



## **Avaya Solution & Interoperability Test Lab**

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# **Application Notes for configuring NEXUSCUBE Version 2 with Avaya Aura® Contact Center Release 6.3 and Avaya Communication Server 1000E Release 7.6 using Meridian Link Services – Issue 1.0**

## **Abstract**

These Application Notes describe the configuration steps required for NEXUSCUBE application to successfully interoperate with Avaya Aura® Contact Center Release 6.3 and Avaya Communication Server 1000E Release 7.6 using Meridian Link Services. NEXUSCUBE is a Computer Telephony Integration middleware that simplifies the call handling process for call centers.

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

These Application Notes describe a solution comprised of Avaya Aura® Contact Center (Contact Center) Release 6.3, Avaya Communication Server 1000E Release 7.6 (Communication Server 1000E), and NEXUSCUBE (NEXUS) application. NEXUS allows a user to operate a physical Deskphone through a graphical user interface (GUI). NEXUS integrates with the Communication Server 1000E using the Meridian Link Services (MLS) running on the Contact Center to control phone states. MLS is a proprietary messaging protocol and interface that enables external parties to connect a software application to the Avaya Communication Server 1000E and Avaya Contact Center Manager Server (CCMS) platforms for Computer Telephony Integration (CTI).

The objective of this compliance test was to validate that NEXUS successfully interacts with the Contact Center MLS to control a physical deskphone connected to Avaya Communication Server 1000E.

NEXUS uses MLS Protocol through TCP/IP using port Number 3000 with Contact Center and Communication Server 1000E. MLS utilizes TCP/IP using Ethernet as the transport mechanism. To connect to MLS through TCP/IP, NEXUS establishes a socket connection with the Contact Center Manager Server (CCMS) using port Number 3000. When the socket connection is accepted, the Meridian Link message exchange will begin.

## 2. General Test Approach and Test Results

The general test approach was to verify interoperability feature and serviceability test cases between NEXUS application and Communication Server 1000E via the MLS protocol running on the Contact Center. All test cases were executed manually.

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.

## 2.1. Interoperability Compliance Testing

The compliance test concentrated on the CTI based integration of NEXUS with Communication Server 1000E via the MLS running on the Contact Center. The compliance test verified the ability of NEXUS to:

- Login and Log out of the Agent stations.
- Change the status to Not Ready and MakeBusy.
- Receive and answer Automated Call Distribution (ACD) calls in queue and regular calls.
- Generate outgoing calls.
- Place calls on hold and resume.
- Perform blind and supervised transfers to any configured station or PSTN number.
- Perform call conferencing to any configured station or PSTN number.
- Recover from any network disruption or reboot.
- Switch over (both Auto and Manual mode) to standby NEXUS engine (high availability).
- Switch over to standby Contact Center (high availability).

## 2.2. Test Results

All test cases were executed and passed with the following observations:

- In the event of losing communication with the Contact Center, NEXUS does not have the ability to receive any ACD calls until the link between Contact Center and NEXUS is established again.
- When NEXUS changes the state of the agent to LogOff, the physical Agent deskphone display shows the MakeSetBusy key activated.
- The Directory Number (DN) for the Agent deskphones and the Controlled Directory Number (CDN) should not be acquired by the Contact Center since NEXUS will be acquiring the same.

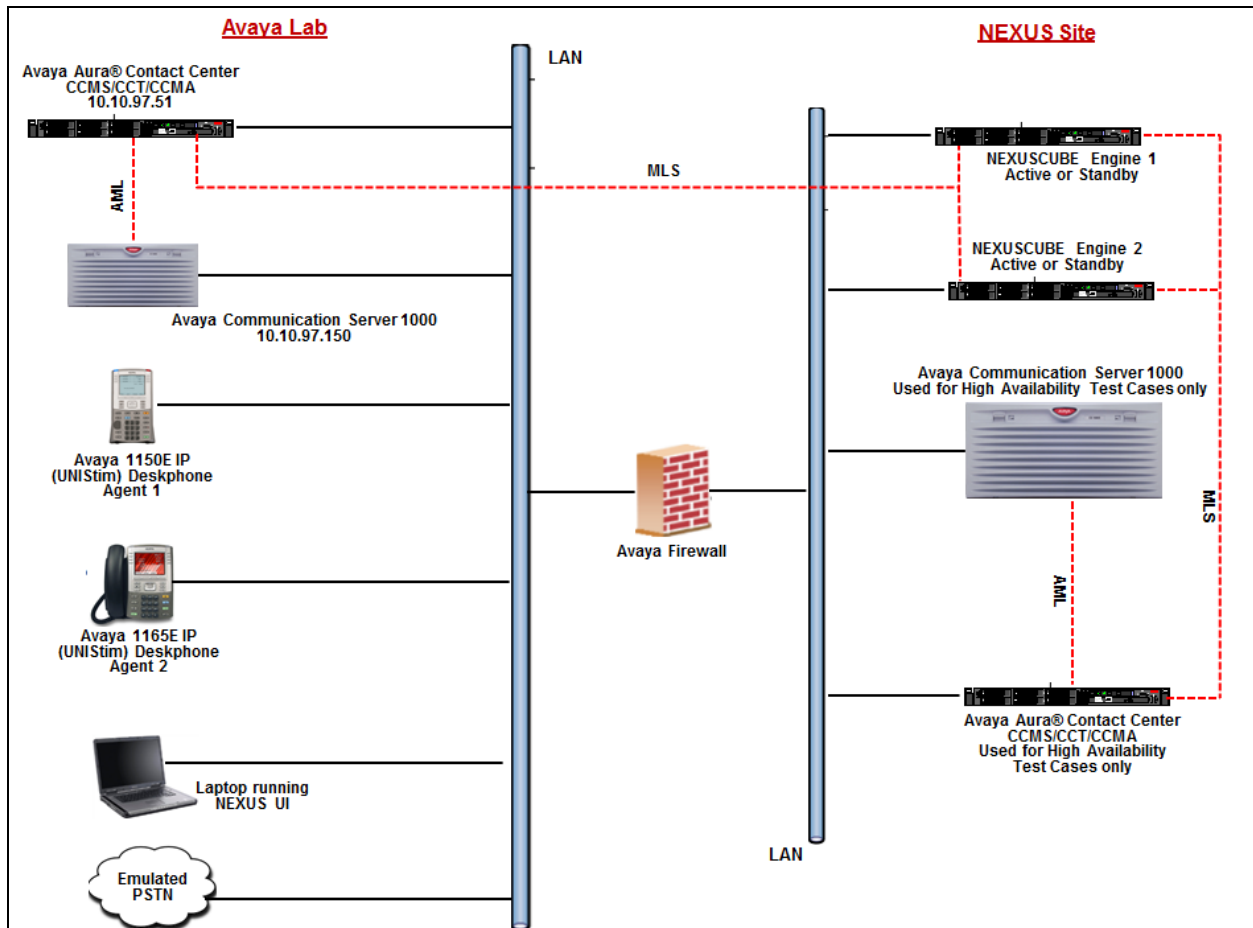
## 2.3. Support

For technical support on the NEXUSCUBE product, contact support via,

- **Website:** <http://www.nexus.co.kr>
- **Email:** [nexus@nexus.co.kr](mailto:nexus@nexus.co.kr)
- **Phone:** +82-2-6240-2580

### 3. Reference Configuration

**Figure 1** below illustrates the test configuration diagram between Contact Center system, Communication Server 1000E and NEXUSCUBE servers. Communication Server 1000E uses AML to communicate with the Contact Center and NEXUS uses MLS to communicate to the Contact Center. The Communication Server 1000E system also had a SIP trunk to the PSTN for making and receiving external calls. For High Availability (HA) test cases, the equipment installed and configured at the NEXUS site was used.



**Figure 1: Test Configuration Diagram**

## 4. Equipment and Software Validated

The following equipment and software were used for the compliance test:

Equipment/Software	Release/Version
Avaya S8800 server running Avaya Aura® Contact Center	6.3 SP10 on Windows OS
Avaya Communication Server 1000E/CPPM	7.65
Avaya 1165E (Unistim) IP Deskphone	0x25C8Q
Avaya 1150E (Unistim) IP Deskphone	0x27C8Q
Laptop running NEXUS UI	Windows 7 Professional SP1
NEXUSCUBE Engine	Version 2

## 5. Configure Avaya Communication Server 1000E

This document assumes that the Avaya Communication Server 1000E system was properly installed and configured as per the product documents. This section provides the steps on how to provision the Communication Server 1000E to work with Contact Center. For more information about how to install and configure Communication Server 1000E, refer to **Section 10**.

The following summarizes the tasks that need to be done on Communication Server 1000E. This section shows configurations provisioned by using overlay (LD) commands; the same configurations can be also done by using Element Manager.

- Verify Software Packages for Contact Center Features.
- Configure ELAN and VAS for Contact Center application.
- Configure Automatic Call Distribution (ACD) Queue.
- Configure Control Directory Number (CDN).
- Configure Agent Phone.

## 5.1. Verify Software Packages for Contact Center Features

Use overlay LD 22 to print software packages required for Contact Center feature. Make sure the following software packages are equipped in the Communication Server 1000E system.

Prompt	Response	Comment
REQ	PRT	Request print
TYPE	PKG	Type of data: package
BACD	40	Basic Automatic Call Distribution
ACDB	41	Automatic Call Distribution B
ACDC	42	Automatic Call Distribution C
LMAN	43	Automatic Call Distribution Load Management
MUS	44	Music
ACDA	45	Automatic Call Distribution A
ACDD	50	Automatic Call Distribution D
NGCC	311	Symposium Call Center

Use the same overlay LD 22 command to print out allowed numbers of ACD agents, AST and AML.

Prompt	Response	Comment
REQ	SLT	Request software list
ACD AGENTS	32767      LEFT 32739      USED      28	
AST	32767      LEFT 32712      USED      55	
AML	16          LEFT          9      USED          7	

## 5.2. Configure ELAN and VAS for Contact Center application

Use overlay LD 17 to create an Application Module over Ethernet (ELAN) for Contact Center application. Below are the prompts that need to be entered. For other prompts, keep pressing “Enter” key to use default value.

Prompt	Response	Comment
REQ	CHG	Request change
TYPE	ADAN	Type:
ADAN	NEW ELAN 19	Add a new ELAN 19
CTYP	ELAN	Card type: ELAN
DES	AACC63	Designator

Use overlay LD 17 to create a Value Added Server (VAS) to associate with the ELAN above. Enter the information as displayed in the table below.

Prompt	Response	Comment
REQ	CHG	Request change
TYPE	VAS	Type: Value added server
VAS	NEW	Add a new ELAN 19
VSID	19	Card type: ELAN
ELAN	19	ELAN 19 as configured in the step above
SECU	YES	Security the link

### 5.3. Configure Automatic Call Distribution (ACD) Queue

Use overlay LD 23 to create an ACD queue for Contact Center agent. The important fields are displayed below. For other fields in the command, keep pressing the “Enter” key to use default value.

Prompt	Response	Comment
REQ	NEW	Request new
TYPE	ACD	Type: ACD
CUST	0	Customer ID
ACDN	54901	ACD DN
MAXP	50	Maximum of agent for this ACD queue, from 1-120

### 5.4. Configure Control Directory Number (CDN)

Use overlay LD 23 to create a CDN number for Contact Center. The important fields are displayed below. For other fields in the command, keep pressing the “Enter” key to use default value.

Prompt	Response	Comment
REQ	NEW	Request new
TYPE	CDN	Type: CDN
CUST	0	Customer ID
CDN	54900	CDN Directory Number
DFDN	54901	Default DN: assign the ACD DN above to the CDN

## 5.5. Configure Agent Phone

User overlay LD 11 to create or change the configuration for agent phones. The important fields are displayed below, for other fields in the command keep pressing the “Enter” key to use default values. In the compliance test, 2 agents (agent6 and agent7) created for different phone types were used for testing purpose. The configuration below represents one agent phone type, 1150E.

Prompt	Response	Comment
REQ	NEW	Request new
TYPE	1150	Type: 1150 phone
CUST	0	Customer ID
ZONE	1	Zone for phone it is defined before
AST	00 03	CCT will monitor key 0 and 3
KEY	00 ACD 54901 1005	Key 0 assign to ACD 54901 above
KEY	01 NRD	Key 1 Not Ready
KEY	02 MSB	Key 2 Make Set Busy
Key	03 SCR 54405	KEY 3 secondary DN for agent phone
CPND	NEW	Add a name for agent phone
NAME	Agent6	Enter a name for agent phone

## 6. Configure Avaya Aura® Contact Center

This document assumes that the Contact Center system with all its modules including CCMS and MLS are installed and configured correctly and it communicates to the Communication Server 1000E. For more information how to install and configure the Contact Center please refer to **Section 10**.



## 7. Configure NEXUSCUBE

This document assumes that the NEXUS application was properly installed and configured by the NEXUSCUBE engineer. This section only provides the steps on how to configure the NEXUS application to work with the MLS protocol of Contact Center.

### 7.1. Login to NEXUS User Interface

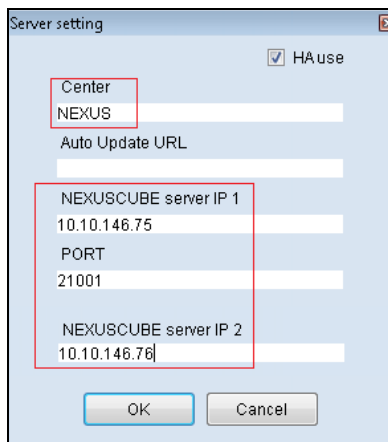
Launch the NEXUSCUBE icon from the machine that it is installed on (not shown). The NEXUSCUBE Messenger login screen is seen as shown below. Enter valid credentials in the **ID** and **Password** fields. Click on the **Server setting** link to configure the server.



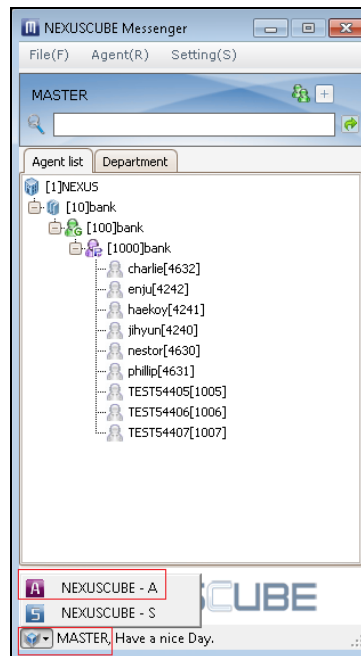
The Server setting screen is seen as shown below. Enter the following values,

- **Center:** A descriptive name.
- **NEXUSCUBE server IP 1:** IP address of Active NEXUS Engine.
- **Port:** 21001.
- **NEXUSCUBE server IP 2:** IP address of Standby NEXUS Engine.

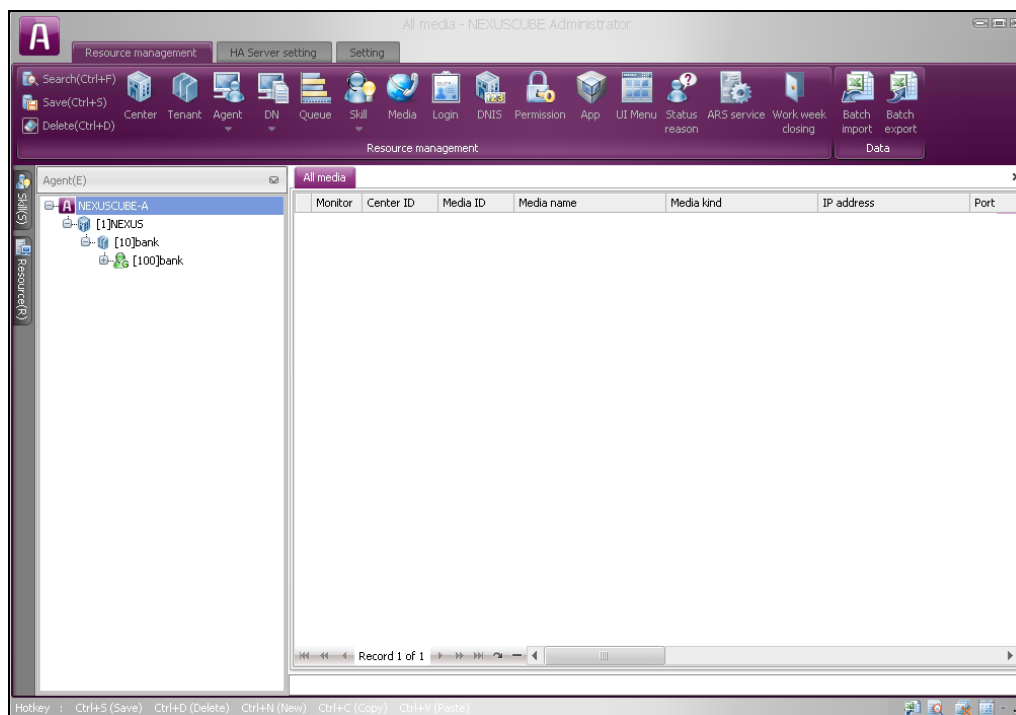
Click on the **OK** button and then click on the **Login** button.



The NEXUSCUBE Messenger screen is shown as below. Click on the bottom left icon on this screen to launch any of NEXUSCUBE UI, however the UI of NEXUSCUBE that could launch relies on the user permissions. Click on **NEXUSCUBE – A** option.



The screen below shows the main NEXUSCUBE – A screen that can be used to make changes.



## 7.2. Configuration for Center

This section describes the steps to configure the Center using the NEXUS UI.

To configure a Center, enter the following values for the specified fields and retain the default values in the remaining fields as shown in the screen below.

- **Center ID** : 1(in case, there is only one center)
- **IP address** : IP address of Active NEXUS Engine
- **IP address 2**: IP address of Standby NEXUS Engine.
- **Use HA** : It depends on the usage of HA
- **DB Kind**: It depends on the DB kind (Oracle, Mysql, Sysbase etc...)

Monitor	Center ID	Real center ID	Center name	Center kind	IP address	Center nickname	Minutely center closing	Trunk access code	Trunk group code	IP address 2	UI update server	Use HA	DB Kind
>	<input checked="" type="checkbox"/>	1	1 NEXUS	0 : Main c...	10.10.146.75	NX	10 : 10 min.	0	0	10.10.146.76		1 : Use	1 : O...

## 7.3. Configuration for Media

This section describes the steps to configure the Media using the NEXUS UI.

To configure a Media, enter the following values for the specified fields and retain the default values in the remaining fields as shown in the screen below.

- **Media kind** : 11: MEDIA\_MERIDIAN
- **IP address** : 10.10.97.51 (IP address of Contact Center Server)
- **Port** : 3000 (MLSM Process on Contact Center bind port 3000)

Monitor	Center ID	Media ID	Media name	Media kind	IP address	Port	Monitor interval	Max. frame size	The number of packet tran...
>	<input checked="" type="checkbox"/>	1	1 Meridian	11 : MEDIA_MERIDIAN	10.10.97.51	3000		50000	2048

## 7.4. Configuration for Directory Number

This section describes the steps to configure the Directory Number (DN) using the NEXUS UI.

To configure a DN, enter the following values for the specified fields and retain the default values in the remaining fields as shown in the screen below.

**DN ID**: 54000, 54405, 54406, 54407 (DN used during compliance testing)

**DN type**: 2: Digital

**Tag**: 1008, 1005, 1006, 1007 (Agent Position ID used during compliance testing)

Monitor	Center ID	Tenant ID	DN group ID	DN part ID	DN ID	Main media	Sub media	Model	Service	DN kind	DN type	IP address	Observation setting	Tag
>	<input checked="" type="checkbox"/>	1	10	100	1000	4220	1	0		1 : PSTN	2 : Digi...		1 : Observation	4230
	<input checked="" type="checkbox"/>	1	10	100	1000	54000	1	0		1 : PSTN	2 : Digi...		1 : Observation	1008
	<input checked="" type="checkbox"/>	1	10	100	1000	54405	1	0		1 : PSTN	2 : Digi...		1 : Observation	1005
	<input checked="" type="checkbox"/>	1	10	100	1000	54406	1	0		1 : PSTN	2 : Digi...		1 : Observation	1006
	<input checked="" type="checkbox"/>	1	10	100	1000	54407	1	0		1 : PSTN	2 : Digi...		1 : Observation	1007

## 7.5. Configuration for Controlled Directory Number

This section describes the steps to configure the Controlled Directory Number (CDN) using the NEXUS UI. To configure a CDN, enter the following values for the specified fields and retain the default values in the remaining fields as shown in the screen below.

**Queue ID:** 54900 (CDN Number).

**Queue kind:** 4: *RoutePoint*

	Monitor	Center ID	Tenant ID	DN group ID	DN part ID	Main media	Sub media	Queue ID	Queue name	Queue kind	Queue type	Max. waiting time(sec.)	Service level formula time(sec.)	Option	Queue match	Final skill ID	NACD
>	<input checked="" type="checkbox"/>	1	10	100	1001	1	0	54900	54900	4 : Route...	1 : Service...	100	20		0	0	0

## 8. Verification Steps

The following are typical steps to verify that NEXUS application successfully integrates with the Contact Center.

### 8.1. Check for Media

This section describes the steps to check the Media using the command line.

To verify the status of media, login in as *cube* using the command line interface and issue the *prtmedia* command. If the **link-state** becomes 7 and the **alive keep** field shows *[up]* as shown in the screen below, it means the connection to Contact Center is successful.

```
[cube@devpri75 bin]$ prtmedia
=====
|Rep Name | Cur / Max |
|-----|
|Media    |    1 / 10 |
|-----|

#-----#
# server type      name      pid      p/l      invoke gate link-state
#-----#
1 1      11(meridian ) Meridian  0      (60/200)  0 *2      7
-->media( 10.10.97.51:3000 ) state[1] alive[up] keep[up] count[0]
-->options =
```

### 8.2. Check for Directory Number

This section describes the steps to check the DN using the command line. To verify the status of DN, login in as *cube* using the command line interface and issue the *prtdn* command. If the DN is shown as shown in the screen below, then it is registered correctly.

```
[cube@devpri75 bin]$ prtdn
=====
|Rep Name | Cur / Max |
|-----|
|Dn       |    10 / 4000 |
|-----|

#-----#
# dn      agent      group/team tenant media k/t/m      conn ctype count evt
#-----#
[001](000) 1-4220 (4230) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[002](001) 1-4221 (4231) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[003](002) 1-4222 (4232) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[004](003) 1-4620 (4630) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
CC
[005](004) 1-4621 (4631) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
CC
[006](005) 1-4622 (4632) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[007](006) 1-54000(1008) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[008](007) 1-54405(1005) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[009](008) 1-54406(1006) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
[010](009) 1-54407(1007) 0      (-1 :20)  0/0 10      0/1/2/logout -1 0 0
-X-
```

### 8.3. Check for Controlled Directory Number

This section describes the steps to check the CDN using the command line. To verify the status of CDN, login in as *cube* using the command line interface and issue the *prtroute* command. If the CDN (in this case 54900) is shown as seen in the screen below, then the CDN is registered correctly.

```
[cube@devpri75 bin]$ prtroute
=====
|Rep Name | Cur / Max |
|-----|-----|
|Route    | 7 / 50 |
|-----|-----|

# Fri Mar 21 14:53:14 2014
# 7/50(max)
#-----#
# route kind type tenant media conn wait ab sum avg(min:max) exp scen date scenarioNO scenarioNAME
#-----#
[001] 4200 (0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 03-21 14:00 1111( 11111)
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
[002] 4201 (0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 03-21 14:00 1111( 11111)
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
[003] 4202 (0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 03-21 14:00 1111( 11111)
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
[004] 4601 (0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 03-21 14:00 1111( 11111)
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
[005] 4602 (0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 03-21 14:00 1111( 11111)
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
[006] 4603 (0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 01-01 09:00 0( )
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
[007] 54900(0) 4 1 10 1 -1 *0 0 0 0 ( 0:0 ) 0 03-21 14:00 1111( 11111)
++ en:0 ens:0 dv:0 aw:0 at:0 ab:0 ns:0 fl:0 ed:0 ea:0 tr:0 cb:0 rto:0 rtf:0 rfm:0 lwt:100 lrs:20 ++
```

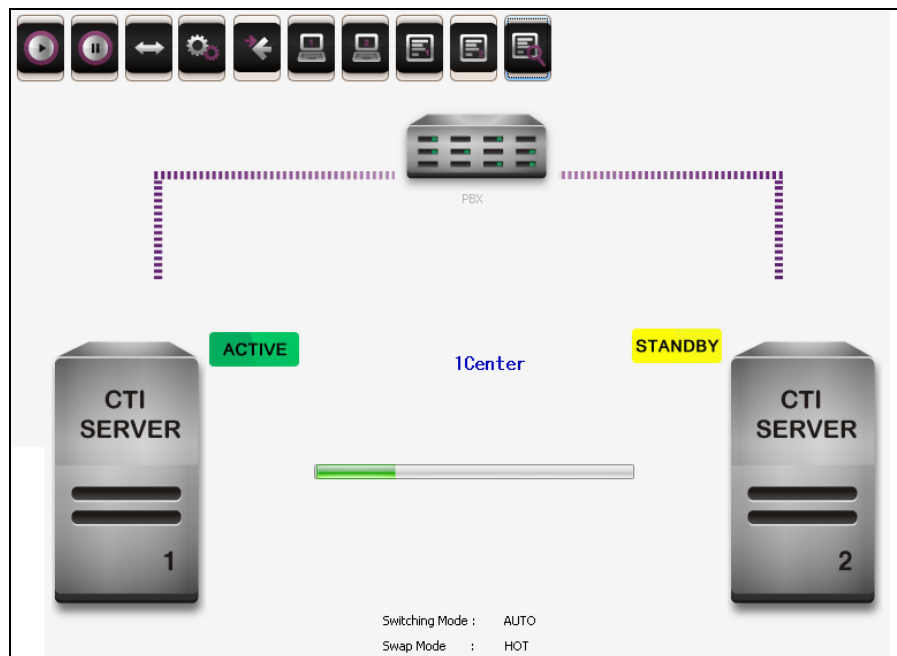
### 8.4. Check for High Availability

This section describes the steps to check the High Availability (HA) using the command line. To verify the status of HA, login in as *cube* using the command line interface and issue the *prtha* command as shown in the screen below.

```
[cube@devpri75 bin]$ prtha
#-----#
host::{
  id      = 1          id      = 2
  name    = wb_pri     name    = wb_sec
  ip      = 10.10.146.75 ip      = 10.10.146.76
  state   = active     state   = ready
  mode    = auto
  swap    = hot
  disk    = share

  engine::{
    uptime = 2014-03-21 10:46:50    uptime = 2014-03-21 10:48:14
    state  = service ready         state  = service ready
    wcall  = 0                     wcall  = 0
    cnid-e1 = 3273000017:3273000000:3273000000
    cnid-e2 = 3273000017:3273000000:3273000000
    monitor = nxstate
    monitor = nxmedia_1
  }
}
```

User can also use the NEXUS UI to check the status of HA as shown in the screen below.



## 8.5. Check Avaya Communication Server 1000E

Verify that the following works on the Communication Server 1000E,

- DN and CDN are acquired.
- Agent Deskphones are able to make and receive calls.
- Agent Deskphones statuses like, Login, LogOff, Not Ready and MakeSetBusy can be controlled by NEXUS application.
- Calls can be presented on the CDN.
- Calls can be put on hold and resumed.
- Calls can be transferred (both blind and attended) and conferenced.

## 9. Conclusion

The compliance test between NEXUSCUBE with Avaya Aura® Contact Center and Avaya Communication Server 1000E using Median Link Services protocol was successfully completed. All executed test cases passed with observations noted in **Section** Error! Reference source not found..

## 10. Additional References

Product documentation for Avaya Aura® Contact Center and Avaya Communication Server 1000E may be found at <https://support.avaya.com>

Product documentation for NEXUSCUBE application may be found at [www.nexus.co.kr](http://www.nexus.co.kr) and then navigating to Technical Support → Download.

Avaya Communication Server 1000E Documents:

1. *Communication Server 1000E Installation and Commissioning*, March 2013, Release 7.6, NN46041-310
2. *Co-resident Call Server and Signaling Server Fundamentals - Avaya Communication Sever 1000*, March 2013, Release 7.6, NN43001-509.
3. *Software Input Output Reference —Administration Avaya Communication Server 1000*, NN43001-611

Avaya Aura® Contact Center 6.3 documents:

1. *Avaya Aura® Contact Center Planning and Engineering* (NN44400-210) May 2013
2. *Avaya Aura® Contact Center Installation* (NN44400-311) May 2013
3. *Avaya Aura® Contact Center Server Administration* (NN44400-610) May 2013
4. *Avaya Aura® Contact Center Overview* (NN44400-111) May 2013
5. *Avaya Aura® Contact Center Fundamentals* (NN44400-110) May 2013
6. *Avaya Aura® Contact Center Manager Administration – Client Administration* (NN44400-611) May 2013.



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