



## Avaya Solution & Interoperability Test Lab

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# Application Notes for the Trisys Tapit EX Call Accounting Software with Avaya Communication Manager – Issue 1.0

### Abstract

These application notes describe the configuration procedures required to allow the Trisys Tapit EX call accounting software to collect call detail records from Avaya Media Servers running Avaya Communication Manager. Tapit EX collects, stores and processes call records to provide usage analysis, call costing and billing capabilities. Tapit EX contains a server utility that connects to an Avaya Media Server via a CDR link, which communicates over the TCP/IP network using the Avaya Reliable Session Protocol (RSP) to ensure reliable delivery of the call records. During compliance testing, Tapit EX was able to successfully collect and process CDR data for all call scenarios tested including outbound trunk calls, inbound trunk calls and intra-switch calls. Information in these notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the *DeveloperConnection* Program at the Avaya Solution and Interoperability Test Lab.

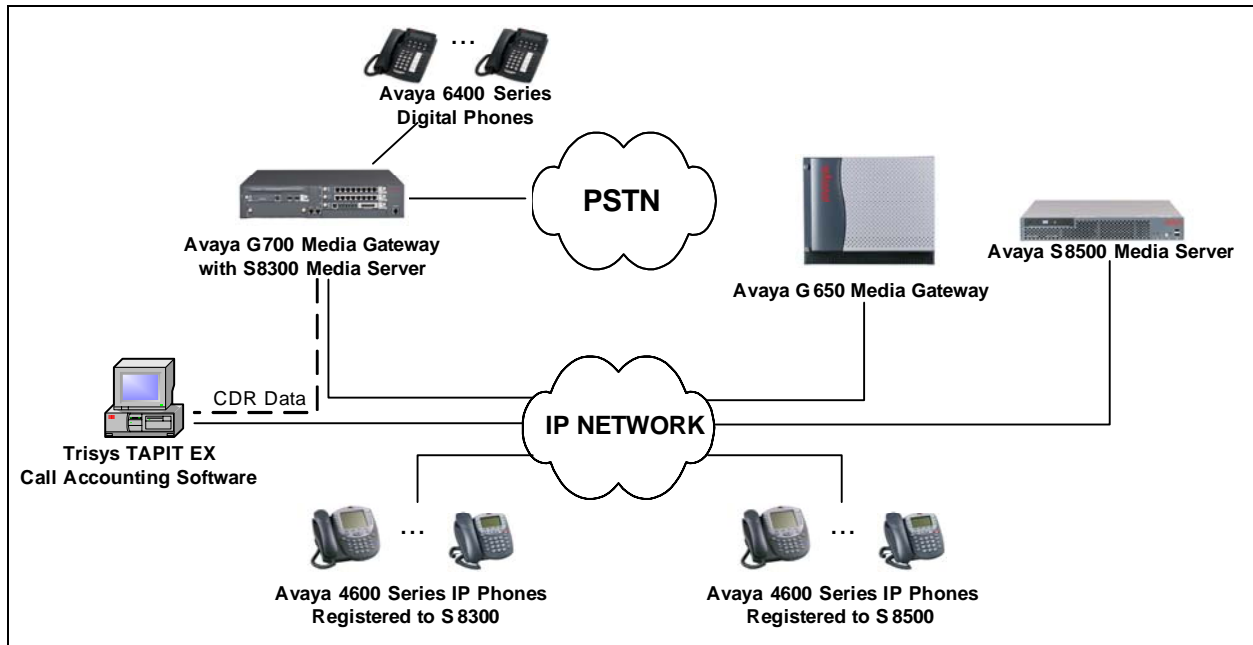
# 1. Introduction

These Application Notes describe a call detail recording (CDR) solution comprised of an Avaya Media Server running Avaya Communication Manager and the Trisys Tapit EX call accounting software. In addition, it provides the configuration and verification procedures needed to allow both products to interoperate together.

In this solution, Avaya Communication Manager generates the call records and sends them out on the CDR link, and Tapit EX collects, stores and processes them at the other end. The CDR link is established via an Avaya Reliable Session Protocol (RSP) session over the TCP/IP network. RSP provides a transport mechanism for reliable delivery of CDR records. The type of call records that are generated is controlled by the CDR configuration on Avaya Communication Manager and can include intra-switch calls, inbound trunk calls and outbound trunk calls. In addition, split records can be generated for transferred calls and conference calls. Of the various CDR formats provided by Avaya Communication Manager, the *expanded* format is the one supported by Tapit EX.

The Tapit EX software is comprised of three components: the Trisys Server, Tapit Monitor, and Tapit EX application running on the same Windows PC. The Trisys Server establishes and maintains the RSP session with Avaya Communication Manager, collects the call records, and buffers them temporarily in a raw text file. The Tapit Monitor periodically polls the data from the Trisys Server, preprocesses the data and buffers it in a secondary text file. The Tapit Monitor provides a means for the system administrator to view the raw data being collected by the system if so desired. Lastly, the Tapit EX application polls the data from the Tapit Monitor for storage in a Microsoft Access database where it is accessed to generate a variety of reports for usage analysis and cost accounting.

**Figure 1** illustrates a typical enterprise configuration which was used as the test configuration consisting of an Avaya S8300 Media Server with an Avaya G700 Media Gateway, an Avaya S8500 Media Server with an Avaya G650 Media Gateway, the Tapit EX call accounting software and an assortment of phones and trunk interfaces. The Avaya S8300 and S8500 Media Servers were running Avaya Communication Manager. Tapit EX was installed on a PC running Windows 2000 Professional. The Tapit EX installation included all Tapit EX components and an internal Microsoft Access database, which is required for operation. Tapit EX was configured to collect CDR records from a single server, in this case the Avaya S8300 Media Server. Tapit EX has the ability to collect records from multiple Avaya Media Servers, but this configuration was not tested. The more common configuration for the Tapit EX customer base is to collect data from a single Avaya Media Server.



**Figure 1: Tapit EX call accounting software collecting data from an Avaya S8300 Media Server**

## 2. Equipment and Software Validated

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

Equipment	Version
Avaya S8300 Media Server	Communication Manager 3.0 (R013x.00.0.340.3)
Avaya G700 Media Gateway Media Gateway Processor	24.17
Avaya S8500 Media Server	Communication Manager 3.0 (R013x.00.0.340.3)
Avaya G650 Media Gateway TN2312BP IPSI TN799DP C-LAN TN2302AP MEDPRO	HW 03 FW 21 HW 01 FW 15 HW 20 FW 104
Trisys Tapit EX	4.1.8

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 the Trisys Server. For the Avaya S8300 Media Server, the RSP link originates at the IP address of the local media server (procr). For other Avaya Media Servers, the RSP link originates at the IP address of the local C-LAN board that connects to the same network that the Trisys Server resides.

In order for the media server to locate the Trisys Server, the IP address of the Trisys Server must be configured in Avaya Communication Manager, along with a corresponding node name. Use the **change node-names ip** command, shown below for the Avaya S8300 Media Server, to create a node name with the IP address of the Trisys Server. There should already be an entry for the local processor (procr) for the Avaya S8300 Media Server. If using another media server, there should be an entry for a previously configured C-LAN board from the C-LAN's prior installation. These names will be used in the **ip-services** form for the CDR link.

**Figure 2: IP Node Names Form**

### 3.2. Enable CDR as an IP Service

The CDR link needs to be defined to use IP, and more specifically, to use RSP over IP. This is done using the **change ip-services** command. On Page 1 of the **ip-services** form, set the **Service Type** field to “**CDR1**” for the primary CDR link. “**CDR2**” is used for the secondary CDR link. The **Local Node** name for the Avaya S8300 Media Server will be “**procr**”. If using another media server platform, the node name will be the node name of the C-LAN board connected to this network. The **Local Port** number is fixed to “**0**”. For the **Remote Node**, select the node name that was created for the Trisys Server on the **node-names ip** form, in this case “**Tapit**”. The **Remote Port** may be set to a value between “**5000**” and “**64500**” inclusive, but must match the port configured in the Trisys Server.

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

ESC-x=Cancel ESC-e=Submit ESC-p=Prev Pg ESC-n=Next Pg ESC-h=Help ESC-r=Refresh

**Figure 3: IP Services Form (Page 1)**

On Page 3 of this form, verify the **Reliable Protocol** field is set to “**y**”. This will enable the Reliable Session Protocol (RSP) for the CDR link. Use the default values for all other fields.

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	y	30	3	3	60

ESC-x=Cancel Esc-e=Submit Esc-p=Prev Pg Esc-n=Next Pg Esc-h=Help Esc-r=Refresh

Figure 4: IP Services Form (Page 3)

### 3.3. Configure CDR Reporting Parameters

The **change system-parameters cdr** command is used to set parameters for the type of calls to record and how to format the CDR data. Tapit EX recommends use of the *expanded* format, so the following fields should be set accordingly.

- **CDR Date format:** month/day
- **Primary Output Format:** expanded
- **Primary Output Endpoint:** CDR1
- **Use ISDN Layouts?** n
- **Use Enhanced Formats?** 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 [This allows incoming trunk calls to appear in the CDR records along with the outgoing trunk calls]
- **Suppress CDR for Ineffective Call Attempts?** y [ This 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.]

```

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

Node Number (Local PBX ID):                                CDR Date Format: month/day
Primary Output Format: expanded                               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

ESC-x=Cancel Esc-e=Submit Esc-p=Prev Pg Esc-n=Next Pg Esc-h=Help Esc-r=Refresh

```

**Figure 5: CDR System Parameter Form**

If **intra-switch CDR** is set to “y”, then the specific extensions for which CDR records will be generated need to be defined. This is done using the **change intra-switch-cdr** command. 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:

ESC-x=Cancel Esc-e=Submit Esc-p=Prev Pg Esc-n=Next Pg Esc-h=Help Esc-r=Refresh

```

**Figure 6: Intra-switch CDR Form**

### 3.4. Enable CDR Reporting on Each Trunk Group

For each trunk group for which CDR records are desired, use the **change trunk-group n** command, where n is the trunk group number. Verify that the **CDR Reports** field is set to “y”. This is the default value. 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

ESC-x=Cancel Esc-e=Submit Esc-p=Prev Pg Esc-n=Next Pg Esc-h=Help Esc-r=Refresh
```

Figure 7: Trunk Group Form

## 4. Configure the Trisys Tapit EX

This section describes the configuration of the Trisys Tapit EX call accounting software. It is comprised of three major components: Trisys Server, Tapit Monitor and the main Tapit application.

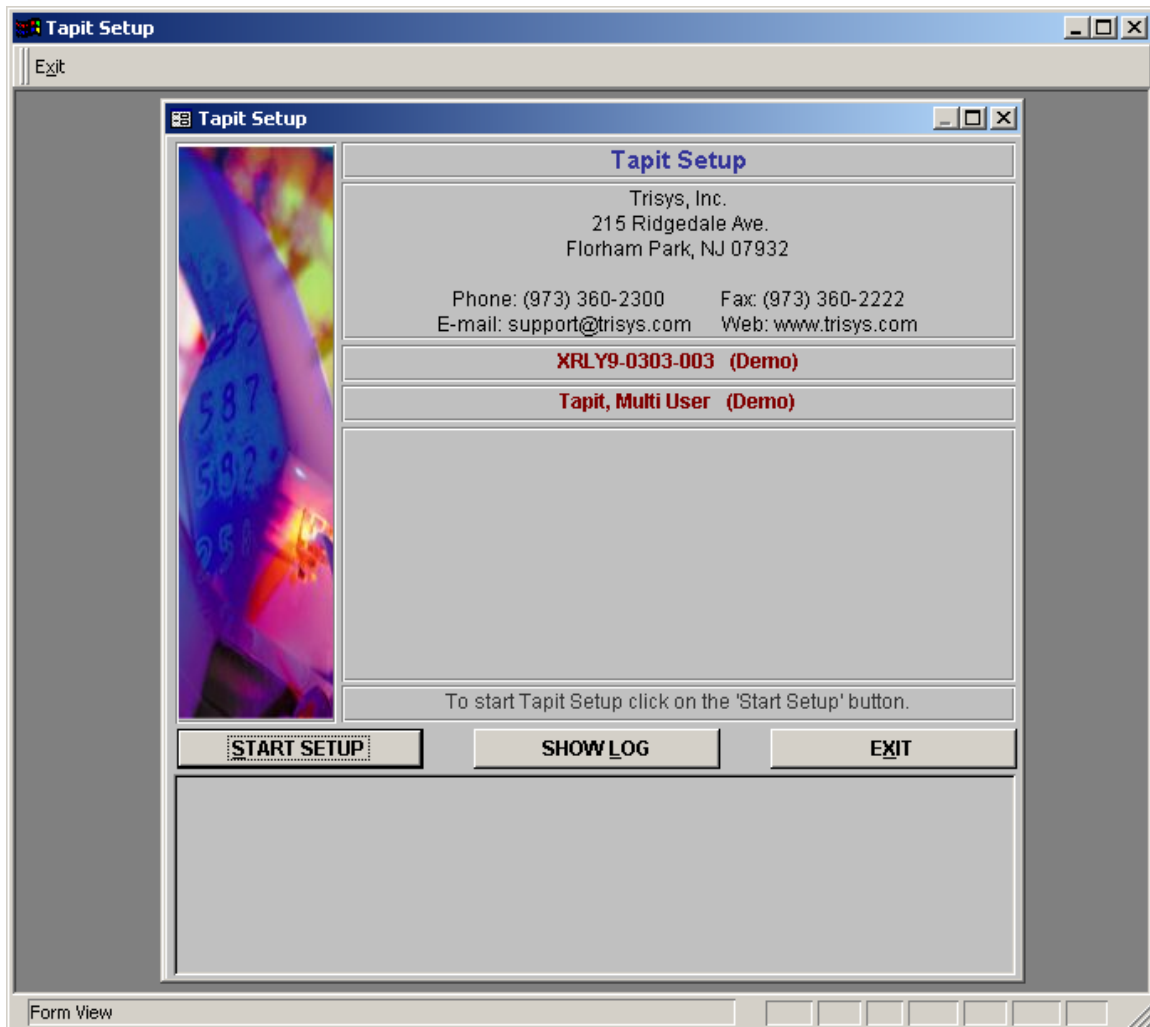
The Trisys Server is the component that directly connects to Avaya Communication Manager to collect the call records and terminate the RSP protocol. The Tapit Monitor allows an administrator to view the raw data that is received from the telephone system. It also parses and formats the data for inclusion in the database. Lastly, the Tapit application maintains the database and provides all the reporting capabilities.

To install Tapit EX, please refer to the complete installation procedures in reference [3]. This will install the Tapit Monitor and Tapit application. Next, install the Trisys Server utility from the *Utilities/IP server for Avaya* folder located on the Tapit CD. See reference [4] for complete details of this procedure. At this point, Tapit EX can be configured by running Tapit Setup from the Windows Start menu: Start>Programs>Tapit>Tapit Setup. The administrator is guided through the Setup screens. Once Tapit Setup is complete, then the Trisys Server utility must be



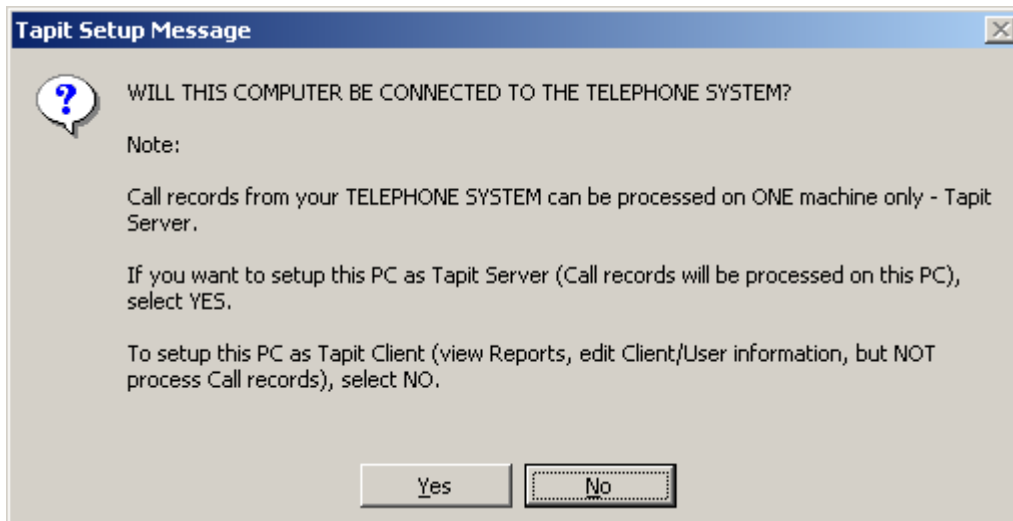
started by double-clicking on the *ServerTrisys.exe* icon in the directory where it was installed. The default directory is *C:\TapitW32\TrisysServer*.

Tapit EX was installed using the multi-user option. The following procedure shows a typical Tapit EX configuration and the one used for compliance testing. Tapit Setup begins with the following splash screen. Select “**Start Setup**” to begin.



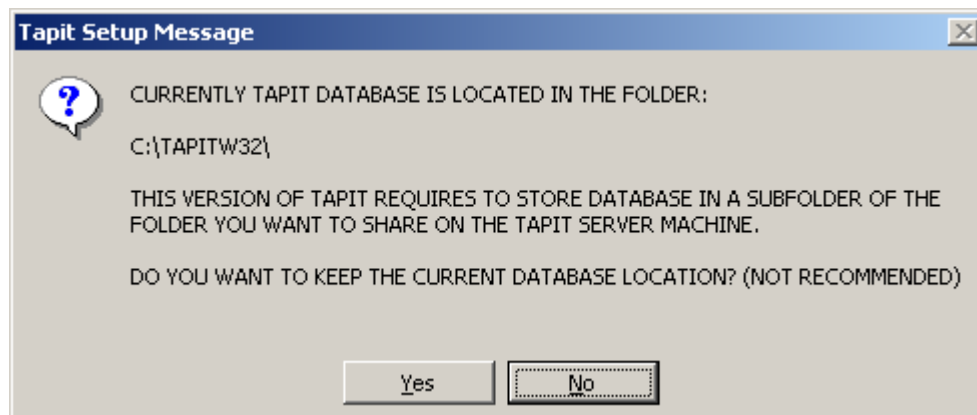
**Figure 8: Initial Tapit Setup Screen**

After selecting Start Setup, the following screen will appear asking whether this PC will be connected to the telephone system. The answer is “**Yes**”, since the current PC will serve as the PC where the Trisys Server process resides.



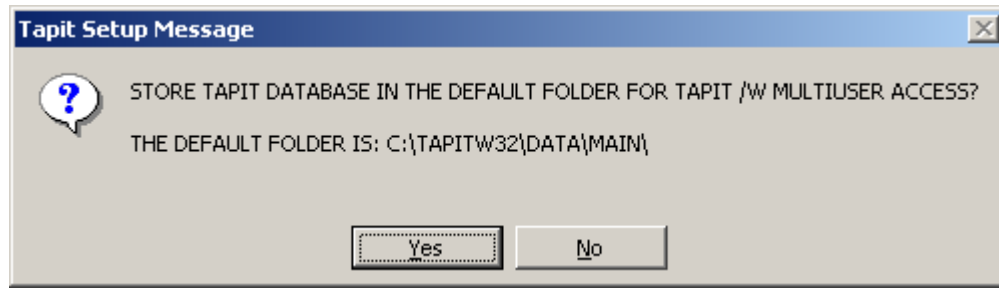
**Figure 9: Telephone System Connectivity?**

Next, the following screen appears asking if the database should be kept in its current location. Since Tapit EX was installed with the multi-user option, the database needs to be in a shared folder. Since the current database location is normally used for single-user mode and is not recommended if using multi-user, select “No”.



**Figure 10: Keep Current Database Location?**

Another message is displayed asking if the database should be stored in the default location for Tapit EX using multi-user access. Select “Yes”.



**Figure 11: Use Default Multi-User Path for Database?**

The next screen that appears allow configuration of system parameters of the Tapit reporting application. These parameters can be changed at a later time by starting the Tapit application and selecting **Maintenance** from the **Main** menu, followed by **System Parameters** on the **Maintenance** Menu.

Enter the local phone number in the **Telephone Number** Field. This is used for calculating call charges. The **Load Calls from Text File** box should be checked and a pathname entered for the text file to be used. This pathname must match the pathname used by the Trisys Server to store the data. The Trisys Server pathname will be configured in a later step. The default pathname used by the Trisys Server is “C:\TapitW32\TrisysServer\SPL\_Output.txt”. The **PBX Type / SMDR format** should be set to “**Avaya Definity w/Caller ID – XP**” for use with Avaya Communication Manager. The **Use Computer or Telephone System Date** field should be set to “**PBX**”. The default values for the rest of the fields can be used. Please refer to reference [3] for a complete explanation of all the fields. When done entering data, select “**OK**”.

**System Parameters - Setup TAPIT - Setup TAPIT**

**Phone Communications Settings**

Your Telephone Number: (732) 852-0000

☒ Load Calls from Text File: C:\Tapit\W32\TrisysServer\SPL\_Output.txt

Process Text File Every: 180 seconds

Load Calls into Database Every: 20 minutes

PBX Type / SMDR format: Avaya Definity w/ Caller ID - XP

☒ eXtended Processing (not available for ALL PBX formats)

Use Computer or Telephone System Date?  
☐ Computer ☒ PBX

Port: COM1  
Speed: 1200  
Parity: Even  
Data Bits: ☒ 7 ☐ 8  
Stop Bits: ☒ 1 ☐ 2

Please verify correct SMDR format selection. Also it may require additional settings to process your SMDR format properly. All settings can be changed later.

OK

**Figure 12: Phone Connectivity**

Next, the user is shown a screen asking if a V&H Data Package is available. This is an optional package containing rate information. In compliance testing, no V&H Data package was used. Select “No”.

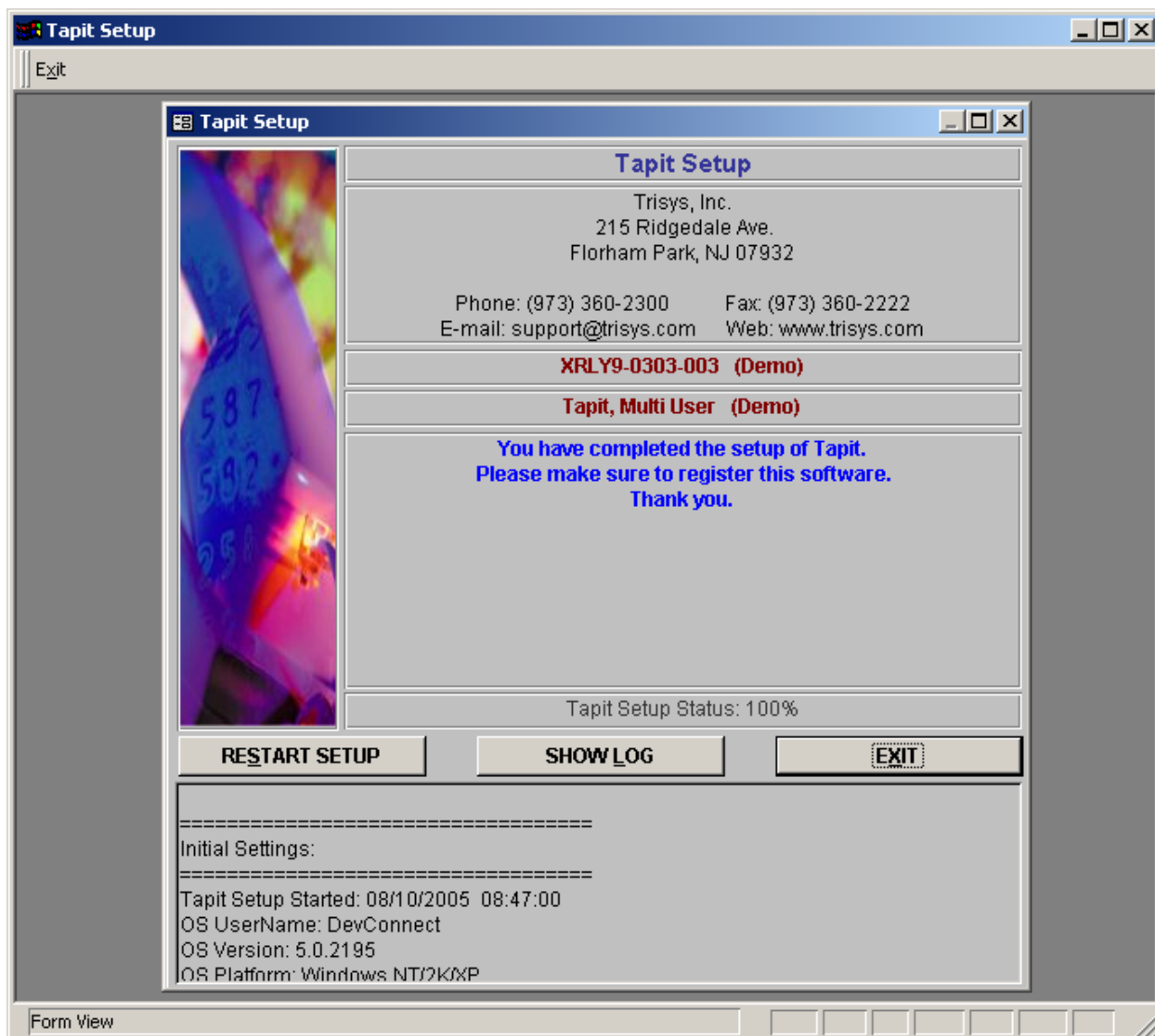
**Tapit Setup Message**

Do you have a V&H Data Package?

Yes No

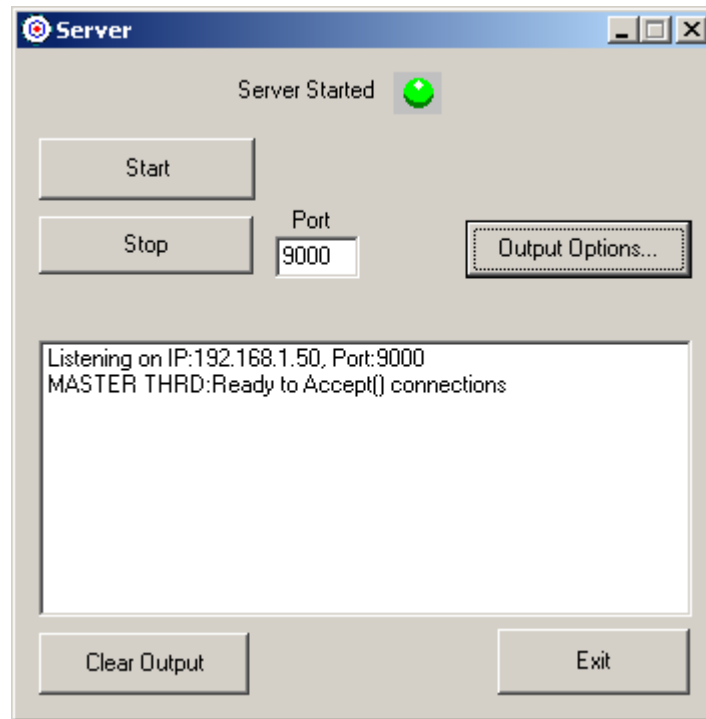
**Figure 13: V&H Package**

The Tapit Setup screen reappears. Select “Exit”.



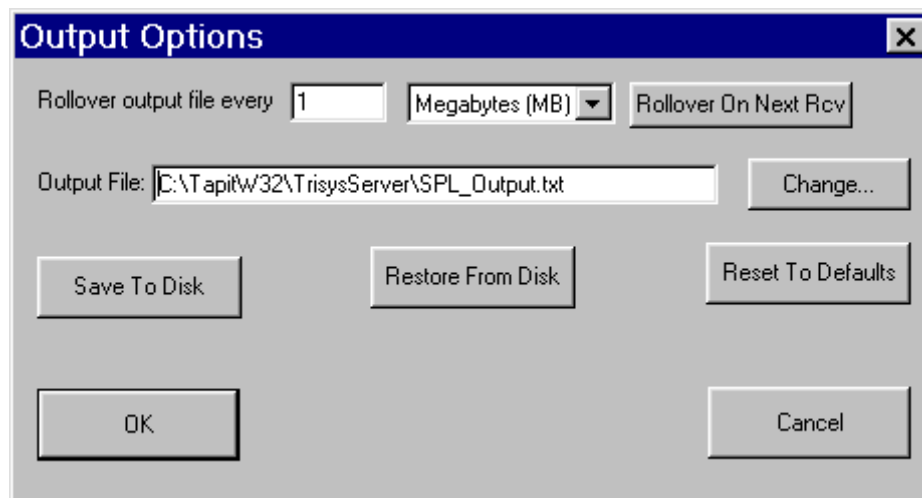
**Figure 14: Tapit Setup Exit Screen**

When Tapit EX Setup is completed, the administrator launches the Trisys Server utility from the *C:\TapitW32\TrisysServer* folder and the main screen appears (shown below). The Trisys Server immediately begins to monitor the RSP connection. If any changes are required to the default configuration, first stop the Trisys Server, make the changes and restart the Trisys Server. Check the port number to be used for the RSP connection. This needs to match the port number specified for the CDR link in Avaya Communication Manager on the **ip-services** form. Select the “**Output Options**” button to configure an output file path.



**Figure 15: Trisys Server Screen**

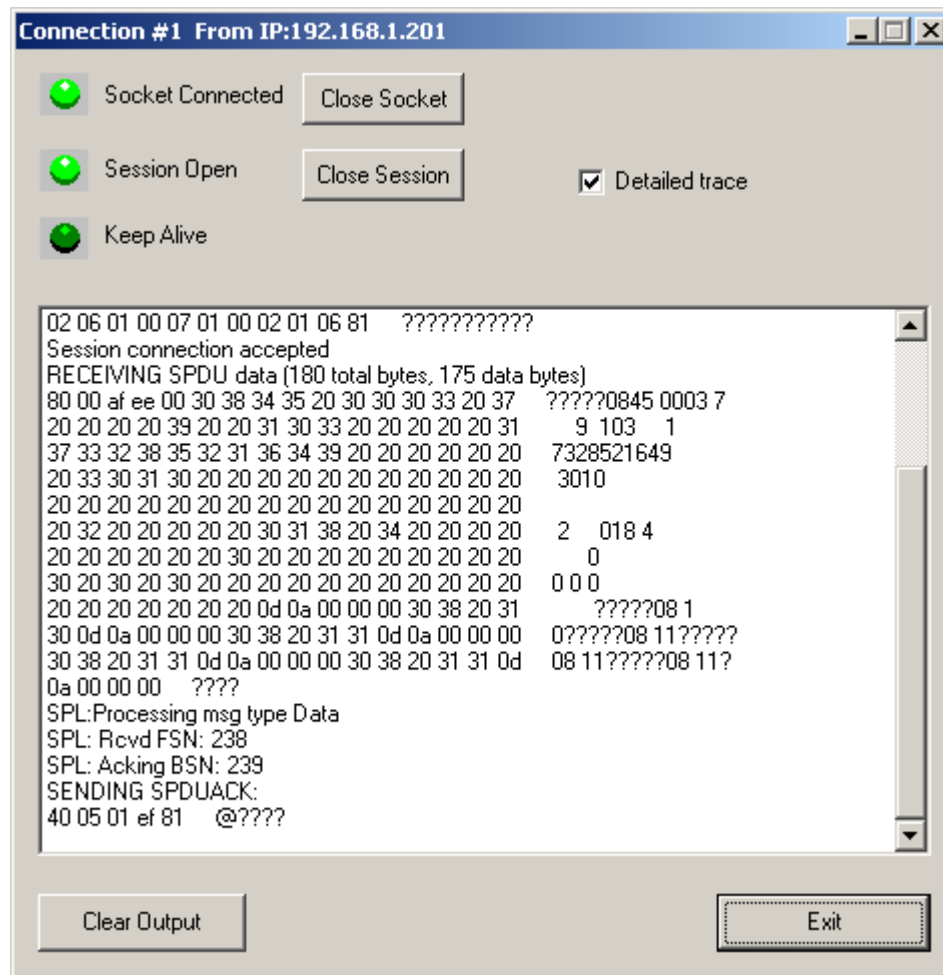
On the **Output Options** screen, enter a file name for the server output file or use the default. Make sure that the **Load Calls from Text File** setting from the **Systems Parameters** screen in the Tapit application matches the **Output File** path and name on the **Output Options** screen. Click on **“Save to Disk”** and then click on **“OK”**.



**Figure 16: Tapit Options**

If any changes were made to the configuration of the Trisys Server, select **“Start”** on the Trisys Server Screen, to restart the server. The Trisys Server will attempt to establish a session with

Avaya Communication Manager and the following screen will appear to show the messages passed between the Trisys Server and Avaya Communication Manager.



**Figure 17: Trisys Server Connection Screen**

At this point, a RSP session should be established over TCP/IP to transfer the CDR records. To collect and process data, Trisys Server must be running at all times. It is recommended to include a Trisys Server shortcut into your Windows Startup folder so that the Trisys Server will be automatically restarted if the PC is rebooted.

Next, the Tapit Monitor is started via the Windows Start Menu, using Start>Programs>Tapit>Tapit Monitor. In order to collect and process data, it too must be running at all times and will restart automatically after a reboot. In addition, the Tapit Monitor can be used to monitor the raw data received from Avaya Communication Manager.

As CDR records are generated and stored in the database, the Tapit application can then be used to provide call usage reports to help manage business telephony expenses. The Tapit application can be started from the Windows Start Menu, using Start>Programs>Tapit>Tapit.

At this point, follow the steps in the Verification section to confirm that everything is working properly.

After the main Tapit application is up and running, one additional configuration step is required in order to generate reports that contain both account and authorization codes at the same time. From the **Main** menu, select **Maintenance**. From the **Maintenance** menu, select **System Parameters**. In the **System Parameters** window, select the **Call Costing** tab to view the screen shown below. Verify that the **Separate Account & Authorization Codes** option has been selected. It is the default. If not, select this option by clicking the radio button next to **Separate Account & Authorization Codes**, and then select “OK”.

The screenshot shows the 'Tapit EX' application window with the 'System Parameters' dialog box open. The 'Call Costing' tab is selected. The dialog box has a title bar with 'System Parameters' and standard window controls. Below the title bar are tabs for 'Communications', 'Call Costing', 'Activity', 'Trunks', 'Destination', and 'Data'. The 'Call Costing' tab is active, showing 'Call Costing Settings'. Under this heading, there are settings for 'Tapit Pricing table': 'First Interval' (80 sec), 'Next Interval' (60 sec), 'First Increment' (6 sec), and 'Next Increment' (6 sec). Below these are two checkboxes: 'Would you like to price incoming calls?' (unchecked) and 'Would you like to surcharge calls which cost \$0.00?' (unchecked). A table follows with three columns: 'Per Call', 'Per Min', and 'Multiplier %'. The rows are 'Default Surcharges' and 'Zero Plus Pricing @', both showing '\$0.00' in the first two columns and '0' in the third. At the bottom, under 'Account / Authorization Code Processing Options:', there are three radio buttons: 'Client Account Code' (unchecked), 'Matter Code Length' (0) (unchecked), and 'User Authorization Code Only' (unchecked). The 'Separate Account & Authorization Codes ( when both are supplied by System )' option is selected with a checked radio button. At the bottom of the dialog are 'OK' and 'Cancel' buttons. The main window has a menu bar with 'Main', 'Window', and 'Help'. The status bar at the bottom says 'Form View'.

	Per Call	Per Min	Multiplier %
Default Surcharges	\$0.00	\$0.00	0
Zero Plus Pricing @	\$0.00	\$0.00	0

Figure 18: Call Costing Tab of System Parameter Screen



## 5. Interoperability Compliance Testing

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

### 5.1. General Test Approach

The general test approach was to manually place intra-switch calls, inbound trunk and outbound trunk calls to and from telephones on Avaya Communication Manager and verify that Tapit EX 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, the Avaya S8300 Media Server was reset and Tapit EX was restarted. For performance testing, a call generator was used to place calls over an extended period of time.

### 5.2. Test Results

All test cases performed passed. Tapit EX successfully collected the CDR records from the Avaya Media Server 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, Tapit EX 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 Tapit EX could collect call records during a sustained, high volume of calls.

The following observations were made on the way that Tapit EX reports certain types of calls.

- Intra-switch conference calls are identified as inbound calls. Testing was repeated with an interim release of the Tapit Monitor v4.0.7.4 (dated 8/4/2005) that identified these calls as internal calls.
- Account codes and Authorization codes on calls are reported in the same field. Testing was repeated with an interim release of the Tapit Monitor v4.0.7.4 (dated 8/4/2005) that reported these values in separate fields.

These changes in the Tapit Monitor are included in the SMDR2K.exe update available for download from Trisys.com web site.

In addition, due to a CDR issue in Avaya Communication Manager (R013x.00.0.340.3) with certain transfer and conference call scenarios, some test cases were retested with an interim release of Avaya Communication Manager (R013x.00.0.345.0). This change is planned for general availability at a future date.

## 6. Verification Steps

The following steps may be used to verify the configuration:

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

## 7. Support

Technical support for Tapit EX can be obtained by contacting Trisys, Inc at:

- Phone: 1-973-360-2300 opt. 3
- E-mail: [tech@trisys.com](mailto:tech@trisys.com)

## 8. Conclusion

These Application Notes describe the procedures for configuring the Trisys Tapit EX call accounting software to collect call detail records from Avaya Media Servers running Avaya Communication Manager software. Tapit EX was successfully compliance tested with an Avaya S8300 Media Server residing in a G700 Media Gateway.

## 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 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 Tapit EX product documentation is available from Trisys, Inc. Visit their website at <http://www.trisys.com> for company and product information.

[3] Tapit Manual

[4] Readme file for installing Trisys Server

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