



Avaya Solution & Interoperability Test Lab

Application Notes for Tri-Line TIM Enterprise with Avaya Communication Manager - Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Tri-Line's TIM Enterprise to interoperate with Avaya Communication Manager.

TIM Enterprise is an enterprise-class call logging software that interoperates with Avaya Communication Manager over TCP/IP for the collection of Call Details Records (CDRs). TIM Enterprise listens, collects, and processes the call records generated for various types of calls.

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

The objective of this compliance test is to verify that Tri-Line's TIM Enterprise 3.0.0.50 enterprise-class call logging software can interoperate with Avaya Communication Manager 5.1.2. TIM Enterprise interoperates with Avaya Communication Manager over TCP/IP for the collection of Call Detail Records (CDR). During compliance testing, the CDR collection was verified for two Avaya Communication Managers running on an Avaya S8730 server and an Avaya S8300 server.

1.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing. The feature testing evaluated the ability of Tri-Line's TIM Enterprise to collect and process CDR records for various types of calls: intra-switch calls (calls between phones on the same site), outbound/inbound calls to/from the PSTN and outbound/inbound calls to/from the phones between the two sites via the IP trunk. The serviceability testing introduced failure scenarios to see if TIM Enterprise can resume CDR collection after failure recovery.

1.2. Support

Technical support from Tri-Line can be obtained through the following:

Phone: +44 20 7265 2626
E-mail: support@tri-line.com.
Web: <http://www.tri-line.com/>

2. Reference Configuration

Figure 1 illustrates a sample configuration that was used to compliance test the interoperability of Tri-Line's TIM Enterprise and Avaya Communication Manager. The configuration consists of two Avaya Servers running Avaya Communication Manager. Site A is comprised of an Avaya S8730 Media Server with a G650 Media Gateway, and has connections to Avaya 9600 Series IP Phones, Avaya 2400 Series Digital Telephone and an ISDN-PRI trunk to the simulated PSTN. Site B is comprised of an Avaya S8300 Media Server with a G700 Media Gateway, and has connections to Avaya 9600 Series IP telephones, an Avaya 2400 Series Digital Telephone and it is connected to the Site A via an H.323 IP trunk. TIM Enterprise was installed on Windows Vista Business and it was connected to both sites for collecting CDR records.

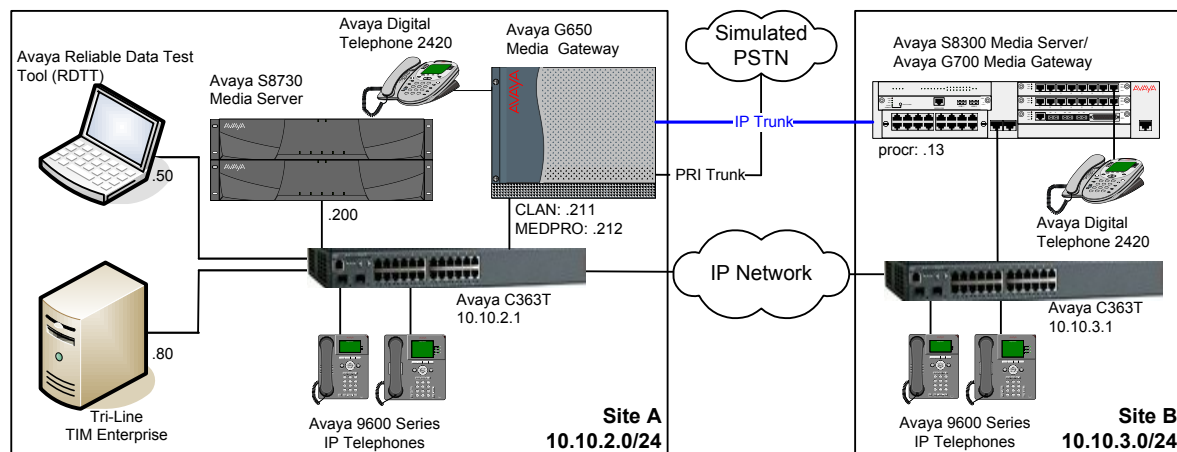


Figure 1: Tri-Line TIM Enterprise with Avaya Communication Manager

3. Equipment and Software Validated

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

Equipment	Software
Avaya S8730 Server	Avaya Communication Manager 5.1.2 Service Pack: 01.2.416.4-17067
Avaya G650 Media Gateway TN2312BP IP Server Interface TN799DP C-LAN Interface TN2302AP IP Media Processor TN2214CP Digital Line TN2464CP DS1	HW28, FW045 HW16, FW031 HW32, FW118 HW10, FW015 HW02, FW022
Avaya S8300 Server	Avaya Communication Manager 5.1.2 Service Pack: 01.2.416.4-17067
Avaya G700 Media Gateway	28.25.0
Avaya 9600 Series IP Telephones - 9610 - 9620 - 9630	3.0 (H.323)
Avaya 2400 Series Digital Telephone	-
Avaya C363T-PWR Converged Stackable Switch	4.3.12
Tri-Line TIM Enterprise • Windows Vista Business • Internet Explorer 7	3.0.0.50

4. Configure the Avaya Communication Manager

This section provides the procedures for configuring Call Detail Record (CDR) features in Avaya Communication Manager. All the configuration changes in Avaya Communication Manager are performed through the System Access Terminal (SAT). These steps describe the procedure used for the Avaya S8730 Server. All steps are the same for other media servers unless otherwise noted. Avaya Communication Manager was configured to generate CDR records to the IP address of the TIM Enterprise server over TCP/IP. For the Avaya S8730 Server, the CDR link originates at the IP address of the C-LAN board that connects to the same network where the TIM Enterprise server is located. For the Avaya S8300 Server, the CDR link originates at the IP address of the local media server (with node-name – “procr”). The highlights in the following screens indicate the value used during the compliance test.

Use the **change node-names ip** command to add a new node name for the TIM Enterprise server by specifying the **Name** and the **IP Address** of the server.

change node-names ip		Page 1 of 1	
		IP NODE NAMES	
Name	IP Address	Name	IP Address
CLAN	10. 10 .2 .211	.	.
MEDPRO	10. 10 .2 .212	.	.
RDTT	10. 10 .2 .50	.	.
SiteB	10. 10 .3 .13	.	.
TIMEnterprise	10. 10 .2 .80	.	.
default	0 .0 .0 .0	.	.
procr	10. 10 .2 .201	.	.

Use the **change ip-services** command to define the CDR link over TCP/IP. 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: CLAN** [For the Avaya S8730 Server, the Local Node is set to the node name of the C-LAN board. If the Avaya S8300 Server was utilized, set the Local Node to **procr**.]
- **Local Port: 0** [The Local Port is fixed to 0.]
- **Remote Node: TIMEnterprise** [The Remote Node is set to the node name that was created in the previous step for the TIM Enterprise server.]
- **Remote Port: 9000** [The Remote Port may be set to a value between 5000 and 64500 inclusive and must match the port configured in the TIM Enterprise server. During the compliance test, the remote port 9000 was used.]

Note: A different port number must be specified for each S8XXX Server.

change ip-services			Page 1 of 3		
Service Type	Enabled	Local Node	IP SERVICES		
			Local Port	Remote Node	Remote Port
CDR1		CLAN	0	TIMEnterprise	9000

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	3
Service Type	Reliable Protocol	SESSION LAYER TIMERS					
		Packet Resp Timer	Session Connect Message Cntr	SPDU Cntr	Connectivity Timer		
CDR1	n	30	3	3	60		

Enter the **change system-parameters cdr** command from the SAT to set the parameters for the type of calls to track and the format of the CDR data. The example below shows the settings used during the compliance test. Provide the following information:

- **CDR Data Format: day/month**
- **Primary Out Format: customized**
- **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** [Allows CDR formats to use 5.x CDR formats. If the field is set to y, then CDR formats utilize the 3.x CDR formats.]
- **Intra-switch CDR: y** [Allows call records for internal calls involving specific stations. Those stations must be specified in the **inter-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: y** [Allows a separate call record for any portion of an incoming call that is transferred or conferenced.]

```
change system-parameters cdr                                     Page 1 of 2
                                CDR SYSTEM PARAMETERS

Node Number (Local PBX ID): 1                                CDR Date Format: day/month
Primary Output Format: customized    Primary Output Endpoint: CDR1
Secondary Output Format:
    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? y                                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: group-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: 6
```

On the **Page 2** of the CDR SYSTEM PARAMETERS form, define the customized CDR format as shown below.

change system-parameters cdr			Page 2 of 2		
CDR SYSTEM PARAMETERS					
Data Item	Length		Data Item	Length	
1: date	- 6		17: dialed-num	- 18	33: auth-code
2: space	- 1		18: space	- 1	34: return
3: time	- 4		19: in-trk-code	- 4	35: line-feed
4: space	- 1		20: space	- 1	36:
5: sec-dur	- 5		21: in-crt-id	- 3	37:
6: space	- 1		22: space	- 1	38:
7: cond-code	- 1		23: calling-num	- 15	39:
8: space	- 1		24: space	- 1	40:
9: attt-console	- 2		25: vdn	- 5	41:
10: space	- 1		26: space	- 1	42:
11: code-used	- 4		27: bcc	- 1	43:
12: space	- 1		28: space	- 1	44:
13: out-crt-id	- 3		29: ppm	- 5	45:
14: space	- 1		30: space	- 1	46:
15: code-dial	- 4		31: acct-code	- 15	47:
16: space	- 1		32: space	- 1	48:

Record length = 126

If the Intra-switch CDR field is set to **y** in the CDR SYSTEM PARAMETERS form, use the **change intra-switch-cdr** command to define the extensions that will be subject to call detail records. In the INTRA-SWITCH CDR form, 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 3	
INTRA-SWITCH CDR			
Extension	Assigned Members:	4	of 5000 administered
301	Extension	Extension	Extension
302			
303			
311			

For each trunk group for which CDR records are desired, verify that CDR reporting is configured to generate the ring interval CDR records. Use the **change trunk-group n** command, where **n** is the trunk group number, to verify that the **CDR Reports** field is set to **r**. This is the recommended setting for the solution and applies to all trunk group types.

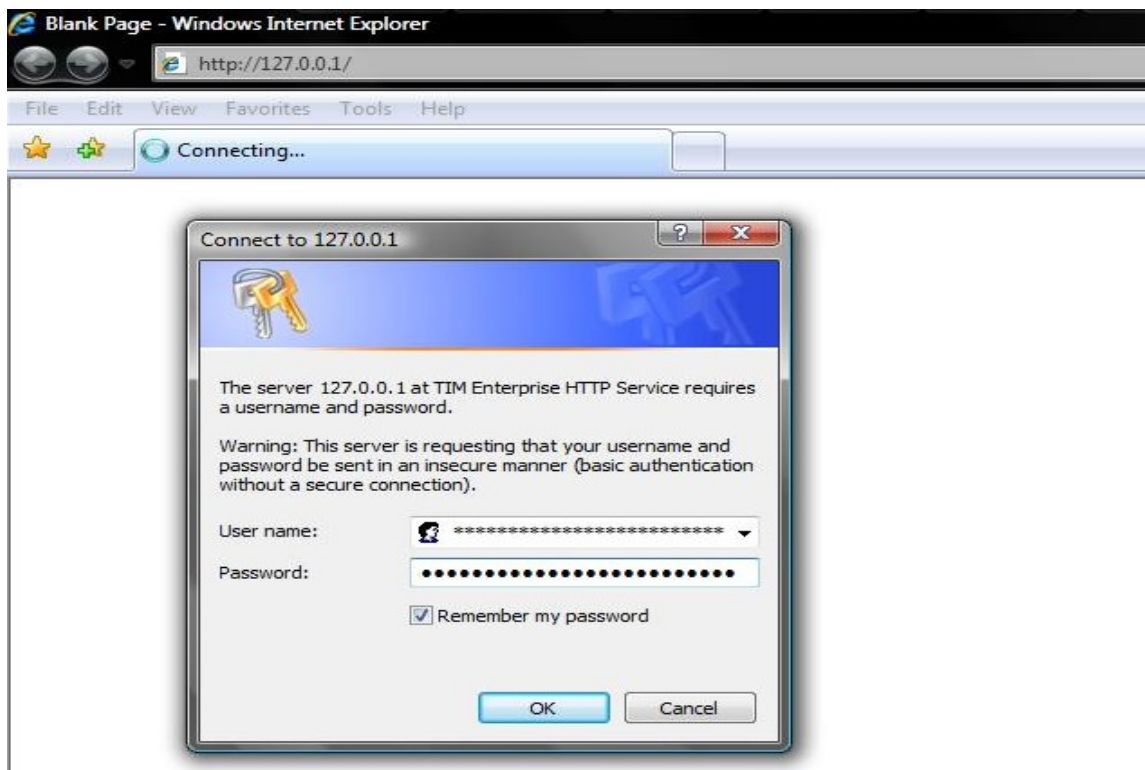
change trunk-group 3		Page 1 of 21
TRUNK GROUP		
Group Number: 3	Group Type: isdn	CDR Reports: r
Group Name: ToSimulatedPSTN	COR: 1	TN: 1 TAC: 113
Direction: two-way	Outgoing Display? y	Carrier Medium: PRI/BRI
Dial Access? y	Busy Threshold: 255	Night Service:
Queue Length: 0		
Service Type: tie	Auth Code? n	TestCall ITC: rest
	Far End Test Line No:	
TestCall BCC: 4		

5. Configure the TIM Enterprise server

This section provides the procedures for configuring the TIM Enterprise server to receive Call Detail Records (CDRs) for various call types output by the Avaya Communication Manager.

To access TIM Enterprise, open a web browser and enter the IP address of the TIM Enterprise server, e.g. <http://x.x.x.x/> where x.x.x.x is the IP address of the machine running TIM Enterprise.

Enter a valid username and password in the web browser's authentication window that appears, and select **OK**.



After successful login, the default **System settings** screen is displayed. This is the main screen that will be used to configure the TIM Enterprise system.

TIM Enterprise 3.0.0.50 - Tri-Line Network Telephony Limited (100) - Windows Internet Explorer

http://127.0.0.1/

File Edit View Favorites Tools Help

TIM Enterprise 3.0.0.50 - Tri-Line Network Teleph...

timenterprise Engineering Directory

System settings

Database

Create tables Test settings...

Enter connection information of database storage engine

Database provider: Native Database, Microsoft SQL Server, **MySQL Server**

Host : Port: 127.0.0.1 3306

Username: root

Password:

Database: Avaya

Alerts

Enter an email address for each type of alert

Critical: [text box]

Warning: [text box]

Information: [text box]

Email

Test settings...

Web server

Test settings...

To configure the Database settings, select the **Database provider** that will be used to store the call data on the TIM Enterprise server. In this case, **MySQL Server** was specified. Type in the **Host** and **Port** number of the SQL server and enter the **Username** and **Password** for the SQL server connection. Type the name of the **Database** to connect to and click on the **Test settings** button to verify that the database details entered are valid.

Database

Create tables Test settings...

Enter connection information of database storage engine

Database provider: Native Database, Microsoft SQL Server, **MySQL Server**

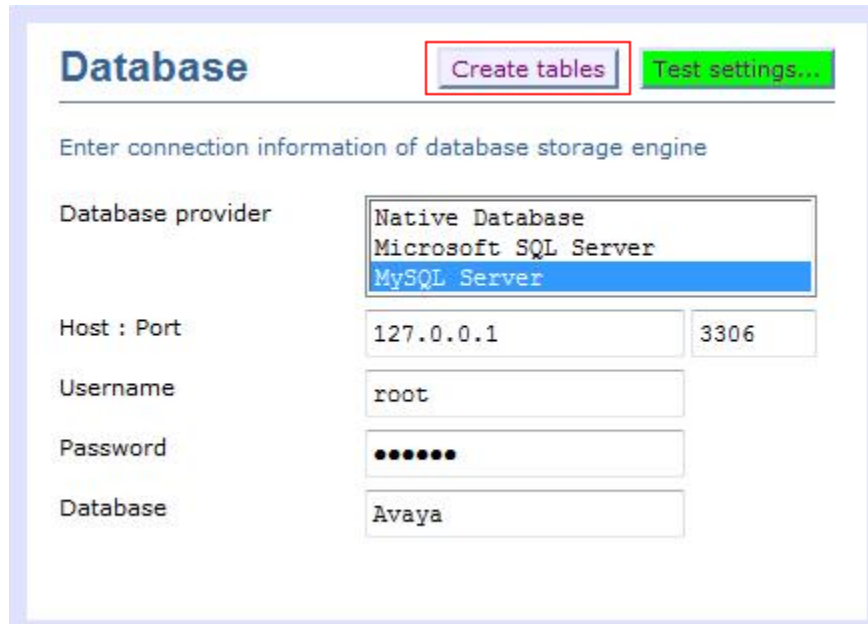
Host : Port: 127.0.0.1 3306

Username: root

Password:

Database: Avaya

If the **Test settings** button comes back green, the settings were correct. Prepare the database tables and indices by clicking the **Create tables** button.



Database Create tables Test settings...

Enter connection information of database storage engine

Database provider: Native Database, Microsoft SQL Server, **MySQL Server**

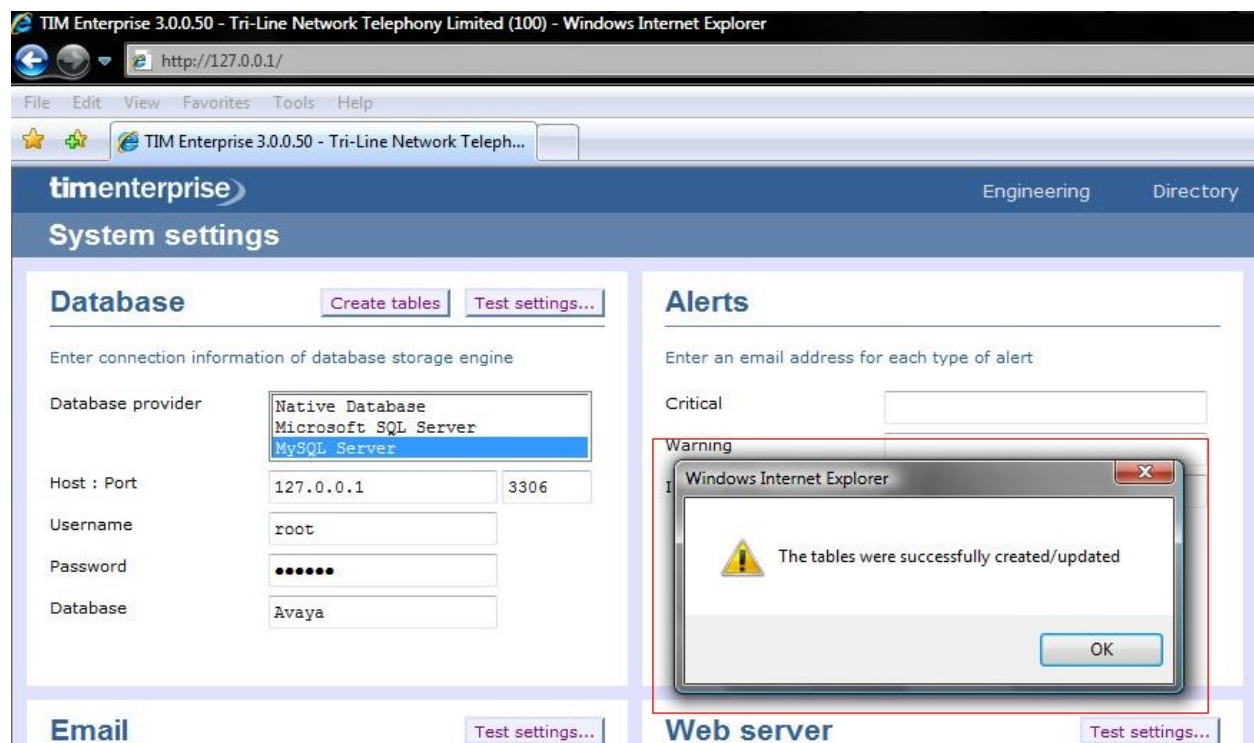
Host : Port: 127.0.0.1 3306

Username: root

Password:

Database: Avaya

When the tables are created successfully, the alert will be displayed as shown below. Click **OK**.



TIM Enterprise 3.0.0.50 - Tri-Line Network Telephony Limited (100) - Windows Internet Explorer

http://127.0.0.1/

File Edit View Favorites Tools Help

TIM Enterprise 3.0.0.50 - Tri-Line Network Teleph...

timenterprise Engineering Directory

System settings

Database Create tables Test settings...

Enter connection information of database storage engine

Database provider: Native Database, Microsoft SQL Server, **MySQL Server**

Host : Port: 127.0.0.1 3306

Username: root

Password:

Database: Avaya

Alerts

Enter an email address for each type of alert

Critical

Warning

Windows Internet Explorer

The tables were successfully created/updated

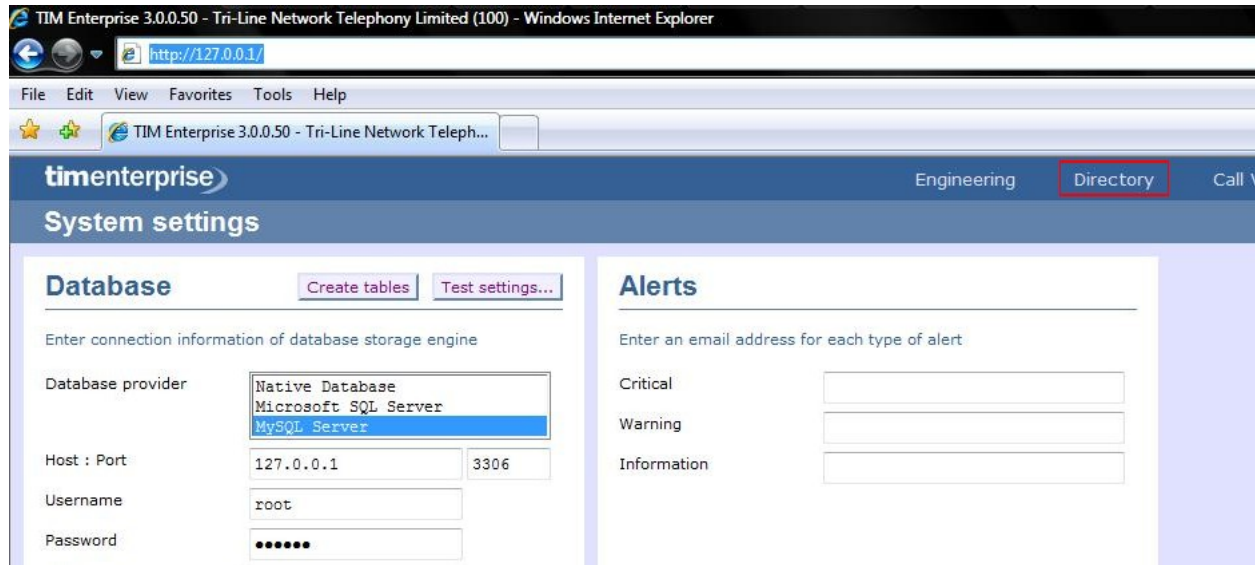
OK

Email Test settings...

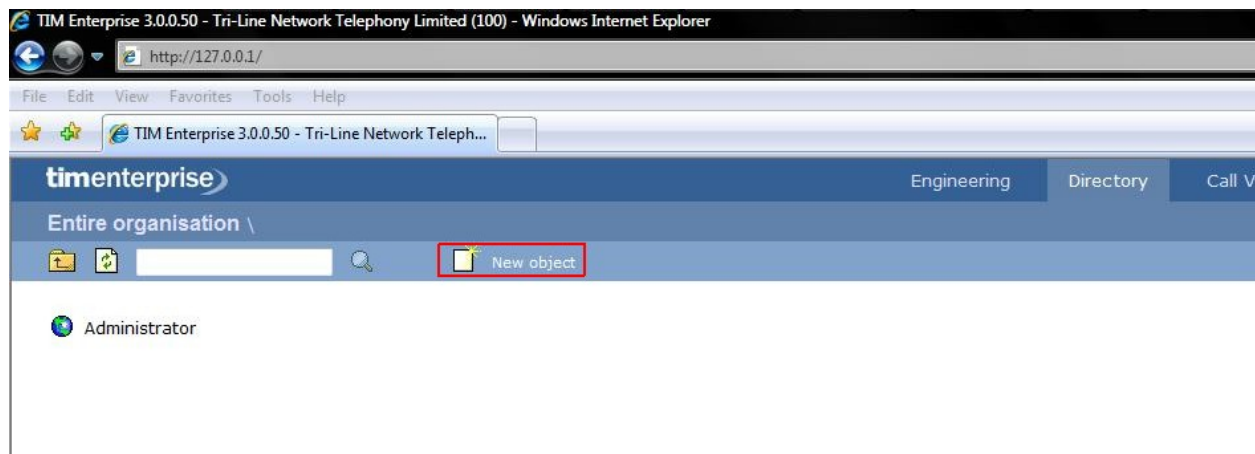
Web server Test settings...

This completes the configuration of the Database settings on TIM Enterprise. The next task is to configure the Directory settings.

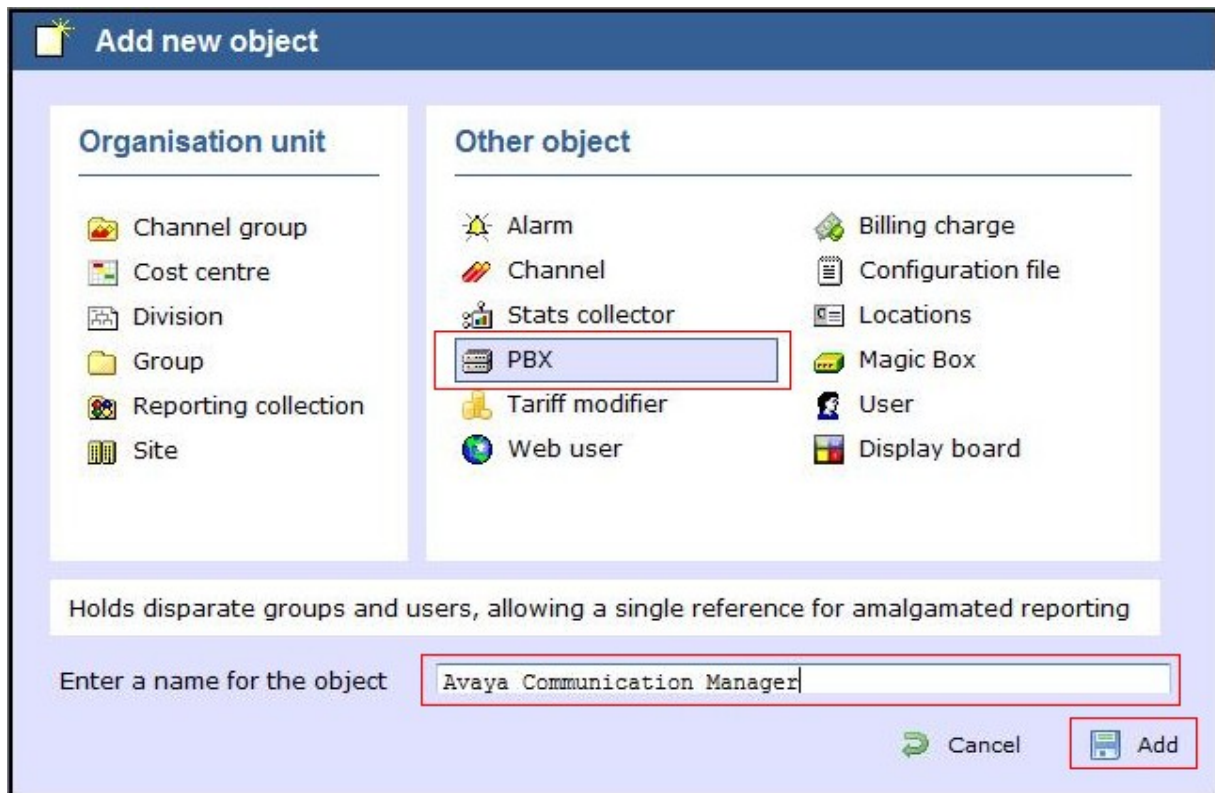
To configure the Directory settings, click on the **Directory** tab in the TIM Enterprise toolbar.



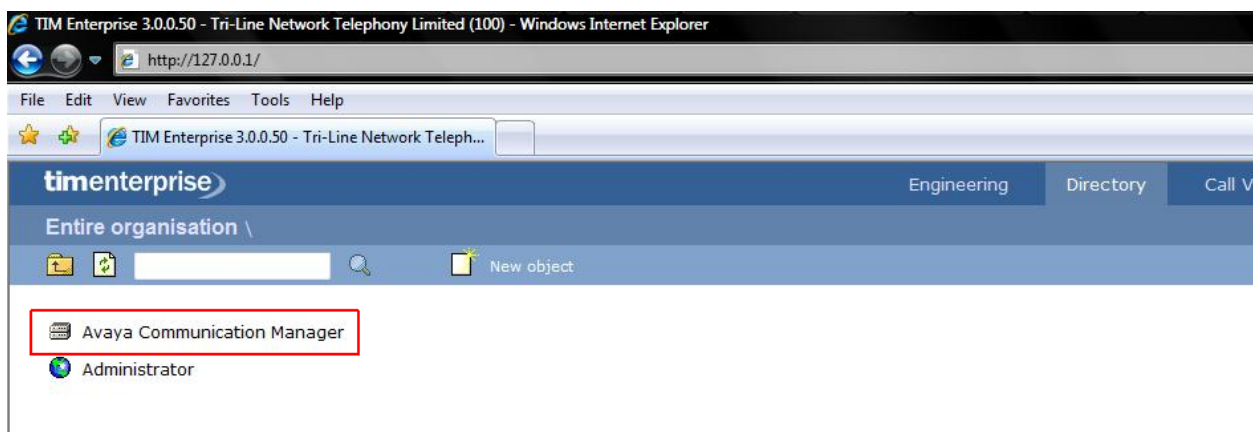
On the Directory screen that is displayed, click on **New Object**.



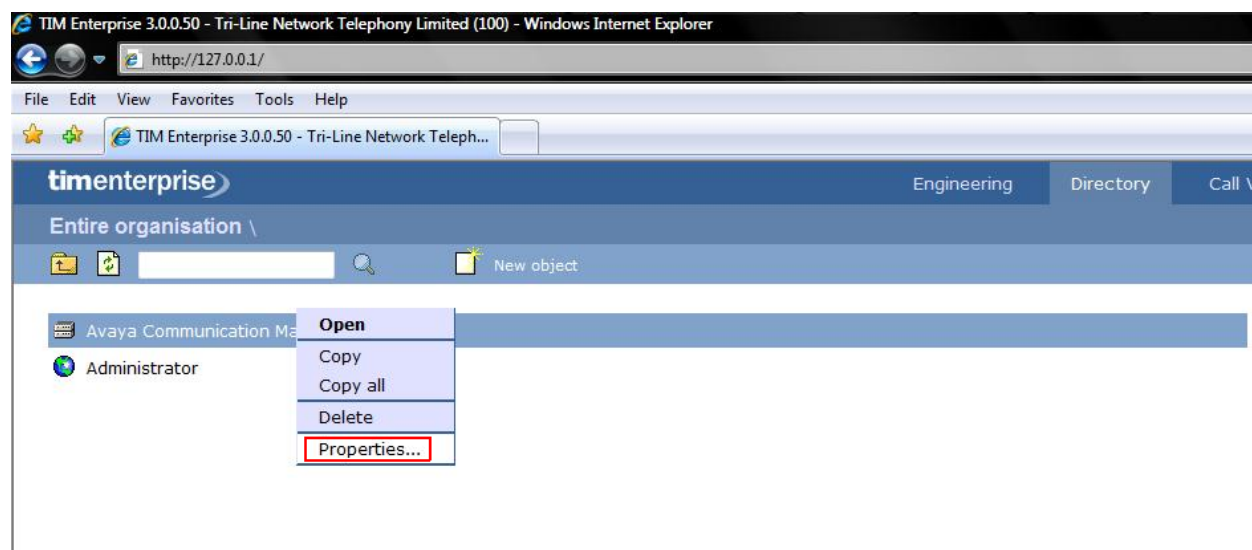
On the **Add new object** window that appears, select **PBX**. In the field, **Enter a name for the object**, enter **Avaya Communications Manager** and click the **Add** button as shown below.



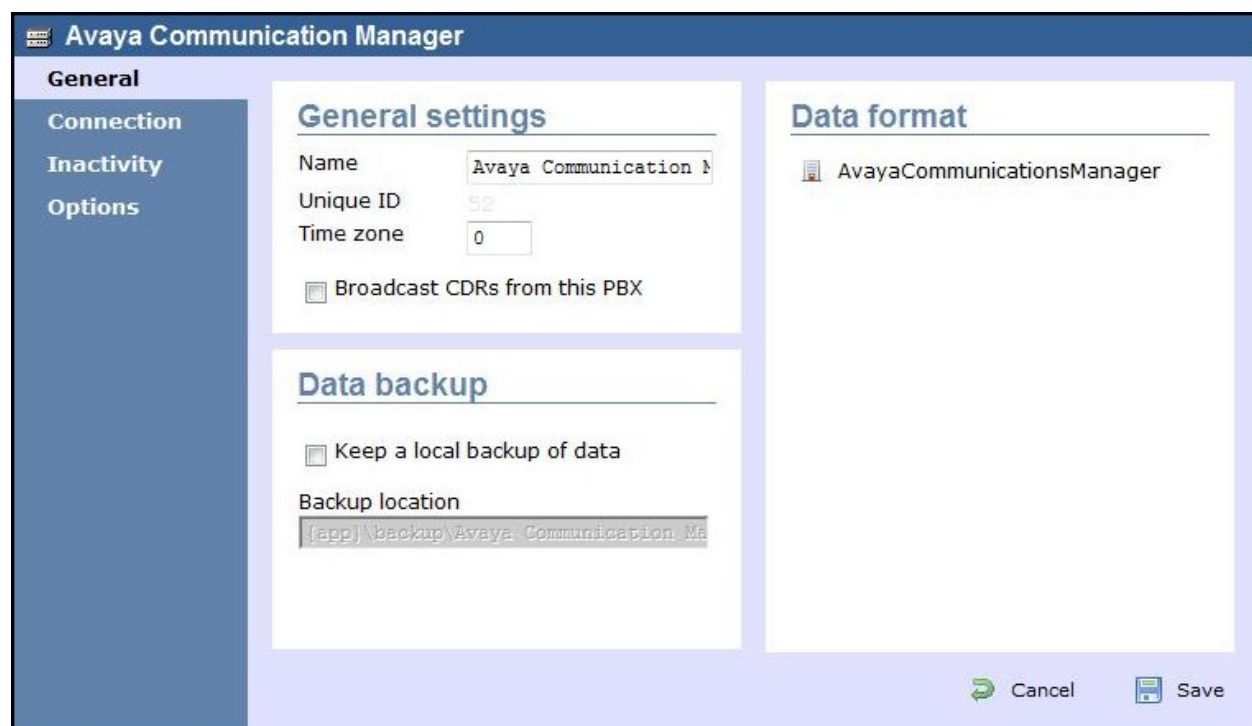
The **Avaya Communication Manager** will appear in the Directory as shown below.



To configure TIM Enterprise to receive information from Avaya Communication Manager, click on the **Avaya Communication Manager** object and select **Properties** as shown below.



A new **Avaya Communication Manager** window will appear with default **General** tab displayed.



Under the **Data format** section of the **General** tab, select **AvayaCommunicationsManager**.

The screenshot shows the 'Avaya Communication Manager' window with the 'General' tab selected. On the left sidebar, 'General' is highlighted. The main area is divided into two sections: 'General settings' and 'Data format'. In the 'Data format' section, 'AvayaCommunicationsManager' is selected and highlighted with a red box. Below it, a dropdown menu also shows 'AvayaCommunicationsManager'. At the bottom right, there are 'Cancel' and 'Save' buttons.

Click on the **Connection** tab on the left hand side. In the screen that appears, select **Listen for connections from PBX** and enter the **Port** number as configured for the CDR link in **Section 4**. Check the **Timestamp data** check-box and click **Save**.

The screenshot shows the 'Avaya Communication Manager' window with the 'Connection' tab selected. On the left sidebar, 'Connection' is highlighted. The main area is divided into two sections: 'Connection method' and 'Connection details'. In the 'Connection method' section, 'Listen for connections from PBX' is selected and highlighted with a red box. In the 'Connection details' section, the 'Port' field is set to '9000' and is highlighted with a red box. In the 'Connection options' section, the 'Timestamp data' checkbox is checked and highlighted with a red box. At the bottom right, there are 'Cancel' and 'Save' buttons, with the 'Save' button highlighted by a red box.

Repeat the above steps to add a new directory for the second Avaya Communication Manager.

6. General Test Approach and Test Results

The general test approach was to manually place intra-switch calls, inter-switch calls, inbound and outbound PSTN trunk calls to and from telephones attached to the Avaya Servers, and verify that TIM Enterprise collects the CDR records and properly classifies and reports the attributes of the call. The Avaya Reliable Data Test Tool (RDTT) was connected to compare the records received by RDTT and those by TIM Enterprise. For serviceability testing, logical links were disabled/re-enabled, and servers were rebooted.

All executed test cases were passed. TIM Enterprise successfully collected the CDR records from Avaya Communication Managers via CDR link for all types of calls generated including intra-switch calls, inbound / outbound PSTN trunk calls, inbound/outbound inter-switch IP trunk calls, transferred calls, and conference calls. For serviceability testing, the TIM Enterprise server was able to resume collecting CDR records automatically after failure recovery, including buffered CDR records for calls that were placed during the outages. TIM Enterprise doesn't support RSP, which may lead to the loss of CDR records if there is a link outage. During a link outage test in the lab, loss of CDR records was not observed.

7. Verification Steps

The following steps may be used to verify the configuration:

- Use the **ping** utility on the TIM Enterprise server to verify the IP connectivity to the Avaya S8730 and S8300 Servers.
- On the SAT of each Avaya Server, enter the **status cdr-link** command and verify that the CDR Link State shows **up**.

```
status cdr-link
```

CDR LINK STATUS	
Primary	Secondary
Link State: up	CDR not administered
Date & Time: 2009/4 /14 11: 40: 34	0 /0 /0 0: 0: 0
Forward Seq. No: 134	0
Backward Seq. No: 325	0
CDR Buffer % Full: 0.00	0.00
Reason Code: OK	

Place a call and verify that TIM Enterprise receives the raw CDR record for the call. Compare the values of data fields in the raw CDR record with TIM Enterprise's Call View by selecting the **Call View** tab on the TIM Enterprise toolbar.

Date	Time	Source	Route	Destination	Response	Duration	Cost
14 April 2009	11:45:52	302	303	303	0	00:00:08	0.00

The call displayed above is an internal call from extension 302 to extension 303. TIM Enterprise uses grey color to represent internal calls. Call duration was 8 seconds, date of the call was 14th of April 2009 and the start time was 11:45:52. Cost is zero for the internal calls, since they did not reach the PSTN.

- Place internal, inbound trunk and outbound trunk calls to and from various telephones, generate an appropriate report in TIM Enterprise and verify the report's accuracy.

My custom report							2009-04-15 11:10:26
Entire organisation \							About this report
Outbound							
Date & Time	Source	CLI	Route	Destination	Duration	Cost	
15/04/2009 10:01:51	302	-	2501#	Local Call	00:00:14	0.030	
15/04/2009 10:02:31	301	-	201#	Local Call	00:00:13	0.030	
2 calls					00:00:27	0.060	
Answered							
Date & Time	Source	CLI	Route	Destination	Duration	Cost	
15/04/2009 10:01:10	113 004	-		302	00:00:16	-	
15/04/2009 10:02:30	110 001	-		201	00:00:14	-	
2 calls					00:00:29	-	
Missed							
Date & Time	Source	CLI	Route	Destination	Duration	Cost	
15/04/2009 10:05:41	113 005	-		301	00:00:13	-	
1 call					00:00:13	-	
Internal							
Date & Time	Source	CLI	Route	Destination	Duration	Cost	
15/04/2009 09:59:54	301	-	302	302	00:00:14	-	
1 call					00:00:14	-	
6 calls					TOTALS	00:01:23	0.060

8. Conclusion

These Application Notes describe the procedures for configuring Tri-Line's TIM Enterprise to collect call detail records from Avaya Communication Manager running on Avaya Servers. TIM Enterprise successfully passed all compliance testing.

9. 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 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.

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