report enables you to view how the network performance gets affected by a varying metric for a selected time range.

This report compares the performance of one metric. A Heat Chart report plots the metric measurement based on how the metric varies for a time range.

QA Heat Chart report uses different colors to display different measures of a metric. The legends display the different ranges of metric measurement, making it easier for you to spot the concern area.

Using this report you can detect the time range when the network performance was affected adversely because of the fluctuating metric value.

NNM iSPI Performance for QA Chart Detail Report Options

The Heat Chart report displays the following option:

Metric[1]

For information on metrics used by NNM iSPI Performance for QA. see NNM iSPI Performance for QA Metrics.

For information on user scenarios on QA Heat Chart report, see User Scenarios for NNM iSPI Performance for QA Heat Chart Report.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA)Managed Inventory Report

Quality Assurance Managed Inventory report enables you to view the topology elements used in a selected time range.

Using this report you can:

- View the utilization for each topology element used in your network.
- Analyze if any of the elements are overutilized or underutilized for a specific time range.
- Track the utilization of topology elements to resolve an existing network problem.
- Track the number of QA probes and QA probe types run in your network.

For more information on topology elements, see NNM iSPI Performance for QA Topology Filters.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA)Most Changed Reports

Quality Assurance (QA) Most Changed report enables you to compare performance for two different (consecutive) time periods and rank the nodes, node groups, or sites by the amount of change. The sort order is most-changed to least-changed, by default.

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[1]Select the metric based on which you want to generate the report.

Using this report you can:

- Measure the performance fluctuations for the selected nodes, node groups, or sites.
- Detect the top N nodes, node groups, or sites having a common network performance problem.

NNM iSPI Performance for QA Most Changed Report Options

The Most Changed report displays the following options:

- Top N[1]
- Metric[3]
- Grouping By[4]

For information on metrics used by NNM iSPI Performance for QA. see NNM iSPI Performance for QA Metrics.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Top N Report

This report ranks the selected network path, by the metric you select. Use this report to spot the network path where the QA probes reveal an extreme metric value. You can use this report to go back in time and investigate sampled data for process that are exhibiting unusual utilization levels.

Some of the network elements that you can use to generate this report are as follows:

- Destination node
- QA Probe Name
- QA Probe Type
- Source Site
- Destination Site
- Class of Service
- QA Probe UUID
- Node UUID

Using this report you can:

- Detect the network path having a common network performance problem
- Detect the underlying reason of a persistent problem with a network path. You can compare the

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[1]Select a rank between top or bottom five, ten, 25, 50, 100, all descending, and all ascending for the selected **network element**[2].
[2]Examples of network elements are; source node, destination node, QA probe name, QA probe type, source site, destination site, class of service, QA probe UUID, node UUID, etc.
[3]Enables you to select the metric based on which you want to generate the report. The metric that you select is used to rank the of the report.
[4]Enables you to group the report data based on a specific parameter. Click to add a sub-group.

performance for multiple network elements using this report.

Example

Some of the destination sites in your network are performing poorly. Using this report, you can group the QA probes reporting highest **Round Trip Time (RTT)**[1] for each of the destination sites. The QA probe reporting the highest RTT is ranked first.

HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Top N Report Options

The Top N report displays the following options:

- Top/Bottom 'N'[2]
- Metric[3]
- Display Time Series Chart[4]
- Grouping By[5]

Tip:

- By default, Top N Report is displayed without Time Series Chart.

    Click **Display Time Series Chart** to view the chart with the detail table.

- Check this report once a day to see which process may need special attention.
- Check this report periodically throughout the day to see which process are performing at the extremes and may need special attention.

For information on metrics used by HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA). see NNM iSPI Performance for QA Metrics.

Use Case for HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Calendar Report

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[1]The time required for a signal pulse or packet to travel from a specific source to a specific destination and back again.
[2]Select a rank between top or bottom five, ten, 25, 50, 100, all descending, and all ascending for the selected network element.
[3]Select the metric based on which you want to generate the report. The metric that you select is used to rank the report.
[4]Select **Yes** to view the detail chart with the table.
Select **No** to hide the chart and display only the table.
The created Top N Report displays with the Time Series Chart.
[5]Enables you to group the report data based on a specific parameter. Click to add a sub-group.

Module	QA Calendar Report
Use Case Name	Using QA Calendar Report
Use Case Author	HP Software

Summary

This use case gives you an overview of how you can use the Quality Assurance (QA) Calendar report to measure your network performances.

Application

NNM iSPI Performance for QA Reports using NNM iSPI Performance console

Overview

Traffic was slow between two **Site**[1]s for past one week

QA Calendar Report enables you to detect any persistent problem in the network.

Actor

- Network Administrator
- Capacity Planner
- Business Manager

Pre Condition

At least two sites should exist for this use case. We select `SiteA` and `SiteB` for this use case.

We need to check the QA Calendar report to analyze how the round trip time got affected by the variance in the two way packet loss over a specified period of time. The round trip time may increase due to high rate of packet loss, causing slow traffic.

Viewing QA Calendar Report

- Process Initialization
- Process
- Report Analysis
- GUIs Referenced

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[1]A logical organization of networking devices. In the scope of enterprise networks, a site can be a logical grouping of networking devices generally situated in similar gegraphic location. The location can include a floor, building or an entire branch office or several branch offices which connect to head quarters or another branch office via WAN/MAN. Each site is uniquely identified by its name. In case of the service provider networks the Virtual Routing and Forwarding (VRF) on a Provider Edge (PE) router or a Customer Edge (CE) routers can be defined as a site.

Assumptions

- User has administrative privileges to NNMi.
- User is analyzing the variations in the **Round Trip Time (RTT)**[1] as a result of packet loss for SiteA and SiteB.
- Both SiteA and SiteB are created NNMi Performance SPI for Quality Assurance Site Configuration form.

Initialization

1. 1. Log on to HP NNM iSPI Performance for Metrics Software console using your username and password.
   2. Click**Quality Assurance** tab to view the HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) reports.

View QA Calendar Report

This section describes all the typical interactions that take place between the actor and this use case.

Format: If the actor selects `<selection>`, the system will request the actor to enter information.

To view the QA Calendar report, follow the steps as discussed below:

1. Expand the Quality Assurance tab.

2. Select one of the following time ranges for the Calendar Report:

   - **D** for the report showing information for past one day
   - **W** for the report showing information for past seven days
   - **M** for the report showing information for past 30 days

   In this case, we select **W**.

3. Click **Topology Filters** and select the source and destination sites.

4. Click **Options** and select the following metrics:

   - **Two Way Packet Loss (%) (avg)** as the primary metric.
   - **Round Trip Time (msec) (avg)** as the secondary metric.

5. Select **Confirm Selection**.

The QA Calendar report opens displaying the weekly comparative study between Average Percentage of Two Way Packet Loss and Average Round Trip Time.

Analyzing the QA Calendar Report

The QA Calendar Report displays the following information:

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[1]The time required for a signal pulse or packet to travel from a specific source to a specific destination and back again.

- X axis: Time interval
- Left Y axis: Average percentage of two way packet loss
- Right Y axis: Average round trip time in milliseconds

We can derive the following points by analyzing the report information:

- Within a specific range of time, if the average two way packet loss increases beyond a valid range, the round trip time is also affected adversely.
- When the two way packet loss increases to the highest level, the round trip time also increases to its highest level.

  Some of the reasons that may cause high two way packet loss can be signal degradation over the network medium or over-saturated network links.

You can perform the following tasks to find out more about how the high two way packet loss affects the network:

- Compare the Calendar Report information with the Chart Detail report on round trip time for data packets, which is directly affected by two way packet loss.

  The Chart Detail report displays the measure of the selected metric for each time unit (in this case one day) as a grain, making it easier for you to understand the ups and downs in the metric performance.

  Select **Two Way Packet Loss (%) (avg)** as the primary metric, and **Round trip Time (msec) (avg)** as the secondary metric.
- Analyze the Chart Detail Report information and find out the day on which the two way packet loss was the highest.
- View the Top N report for that day to find the root cause of the problem.

GUIs Referenced

- HP NNM iSPI Performance for Metrics Software console
- NNM iSPI Performance for QA Calendar Report
- NNM iSPI Performance for QA Chart Detail Report
- NNM iSPI Performance for QA Top N Report

System Interface

HP NNM iSPI Performance for Metrics Software console

Use Case for HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Chart Detail Report

Module	QA Chart Detail Report
Use Case Name	Using QA Chart Detail Report
Use Case Author	HP Software

Summary

This use case gives you an overview of how you can use the Quality Assurance (QA) Chart Detail report to measure your network performances.

Application

NNM iSPI Performance for QA Reports using NNM iSPI Performance console

Overview

Traffic was slow between two **Site**[1]s for past one week

QA Chart Detail Report enables you to perform the following:

- Analyze the fluctuations in the network performance over a specific period of time.
- Compare the measures of two metrics and analyze how one metric was affected by the performance of the other metric.

Actor

- Network Administrator
- Capacity Planner
- Business Manager

Pre Condition

At least two sites should exist for this use case. We select `SiteA` and `SiteB` for this use case.

We need to check the QA Chart Detail report to analyze the average two way packet loss and it's effect on the average round trip time for

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[1]A logical organization of networking devices. In the scope of enterprise networks, a site can be a logical grouping of networking devices generally situated in similar gegraphic location. The location can include a floor, building or an entire branch office or several branch offices which connect to head quarters or another branch office via WAN/MAN. Each site is uniquely identified by its name. In case of the service provider networks the Virtual Routing and Forwarding (VRF) on a Provider Edge (PE) router or a Customer Edge (CE) routers can be defined as a site.

each day of the week.

This report displays each day of the week as a **Display Grain** and measures the performance of the selected metrics for that display grain.

Viewing QA Chart Detail Report

- Process Initialization
- Process
- Report Analysis
- GUIs Referenced

Assumptions

- User has administrative privileges to NNMi.
- User is analyzing the variations in the **Round Trip Time (RTT)**[1] as a result of packet loss for SiteA and SiteB.
- Both SiteA and SiteB are created NNMi Performance SPI for Quality Assurance Site Configuration form.

Initialization

1. 1. Log on to HP NNM iSPI Performance for Metrics Software console using your username and password.

    2. Click**Quality Assurance** tab to view the HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) reports.

View Chart Detail Report

To view the QA Chart Detail report, follow the steps as discussed below:

This section describes all the typical interactions that take place between the actor and this use case.

Format: If the actor selects `<selection>`, the system will request the actor to enter information.

To view the QA Chart Detail report, follow the steps as discussed below:

1. Expand the Quality Assurance tab.

    Select one of the following time ranges for the Chart Detail Report:

    - **H** for the report showing information for last one hour
    - **D** for the report showing information for past one day

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[1]The time required for a signal pulse or packet to travel from a specific source to a specific destination and back again.

- **W** for the report showing information for past seven days
- **M** for the report showing information for past 30 days

In this case we select **W**.

2. Click **Topology Filters** and select `SiteA` and `SiteB` as the source and destination sites.

3. Click **Options** and select the following metrics:

   - **Two Way Packet Loss (%) (avg)** as the primary metric.
   - **Round Trip Time (msec) (avg)** as the secondary metric.

4. Select **Confirm Selection**.

   The QA Chart Detail report opensdisplaying the weekly comparative study between maximum Percentage of Two Way Packet Loss and maximum Round Trip Time.

Analyzing the QA Chart Detail Report

The QA Chart Detail Report displays the following information:

- X axis: Time interval
- Left Y axis: Average percentage of packet loss from source to destination and destination to source site
- Right Y axis: Average round trip time in milliseconds

We can derive the following points by analyzing the report information:

- Within a specific range of time, when the average two way packet loss was the highest, the round trip time between two sites also was the highest. That is, the connectivity between these two sites at this point of time was very bad.

- Within a specific time range, whenever the packet loss decreased, it caused a decrease in the round trip time.

- However, if the two way packet loss increased slightly, it had no effect on the round trip time. During these periods, the round trip time remained steady, though the two way percentage of packet loss varied slightly.

You can perform the following tasks to find out more about how the high packet loss affects the network:

- View the Normalized Heat Chart for Two Way Packet :Loss (%) (avg) to analyze when the packet loss increased beyond the threshold limits, signifying a possible increase in the round trip time for data packets.

  The following figure shows a sample Normalized Heat Chart for Two Way Packet :Loss (%) (avg) that displays the varying packet loss for one day:

- View the Quality Assurance (QA) Top N report for round trip time. You can group the report based on the source and destination sites to find out the route on which the round trip time is high.

GUIs Referenced

- HP NNM iSPI Performance for Metrics Software console
- NNM iSPI Performance for QA Chart Detail Report
- NNM iSPI Performance for QA Top N Report

System Interface

HP NNM iSPI Performance for Metrics Software console

Use Case for HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) Heat Chart Report

Module	QA Heat Chart Report
Use Case Name	Using QA Heat Chart Report
Use Case Author	HP Software

Summary

This use case gives you an overview of how you can use the Quality Assurance (QA) Heat Chart report to measure your network performances.

Application

 NNM iSPI Performance for QA Reports using NNM iSPI Performance console

Overview

VoIP connection is disrupted by high level of noise

VoIP is very sensitive to the latency and jitter properties of the network. The level of noise may increase because of high level of jitter or latency in a VoIP connection.

QA Heat Chart report enables you to analyze when the following metrics were beyond the threshold level:

- Average Two Way **Jitter**[1]
- Average **Round Trip Time (RTT)**[2]

This report enables you to perform the following:

- Pinpoint the time period when the metric performance crossed the threshold limit.
- Compare the measures of a metric for various date and time ranges and analyze how the high or low measures affected the whole performance of the metric

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[1]Jitter is a measure of the variability over time of the latency across a network. A very low amount of jitter is important for real-time applications using voice and video. Jitter can be positive, negative, from source to destination, and from destination to source.
[2]The time required for a signal pulse or packet to travel from a specific source to a specific destination and back again.

Actor

- Network Administrator
- Capacity Planner
- Business Manager

Pre Condition

None.

Viewing QA Chart Detail Report

- Process Initialization
- Process
- Report Analysis
- GUIs Referenced

Assumptions

- User has administrative privileges to NNMi.
- User is analyzing the variations in the Jitterand Round Trip Time (RTT) for the disruptions in the VoIP network.

Initialization

1. 1. Log on to HP NNM iSPI Performance for Metrics Software console using your username and pass-word.

   2. Click**Quality Assurance** tab to view the HP Network Node Manager iSPI Performance for Quality Assurance Software (NNM iSPI Performance for QA) reports.

View QA Heat Chart Report

This section describes all the typical interactions that take place between the actor and this use case.

Format: If the actor selects <selection>, the system will request the actor to enter information.

To view the QA Calendar report, follow the steps as discussed below:

1. Expand the Quality Assurance tab.

2. Select one of the following time ranges for the Calendar Report:

   - **D** for the report showing information for past one day
   - **W** for the report showing information for past seven days
   - **M** for the report showing information for past 30 days

   In this case, we select **W**.

3. Click **Topology Filters** and select the source and destination sites.

4. Click **Options** and select the Two Way Jitter (µsecs) (avg) as the report metric:

5. Select **Confirm Selection**.

The QA Heat Chart report opensdisplaying the average two way jitter for past one week.
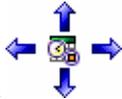
Each column in the report displays the hours of a day Each cell represents the average two way jitter for that hour

Analyzing the QA Heat Chart Report

By analyzing the heat chart report we can analyze at which point of time the jitter was high during the past one week. A high level of jitter may cause disruption over a VoIP network.

You can perform the following tasks to view the cause of high jitter:

- View the Quality Assurance (QA) Top N report for jitter. You can group the report based on one or more metrics to find out the network route having the highest jitter. Examples of such Top N report groups are:

  - The top N (top five, ten, 15, 25, 50, or 100) source and destination sites to find out the route on which the jitter is highest

  - The top N (top five, ten, 15, 25, 50, or 100) source sites, destination sites, and QA probes to view the QA probes that reported the highest jitter within a specific route.

Tip: Click   Select Time Range to configure the time range for the Top N report.

After analyzing the jitter we can also analyze the average round trip time for the network for the past one week.

An increase in the round trip time may cause the voice quality to be sound broken or choppy over a VoIP network.

1. Click **Options** and select the **Round Trip Time (msec) (avg)** as the report metric.

2. Select **Confirm Selection**.

The QA Heat Chart report opens displaying the average round trip time for each hour of the day for past one week.

- Each column displays the hours of a day

- Each cell represents the average round trip time for that hour

You can perform the following tasks to view the cause of increasing round trip time:

- Generate Top N reports for the time range when the round trip time was the highest based on the following metrics to reveal the cause of the round trip time:

  - The top N (you may select top five, top ten or top 15) nodes to view the level of latency (round trip time) for each node group.

  - The top N (you may select top five, top ten or top 15) QA probes to view the QA probes that reported the highest latency.

Tip: Click   Select Time Range to configure the time range for the Top N report.

- Generate the QA Chart Detail Report based on the following metrics to check whether the high round trip time was caused by high percentage of packet loss:

- Two Way Packet Loss (%) (avg) as the primary metric
- Round Trip Time (msec) (avg) as the secondary metric

GUIs Referenced

- HP NNM iSPI Performance for Metrics Software console
- NNM iSPI Performance for QA Heat Chart Report
- NNM iSPI Performance for QA Chart Detail Report
- NNM iSPI Performance for QA Top N Report

System Interface

HP NNM iSPI Performance for Metrics Software console

Appendix A: Glossary Terms

C

Class of Service

Class of Service (CoS) is a way of managing traffic in a network by grouping similar types of traffic (for example, e-mail, streaming video, voice, large document file transfer) together and treating each type as a class with its own level of service priority. The priority value can be between 0 and 7 that can be used by Quality of Service (QoS) disciplines to differentiate traffic.

D

delay

The time taken for a packet to travel from the sender network element to the receiver network element.

H

High

The QA probe measure for the network element performance crossed the High threshold value.

I

ICMP

The Internet Control Message Protocol (ICMP) is one of the core protocols of the Internet Protocol Suite. It is chiefly used by networked computers' operating systems to send error messages—indicating, for instance, that a requested service is not available or that a host or router could not be reached.

ICMP Echo

ICMP Echo is a method used to test whether a particular host is reachable across an IP network; it is also used to self test the network interface card of the computer, or as a latency test. It measures the round-trip time and records any packet loss, response packets received, the minimum, mean, maximum and the standard deviation of the round trip time.

IP SLA

Cisco IOS IP SLAs is a feature included in the Cisco IOS Software that can allow administrators the ability to Analyze IP Service Levels for IP applications and services. IP SLA's uses active traffic-monitoring technology to monitor continuous traffic on the network. Using IP SLAs, routers and switches perform periodic measurements. The exact number and type of available measurements depends on the IOS version.

J

Jitter

Jitter is a measure of the variability over time of the latency across a network. A very low amount of jitter is important for real-time applications using voice and video. Jitter can be positive, negative, from source to destination, and from destination to source.

L

Low

The QA probe measure for the network element performance crossed the Low threshold value.

M

Mean Opinion Scores(MOS)

A measurement of the subjective quality of human speech, represented as a rating index. MOS is derived by taking the average of numerical scores given by juries to rate quality and using it as a quantitative indicator of system performance.

N

Negative Jitter

When the delay variance in sending the data packet from the source network element is less than the predefined inter-packet delay. For example, If packets are sent with 10 ms interval, positive jitter means they were received with less than 10 ms interval.

network element

Examples of network elements are; source node, destination node, QA probe name, QA probe type, source site, destination site, class of service, QA probe UUID, node UUID, etc.

Nominal

The QA probes measure for the network element performance was within healthy range, or no thresholds are being monitored.

Not Polled

Indicates that this network element is not polled intentionally.

O

ODBID

ODBID is a custom attribute that the HP Network Node Manager i-Series Software(NNMi) topology uses to integrate the NNMi topology with Business Service Management(BSM) software suite. The Smart Plug-Ins (SPIs) get this attribute from NNMi during the discovery and keep a reference. You can use ODBID as a report toplogy filter.

P

Positive Jitter

When the delay variance in sending the data packet from the source network element is more than the predefined inter-packet delay. For example, If packets are sent with 10 ms interval, positive jitter means they were received with more than 10 ms interval.

R

Round Trip Time (RTT)

The time required for a signal pulse or packet to travel from a specific source to a specific destination and back again.

S

Site

A logical organization of networking devices. In the scope of enterprise networks, a site can be a logical grouping of networking devices generally situated in similar gegraphic location. The location can include a floor, building or an entire branch office or several branch offices which connect to head quarters or another branch office via WAN/MAN. Each site is uniquely identified by its name. In case of the service provider networks the Virtual Routing and Forwarding

(VRF) on a Provider Edge (PE) router or a Customer Edge (CE) routers can be defined as a site.

site rules

Configuration associated to a site are called site rules. For example Node Group, Ordering, Test Name Pattern, etc are the site rules that are used to configure a site. The rules are prioritized inherently. The Node Group rule has the highest priority, the IP Address rule the second highest priority. Test Name Pattern rule has the third highest priority while the VRF Name rule has the the lowest priority among these foure rules. Note that none of these rules have any dependency to each other. In other words, while creating a site, you can specify all or any of the the rules.

sites

A logical organization of networking devices. In the scope of enterprise networks, a site can be a logical grouping of networking devices generally situated in similar gegraphic location. The location can include a floor, building or an entire branch office or several branch offices which connect to head quarters or another branch office via WAN/MAN.

Each site is uniquely identified by its name.

standard IPv6 shorthand notation

IPv6 addresses are generally written in the form, hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:h In this full notation, pairs of IPv6 bytes are separated by a COLON and each byte in turns is represented as a pair of hexadecimal numbers. For example, E3D7:0000:0000:0000:51F4:9BC8 Shorthand notation in IPv6 removes these bytes with a zero values from the text representation, though the bytes still remain present in the actual network address). For example, E3D7::51F4:9BC8:C0A8:6420.

T

TCP Connect

TCP Connect scans a normal TCP connection to determine if a port is available. This scan method uses the same TCP handshake connection that every other TCP-based application uses on the network.

Two Way Jitter

The two way jitter is the average of the upstream positive, upstream negative, downstream positve, and downstream negative jitter.

U

UDP

The User Datagram Protocol (UDP) is one of the core members of the Internet Protocol Suite. UDP service type in QA SPI uses the UDP protocol and provides jitter measurements. With UDP protocol, computer applications can send messages, in this case referred to as datagrams, to other hosts on an Internet Protocol (IP) network without requiring prior communications to set up special transmission channels or data paths.

UDP Echo

A UDP Echo is a server program that gives you an echo of a text string that you send using a UDP client.

Unavailable

Unable to compute the performance state of the network element, or the computed value is outside the valid range.

V

VoIP

Voice over Internet Protocol (VoIP) is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or

other packet-switched net-
works. VoIP converts an analog
voice signal to digital format
and compresses the signal into
Internet protocol (IP) packets for
transmission over the Internet.

VRF

Virtual Routing and Forwarding
(VRFs) tables include the rout-
ing information that defines the
Virtual Private Network (VPN)
attached to a Provider Edge
(PE) router. Each VRF is on a
PE router. All PE routers con-
taining VRFs relevant to the
named VPN are grouped in
one VPN. A VRF can only
belong to a single VPN and is
grouped on the basis of the
Route Targets.

Appendix B: Index