



Avaya Solution & Interoperability Test Lab

Application Notes for Integrated Research PROGNOSIS IP Telephony Manager with Avaya Communication Manager - Issue 1.0

Abstract

These Application Notes describe the procedures for configuring Integrated Research PROGNOSIS IP Telephony Manager to interoperate with Avaya Communication Manager.

PROGNOSIS IP Telephony Manager is a performance management solution for multi-vendor IP telephony solutions. PROGNOSIS IP Telephony Manager provides visibility of Avaya and other vendor's IP Telephony solutions from a single console. Targeted at Managed Service Providers of IP telephony solutions, PROGNOSIS IP Telephony Manager offers a multi-customer, multi-PBX perspective, enabling a significant reduction in complexity when managing multiple IP Telephony vendors.

PROGNOSIS integrates directly to Avaya Communication Manager using Secure Shell (SSH). At the same time, it processes Real-time Transport Control Protocol (RTCP) information from Avaya Communication Manager and Avaya IP Telephones.

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

1. Introduction

These Application Notes describe the compliance-tested configuration used to validate Integrated Research PROGNOSIS IP Telephony Manager 9.0.1 patch 14 with Avaya Communication Manager Version 3.1.4.

The PROGNOSIS IP Telephony Manager is based on the PROGNOSIS product-family architecture for the scalable monitoring of business critical systems. The PROGNOSIS product consists of:

- One or more **PROGNOSIS Monitoring Nodes** (Server Nodes). These are servers used by the PROGNOSIS product to collect, relay and store information collected from the monitored systems. In some case the monitoring node may actually exist as an agent running on the monitored system but in the case of Avaya Communication Manager, all monitoring nodes are separate servers.
- The **PROGNOSIS GUI** is a Microsoft Windows client program which is used to connect to a PROGNOSIS monitoring node and display the information collected by the monitoring node. The PROGNOSIS GUI may either be installed on a monitoring node or on a separate computer.

The PROGNOSIS IP Telephony Manager product uses two methods to monitor an Avaya Communication Manager system.

- **System Access Terminal (SAT)**

The PROGNOSIS IP Telephony Manager uses a pool of threads to establish SSH connections to the SAT using the IP address of the Avaya Servers. By default, the solution attempts to establish three concurrent SAT connections to an Avaya Communication Manager system. The solution uses the connections to execute SAT commands on the Avaya Servers.

- **RTCP Collection**

The PROGNOSIS IP Telephony Manager collects RTCP information sent by Avaya Communication Manager IP Media Processor boards, media gateways and IP Telephones.

Figure 1 illustrates the sample configuration used to verify Integrated Research PROGNOSIS IP Telephony Manager interoperability with Avaya Communication Manager. It consists of an Avaya Communication Manager system running on a pair of Avaya S8710 Servers with Avaya G650 Media Gateways. The system also contained an Avaya G350 Media Gateway. The system had Avaya IP, Digital and analog telephones, Avaya IP Softphone, as well as an Avaya TARTS H.323 call generator, configured for making and receiving calls. A PRI Trunk was provisioned between the G650 and the G350 Media Gateways. Integrated Research PROGNOSIS IP Telephony Manager was installed on a PC running Microsoft Windows XP. Both the

PROGNOSIS Monitoring Node and PROGNOSIS GUI software are installed on this server. All the systems and telephones are connected using an Avaya C364T-PWR Converged Stackable Switches for network connectivity.

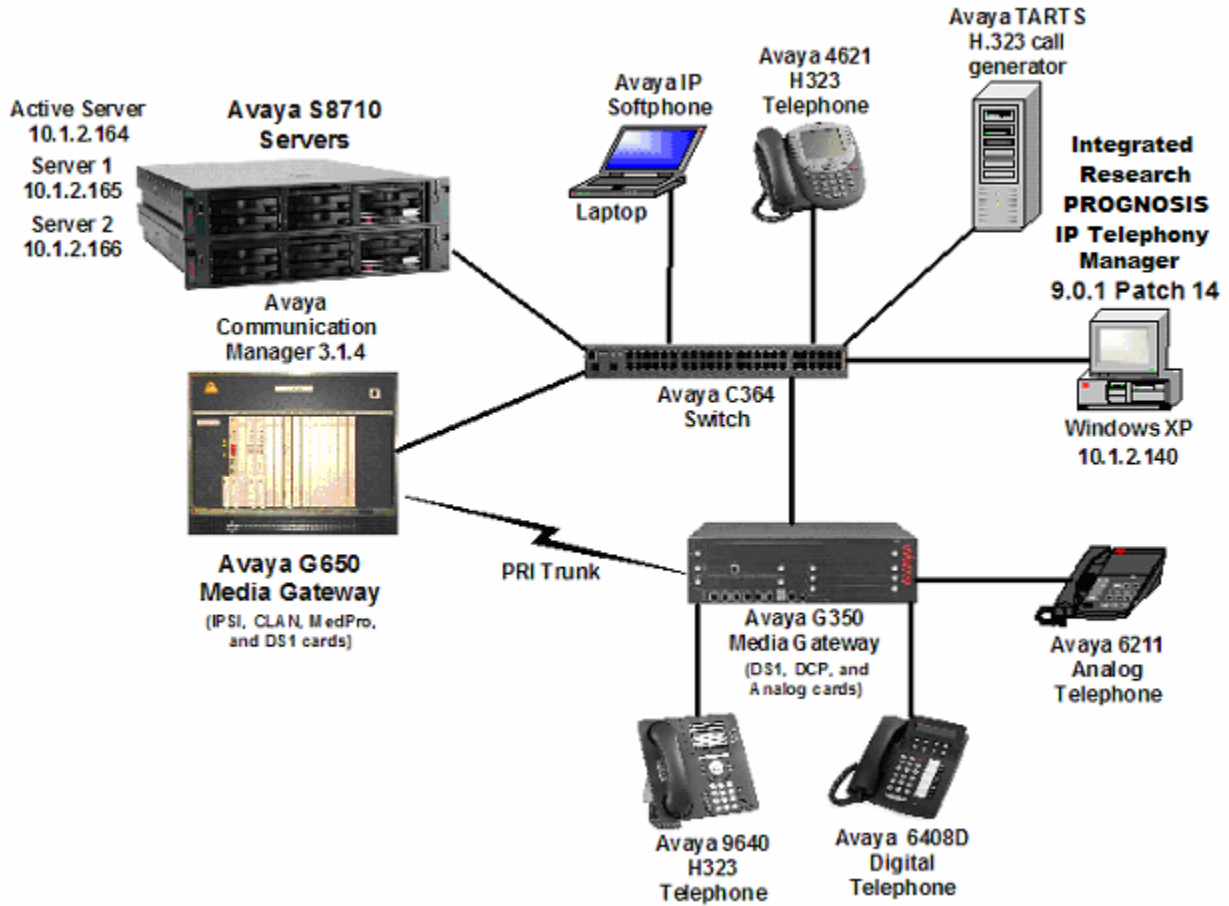


Figure 1: Sample Configuration

2. Equipment and Software Validated

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

Equipment	Software
Avaya S8710 Servers	R013x.01.4.642.1 Patch 01.4.642.1-13882
Avaya G650 Media Gateway <ul style="list-style-type: none">• TN2312BP IP Server Interface• TN799DP C-LAN Interface• TN2302AP IP Media Processor	HW12 FW30 HW01 FW26 HW20 FW117
Avaya G350 Media Gateway	26.31.0
Avaya 4600 Series IP Telephones	R2.8 (H.323)
Avaya 9600 Series IP Telephones	R1.5 (H.323)
Avaya 6200 Series Analog Telephones	-
Avaya 6400 Series Digital Telephones	-
Avaya IP Softphone	R6.0 SP2
Avaya C364T-PWR Converged Stackable Switches	4.5.14
Integrated Research PROGNOSIS IP Telephony Manager	9.0.1. Patch 14
Microsoft Windows XP Professional 2002	SP2

3. Configure Avaya Communication Manager

This section describes the steps needed to configure Avaya Communication Manager to interoperate with Integrated Research PROGNOSIS IP Telephony Manager. This section describes the steps to create a login account for PROGNOSIS to access Avaya Communication Manager, the assigning of permissions to the login account and the steps to enable RTCP reporting.

3.1. Configure SAT Login Account

PROGNOSIS IP Telephony Manager logs into Avaya Communication Manager to monitor the configuration, usage and health of the system. As PROGNOSIS IP Telephony Manager does not modify any system configuration, creating a separate SAT login account with limited permissions is recommended.

Step	Description
1.	<p data-bbox="277 268 1433 380">Enter the add login <i>login-id</i> command, where <i>login-id</i> is the name of login account to be created. Set Login Type to <i>customer</i>, the Service Level to <i>non-super-user</i>, and specify a password.</p> <pre data-bbox="277 443 1433 1010"> add login proguser Page 1 of 1 LOGIN ADMINISTRATION LOGIN BEING ADMINISTERED Login's Name: prog Login Type: customer Service Level: non-super-user Shell Access? n Days To Disable After Inactivity: LOGIN'S PASSWORD INFORMATION Login's Password:XXXXXX Reenter Password:XXXXXX Change Password at First Login? n Password Aging Cycle Length (Days): LOGOFF NOTIFICATION Facility Test Call Notification? n Remote Access Notification? n </pre>
2.	<p data-bbox="277 1073 1433 1157">Enter the change permissions <i>login-id</i> command, where <i>login-id</i> is the login account created in Step 1. Set Display Admin. and Maint. Data and System Measurements to <i>y</i>.</p>

Step	Description
	<pre> change permissions proguser Page 1 of 1 COMMAND PERMISSION CATEGORIES Login Name: prog COMMON COMMANDS Display Admin. and Maint. Data? y System Measurements? y System Mgmt Data Transfer Only? n ADMINISTRATION COMMANDS Administer Stations? n Administer Features? n Administer Trunks? n Administer Permissions? n Additional Restrictions? n MAINTENANCE COMMANDS Maintain Stations? n Maintain Switch Circuit Packs? n Maintain Trunks? n Maintain Process Circuit Packs? n Maintain System? n Maintain Enhanced DSL? n </pre>

3.2. Configure RTCP Monitoring

To allow PROGNOSIS IP Telephony Manager to monitor the quality of IP calls, configure Avaya Communication Manager to send RTCP reporting to the IP address of the PROGNOSIS server.

Step	Description
1.	Enter the change system-parameters ip-options command. In the RTCP MONITOR SERVER section, set Default Server IP Address to the IP address of the PROGNOSIS IP Telephony Manager server. Set Default Server Port to 5005 and Default RTCP Report Period(secs) to 5 .

Step	Description																				
	<p>change system-parameters ip-options Page 1 of 3</p> <p style="text-align: center;">IP-OPTIONS SYSTEM PARAMETERS</p> <p>IP MEDIA PACKET PERFORMANCE THRESHOLDS</p> <table border="0" style="width: 100%;"> <tr> <td style="padding-left: 20px;">Roundtrip Propagation Delay (ms)</td> <td style="padding-left: 20px;">High: 800</td> <td style="padding-left: 20px;">Low: 400</td> </tr> <tr> <td style="padding-left: 40px;">Packet Loss (%)</td> <td style="padding-left: 20px;">High: 40</td> <td style="padding-left: 20px;">Low: 15</td> </tr> <tr> <td style="padding-left: 40px;">Ping Test Interval (sec):</td> <td colspan="2">20</td> </tr> <tr> <td style="padding-left: 20px;">Number of Pings Per Measurement Interval:</td> <td colspan="2">10</td> </tr> </table> <p>RTCP MONITOR SERVER</p> <p style="padding-left: 40px;">Default Server IP Address: 10 .1 .2 .140</p> <p style="padding-left: 40px;">Default Server Port: 5005</p> <p style="padding-left: 20px;">Default RTCP Report Period(secs): 5</p> <p>AUTOMATIC TRACE ROUTE ON</p> <p style="padding-left: 40px;">Link Failure? y</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">H.248 MEDIA GATEWAY</td> <td style="width: 50%;">H.323 IP ENDPOINT</td> </tr> <tr> <td style="padding-left: 20px;">Link Loss Delay Timer (min): 5</td> <td style="padding-left: 20px;">Link Loss Delay Timer (min): 5</td> </tr> <tr> <td></td> <td style="padding-left: 40px;">Primary Search Time (sec): 75</td> </tr> <tr> <td></td> <td style="padding-left: 40px;">Periodic Registration Timer (min): 20</td> </tr> </table>	Roundtrip Propagation Delay (ms)	High: 800	Low: 400	Packet Loss (%)	High: 40	Low: 15	Ping Test Interval (sec):	20		Number of Pings Per Measurement Interval:	10		H.248 MEDIA GATEWAY	H.323 IP ENDPOINT	Link Loss Delay Timer (min): 5	Link Loss Delay Timer (min): 5		Primary Search Time (sec): 75		Periodic Registration Timer (min): 20
Roundtrip Propagation Delay (ms)	High: 800	Low: 400																			
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H.248 MEDIA GATEWAY	H.323 IP ENDPOINT																				
Link Loss Delay Timer (min): 5	Link Loss Delay Timer (min): 5																				
	Primary Search Time (sec): 75																				
	Periodic Registration Timer (min): 20																				

2. Enter the **change ip-network-region *n*** command, where *n* is IP network region number to be monitored. Set **RTCP Reporting Enabled** to **y** and **Use Default Server Parameters** to **y**.

Note: Only one RTCP MONITOR SERVER can be configured per IP network region.

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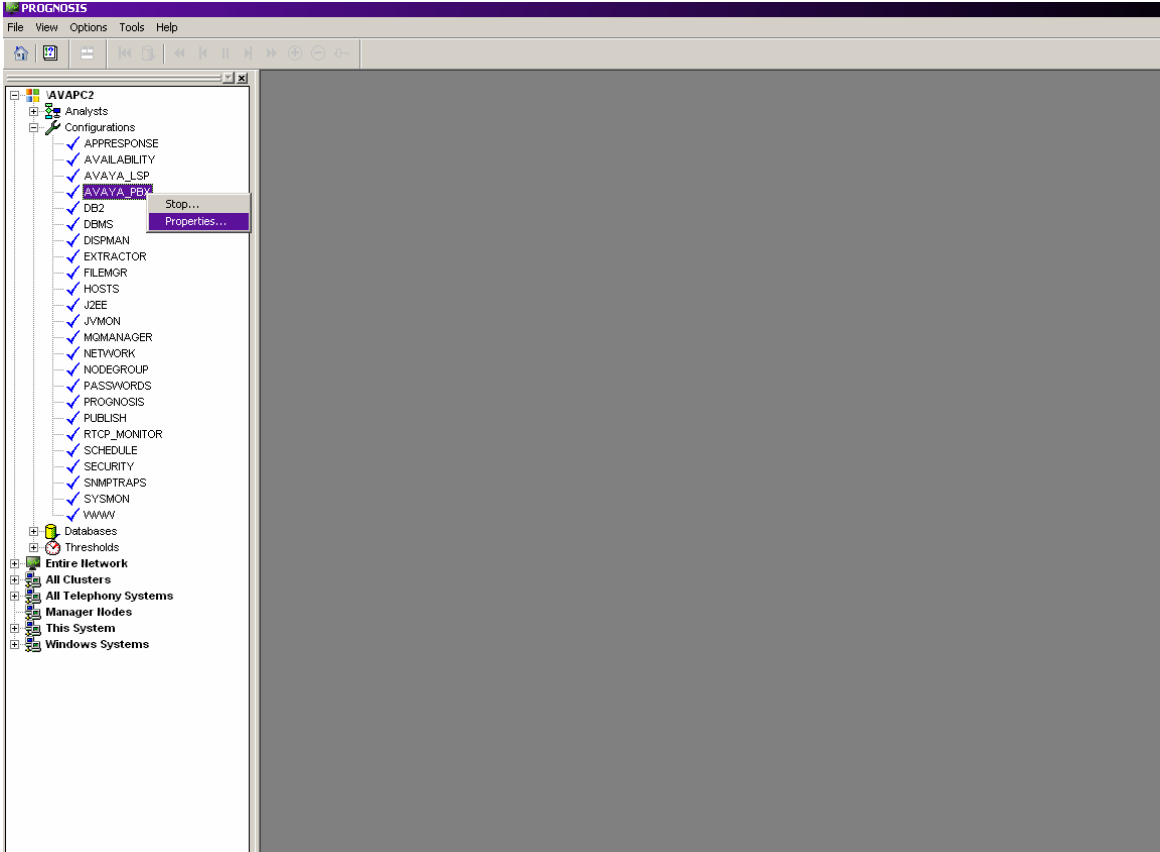
change ip-network-region 1                                     Page 1 of 19
                                                    IP NETWORK REGION
  Region: 1
Location: 1          Authoritative Domain: lab.com
  Name: Test
MEDIA PARAMETERS                                           Intra-region IP-IP Direct Audio: no
  Codec Set: 1                                             Inter-region IP-IP Direct Audio: no
  UDP Port Min: 2048                                       IP Audio Hairpinning? y
  UDP Port Max: 3029
DIFFSERV/TOS PARAMETERS                                     RTCP Reporting Enabled? y
  Call Control PHB Value: 46                               RTCP MONITOR SERVER PARAMETERS
  Audio PHB Value: 46                                     Use Default Server Parameters? y
  Video PHB Value: 26
802.1P/Q PARAMETERS
  Call Control 802.1p Priority: 6
  Audio 802.1p Priority: 6
  Video 802.1p Priority: 5                               AUDIO RESOURCE RESERVATION
PARAMETERS
H.323 IP ENDPOINTS                                       RSVP Enabled? n
  H.323 Link Bounce Recovery? y
  Idle Traffic Interval (sec): 20
  Keep-Alive Interval (sec): 5
  Keep-Alive Count: 5

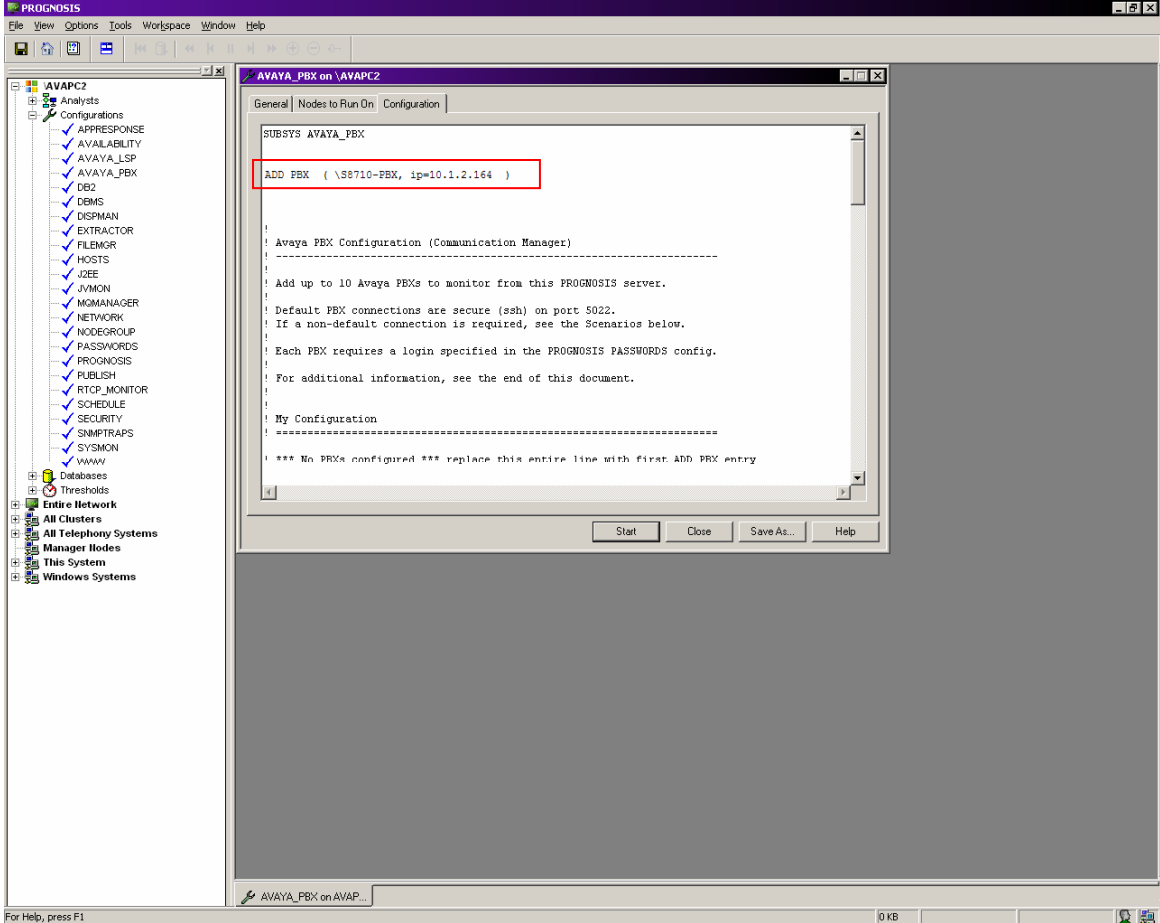
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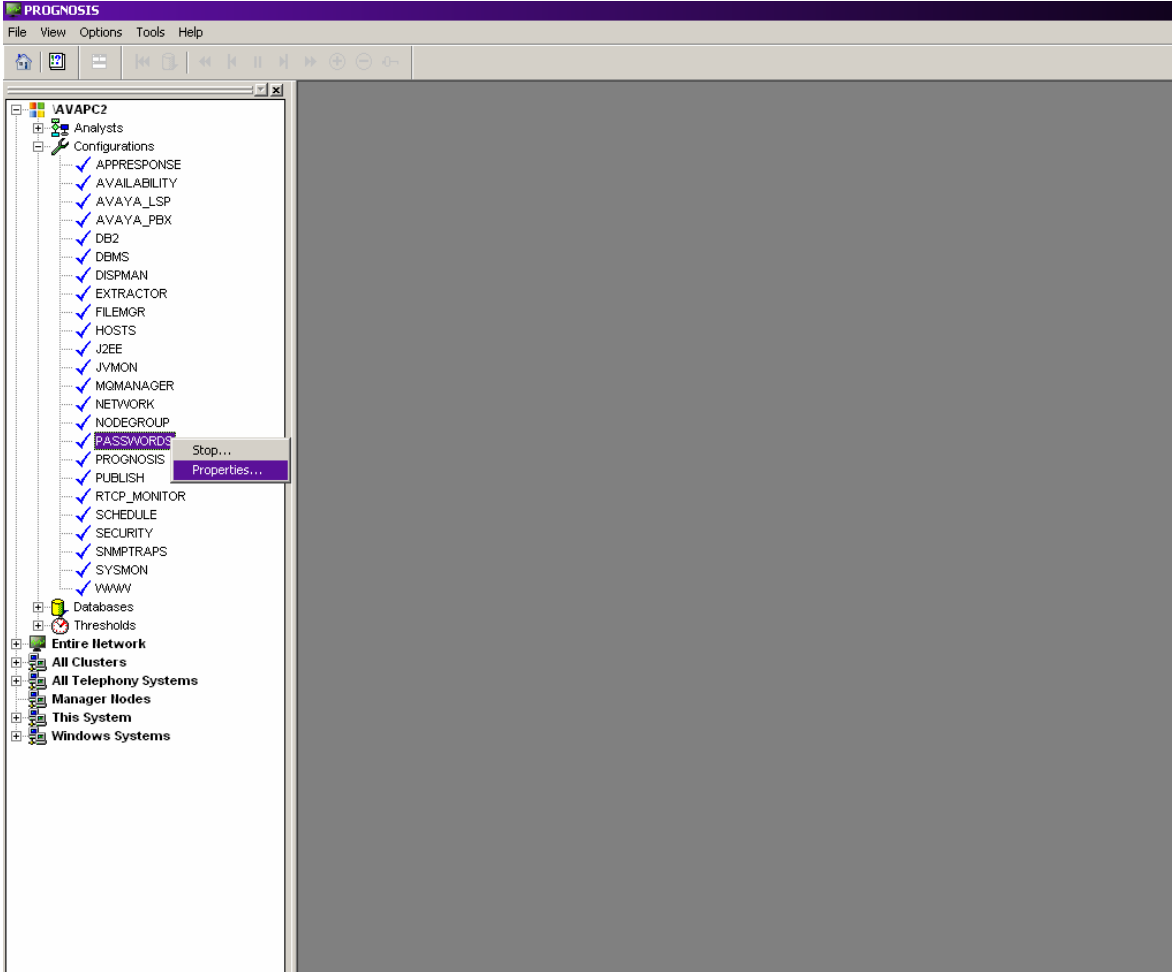
3. Repeat **Step 2** for all IP network regions that are required to be monitored.

4. Configure Integrated Research PROGNOSIS IP Telephony Manager

This section describes the configuration of Integrated Research PROGNOSIS IP Telephony Manager required to interoperate with Avaya Communication Manager.

Step	Description
1.	On the Integrated Research PROGNOSIS IP Telephony Manager server, click Start → All Programs → PROGNOSIS IP Telephony Manager → PROGNOSIS GUI to start the PROGNOSIS GUI application. Enter a valid Windows user account and password to log in to the Monitoring Node.
2.	<p>To configure Avaya Communication Manager systems to be monitored, expand Configurations of the Monitoring Node, right-click on AVAYA_PBX and select Properties.</p>  <p>The screenshot shows the PROGNOSIS GUI interface. On the left, a tree view displays the configuration hierarchy under 'AVAPC2'. The 'Configurations' folder is expanded, and 'AVAYA_PBX' is selected. A context menu is open over 'AVAYA_PBX', with 'Properties...' highlighted. Other configuration items include APPRESPONSE, AVAILABILITY, AVAYA_LSP, DEB2, DEMS, DISPMAN, EXTRACTOR, FILEMGR, HOSTS, J2EE, JVMON, MCMANAGER, NETWORK, NODEGROUP, PASSWORDS, PROGNOSIS, PUBLISH, RTP_MONITOR, SCHEDULE, SECURITY, SNMPTRAPS, SYSMON, and WWW. Below the tree, there are sections for 'Databases', 'Thresholds', 'Entire Network', 'All Clusters', 'All Telephony Systems', 'Manager Nodes', 'This System', and 'Windows Systems'.</p>

Step	Description
3.	<p>In the Configurations tab, add an entry for the Avaya Communication Manager system to be managed. The template to add a system is given in the PROGNOSIS GUI application. In this sample configuration, the following entries are added for the Avaya Communication Manager system with the name <i>S8710-PBX</i> and with the IP addresses of the active Avaya Server 10.1.2.164. The PROGNOSIS Monitoring Node will use SSH to connect to port 5022 of the Media Servers by default.</p> <p style="text-align: center;">ADD PBX (\S8710-PBX, ip= 10.1.2.164)</p> <p>Click Start to proceed.</p> 

Step	Description
4.	<p>To configure the SAT login account and password, expand Configurations of the Monitoring Node, right-click on PASSWORDS and select Properties.</p>  <p>The screenshot shows the PROGNOSIS application window. The title bar reads 'PROGNOSIS'. The menu bar includes 'File', 'View', 'Options', 'Tools', and 'Help'. Below the menu bar is a toolbar with various icons. The main area is divided into a left-hand tree view and a larger right-hand pane. The tree view is expanded to show the 'Configurations' folder under 'JAVAPC2'. A list of configuration items is visible, including APPRESPONSE, AVAILABILITY, AVAYA_LSP, AVAYA_PBX, DB2, DBMS, DISPMAN, EXTRACTOR, FILEMGR, HOSTS, J2EE, JVMON, MGRMANAGER, NETWORK, NODEGROUP, PASSWORDS (highlighted), PROGNOSIS, PUBLISH, RTCP_MONITOR, SCHEDULE, SECURITY, SNMPTRAPS, SYSMON, and WWW. A context menu is open over 'PASSWORDS', showing 'Stop...' and 'Properties...' options.</p>

Step	Description
5.	Click the + 'plus' button to add a new password entry for each of the configured system in Step 3. The Entry Name must be of the form <i>avaya-sat:<pbx-name></i> . For the system with the name <i>S8710-PBX</i> , enter <i>avaya-sat:S8710-PBX</i> for Entry Name , uncheck Password Only , and enter the login account created in Section 3.1 for Username and Password . Click Start to proceed.

5. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing evaluated the ability of the PROGNOSIS IP Telephony Manager to correctly retrieve the configuration, performance, alarms and errors from an Avaya Communication Manager system. In addition, the ability of PROGNOSIS IP Telephony Manager to receive and process RTCP information from Avaya Communication Manager and Avaya IP endpoints was also validated.

The serviceability testing introduced failure scenarios to see if PROGNOSIS IP Telephony Manager is able to resume service after failure recovery and Avaya Server interchange.

5.1. General Test Approach

The general test approach was to use PROGNOSIS GUI to display the configurations of Avaya Communication Manager system and verify against what is displayed on the SAT interface. The SAT interface is accessed by using either telnet or Secure Shell (SSH) to the Avaya Server. Calls were placed between various Avaya endpoints and the PROGNOSIS GUI was used to display the RTCP information collected.

For feature testing, PRONOSIS GUI was used to view the configurations of Avaya Communication Manager such as media gateways, cabinets, port networks, trunk groups, route patterns, CLAN, MEDPRO and DS1 boards, IP network regions, stations, processor occupancy, alarm and error information. Various conditions such as media gateway, port network, trunk group, trunk member and endpoint failures were created to see if PROGNOSIS IP Telephony Manager was able to detect the outage. For the collection of RTCP information, the endpoints included Avaya IP, digital and analog telephones, and Avaya IP Softphone.

For serviceability testing, reboots were applied to the PROGNOSIS IP Telephony Manager server and the Avaya Communication Manager Media Server to simulate system unavailability. Interchange of the Avaya S8710 Servers was also performed during testing.

5.2. Test Results

All test cases passed successfully. Integrated Research PROGNOSIS IP Telephony Manager successfully interoperates with Avaya Communication Manager.

6. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Communication Manager and Integrated Research PROGNOSIS IP Telephony Manager.

6.1. Verify Avaya Communication Manager

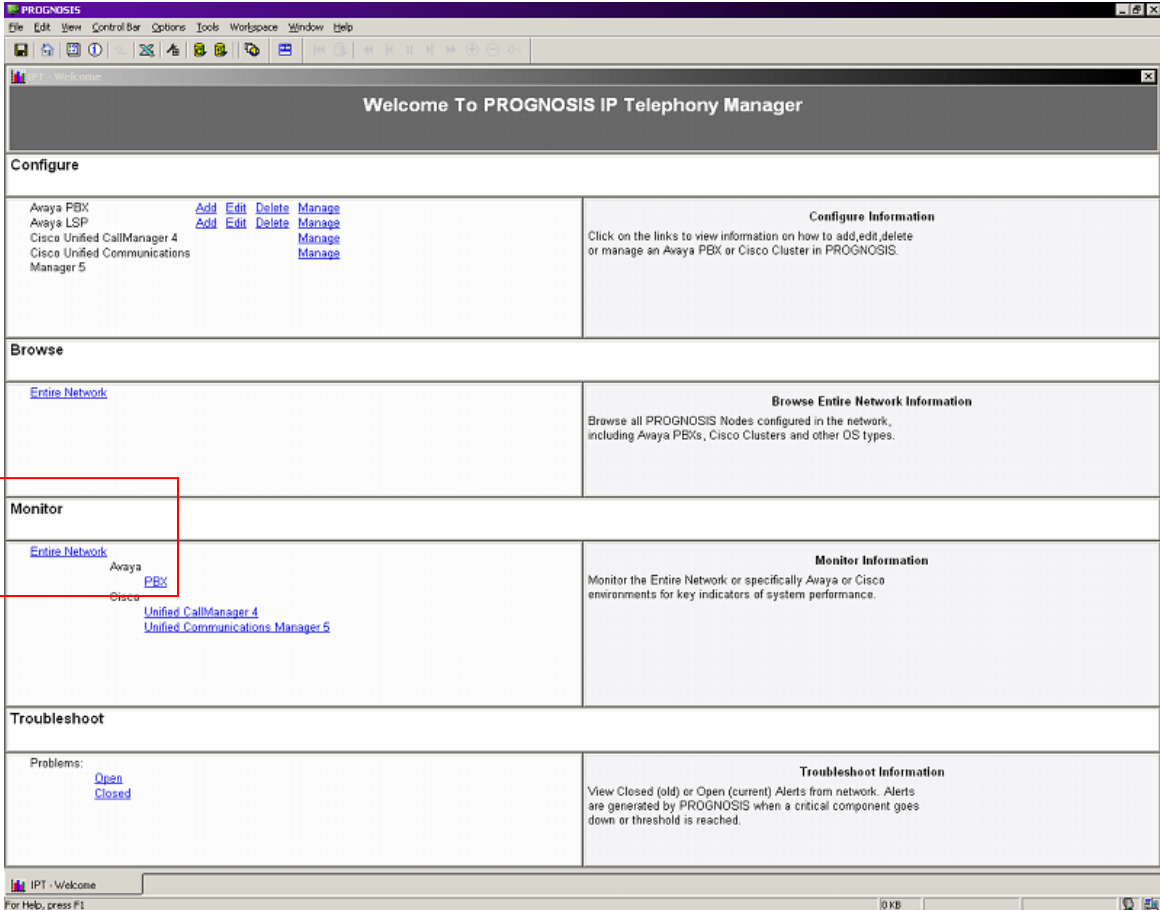
Verify that PROGNOSIS IP Telephony Manager has established three concurrent SSH connections to the SAT by using the **status logins** command.

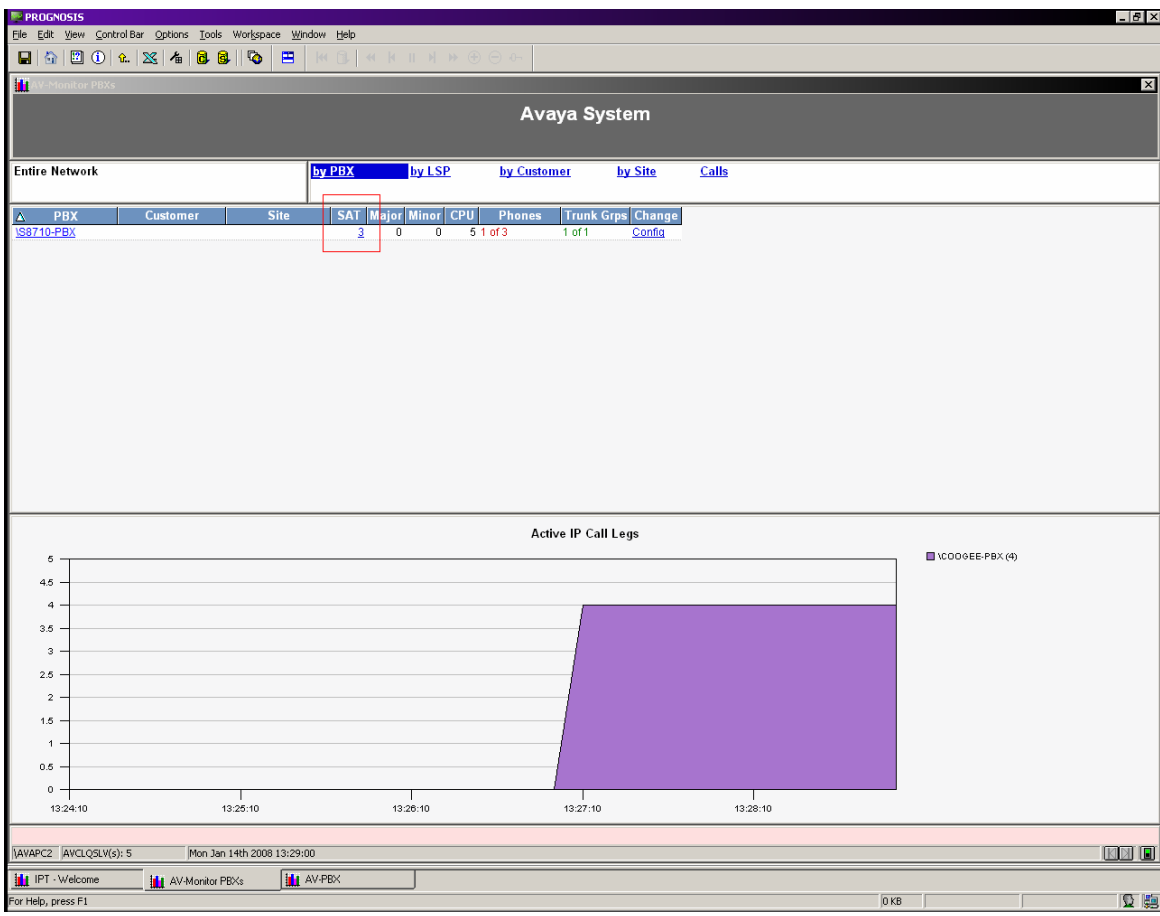
```
status logins
```

USER LOGIN INFORMATION					
Login	Type	Location	Aux	Active Command	ID
*dadmin	SYS-PORT	SSH	198.152.254.63	stat logins	1
proguser	SYS-PORT	SSH	10.1.10.105		3
proguser	SYS-PORT	SSH	10.1.10.105		4
proguser	SYS-PORT	SSH	10.1.10.105		5

6.2. Verify Integrated Research PROGNOSIS IP Telephony Manager

The following steps are done using the PROGNOSIS GUI.

Step	Description
1.	<p>After logging into PROGNOSIS GUI, click on the Home button on the toolbar to display the Welcome screen. In the Monitor section, click Entire Network→Avaya→PBX to display the list of Avaya Communication Manager Servers configured in Section 4 Step 3.</p> 

Step	Description																				
2.	<p>In the Avaya System page, verify that the SAT field for each configured Avaya Communication Manager shows 3 connections.</p>  <p>The screenshot displays the 'Avaya System' monitoring page. The 'Entire Network' section is filtered by 'by PBX'. The table below shows the following data:</p> <table border="1"> <thead> <tr> <th>PBX</th> <th>Customer</th> <th>Site</th> <th>SAT</th> <th>Major</th> <th>Minor</th> <th>CPU</th> <th>Phones</th> <th>Trunk Grps</th> <th>Change</th> </tr> </thead> <tbody> <tr> <td>S3710-PBX</td> <td></td> <td></td> <td>3</td> <td>0</td> <td>0</td> <td>5</td> <td>1 of 3</td> <td>1 of 1</td> <td>Config</td> </tr> </tbody> </table> <p>The 'Active IP Call Legs' section shows a graph with a purple area representing call activity starting at 13:27:10 and ending at 13:28:10, with a peak of 4 call legs.</p>	PBX	Customer	Site	SAT	Major	Minor	CPU	Phones	Trunk Grps	Change	S3710-PBX			3	0	0	5	1 of 3	1 of 1	Config
PBX	Customer	Site	SAT	Major	Minor	CPU	Phones	Trunk Grps	Change												
S3710-PBX			3	0	0	5	1 of 3	1 of 1	Config												

7. Support

For technical support on Integrated Research PROGNOSIS IP Telephony Manager, contact the Integrated Research Support Team at:

- Phone: +61 (2) 9966 1066
- Fax: +61 (2) 9921-1042
- Email: support@prognosis.com

8. Conclusion

These Application Notes describe the procedures for configuring the Integrated Research PROGNOSIS IP Telephony Manager 9.0.1. Patch 14 to interoperate with Avaya Communication Manager release 3.1.4. In the configuration described in these Application Notes, the PROGNOSIS IP Telephony Manager established SSH connections to the SAT to view the configurations of Avaya Communication Manager and to monitor for failures. PROGNOSIS IP Telephony Manager also processed the RTCP information to monitor the quality of IP calls. During compliance testing, all test cases were completed successfully.

9. Additional References

The following document can be found at <http://support.avaya.com>:

- Administrator Guide for Avaya Communication Manager, 03-300509, Issue 2, February 2006

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