AVAYA

Avaya Solution & Interoperability Test Lab

Application Notes for Spectrum Nexorce Version 2.3 with Avaya Call Management System R19 – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Spectrum Nexorce to interoperate with Avaya Call Management System using Real-Time Socket adapters. Spectrum Nexorce is a solution that provides forecasting, scheduling, and monitoring of work for contact center agents.

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 compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe the configuration steps required for Spectrum Nexorce (Nexorce) application with Avaya Call Management System (CMS) Release 19.

On Avaya Aura® Communication Manager (Communication Manager), relevant contact center resources consisting of Vector Directory Number (VDN), Skill, and Agent are configured to be "measured" by CMS. When a call travels through a "measured" resource on Communication Manager, the call measurement data is sent to CMS, which in turn provides the data to Nexorce via custom reports.

The test integration includes a real-time connectivity between Nexorce and CMS, to supply real-time agent state information to Nexorce. A TCP client-server model is used for the connection, with CMS being the "client", and Nexorce server being the "server". The Nexorce server runs a TCP "listener" process to accept data in real-time from CMS.

Nexorce uses ODBC to provide an integrated statistic on the Skill/Split and VDN level for some of the items that are available in the h tables.

2. General Test Approach and Test Results

The interoperability compliance test included feature and serviceability testing. The feature test cases were performed manually. Incoming calls were made within a measured interval to the measured VDNs, Skills, and Agents to enable measurement data to be sent to CMS. Manual call controls and work mode changes from the agent telephones were exercised to populate specific fields in the data stream.

The serviceability test cases were performed manually by forcing solution components to go out of service and come back and verifying Nexorce server's ability to recover.

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 this DevConnect Application Note 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.

For the testing associated with this Application Note, the interface between Avaya systems and Spectrum Nexorce did not include use of any specific encryption features.

Encryption (TLS/SRTP) was used internally between Avaya products.

2.1. Interoperability Compliance Testing

The feature testing focused on verifying Nexorce correctly obtaining VDN, Skill, and Agent data from CMS and shows it on the reports. A number of call center scenarios including agent login, agent mode change, agent logout, incoming call to VDN, abandon call, call waiting in queue, call waiting at agent, hold/resume, direct agent call, extension call from agent, incoming call to agent extension, and redirect on no answer were exercised and a number of vector commands such as queue-to, busy, disconnect, and route-to were executed to generate data for specific fields in the historical reports and real-time supervisor interface.

The serviceability testing focused on verifying the ability of the Nexorce server to recover from adverse conditions, such as restarting CMS service, disconnecting the Nexorce server from the network, and rebooting the Nexorce server.

2.2. Test Results

All test cases were executed successfully.

2.3. Support

For technical support on the Nexorce, contact Nexorce via phone, email, or internet.
- **Phone:**   +1713-551-4701
- **Web:**   https://www.specorp.com/products/Nexorce
- **Support:** http://support.specorp.com
- **Email:**   info@specorp.com

3. Reference Configuration

The compliance test was done with all the test equipment in an Avaya Lab. The Avaya side equipment included Communication Manager, CMS, and several IP phones. The Nexorce application resided on a Windows 2016 Server running on Virtual Machine.
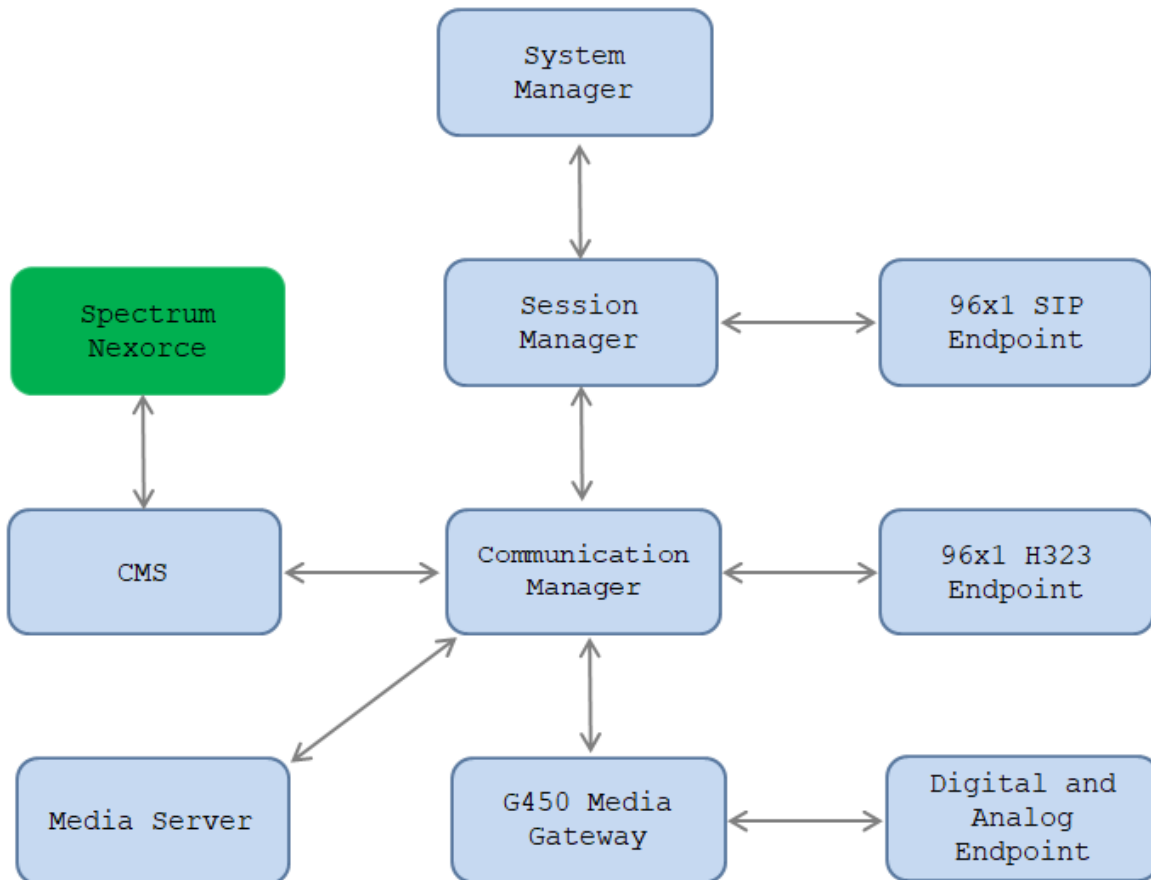
Figure 1: Nexorce with Avaya Call Management System

4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya Aura® Communication Manager running on Virtualized Environment	8.1.1 R018x.00.0.822.0
Avaya Aura® System Manager running on Virtualized Environment	8.1.1 Build 8.0.0.0.931077
Avaya Aura® Session Manager running on Virtualized Environment	8.1.1 Build 8.0.0.0.800035
Avaya Call Management System	19.0
Avaya Aura® Media Server running on Virtualized Environment	8.0.0.150
Avaya G450 Media Gateway • MGP	 41.10.0
Avaya 96x1 IP Deskphones	H.323 6.804 SIP 7.1.7
Avaya 1416 Digital Deskphone	FW1
Analog Deskphone	-
Spectrum Nexorce running on Windows Server 2016	Version 2.3

5. Configure Avaya Aura® Communication Manager

The detailed administration of contact center resources and connectivity between Communication Manager and CMS are not the focus of these Application Notes and will not be described. For administration of contact center resources and connectivity to CMS, refer to the appropriate documentation listed in **Section 10**.

This section provides the procedures for how to enable VDN, Skill, and Agent measurement data to be sent to CMS. The procedures include the following areas:

- Administer measured VDN
- Administer measured Skill and Agent

For the compliance testing, the following contact center devices were used.

VDN	Skill	Agents
3340	1	1000
3341	2	1001
		1002

5.1. Administer Measured VDN

Use the "change vdn n" command, where "n" is the extension of the VDN to be measured by CMS. Set the **Measured** field to "both" to enable measurement data on the VDN to be sent to CMS. Repeat this step for all VDNs that will be measured by CMS.

```
change vdn 3340                                                 Page   1 of
3
                        VECTOR DIRECTORY NUMBER

                        Extension: 3340
                            Name*: Contact Center 1
                      Destination: Vector Number        1
                Attendant Vectoring? n
               Meet-me Conferencing? n
                 Allow VDN Override? n
                               COR: 1
                               TN*: 1
                          Measured: both    Report Adjunct Calls as
ACD*? n
        Acceptable Service Level (sec): 20

        VDN of Origin Annc. Extension*:
                          1st Skill*:
                          2nd Skill*:
                          3rd Skill*:

* Follows VDN Override Rules
```

For the compliance testing, two VDNs with extensions 3340 and 3341 were configured to be measured.

5.2. Administer Measured Skill and Agent

Use the "change hunt-group n" command, where "n" is the number of the Skill group to be measured by CMS. Navigate to **Page 2**, and set the **Measured** field to "both" to enable measurement data on the Skill group and the associated Agents to be sent to CMS. Repeat this step for all Skill groups that will be measured by CMS.

```
change hunt-group 1                                       Page   2 of   4
                              HUNT GROUP

                   Skill? y       Expected Call Handling Time (sec): 20
                     AAS? n          Service Level Target (% in sec): 80 in 20
                Measured: both
      Supervisor Extension:


       Controlling Adjunct: none


        VuStats Objective:

    Multiple Call Handling: none


 Timed ACW Interval (sec): 100      After Xfer or Held Call Drops? n
```

For the compliance testing, two Skill groups with group numbers 1 and 2 were configured to be measured. In addition, three agents with extensions 3301, 3302 and 3402 and agent id 1000, 1001 and 1002 were used as available agents for the above Skill groups.

```
list agent-loginID

                          AGENT LOGINID
Login ID     Name            Extension     Dir Agt  AAS/AUD      COR Ag Pr SO
             Skil/Lv Skil/Lv Skil/Lv Skil/Lv Skil/Lv Skil/Lv Skil/Lv Skil/Lv

1000         Agent 1000    unstaffed                              1   lvl
                 1/01     /        /        /        /        /        /
1001         Agent 1001    unstaffed                              1   lvl
                 1/01     /        /        /        /        /        /
1002         Agent 1002    unstaffed                              1   lvl
                 2/01     /        /        /        /        /        /
```

6. Configure Avaya Call Management System

The connectivity between CMS and Communication Manager is assumed to be in place and will not be described. In addition, these Application Notes assume the intra-hour interval is already administered to 30 minutes.

This section provides the procedures for the following:

- Verify CMS license
- Create custom reports

6.1. Verify CMS License

The license for the CMS system needs to be installed before the system can be used for the testing. To verify the license, log in the CMS system with "cms" user and run the command "cms" (not shown). From the **Main Menu**, navigate to **Maintenance → License Status**.

```
1/27/20  10:21  Avaya(TM) CMS                              Windows: 0 of 10   ^

 lMainMenuqqqqqqqqqqqqqqqqqqqqk
 x Reports>                  x
 x Dictionary>              x
 x Exceptions>              x
 x Agent Administration>    x
 x Call Center Administration> x
 x Custom Reports>          x
 x User Permissions>        x
 x System Setup>lqqqqqqqqqqqqqqqqqqqqqqqqk
 x Maintenance> x Back Up Data         x
 x Logout       x Restore Data         x
 x ;            x Backup/Restore Devices x
 mqqqqqqqqqqqqqqqx Printer Administration x
               x Report Administration x
               x Connection Status     x
               x ACD Status            x
               x Archiving Status      x
               x ACD Admin Log Report  x
               x Error Log Report      x
               x Firewall Status       x
               x License Status        x
               mqqqqqqqqqqqqqqqqqqqqqqqqj



  Help    Window  Commands   Keep                   Exit   Scroll  Current  MainMenu
```
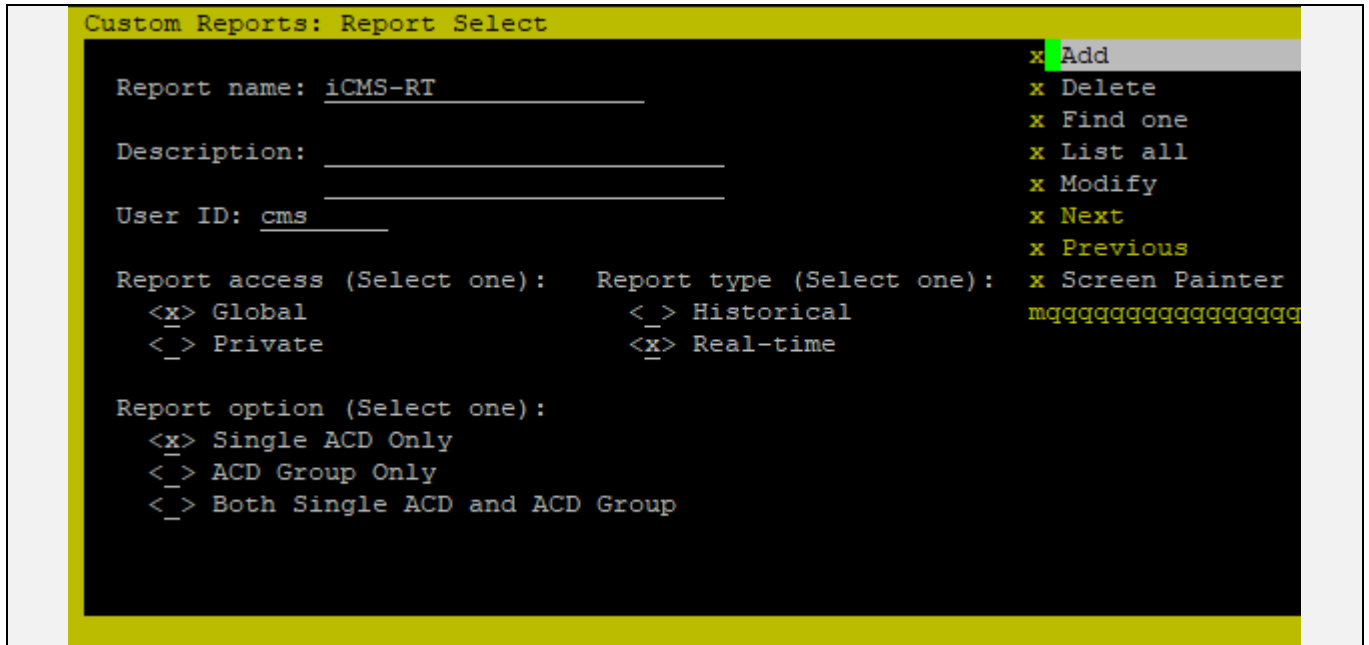
The **Status** should show as "Normal".

```
1/27/20  10:23  Avaya(TM) CMS                                    Windows: 1 of 10    ^




               Maintenance: License Status                                 All ACDs
               Last Update: 01/27/20 11:04
               WebLM      : https://smgrv70:52233/WebLM/LicenseServer
               Status     : Normal    12/17/19  7:47


                                                       Initial         Latest
                          Status    Licensed  Current  Violation       Violation
               ------------------------------------------------------------------------
               WebLM      Normal              connected
               Licensing  Normal    CMS       obtained
               Expiration Normal    12/16/20  01/27/20
               Version    Normal    R19       R19
               HA         Normal    off       off
               ACDs       Normal    100       1
               Agents     Normal    100       1
               Logins     Normal    100       0
               ODBC/JDBC  Normal    100       0
               CLInt int  Normal    100       0
               CLInt ext  Normal    100       3

  Help    Window  Commands  Keep                   Exit    Scroll  Current  MainMenu
```

6.2. Create Custom Reports

To create the custom reports, from the CMS menu navigate to **Custom Reports → Edit Report**.

```
1/27/20  10:25  Avaya(TM) CMS                                    Windows: 0 of 10    ^

  lMainMenuqqqqqqqqqqqqqqqqqqqqqqk
  x Reports>                    x
  x Dictionary>                 x
  x Exceptions>                 x
  x Agent Administration>       x
  x Call Center Alqqqqqqqqqqqqqqkx
  x Custom Reportx Real-time>  xx
  x User Permissix Historical> xx
  x System Setup>x Edit Report xx
  x Maintenance> mqqqqqqqqqqqqqqjx
  x Logout                      x
  x ;                           x
  mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqj








  Help    Window  Commands  Keep                   Exit    Scroll  Current  MainMenu
```
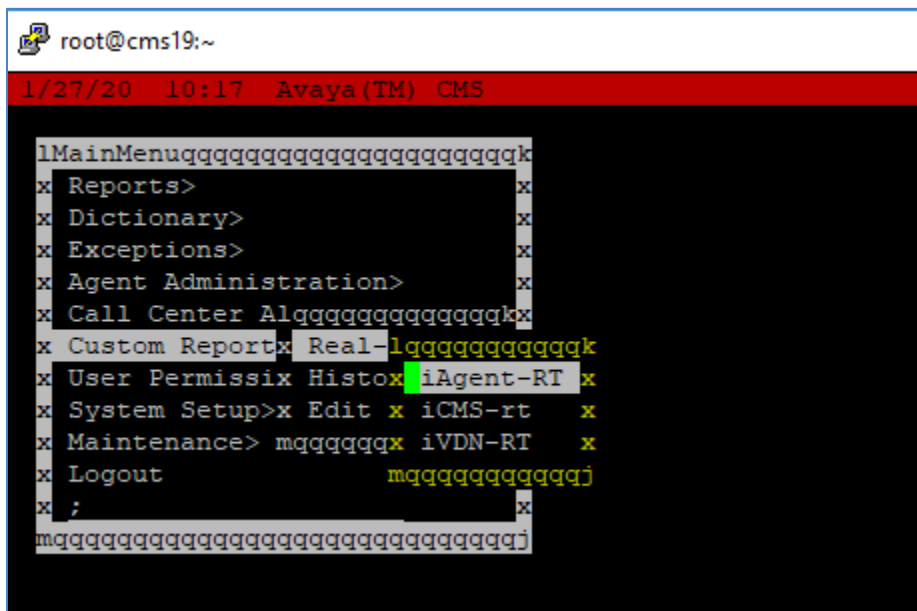
The **Custom Report: Report Select** window displays, enter a name in the **Report name** field, select **Report type** as *Real-time*, select **Report option** as *Single ACD Only* and select the **Add** button to add the new report.

In the compliance test, there were 3 custom Real-time reports created.

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7. Configure Spectrum Nexorce

This section provides the procedures for configuring Nexorce. The procedures include the following areas:

7.1 Installation of Nexorce

Nexorce is provided by either a USB Flash drive, or via a download from a Spectrum FTP server. If downloaded, the following folders will be contained within a single zip archive. A flash drive will contain the folders already unzipped. A separate download is also provided for the core installation of SQL 2016 Express. SQL hosts a database for Nexorce that all configurations are maintained. A backup of this database provides all necessary configuration to move to another server, or rebuild in the event of catastrophic hardware failure.

The install folder contains the Nexorce package. Post SQL installation, the Nexorce software can be installed through a step by step procedure with Menu. A sample of all server components is shown below.
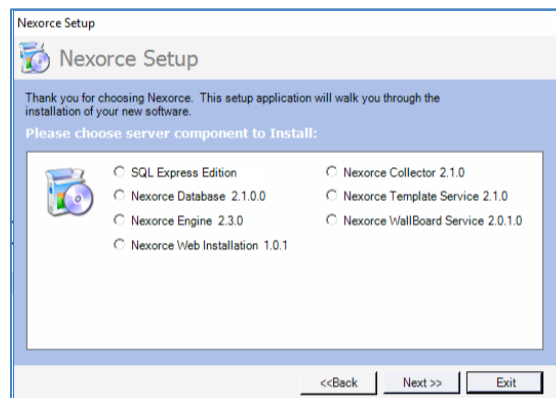
Not all components are needed for every installation. The default location for installing the components are C:\Program Files (x86)\Spectrum\ .
Some may not be used depending on options that were decided upon at time of sale. Required components are as follows:

- SQL Express Edition – Used for data staging and configuration of Nexorce
- Nexorce Database – contains configured settings
- Nexorce Engine – Primary web service for components to talk to each other

- Nexorce Collector – Service that maintains data collection and KPI updates.

Basic Configuration of Nexorce requires information about the SQL Database location, SQL username and password, and the name of the database. The installation process prompts for this information as shown.
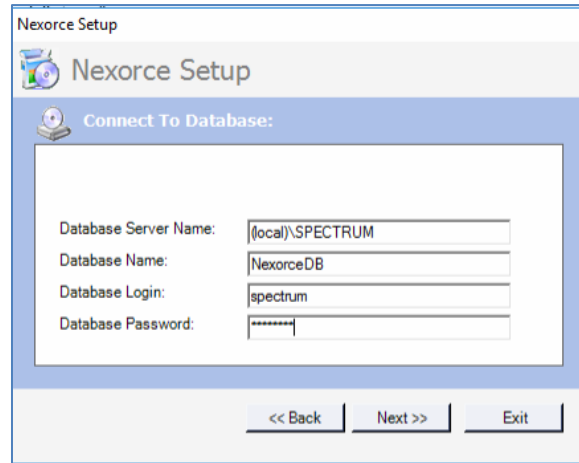
Once components are installed, Spectrum will issue the license for the software suite to function with modules that were ordered. This license can either be installed by Spectrum directly, or by an end user through the Nexorce Configurator client application.

Example of license:

Serial Number: JJCIDGFE-BJMKAAAB-AABAAAAF-DAFABABA-BAABBBAB
Activation Code: 3733582528
LicenseKey: <XMLDOC><LicenseKey>bDy82RL1kASc0HhT8c523SwP0Lk913hTM77RnxMmeFyTJNSeNklVYK3U OnP6E/1FfaH9jZrsOQVo=</LicenseKey><SignedKey>m1qtLQK+0xeVnqTV+0CZD9u5trrSggamAmUpeC6aovNY+Wqvr l2How==</SignedKey></XMLDOC>

7.2 Configuration of Nexorce

For this scenario, Nexorce was configured for data collection in 3 categories.
Agent – realtime and historical (current day)
Split/Skill – Realtime and historical (current day)
VDN –   Realtime and historical (current day)

These categories are configured as data collectors within Nexorce.

	Name	Collector Type	Enabled	Status	Last Updated On
☐	Agent_Summary	ODBC-STANDARD	Yes	Running	12/30/2019 9:41 AM
☐	AgentStates	ODBC-STANDARD	Yes	Running	12/17/2019 9:38 AM
☐	iCMSData	ODBC-STANDARD	Yes	Running	12/17/2019 9:40 AM
☐	VDN	ODBC-STANDARD	Yes	Running	12/17/2019 9:46 AM

Each of these "collectors" can be installed by simply running the appropriate collector SQL Script provided by Spectrum.

📄 Collector_ODBC_Agent_Summary.sql

📄 Collector_ODBC_Agentstates.sql

📄 Collector_ODBC_iCMSData.sql

📄 Collector_ODBC_VDN.sql

These scripts build the collectors specifically for the default configurations that are typically used. Parameters can be modified after the scripts are run and the collectors are created. These collectors are pre-set to look at the local SQL instance and collection tables.

7.3 Configuration of iCMSData

Nexorce obtains data from CMS by the use of real-time reports, and historical database queries that occur simultaneously from the windows server. The reports and database connection is managed by a service called iCMSData.

The service is installed on the Windows 2016 server to C:\Program Files\Voast\iCMSData\ . The primary configuration for this service is hosted in an xml file named "icmsdata_config.xml". This file contains IP information to the cms, as well as encrypted values for the login, and DSN connection. Primary fields are explained below.

- **Host** – ipaddress of the cms
- **User** – username for running realtime reports
- **Password** – encrypted password for above user
- **DSN** – the CMS Database connection (system data source name)
- **Report Name** – Name of the report as it appears in Avaya CMS
- **Input field 1, 2, and 3**. – As running the report in cms, there are 3 fields that can be defined. List of Split/skills, the ACD number, and the refresh rate.
- Column Name's are simply the destination table column names. Data that is obtained from Avaya CMS is written to these columns in the Nexorce Database for collection and formulating of Key performance indicators.

Each collection type will have it's own unique table destination.

Example:

Split Skill data > iCMSData
Agent States > icmsAgent
VDN > iCMSvdn

Example of the configuration file:

```xml
<iCMSData Key="Ezp0Cbzg67VDugryIzZz/1+Z+JmdKG2ZNYQtV5nmqaI0xqELsj4JA5IlozrRCPH4yklm+vLGjTPdCswKoTW1eg=="><CMS Name="cms19">
    <Host>10.33.1.18</Host>
    <User>specorp</User>
    <Password>W72smXBRlRBnpgX0yq+Lzg==</Password>
    <DSN>cms32</DSN>
    <Report Name="iCMS-RT" Debug="false" Autostart="true" >
      <HeaderFlag>H:</HeaderFlag>
      <DataFlag>DL:</DataFlag>
      <Delimiter>|</Delimiter>
      <ReportName>iCMS-RT</ReportName>
      <ReportInputs>
        <InputField Number="1">icms</InputField>
        <InputField Number="2">1</InputField>
        <InputField Number="3">10</InputField>
      </ReportInputs>
      <Columns>
        <!--
        historical=true/false determines if the number will accumulate
        type=Number/String.  The number is either stored as a float or a string.
        Name should be all lower case, informix ignores the capitals and the name must match for updates.
        -->
        <Column Name="SPL" ColumnNumber="1" Historical="false" Type="number" Unique_Field="true" />
        <Column Name="ACD" ColumnNumber="2" Historical="false" Type="number" />
        <Column Name="ACDc" ColumnNumber="3" Historical="true" Type="number"/>
        <Column Name="ABNc" ColumnNumber="4" Historical="true" Type="number" />
        <Column Name="OFFR" ColumnNumber="5" Historical="true" Type="number" Historical_Flag="true" />
        <Column Name="ACC" ColumnNumber="6" Historical="true" Type="number" />
        <Column Name="ANSt" ColumnNumber="7" Historical="true" Type="number" />
        <Column Name="ACDt" ColumnNumber="8" Historical="true" Type="number" />
        <Column Name="STAF" ColumnNumber="9" Historical="false" Type="number" />
        <Column Name="AVIL" ColumnNumber="10" Historical="false" Type="number" />
        <Column Name="ONa" ColumnNumber="11" Historical="false" Type="number" />
```

The icmsdata_config.xml file is loaded only when the iCMSData Service is started, or restarted. This allows for inline editing of the configuration without impact of the current configuration or system.

The icmsdata service can be started, stopped, or restarted by navigating to system services.

Name	Description	Status	Startup Type	Log On As
iCMSData Service		Running	Automatic (D...	Local Service

By default, the service is installed with Manual Startup type. After configuration is complete, and data verification has occurred, Spectrum will change this service to be "Automatic Delayed". The delayed start allows for all network connection to be established before attempting to start this service.

Log file for the data collection is stored in C:\Program Files\Voast\iCMSData\Logs\ iCmsdata creates a new log file every day with a timestamp on the log file. It will also clear out log files older than 10 days.

8. Verification Steps

This section provides the tests that can be performed to verify proper configuration of CMS and Nexorce.

8.1. Verify Avaya Call Management System

From the CMS server, follow the procedures in **Section 6.2** to display the Main Menu. Verify the status of the connection to Communication Manager by selecting **Maintenance → Connection Status**, and press the Enter key.

```
1/27/20  10:33  Avaya(TM) CMS                              Windows: 0 of 10   ^

  lMainMenuqqqqqqqqqqqqqqqqqqqqqk
 x Reports>                    x
 x Dictionary>                 x
 x Exceptions>                 x
 x Agent Administration>      x
 x Call Center Administration> x
 x Custom Reports>             x
 x User Permissions>           x
 x System Setup>lqqqqqqqqqqqqqqqqqqqqqqqqqk
 x Maintenance> x Back Up Data             x
 x Logout       x Restore Data             x
 x ;            x Backup/Restore Devices x
mqqqqqqqqqqqqqqx Printer Administration x
               x Report Administration   x
               x Connection Status       x
               x ACD Status              x
               x Archiving Status        x
               x ACD Admin Log Report    x
               x Error Log Report        x
               x Firewall Status         x
               x License Status          x
               mqqqqqqqqqqqqqqqqqqqqqqqqqj




   Help    Window  Commands   Keep          Exit    Scroll  Current  MainMenu
```

In the **Maintenance: Connection Status** dialog box, enter the corresponding **ACD(s)** number followed by the **Enter** key. For the compliance testing, the corresponding switch connection is ACD "1". Select **Find one** (not shown) in the right window and press **Enter**.

The **Maintenance: Connection Status** dialog box is updated with status information. Verify that the **Session** status is "data transfer" and "normal", and that the **Connection** status is "operational", as shown below.
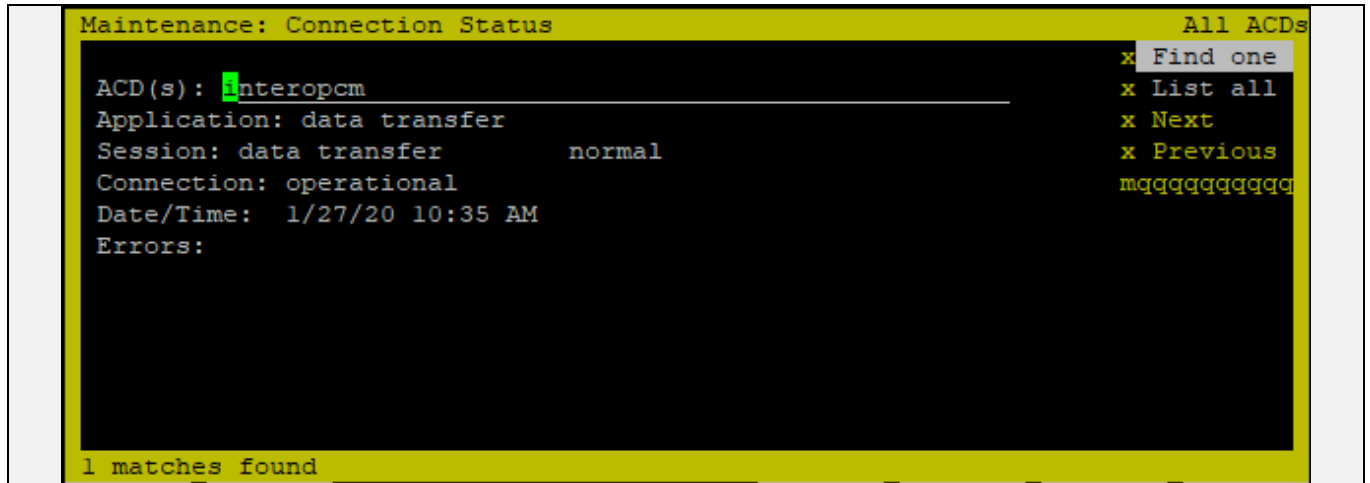
8.2. Verify Spectrum Nexorce

From the Nexorce dashboard, navigate to **Collectors** → **ODBC** → **View/Edit All**. The **ODBC Collectors** displays in the right window.
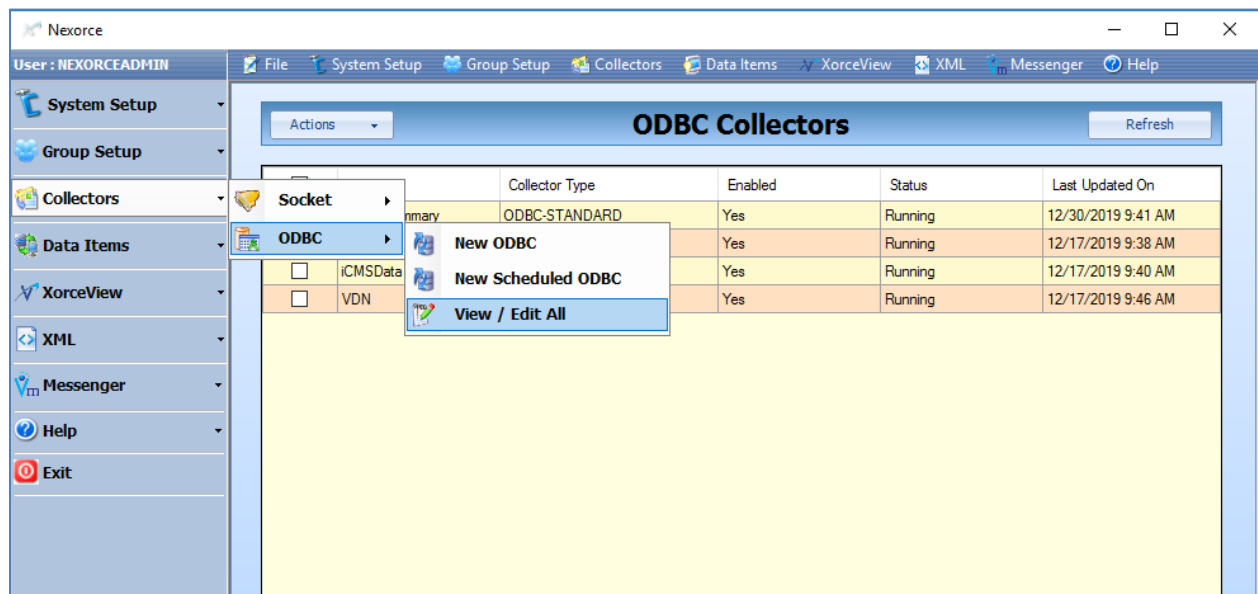
Double click on **AgentStates** in the list of the Collectors. The new window displays, select View Data tab and select View Current Data button to view the real-time data of agent.
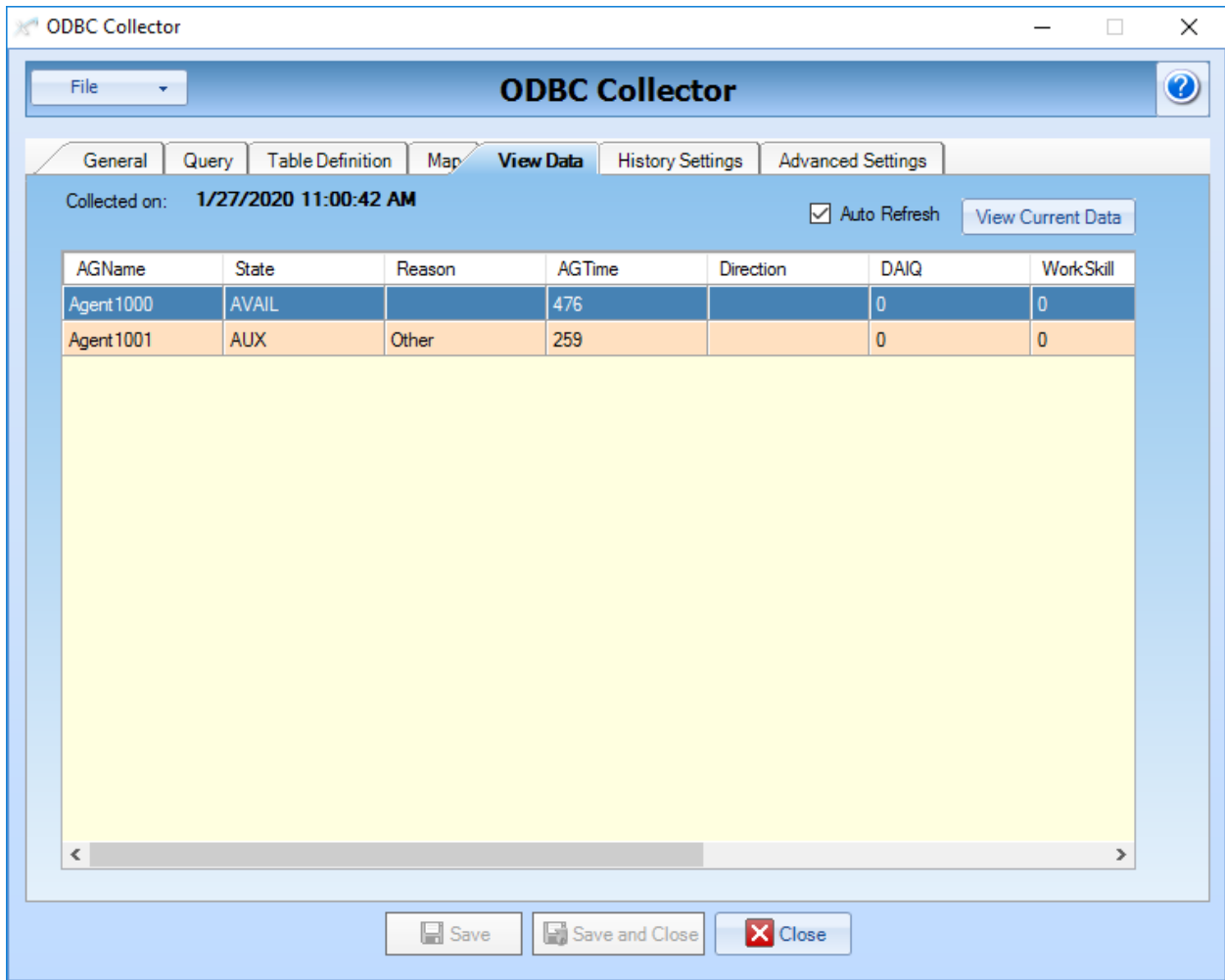
9. Conclusion

These Application Notes describe the configuration steps required for Nexorce to interoperate with Avaya Call Management System. All feature and serviceability test cases were completed with one observation noted in **Section 2.2**.

10. Additional References

This section references the product documentation that is relevant to these Application Notes. Documentation for Avaya products may be obtained via http://support.avaya.com

[1] Administering Avaya Aura® Communication Manager, Release 8.1, December 2019, Document Number 03-300509, Issue 1.
[2] Administering Avaya Aura® Session Manager, Release 8.1, Issue 7, December 2019.
[3] Avaya Call Management System Software Installation, Maintenance, and Troubleshooting for Linux, Release 19.0.2, February 2019.
[4] Deploying Avaya Call Management System in an Avaya Customer Experience Virtualized Environment, Release 18, April 2018.

Documentation related to Nexorce may directly be obtained from Nexorce.

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