Avaya Solution & Interoperability Test Lab

Application Notes for EMC Smarts VoIP Performance Manager with Avaya Communication Manager - Issue 1.0

Abstract

These Application Notes describe the procedures for configuring EMC Smarts VoIP Performance Manager to interoperate with Avaya Communication Manager.

EMC Smarts VoIP Performance Manager delivers the performance data you need to ensure the highest possible call quality and reliability. With EMC Smarts VoIP Performance Manager, organizations can manage, monitor, and diagnose Voice over IP (VoIP) services.

EMC Smarts VoIP Performance Manager integrates directly to Avaya Communication Manager using Secure Shell (SSH). At the same time, it processes Real-time Transport Control Protocol (RTCP) and Call Detail Recording (CDR) information from Avaya Communication Manager.

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 EMC Smarts VoIP Performance Manager 2.0.2 with Avaya Communication Manager 5.0.

EMC Smarts VoIP Performance Manager delivers the performance data you need to ensure the highest possible call quality and reliability. With EMC Smarts VoIP Performance Manager, organizations can manage, monitor, and diagnose Voice over IP (VoIP) services.

EMC Smarts VoIP Performance Manager provides intelligent alerting, deep diagnostics, and extensive reporting to help you gain in-depth, real-time views into the performance of VoIP services and the telephony infrastructure on which they rely while showing how that detailed information relates to the end user experience.

EMC Smarts VoIP Performance Manager uses three methods to monitor an Avaya Communication Manager system.

- **System Access Terminal (SAT)** - The EMC Smarts VoIP Performance 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 Server.

- **RTCP Collection** - The EMC Smarts VoIP Performance Manager collects RTCP information sent by Avaya Communication Manager IP Media Processors, Media Gateways and IP Telephones.

- **Call Detail Recording (CDR) Collection** - The EMC Smarts VoIP Performance Manager collects CDR information sent by Avaya Communication Manager.

Figure 1 illustrates the test configuration used to verify EMC Smarts VoIP Performance Manager interoperability with Avaya Communication Manager. It consists of an Avaya Communication Manager system running on a pair of Avaya S8720 Servers with an Avaya G650 Media Gateway and an Avaya G250-BRI Media Gateway for a remote office. A second system runs on an Avaya S8300 Server with an Avaya G700 Media Gateway. Both systems have Avaya IP, digital and analog telephones, and Avaya IP Softphone and Avaya IP Agent users configured for making and receiving calls. IP Trunks connects the two systems together to allow calls between them. EMC Smarts VoIP Performance Manager was installed on a server running Microsoft Windows Server 2003 Standard Edition with Service Pack 2. All the systems and telephones are connected using two Avaya C364T-PWR Converged Stackable Switches for network connectivity.

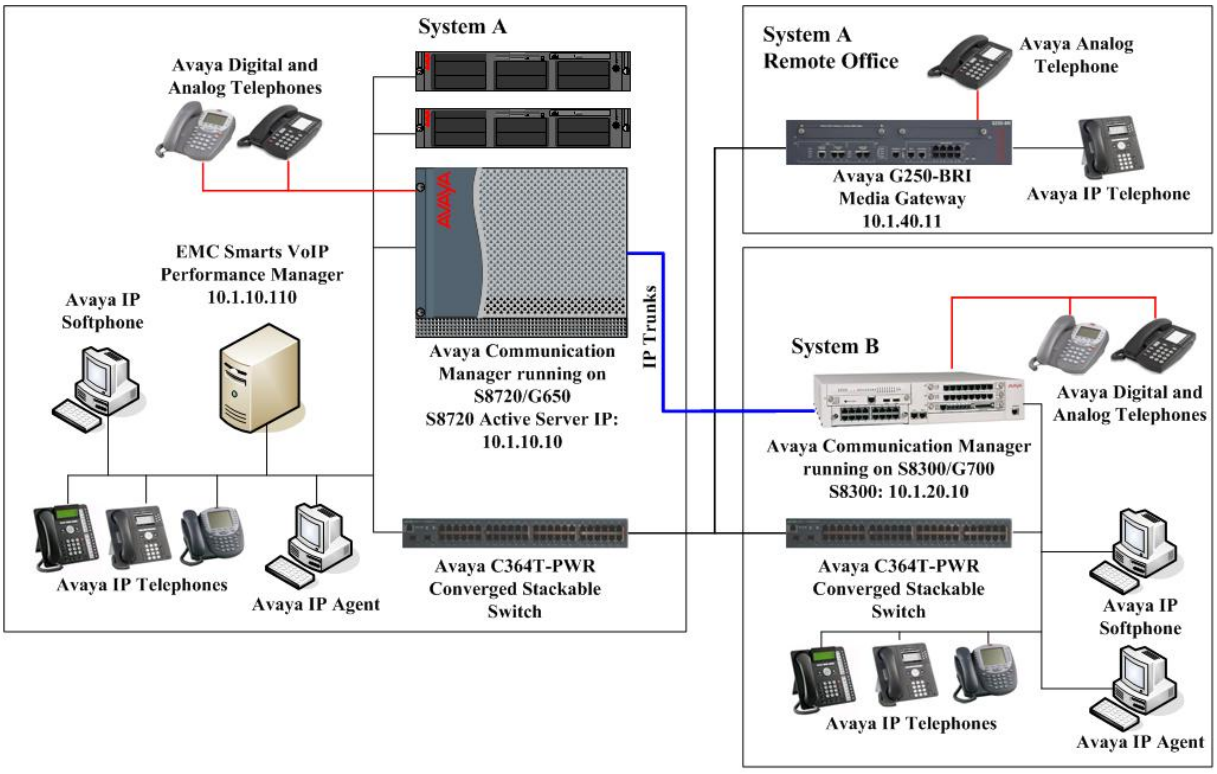


Figure 1: Test Configuration

2. Equipment and Software Validated

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

Equipment	Software
Avaya S8720 Servers	Avaya Communication Manager 5.0 (R015x.00.0.825.4) with Service Pack 1 (00.0.825.4-15175)
Avaya G650 Media Gateway • TN2312BP IP Server Interface • TN799DP C-LAN Interface • TN2302AP IP Media Processor • TN2602AP IP Media Processor • TN2214CP Digital Line • TN2793B Analog Line	- HW07, FW042 HW01, FW026 HW20, FW117 HW02, FW034 HW08, FW015 000013
Avaya G250-BRI Media Gateway	27.27.0 (for 5.0)
Avaya S8300 Server	Avaya Communication Manager 5.0 (R015x.00.0.825.4) with Service Pack 1 (00.0.825.4-15175)
Avaya G700 Media Gateway	27.29.0 (for 5.0)

• MM760AP VOIP Media Module • MM712AP DCP Media Module • MM714AP Analog Media Module	HW01, FW075 HW04, FW009 HW42, FW089
Avaya 4600 Series IP telephones	2.8.8.7 (H.323)
Avaya 9600 Series IP telephones	1.5 Service Pack 1 (H.323)
Avaya 1600 Series IP telephones	1.0.2 (H.323)
Avaya 6200 Series analog telephones	-
Avaya 2400 Series digital telephones	-
Avaya IP Softphone	6.0 Service Pack 2
Avaya IP Agent	7.0.23.116
Avaya C364T-PWR Converged Stackable Switches	4.5.18
EMC Smarts VoIP Performance Manager	2.0.2
Dell PowerEdge 860	Microsoft Windows Server 2003 Standard Edition Service Pack 2

3. Configure Avaya Communication Manager

This section describes the steps needed to configure Avaya Communication Manager to interoperate with EMC Smarts VoIP Performance Manager. This section describes the steps to create a login account and a SAT User Profile for EMC Smarts VoIP Performance Manager to access Avaya Communication Manager and the steps to enable RTCP and CDR reporting. The steps are repeated for each Avaya Communication Manager system.

3.1. Configure SAT User Profile

A SAT User Profile specifies which SAT screens may be accessed by the user assigned the profile and the type of access to each screen. As EMC Smarts VoIP Performance Manager does not modify any system configuration, create a SAT User Profile with limited permissions to assign to the EMC Smarts VoIP Performance Manager login account.

Step	Description
1.	Enter the **add user-profile *n*** command, where ***n*** is the next unused profile number. Enter a descriptive name for **User Profile Name** and enable all categories by setting the **Enbl** field to **y**. In this configuration, the user profile 20 is created.

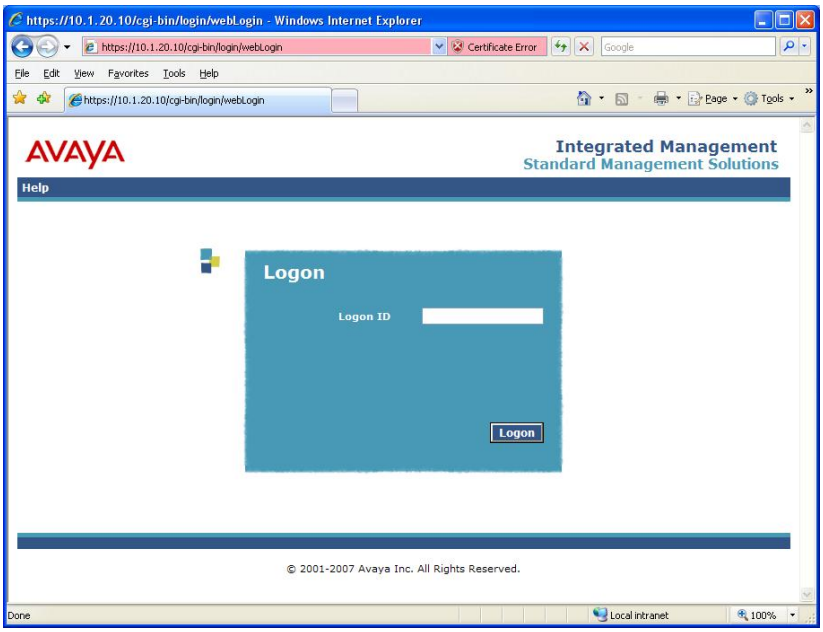
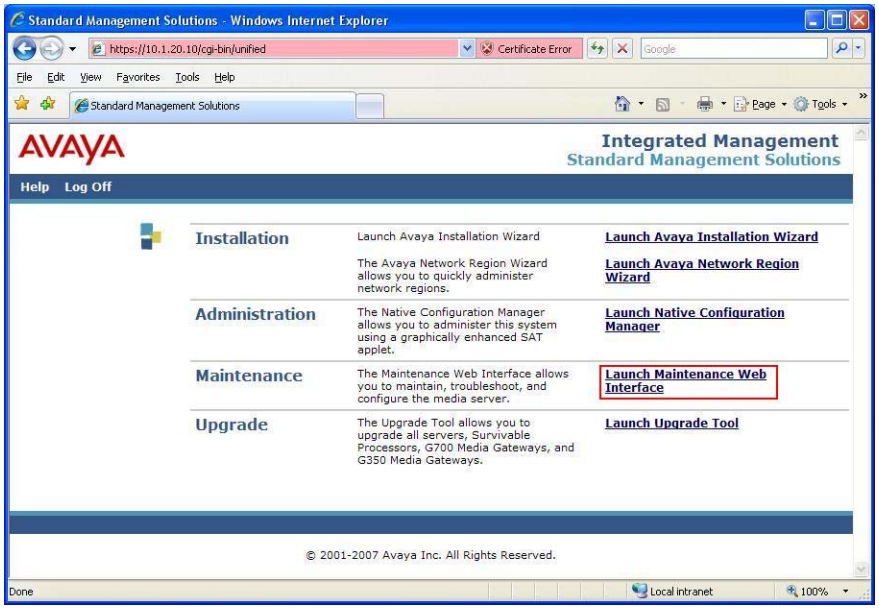
```
add user-profile 20                                          Page   1 of  41
                                USER PROFILE 20

User Profile Name: EMC

       This Profile is Disabled? n              Shell Access? n
Facility Test Call Notification? n   Acknowledgement Required? n
     Grant Un-owned Permissions? n           Extended Profile? n

             Name           Cat Enbl           Name                Cat Enbl
                    Adjuncts A   y            Routing and Dial Plan J   y
                Call Center B   y                        Security K   y
                   Features C   y                         Servers L   y
                   Hardware D   y                        Stations M   y
                Hospitality E   y               System Parameters N   y
                         IP F   y                    Translations O   y
                Maintenance G   y                        Trunking P   y
Measurements and Performance H   y                           Usage Q   y
              Remote Access I   y                     User Access R   y
```

2.	On Pages 2 to 41 of the USER PROFILE forms, set the permissions of all objects to **rm** (read and maintenance). This can be accomplished by typing **rm** into the field **Set All Permissions To**. Submit the form to create the user profile.

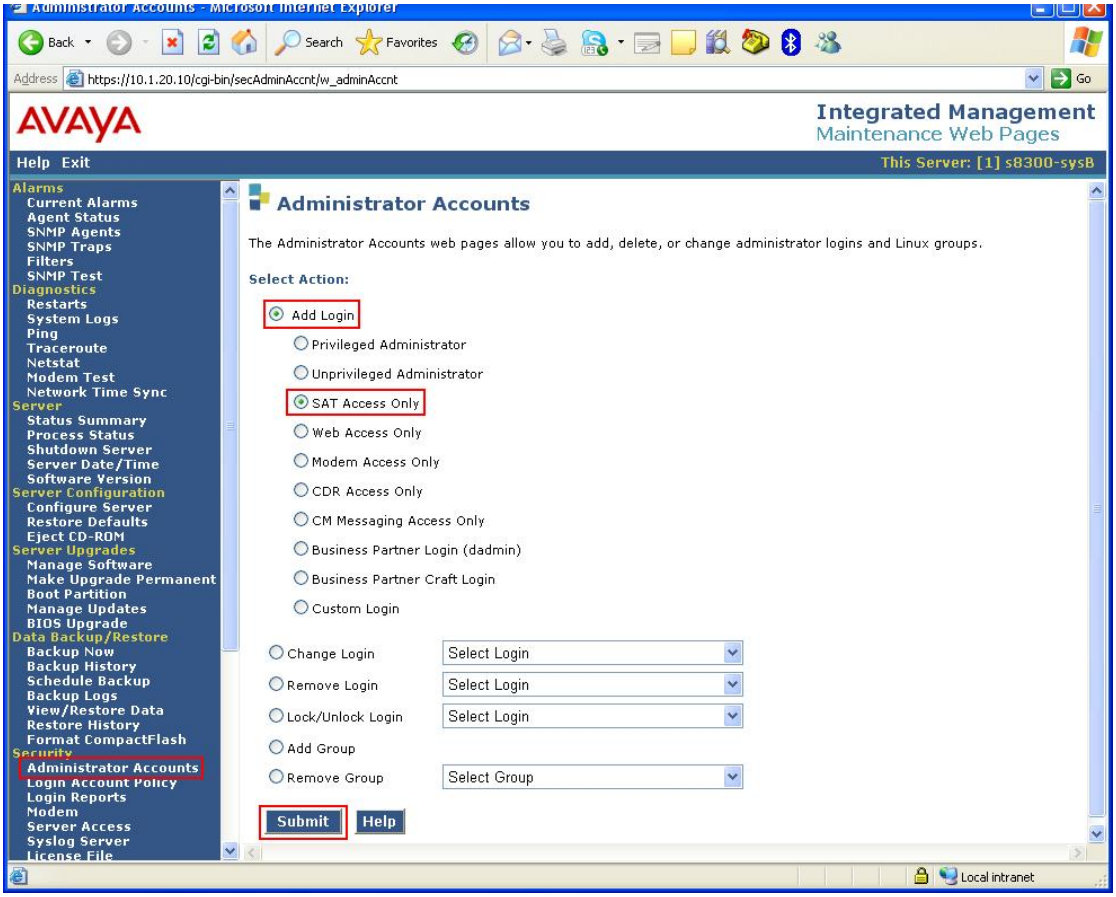
```
add user-profile 20                                          Page   2 of  41
                                USER PROFILE 20
 Set Permissions For Category:    To:          Set All Permissions To: rm

                  Name          Cat  Perm
                    aar analysis J    rm
            aar digit-conversion J    rm
                aar route-chosen J    rm
abbreviated-dialing 7103-buttons C    rm
    abbreviated-dialing enhanced C    rm
       abbreviated-dialing group C    rm
    abbreviated-dialing personal C    rm
      abbreviated-dialing system C    rm
                  aca-parameters P    rm
                access-endpoints P    rm
                   adjunct-names A    rm
        administered-connections C    rm
                  aesvcs cti-link A    rm
                aesvcs interface A    rm
```

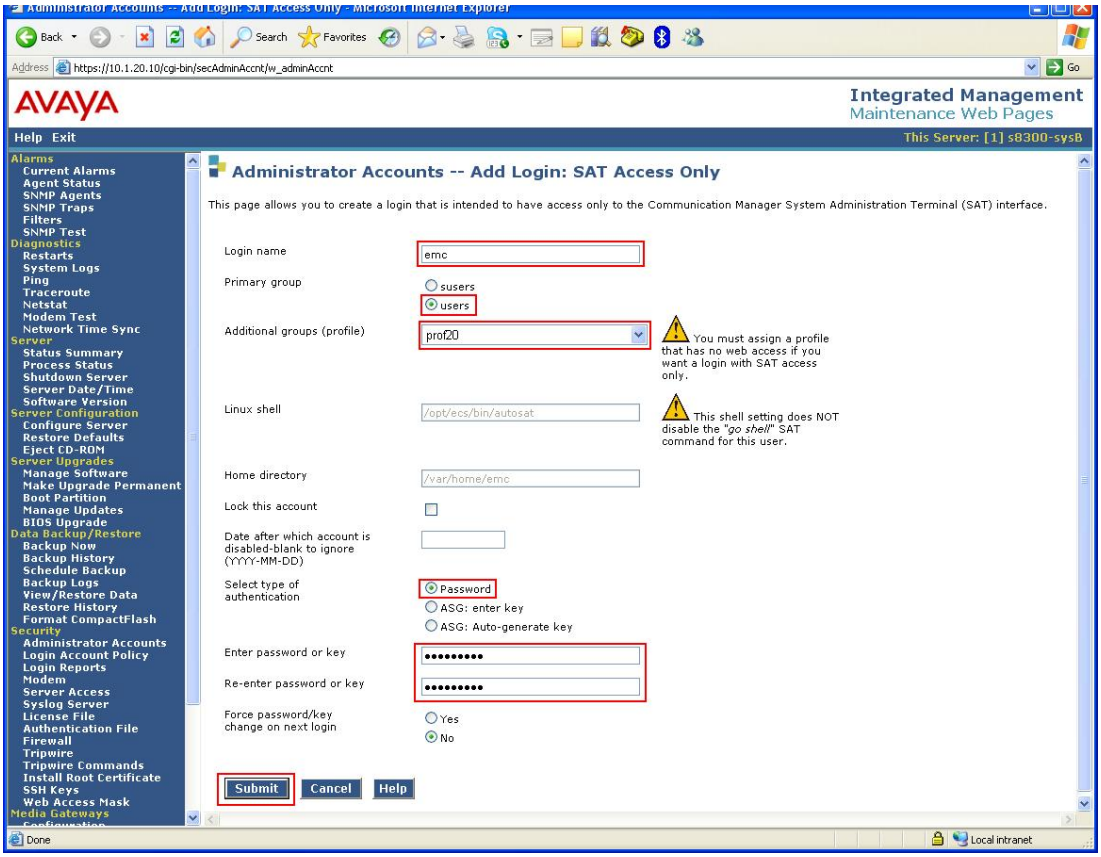
3.2. Configure Login

Create a login account for EMC Smarts VoIP Performance Manager to access the SAT.

Step	Description
1.	Using a web browser, enter https://<IP address of Avaya Server> to connect to the Avaya Server being configured and log in using appropriate credentials. 
2.	Click **Launch Maintenance Web Interface**. This will open up the **Maintenance Web Pages** in a new window that will allow the user to complete the configuration process. 

Step	Description
3.	From the navigation panel on the left side, click **Administrator Accounts**. Select **Add Login** and **SAT Access Only** and click **Submit**.



Step	Description
4.	On the Administrator Accounts -- Add Login: SAT Access Only page, enter the login to be created for the field **Login name**. In this configuration, the login **emc** is created. Configure the rest of the fields as follows: • **Primary group**: **users** [Limits the permissions of the login] • **Additional groups (profile)**: **prof20** [Select the user profile created in **Section 3.1**.] • **Select type of authentication: password** [Uses a password for authentication.] • **Enter password or key / Re-enter password or key** [Define the password] Click **Submit** to continue. This completes the configuration of the login. 

3.3. Configure RTCP Monitoring

To allow EMC Smarts VoIP Performance Manager to monitor the quality of IP calls, configure Avaya Communication Manager to send RTCP reporting to the IP address of the EMC Smarts VoIP Performance Manager 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 EMC Smarts VoIP Performance Manager server. Set **Default Server Port** to **5005** and **Default RTCP Report Period (secs)** to **5**.

```
change system-parameters ip-options                                 Page   1 of   3
                          IP-OPTIONS SYSTEM PARAMETERS

 IP MEDIA PACKET PERFORMANCE THRESHOLDS
    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

 RTCP MONITOR SERVER
         Default Server IP Address: 10 .1  .10 .110
               Default Server Port: 5005
  Default RTCP Report Period(secs): 5

AUTOMATIC TRACE ROUTE ON
           Link Failure? y

 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 the 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.

Step	Description
	change ip-network-region 1 Page 1 of 19 IP NETWORK REGION Region: 1 Location: 1 Authoritative Domain: Name: Local MEDIA PARAMETERS Intra-region IP-IP Direct Audio: yes Codec Set: 1 Inter-region IP-IP Direct Audio: yes UDP Port Min: 2048 IP Audio Hairpinning? y UDP Port Max: 65535 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
3.	Repeat **Step 2** for all IP network regions that are required to be monitored.

3.4. Configure CDR Monitoring

To allow EMC Smarts VoIP Performance Manager to monitor the CDR information, configure Avaya Communication Manager to send CDR information to the IP address of the EMC Smarts VoIP Performance Manager server.

Step	Description
1.	Enter the **change node-names ip** command to add a new node name for the EMC Smarts VoIP Performance Manager server. Note also, the node name **clan1** that was added for one of the C-LAN boards, which will be used by Avaya Communication Manager to send out the CDR information.
	change node-names ip Page 1 of 2 IP NODE NAMES Name IP Address **clan1 10.1.10.21** clan2 10.1.10.22 default 0.0.0.0 medpro1 10.1.10.31 medpro2 10.1.10.32 procr 10.1.10.9 val1 10.1.10.41 **VoIPPM 10.1.10.110**

Step	Description
2.	Enter the **change ip-services** command to define the CDR link. To define a primary CDR link, the following information should be provided: • **Service Type: CDR1** [If needed, a secondary link can be defined by setting Service Type to CDR2.] • **Local Node: clan1** [Avaya Communication Manager will use this C-LAN to send out the CDR] • **Local Port: 0** [The Local Port is fixed to 0 because Avaya Communication Manager initiates the CDR link.] • **Remote Node: VoIPPM** [The Remote Node is set to the node name previously defined in Step 1.] • **Remote Port: 50000** [The Remote Port may be set to a value between 5000 and 64500 inclusive. The default port for EMC Smarts VoIP Performance Manager server is 50000. Note that EMC Smarts VoIP Performance Manager server uses the same port number for every S8XXX Server.]

```
change ip-services                                              Page   1 of   4

                                    IP SERVICES
 Service      Enabled      Local        Local       Remote      Remote
  Type                     Node         Port        Node        Port
CDR1                    clan1           0       VoIPPM          50000
```

On Page 3 of the IP SERVICES form, disable the Reliable Session Protocol (RSP) for the CDR link by setting the **Reliable Protocol** field to **n**.

```
change ip-services                                              Page   3 of   4

                              SESSION LAYER TIMERS
  Service      Reliable  Packet Resp   Session Connect  SPDU  Connectivity
   Type        Protocol     Timer        Message Cntr    Cntr     Timer

 CDR1             n         30               3            3         60
```

Step	Description
3.	Enter the **change system-parameters cdr** command to set the parameters for the type of calls to track and the format of the CDR data. The following settings were used during the compliance test. • **CDR Date Format**: **month/day** • **Primary Output Format**: **unformatted** • **Primary Output Endpoint**: **CDR1** The remaining parameters define the type of calls that will be recorded and what data will be included in the record. See reference [2] for a full explanation of each field. The test configuration used some of the more common fields described below. • **Use Legacy CDR Formats? y** [Specify the use of the Avaya Communication Manager 3.x ("legacy") formats in the CDR records produced by the system.] • **Intra-switch CDR: y** [Allows call records for internal calls involving specific stations. Those stations must be specified in the INTRA-SWITCH-CDR form.] • **Record Outgoing Calls Only? n** [Allows incoming trunk calls to appear in the CDR records along with the outgoing trunk calls.] • **Outg Trk Call Splitting? y** [Allows a separate call record for any portion of an outgoing call that is transferred or conferenced.] • **Inc Trk Call Splitting? n** [Do not allow a separate call record for any portion of an incoming call that is transferred or conferenced.]

```
change system-parameters cdr                                    Page   1 of   1
                            CDR SYSTEM PARAMETERS

 Node Number (Local PBX ID):                          CDR Date Format: month/day
      Primary Output Format: unformatted   Primary Output Endpoint: CDR1
    Secondary Output Format:              Secondary Output Endpoint:
           Use ISDN Layouts? n                     Enable CDR Storage on Disk? n
       Use Enhanced Formats? n       Condition Code 'T' For Redirected Calls? n
      Use Legacy CDR Formats? y                  Remove # From Called Number? n
Modified Circuit ID Display? n                                Intra-switch CDR? y
                  Record Outgoing Calls Only? n     Outg Trk Call Splitting? y
  Suppress CDR for Ineffective Call Attempts? y       Outg Attd Call Record? y
      Disconnect Information in Place of FRL? n      Interworking Feat-flag? n
 Force Entry of Acct Code for Calls Marked on Toll Analysis Form? n
                                    Calls to Hunt Group - Record: member-ext
Record Called Vector Directory Number Instead of Group or Member? n
Record Agent ID on Incoming? n       Record Agent ID on Outgoing? y
     Inc Trk Call Splitting? n
  Record Non-Call-Assoc TSC? n           Call Record Handling Option: warning
      Record Call-Assoc TSC? n   Digits to Record for Outgoing Calls: dialed
   Privacy - Digits to Hide: 0              CDR Account Code Length: 15
```

Step	Description
4.	If the **Intra-switch CDR** field is set to **y** on Page 1 of the CDR SYSTEM PARAMETERS form, then enter the **change intra-switch-cdr** command to define the extensions that will be subjected to call detail recording. In the **Extension** field, enter the specific extensions whose usage will be tracked with the CDR records.

```
change intra-switch-cdr                                        Page   1 of   3
                          INTRA-SWITCH CDR

                                 Assigned Members:   8    of 5000   administered
   Extension          Extension          Extension          Extension
   10001
   10002
   10003
   10004
   10005
   10006
   10007
   10008
```

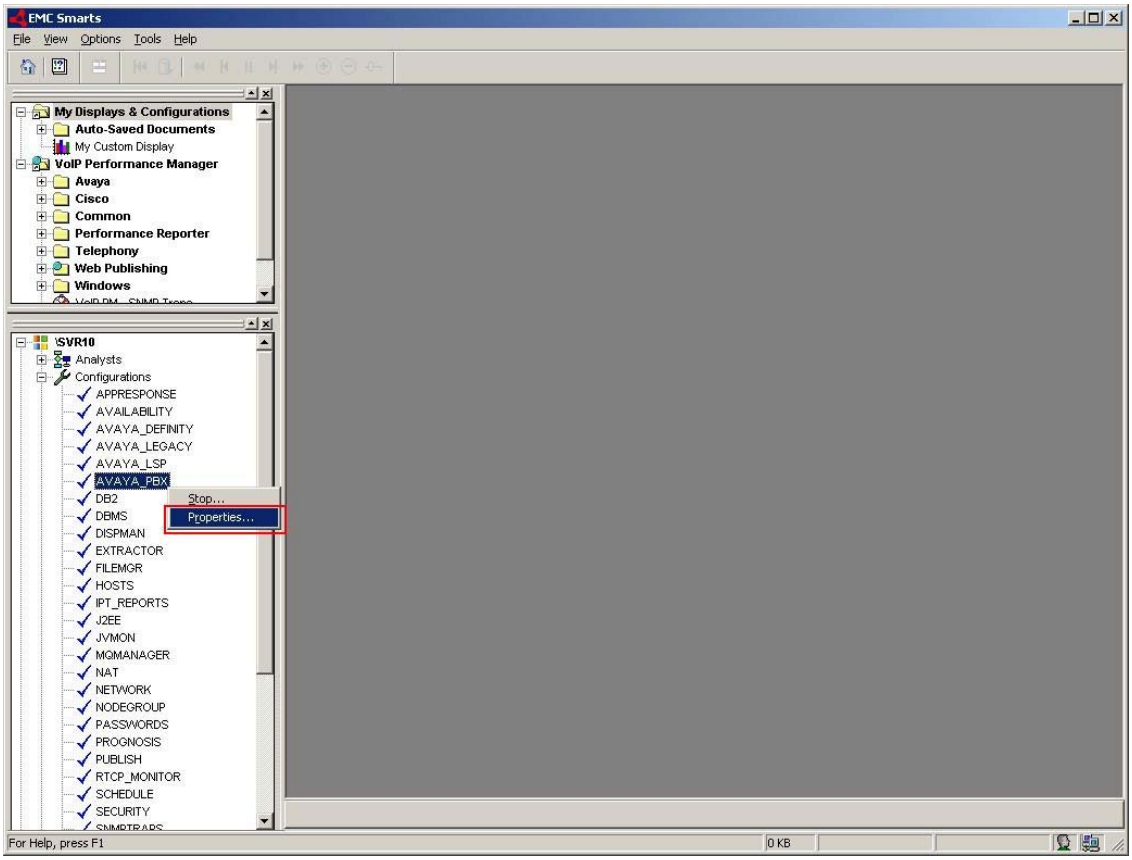
5.	For each trunk group for which CDR records are desired, verify that CDR reporting is enabled. Enter the **change trunk-group *n*** command, where ***n*** is the trunk group number, to verify that the **CDR Reports** field is set to **y**. Repeat for all trunk groups to be reported.

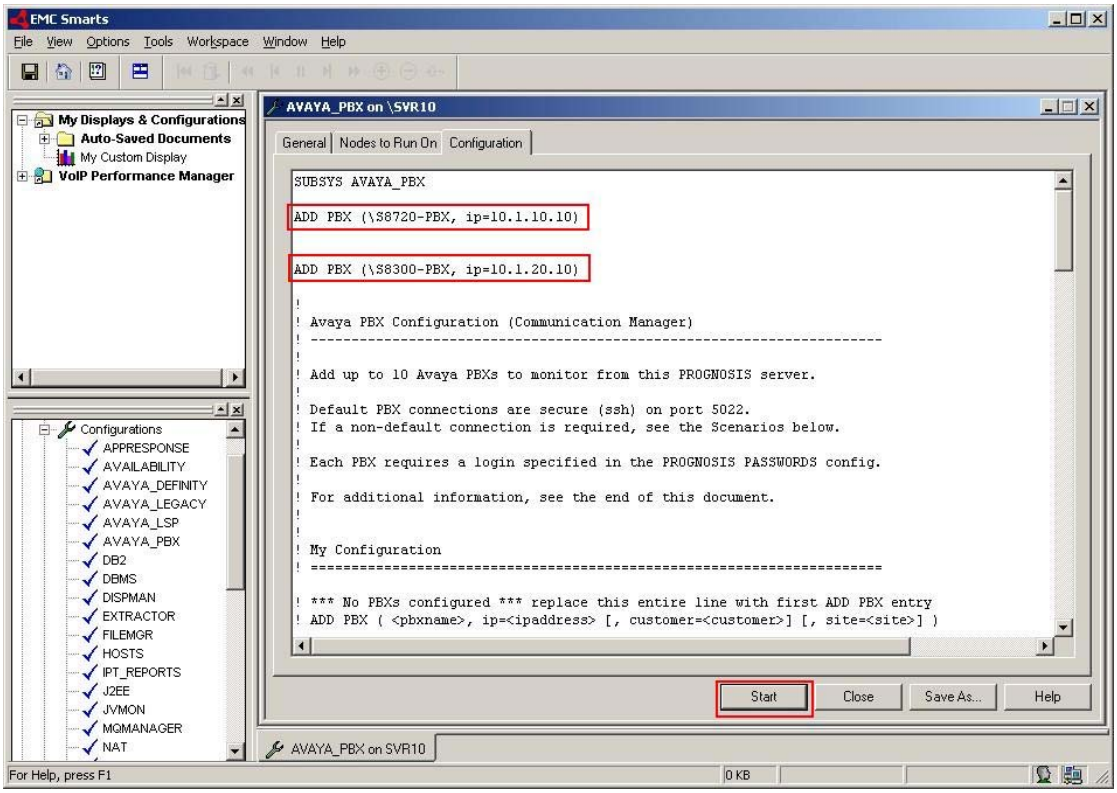
```
change trunk-group 2                                           Page   1 of  21
                                TRUNK GROUP

Group Number: 2                     Group Type: isdn          CDR Reports: y
  Group Name: PSTN BRI Line 2             COR: 95       TN: 1        TAC: 702
   Direction: two-way        Outgoing Display? n         Carrier Medium: PRI/BRI
 Dial Access? y              Busy Threshold: 255  Night Service: 10004
Queue Length: 0
Service Type: public-ntwrk          Auth Code? n            TestCall ITC: rest
                        Far End Test Line No:
TestCall BCC: 4
```

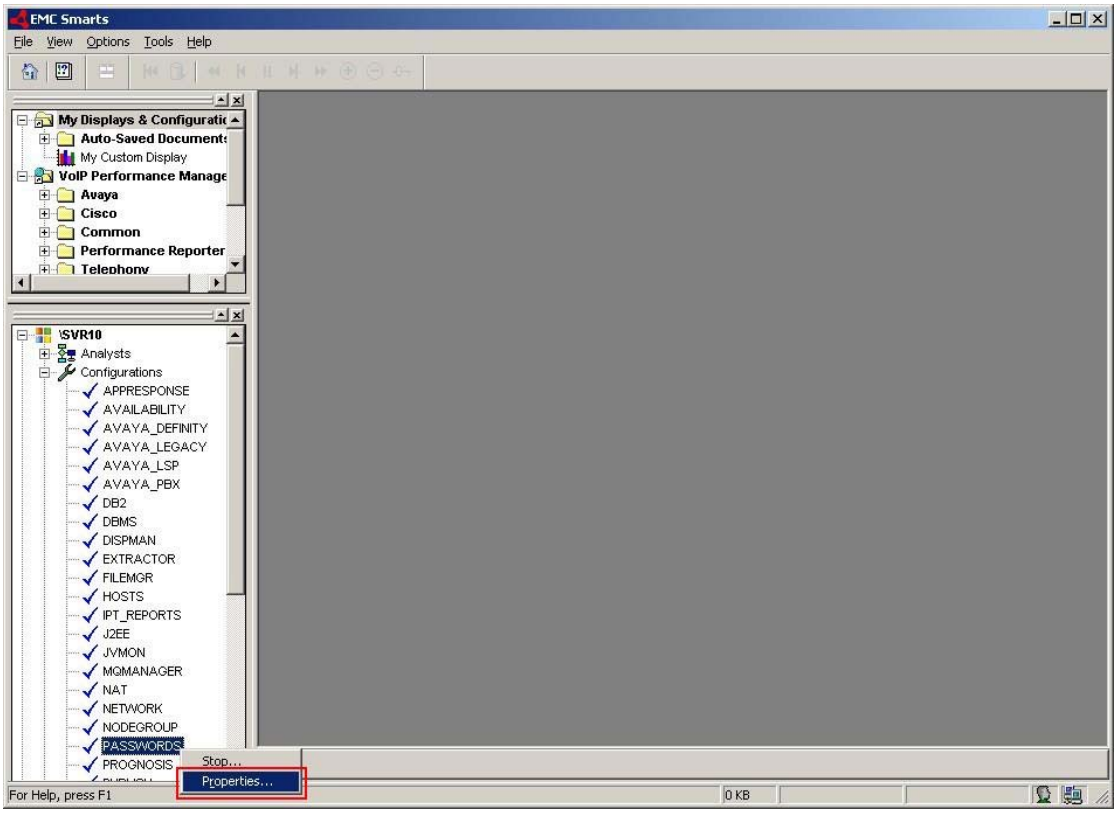
4. Configure EMC Smarts VoIP Performance Manager

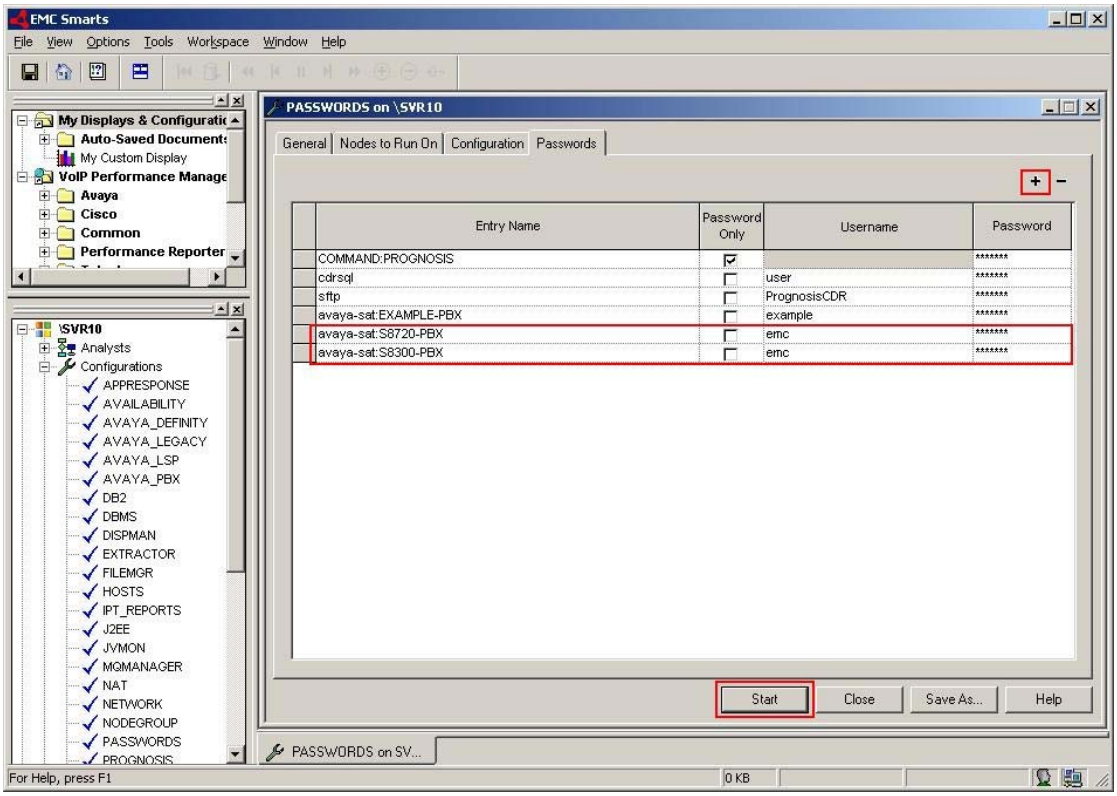
This section describes the configuration of EMC Smarts VoIP Performance Manager required to interoperate with Avaya Communication Manager.

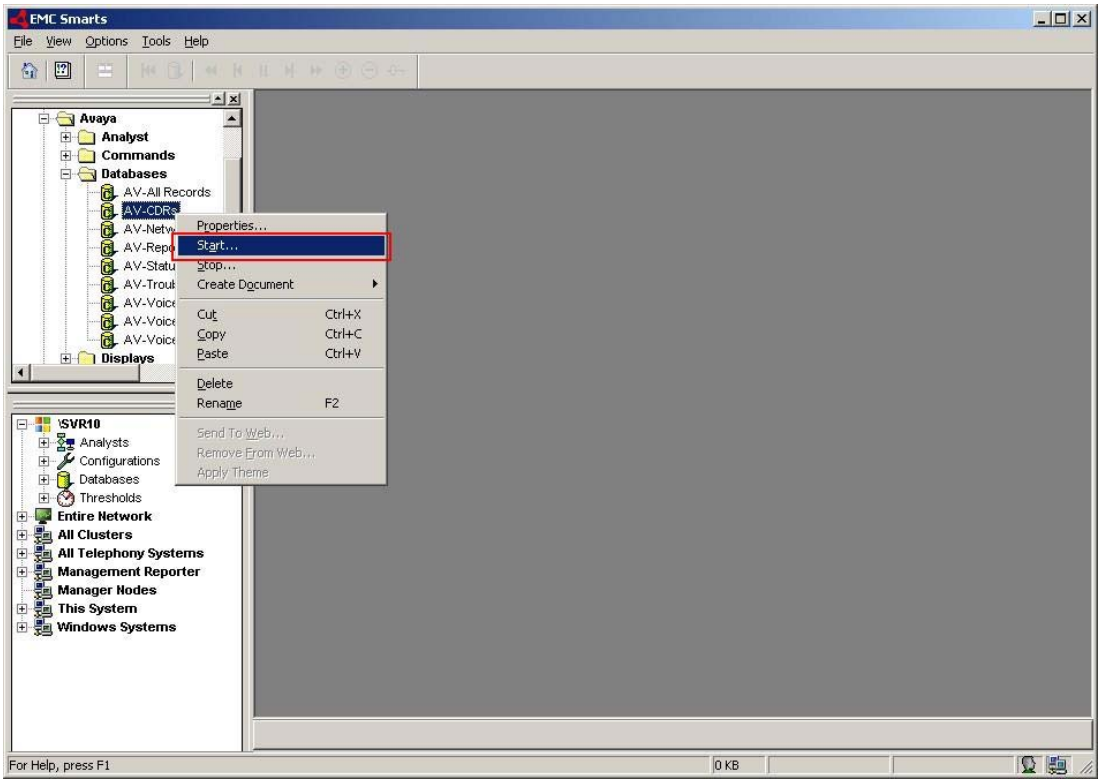
Step	Description
1.	On the EMC Smarts VoIP Performance Manager server, click **Start** > **All Programs** > **EMC Smarts VoIP Performance Manager** > **VoIP Performance Manager GUI** to start the VoIP Performance Manager GUI application. Enter a valid Windows user account and password to log in.

Step	Description
2.	To configure the Avaya Communication Manager systems to be monitored, expand **Configurations** of the Monitoring Node, right-click on **AVAYA_PBX** and select **Properties**. 

Step	Description
3.	In the **Configuration** tab, add an entry for each Avaya Communication Manager system to be managed. The template to add a system is provided in the VoIP Performance Manager GUI application. In this sample configuration, the following entries are added for the two Avaya Communication Manager systems with the names **S8720-PBX** and **S8300-PBX** along with the IP addresses of the Avaya Servers 10.1.10.10 and 10.1.20.10 respectively. The EMC Smarts VoIP Performance Manager will use SSH to connect to port 5022 of the Avaya Servers by default. ADD PBX (\S8720-PBX, ip=10.1.10.10) ADD PBX (\S8300-PBX, ip=10.1.20.10) Click **Start** to proceed. 

Step	Description
4.	To configure the SAT login account and password, expand **Configurations** of the Monitoring Node, right-click on **PASSWORDS** and select **Properties**. 

Step	Description
5.	Click the **+ 'plus'** button to add a new password entry for each of the configured systems in **Step 3**. The **Entry Name** must be of the form avaya-sat:<pbx-name>. For the system with the name **S8720-PBX**, enter **avaya-sat:S8720-PBX** for **Entry Name**, uncheck **Password Only**, and enter the login account created in **Section 3.2** for **Username** and **Password**. Repeat to add another entry for the second system **S8300-PBX**. Click **Start** to proceed. 

Step	Description
6.	By default, the CDR database used for the collection of CDR information is not started. To start the database, expand **VoIP Performance Manager > Avaya > Databases** of the Monitoring Node, right-click on **AV-CDRs** and click **Start**. This completes the configuration for EMC Smarts VoIP Performance Manager. 

5. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing evaluated the ability of the EMC Smarts VoIP Performance Manager to correctly retrieve the configuration, performance, alarms and errors from an Avaya Communication Manager system. In addition, the ability of EMC Smarts VoIP Performance Manager to receive and process both RTCP and CDR information from Avaya Communication Manager was also validated.

The serviceability testing introduced failure scenarios to see if EMC Smarts VoIP Performance 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 VoIP Performance Manager GUI to display the configurations of Avaya Communication Manager systems 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 S8720 and S8300 Servers. Calls were placed between various Avaya endpoints and VoIP Performance Manager GUI was used to display the RTCP and CDR information collected.

For feature testing, VoIP Performance Manager GUI was used to view the configurations of Avaya Communication Manager such as media gateways, cabinets, port networks, trunk groups, route patterns, C-LAN, 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 EMC Smarts VoIP Performance Manager was able to detect the outage. For the collection of RTCP and CDR information, the endpoints included Avaya IP, digital and analog telephones, and Avaya IP Softphone and IP Agent users. The types of calls made included intra-switch calls, inbound/outbound inter-switch IP trunk calls, transferred calls and conferenced calls.

For serviceability testing, reboots were applied to the EMC Smarts VoIP Performance Manager Server and Avaya Servers to simulate system unavailability. Interchanging of the Avaya S8720 Servers was also performed during testing.

5.2. Test Results

All test cases passed successfully. EMC Smarts VoIP Performance 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 EMC Smarts VoIP Performance Manager.

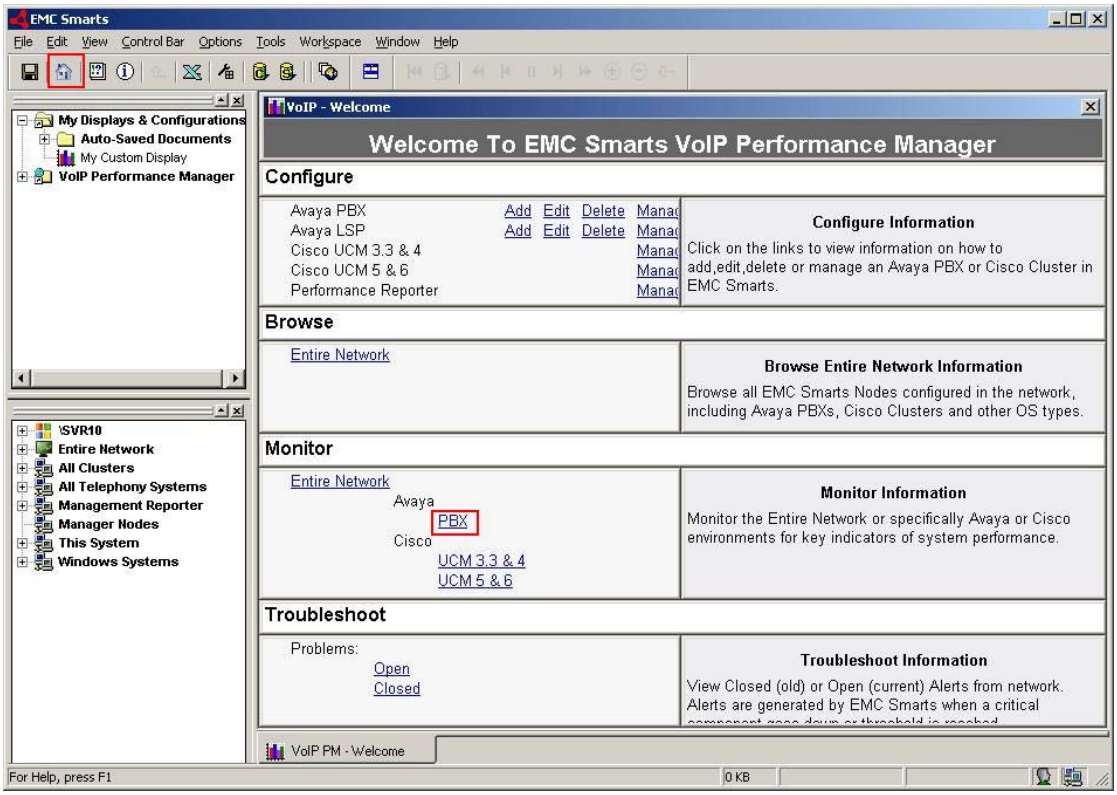
6.1. Verify Avaya Communication Manager

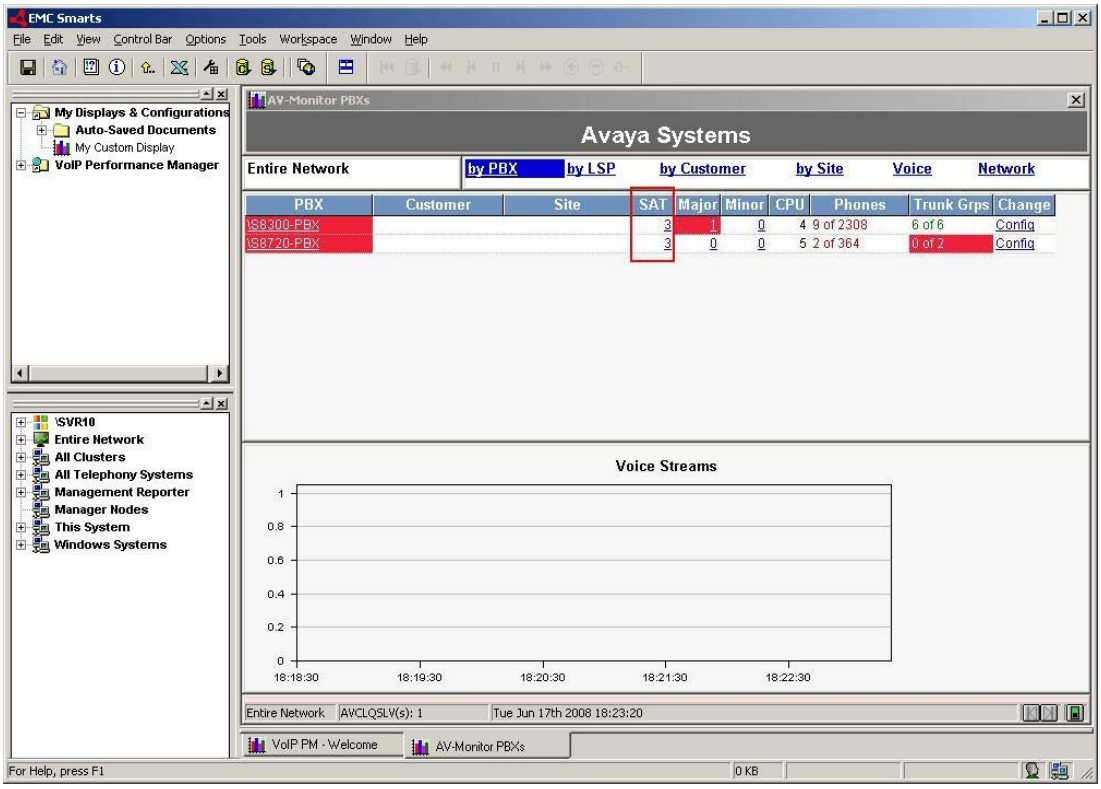
Verify that EMC Smarts VoIP Performance Manager has established three concurrent SSH connections to the SAT by using the **status logins** command.

```
status logins

                    COMMUNICATION MANAGER LOGIN INFORMATION

Login     Profile   User's Address       Active Command               Session

*dadmin      2        10.1.10.152       stat logins                     1
 emc         20       10.1.10.110       list measurements summary       3
 emc         20       10.1.10.110       list registered-ip-stations     4
 emc         20       10.1.10.110       stat trunk 10                   5
```

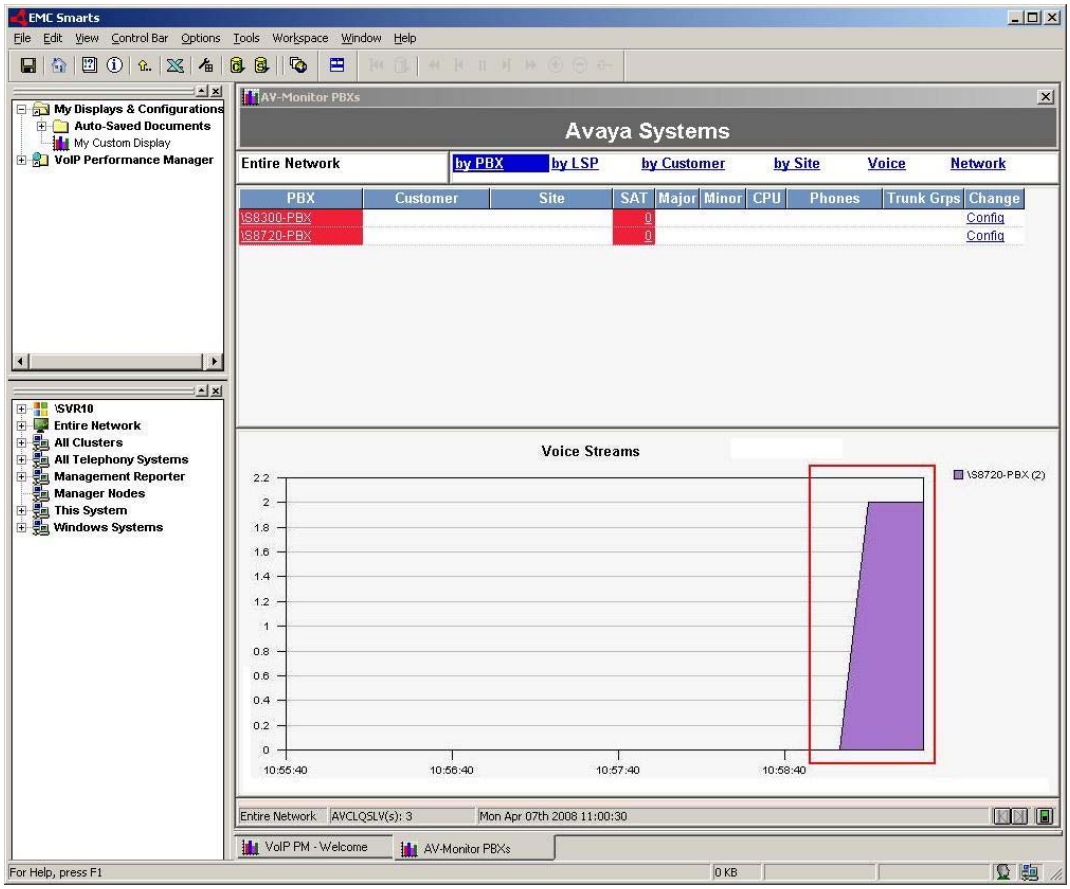
6.2. Verify EMC Smarts VoIP Performance Manager

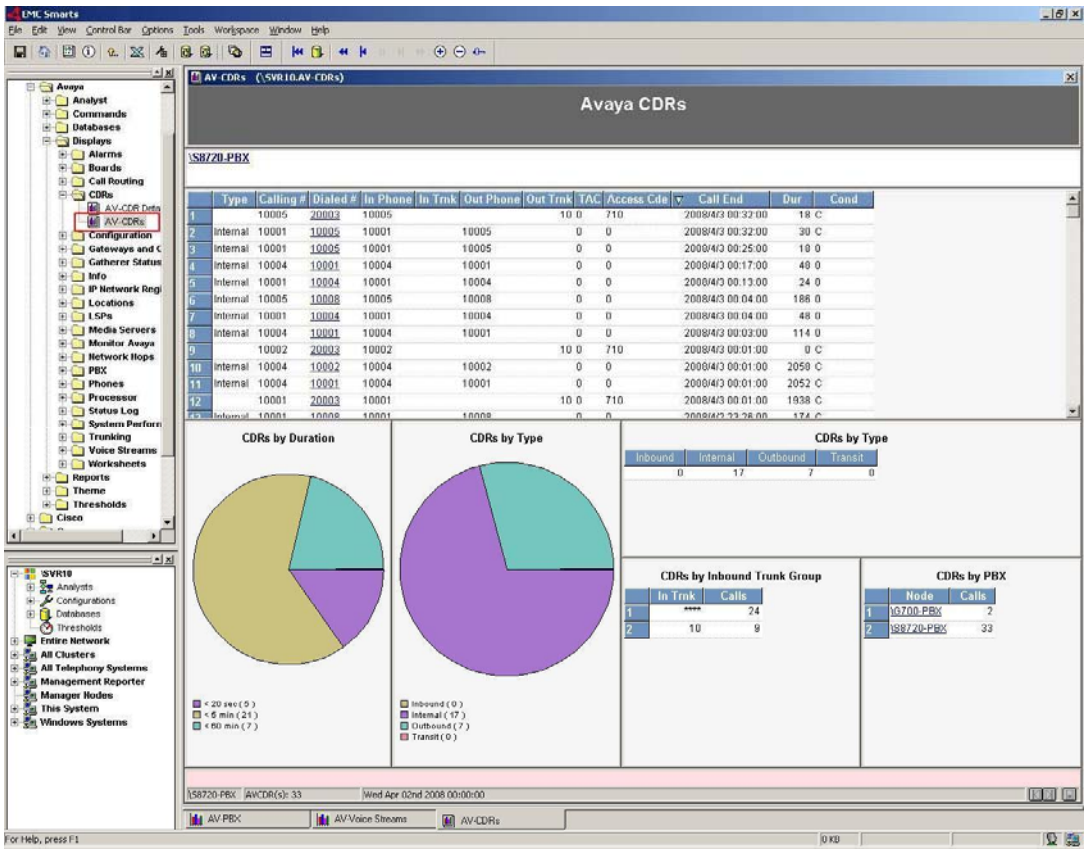
The following steps are done using the VoIP Performance Manager GUI.

Step	Description
1.	After logging into VoIP Performance Manager 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	Description
2.	In the **Avaya System** page, verify that the **SAT** field for each configured Avaya Communication Manager shows **3** connections. 

Step	Description
3.	Make a call between two Avaya IP telephones that belongs to an IP Network Region that is being configured to send RTCP information to the EMC Smarts VoIP Performance Manager server. Verify that the **Voice Streams** section shows two active voice streams reflecting the quality of the call.



Step	Description
4.	Expand **IP Telephony Manager > Avaya > Displays > CDRs** of the Monitoring Node and double-click **AV-CDRs**. Make an incoming call through a trunk group configured for CDR reporting in **Section 3.4 Step 5**. Answer the call and hang up after about 10 seconds. Verify that a new CDR record is displayed for the call. 

7. Support

For technical support on EMC Smarts VoIP Performance Manager, contact the EMC Support Team at:

- Phone: +1 (508) 497-7901

8. Conclusion

These Application Notes describe the procedures for configuring EMC Smarts VoIP Performance Manager 2.0.2 to interoperate with Avaya Communication Manager Release 5.0. In the configuration described in these Application Notes, EMC Smarts VoIP Performance Manager established SSH connections to the SAT to view the configurations of Avaya Communication Manager and to monitor for failures. EMC Smarts VoIP Performance Manager also processed the RTCP information to monitor the quality of IP calls and collect CDR information from the Avaya Communication Manager. During compliance testing, all test cases were completed successfully.

9. Additional References

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

[1] *Feature Description and Implementation For Avaya Communication Manager*, Release 5.0, Issue 6, January 2008, Document Number 555-245-205.

[2] *Administrator Guide for Avaya Communication Manager*, Release 5.0, Issue 4.0, January 2008, Document Number 03-300509.

[3] *Feature Description and Implementation For Avaya Communication Manager*, Release 4.0, Issue 5, February 2007, Document Number 555-245-205.

[4] *Administrator Guide for Avaya Communication Manager*, Release 4.0, Issue 3, February 2007, Document Number 03-300509.

The following documentations are provided by EMC:

[5] *EMC® Smarts® VoIP Performance Manager for Cisco v5+ and Avaya Installation Guide*, Version 2.0.

[6] *EMC® Smarts® VoIP Performance Manager for Cisco v5+ and Avaya User Guide*, Version 2.0.

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 DevConnect Program at devconnect@avaya.com.