



Avaya Solution & Interoperability Test Lab

Application Notes for Network Physics NetSensory Solution Insight for VoIP in an Avaya IP Telephony Environment – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Network Physics NetSensory Solution Insight for VoIP to interoperate in an Avaya IP Telephony environment, consisting of Avaya Communication Manager, Avaya 4610SW IP Telephones and Avaya 9600 Series IP Telephones. In the compliance testing, NetSensory monitored the IP traffic from the Avaya IP telephones, and produced information to help identify network performance problems.

Information in these Application Notes has been obtained through DeveloperConnection compliance testing and additional technical discussions. Testing was conducted via the DeveloperConnection Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

NetSensory Solution Insight for VoIP is a network monitor and analysis application from Network Physics. The interoperability testing is in an Avaya IP Telephony environment, consisting of Avaya Communication Manager, Avaya 4610SW IP Telephones and Avaya 9600 Series IP Telephones. In the compliance testing, NetSensory monitored the IP traffic from the Avaya IP telephones, and produced information to help identify network performance problems.

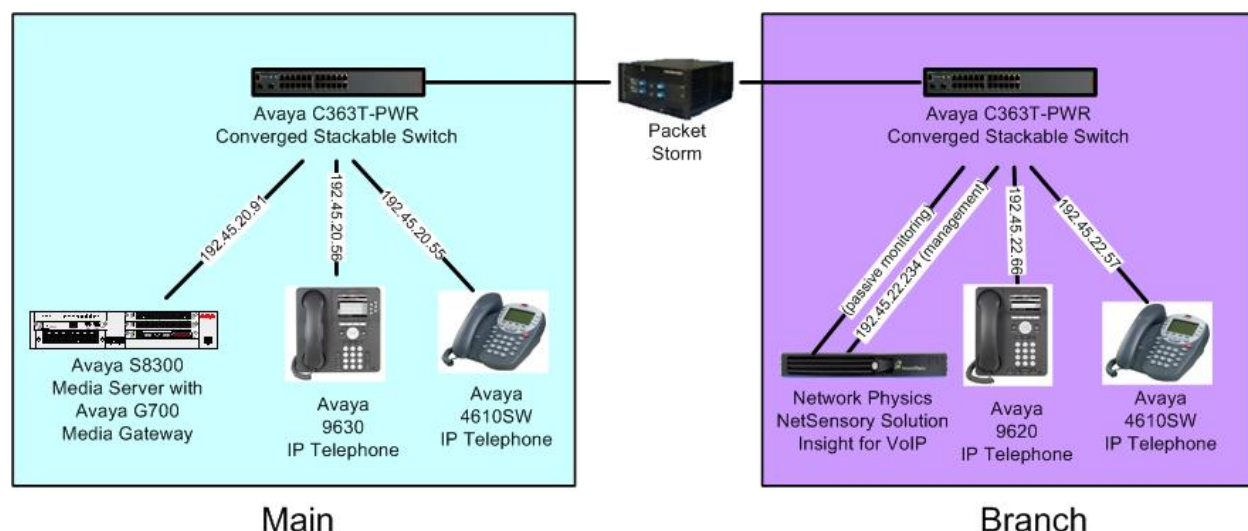


Figure 1: Network Physics NetSensory Solution Insight for VoIP in an Avaya IP Telephony Environment

In the test configuration shown in **Figure 1**, NetSensory monitored the Avaya 4610SW IP and Avaya 9620 IP telephones at the Branch site. The Packet Storm was used as a tool to inject network impairments, such as jitter/delay/loss, into the network for calls between the Main and Branch sites.

For the compliance testing, NetSensory was running on the Network Physics NP-2000 platform with NetSensory Enterprise OS. There were two connections from NetSensory to the Avaya C363T-PWR Converged Stackable Switch. One connection was used to connect to the NetSensory management interface, and the other to connect to the NetSensory monitoring interface. The port that connects to the Packet Storm on the Avaya C363T-PWR Converged Stackable Switch in the Branch site was mirrored to the port connecting to the NetSensory passive monitoring interface. This would enable NetSensory to receive a copy of all IP traffic between the two sites. A single copper span port from the NetSensory monitoring interface was used in the compliance testing.

The Avaya IP Telephony infrastructure is not the focus of these Application Notes and will not be described. Furthermore, the port mirroring on the Avaya C363T-PWR Converged Stackable Switch and the network impairment injection from the Packet Storm will also not be described.

2. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment	Software
Avaya S8300 Media Server with G700 Media Gateway	Avaya Communication Manager 3.1.2, R013x.01.2.632.1
Avaya C363T-PWR Converged Stackable Switches	4.3.12
Avaya 4610SW IP Telephones (H.323)	2.7
Avaya 9620 IP Telephone (H.323)	1.2
Avaya 9630 IP Telephone (H.323)	1.2
Packet Storm	10.5v1
Network Physics NetSensory Solution Insight for VoIP with NP-2000 NetSensory Enterprise	1.0.224 5.3.2

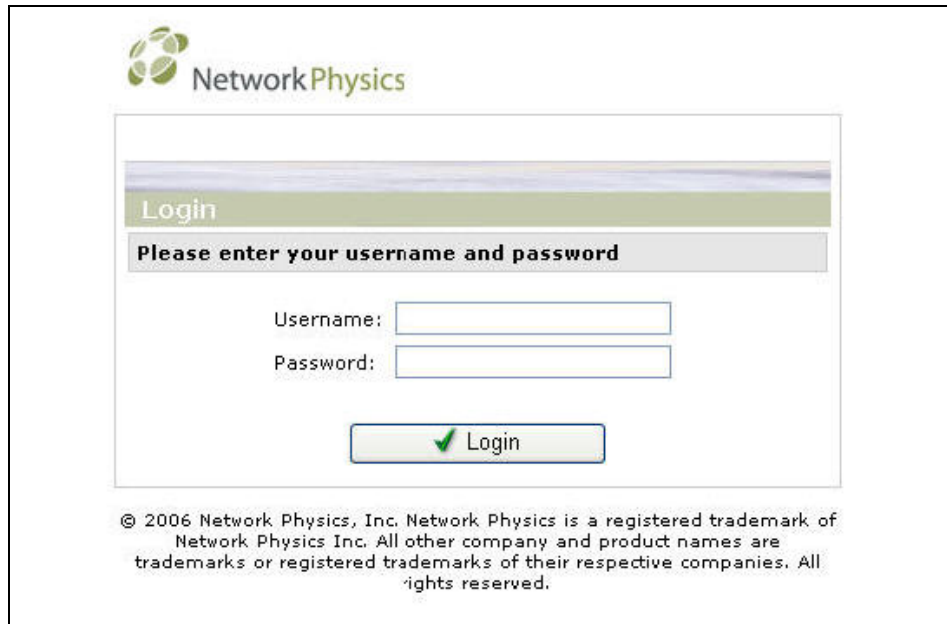
3. Configure Network Physics NetSensory

This section provides the procedures for configuring NetSensory Solution Insight for VoIP from Network Physics. The procedures fall into the following areas:

- Verify system configuration
- Launch NetSensory Console
- Create new project

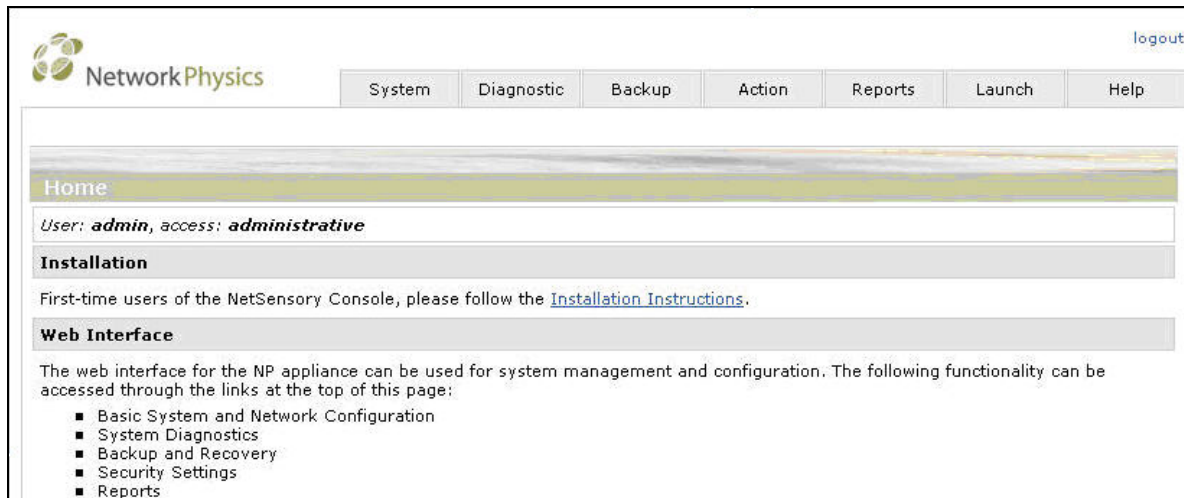
3.1. Verify System Configuration

Access the NetSensory web based interface by using the URL “http://ip-address:8080” in an Internet browser window, where “ip-address” is the IP address of NetSensory. Enter the appropriate credentials, and click **Login**.



The screenshot shows the Network Physics NetSensory login interface. At the top left is the Network Physics logo, consisting of a green circular icon with three leaf-like shapes and the text "NetworkPhysics". Below the logo is a white rectangular box containing the login form. Inside the box, there is a green header bar with the word "Login" in white. Below this is a grey bar with the text "Please enter your username and password". Underneath, there are two input fields: "Username:" followed by a text box, and "Password:" followed by a text box. Below the password field is a button with a green checkmark icon and the word "Login". At the bottom of the white box, there is a copyright notice: "© 2006 Network Physics, Inc. Network Physics is a registered trademark of Network Physics Inc. All other company and product names are trademarks or registered trademarks of their respective companies. All rights reserved."

The **Home** screen is displayed next, as shown below. Select the **System** tab.



NetworkPhysics logout

System Diagnostic Backup Action Reports Launch Help

Home

User: **admin**, access: **administrative**

Installation

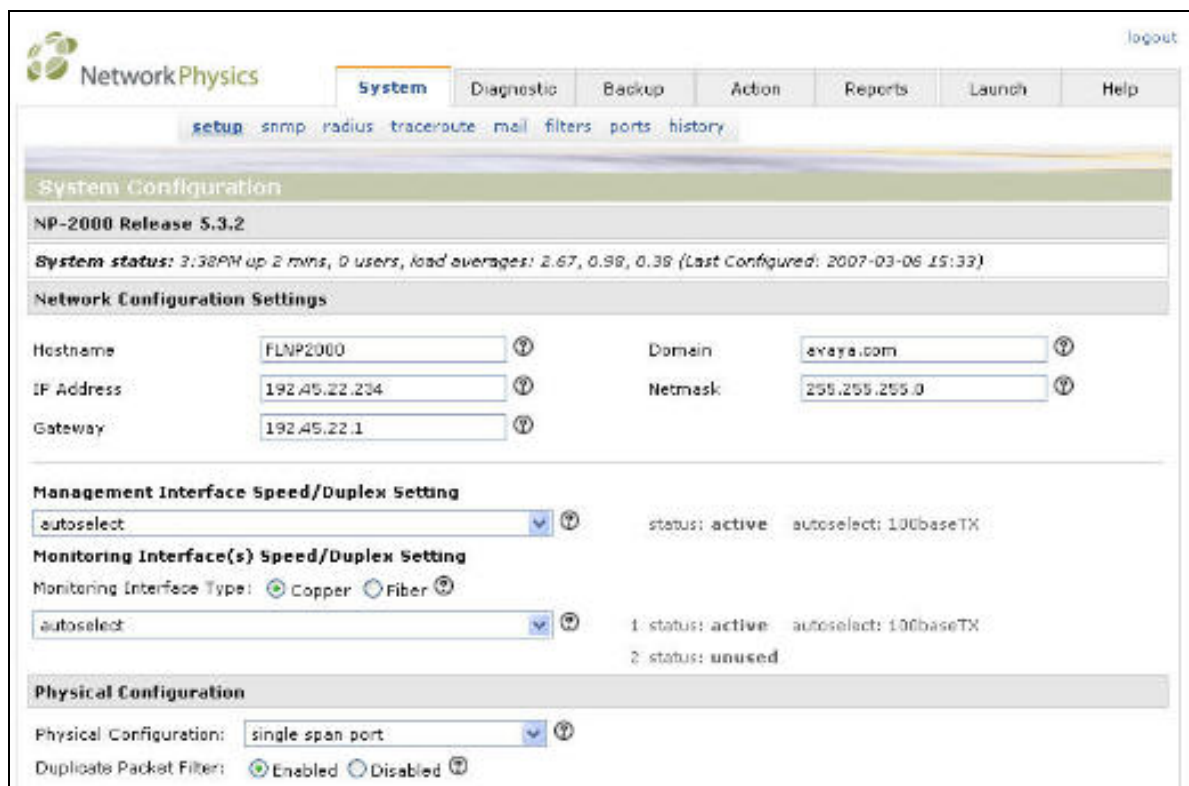
First-time users of the NetSensory Console, please follow the [Installation Instructions](#).

Web Interface

The web interface for the NP appliance can be used for system management and configuration. The following functionality can be accessed through the links at the top of this page:

- Basic System and Network Configuration
- System Diagnostics
- Backup and Recovery
- Security Settings
- Reports

The **System Configuration** screen is displayed. Verify the values of the fields in the **Network Configuration Settings** section, which were entered as part of NetSensory installation. These values should match the network configuration. Check the remaining fields for default values. Verify that the **Monitoring Interface Type** is set to “Copper”, the **Physical Configuration** is set to “single span port”, and that the **Duplicate Packet Filter** is set to “Enabled”. Should any modification be necessary, enter the new values and scroll down to the bottom of the screen to click **Apply** (not shown).



NetworkPhysics logout

System Diagnostic Backup Action Reports Launch Help

[setup](#) [snmp](#) [radius](#) [traceroute](#) [mail](#) [filters](#) [ports](#) [history](#)

System Configuration

NP-2000 Release 5.3.2

System status: 3:38PM up 2 mins, 0 users, load averages: 2.67, 0.98, 0.38 (Last Configured: 2007-03-06 15:33)

Network Configuration Settings

Hostname: ? Domain: ?

IP Address: ? Netmask: ?

Gateway: ?

Management Interface Speed/Duplex Setting

? status: active autoselect: 100baseTX

Monitoring Interface(s) Speed/Duplex Setting

Monitoring Interface Type: ☒ Copper ☐ Fiber ?

? 1 status: active autoselect: 100baseTX

2 status: unused

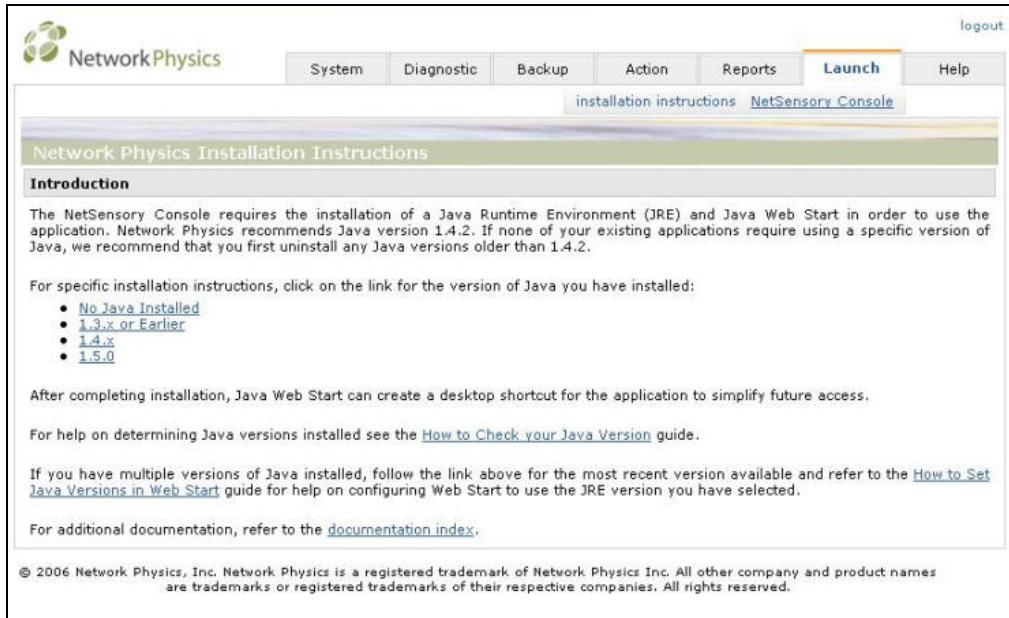
Physical Configuration

Physical Configuration: ?

Duplicate Packet Filter: ☒ Enabled ☐ Disabled ?

3.2. Launch NetSensory Console

Select the **Launch** tab, followed by **NetSensory Console** to connect to the NetSensory Console. The NetSensory Console is a Java-based application that enables exploring of network data and building of detailed traffic analysis by organizing the network view into projects.

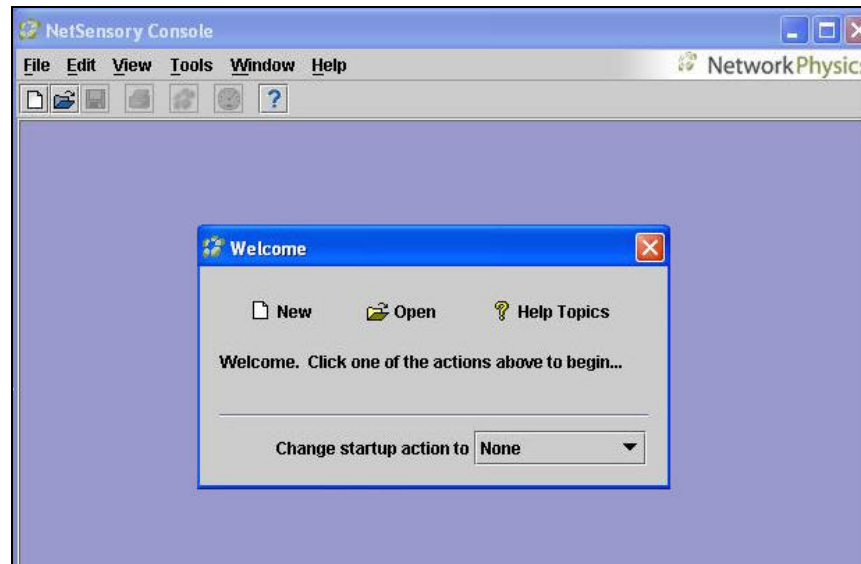


The **Connect** dialog box is displayed. For the **Hostname** field, enter the IP address of the NetSensory management interface. Enter appropriate credentials for the **User Name** and **Password** fields. Maintain the default values in the remaining fields, and click **OK**.

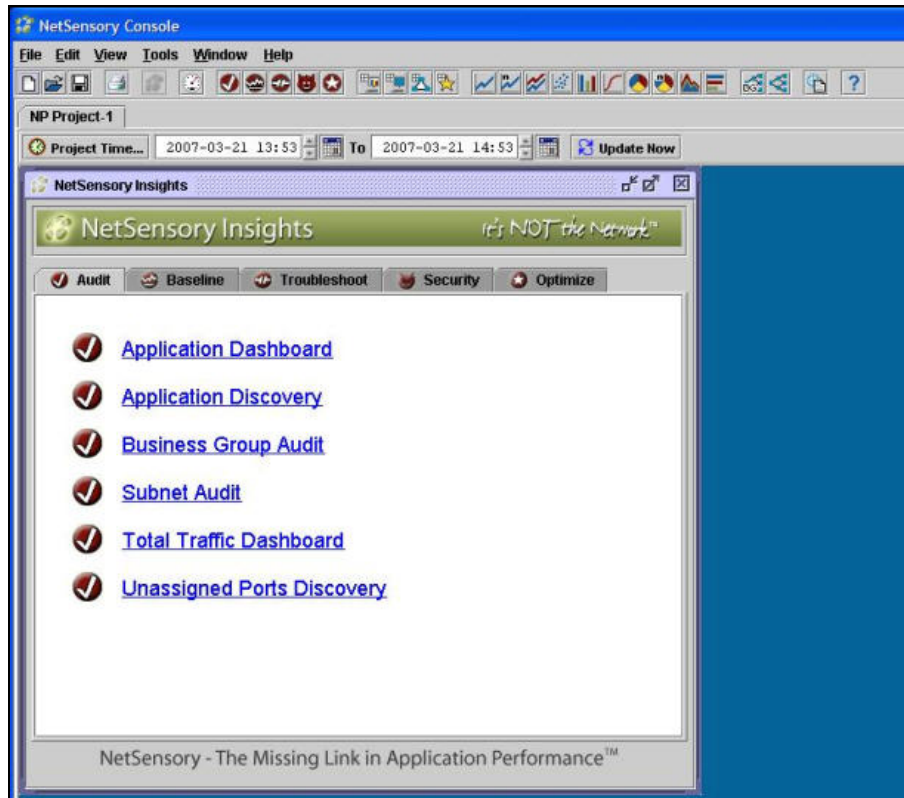


3.3. Create New Project

The **NetSensory Console** screen is displayed next. In the **Welcome** dialog box, select **New** to create a new project.



The **NetSensory Console** screen is displayed again, and updated with a default project name of “NP Project-1” and **NetSensory Insights** menu selections.



4. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing focused on verifying NetSensory's capture and analysis of IP packets from the Avaya 4610SW and Avaya 9620 IP telephones. The call scenarios included registration, audio codecs with and without IP media shuffling (also referred to as direct IP-IP audio connection), encryption, and network impairments.

The serviceability testing focused on verifying the ability of NetSensory to recover from adverse conditions, such as disconnecting the Ethernet cables to NetSensory.

4.1. General Test Approach

All tests were performed manually. The Packet Storm was used to inject network impairments, such as jitter/delay/loss, into the network for calls between the two sites.

The serviceability test cases were performed manually by disconnecting and reconnecting the LAN cable to NetSensory.

The verification of all tests included checking of proper display of call data at NetSensory, and of comparing the reported network impairments from NetSensory with the network audio quality data reported on the Avaya 4610SW and Avaya 9620 IP telephones.

4.2. Test Results

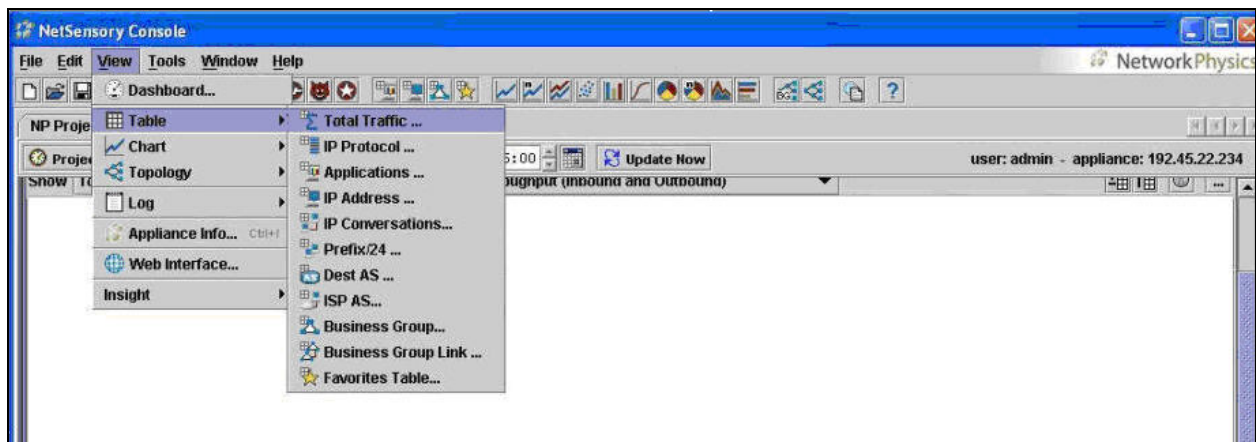
All test cases were executed and passed. Encrypted RTP packets had no impact on NetSensory as only the RTP packet headers were analyzed and not the content.

5. Verification Steps

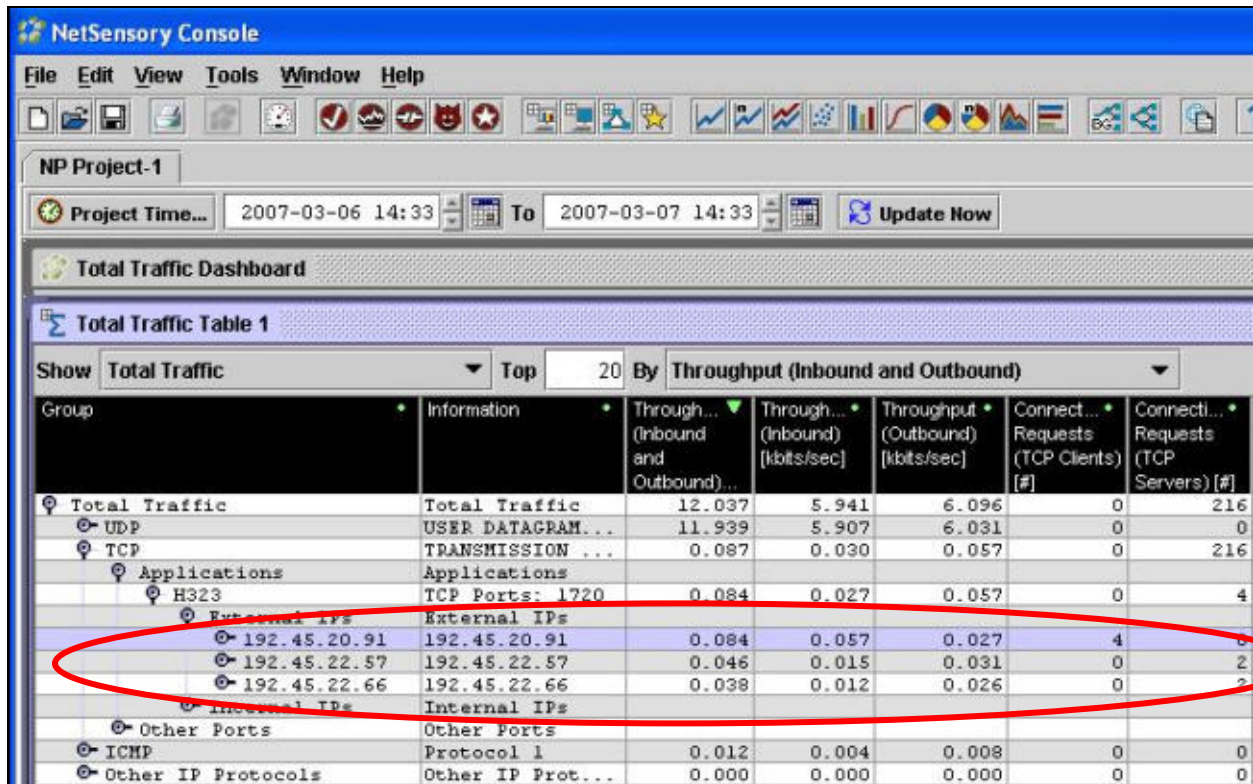
This section provides the tests that can be performed to verify proper configuration of NetSensory. Prior to verification, connect the two telephones monitored by NetSensory and make a few calls to enable registration and media packets to be captured.

5.1. Verify H.323 Registration

The H.323 registration data can be verified using the NetSensory Console interface. From the **NetSensory Console** screen, select **View > Table > Total Traffic** as shown below.



The screen is updated with **Total Traffic Dashboard** information. Expand on **Total Traffic > TCP > Applications > H323 > External IPs**. Verify that there are entries associated with the two Avaya IP telephones at the Branch site (in this case, IP addresses “192.45.22.57” and “192.45.22.66”), and that there is an entry for the Avaya Communication Manager device that the two Avaya IP telephones registered to (in this case, the two telephones registered to the S8300 Media Server processor with IP address of “192.45.20.91”).



NetSensory Console

NP Project-1

Project Time... 2007-03-06 14:33 To 2007-03-07 14:33 Update Now

Total Traffic Dashboard

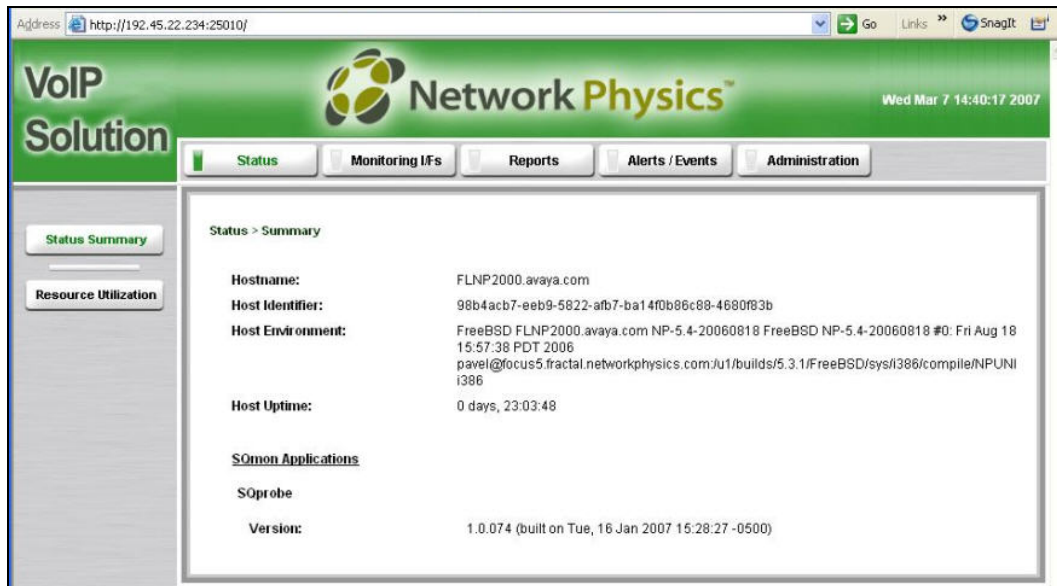
Total Traffic Table 1

Show Total Traffic Top 20 By Throughput (Inbound and Outbound)

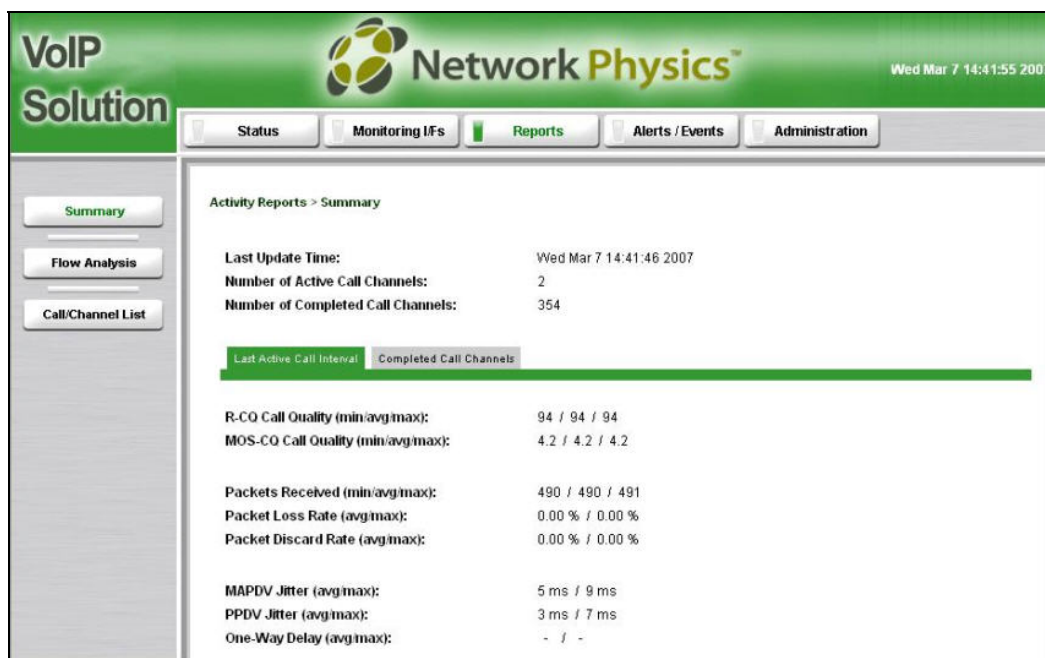
Group	Information	Through... (Inbound and Outbound) ..	Through... (Inbound) [kbits/sec]	Throughput (Outbound) [kbits/sec]	Connect... Requests (TCP Clients) [#]	Connecti... Requests (TCP Servers) [#]
Total Traffic	Total Traffic	12.037	5.941	6.096	0	216
UDP	USER DATAGRAM...	11.939	5.907	6.031	0	0
TCP	TRANSMISSION ...	0.087	0.030	0.057	0	216
Applications	Applications					
H323	TCP Ports: 1720	0.084	0.027	0.057	0	4
External IPs	External IPs					
192.45.20.91	192.45.20.91	0.084	0.057	0.027	4	0
192.45.22.57	192.45.22.57	0.046	0.015	0.031	0	2
192.45.22.66	192.45.22.66	0.038	0.012	0.026	0	2
Internal IPs	Internal IPs					
Other Ports	Other Ports					
ICMP	Protocol 1	0.012	0.004	0.008	0	0
Other IP Protocols	Other IP Prot...	0.000	0.000	0.000	0	0

5.2. Verify Media Channels

Establish an active call between the Main and Branch sites. The media channels can be verified using the NetSensory VoIP Solution interface. Access the NetSensory VoIP Solution interface by using the URL “http://ip-address:25010” in an Internet browser window, where “ip-address” is the IP address of NetSensory.



Select the **Reports** tab in the top menu bar, followed by **Summary** in the left pane. Verify that the **Number of Active Call Channels** is “2” to denote the two media channels for the current active call.



Select **Call/Channel List** from the left pane. The media channel data is displayed into the right pane. Verify that the top two lines are associated with the two channels for the current active call. Verify that the IP addresses of the two telephones are listed in the **Originator Endpoint** and **Terminator Endpoint** fields, and that the status of both channels is “Active” as shown below. Click on **View Details** on one of the media channels.



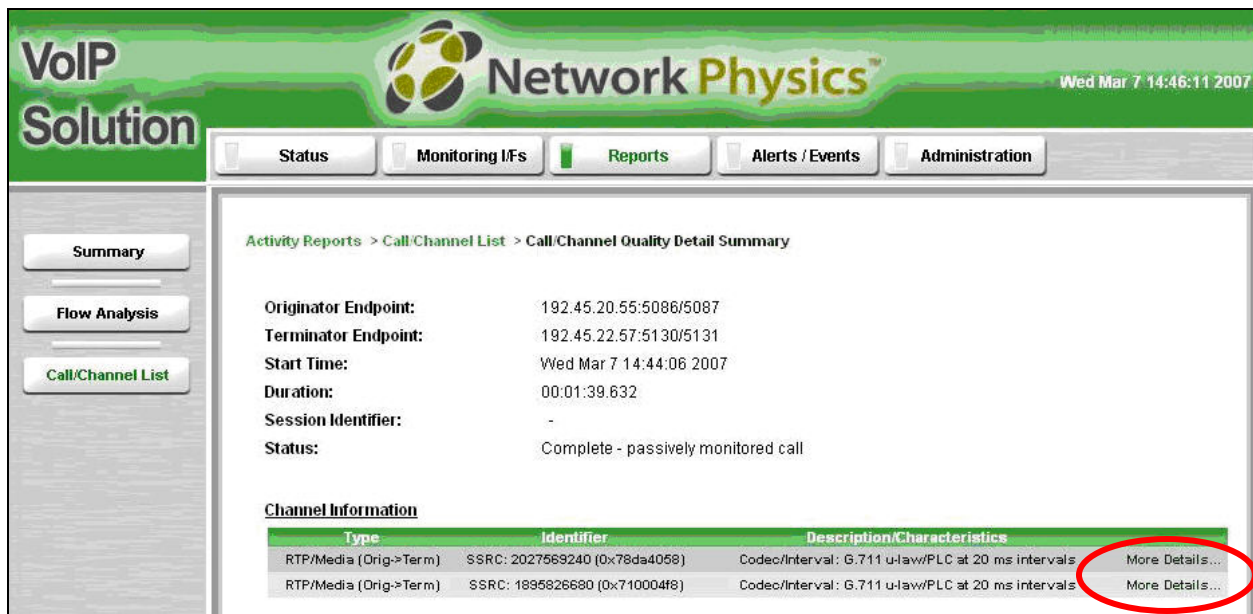
VoIP Solution Network Physics™ Wed Mar 7 14:44:28 2007

Status Monitoring I/Fs Reports Alerts / Events Administration

Activity Reports > Call/Channel List

Start Time	Originator Endpoint	Terminator Endpoint	Duration	Status	Quality (LQ/CQ)	
Wed Mar 7 14:44:06 2007	192.45.20.55:5086/5087	192.45.22.57:5130/5131	00:00:19.624	Active	4.2	View Details
Wed Mar 7 14:44:06 2007	192.45.22.57:5130/5131	192.45.20.55:5086/5087	00:00:19.762	Active	4.2	View Details
Wed Mar 7 14:44:02 2007	192.45.20.55:5086/5087	192.45.22.57:5130/5131	00:00:18.343	Complete	4.2 / 4.2	View Details
Wed Mar 7 14:44:02 2007	192.45.22.57:5130	192.45.20.93:5344	00:00:18.732	Complete	4.2 / 4.2	View Details
Wed Mar 7 14:43:48 2007	192.45.20.55:5086	192.45.22.57:5130	00:00:24.347	Complete	4.2 / 4.2	View Details

The right pane is updated with channel quality summary information. Click **More Details** on one of the media channels.



VoIP Solution Network Physics™ Wed Mar 7 14:46:11 2007

Status Monitoring I/Fs Reports Alerts / Events Administration

Activity Reports > Call/Channel List > Call/Channel Quality Detail Summary

Summary

Flow Analysis

Call/Channel List

Originator Endpoint: 192.45.20.55:5086/5087

Terminator Endpoint: 192.45.22.57:5130/5131

Start Time: Wed Mar 7 14:44:06 2007

Duration: 00:01:39.632

Session Identifier: -

Status: Complete - passively monitored call

Channel Information

Type	Identifier	Description/Characteristics	
RTP/Media (Orig->Term)	SSRC: 2027569240 (0x78da4058)	Codec/Interval: G.711 u-law/PLC at 20 ms intervals	More Details...
RTP/Media (Orig->Term)	SSRC: 1895826680 (0x710004f8)	Codec/Interval: G.711 u-law/PLC at 20 ms intervals	More Details...

The right pane is updated with additional channel quality information. Click on the **Channel Encoding** tab toward the bottom of the right pane, and verify the **Codec Type** value.

The screenshot shows the 'VoIP Solution' interface with the 'Network Physics' logo. The top navigation bar includes 'Status', 'Monitoring I/Fs', 'Reports' (selected), 'Alerts / Events', and 'Administration'. The left sidebar has 'Summary', 'Flow Analysis', and 'Call/Channel List' (selected). The main content area displays a breadcrumb trail: 'Activity Reports > Call/Channel List > Call/Channel Quality Detail Summary > Call Channel Details'. Below this, a table lists call details:

Originator Endpoint:	192.45.20.55:5086/5087
Terminator Endpoint:	192.45.22.57:5130/5131
Start Time:	Wed Mar 7 14:44:06 2007
Duration:	00:01:39.632
Status:	Complete - passively monitored call
Session Identifier:	-
Channel Identifier/SSRC:	2027569240 (0x78da4058)
Channel Characteristics:	N/A

Below the table is a row of tabs: 'Channel Encoding' (selected), 'Channel Quality', 'Packet Counts', 'Burst Characteristics', 'Jitter/Delay', 'Degradation Factors', and 'Last RTP XR/SR/RR'. The 'Channel Encoding' tab displays the following information:

Codec Type:	G.711 u-law/PLC
Codec Sample Rate:	8000 Hz
Codec Notes:	Narrowband, Assumed Codec

Click on the **Channel Quality** tab, and verify the voice channel quality scores. Refer to the appropriate NetSensory documentation for detailed description of the various measurements.

The screenshot shows the 'VoIP Solution' interface with the 'Network Physics' logo. The top navigation bar includes 'Status', 'Monitoring I/Fs', 'Reports' (selected), 'Alerts / Events', and 'Administration'. The left sidebar has 'Summary', 'Flow Analysis', and 'Call/Channel List' (selected). The main content area displays a breadcrumb trail: 'Activity Reports > Call/Channel List > Call/Channel Quality Detail Summary > Call Channel Details'. Below this, a table lists call details:

Originator Endpoint:	192.168.1.100:10126/10127
Terminator Endpoint:	69.59.243.34:13770/13771
Start Time:	Wed Apr 18 04:55:42 2007
Duration:	00:00:51.556
Status:	Complete - passively monitored call
Session Identifier:	-
Channel Identifier/SSRC:	1872290673 (0x6f98e371)
Channel Characteristics:	N/A

Below the table is a row of tabs: 'Channel Encoding', 'Channel Quality' (selected), 'Packet Counts', 'Burst Characteristics', 'Jitter/Delay', 'Degradation Factors', and 'Last RTP XR/SR/RR'. The 'Channel Quality' tab displays the following information:

R-LQ:	87
R-CQ:	86
R-Nominal:	93
MOS-LQ:	4.1
MOS-CQ:	4.0
MOS-Nominal:	4.2
MOS Scaling:	<not implemented>

At the bottom right of the main content area, there is a link: 'Back To Call/Channel Quality Detail Summary'.

Click on the **Jitter/Delay** tab, and verify the reported jitter/delay against the reported jitter/delay from the Avaya 4610SW and Avaya 9620 IP telephones.

The screenshot displays the Network Physics VoIP Solution web interface. The top header is green with the 'VoIP Solution' logo on the left and the 'Network Physics' logo on the right, with a timestamp 'Wed Mar 21 16:15:39 2007' on the far right. Below the header is a navigation bar with tabs: 'Status', 'Monitoring I/Fs', 'Reports' (highlighted with a green bar), 'Alerts / Events', and 'Administration'. On the left side, there is a sidebar with buttons for 'Summary', 'Flow Analysis', and 'Call/Channel List' (highlighted with a green bar). The main content area shows a breadcrumb trail: 'Activity Reports > Call/Channel List > Call/Channel Quality Detail Summary > Call Channel Details'. Below this, a table of call details is displayed:

Originator Endpoint:	69.59.233.34:15086
Terminator Endpoint:	192.168.1.100:10086
Start Time:	Wed Mar 21 16:14:04 2007
Duration:	00:00:56.069
Status:	Complete - passively monitored call
Session Identifier:	-
Channel Identifier/SSRC:	1800502242 (0x6b517be2)
Channel Characteristics:	N/A

Below the table is a row of tabs: 'Channel Encoding', 'Channel Quality', 'Packet Counts', 'Burst Characteristics', 'Jitter/Delay' (highlighted with a green bar), 'Degradation Factors', and 'Last RTCP XR/SR/RR'. Under the 'Jitter/Delay' tab, a table of jitter and delay metrics is shown:

Measured PPDV (Jitter):	1 ms
Last Reported PPDV (Jitter):	-
MAPDV (Absolute Jitter):	1 ms
MAPDV Positive Delta:	1 ms
MAPDV Negative Delta:	0 ms
Estimated Round Trip Delay:	-
Average One-Way Delay:	60 ms
Maximum One-Way Delay:	60 ms
Estimated End System Delay:	-

At the bottom right of the main content area, there is a link: 'Back To Call/Channel Quality Detail Summary'.

6. Support

Technical support on Network Physics NetSensory Solution Insight for VoIP can be obtained through the following:

- **Phone:** (888) 390-5665
- **Web:** <http://www.networkphysics.com/support>
- **Email:** support@networkphysics.com

7. Conclusion

These Application Notes describe the configuration steps required for Network Physics NetSensory Solution Insight for VoIP 1.0 to interoperate in an Avaya IP Telephony environment, consisting of Avaya Communication Manager 3.1.2, Avaya 4610SW IP Telephones, and Avaya 9600 Series IP Telephones. All feature and serviceability test cases were completed successfully.

8. Additional References

This section references the product documentation relevant to these Application Notes.

- *Administrator Guide for Avaya Communication Manager*, Document 03-300509, Issue 2.1, May 2006, available at <http://support.avaya.com>
- *NetSensory Professional and Enterprise Release 5.3 Operation Manual*, available on NetSensory installation CD.
- *Operations Guide for NetSensory Insight Solutions for VoIP*, available on NetSensory installation CD.

©2007 Avaya Inc. All Rights Reserved.

Avaya and the Avaya Logo are trademarks of Avaya Inc. All trademarks identified by ® and ™ are registered trademarks or trademarks, respectively, of Avaya Inc. All other trademarks are the property of their respective owners. The information provided in these Application Notes is subject to change without notice. The configurations, technical data, and recommendations provided in these Application Notes are believed to be accurate and dependable, but are presented without express or implied warranty. Users are responsible for their application of any products specified in these Application Notes.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Developer*Connection* Program at devconnect@avaya.com.