Avaya Solution & Interoperability Test Lab

Application Notes for TriVium Systems CallAnalyst Enterprise Server with Avaya Communication Manager – Issue 1.0

Abstract

These Application Notes describe the configuration procedures required for TriVium Systems CallAnalyst Enterprise Server to successfully interoperate with Avaya Communication Manager to collect call detail records (CDR) using Avaya Reliable Session Protocol (RSP) over TCP/IP. CallAnalyst Enterprise Server is a software application that collects, stores and processes call records to provide call usage analysis and call accounting capabilities.

The general test approach was to perform a set of call scenarios that would generate varied data in the call detail records and verify that CallAnalyst Enterprise Server properly parsed and displayed the record fields. The call scenarios included inbound trunk calls, outbound trunk calls and intra-switch calls. Basic serviceability and performance testing was also conducted to assess the reliability of the solution. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe a compliance-tested call detail recording (CDR) solution comprised of Avaya Communication Manager and TriVium Systems CallAnalyst Enterprise Server. CallAnalyst Enterprise Server is a software application that collects, stores and processes call detail records to provide call usage analysis and call accounting capabilities.

Avaya Communication Manager communicates with CallAnalyst Enterprise Server via Avaya Reliable Session Protocol (RSP) over TCP/IP. RSP provides a transport mechanism for reliable delivery of CDR records. Avaya Communication Manager generates and sends the call records via RSP while CallAnalyst Enterprise Server collects, stores and processes the records at the other end.

Avaya Communication Manager can generate call detail records for intra-switch calls, inbound trunk calls and outbound trunk calls. In addition, split records can be generated for transferred calls and conference calls. CallAnalyst Enterprise Server supports the unformatted CDR format.

Multi Site Process Manager is a key component of CallAnalyst Enterprise Server. The Multi Site Process Manager is a Windows service that collects the records from the Avaya Communication Manager, processes the data and stores the data in the database. CallAnalyst Enterprise Server provides the reporting capabilities and allows the user to perform data management tasks and automation. Unless stated otherwise, this document will use CallAnalyst Enterprise Server to refer to the complete product including all components.

Figure 1 illustrates the network configuration that was used for the compliance test. The configuration consists of two CDR sources. The first is an Avaya S8300 Media Server running Avaya Communication Manager residing in an Avaya G700 Media Gateway. There are Avaya 6400D Series Digital Telephones and a PSTN PRI trunk connected to the Media Gateway. There are Avaya 4600 Series IP Telephones registered to the Media Server.

The second source is an Avaya S8500 Media Server running Avaya Communication Manager with an Avaya G650 Media Gateway. There are Avaya 4600 Series IP Telephones registered to the Media Server.

All network components are connected to an IP network comprised of an Extreme Networks Alpine 3804 switch and Avaya C363T-PWR Converged Stackable Switch. A Windows 2000 PC is connected to the network that hosts CallAnalyst Enterprise Server. A RSP session is established from each Avaya Communication Manager to CallAnalyst Enterprise Server to collect CDR records. In addition, a H.323 IP trunk is established between the two Avaya Media Servers so calls can be placed from one to the other.

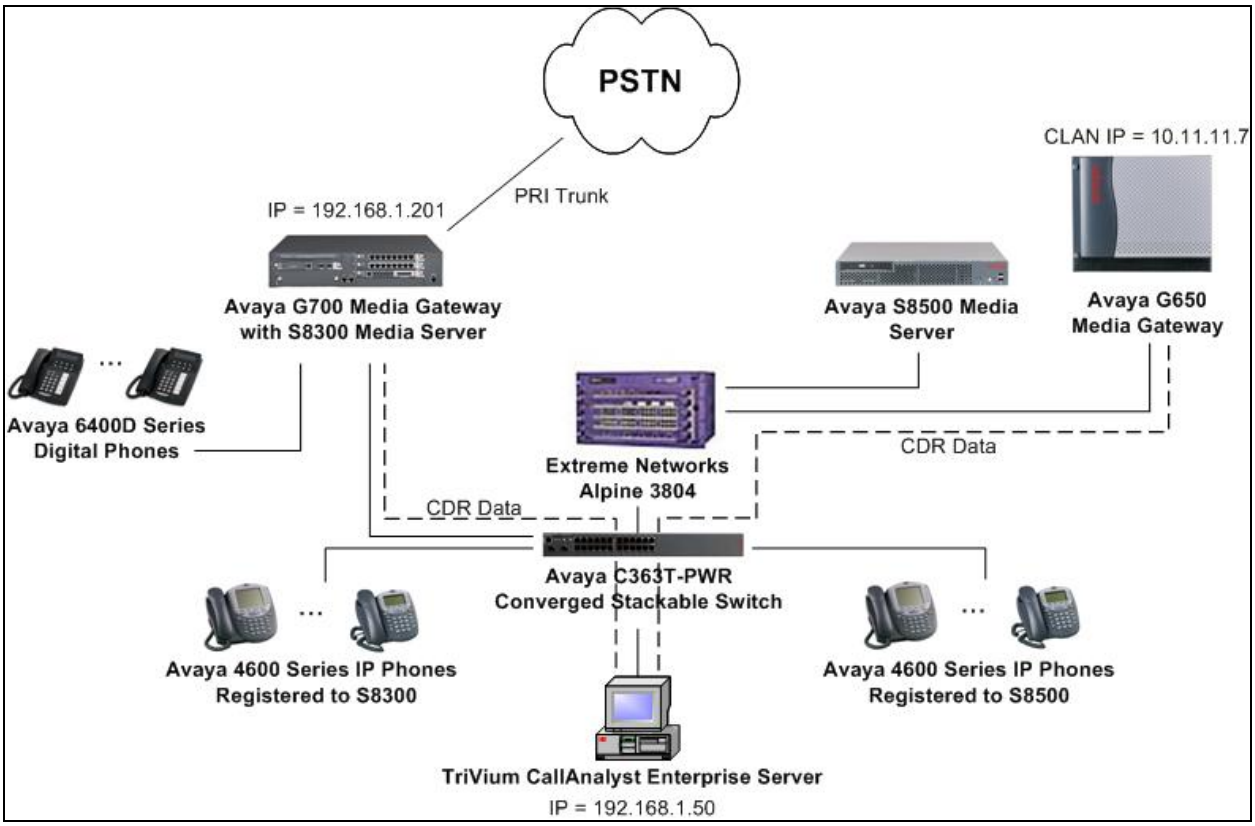


Figure 1: Test Configuration Collecting CDR Data from Multiple Servers

2. Equipment and Software Validated

The following equipment and software/firmware were used for the test configuration provided.

Equipment	Software/Firmware
Avaya S8300 Media Server	Communication Manager 3.0.1 (R013x.00.1.346.0)
Avaya G700 Media Gateway (Media Gateway Processor)	24.21.1
Avaya S8500 Media Server	Communication Manager 3.0 (R013x.00.0.340.3)
Avaya G650 Media Gateway	-
TN2312BP IP Server Interface (IPSI)	HW 03 FW 21
TN799DP C-LAN Interface (C-LAN)	HW 01 FW 15
TN2302AP IP Media Processor (MEDPRO)	HW 20 FW 104
Avaya 4600 Series IP Telephones	2.3 (4610SW H.323) 2.3 (4620SW H.323) 2.5 (4625SW H.323)
Avaya 6400D Series Digital Telephones	-
Avaya C363T-PWR Converged Stackable Switch	4.5.14

Equipment	Software/Firmware
Extreme Networks Alpine 3804	7.2.0 Build 25
CallAnalyst Enterprise Server running on Windows 2000 Professional SP4	2.3 (Build:5123 Update 1) plus the following patches: CES2.3Patch1.zip AvayaHotFix.zip

3. Configure Avaya Communication Manager

This section describes the procedure for configuring call detail recording on Avaya Communication Manager. These steps are performed through the System Access Terminal (SAT). These steps describe the procedure used for the Avaya S8300 Media Server. All steps are the same for the other media servers unless otherwise noted. Avaya Communication Manager will be configured to generate CDR records using RSP over TCP/IP to the IP address of the PC running CallAnalyst Enterprise Server. For the Avaya S8300 Media Server, the RSP link originates at the IP address of the local media server. For other Avaya Media Servers, the RSP link originates at the IP address of the C-LAN board.

Step	Description
1.	Use the **change node-names ip** command to create a new node name with the IP address of the PC running CallAnalyst Enterprise Server. The example below shows a descriptive node name of *CallAnalyst* was created with the IP address set to *192.168.1.50* as shown in **Figure 1**. This will be used in Step 3.

```
change node-names ip                                        Page   1 of   1
                                IP NODE NAMES
    Name              IP Address          Name              IP Address
CallAnalyst         192.168.1  .50                          .   .   .
Wireless-S8500      10 .11 .11 .7                           .   .   .
default             0  .0  .0  .0                          .   .   .
procr               192.168.1  .201                         .   .   .
                       .   .   .                           .   .   .
```

Step	Description

2.	Next, the node name of the Media Server or C-LAN circuit pack must be determined. This information will be used in Step 3. If the Avaya S8300 Media Server is used, the node name of the Media Server is required. If using any other Media Server, the node name of the C-LAN is needed.
	
	The node name of the Media Server is pre-defined as *procr*. To locate the node name of the C-LAN, use the **list ip-interface all** command. If multiple C-LANs are displayed, locate the C-LAN in the list that will be used for the RSP connection. Note the name in the **Node Name / IP-Address** field.
	
	The example below shows the output of the **list ip-interface all** command from the S8500 Media Server used in the compliance test. The node name of the C-LAN on the S8500 Media Server is *TR2-CLAN-1A13*.
	
	`list ip-interface all`
	
	`IP INTERFACES`
	`ON Type Slot Code Sfx Node Name/ IP-Address Subnet Mask Gateway Address Net Rgn VLAN`
	`y C-LAN 01A13 TN799 D **TR2-CLAN-1A13** 10.11.11.7 255.255.255.0 10.11.11.1 11 n`
	`y MEDPRO 01A14 TN2302 TR2-MEDPRO-1A14 10.11.11.8 255.255.255.0 10.11.11.1 11 n`

Step	Description

3.	Use the **change ip-services** command to define the CDR link to use RSP over TCP/IP. To define a primary CDR link, set the **Service Type** to *CDR1*. A secondary link can be defined by setting **Service Type** to *CDR2*. If using the Avaya S8300 Media Server, the **Local Node** is set to *procr* which is the node name of the local processor. If using another Avaya Media Server, the node name is set to the node name of the C-LAN board. The **Local Port** number is fixed to *0*. The **Remote Node** is set to the node name that was created in Step 1 for the PC running CallAnalyst Enterprise Server. The **Remote Port** may be set to a value between 5000 and 64500 inclusive and must match the port configured in CallAnalyst Enterprise Server. See Section 4 Step 2.
	
	The example below shows the values used in the compliance test for each Media Server.
	
	Values used on the Avaya S8300 Media Server:
	`change ip-services Page 1 of 3`
	
	`IP SERVICES`
	`Service Type Enabled Local Node Local Port Remote Node Remote Port`
	`CDR1 procr 0 CallAnalyst 9000`
	
	Values used on the Avaya S8500 Media Server:
	`change ip-services Page 1 of 3`
	
	`IP SERVICES`
	`Service Type Enabled Local Node Local Port Remote Node Remote Port`
	`CDR1 TR2-CLAN-1A13 0 CallAnalyst 9001`

4.	On **Page** 3 of the **change ip-services** command, enable the Reliable Session Protocol (RSP) for the CDR link by setting **Reliable Protocol** to *y*. Default values can be used for the other fields.
	
	`change ip-services Page 3 of 3`
	
	`SESSION LAYER TIMERS`
	`Service Type Reliable Protocol Packet Resp Timer Session Connect Message Cntr SPDU Cntr Connectivity Timer`
	
	`CDR1` **`y`** `30 3 3 60`

Step	Description

5.	Use 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 example below shows the values used in the compliance test.
	
	CDR Date format: *month/day*
	Primary Output Format: *unformatted*
	Primary Output Endpoint: *CDR1*
	Use ISDN Layouts? *n*
	Use Enhanced Formats? *n*
	Modified Circuit ID Display? *n*
	
	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.
	• **Record Outgoing Calls Only?** *n* [Allows incoming trunk calls to appear in the CDR records along with the outgoing trunk calls.]
	• **Suppress CDR for Ineffective Call Attempts?** *y* [Prevents calls that are blocked from appearing in the CDR record.]
	• **Intra-switch CDR?** *y* [Allows call records for internal calls involving specific stations.]
	• **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?** *y* [Allows a separate call record for any portion of an incoming call that is transferred or conferenced.]
	
	Note: If **Suppress CDR for Ineffective Call Attempts** is set to ***n*,** CallAnalyst Enterprise Server does not distinguish between these CDR records of blocked calls from completed call records. It is recommended that this parameter be set to *y* for use with CallAnalyst Enterprise Server.
	
	`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:`
	`Use ISDN Layouts? n`
	`Use Enhanced Formats? n Condition Code 'T' For Redirected Calls? n`
	`Modified Circuit ID Display? n Remove # From Called Number? n`
	`Record Outgoing Calls Only? n Intra-switch CDR? y`
	`Suppress CDR for Ineffective Call Attempts? y Outg Trk Call Splitting? y`
	`Disconnect Information in Place of FRL? n Outg Attd Call Record? y`
	`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`
	`Inc Trk Call Splitting? y Inc Attd Call Record? y`
	`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: 5`

Step	Description

6.	If **Intra-switch CDR** is set to *y*, use the **change intra-switch-cdr** command to define the extensions that will be subject to call detail records. In the **Assigned Members** field, enter a specific extension whose usage will be tracked with a CDR record. Add an entry for each additional extension of interest.
	
	`change intra-switch-cdr` Page 1 of 2
	`INTRA-SWITCH CDR`
	
	`Assigned Members: 4 of 1000 administered`
	`1: 3000 19: 37: 55: 73: 91:`
	`2: 3001 20: 38: 56: 74: 92:`
	`3: 3010 21: 39: 57: 75: 93:`
	`4: 3011 22: 40: 58: 76: 94:`
	`5: 23: 41: 59: 77: 95:`
	`6: 24: 42: 60: 78: 96:`
	`7: 25: 43: 61: 79: 97:`
	`8: 26: 44: 62: 80: 98:`
	`9: 27: 45: 63: 81: 99:`
	`10: 28: 46: 64: 82: 100:`
	`11: 29: 47: 65: 83: 101:`
	`12: 30: 48: 66: 84: 102:`
	`13: 31: 49: 67: 85: 103:`
	`14: 32: 50: 68: 86: 104:`
	`15: 33: 51: 69: 87: 105:`
	`16: 34: 52: 70: 88: 106:`
	`17: 35: 53: 71: 89: 107:`
	`18: 36: 54: 72: 90: 108:`

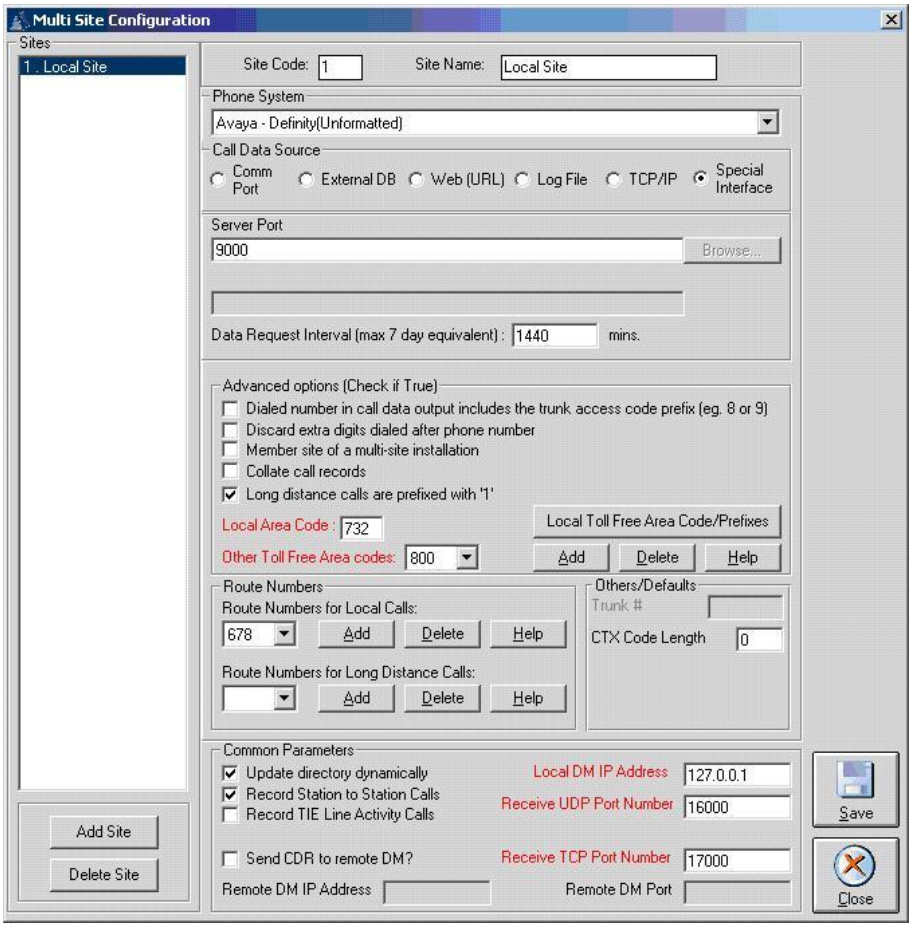
7.	For each trunk group for which CDR records are desired, verify that CDR reporting is enabled. To do this, use the **change trunk-group *n*** command, where *n* is the trunk group number, to verify that the **CDR Reports** field is set to *y*. This applies to all types of trunk groups.
	
	`change trunk-group 3` Page 1 of 19
	`TRUNK GROUP`
	
	`Group Number: 3 Group Type: isdn` **`CDR Reports: y`**
	`Group Name: PSTN PRI 2 COR: 1 TN: 1 TAC: 103`
	`Direction: two-way Outgoing Display? n Carrier Medium: PRI/BRI`
	`Dial Access? y Busy Threshold: 255 Night Service:`
	`Queue Length: 0`
	`Service Type: tie Auth Code? n TestCall ITC: rest`
	`Far End Test Line No:`
	`TestCall BCC: 4`
	`TRUNK PARAMETERS`
	`Codeset to Send Display: 6 Codeset to Send National IEs: 6`
	`Max Message Size to Send: 260 Charge Advice: none`
	`Supplementary Service Protocol: a Digit Handling (in/out): enbloc/enbloc`
	
	`Trunk Hunt: cyclical`
	`Digital Loss Group: 13`
	`Incoming Calling Number - Delete: Insert: Format:`
	`Bit Rate: 1200 Synchronization: async Duplex: full`
	`Disconnect Supervision - In? n Out? n`
	`Answer Supervision Timeout: 0`

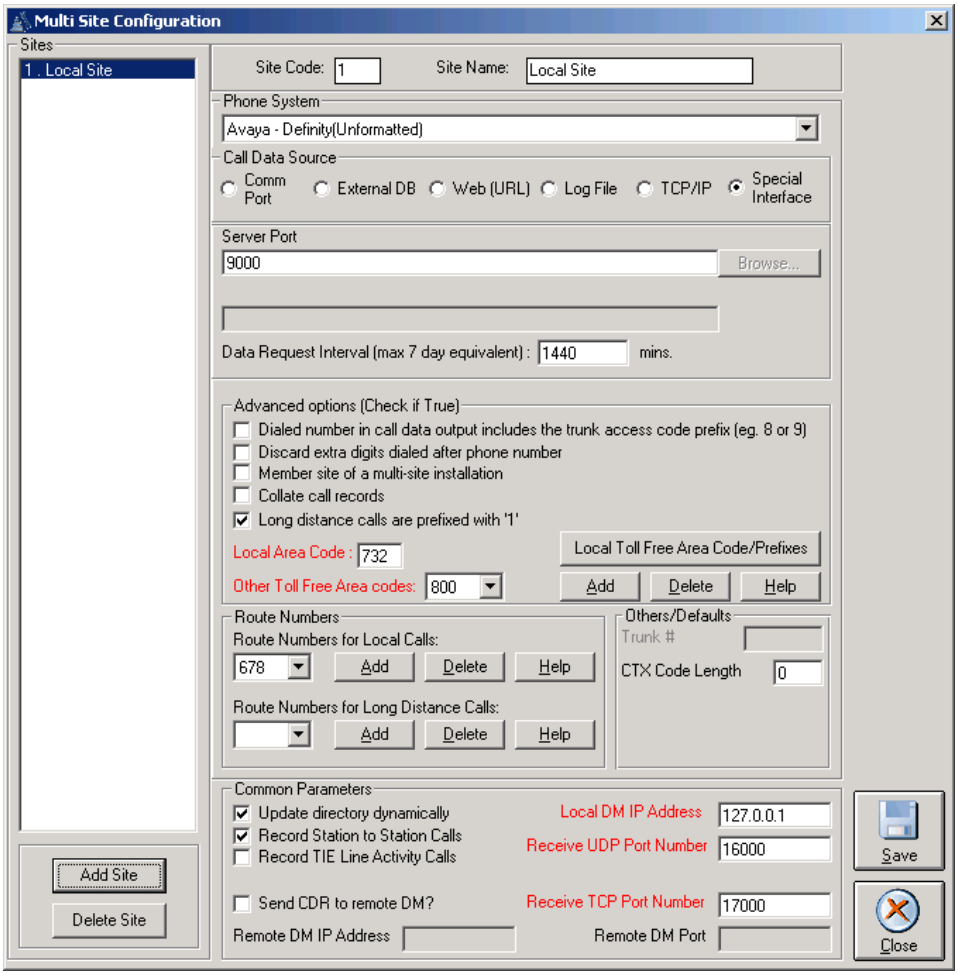
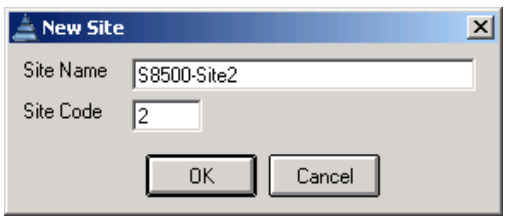
Step	Description
8.	Repeat Steps 1- 7 for each Avaya Communication Manager sending CDR records to CallAnalyst Enterprise Server. The CDR format must be the same for each Avaya Communication Manager. However, the CDR port number should be different for each Avaya Communication Manager and match the value configured in CallAnalyst Enterprise Server for each. For the compliance test, port 9000 was used for the Avaya S8300 Media Server and port 9001 was used for the Avaya S8500 Media Server.

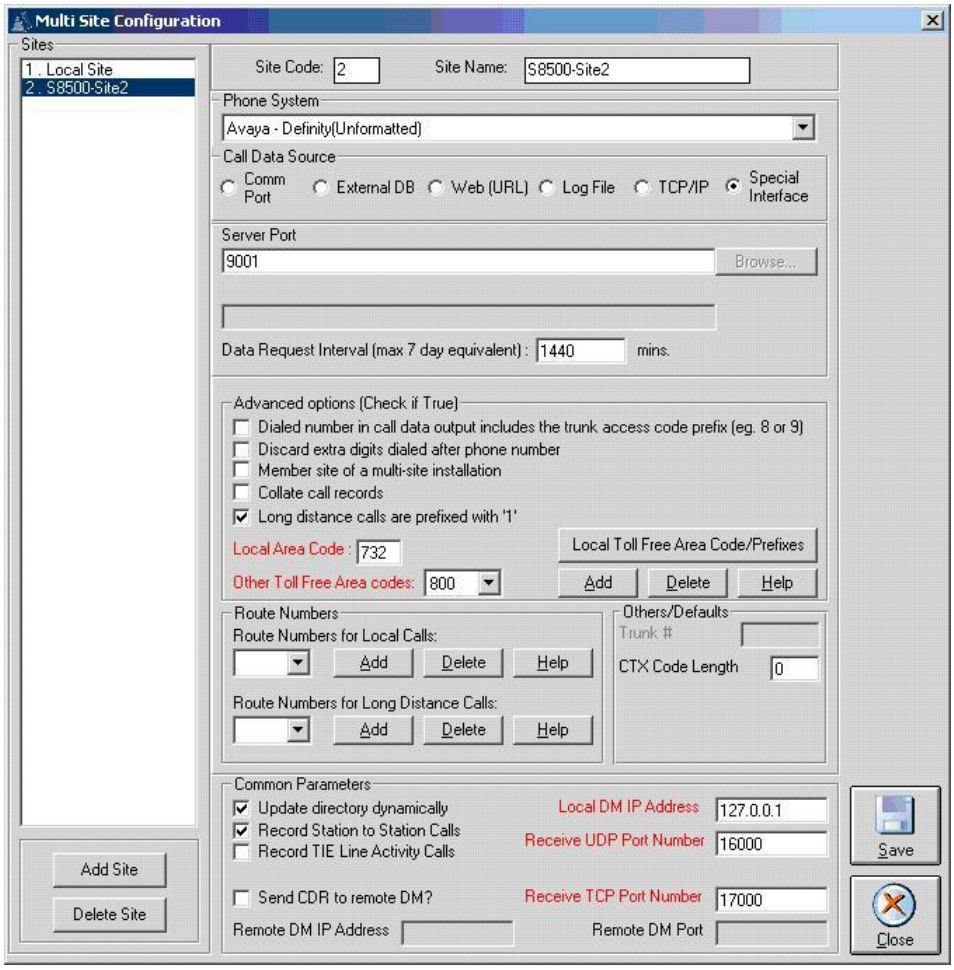
4. Configure CallAnalyst Enterprise Server

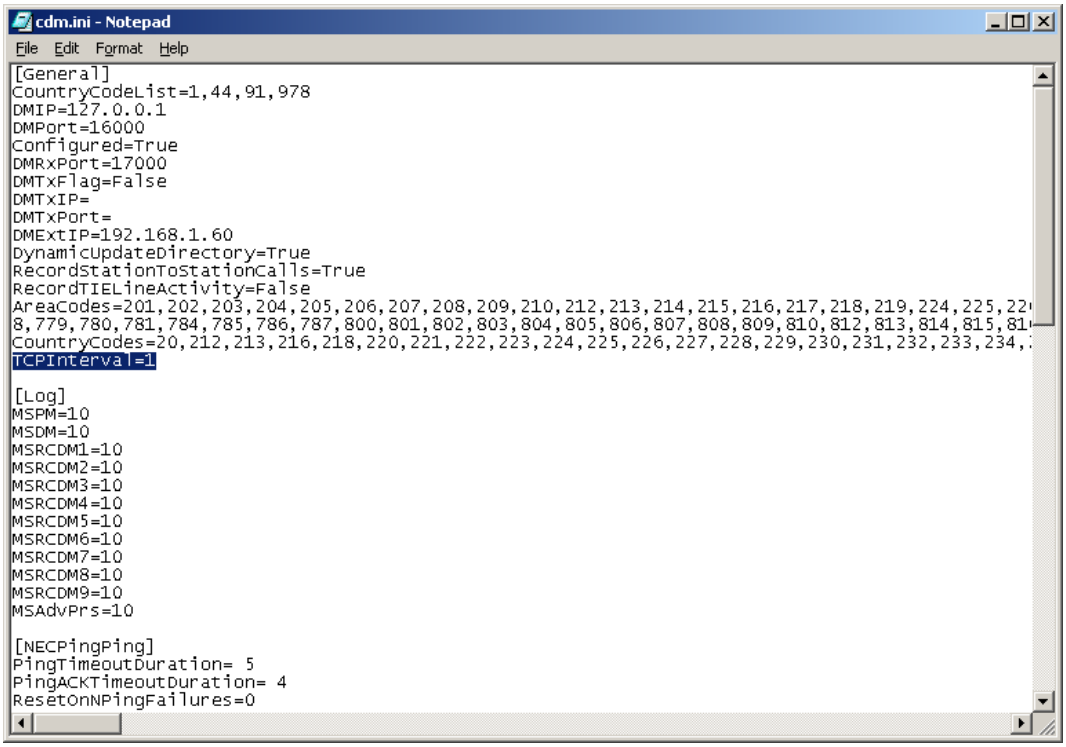
This section describes the procedures for configuring CallAnalyst Enterprise Server to collect CDR records from Avaya Communication Manager. The following procedures assume CallAnalyst Enterprise Server has been previously installed and licensed as per reference [3] including all relevant software patches.

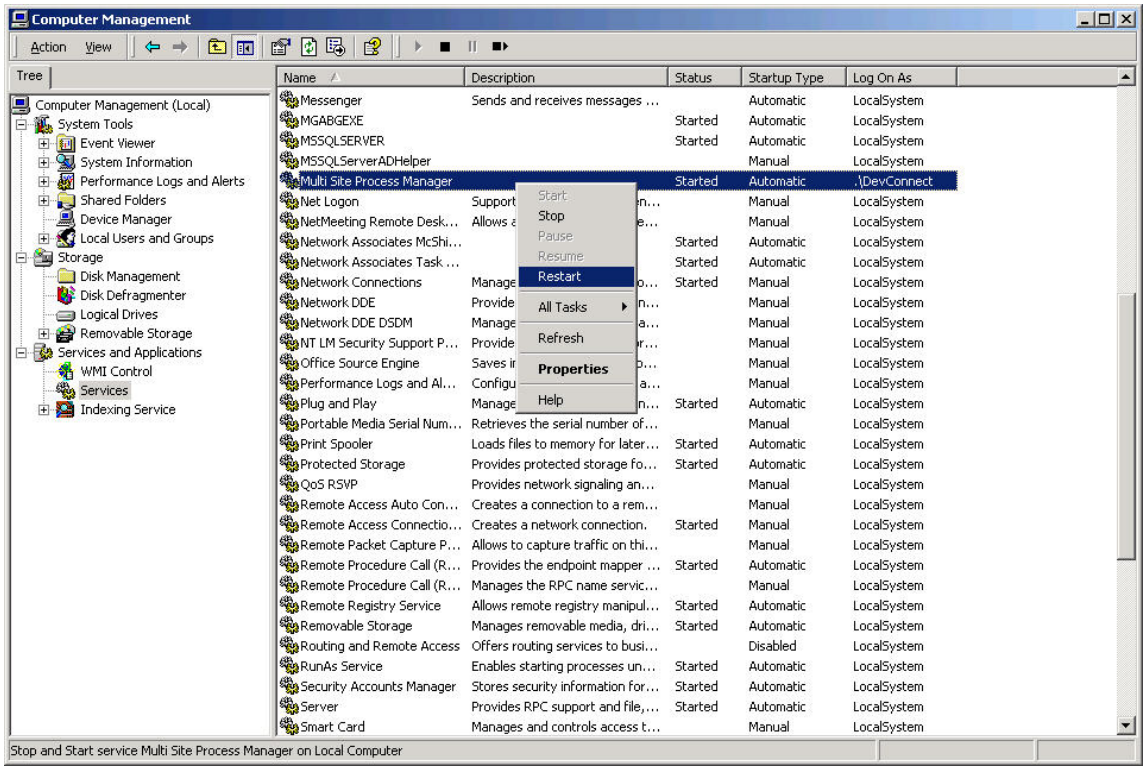
Step	Description
1.	To configure the link between CallAnalyst Enterprise Server and Avaya Communication Manager, navigate from the Windows Start Menu to **Start→ Programs → TriVium → Multi Site Configuration.**

Step	Description
2.	The main **Multi Site Configuration** screen appears. Set the **Phone System** field to *Avaya – Definity(Unformatted)* from the pull-down menu. Click the radio button next to *Special Interface* for the **Call Data Source**. Set the **Server Port** field to the same value set on Avaya Communication Manager in Section 3 Step 3. The remaining fields affect how calls are classified and displayed in the reports. The values will vary depending on the customer requirements. For the compliance test, the box was checked to indicate **Long distance calls are prefixed with "1"**. The **Local Area Code** was set to *732*. In the **Other Toll Free Area codes** field, the value *800* was added. The screen below shows the **Data Request Interval** set to *1440* minutes which is the default value. However, this interval has no effect when using RSP as the data collection method, specified by clicking the radio button next to *Special Interface* for the **Call Data Source**. Default values were used for all other fields. Select **Save** to continue. 

Step	Description
3.	CallAnalyst Enterprise Server can collect data from multiple Avaya Communication Manager sites. For each additional site, a license must be obtained from TriVium Systems. To enable CDR collection for the additional site, select **Add Site** at the bottom of the window. 
4.	Enter a **Site Name** to represent the new site. **Site Code** will automatically increment to the next available number. Select **OK** to continue. 

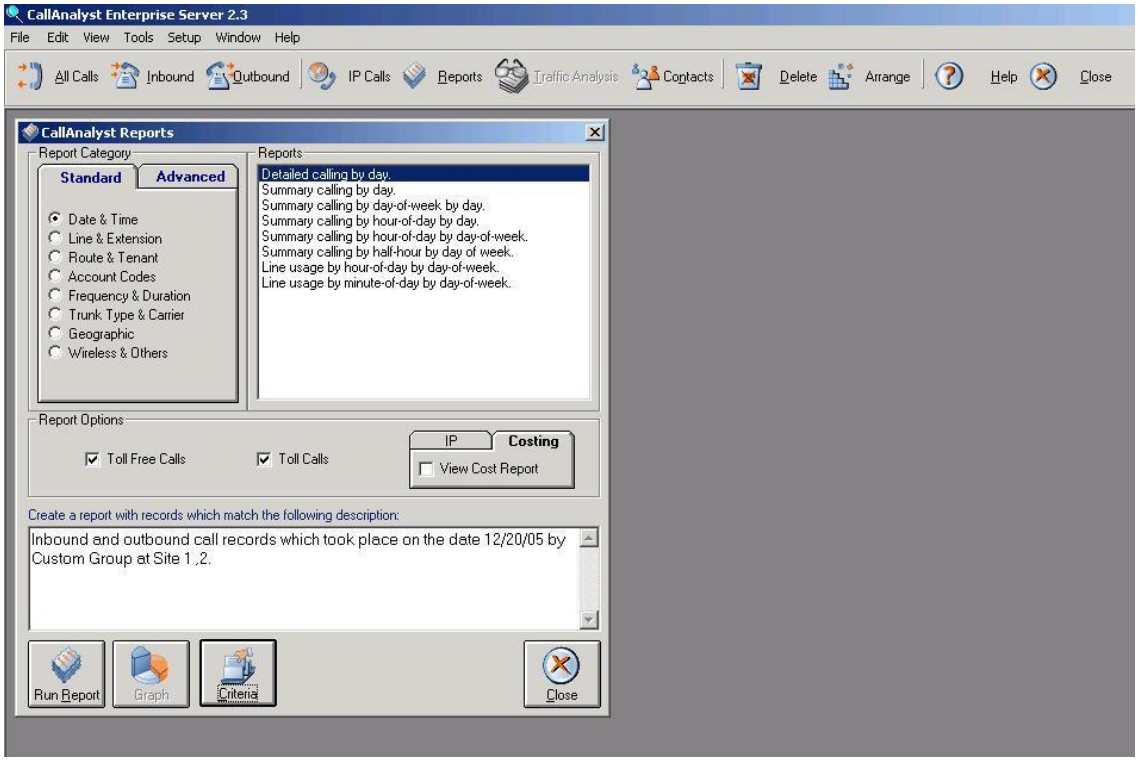
Step	Description
5.	The main **Multi Site Configuration** window appears again with the new site name highlighted in the **Sites** list. Set the **Phone System** field and the **Call Data Source** field to the same values as used for the first site. The **Server Port** must be a different value than the first site and must match the value configured on the second Avaya Communication Manager. The compliance test set the **Server Port** field to *9001* for the second site as described in Section 3 Steps 3 and 8. For the purposes of the compliance test, the **Advanced options** fields were set in the same manner as the first site. In a customer configuration, these fields may vary from site to site. Default values were used for all other fields. Select **Save** to continue. 

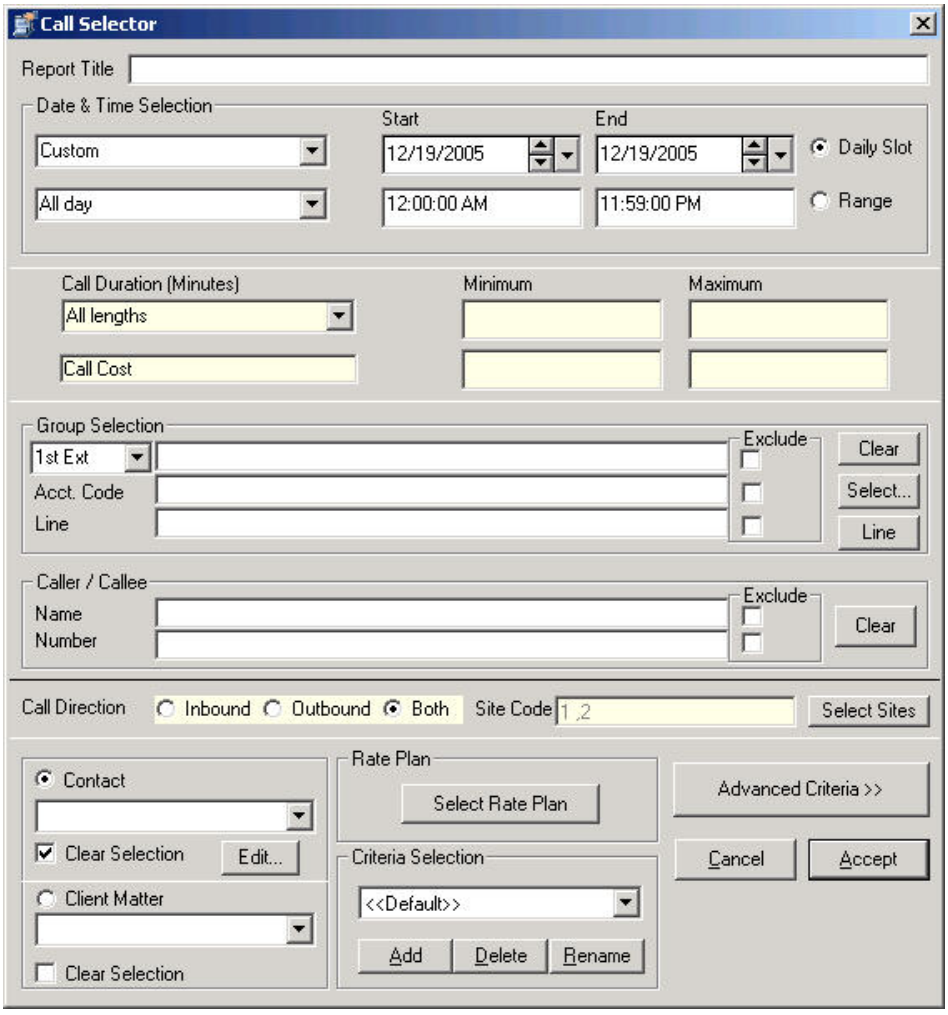
Step	Description
6.	The following window appears, asking if the changes should be committed. Select **Yes** to continue. 
7.	Lastly, to enable the RSP link to recover automatically after a network outage or system restart, the following modification is required in the **cdm.ini** file. The **cdm.ini** file is located in the CallAnalyst Enterprise Server installation directory, typically *C:Program Files/TriVium.* Changing the value of the **TCPInterval** determines the regularity, in minutes, with which CallAnalyst Enterprise Server will check the connection with the Avaya Communication Manager. Use a text editor such as Notepad to locate the line that defines the **TCPInterval**. For the compliance test, the **TCPInterval** was set to *1* minute as indicated by the highlighted entry in the example below. Thus, the CallAnalyst Enterprise Server will check the connection once every minute. 

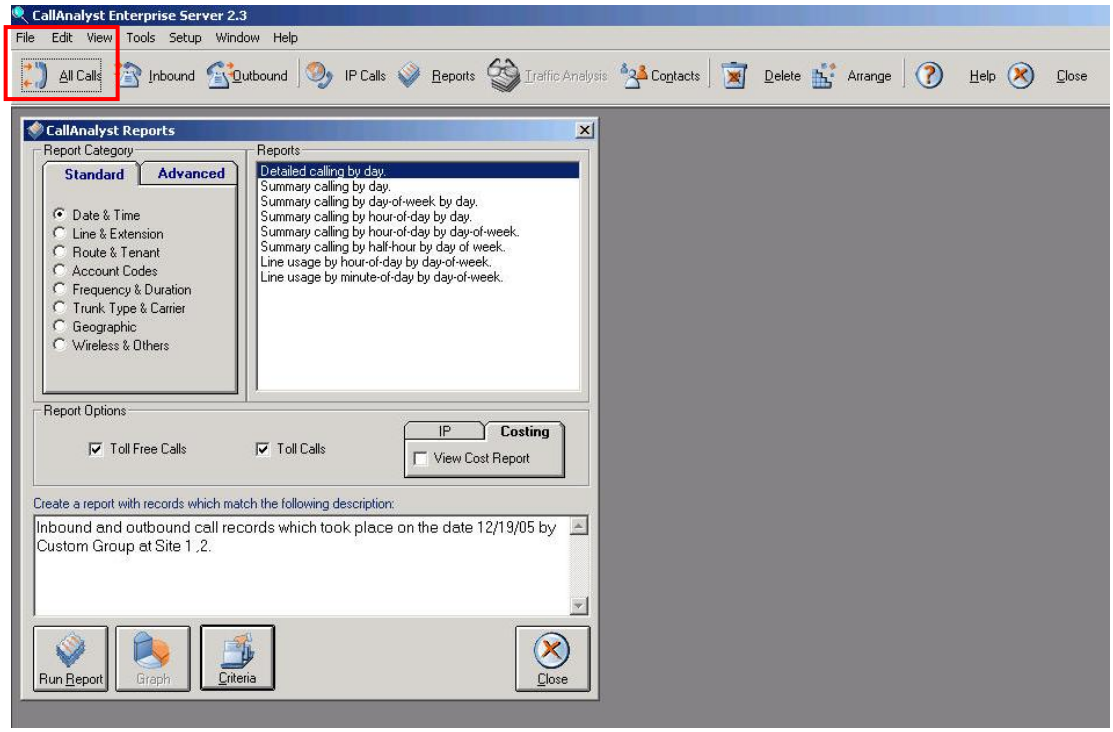
Step	Description
8.	After changing the **Multi Site Configuration** screens, the **Multi Site Process Manager** Windows service needs to be restarted. From the Windows Start Menu, navigate to **Start → Control Panel → Administrative Tools → Computer Management → Services and Applications → Services**. In the **Services** window that appears, highlight the **Multi Site Process Manager** in the list of services. Right-click on this entry and select **Restart**. This completes the configuration of the RSP link. 

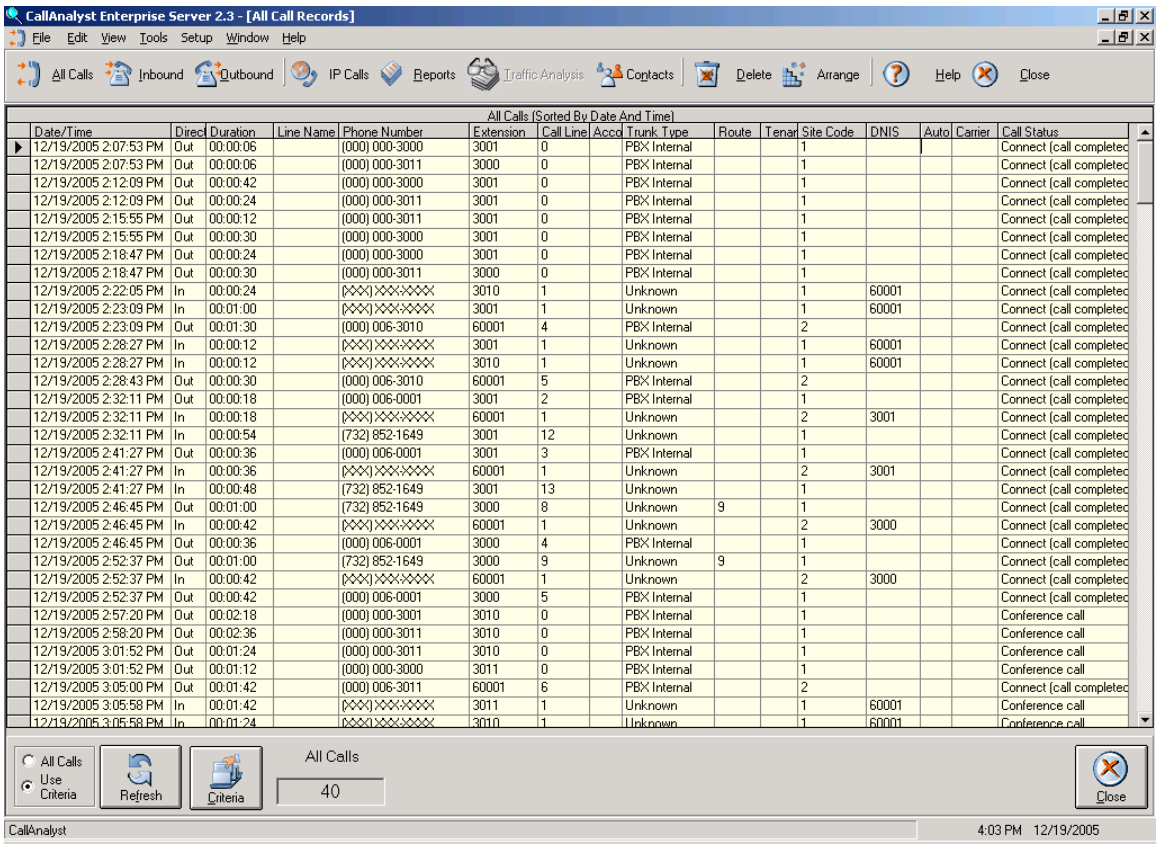
5. Using CallAnalyst Enterprise Server

This section shows an example of how to view a specific set of calls stored by CallAnalyst Enterprise Server. The example shown includes all calls made on a particular day. For more information on using CallAnalyst Enterprise Server refer to reference [4].

Step	Description
1.	Launch CallAnalyst Enterprise Server on the PC where the software was installed. From the Windows Start menu, navigate to **Start → Programs → TriVium → CallAnalyst**.
2.	The main window and the **CallAnalyst Reports** window appear as shown below. The **CallAnalyst Reports** window will be used to define the criteria for calls to be viewed. In the **CallAnalyst Reports** window, under **Report Options**, click the check boxes next to **Toll Free Calls** and **Toll Calls**. Use the default values for all other fields. Select the **Criteria** button to continue. 

Step	Description
3.	The **Call Selector** window appears. To view calls limited to a specific date, enter a valid date in the **Start** and **End** fields. Use the default values for all the other values. Select **Accept** to submit the changes and close the **Call Selector** window. 

Step	Description
4.	After selecting the criteria in the previous step, return to the main window shown below. The criteria are summarized in the lower text box of the **CallAnalyst Reports** window. To view all calls (e.g. inbound, outbound and internal) using the defined criteria, select the **All Calls** icon in the menu bar of the main window. An example of this output is shown in Step 5. Alternatively, formal reports of various types using the same criteria can be run from the **CallAnalyst Reports** window. Select the radio button next to the desired **Report Category**. Highlight the report of interest in the **Reports** list. Then, select the **Run Report** button at the bottom of the window. 

Step	Description
5.	The example below shows output from selecting the **All Calls** icon in the previous step. The main window is populated with the selected calls. Verify that the radio button next to **Use Criteria** at the bottom of the window is active. If not, select this radio button and select **Refresh**. Select the **Close** button at the bottom right-hand corner of the window to close the **All Calls** screen. 

6. Interoperability Compliance Testing

The interoperability compliance testing included feature, serviceability and performance testing. The feature testing evaluated the ability of CallAnalyst Enterprise Server to collect and process CDR records for various types of calls. The serviceability testing introduced failure scenarios to verify that CallAnalyst Enterprise Server can resume CDR collection after failure recovery. The performance testing produced bulk call volumes to generate a substantial amount of CDR records.

6.1. General Test Approach

The general test approach was to manually place intra-switch calls, inbound trunk and outbound trunk calls to and from telephones attached to the Avaya Media Servers and verify that CallAnalyst Enterprise Server collects the CDR records and properly classifies and reports the attributes of the call. For serviceability testing, physical and logical links were disabled/re-enabled, Media Servers were reset and CallAnalyst Enterprise Server was restarted. For performance testing, a call generator was used to place calls over an extended period of time.

6.2. Test Results

CallAnalyst Enterprise Server successfully collected the CDR records from Avaya Communication Manager via a RSP connection for all types of calls generated including intra-switch calls, inbound/outbound PSTN trunk calls, inbound/outbound private IP trunk calls, transferred calls, and conference calls. For serviceability testing, CallAnalyst Enterprise Server was able to resume collecting CDR records after failure recovery including buffered CDR records for calls that were placed during the outages. Performance tests verified that CallAnalyst Enterprise Server could collect call records during a sustained, high volume of calls.

The following observations were made during the CallAnalyst Enterprise Server compliance testing.

- After successfully configuring the second site, if the **Multi Site Configuration** window is reopened and the second site is highlighted, the **Server Port** value incorrectly displays the value used for site 1 instead of site 2.
- Inbound trunk calls that dial less than 10 digits (as may occur from a private trunk) are not displayed in the **Phone Number** field in the report output. See Section 5 Step 5. Instead, the dialed digits are displayed in the **DNIS** field.
- Outbound trunk calls that dial less than 10 digits (as may occur on a private trunk) are classified in the report output as *PBX Internal* calls. See Section 5 Step 5.
- CallAnalyst Enterprise Server does not distinguish between CDR records of blocked calls from completed call records. Thus, it is recommended that Avaya Communication Manager be configured to suppress CDR records for ineffective call attempts. See Section 3 Step 5.

7. Verification Steps

The following steps may be used to verify the configuration:

- Use the **ping** command, to verify IP communication between CallAnalyst Enterprise Server and Avaya Communication Manager. For the Avaya S8300 Media Server, ping the Media Server IP address from the CallAnalyst Enterprise Server PC. For the other Media Servers, ping the C-LAN IP address from the CallAnalyst Enterprise Server PC.
- On the SAT of each Avaya Media Server, enter the **status cdr-link** command and verify that the CDR link state is up.
- Place a call and verify that CallAnalyst Enterprise Server received the CDR record for the call. Compare the values of data fields in the CDR record with the expected values and verify that the values match.
- Place internal, inbound trunk, and outbound trunk calls to and from various telephones, generate an appropriate report in CallAnalyst Enterprise Server, and verify the report's accuracy.

8. Support

Technical support for CallAnalyst Enterprise Server can be obtained by contacting TriVium Systems at (503) 439-9338.

9. Conclusion

These Application Notes describe the procedures for configuring CallAnalyst Enterprise Server to collect call detail records from Avaya Communication Manager running on Avaya Media Servers. CallAnalyst Enterprise Server successfully passed all compliance testing.

10. Additional References

The following Avaya product documentation can be found at http://support.avaya.com.

[1] *Feature Description and Implementation For Avaya Communication Manager*, Release 3.0, Issue 3.0, June 2005, Document Number 555-245-205.

[2] *Administrator Guide for Avaya Communication Manager*, Release 3.0, Issue 1.0, June 2005, Document Number 03-300509.

The following CallAnalyst Enterprise Server product documentation is available from TriVium Systems. Visit http://www.triviumsys.com for company and product information.

[3] *CallAnalyst Enterprise Server (Version 2.3) Installation and Configuration Guide.*

[4] *CallAnalyst Enterprise Server (Version 2.3) User Guide*.

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.