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Avaya Solution & Interoperability Test Lab

Application Notes for Soft-ex RingMaster with Avaya Aura® Communication Manager to collect Call Detail Records (CDR) – Issue 1.0

Abstract

These Application Notes describe the configuration steps necessary for provisioning Soft-ex's product RingMaster V6.1 to successfully interoperate with. Avaya Aura® Communication Manager R8.1 to collect CDR.

Readers should pay attention to **Section 2**, in particular the scope of testing as outlined in **Section 2.1** as well as the observations noted in **Section 2.2**, to ensure that their own use cases are adequately covered by this scope and results.

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.

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1. Introduction

These Application Notes describe the configuration steps necessary for provisioning Soft-ex's product RingMaster V6.1 to successfully interoperate with Avaya Aura® Communication Manager R8.1 to collect CDR. RingMaster from Soft-ex is a telephone call accounting system that uses Call Detail Records (CDR) information from Avaya Aura® Communication Manager and produces management reports. RingMaster is used to process CDR and has an alerting system for calls that meet specific requirements, for instance those that may indicate telephone fraud. For further information please go to https://www.soft-ex.net

2. General Test Approach and Test Results

The compliance testing is concerned with verifying that the addition of Soft-ex's RingMaster does not interfere with the operation of the Communication Manager. CDR information is transferred via TCP/IP stream, so RingMaster is listening on a port awaiting CDR output. RingMaster also operates in multisite environments, where CDR data from more than one site is collected and forwarded to a central site. In these cases, the data is collected by buffering devices supplied by Soft-ex and transferred by a variety of methods such as via TCP/IP, FTP or email. Essentially for each PBX the interface has the same characteristics: one way data flow from the PBX.

There are some differences in Communication Manager in the call records generated by SIP endpoints compared to Analog, Digital, and H.323 endpoints. As a result, in certain scenarios involving SIP endpoints (e.g., two-party call, transfer, or conference), a CDR application may see more or less records, or records with condition codes/calling party other than expected.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

Avaya recommends our customers implement Avaya solutions using appropriate security and encryption capabilities enabled by our products. The testing referenced in these DevConnect Application Notes included the enablement of supported encryption capabilities in the Avaya products. Readers should consult the appropriate Avaya product documentation for further information regarding security and encryption capabilities supported by those Avaya products.

Support for these security and encryption capabilities in any non-Avaya solution component is the responsibility of each individual vendor. Readers should consult the appropriate vendor-supplied product documentation for more information regarding those products.

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For the testing associated with these Application Notes, the interface between Avaya systems and Soft-ex RingMaster did not include use of any specific encryption features as requested by Soft-ex.

2.1. Interoperability Compliance Testing

The objective of Interoperability Compliance Testing is to provide assurance to the potential customers that the tested products operate as specified and can interoperate in an environment similar to the one that will be encountered at a customer's premises. The interoperability compliance testing focused on a Real-Time TCP/IP connection listening on a port awaiting CDR data from Communication Manager.

2.2. Test Results

Tests were performed to ensure full interoperability of Communication Manager R8.1 with Soft-ex RingMaster V6.1. Performance and load testing is outside the scope of the compliance testing. All the test cases passed successfully. With the following observations noted.

1. Initially an attempted call out on a "busy" trunk that fails does not get reported on. Ringmaster needs to have the "Unanswered Outgoing Calls" call type enabled within its configuration. This is generally not enabled as it can lead to a large increase in call data volume being captured. Once it was enabled it produced a record.
2. There is no CDR sent for the second leg of the call if a SIP phone makes the blind transfer. This appears to be due to Communication Manager not sending the record, Avaya is investigating the issue.
3. Special Application 8702 was set to yes to allow the UCID be reported on. This Special Application changes the behaviour of how Communication Manager handles UCIDs, especially in conference and transfer scenarios. Some call recorders may need to accommodate for this change. Please refer to the "User Scenarios" section in the SA8702 customer document and confirm adjunct applications e.g., call recorders would be compatible with SA8702. Also, SA8702 is not compatible with Avaya IQ and Contact Center SIP agents.

2.3. Support

Information on Soft-ex and product support can be obtained through the following:

Phone: +353 1 241 6600
Fax: +353 1 295 6290
E-mail: sales@soft-ex.net
Web: https://www.soft-ex.net

3. Reference Configuration

Figure 1 illustrates the network topology used during compliance testing. The Avaya solution consists of a Communication Manager, System Manager, Session Manager, a Media Server and a G430 Gateway. The Communication Manager is configured to output CDR over a TCP/IP port. CDR are sent in customized format and retrieved by RingMaster. A variety of Avaya deskphones were used to generate intra-switch calls (calls between phones on the same system), and outbound/inbound calls to/from the PSTN. The Session and System Manager are shown in the diagram as they are required for the SIP telephones.

Note: RingMaster was connected directly to Communication Manager using a direct TCP/IP connection.
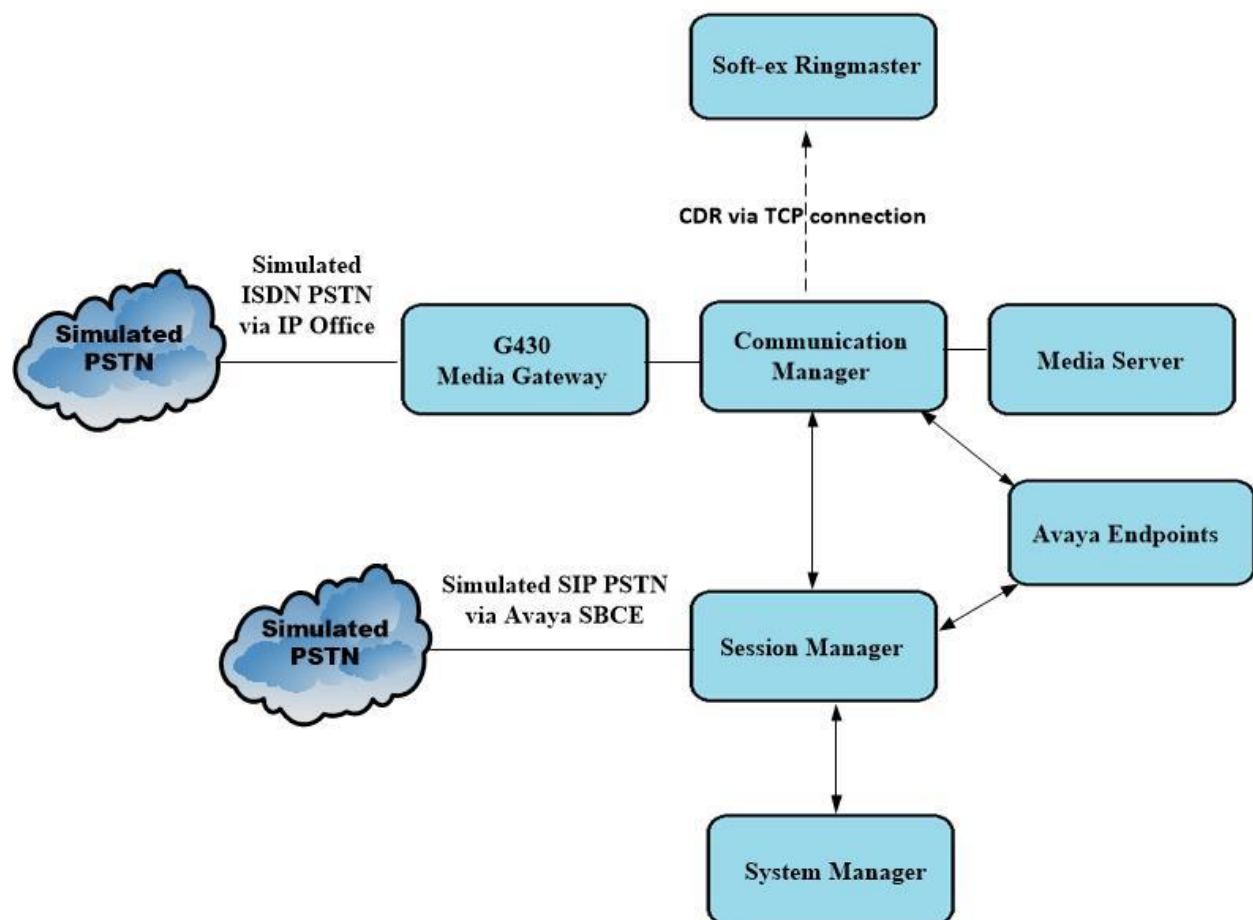
Figure 1: Avaya Aura® Communication Manager and Soft-ex reference configuration

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4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya Aura® System Manager running on a virtual server	8.1.3.2 Build No. – 8.1.0.0.733078 Software Update Revision No: 8.1.3.2.1012646 Service Pack 2
Avaya Aura® Session Manager running on a virtual server	8.1.3.2 Build No. – 8.1.3.2.813207
Avaya Aura® Communication Manager running on a virtual server	8.1.3.2 – FP3SP2 R018x.01.0.890.0 Update ID 01.0.890.0-26989
Avaya Aura® Application Enablement Services running on a virtual server	8.1.3.2 Build 8.1.3.2.0.4-0
Avaya Aura® Media Server	8.0.2.184
Avaya G430 Media Gateway	41.16.0/1
Avaya J179 H.323 Deskphone	6.8502
Avaya J189 SIP Deskphone	4.0.10.1.2
Soft-ex RingMaster running on Windows 10 PC	6.1.1

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5. Configure Avaya Aura® Communication Manager

Configuration and verification operations on the Communication Manager illustrated in this section were all performed using Avaya Site Administrator Emulation Mode. The information provided describes the configuration of the Communication Manager for this solution. It is implied that a working system is already in place. For all other provisioning information such as initial installation and configuration, please refer to the product documentation in **Section 9**. The configuration operations described in this section can be summarized as follows:

- Create Node Name for RingMaster
- Define the CDR Link
- Change System Parameters CDR
- Set System Parameters Special Applications
- Set System Parameters Features
- Set Class of Service
- Configure Trunks for CDR Reporting

5.1. Create Node Name for RingMaster

A Node Name needs to be created to associate RingMaster with Communication Manager. Use the **change node-names ip** command to configure the following:

- **Name**   Enter an informative name i.e., **Ringmaster**
- **IP address**   Enter the IP address of the RingMaster PC/Server

```
change node-names ip                                        Page   1 of   2
                             IP NODE NAMES
   Name               IP Address
Ringmaster           10.10.40.182
```

5.2. Define the CDR Link

A CDR link needs to be defined between the Communication Manager and Ringmaster. Use the **change ip-services** command to configure the following:

- **Service Type**   Enter **CDR1**
- **Local Node**   Enter **procr**
- **Remote Node**   Enter **Ringmaster**
- **Remote Port**   Enter **9000**

```
change ip-services                                          Page   1 of   4

                             IP SERVICES
 Service      Enabled    Local    Local      Remote      Remote    TLS
  Type                   Node     Port       Node        Port    Encryption
AESVCS          y        procr    8765
CDR1                     procr    0          Ringmaster  9000        n
```

TLS Encryption was set to **n**, as encryption was not used.

Navigate to **Page 3** and set the **Reliable Protocol** field to **n**. This will disable Reliable Session Protocol (RSP) for CDR transmission. In this case, the CDR link will use TCP without RSP.

```
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
```

5.3. Change System Parameters CDR

Certain parameter changes are required for Communication Manager to interoperate with RingMaster. The screen shots below show the settings used during compliance testing. Use the **change system-parameters cdr** command to configure the following.

```
change system-parameters cdr                                    Page   1 of   2
                         CDR SYSTEM PARAMETERS
 Node Number (Local PBX ID):                      CDR Date Format: month/day
     Primary Output Format: customized    Primary Output Endpoint: CDR1
   Secondary Output Format:
     CDR Retention (days): 20
          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
                Record Outgoing Calls Only? n      Outg Trk Call Splitting? y
  Suppress CDR for Ineffective Call Attempts? n      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
Record Agent ID on Incoming? n       Record Agent ID on Outgoing? y
     Inc Trk Call Splitting? y                  Inc Attd Call Record? 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
Remove '+' from SIP Numbers? y
```

Navigate to **Page 2** and enter **Data Item** and **Length** as shown in the screen below.

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


      Data Item - Length         Data Item - Length         Data Item - Length
 1: date          - 6   17: in-trk-code    - 4   33: vdn               -
15
 2: space         - 1   18: space          - 1   34: space             - 1
 3: time          - 4   19: auth-code      - 7   35: ucid              -
20
 4: space         - 1   20: space          - 1   36: space             - 1
 5: sec-dur       - 5   21: in-crt-id      - 3   37: frl               - 1
 6: space         - 1   22: space          - 1   38: return            - 1
 7: cond-code     - 1   23: out-crt-id     - 3   39: line-feed         - 1
 8: space         - 1   24: space          - 1   40:                   -
 9: code-dial     - 4   25: isdn-cc        - 11  41:                   -
10: space         - 1   26: space          - 1   42:                   -
11: code-used     - 4   27: ppm            - 5   43:                   -
12: space         - 1   28: space          - 1   44:                   -
13: dialed-num    - 18  29: acct-code      - 15  45:                   -
14: space         - 1   30: space          - 1   46:                   -
15: clg-num/in-tac - 15 31: attd-console   - 2   47:                   -
16: space         - 1   32: space          - 1   48:                   -

                            Record length = 163
```

5.4. Set System Parameters Special Applications

There are two Special Applications that need to be set to allow Intra-Switch CDR and to allow the UCID be reported on. On **Page 3** set **SA8202** to **y** as shown below.

```
change system-parameters special-applications            Page   3 of  11
                        SPECIAL APPLICATIONS


               (SA8141) - LDN Attendant Queue Priority? n
      (SA8143) - Omit Designated Extensions From Displays? n
          (SA8146) - Display Update for Redirected Calls? n
             (SA8156) - Attendant Priority Queuing by COR? n
              (SA8157) - Toll Free Vectoring until Answer? n
  (SA8201) - Start Time and 4-Digit Year CDR Custom Fields? n
                   (SA8202) - Intra-switch CDR by COS? y
               (SA8211) - Prime Appearance Preference? n
                 (SA8240) - Station User Admin of FBI? n
                           (SA8312) - Meet-Me Paging? n
              (SA8323) - Idle Call Preference Display? n
                  (SA8339) - PHS X-Station Mobility? n
              (SA8348) - Map NCID to Universal Call ID? n
             (SA8428) - Station User Button Ring Control? n
            (SA8434) - Delay PSTN Connect on Agent Answer? n
                    (SA8439) - Forward Held-Call CPN? n
             (SA8440) - Unmodified QSIG Reroute Number? n

                              (SA8475) - SOSM? n
```

On **Page 5**, set **SA8702** to **y** as shown below. Note that the user INIT may need to be used to set this particular Special Application.

Note: This Special Application changes the behaviour of how Communication Manager handles UCIDs, especially in conference and transfer scenarios. Some call recorders may need to accommodate for this change. Please refer to the "User Scenarios" section in the SA8702 customer document and confirm adjunct applications e.g., call recorders would be compatible with SA8702. Also, SA8702 is not compatible with Avaya IQ and Contact Center SIP agents.

```
change system-parameters special-applications            Page   5 of  11
                         SPECIAL APPLICATIONS



                                (SA8652) - No Hold Consult? n
   (SA8654) - Crisis Alert Call Monitoring and Recording? n
            (SA8661) - Increased Automatic Wakeup Calls? n
                (SA8662) - Expanded PMS Name & Number? n
                         (SA8684) - PMS Wakeup Message? n
   (SA8693) - Connectivity Check for Direct IP Shuffling? n

             (SA8697) - 3rd Party H.323 Endpoint Support? n
 (SA8701) - Net Region Support H.323 Endpoints Behind ALG? n
            (SA8702) - CDR Enhancements for Network? y
         (SA8731) - Block Outgoing Bridged Call Display? n
                 (SA8734) - Enhanced Extension Display? n
         (SA8741) - CDR Identifier for IP Station Calls? n
           (SA8744) - Block Name for Room to Room Calls? n
       (SA8747) - Softphone Indication on DCP Terminals? n
```

5.5. Set System Parameters Features

UCID is used by RingMaster to connect calls and report on them correctly. **Create Universal Call ID (UCID)** should be set to **y** and the **UCID Network Node ID** should be set to a unique number.

```
change system-parameters features                          Page   5 of  19
                        FEATURE-RELATED SYSTEM PARAMETERS


SYSTEM PRINTER PARAMETERS
  Endpoint:              Lines Per Page: 60


SYSTEM-WIDE PARAMETERS
                                      Switch Name: cm81xvmpg
            Emergency Extension Forwarding (min): 10
          Enable Inter-Gateway Alternate Routing? n
Enable Dial Plan Transparency in Survivable Mode? n
                            COR to Use for DPT: station
             EC500 Routing in Survivable Mode: dpt-then-ec500
MALICIOUS CALL TRACE PARAMETERS
               Apply MCT Warning Tone? n   MCT Voice Recorder Trunk Group:
     Delay Sending RELease (seconds): 0
SEND ALL CALLS OPTIONS
     Send All Calls Applies to: station    Auto Inspect on Send All Calls? n
            Preserve previous AUX Work button states after deactivation? n
UNIVERSAL CALL ID
     Create Universal Call ID (UCID)? y    UCID Network Node ID: 37
     Copy UCID for Station Conference/Transfer? y
```

On **Page 13**, **Send UCID to ASAI** should be set to **y** as shown below.

```
change system-parameters features                          Page  13 of  19
                        FEATURE-RELATED SYSTEM PARAMETERS
 CALL CENTER MISCELLANEOUS
           Callr-info Display Timer (sec): 10
                       Clear Callr-info: next-call
        Allow Ringer-off with Auto-Answer? n

    Reporting for PC Non-Predictive Calls? n

             Agent/Caller Disconnect Tones? n
Interruptible Aux Notification Timer (sec): 3
   Zip Tone Burst for Callmaster Endpoints: double

  ASAI
                Copy ASAI UUI During Conference/Transfer? y
            Call Classification After Answer Supervision? y
                                      Send UCID to ASAI? y
             For ASAI Send DTMF Tone to Call Originator? y
        Send Connect Event to ASAI For Announcement Answer? n
 Prefer H.323 Over SIP For Dual-Reg Station 3PCC Make Call? n
```

5.6. Set Class of Service

Intra-switch CDR can be set to **y** as shown below. This was set for COS 1 and can be then assigned to each trunk group or station as required.

```
change cos-group 1                                        Page   1 of   2
CLASS OF SERVICE        COS Group: 1    COS Name: PG Default


                          0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
 Auto Callback            n  y  y  n  y  n  y  n  y  n  y  n  y  n  y  n
 Call Fwd-All Calls       n  y  n  y  y  n  n  y  y  n  n  y  y  n  n  y
 Data Privacy             n  y  n  n  n  y  y  y  y  n  n  n  n  y  y  y
 Priority Calling         n  y  n  n  n  n  n  n  n  y  y  y  y  y  y  y
 Console Permissions      n  y  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Off-hook Alert           n  n  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Client Room              n  n  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Restrict Call Fwd-Off Net y  y  y  y  y  y  y  y  y  y  y  y  y  y  y  y
 Call Forwarding Busy/DA  n  y  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Personal Station Access (PSA) n  n  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Extended Forwarding All  n  y  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Extended Forwarding B/DA n  y  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Trk-to-Trk Transfer Override n  y  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 QSIG Call Offer Originations n  n  n  n  n  n  n  n  n  n  n  n  n  n  n  n
 Contact Closure Activation n  n  n  n  n  n  n  n  n  n  n  n  n  n  n  n



 Intra-switch CDR         n  y  n  n  n  n  n  n  n  n  n  n  n  n  n  n
```

5.7. Configure Trunks for CDR Reporting

For each trunk group for which CDRs are desired, verify that CDR reporting is configured to generate CDR's. 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 applies to all types of trunk groups.

Setting the CDR Reports field to r means that CDR records are generated for both incoming and outgoing calls. In addition, the following ringing interval CDR records are generated:

- Abandoned calls: The system creates a record with a condition code of "H" indicating the time until the call was abandoned.
- Answered calls: The system creates a record with a condition code of "G" indicating the interval from start of ring to answer.
- Calls to busy stations: The system creates a record with a condition code of " I " indicating a recorded interval of 0.

```
change trunk-group 22                                        Page    1 of    5
                              TRUNK GROUP

Group Number: 22                     Group Type: sip          CDR Reports: r
  Group Name: To Simulated PSTN           COR: 1      TN: 1        TAC: *822
   Direction: two-way        Outgoing Display? n
 Dial Access? n                                        Night Service:
Queue Length: 0
Service Type: public-ntwrk           Auth Code? n
                                               Member Assignment Method: auto
                                                        Signaling Group: 22
                                                        Number of Members: 10
```

On **Page 3**, set **UUI Treatment** to **shared** and set **Send UCID** to **y** as shown below.

```
change trunk-group 22                                        Page    3 of    5
TRUNK FEATURES
        ACA Assignment? n              Measured: none
                                                        Maintenance Tests? y



  Suppress # Outpulsing? n  Numbering Format: private
                                      UUI Treatment: shared
                                      Maximum Size of UUI Contents: 128
                                         Replace Restricted Numbers? n
                                         Replace Unavailable Numbers? n


                           Modify Tandem Calling Number: no
                 Send UCID? y



 Show ANSWERED BY on Display? y

 DSN Term? n
```

6. Configuration of Soft-ex RingMaster

This section outlines the steps to configure the RingMaster to collect CDR data. RingMaster can be installed on a server or desktop PC. Installation is carried out using software provide by Soft-ex. Installation instructions are outside the scope of this document but information on installation of RingMaster can be found in **Section 9** of this document. Once the software is correctly installed it automatically prompts for some configuration details to complete the installation. This includes information on the PBX that it is connecting to.

When the Wizard opens, click on the **Provide information about the telephone system** radio button. Click the **Next** button to continue.
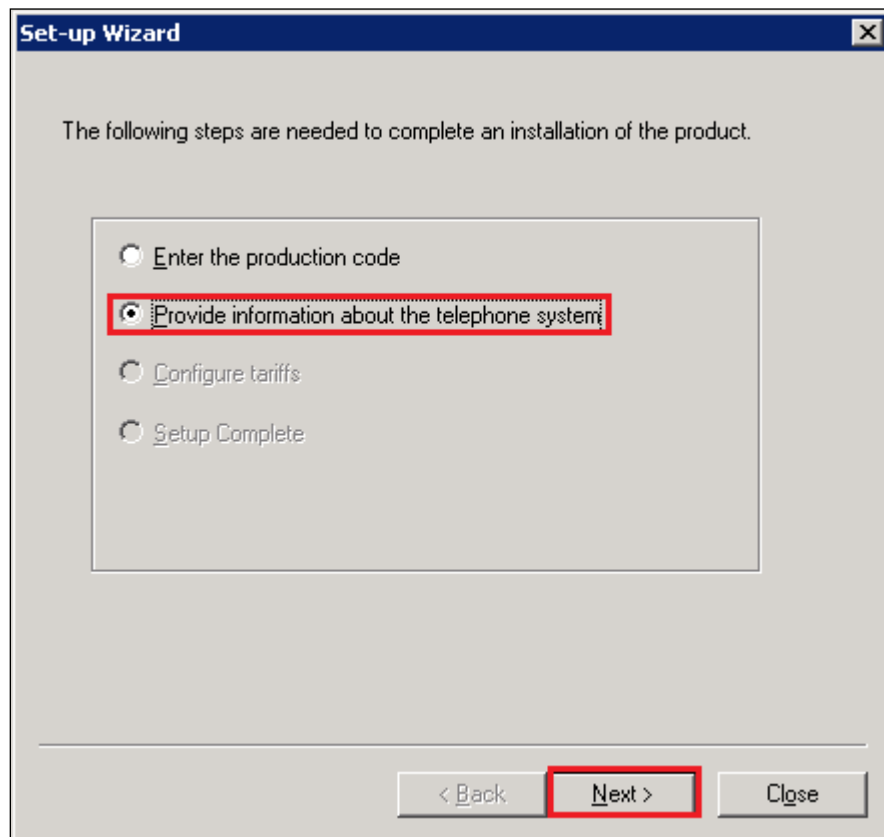
Select the PBX that is being connected to from the **PBX Group** as shown below. For a connection to Communication Manager choose **Avaya IP403** from the list for PBX's.

Click the **Next** button to continue.

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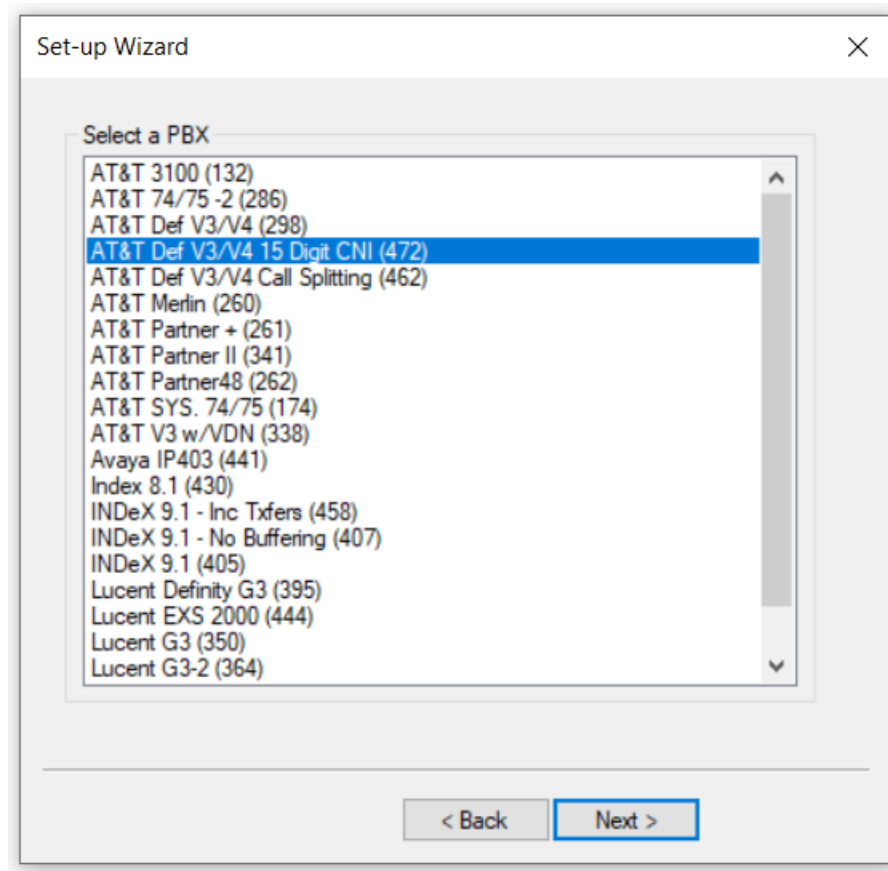
6.1. Configuration of Soft-ex RingMaster connection to Avaya Aura® Communication Manager

Once the application is successfully installed a connection must be setup to collect CDR data. This section shows the setup of a Real-time TCP/IP connection to Communication Manager. This uses a port to listen for CDR data being sent from Communication Manager.

Open the Communications Server configuration in order to configure the new Real-time connection by clicking on **Communications Server** as shown below.

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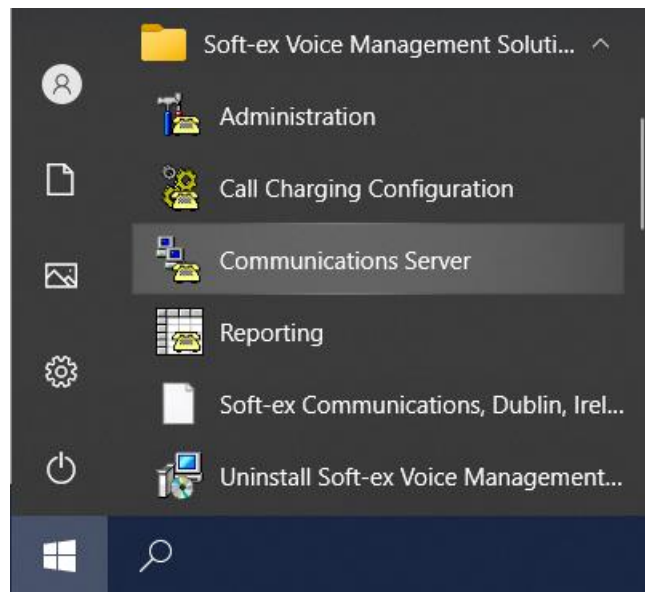
Select the **Real-time Connections** folder in the left-hand pane and double click on **Add Connection** as highlighted below.
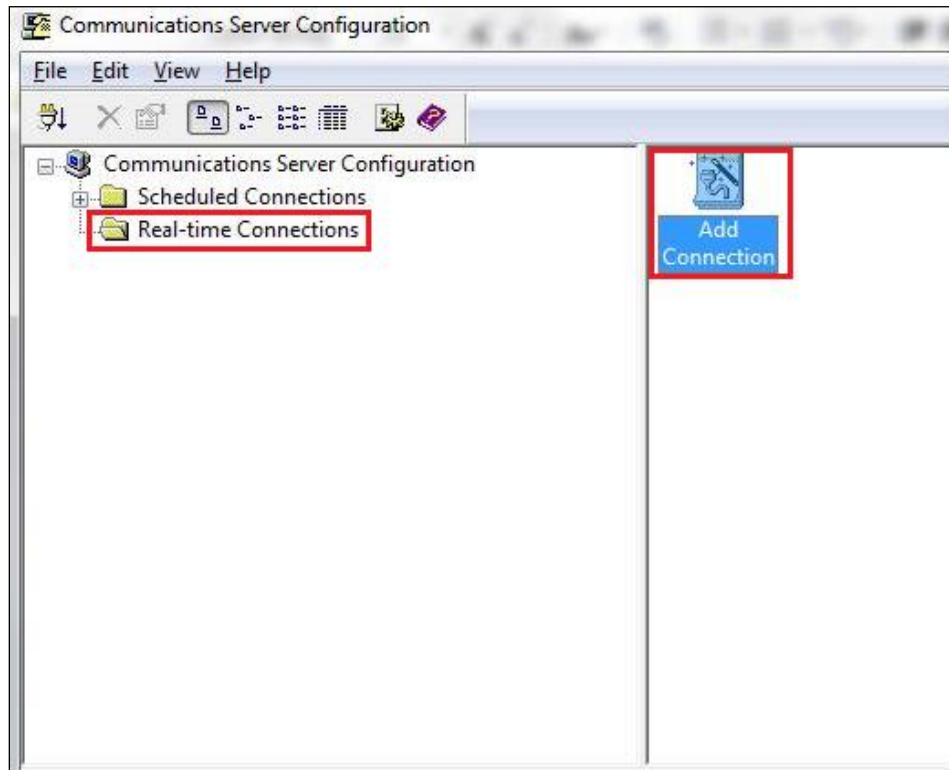
When the **Add Real-time Connection Wizard** opens, click the **Next** button to continue.

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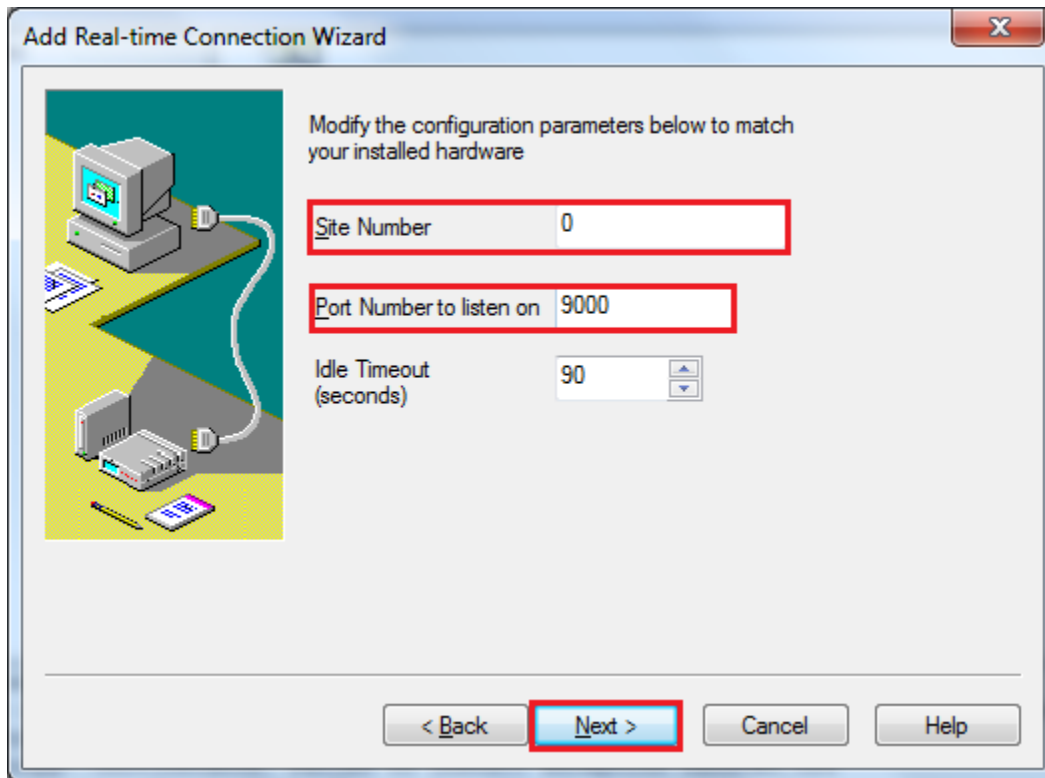
On the subsequent screen select **The Exchange is a TCP/IP Client** radio button, followed by the **Next** button.
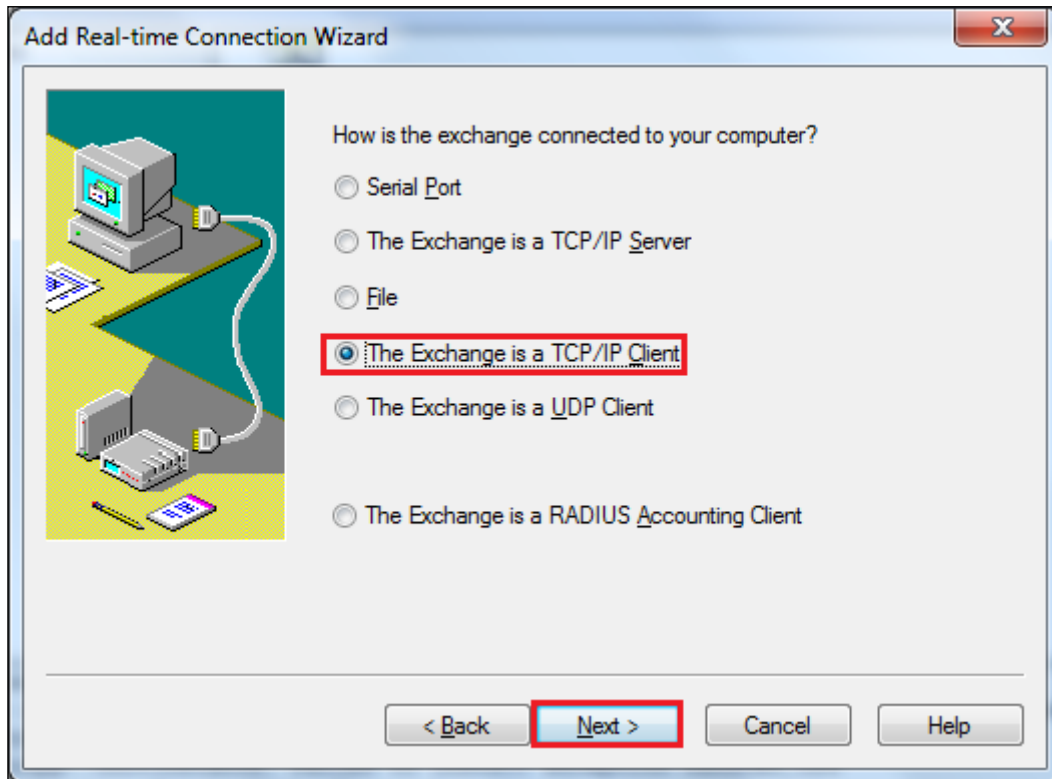
On the subsequent screen enter the following:
- **Site Number** Select the site number (When there is only one site the site number will always be **0**)
- **Port Number** Enter the port number to listen on (this is the port number as configured in **Section 5.2**)

Click the **Next** button to continue.

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On the subsequent screen choose a **Connection name** for the new connection and click on the **Finish** button.
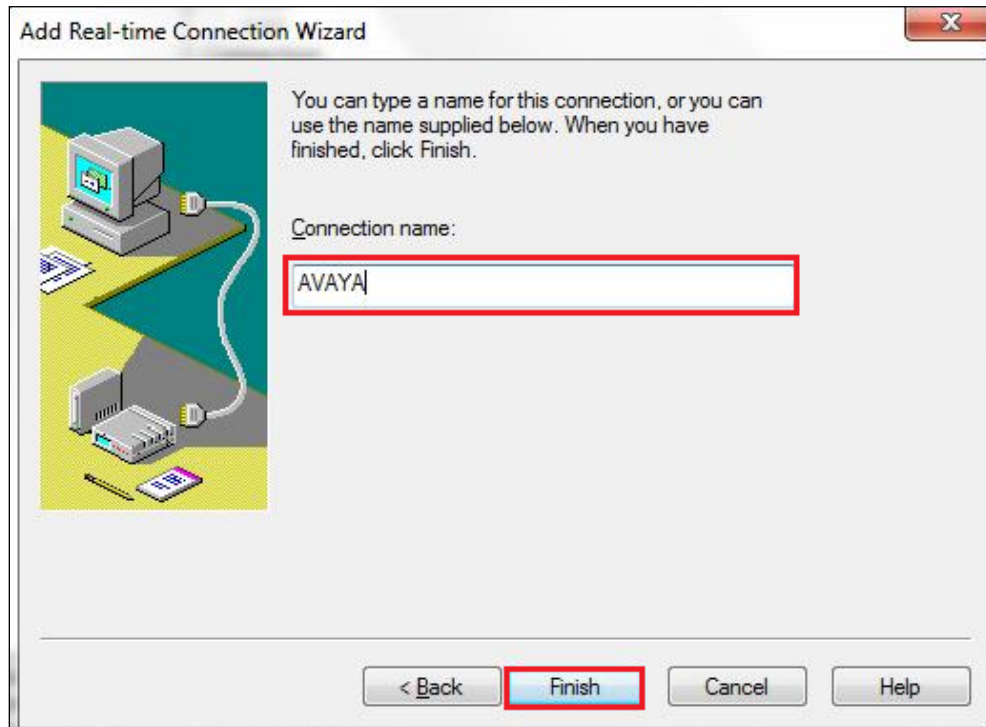
This new connection is shown under **Real-time Connections**.
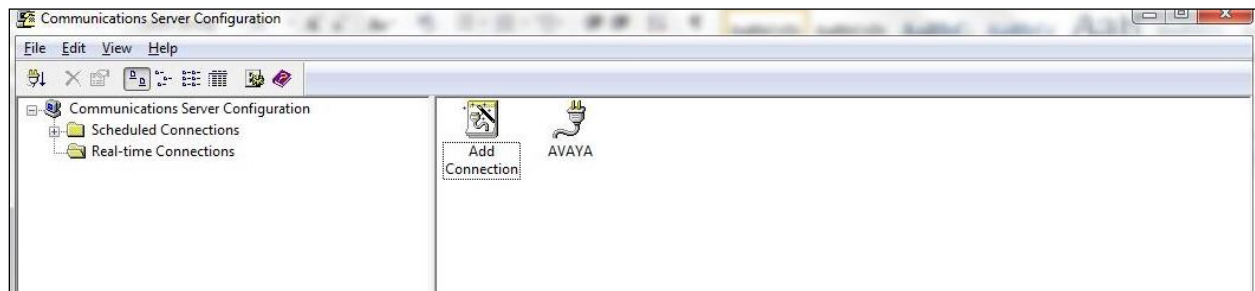
7. Verification Steps

This section provides tests that can be performed to verify correct configuration of the Avaya and Soft-ex solution.

7.1. Verify Avaya Aura® Communication Manager CDR Link

Use the **status cdr-link** command to verify that the link between the Communication Manager and the IP buffer is in service. **Link State: up** and **Reason Code: OK** confirms successful connection.

```
status cdr-link
                              CDR LINK STATUS
                   Primary                        Secondary
         Link State: up                      CDR administered
Number of Retries: 999
       Date & Time: 2021/01/28 18:01:12       0000/00/00 00:00:00
  Forward Seq. No: 0                          0
 Backward Seq. No: 0                          0
CDR Buffer % Full: 0.03                       0.00
       Reason Code: OK
```

7.2. Verify CDR data is being sent from Avaya Aura® Communication Manager

Setup a port listening tool on a PC and set it to listen on port 9000. Once connected make an incoming and outgoing call and on completion of the calls CDR data should be visible on the port listening tool. An example is shown below.

270115 1614 00007 O		701		1003	1003			007	0	0	8888
270115 1614 00007 C				1003	3005	710	015		0	0	
270115 1623 00004 9				710	1003	701	001		0	0	8888
270115 1623 00004 7	9	710		3005	1003		001	009	0	0	8888
270115 1623 00002 7	9	710		3005	1016			010	0	0	
270115 1632 00004 C				1003	1016						
270115 1632 00004 O		701		1003	1003			008	0	0	8888
270115 1633 00004 C				1003	1016						
270115 1633 00004 O		701		1003	1003			009	0	0	8888
270115 1633 00004 C				1003	1016						
270115 1633 00004 O		701		1003	1003			010	0	0	8888
270115 1635 00006 C				1003	1016						
270115 1635 00006 O		701		1003	1003			011	0	0	8888
270115 1637 00004 9				710	1003	701	001		0	0	8888
270115 1637 00004 7	9	710		3005	1003		001	011	0	0	8888
270115 1638 00003 9				1015	1003	701	001		0	0	8888
270115 1639 00002 C				1003	1016						

7.3. Verify CDR data is being received by the RingMaster

Check that the Soft-ex Communications Server service is running as shown below.
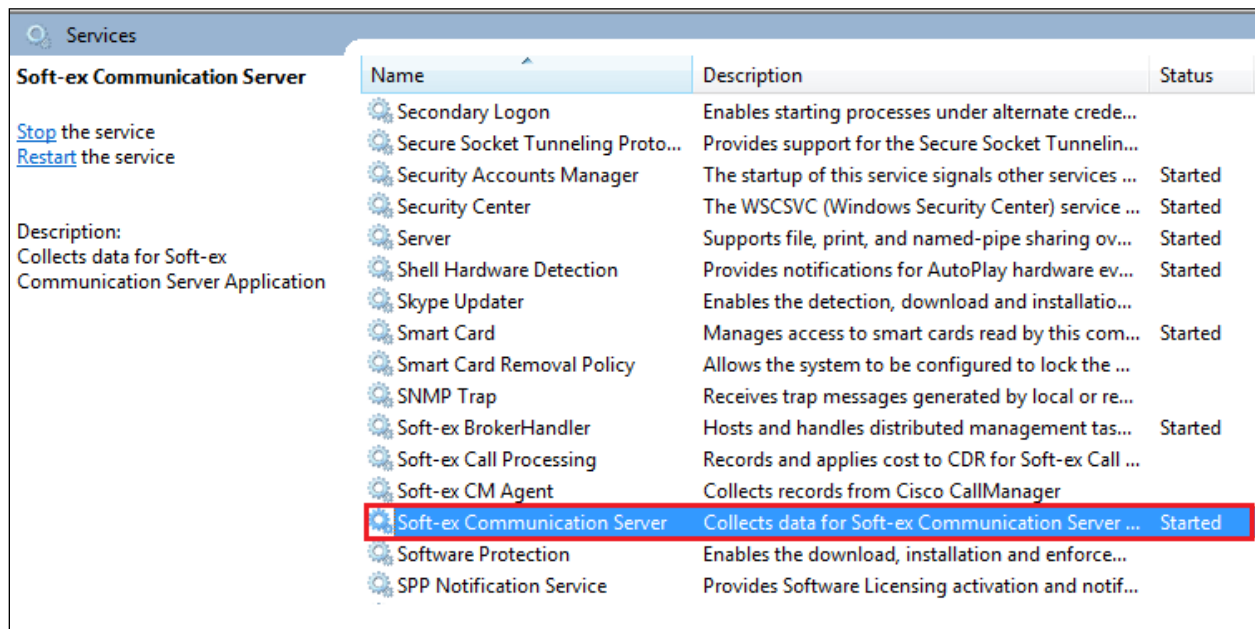
Check to see that a CDR file is created in the location **C\:RM2000\<Sitename>** as shown below.
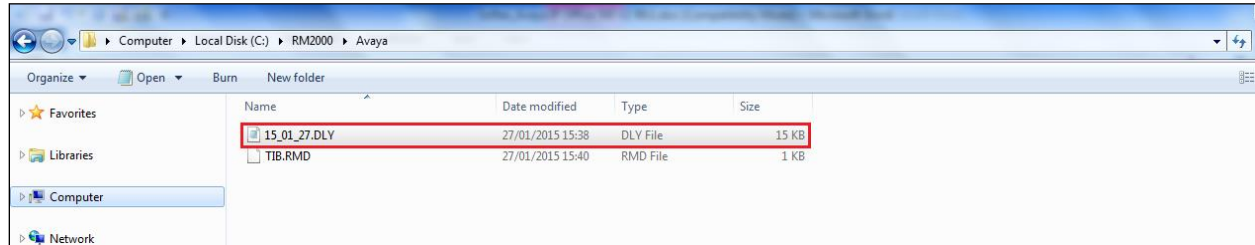
Check using the Soft-ex Call Charging Configuration tool, that CDR data is being processed correctly.

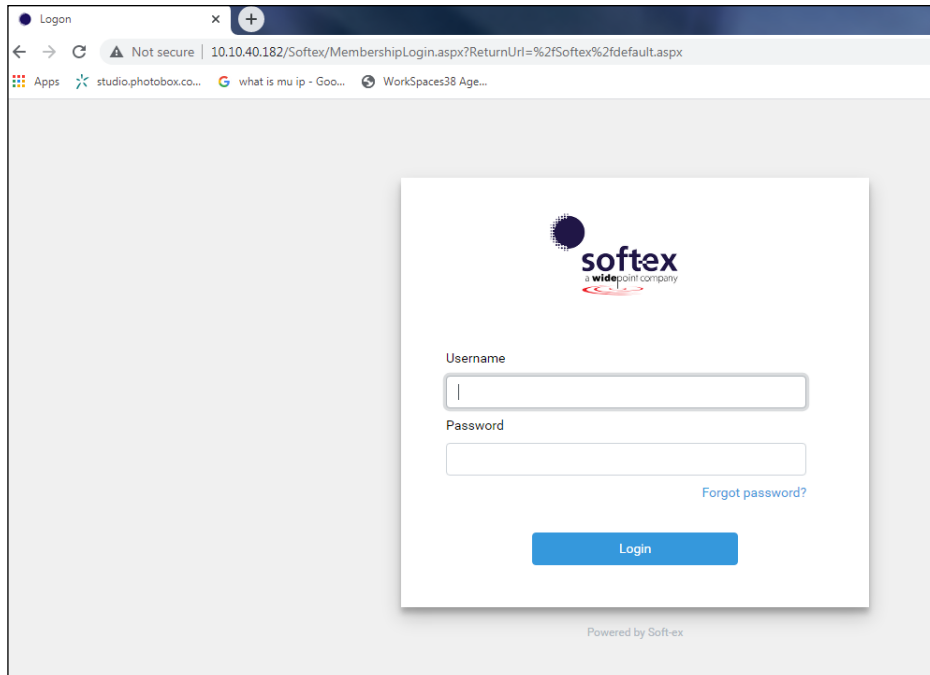This will show the CDR data as it was sent from the Communication Manager.
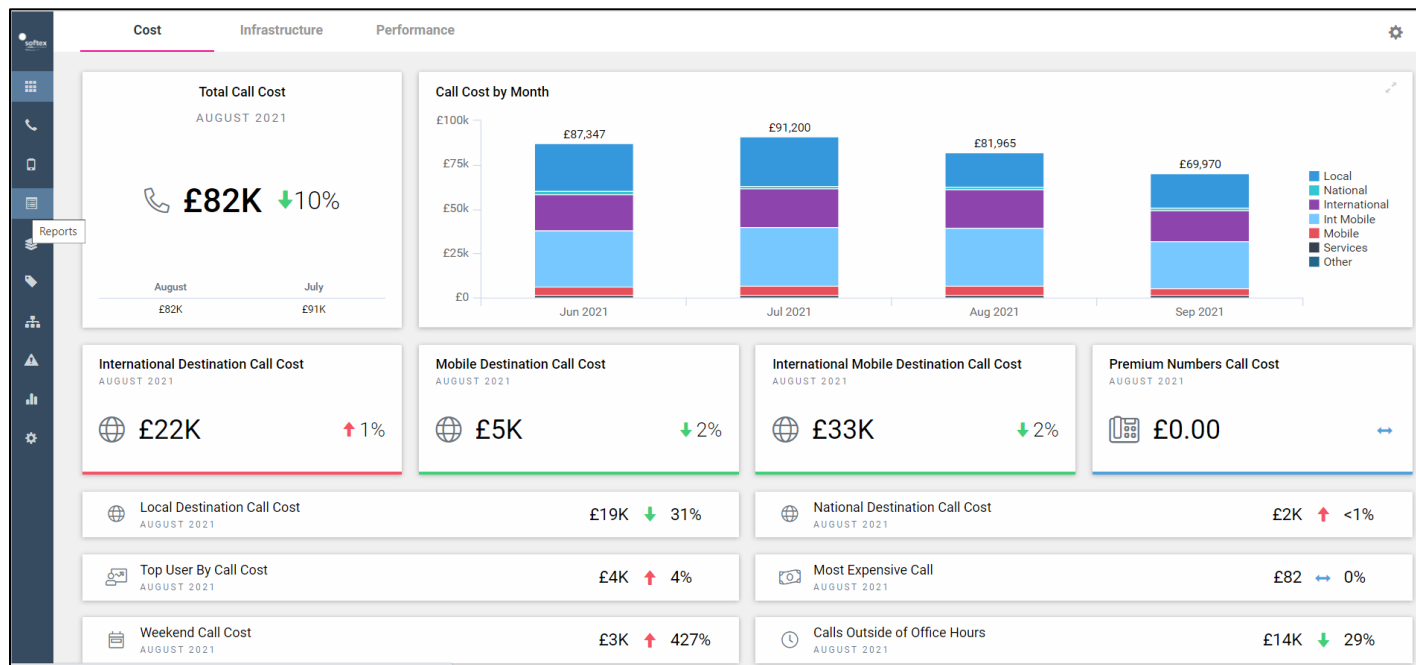

An example is shown below.

7.4. Verify Ringmaster CDR reports

Open a web browser to the IP address of the CDR server as shown below and enter the appropriate credentials.

Click on **Reports** in the left window.

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Report templates can be created and saved to suit the type of information that is required to be shown. Such a report was saved below and double-click on it to open it or click on the **Run Reports** button.

The report should give back call data, something like is shown below.

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8. Conclusion

A full and comprehensive set of feature functional test cases were performed during compliance testing. Soft-ex RingMaster v6.1 is considered compliant with Avaya Aura® Communication Manager R8.1. All test cases have passed with all observations noted in **Section 2.2**.

9. Additional References

These documents form part of the Avaya official technical reference documentation suite. Further information may be had from *http://support.avaya.com* or from your Avaya representative.

[1] *Administering Avaya Aura® Communication Manager,* Release 8.1.x, Issue 12, Jul 2021
[2] *Administering Avaya Aura® Session Manager,* Release 8.1.x, Issue 8, Feb 2021
[3] *Avaya Aura® Communication Manager Screen Reference,* Release 8.1.x Issue 12 September 2021
[4] *Avaya Aura® Communication Manager Feature Description and Implementation*, Release 8.1.x Issue 17 August 2021
[5] *Avaya Aura® Communication Manager Special Application Features*, October 2020

Information on the installation and configuration of RingMaster can be found at https://www.soft-ex.net website.

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