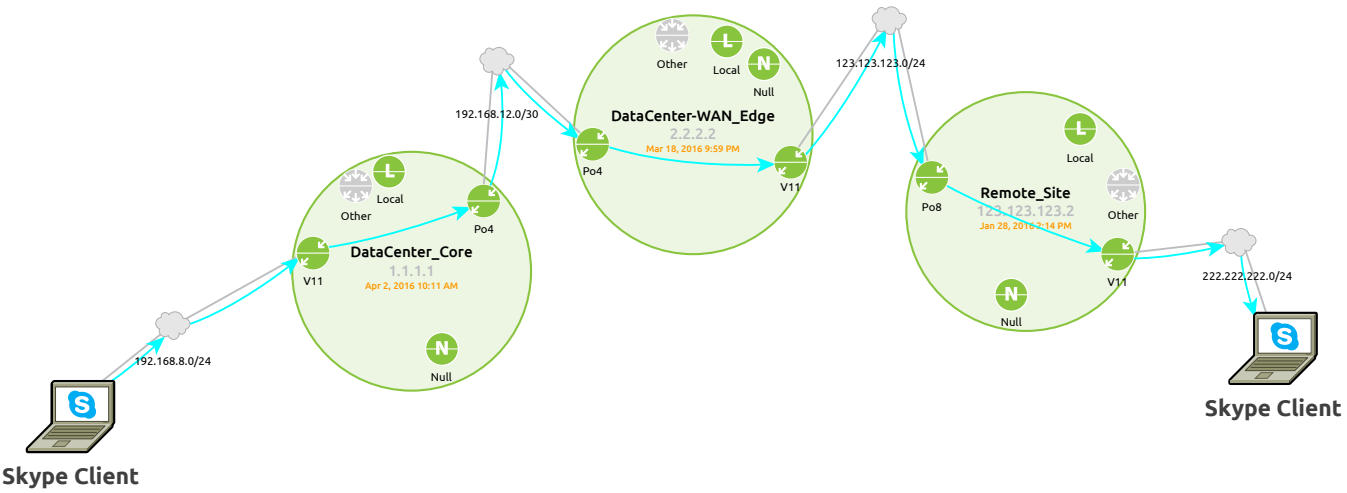
Using Cisco Medianet Performance Monitor with LiveNX



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INTRODUCTION

Cisco's Medianet Performance Monitor (PerfMon) is a variation of Flexible NetFlow (FNF) that allows the user to become aware of key media and application metrics for traffic flows. This new capability reports not only on the standard NetFlow 5-tuple (Source IP Address, Destination IP Address, Source Port, Destination Port, and IP Protocol), but also on media specific data such as Jitter, Media Rate Variation, RTP Synchronization Source (SSRC), and much more. The main goal is to grant Network Administrators the chance to detect flow performance issues before they impact the overall usability of the media application.

LiveNX serves to provide a detailed view of the reported PerfMon traffic, with an easy to understand graphical interface. Users can then further leverage Cisco's PerfMon technology, with the assistance of LiveNX, to perform troubleshooting and monitoring of critical voice and video traffic flows. This technical application note provides instructions on enabling and using PerfMon within the context of the LiveNX software.

SUPPORTED IOS

Cisco Catalyst Switches

Platform	IOS	License
Catalyst 6500-E SUP2-T	15.0(1)SY	IP Services
Catalyst 4900M	15.1(1)SG	IP Base
Catalyst 4500X	XE 3.3.0SG	IP Base
Catalyst 4500E SUP7-E	XE 3.3.0SG	IP Base
Catalyst 4500E SUP6-E	15.1(1)SG	IP Base
Catalyst 3750 / 3560	12.2(58)SE2	IP Base

Cisco Integrated Services Routers (ISR) and Aggregation Services Routers (ASR)

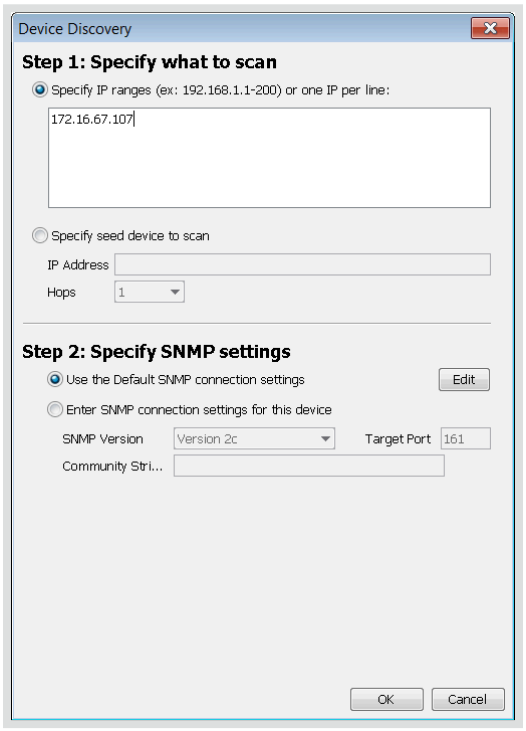
Platform	IOS	License
Cisco 3900 ISR	15.1(3)T	UC or Data
Cisco 2900 ISR	15.1(3)T	UC or Data
Cisco 4000 ISR	15.1 (3)T	UC or Data
Cisco 1900 ISR	15.1(3)T	Data
Cisco 880/890 ISR	15.1(3)T	Universal with Advanced IP
Cisco ASR 1001	XE 3.5	Universal with Advanced IP
Cisco ASR 1000	XE 3.5	Universal with Advanced Enterprise

For the latest information regarding Cisco Medianet, visit: http://www.cisco.com/go/medianet

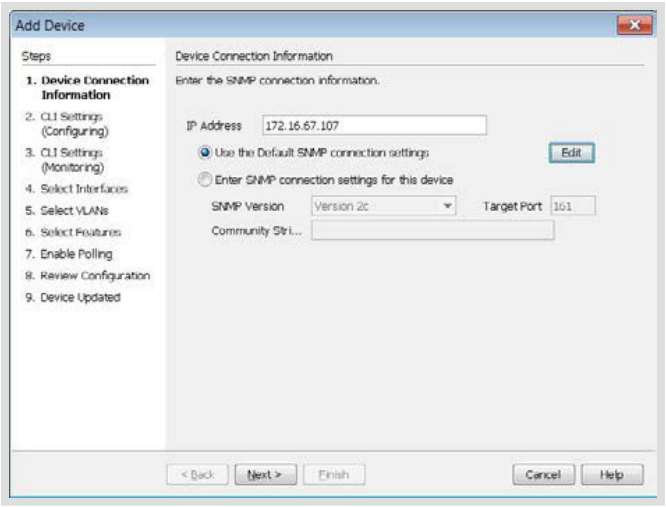
LIVENX CONFIGURATION

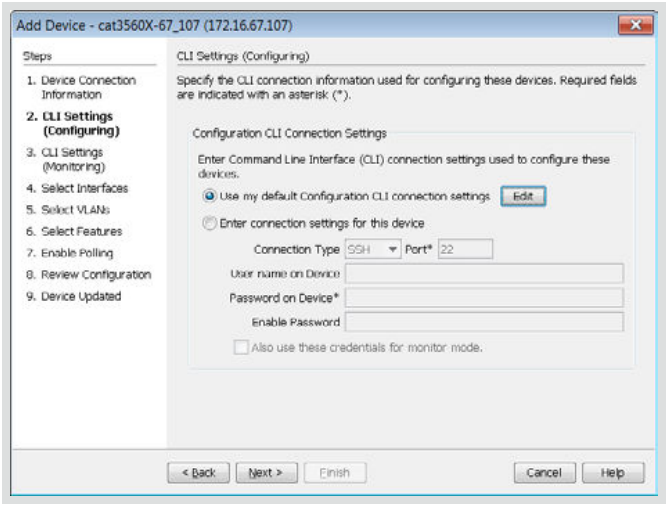
Setting Up the Device

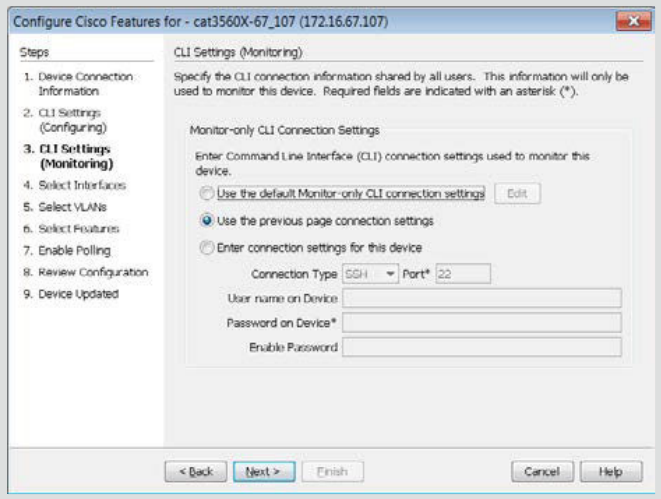
The first step to leveraging these capabilities is to add the devices to the LiveNX topology. This is accomplished through discovery, or by directly adding the devices through the File menu:

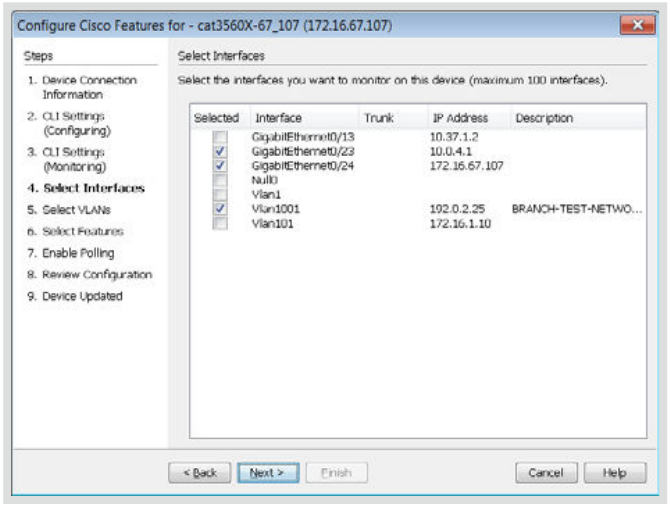


Then, step through the Add Device wizard entering the appropriate information for the IP address, SNMP read string, CLI login credentials, and select the appropriate interfaces:

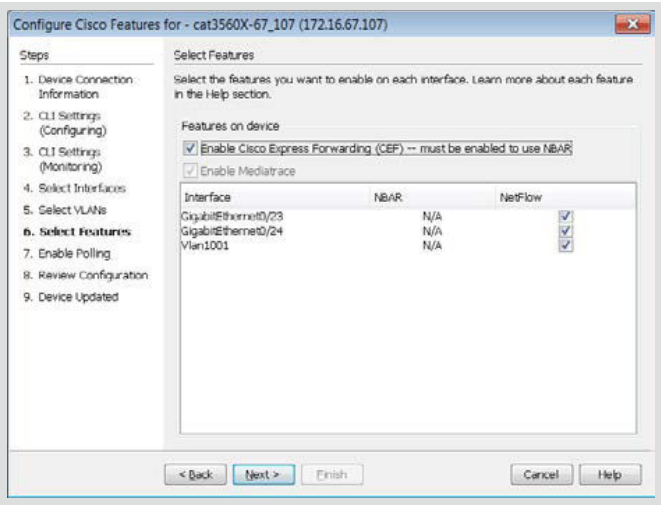


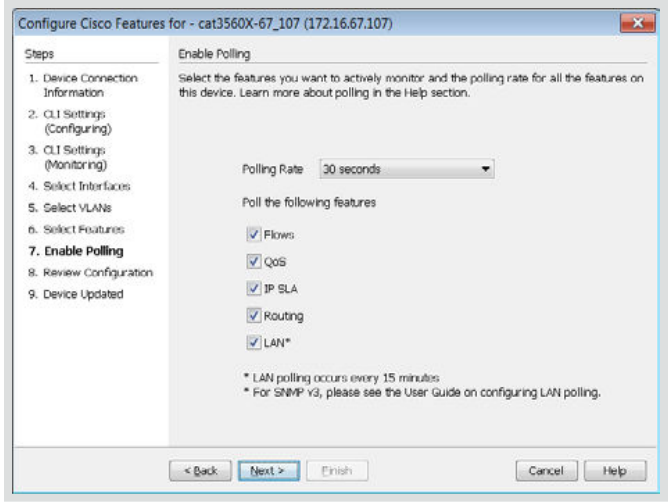






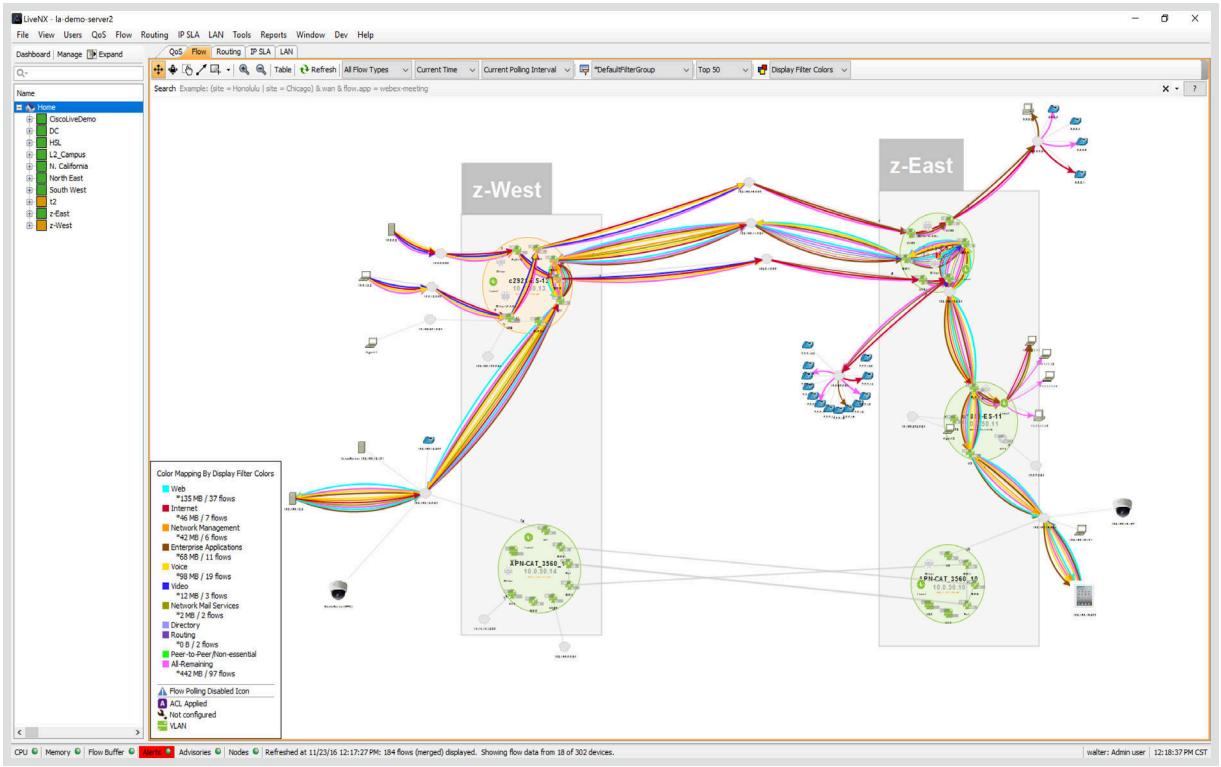
Then enable NetFlow collection and configure any other polling options:





CONFIGURING MEDIANET WITH LIVENX

Here is the example topology we will be using for the commands:



LiveNX can assist in configuring Medianet on supported devices. The Configure Flow feature allows each device to be configured with the necessary commands.

Click **Flow > Configure Flow** or right click on a device in the device view and then selecting **Flow > Configure Flow**. This capability is available to Admin and Full-Config user roles.

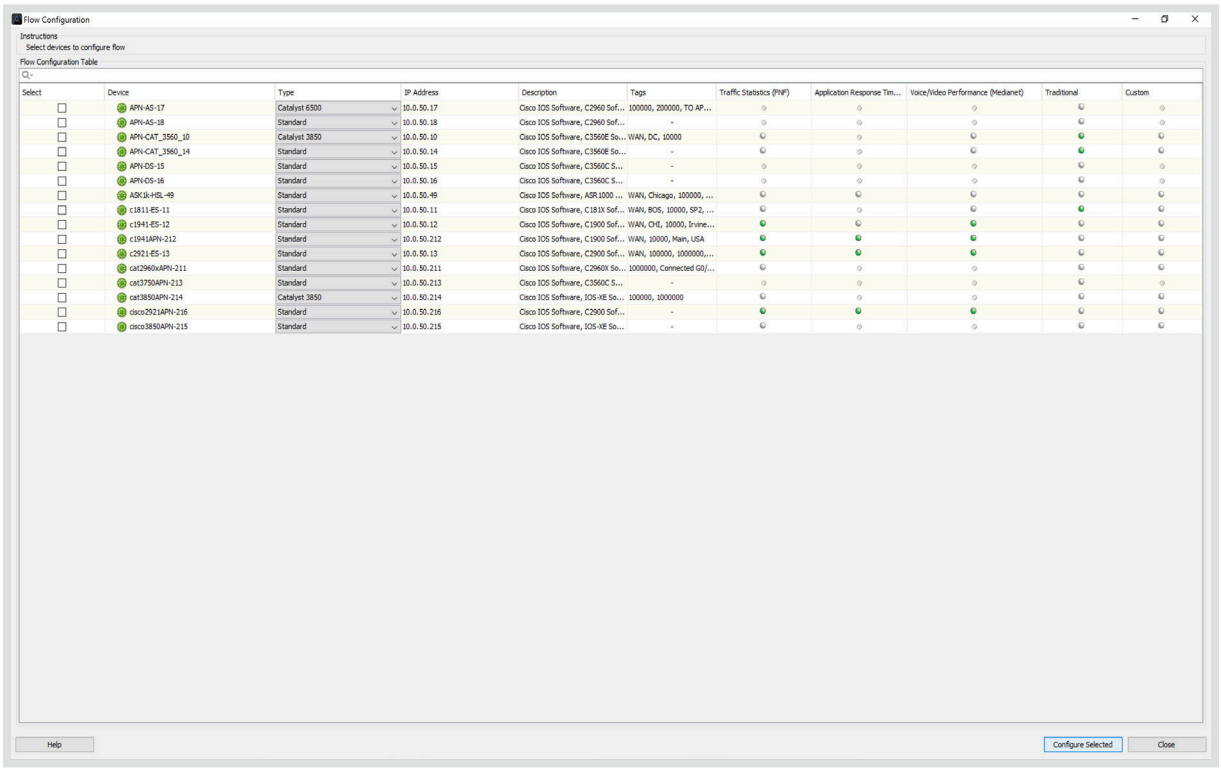
After clicking on **Flow > Configure Flow**, LiveNX displays a Flow Configuration summary table listing all the devices discovered by LiveNX as well as its properties including Type, IP Address, Description, Tags, and several Flow Configuration Options.

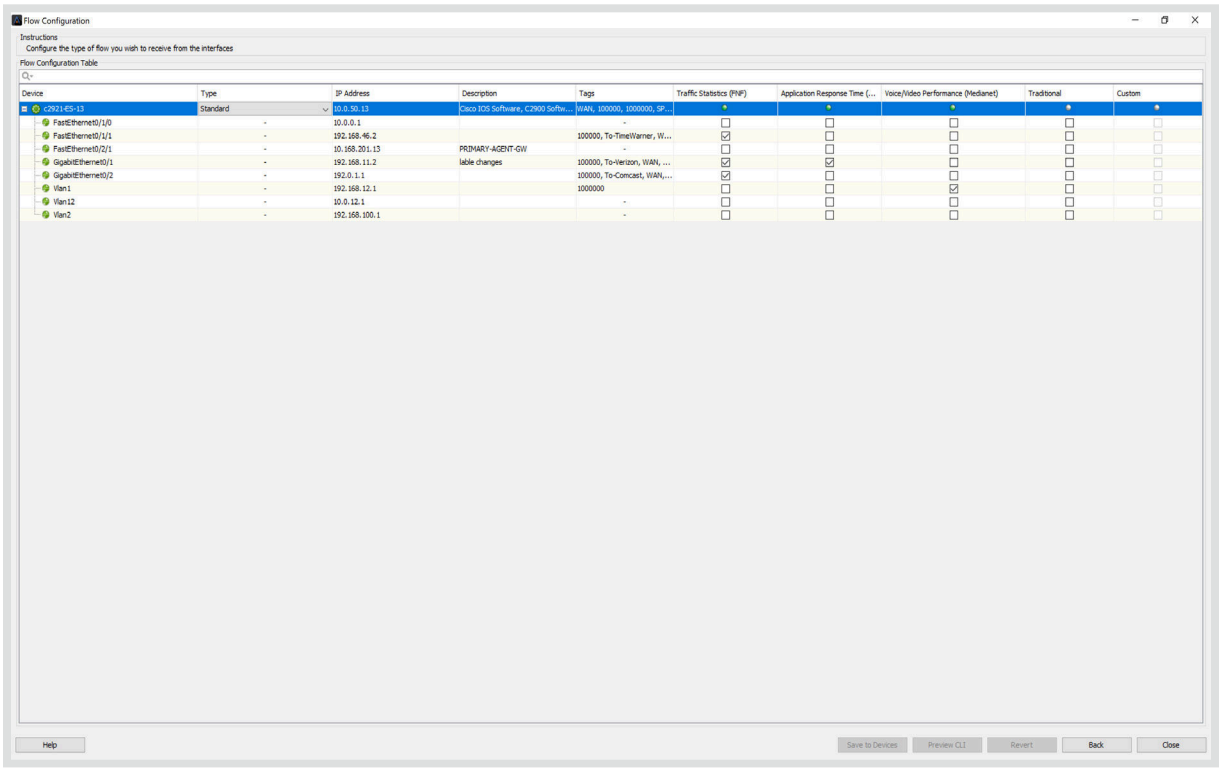
Select the device(s) you wish to configure Medianet on by clicking the check box next to the device name and then click on **Configure Selected**.

Select the interfaces you wish to configure Medianet on with the check boxes under the Voice/Video Performance (Medianet) column. A hyphen mark in the column indicates that the device does not support Medianet.

Once all the selections have been made, the **Save to Devices**, **Preview CLI**, and **Revert**.

- **Preview CLI** – click on **Preview CLI** to review the commands that LiveNX will send to the device to re-configure flows on the selected interfaces. If configuring multiple devices, use the device table on the left to select a device in the list.

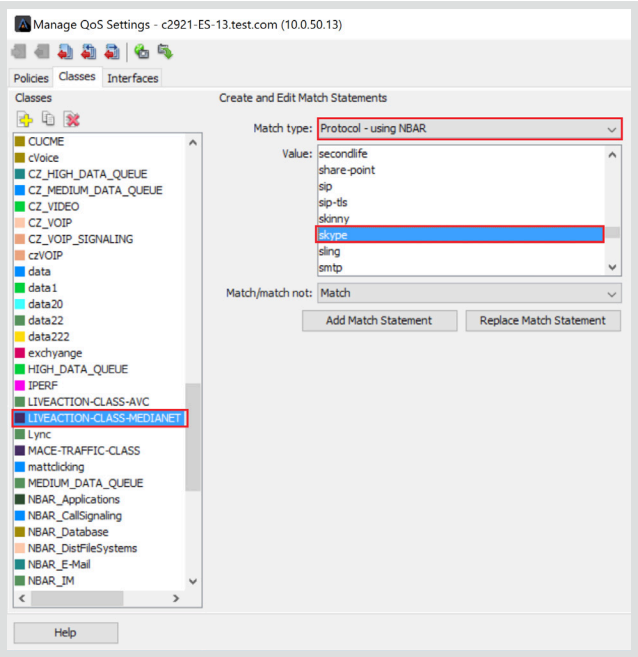

Flow Configuration
Instructions
Select devices to configure flow
Flow Configuration Table
Select
Device
Type
IP Address
Description
Tags
Traffic Statistics (FNF)
Application Response Tim...
Voice/Video Performance (Medianet)
Traditional
Custom
APN-AS-17
Catalyst 6500
10.0.50.17
Cisco IOS Software, C2960 Sof...
100000, 200000, TO AP...
APN-AS-18
Standard
10.0.50.18
Cisco IOS Software, C2960 Sof...
APN-CAT_3560_10
Catalyst 3850
10.0.50.10
Cisco IOS Software, C3560E So...
WAN, DC, 10000
APN-CAT_3560_14
Standard
10.0.50.14
Cisco IOS Software, C3560E So...
APN-DS-15
10.0.50.15
Cisco IOS Software, C3560C S...
APN-DS-16
10.0.50.16
ASK1k-HSL-49
10.0.50.49
Cisco IOS Software, ASR1000 ...
WAN, Chicago, 100000, ...
c1811-ES-11
10.0.50.11
Cisco IOS Software, C181X Sof...
WAN, BOS, 10000, SP2, ...
c1941-ES-12
10.0.50.12
Cisco IOS Software, C1900 Sof...
WAN, CHI, 10000, Irvine...
c1941APN-212
10.0.50.212
WAN, 10000, Main, USA
c2921-ES-13
10.0.50.13
WAN, 100000, 1000000,...
cat2960xAPN-211
10.0.50.211
Cisco IOS Software, C2960X So...
1000000, Connected G0/...
cat3750APN-213
10.0.50.213
cat3850APN-214
10.0.50.214
Cisco IOS Software, IOS-XE So...
100000, 1000000
cisco2921APN-216
10.0.50.216
cisco3850APN-215
10.0.50.215
Help
Configure Selected
Close

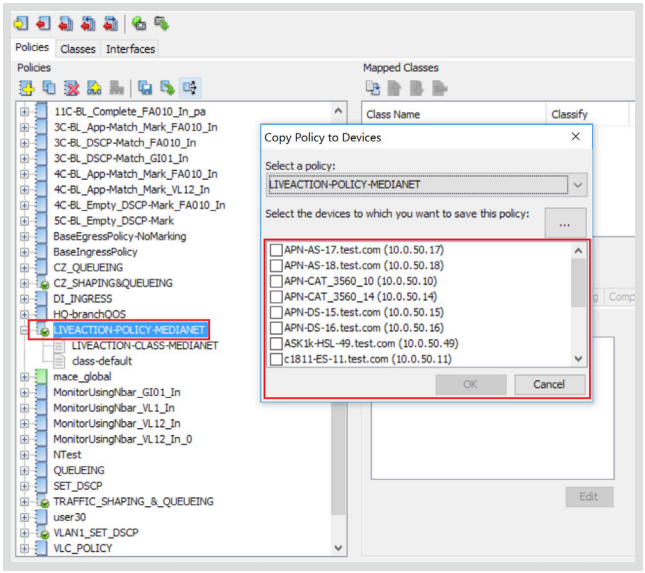

Flow Configuration
Instructions
Configure the type of flow you wish to receive from the interfaces
Flow Configuration Table
Device
Type
IP Address
Description
Tags
Traffic Statistics (FNF)
Application Response Time (...
Voice/Video Performance (Medianet)
Traditional
Custom
c2921-ES-13
Standard
10.0.50.13
Cisco IOS Software, C2900 Softw...
WAN, 100000, 1000000, SP...
FastEthernet0/1/0
10.0.0.1
FastEthernet0/1/1
192.168.46.2
100000, To-TimeWarner, W...
FastEthernet0/2/1
10.168.201.13
PRIMARY-AGENT-GW
GigabitEthernet0/1
192.168.11.2
lable changes
100000, To-Verizon, WAN, ...
GigabitEthernet0/2
192.0.1.1
100000, To-Comcast, WAN,...
Vlan1
1000000
Vlan12
10.0.12.1
Vlan2
192.168.100.1
Help
Save to Devices
Preview CLI
Revert
Back
Close

- **Revert** – click on **Revert** to return your flow configuration settings back to the initial state prior to any **"Save to Devices"** command.
- **Back** – click on **Back** to return back to the device only view of the flow configuration table.
- **Close** – close the flow configuration table.
- **Save to Devices** – LiveNX will ask you to confirm that you would like to configure the devices. If confirmed, LiveNX will modify the flow configuration for the selected interfaces on the device. A message will be generated to indicate successful re-configuration of that device or to indicate details on the errors encountered during the flow configuration.

NOTE: You can modify your Medianet Policy to add other Voice and Video applications to monitor. To do this for all of your devices that have Medianet, you only need to modify one seed policy and then push that policy to the rest of your devices.

First go to your seed device and find the "LIVEACTION-CLASS-MEDIANET" and then select your match type. Below the policy is being matched to Skype using NBAR2, but you can also use access-lists to be specific about your telepresence video conversations.





After modifying your policy, you can then select to copy that policy to your other Medianet capable devices.

LIVENX PERFMON FEATURES

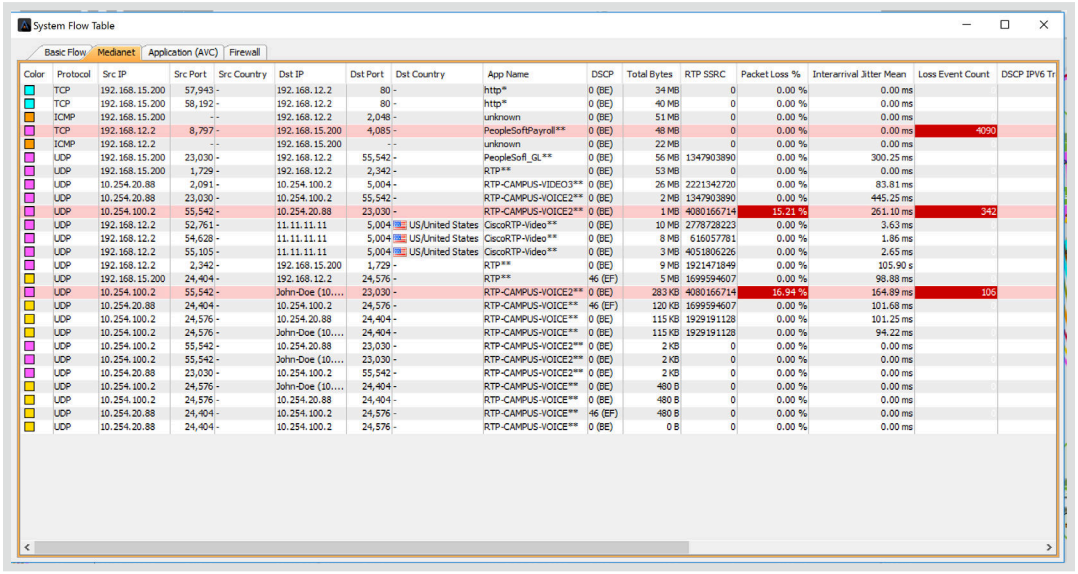
Medianet Flow Alerts

LiveNX's alert system affects the output of multiple views and reports in the application. Exceeding the threshold values under the Configure Alerts dialogue will trigger an alert in the In-Application Alerts window, and the corresponding flows will be highlighted in the Device View, System View, and Medianet Top Analysis Report. The following screenshots reflect the enabled alerts (percentage being greater than 1%).

System Flow Table

Under the Medianet tab, the System Flow Table will display PerfMon related statistics on the collected flows. The flows are an aggregation of all received flows handled by both the Traditional NetFlow process and the Medianet PerfMon process, with a new entry being uniquely identified by the collectable attributes of the packets. Some of the new packet attributes related to Medianet include:

- RTP SSRC = RTP Synchronization Source. A unique identifier used to differentiate stream sources using the same 5-tuple flow information.
- Packet Loss % = The largest packet loss % value received from all devices in the system during the polling period.
- Interarrival Jitter Mean = The largest RTP jitter mean value received from all devices in the system during the polling period.
- Loss Event Count = The sum of the Loss Event Counts received from all devices during the polling period.
- DSCP IPV6 Traffic = Medianet PerfMon reported DSCP value for the specific flow.



Color	Protocol	Src IP	Src Port	Src Country	Dst IP	Dst Port	Dst Country	App Name	DSCP	Total Bytes	RTP SSRC	Packet Loss %	Interarrival Jitter Mean	Loss Event Count	DSCP IPV6 Tr
	TCP	192.168.15.200	57,943	-	192.168.12.2	80	-	http*	0 (BE)	34 MB	0	0.00 %	0.00 ms		
	TCP	192.168.15.200	58,192	-	192.168.12.2	80	-	http*	0 (BE)	40 MB	0	0.00 %	0.00 ms		
	ICMP	192.168.15.200	-	-	192.168.12.2	2,048	-	unknown	0 (BE)	51 MB	0	0.00 %	0.00 ms		
	TCP	192.168.12.2	8,797	-	192.168.15.200	4,085	-	PeopleSoftPayroll**	0 (BE)	48 MB	0	0.00 %	0.00 ms	4090	
	ICMP	192.168.12.2	-	-	192.168.15.200	-	-	unknown	0 (BE)	22 MB	0	0.00 %	0.00 ms		
	UDP	192.168.15.200	23,030	-	192.168.12.2	55,542	-	PeopleSoft_GL**	0 (BE)	56 MB	1347903890	0.00 %	300.25 ms		
	UDP	192.168.15.200	1,729	-	192.168.12.2	2,342	-	RTP**	0 (BE)	53 MB	0	0.00 %	0.00 ms		
	UDP	10.254.20.88	2,091	-	10.254.100.2	5,004	-	RTP-CAMPUS-VIDEO3**	0 (BE)	26 MB	2221342720	0.00 %	83.81 ms		
	UDP	10.254.20.88	23,030	-	10.254.100.2	55,542	-	RTP-CAMPUS-VOICE2**	0 (BE)	2 MB	1347903890	0.00 %	445.25 ms		
	UDP	10.254.100.2	55,542	-	10.254.20.88	23,030	-	RTP-CAMPUS-VOICE2**	0 (BE)	1 MB	4080166714	15.21 %	261.10 ms	342	
	UDP	192.168.12.2	52,761	-	11.11.11.11	5,004	US/United States	CiscoRTP-Video**	0 (BE)	10 MB	2778728223	0.00 %	3.63 ms		
	UDP	192.168.12.2	54,628	-	11.11.11.11	5,004	US/United States	CiscoRTP-Video**	0 (BE)	8 MB	616057781	0.00 %	1.86 ms		
	UDP	192.168.12.2	55,105	-	11.11.11.11	5,004	US/United States	CiscoRTP-Video**	0 (BE)	3 MB	4051806226	0.00 %	2.65 ms		
	UDP	192.168.12.2	2,342	-	192.168.15.200	1,729	-	RTP**	0 (BE)	9 MB	1921471849	0.00 %	105.90 s		
	UDP	192.168.15.200	24,404	-	192.168.12.2	24,576	-	RTP**	46 (EF)	5 MB	1699594607	0.00 %	98.88 ms		
	UDP	10.254.100.2	55,542	-	John-Doe (10....	23,030	-	RTP-CAMPUS-VOICE2**	0 (BE)	283 KB	4080166714	16.94 %	164.89 ms	106	
	UDP	10.254.20.88	24,404	-	10.254.100.2	24,576	-	RTP-CAMPUS-VOICE**	46 (EF)	120 KB	1699594607	0.00 %	101.68 ms		
	UDP	10.254.100.2	24,576	-	10.254.20.88	24,404	-	RTP-CAMPUS-VOICE**	0 (BE)	115 KB	1929191128	0.00 %	101.25 ms		
	UDP	10.254.100.2	24,576	-	John-Doe (10....	24,404	-	RTP-CAMPUS-VOICE**	0 (BE)	115 KB	1929191128	0.00 %	94.22 ms		
	UDP	10.254.100.2	55,542	-	10.254.20.88	23,030	-	RTP-CAMPUS-VOICE2**	0 (BE)	2 KB	0	0.00 %	0.00 ms		
	UDP	10.254.100.2	55,542	-	John-Doe (10....	23,030	-	RTP-CAMPUS-VOICE2**	0 (BE)	2 KB	0	0.00 %	0.00 ms		
	UDP	10.254.20.88	23,030	-	10.254.100.2	55,542	-	RTP-CAMPUS-VOICE2**	0 (BE)	2 KB	0	0.00 %	0.00 ms		
	UDP	10.254.100.2	24,576	-	John-Doe (10....	24,404	-	RTP-CAMPUS-VOICE**	0 (BE)	480 B	0	0.00 %	0.00 ms		
	UDP	10.254.100.2	24,576	-	10.254.20.88	24,404	-	RTP-CAMPUS-VOICE**	0 (BE)	480 B	0	0.00 %	0.00 ms		
	UDP	10.254.20.88	24,404	-	10.254.100.2	24,576	-	RTP-CAMPUS-VOICE**	46 (EF)	480 B	0	0.00 %	0.00 ms		
	UDP	10.254.20.88	24,404	-	10.254.100.2	24,576	-	RTP-CAMPUS-VOICE**	0 (BE)	0 B	0	0.00 %	0.00 ms		

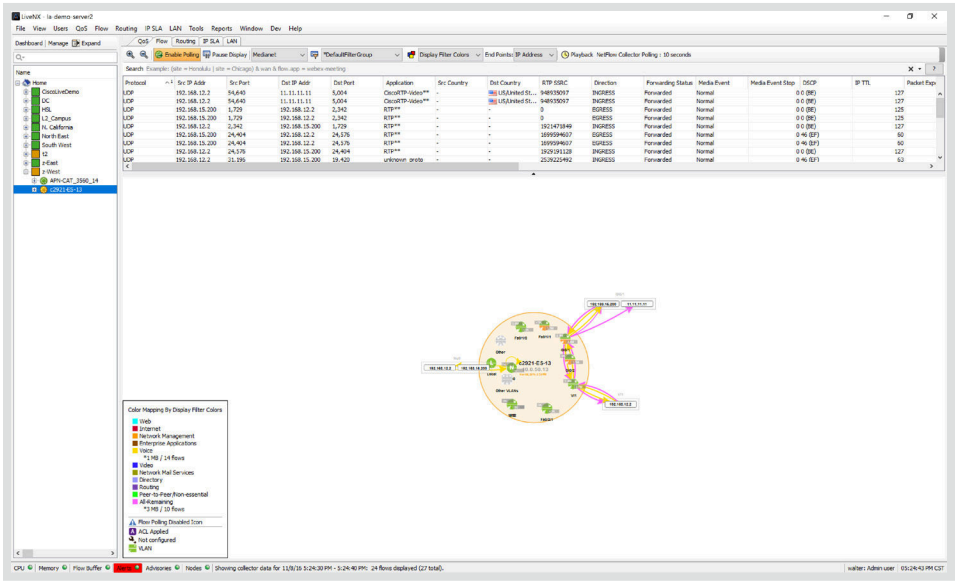
NOTE: Since the System Flow Table deals with aggregated data, some of the PerfMon fields are not displayed. The Device Flow Table includes a more detailed view of various PerfMon attributes.

Medianet Path Analysis

LiveNX can help quickly determine a problematic location with easy to understand color differentiation. Green indicates no issue while red will help determine an issue, like packet loss. It will also help in tracking down the path a conversation takes across the network.

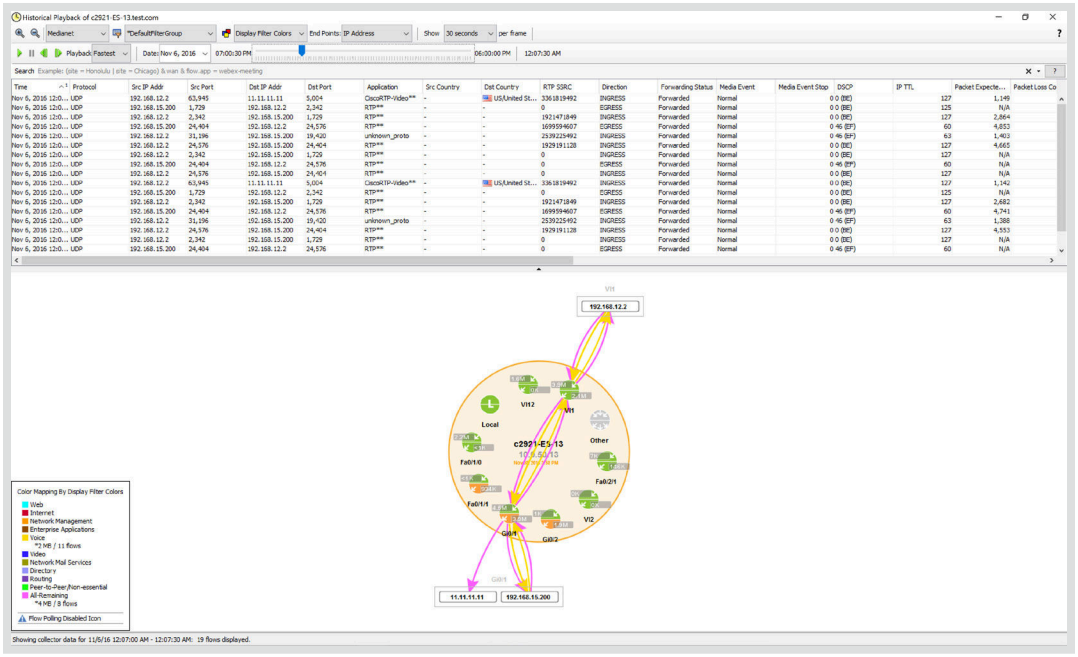
Device Flow Table

LiveNX's Device Flow Table only outputs device-specific Medianet flow data in contrast to the aggregated flow data displayed by the System Flow Table. This allows for a more in-depth view into the media flow and projects a wider range of flow metrics. Utilizing the configured alert threshold shows the offending media flow highlighted in pink, while the attribute is highlighted in red. The main purpose of the Device Flow Table is to provide real-time monitoring capability to the user.



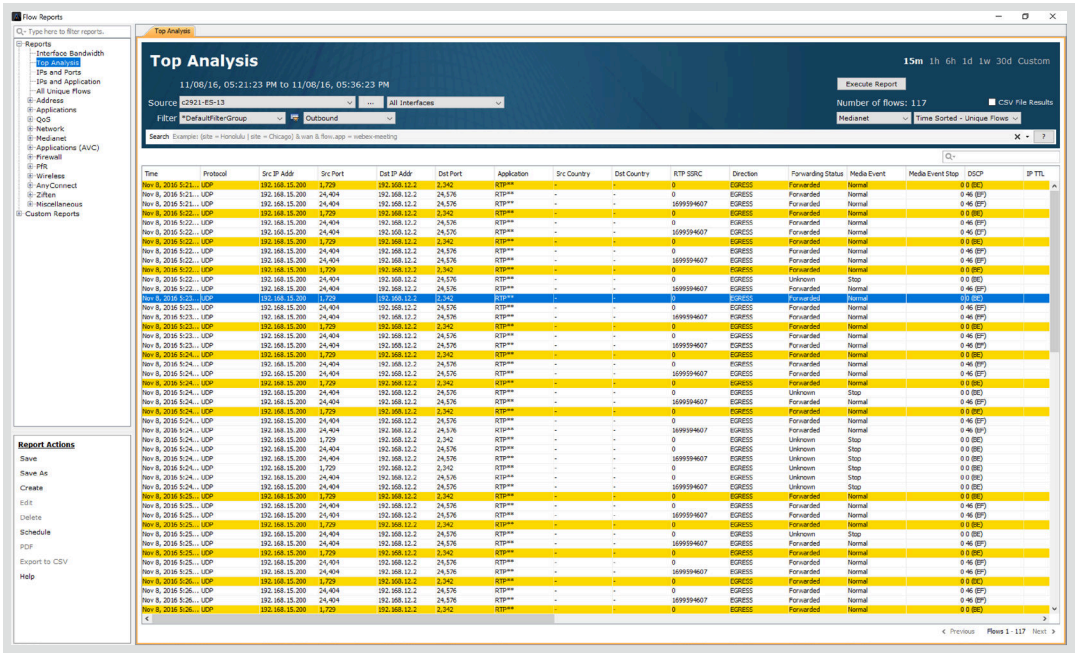
Historical Playback

Another functionality specific to the Device View is the ability to perform Historical Playback on flows traversing the device. This is not limited to Medianet PerfMon flows, but also includes Basic Flows, AVC, Firewall, Wireless, PfR, and other unspecified flow types. Historical Playback provides the ability to inspect the changes to flow behavior within a given timeframe, with a scrollbar. The following screenshots represent the time period before and after the addition of RTP traffic into the network.



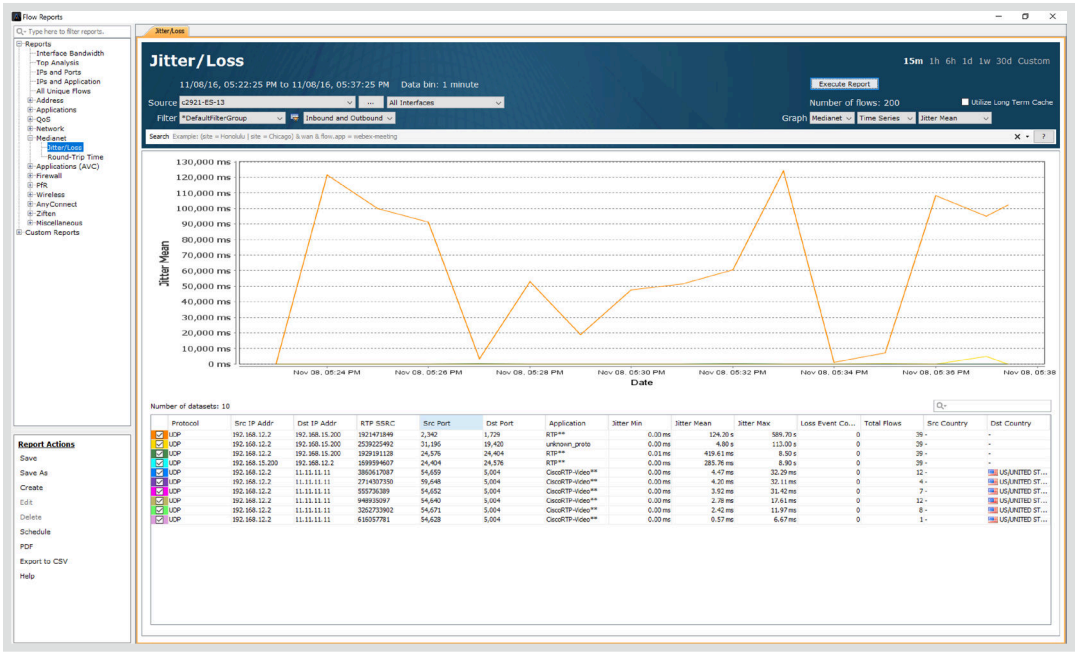
Medianet Reports

While the Device View displays real-time flow data, the Medianet Report section provides historical data on a specific device. The user can specify the various flow types and time periods for which to run the report. By default, a report for the last 15 minutes is selected, but a Custom time range can also be used which spans across multiple days, weeks, or even months.



NOTE: A larger time frame requires LiveNX to process more flows, which will take longer to process.

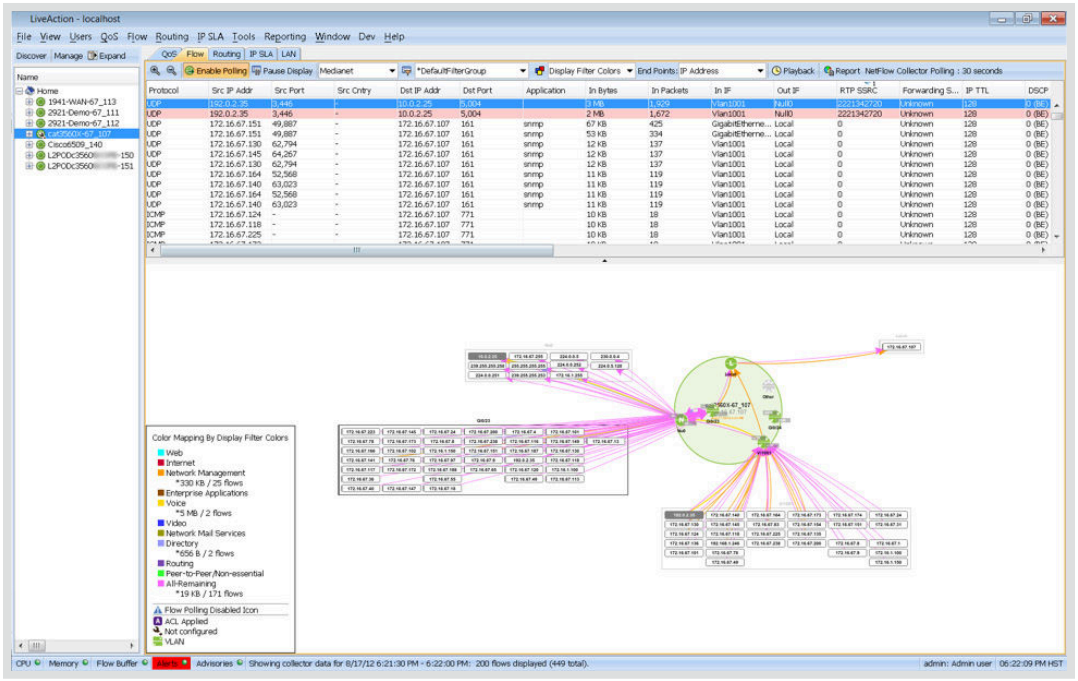
Other reports are also available for the user under the Medianet Reports section. This allows historical visibility for the Jitter/Loss and Round Trip Time related data for any specific device. Reports can also be scheduled, which allows for storage and email notification of reports in a centralized location. Both Time Series and Aggregation modes can be selected as well as flow direction.



CAVEATS AND LIMITATIONS

Catalyst 3750/3560 Egress Interface Index

The Catalyst 3560/3750 platforms suffer from a known limitation which does not properly display the exit interface. This prevents LiveNX from properly drawing and connecting the flow lines between devices participating in PerfMon and is depicted by an Out IF value of Null0.




```
cat3560X-67_107#show performance monitor status | include (output|Match)
Match: ipv4 src addr = 192.0.2.35, ipv4 dst addr = 10.0.2.25, ipv4 prot = udp, trns src port = 3446,
trns dst port = 5004, SSRC = 2221342720
interface output : NA
```

APPENDIX A

Notes on Catalyst 3750/3560 NetFlow Operation

Performance Monitor imparts a CPU and memory performance impact. Test the impact for your specific environment in the lab before wide scale deployments. Performance Monitor impact depends on factors such as number of flows monitored and the complexity of the classification. As an estimate, you can budget about:

- 3% CPU utilization for every 200 flows
- 5 MB initial memory usage and about 3 MB for every 500 flows monitored

CONCLUSION

Cisco's PerfMon is a helpful tool for Network Administrators in modern networks who are asked to deliver high-quality voice and video conversations. Using LiveNX to configure PerfMon simplifies the procedure for these capabilities. By leveraging PerfMon within LiveNX, an administrator is able to gain insight into key metrics via visualization and reporting that were previously unavailable.

MORE INFORMATION

Network Performance Monitoring
For further details about network performance monitoring, check out LiveNX's Product Page.

SaaS/Cloud Performance Monitoring
Find out why—and how—SaaS/Cloud Monitoring can accelerate problem resolution and simplify your application performance monitoring challenges.

Upcoming Webinars
Check out our updated webinar schedule—gain insights from our special presenters about topics like QoS, Hybrid WAN Management, Capacity Planning and more.

Additional Resources
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ABOUT LIVEACTION

LiveAction provides comprehensive and robust solutions for Network Performance Management. Key capabilities include Cisco Intelligent WAN visualization and service assurance, best-practice QoS policy management, and application-aware network performance management. LiveAction software's rich GUI and visualization provide IT teams with a deep understanding of the network while simplifying and accelerating management and troubleshooting tasks.

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