

Microsoft® Lync™ Server

Survivable Branch Appliance

Mediant™ 1000B SBA

SBA Installation and Maintenance Manual

Mediant 1000B SBA for Microsoft Lync Server



Microsoft Partner

Gold Communications



Microsoft®
Lync™



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Notice

This document describes how to install and configure the Mediant 1000B Survivable Branch Appliance (SBA), located at the remote branch office and deployed in the Microsoft Lync Server 2010 or Microsoft Lync Server 2013 environment.

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Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used.

Related Documentation

Manual Name
Mediant 1000B SBA Quick Guide

1 Introduction

This document provides step-by-step instructions on installing and configuring the Survivable Branch Appliance (SBA) application running on AudioCodes Mediant 1000B OSN, located at the remote branch office and deployed in the Microsoft Lync Server 2013 or 2010 environments. The Mediant 1000B SBA includes an OSN Server platform with Windows Server 2008 R2 operating system and Mediation Server software installation (MSI), and a PSTN gateway, all in a single appliance chassis.

In the Lync Server environment, given the centralized deployment model, Unified Communication (UC) users in a remote site are dependent on the servers in the enterprise's data center (typically at headquarters) for their communication, and hence are vulnerable to losing communication capabilities when the WAN is unavailable. Given the always-available expectation for voice, it is imperative that the UC solution continues to provide the ability for branch users to make and receive calls when the WAN from the branch to the primary data center is unavailable.

To provide voice services to branch users during a WAN outage, a branch office survivability solution—the Survivable Branch Appliance (SBA) application—is hosted on the OSN Server platform running on AudioCodes Mediant 1000B SBA located at the branch office. During a WAN connectivity failure, Mediant 1000B SBA maintains call connectivity among Microsoft users located at the branch office—Lync Server clients (for example, Microsoft Lync clients) and devices (for example, IP phones)—and between these users and the public switched telephone network (PSTN).

The AudioCodes Mediant 1000B gateway can also provide the Lync Server environment with a connection to Analog Devices. The Analog Devices are connected to the Mediant 1000B Foreign eXchange Station (FXS) port interfaces. This document provides also instructions on how to configure the gateway to use its internal FXS port as Analog Devices.



Note: The new SBA image includes the Fax Server and Auto-Attendant IVR applications with full functionality including a ninety day trial license period for each application. For information on how to install these applications and how to activate the license, refer to the document *Fax Server and Auto Attendant IVR Installation Guide* (click the link on the SBA Home Page to open this document). For full purchase information, contact your AudioCodes representative.

Figure 1-1: SBA Home Page (Additional AudioCodes Applications Link) New SBA Image

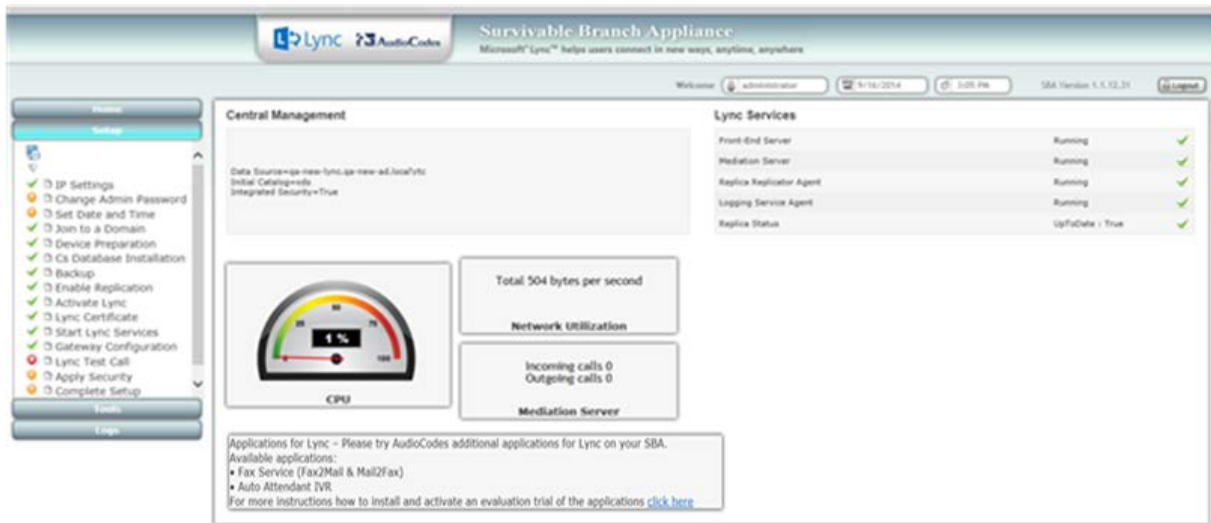
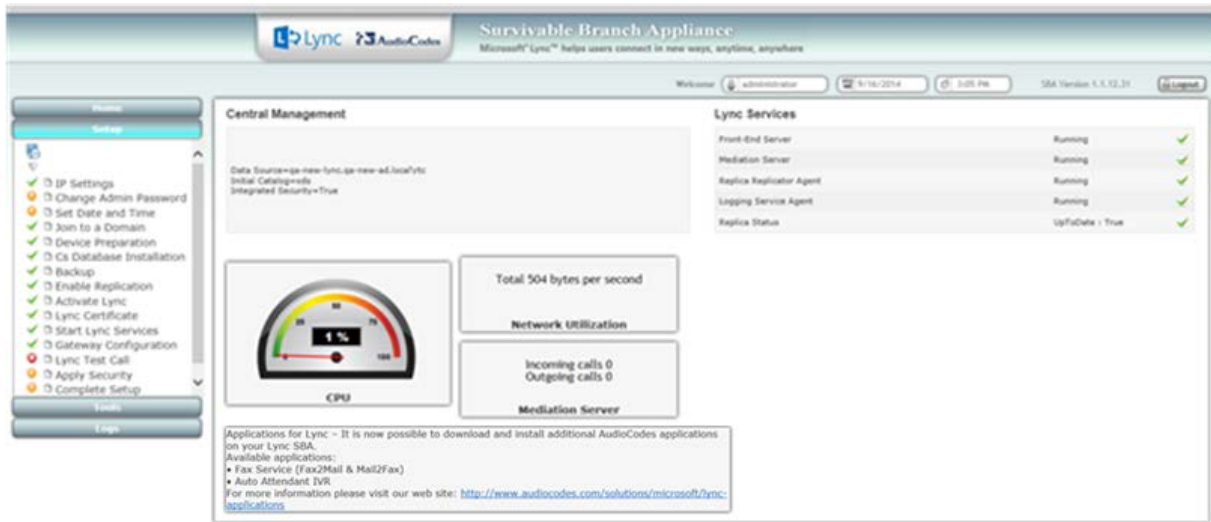
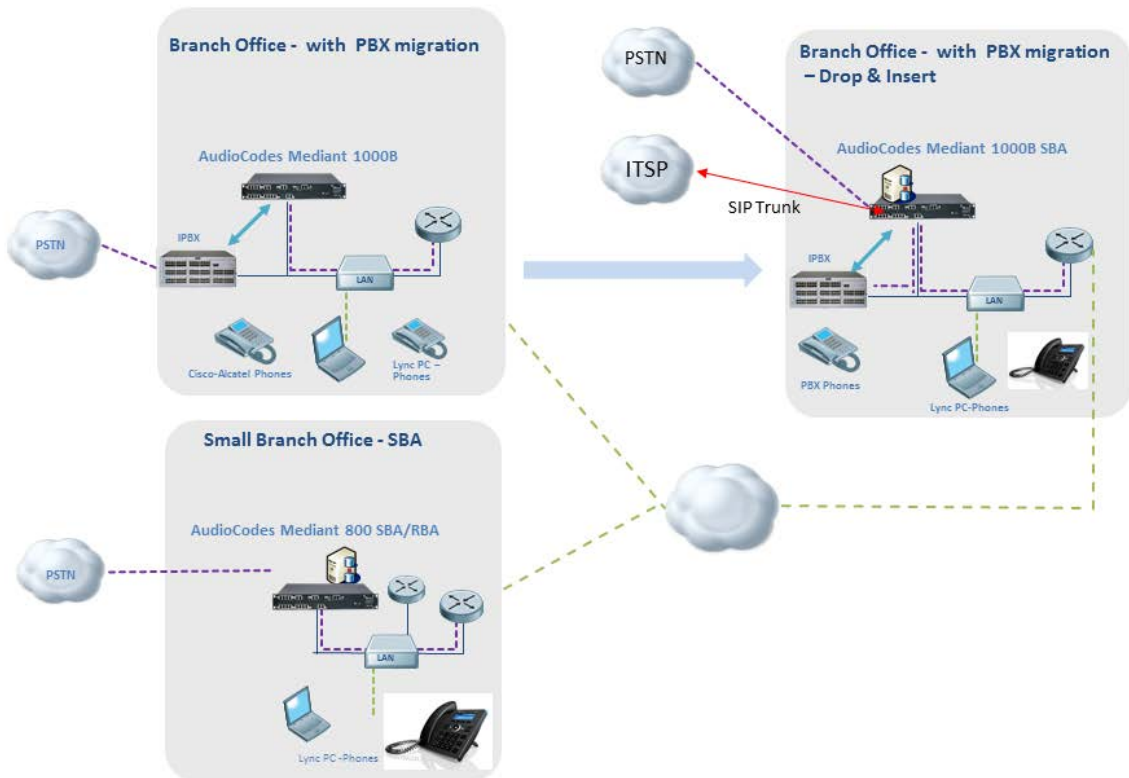


Figure 1-2: SBA Home Page (Additional AudioCodes Applications Link) SBA Upgrade



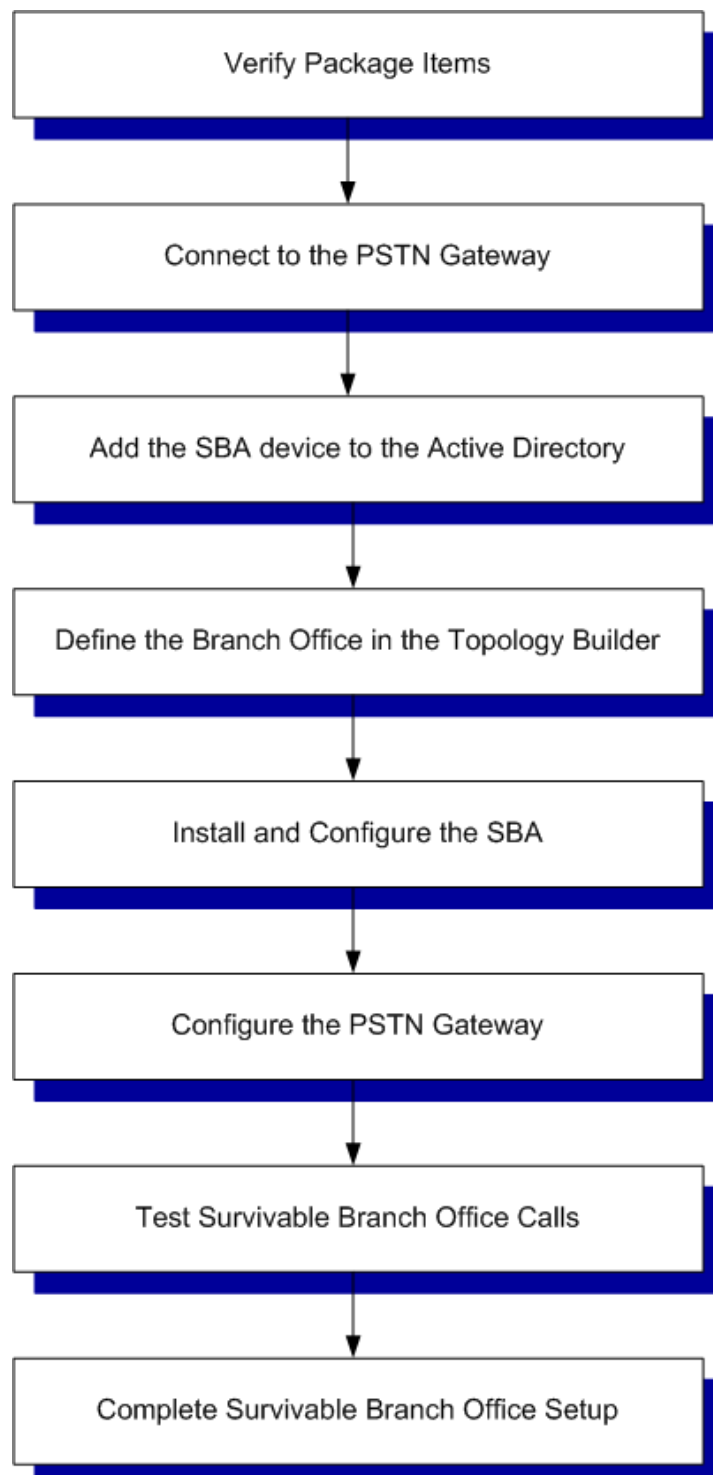
The figure below illustrates typical SBA branch office deployment scenarios.

Figure 1-3: Typical Branch Office Deployments



A summary of the steps required to setup the SBA environment is shown in the figure below:

Figure 1-4: Summary of Steps for Installing and Configuring SBA



2 Verifying Package Contents

Ensure that your Mediant 1000B SBA package is shipped with the following items:

- Four anti-slide bumpers for desktop installation
- 19-inch rack mounting kit (two flanges and six screws)
- Cable mini HDMI to HDMI 1.5m for monitor connections.
- Cable micro USB to USB 1.5m for serial connections.
- One or two AC power cables (depending on customer order)
- USB dongle for SBA software upgrade and recovery procedure (one for Lync Server 2010 and another for Lync Server 2013)
- Microsoft Windows 2008 R2 license document (envelope)

If you are upgrading hardware, see Appendix C on page 275.

Check, retain and process any documents. If any items are missing or damaged, please contact your AudioCodes sales representative.

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Part I

Hardware Description

This part provides a hardware description overview of the Mediant 1000B SBA device. The Mediant 1000B SBA is resident on the Mediant 1000B Gateway and E-SBC chassis. The chassis's panels are described as follows:

- Front Panel - see Section [3](#) on page [23](#)
- Rear Panel - see Section [4](#) on page [25](#)

The AudioCodes SBA is installed on the HDMX disk module and runs on the OSN processor module. These modules are described as follows:

- OSN3B and OSN4 – see Section [5.1](#) on page [28](#)
- OSN3 - see Section [5.2](#) on page [30](#)
- HDMX - see Section [5.3](#) on page [34](#)



3 Front Panel

The Mediant 1000B SBA front panel is shown below and described in the subsequent table.

Figure 3-1: Mediant 1000B SBA Front Panel

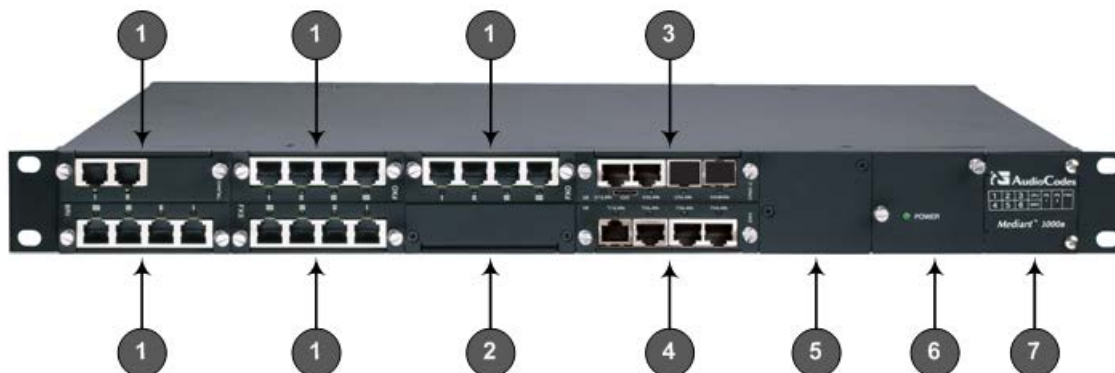


Table 3-1: Front-Panel Description

Item #	Label/Module	Component Description
1	FXS	The FXS module provides the Foreign eXchange Subscriber (FXS) interfaces Note: The presence of this module depends on the ordered configuration. If in the future you need to add such interfaces to your device, you can order this module separately.
	FXO	The FXO module provides the Foreign eXchange Office (FXO) interfaces Note: The presence of this module depends on the ordered configuration. If in the future you need to add such interfaces to your device, you can order this module separately.
	BRI	The BRI module provides the Integrated Services Digital Network (ISDN), Basic Rate Interface (BRI) interfaces. Note: The presence of this module depends on the ordered configuration. If in the future you need to add such interfaces to your device, you can order this module separately.
	TRUNKS	TRUNKS (E1/TE/J1) module Note: The presence of this module depends on the ordered configuration. If in the future you need to add such interfaces to your device, you can order this module separately.
2	MPM	MPM module for IP media server capabilities (i.e., conferencing, SBC, and IP-to-IP routing applications). Depending on required configuration, the MPM module can be housed in chassis slots 3, 4, 5, or 6. Note: The presence of this module depends on the ordered configuration. If in the future you need to add such interfaces to your device, you can order this module separately.
3	CRMX	CRMX module - The CRMX module provides LAN interfaces (providing port-pair redundancy), an RS-232 interface, and a reset pinhole button.
4	SWX	LAN Extension (SWX) module – The SWX LAN Expansion module provides four LAN ports. These ports provide port-pair (group) redundancy, where one port is active and the other redundant. Note: The presence of this module depends on the ordered configuration.

Item #	Label/ Module	Component Description
		If in the future you need to add such interfaces to your device, you can order this module separately.
5	Power 1	(Optional) Spare Power Supply module slot. The device can provide two extractable power supply units (Power 1 and Power 2). Each power supply unit provides an AC power connector on its rear panel. If both Power 1 and Power 2 units are used, the load is shared between them. This (optional) load-sharing feature enables power failure protection (redundancy). When using this feature, you are advised to connect each power supply unit to a different AC supply circuit.
6	Power 2	Main Power Supply module.
7	Schematic	Extractable Fan Tray module with a schematic displayed on its front panel showing the chassis' slot numbers. The Fan Tray module cools the device's components.

4 Rear Panel

The Mediant 1000B SBA rear panel is shown below and described in the subsequent table.

Figure 4-1: Rear Panel of Mediant 1000B SBC and Gateway

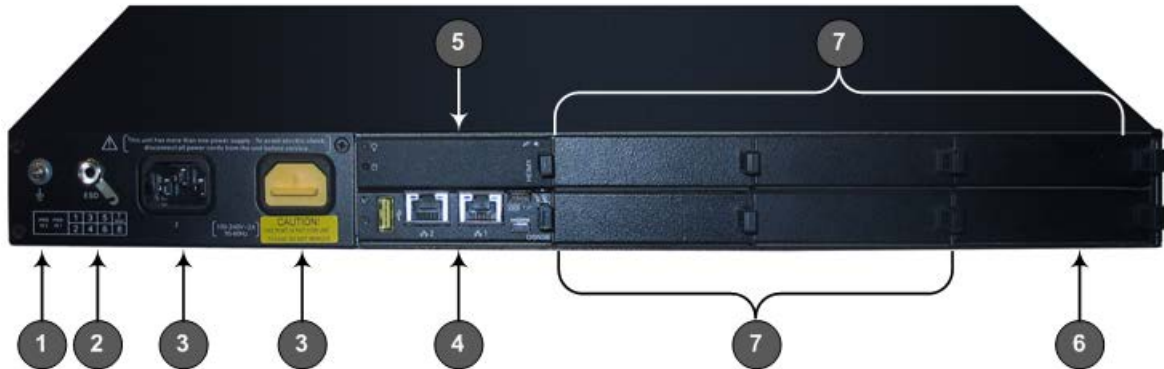



Table 4-1: Rear-Panel Description

Item #	Label	Description
1		Protective earthing screw.
2	ESD	Electrostatic Discharge (ESD) socket.
3	100-240V~1A	Dual AC Power Supply Entries.
4	OSN3B or OSN4	OSN3B or OSN4 AMC module. Note: OSN3 module is no longer available for purchase.
5	HDMX	Main hard-disk drive (HDD) AMC module for OSN server platform.
6	HDMX	Slot for second (optional) HDD for OSN server platform.
7	-	Unused and covered AMC module slots.



Note: The AMC chassis slots must **only** be installed with AMC modules that have been approved and homologated by AudioCodes.

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5 OSN Platform

The OSN platform includes a hard disk to provide a complete solution within the device's chassis. The OSN is based on single and mid-sized Advanced Mezzanine Card / AMC (AdvancedMC form-factor) modules. These are housed in the chassis' AMC slots on the rear panel of the Mediant 1000B chassis.



Note: Any usage of AMC modules that are not described or mentioned in this document needs explicit approval by AudioCodes.

When the OSN platform is installed with an SBA gateway, the following SBA gateway types are offered based on the OSN platforms:

■ Mediant 1000B SBA-ES

The OSN of the Mediant 1000 SBA-ES is OSN3B (see specifications in the above table and additional details in Section 5.2 on page 30).

The Mediant 1000B SBA-ES type is equipped with a Solid State Drive (SSD) storage. The SSD significantly improves reliability, shortens boot-up time, and increases the mean time between failures (MTBF).

This enhanced Mediant 1000B SBA-ES enables customers to run third-party IT software, for example, anti-virus and monitoring agents on the same operating system as the SBA.

■ Mediant 1000B SBA-EO

The OSN of the Mediant 1000B SBA-EO server is OSN4 (see specifications in the above table and additional details in Section 5.1 on page 28).

The Mediant 1000B SBA-EO supports large branches while meeting market demand for running multiple, integrated branch applications. These include third-party applications as well as applications provided by AudioCodes such as Auto-Attendant Interactive Voice Response (AA-IVR), Fax2Mail and Mail2Fax, Campus Mobility, and SmartTap Recording.

Both the Mediant 1000B SBA-EO and Mediant 1000B SBA-ES modules provide the following interfaces:

- 2 Ethernet port interfaces (front panel)
- 1 Ethernet port interface for internal communication
- USB
- Graphic port



Note: For more information on the above platforms, contact your AudioCodes sales representative. To upgrade to either of these platforms, see Appendix C on page 275.

5.1 OSN3B and OSN4 Modules

The OSN3B and OSN4 module is part of the OSN3B and OSN4 server platform. This module provides the port connector interfaces and is housed in Slot #2 on the rear panel.

5.1.1 Ports Description

The OSN3B and OSN4 module is shown below and described in the subsequent table.

Figure 5-1: OSN3B and OSN4 Module Ports

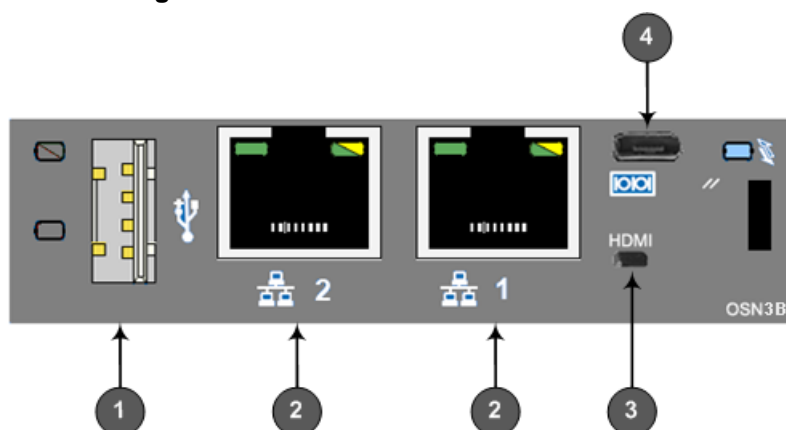


Table 5-1: OSN3B and OSN4 Module Port Description

Item #	Label	Description
1		USB 2.0 port.
2		Two RJ-45 ports for Gigabit Ethernet. The interface provides automatic detection and switching between 10Base-T, 100Base-TX and 1000Base-T data transmission (Auto-Negotiation). Auto-wire switching for crossed cables is also supported (Auto-MDI/X).
3	HDMI	HDMI port for connecting to a graphic display monitor.
4		Console (serial) port (micro-USB) for serial interface (COM1).

The RJ-45 connector pinouts for the Gigabit Ethernet interface are listed in the table below:

Table 5-2: RJ-45 Connector Pinouts for Gigabit Ethernet Interface

Pin	100Base-Tx		1000Base-T	
	I/O	Signal	Signal	Function
1	O	Tx+	I/O	BI_DA+
2	O	Tx-	I/O	BI_DA-
3	I	Rx+	I/O	BI_DB+
4			I/O	BI_DC+
5			I/O	BI_DC-
6	I	Rx-	I/O	BI_DB-
7			I/O	BI_DD+
8			I/O	BI_DD-

5.1.2 LEDs Description

The OSN3B and OSN4 module LEDs are shown in the figure below and described in the subsequent table.

Figure 5-2: OSN3B and OSN4 Module LEDs

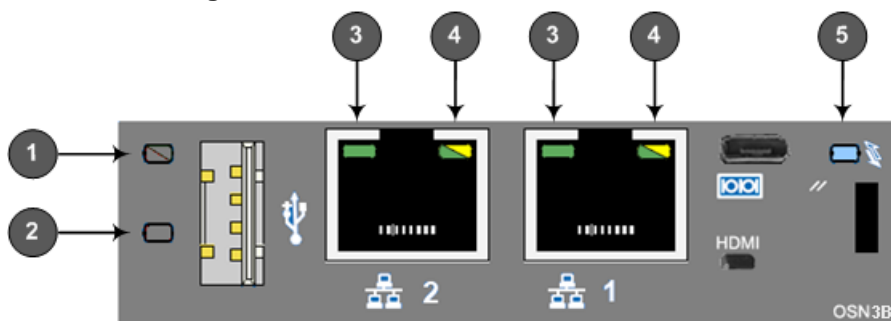


Table 5-3: OSN3B and OSN4 Module LEDs Description

Item	Color	State	Description
1	Green	Flashing	Firmware (BIOS) application active, payload (x86) in sleep.
		Solid	Firmware (BIOS) application active, payload (x86) active.
2	Red	On	Out-of-service indicator due to hardware failure.
		Off	Normal operation.
3	Green	Solid	Valid Ethernet link (cable connection) established.
		Flashing	Activity in the link.
	-	Off	The LED goes temporarily off if network packets are sent or received. When this LED remains off, a valid link has not been established due to a missing or a faulty cable connection.
4	Orange	On	1000Base-TX connection.

Item	Color	State	Description
	Green	On	100Base-T connection.
	-	Off	10Base-T connection if LED #3 is active.
5	Blue	Flashing	Module undergoing shutdown sequence when handle is pulled out to first extraction position, or module had been inserted and handle is still in first extraction position
		On	Module shutdown sequence complete and the module can be extracted from the chassis slot.
		Off	Module correctly inserted in chassis slot.

5.2 OSN3 Module

The OSN3 module provides the port connector interfaces and is housed in Slot #2 on the Mediant 1000B SBA rear panel.



Note: SBA servers with the OSN3 module are no longer available for purchase. However, this document describes the OSN3 platform for customers who have already purchased the SBA with the OSN3 module.

5.2.1 Ports Description

The OSN3 module is shown below and described in the subsequent table.

Figure 5-3: OSN3 Module Ports

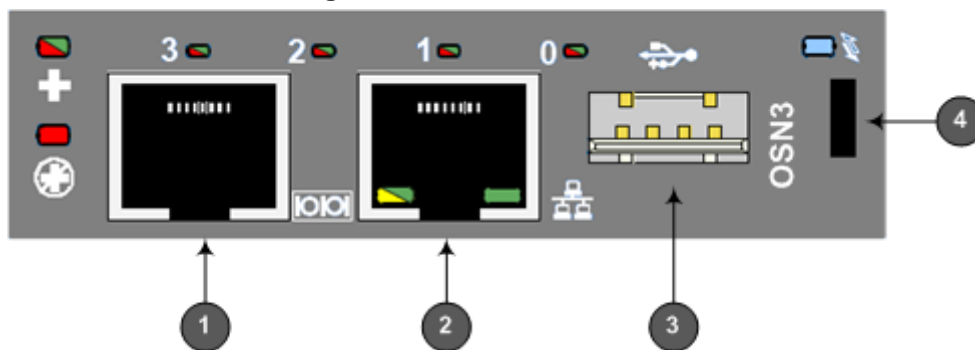


Table 5-4: OSN3 Module Port Description

Item #	Label	Description
1		RJ-45 port for RS-232 serial interface (COM1).
2		One RJ-45 port for Gigabit Ethernet. The interface provides automatic detection and switching between 10Base-T, 100Base-TX and 1000Base-T data transmission (Auto-Negotiation). Auto-wire switching for crossed cables is also supported (Auto-MDI/X).
3		USB 2.0 port.

Item #	Label	Description
4	-	Handle for inserting and extraction module from slot.

5.2.2 LED Description

The OSN3 module LEDs are shown in the figure below and described in the subsequent table.

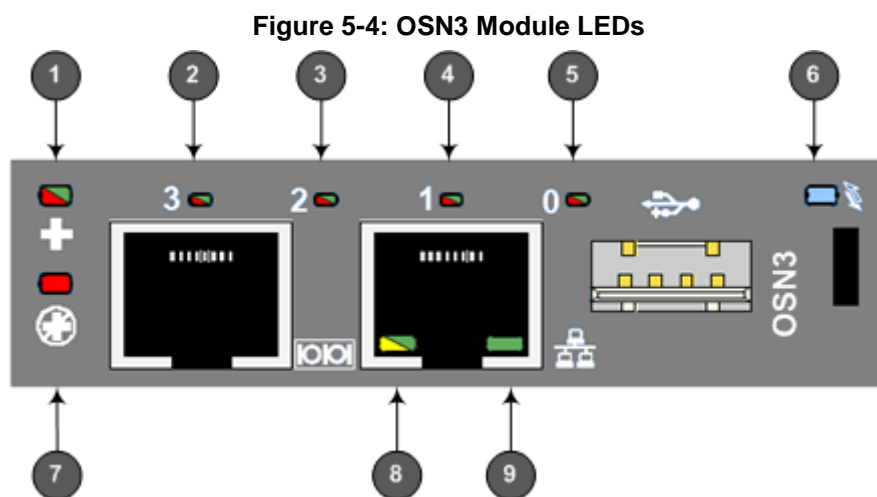




Table 5-5: OSN3 Module LEDs Description

Item	Label	Color	State	Description
1	+	Green	Flashing	Hardware normal operation.
		Red	On	Hardware fault (over-temperature or excess voltage feed).
2	3	Red	On	When lit during boot-up, indicates power failure.
		Red	Flashing	Processor over-temperature above 100°C. If LEDs 0, 1, and 2 are also flashing, there is a processor over-temperature above 125°C and as a result, the module shuts down.
		-	Off	Normal operation.
3	2	Red	On	When lit during boot-up, indicates clock failure.
		Red	Flashing	Chipset over-temperature above 105°C. If LEDs 0, 1, and 3 are also flashing, there is a processor over-temperature above 125°C and as a result, the module shuts down.
		-	Off	Normal operation.
4	1	Red	On	When lit during boot-up, indicates a hardware reset.
		Red	Flashing	Processor over-temperature above 125°C and as a result, OSN3 shuts down (if LEDs 0, 2, and 3 are also flashing)
		-	Off	Normal operation.

Item	Label	Color	State	Description
5	0	Red	On	When lit up during boot-up, indicates a BIOS boot failure.
			Flashing	Processor over-temperature above 125°C and as a result, OSN3 shuts down (if LEDs 1, 2, and 3 are also flashing)
		-	Off	Normal operation.
6		Blue	Flashing	Module undergoing shutdown sequence when module pulled out to first extraction position.
			On	Module shutdown sequence complete and the module can be extracted from the chassis slot.
		-	Off	Module correctly inserted in chassis slot.
7		Red	On	Hardware failure (supplied voltage is not within normal operating range – ensure CRMX is installed in chassis).
			Flashing	Upgrade in progress.
		-	Off	Normal operation.
8	SPEED	Green	On	100Base-TX connection.
		Yellow	On	1000Base-T connection.
		-	Off	10Base-T connection if ACT LED active.
9	ACT	Green	On	Valid Ethernet link (cable connection) has been established.
		-	Off	The LED goes temporarily off if network packets are sent or received. When this LED remains off, a valid link has not been established due to a missing or a faulty cable connection.

5.2.3 Gigabit Ethernet Cable Connector Pinouts

The RJ-45 connector pinouts for the Gigabit Ethernet interface are listed in the table below:

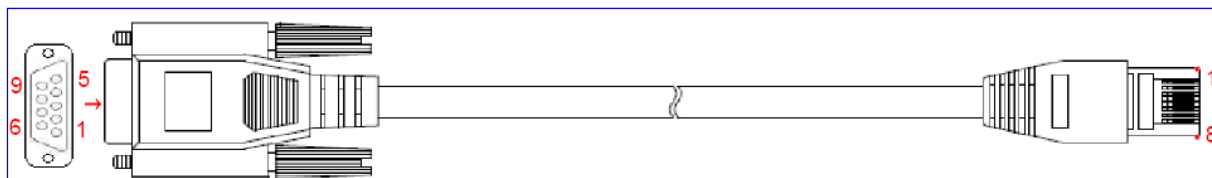
Table 5-6: Gigabit Ethernet Interface (RJ-45) Connector Pinouts

Pin	100Base-Tx		1000Base-T	
	I/O	Signal	Signal	Function
1	0	Tx+	I/O	BI_DA+
2	0	Tx-	I/O	BI_DA-
3	I	Rx+	I/O	BI_DB+
4			I/O	BI_DC+
5			I/O	BI_DC-
6	I	Rx-	I/O	BI_DB-
7			I/O	BI_DD+
8			I/O	BI_DD-

5.2.4 Serial Cable Connector Pinouts

The RJ-45-to-DB-9 female cable adapter is used for serial cabling.

Figure 5-5: RJ-45-to-DB-9 Serial Cable Adapter



The cable connector pinouts are listed in the table below:

Table 5-7: RS-232 Serial Cable Connector Pinouts

RJ-45	DB-9
1	8
2	6
3	2
4	5
5	5
6	3
7	4
8	7

5.3 HDMX (Hard-Disk Drive) Module

The HDMX module provides the hard-disk drive functionality for the OSN platform. This module is housed in Slot #1 on the Mediant 1000B SBA rear panel.



Notes:

- For additional storage capacity per HDMX module, contact your AudioCodes representative.
- The OSN platform can optionally be ordered with dual hard-disk drives (i.e., two HDMX modules).

The HDMX module is available as either an HDD drive or as an SSD drive.

The HDMX module is shown below and described in the subsequent table.

Figure 5-6: HDMX Module



Table 5-8: HDMX Module LED Description

Item #	Label	Color	State	Description
1		Green	On	Power received by module.
		-	Off	No power received by module.
2		Blue	On	Module can be extracted from chassis slot once dismantled from the OSN operating system.
			Off	Module correctly inserted in chassis slot
1		Red	On	Hard disk drive in use (active).
		-	Off	Hard disk drive not in use.

Part II

Setting up the Mediant 1000B PSTN Gateway

This part describes how to cable the Mediant 1000B PSTN gateway and how to connect it to the IP network.



6 Cabling the Mediant 1000B PSTN Gateway

This section describes how to cable the Mediant 1000B PSTN gateway in the branch site:

- Grounding the Device – see Chapter 6
- Connecting to the LAN – see Chapter 6.2
- Connecting to FXS interfaces – see Chapter 6.3
- Connecting to BRI lines – see Chapter 6.4
- Connecting to E1/T1 trunks – see Chapter 6.5
- Connecting the PSTN Fallback for E1/T1 Trunks – see Chapter 6.6

Connecting to Power – see Chapter 7

6.1 Grounding the Device

The procedure below describes how to ground the device.



Protective Earthing

The equipment is classified as Class I EN 60950 and UL 60950 and must be earthed at all times (using an equipment-earthing conductor).

- Finland: "Laitte on liltettava suojamaadoituskoskettimilla varustettuun pistorasiaan."
- Norway: "Apparatet rna tilkoples jordet stikkontakt."
- Sweden: "Apparaten skall anslutas till jordat uttag."

➤ To ground the device:

1. Connect an electrically earthed strap of 16 AWG wire (minimum) to the chassis' earthing screw (located on the rear panel), using the supplied washer.

Figure 6-1: Grounding the Device



2. Connect the other end of the strap to a protective earthing. This should be in accordance with the regulations enforced in the country in which the device is installed.

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6.2 Connecting to LAN with Port-Pair Redundancy

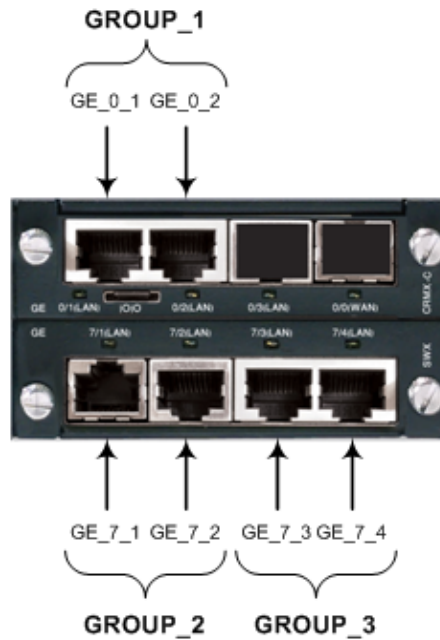
The LAN ports are provided on the CRMX and SWX LAN Expansion modules. These ports operate in pairs (groups) to provide LAN port 1+1 redundancy, where one port is active, while the other port is standby. When the active port fails, the device switches to the standby LAN port. If your deployment requires additional ethernet ports, you can order the optional SWX module, which provides four Ethernet ports.



Note: The SWX module is an optional customer orderable item.

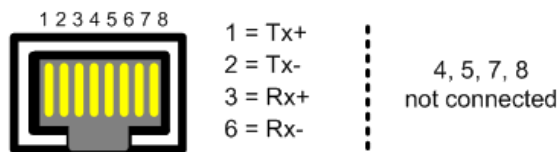
The figure below shows the LAN port-pair groups and the name of the ports and groups as displayed in the Web interface for configuring the port groups and assigning them to IP network interfaces (refer to the User's Manual for more information):

Figure 6-2: LAN Port-Pair Groups and Web Interface String Names



An RJ-45 cable connector with the following pinouts is used:

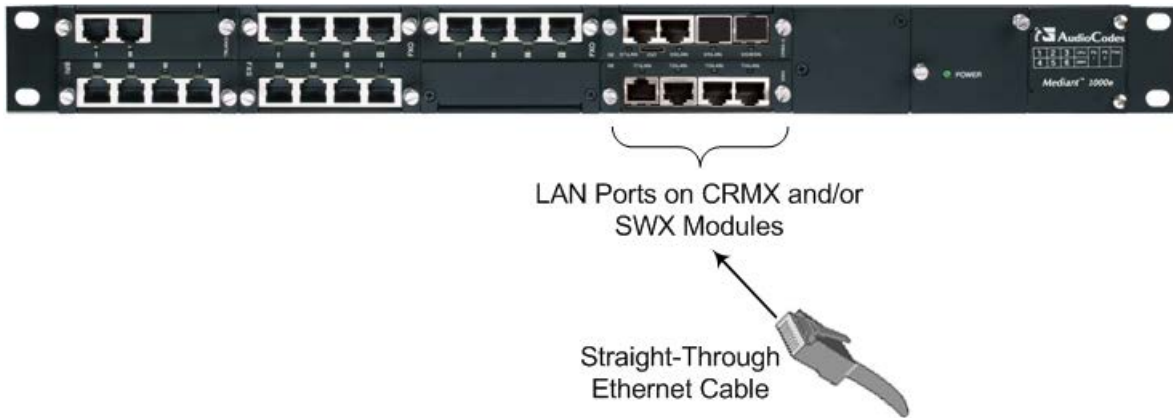
Figure 6-3: RJ-45 Connector Pinouts for LAN



➤ **To connect to the LAN:**

1. Connect one end of a straight-through RJ-45 Ethernet Cat 5/5e cable to the active LAN port on the CRMX or SWX module.

Figure 6-4: Connecting to LAN



2. Connect the other end of the cable to the LAN.
3. For 1+1 LAN protection, repeat Steps 1 and 2 for the standby port, but connect it to another network (in the same subnet).



Note: If you are implementing the LAN port-pair redundancy, ensure that the two ports making up a pair are each connected to a different network (in the same subnet).

6.3 Connecting to FXS Interfaces

The procedure below describes how to connect to FXS interfaces such as fax machines, modems, and plain old telephone system (POTS) telephones.

**Warnings:**

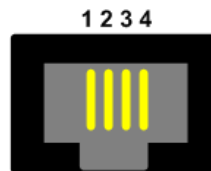
- Ensure that FXS ports are connected to the appropriate external devices; otherwise, damage to the device may occur.
- The FXS ports are considered as TNV-2..



Note: The FXS module is a customer ordered item. This section is applicable only if your device is installed with such a module.

An RJ-11 cable connector with the following pinouts is used:

Figure 6-5: RJ-11 Connector Pinouts for FXS



- 1 - Not connected
- 2 - Tip
- 3 - Ring
- 4 - Not connected

➤ **To connect to FXS interfaces:**

- Using an RJ-11 connector, connect the FXS port/s to the required telephone interface..

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6.4 Connecting to ISDN BRI Interfaces

This section describes how to connect to the ISDN BRI Interfaces.

6.4.1 Connecting to BRI Lines

The procedure below describes how to connect to BRI lines.



Warning: To protect against electrical shock and fire, use a 26 AWG min wire to connect the BRI ports to the PSTN.



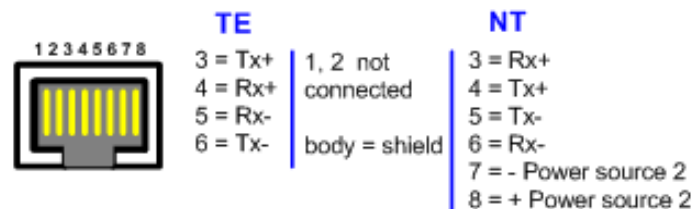
Note: The BRI module is a customer ordered item. This section is applicable only if your device is installed with such a module.

➤ **To connect to BRI lines:**

1. Connect the BRI cable to the device's BRI RJ-45 port.
2. Connect the other end of the cable to your ISDN telephone or PBX/PSTN switch.

A BRI port can be configured either as TE (Termination Equipment/user side) or NT (Network Termination/network side). The connector pinouts vary according to the configuration, as shown in the figure below.

Figure 6-6: RJ-45 Connector Pinouts for BRI



When configured as NT, the BRI port drives a nominal voltage of 38 V with limited current supply of up to 100 mA. The voltage is of Power Source 1 type (line voltage). Power Source 2 is optional.

6.4.2 Connecting the PSTN Fallback for BRI Lines

The device supports a PSTN Fallback feature for BRI lines, whereby if a power outage or IP connectivity problem (e.g., no ping) occurs, IP calls are re-routed to the PSTN. This guarantees call continuity.

PSTN Fallback is supported if the device houses one or more BRI modules, where each BRI module provides two or four spans.

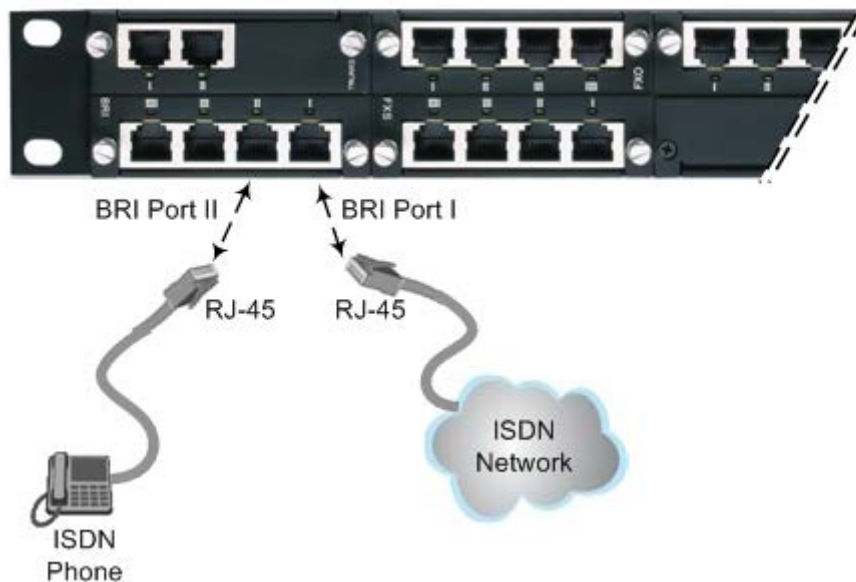
In the event of a PSTN fallback, the BRI module's metallic relay switch automatically connects line Port 1 (I) to Port 2 (II), and / or line Port 3 (III) to Port 4 (IIII) of the same BRI module.

For example, if a PBX trunk is connected to Port 1 and the PSTN network is connected to Port 2, when PSTN Fallback is activated, calls from the PBX are routed directly to the PSTN through Port 2.

➤ **To connect the BRI line interfaces for 1+1 PSTN Fallback:**

1. Connect Line 1 to a PBX.
2. On the same BRI module, connect Line 2 to the PSTN.

Figure 6-7: Cabling (Ports 1 and 2) PSTN Fallback



Notes:

- PSTN Fallback is supported only on the BRI module.
- PSTN Fallback is supported only between ports on the same BRI module.
- The scenarios that trigger PSTN Fallback (i.e., power outage and/or IP network loss) are configured by the TrunkLifeLineType parameter. For more information, see the User's Manual.
- This PSTN Fallback feature has no relation to the PSTN Fallback Software Upgrade Key



6.5 Connecting to ISDN E1/T1 Interfaces

This section describes how to connect to ISDN E1/T1 Interfaces.

6.5.1 Connecting to E1/T1 Trunks

The procedure below describes how to connect to E1/T1 trunks.



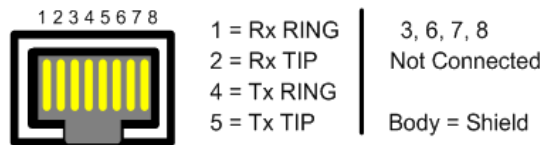
Warning: To protect against electrical shock and fire, use a 26 AWG min wire to connect T1 or E1 ports to the PSTN.



Note: The TRUNKS module is a customer ordered item. This section is applicable only if your device is installed with such a module.

An RJ-48c trunk cable connector with the following pinouts is used:

Figure 6-8: RJ-48c Connector Pinouts for E1/T1



➤ **To connect to E1/T1 trunks:**

1. Connect the E1/T1 trunk cables to the ports on the device's TRUNKS module(s).
2. Connect the other ends of the trunk cables to a PBX/PSTN switch.

6.5.2 Connecting the PSTN Fallback for E1/T1 Trunks

The device supports a PSTN Fallback feature, whereby upon a power outage or IP connectivity problem (e.g., no ping), IP calls are re-routed to the PSTN. This guarantees call continuity.

PSTN Fallback is supported if the device houses one or two E1/T1 ("TRUNKS") modules, where each module provides two or four spans. In the event of a PSTN fallback, the module's metallic relay switch automatically connects trunk Port 1 (I) to Port 2 (II), and / or trunk Port 3 (III) to Port 4 (IIII) of the same module. For example, if a PBX trunk is connected to Port 1 and the PSTN network is connected to Port 2, when PSTN Fallback is activated, calls from the PBX are routed directly to the PSTN through Port 2.

➤ **To connect the digital trunk interfaces for 1+1 PSTN Fallback:**

1. Connect Trunk 1 to a PBX.
2. On the same TRUNKS module, connect Trunk 2 to the PSTN.

Figure 6-9: Cabling (Ports 1 and 2) PSTN Fallback



Notes:

- PSTN Fallback is supported only on the TRUNKS module.
- PSTN Fallback is supported only between ports on the same TRUNKS module.
- PSTN Fallback is supported only for ISDN when the number of supported channels (e.g., 30) is less than the maximum number of possible channels provided by the physical ports (e.g., two E1 trunks). When the number of supported channels (e.g., 60) equals the maximum number of channels provided by the physical ports (e.g., two E1 trunks), then other protocols such as CAS are also supported.
- The scenarios (i.e., power outage and/or IP network loss) upon which PSTN Fallback is triggered is configured by the TrunkLifeLineType parameter. For more information, see the User's Manual.
- This PSTN Fallback feature has no relation to the PSTN Fallback Software Upgrade Key.



6.6 Connecting to Power

The procedure below describes how to connect the device to the AC power supply.

**Warning:**

- Units must be connected (by service personnel) to a socket-outlet with a protective earthing connection.
- Use only the AC power cord supplied with the device.

**Notes:**

- You can install up to two Power Supply modules (Power 1 and Power 2), each providing an AC power connector on the device's rear panel. The dual power option provides the device with power redundancy. If both power units are used (for load sharing - failure protection / redundancy), ensure that you connect each power supply unit to a different AC supply circuit.
- The two AC power sources must have the same ground potential.

➤ **To connect the device to the power supply:**

- On the device's rear panel, connect the left (active) 100-240V~50-60 Hz power socket to a standard electrical outlet using the supplied AC power cord.

When the device receives power, the POWER LED on the front panel of the Power Supply module is lit green. If the LED is off, a power supply problem may be present.

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7 Connecting the Mediant 1000B PSTN Gateway to the Network

The Mediant 1000B SBA includes an embedded Web server (Web interface), providing a user-friendly graphical user interface (GUI) for configuring PSTN gateway-related functionality (PSTN Gateway). The IP address used for accessing this Web interface must be changed to suit the networking scheme in which your Mediant 1000B SBA is deployed.

Before you can configure the PSTN Gateway, you need to first access it with the default VoIP / Management LAN IP address, and configure the port settings.

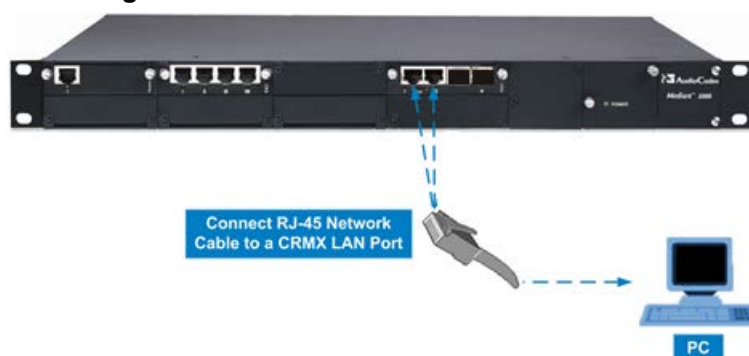
7.1 Initial Access to the PSTN Gateway

Before you can configure the PSTN Gateway, you need to access its Web interface using the default VoIP / Management LAN IP address, as described in below.

➤ **To initially access the PSTN Gateway:**

1. Connect one of the LAN ports on the CRMX module on the front panel of the device directly to a PC, using a straight-through Ethernet cable.

Figure 7-1: Connecting Mediant 1000B SBA LAN Port on CRMX Module (Front Panel)

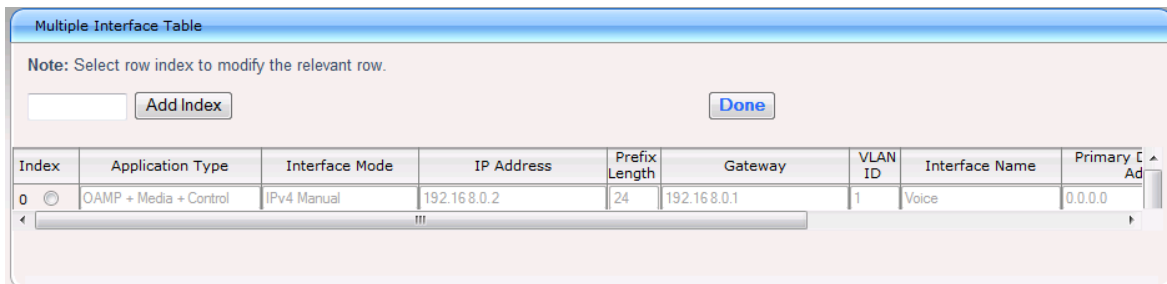


2. Change your computer's IP address so that it is on the same subnet as the default IP address of the Mediant 1000B PSTN Gateway (i.e., 192.168.0.2).
3. Open a standard Web browser, and then in the URL address field, enter the Mediant 1000B SBA default VoIP / Management LAN IP address.
4. The following login screen appears, prompting you to log in with your login credentials:

Figure 7-2: Login Screen

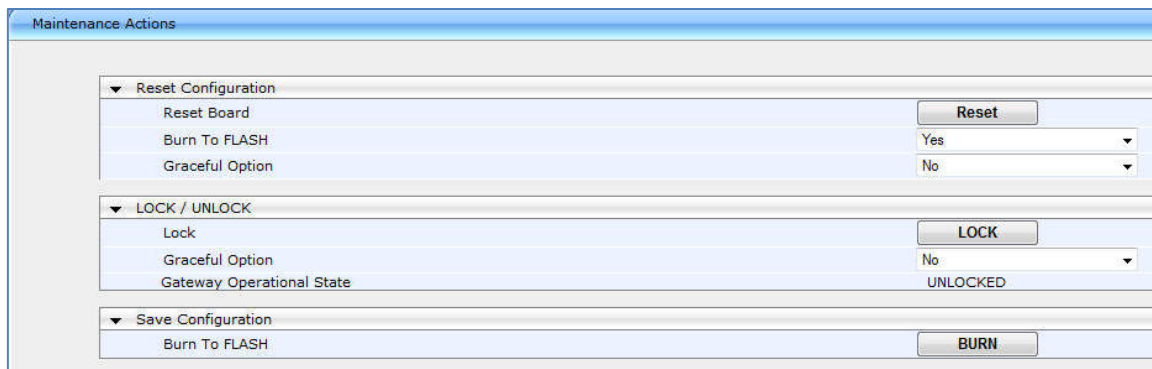
The screenshot shows a web browser window titled "Web Login". The page has a light gray background. At the top center, the text "Web Login" is displayed. Below this, there are two input fields. The first is labeled "Username" and contains the text "Admin". The second is labeled "Password" and is currently empty. Below the password field, there is a checked checkbox followed by the text "Remember Me". To the right of these elements is a blue button with the text "Login" in white.

5. Log in with the default, case-sensitive user name (“Admin”) and password (“Admin”), and then click OK; the Web interface appears, displaying the Home page.
6. Open the Physical Ports Settings page (**Configuration** tab > **VoIP** menu > **Network** > **Physical Ports Settings**) and then modify the device's physical Ethernet port-pair (group) that you want to later assign to the OAMP interface. For more information, see Section 7.2 on page 51.
7. Open the Multiple Interface Table page (**Configuration** tab > **VoIP** menu > **Network** > **IP Settings**), as shown in the figure below.

Figure 7-3: IP Settings Screen


Index	Application Type	Interface Mode	IP Address	Prefix Length	Gateway	VLAN ID	Interface Name	Primary IP Address
0	OAMP + Media + Control	IPv4 Manual	192.168.0.2	24	192.168.0.1	1	Voice	0.0.0.0

8. Select the 'Index' radio button corresponding to the Application Type "OAMP + Media + Control"(i.e., the VoIP and Management LAN interface), and then click **Edit**.
9. Configure a LAN network address so that it corresponds to your network IP addressing scheme.
10. From the 'Underlying Interface' drop-down list, select the physical LAN port-pair group that you want to assign to the interface.
11. Click **Apply**, and then click **Done** to apply and validate your settings.
12. On the toolbar, from the Device Actions drop-down list, choose **Reset**, and then in the 'Maintenance Actions' page, click the **Reset** button; the Mediant 1000B resets and your settings are saved to the flash memory.

Figure 7-4: Maintenance Actions: Reset Gateway


13. Maintain the cabled connection between the Mediant 1000B LAN port and the computer.

7.2 Configuring Physical Ethernet Ports

The device's physical LAN ports are grouped into pairs (termed Group Members), where each group consists of an active port and a standby port. This provides LAN port redundancy within a group, whereby if an active port is disconnected and the other port is connected the device switches over to the standby port, making it active and the previously active port becomes non-active. These port groups can be assigned to IP network interfaces in the Multiple Interface table. Each port group can be assigned to up to 32 interfaces. This enables physical separation of network interfaces, providing a higher level of segregation of sub-networks. Equipment connected to different physical ports is not accessible to one another. The only connection between them can be established by cross connecting them with media streams (a VoIP calls).

For each LAN port, you can configure the speed, duplex mode, native VLAN (PVID), and provide a brief description. Up to three port-pair redundancy groups are supported, where one port-pair is on the CRMX module and two port-pairs are on the SWX LAN Expansion module.

➤ **To configure the physical Ethernet ports:**

1. Open the Physical Ports Settings page (**Configuration** tab > **VoIP** menu > **Network** > **Physical Ports Settings**).

Figure 7-5: Physical Ports Settings Page

Index	Port	Mode	Native Vlan	Speed&Duplex	Description	Group Member	Group Status
1	GE_0_1	Enable	1	Auto Negotiation	User Port #0	GROUP_1	Redundant
2	GE_0_2	Enable	1	Auto Negotiation	User Port #1	GROUP_1	Redundant

2. Select the 'Index' radio button corresponding to the port that you want to configure.
3. Click the **Edit** button.
4. Configure the ports (see the table below for a description of the parameters).
5. Click **Apply**.

Table 7-1: Physical Port Settings Parameters Description

Parameter	Description
Port	<p>(Read-only) Displays the port number. The string values displayed on the Web page represent the physical ports, as shown below:</p> <div style="text-align: center;"> <p>The diagram shows a physical interface panel with two rows of ports. The top row has two ports labeled GE_0_1 and GE_0_2, with arrows pointing to them from the label GROUP_1 above. The bottom row has four ports labeled GE_7_1, GE_7_2, GE_7_3, and GE_7_4, with arrows pointing to them from the labels GROUP_2 and GROUP_3 below.</p> </div>

Parameter	Description
Mode	(Read-only field) Displays the mode of the port: <ul style="list-style-type: none"> ▪ [0] Disable ▪ [1] Enable (default)
Native Vlan	Defines the Native VLAN or PVID of the port. Incoming packets without a VLAN ID are tagged with this VLAN. For outgoing packets, if the VLAN ID as defined in the Multiple Interface table is the same as the Native VLAN ID, the device sends the packet without a VLAN; otherwise, the VLAN ID as defined in the Multiple Interface table takes precedence. The valid value range is 1 to 4096. The default is 1.
Speed & Duplex	Defines the speed and duplex mode of the port. <ul style="list-style-type: none"> ▪ [0] 10BaseT Half Duplex ▪ [1] 10BaseT Full Duplex ▪ [2] 100BaseT Half Duplex ▪ [3] 100BaseT Full Duplex ▪ [4] Auto Negotiation (default) ▪ [6] 1000BaseT Half Duplex ▪ [7] 1000BaseT Full Duplex
Description	Defines an arbitrary description of the port.
Group Member	(Read-only field) Displays the group to which the port belongs.
Group Status	(Read-only) Displays the status of the port: <ul style="list-style-type: none"> ▪ "Active" - the active port ▪ "Redundant" - the standby (redundant) port

Part III

Preparing SBA at DataCenter

Prior to installing and configuring the SBA at the branch office you must perform the following at the datacenter (typically, located at headquarters):

- Add the SBA Device to the Active Directory (AD). See Chapter 8 on page 55.
- Create a user account on the AD belonging to the RTCUniversalSBATEchnicians group. This user performs the SBA deployment (Domain Admin account can also perform SBA deployment, by default). See Chapter 8 on page 55.
- Add (publish) the SBA Device to your topology. See Chapter 9 on page 57.

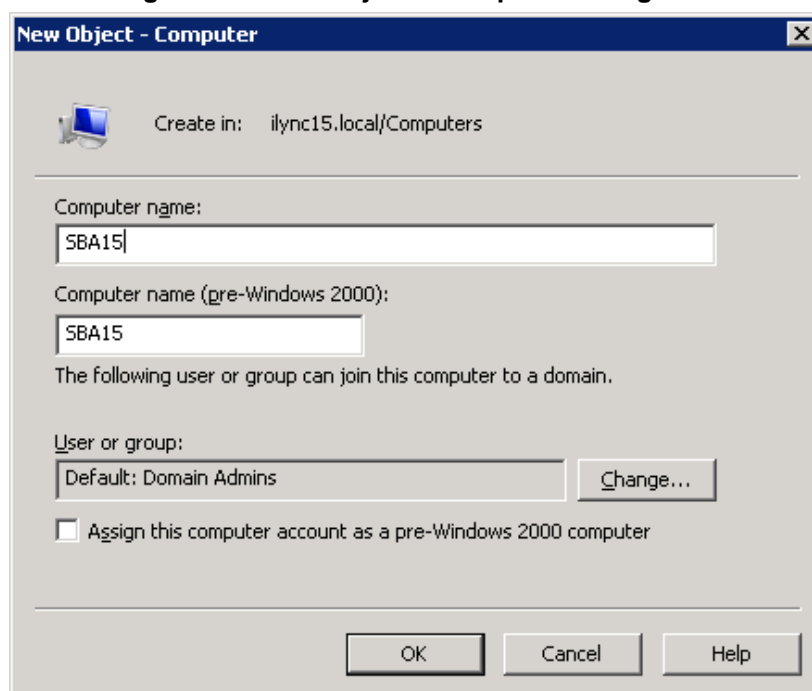
8 Adding the SBA Device to the Active Directory

The procedure below describes how to add the SBA device to the AD.

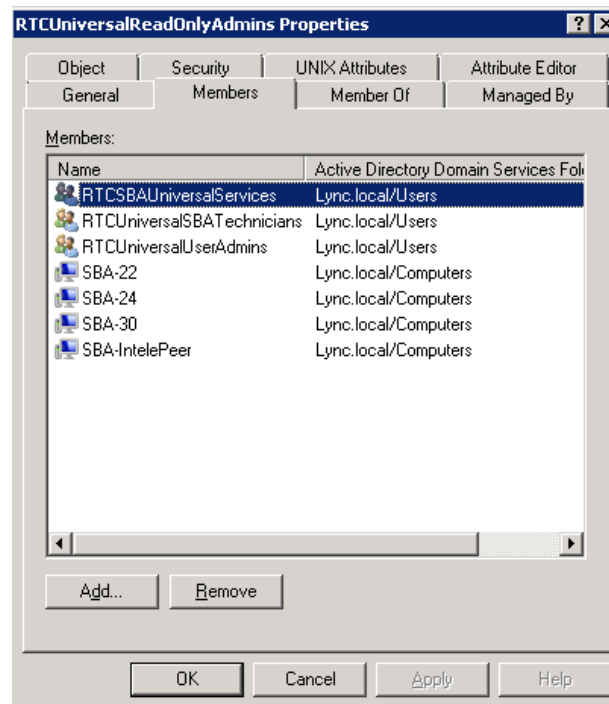
➤ **To add the SBA device to the Active Directory:**

1. Add the planned Survivable Branch Appliance device name to the Active Directory Domain Services:
 - a. Start the Active Directory Users and Computers program (**Start > Administrative Tools > Active Directory Users and Computers**).
 - b. Add the Survivable Branch Appliance device name to the domain computers (right-click Computers, choose New, and then click Computer).

Figure 8-1: New Object – Computer Dialog Box



- c. Click **Change** to add a user or group that can insert this specific SBA server to the domain. (if you working with the Domain Administrator, do not change the "Domain Admin" group, if you working with another user, specify the name of a user or group that is allowed to join this computer to the domain.
 - d. Add the Survivable Branch Appliance computer object to the 'RTCUniversalReadOnlyAdmins' group (**Users > RTCUniversalReadOnlyAdmins** (right-click, select **Properties**, and then select the **Numbers** tab and **Add**).

Figure 8-2: RTCUniversalReadOnlyAdmins


- e. Start the ADSI Edit program (**Start > Administrative Tools > ADSI Edit**).
 - f. Right-click the Survivable Branch Appliance computer name (that you created in Step 'b' above), and then choose **Properties**.
 - g. In the Attributes list, set servicePrincipalName to "HOST/<SBA FQDN>", where SBA FQDN is the FQDN of your Survivable Branch Appliance (e.g., HOST/SBA15.iLync15.local).
2. Create a user account on Active Directory Services belonging to the **RTCUniversalSBATechnicians** group. This user performs the Survivable Branch Appliance deployment.

9 Defining the Branch Office Topology using Topology Builder

This section describes how to add the Survivable Branch Appliance to your topology, using Lync Server 2013 Topology Builder. This configuration includes the following main steps:

- Defining the branch office – see Section 9.1 on page 58.
- Publishing the topology – see Section 9.2 on page 67.



Note: The procedure described in this section is relevant for both Lync 2010 and Lync 2013. Where relevant different screen examples are shown for each deployment.

9.1 Defining the Branch Office

The procedure below describes how to create and define the branch office.

➤ **To create branch sites:**

1. Start the Lync Server 2013 Topology Builder program:
 - a. (**Start menu > All Programs > Microsoft Lync Server 2013, Lync Server Topology Builder**)
 - or
 - b. (**Start menu > All Programs > Microsoft Lync Server 2010, Lync Server Topology Builder**), as shown in the examples below:

Figure 9-1: Menu Path to Topology Builder Program Lync 2013

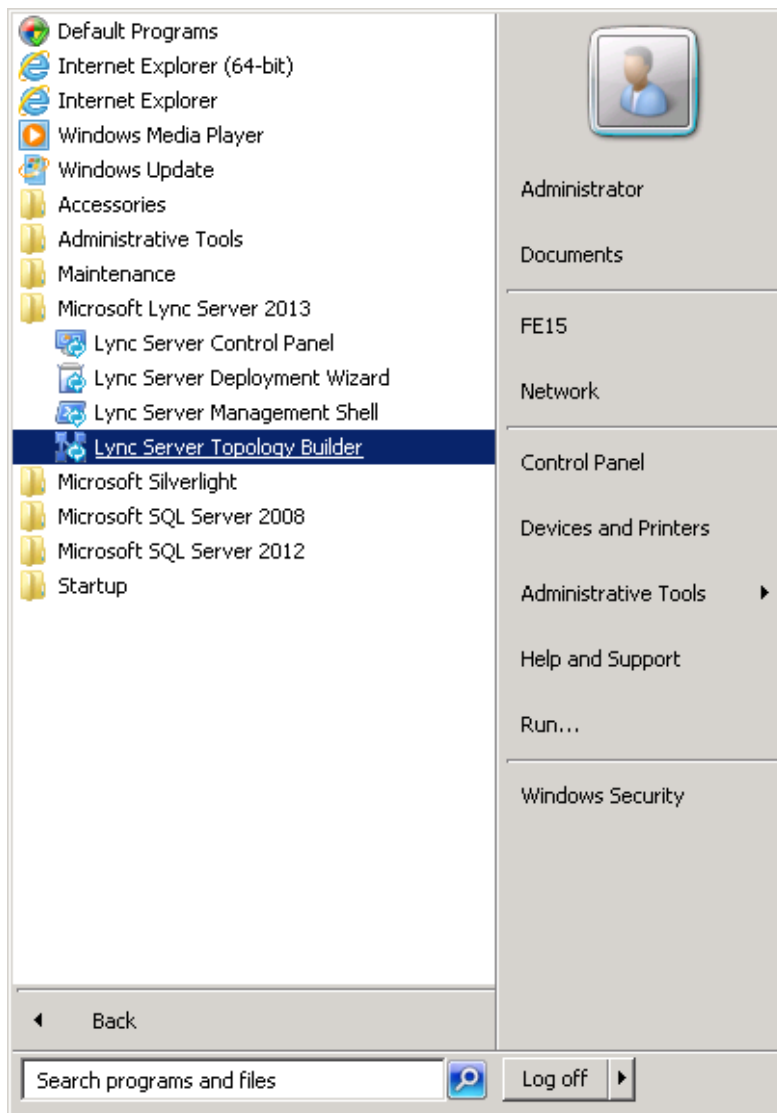
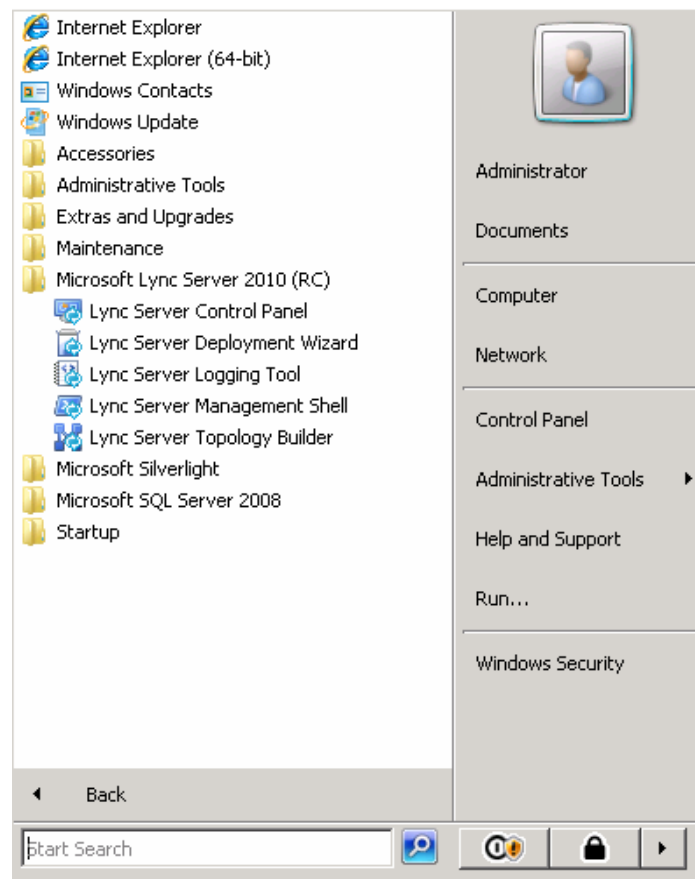


Figure 9-2: Menu Path to Topology Builder Program Lync 2010

The Topology Builder opens as shown in the examples below:

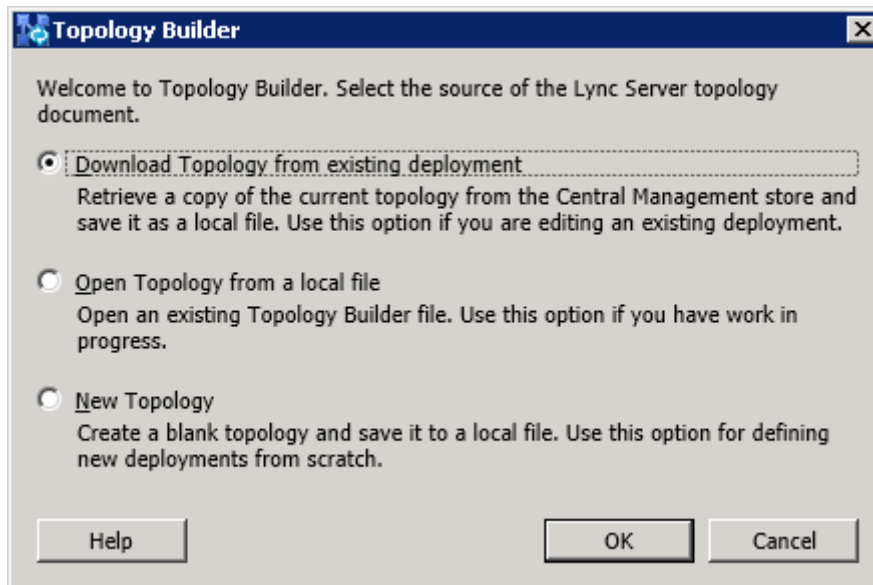
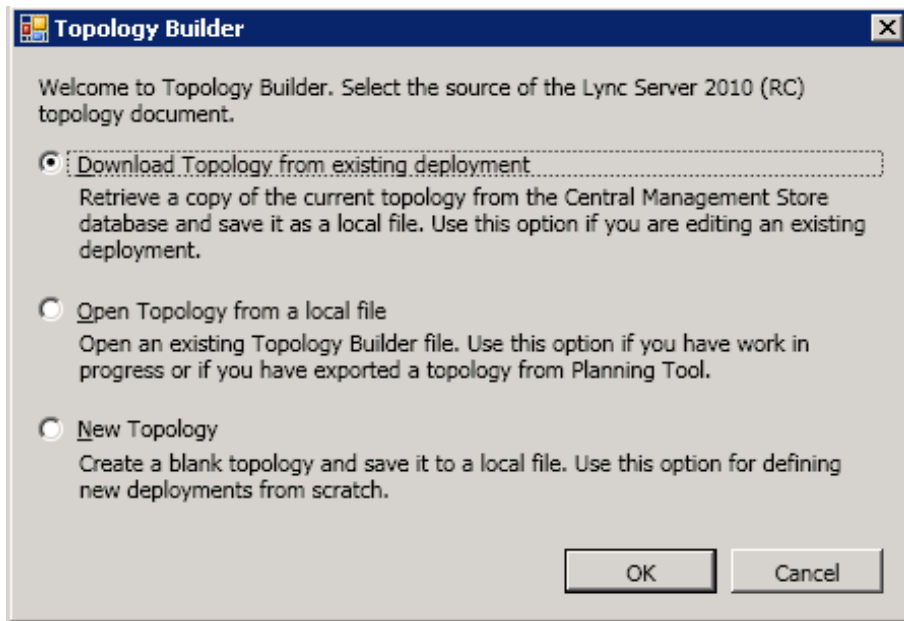
Figure 9-3: Topology Builder Lync 2013

Figure 9-4: Topology Builder Lync 2010



2. Select the Download Topology from existing deployment option (assuming your Lync Server 2013 or Lync Server 2010 deployment already has a topology), and then click **OK**; a dialog box opens, prompting you to save the existing topology file.
3. Save the topology; the following example screens appears:

Figure 9-5: Lync Server 2013 Topology Builder

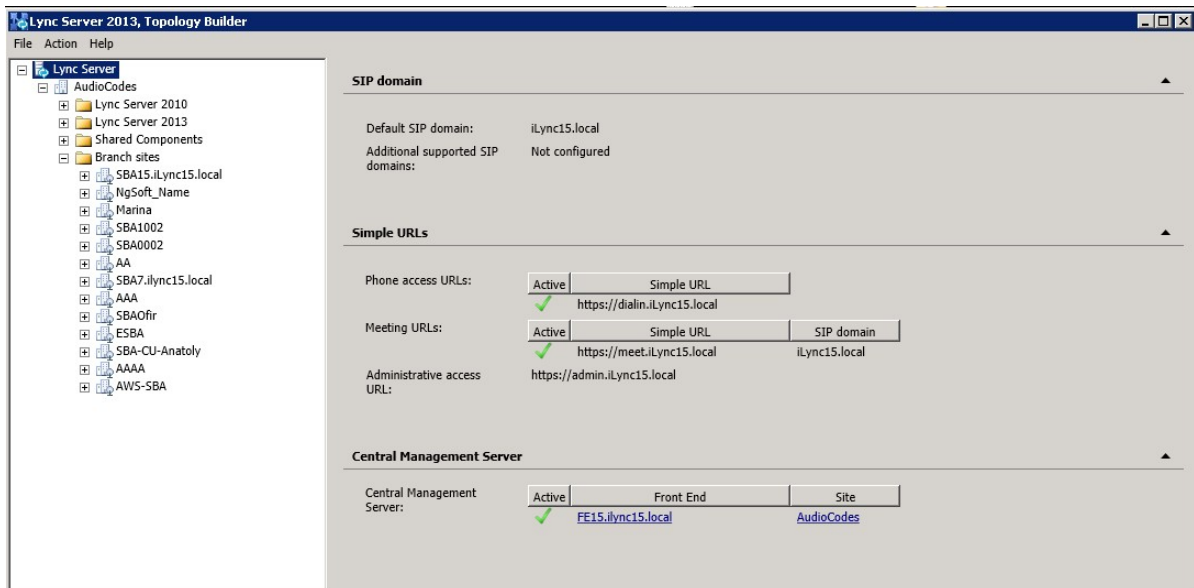
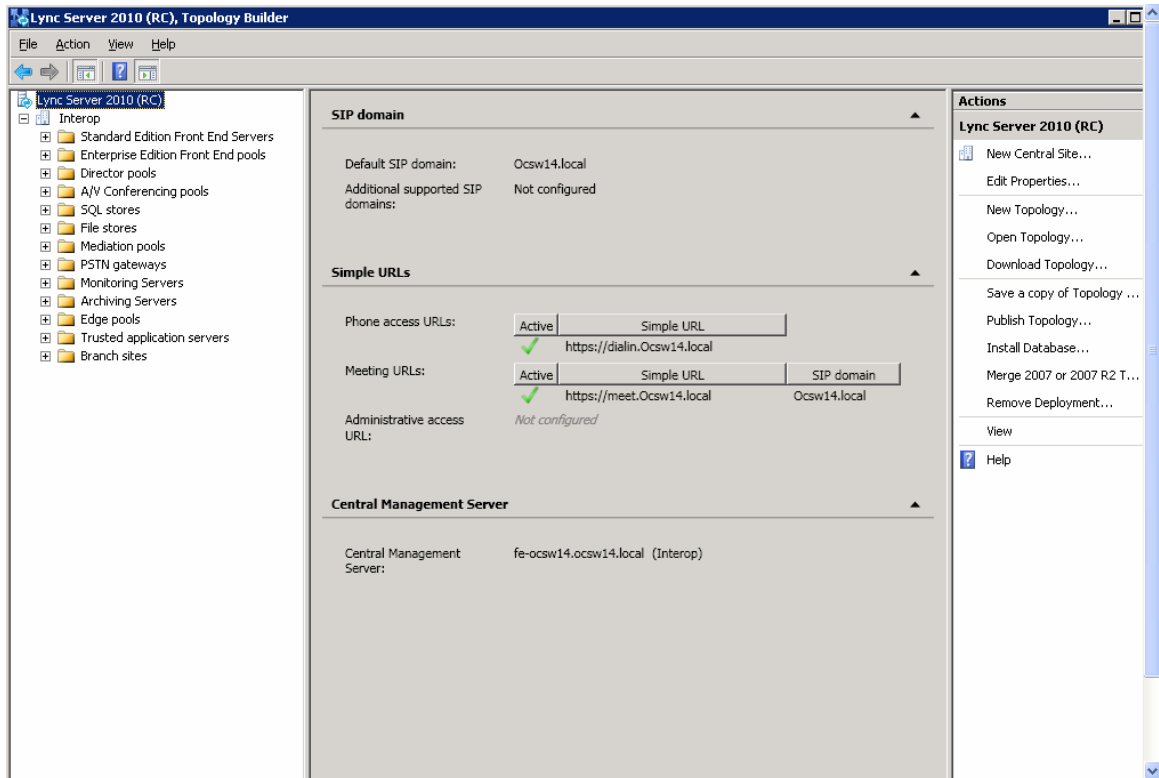
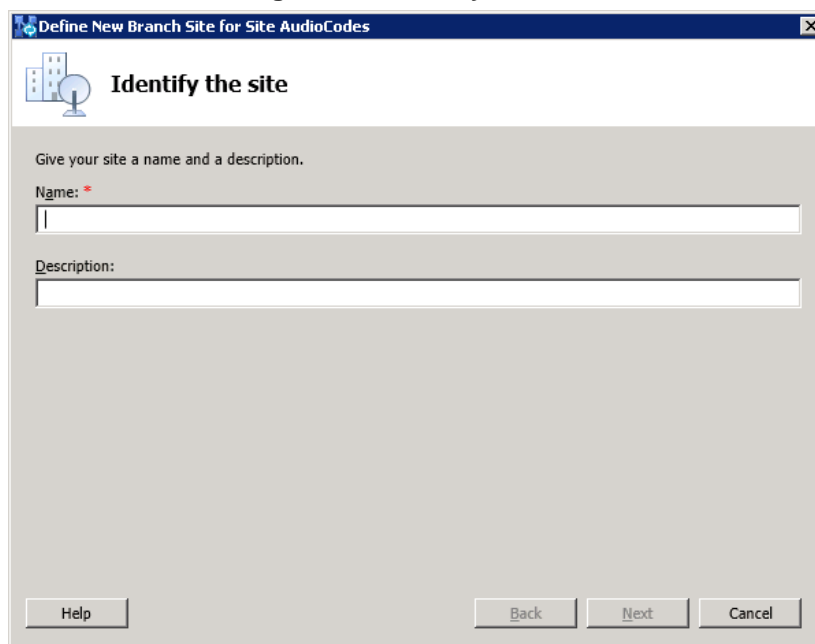


Figure 9-6: Lync Server 2010 Topology Builder



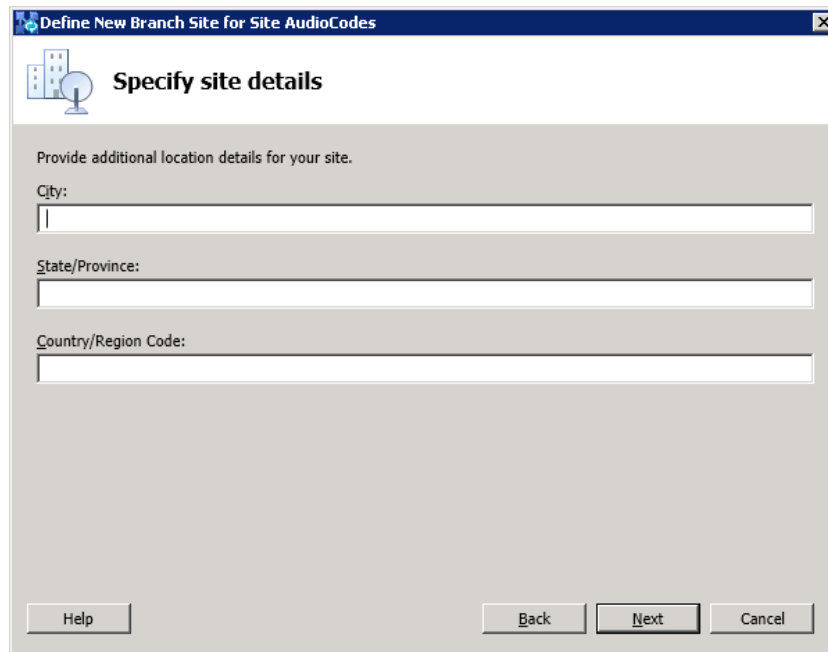
4. From the Topology Builder console tree, do one of the following:
 - If you used the Planning tool to design your Enterprise Voice topology, expand the Branch sites node, and then expand the name of the branch site you specified in the tool. To modify each section of the branch office, right-click the branch site, and then from the shortcut menu, choose Edit Properties.
 - If you did not use the Planning tool, right-click the Branch sites node, and then from the shortcut menu, choose New Branch Site; the following dialog box appears:

Figure 9-7: Identify the Site



5. In the dialog box, do the following:
 - a. In the 'Name' field, type the name of the branch site. Only this field is required, the other fields are optional.
 - b. In the 'Description' field, type a meaningful description of the branch site.
 - c. Click **Next**; the following dialog box appears:

Figure 9-8: Specify Site Details



Define New Branch Site for Site AudioCodes

Specify site details

Provide additional location details for your site.

City:

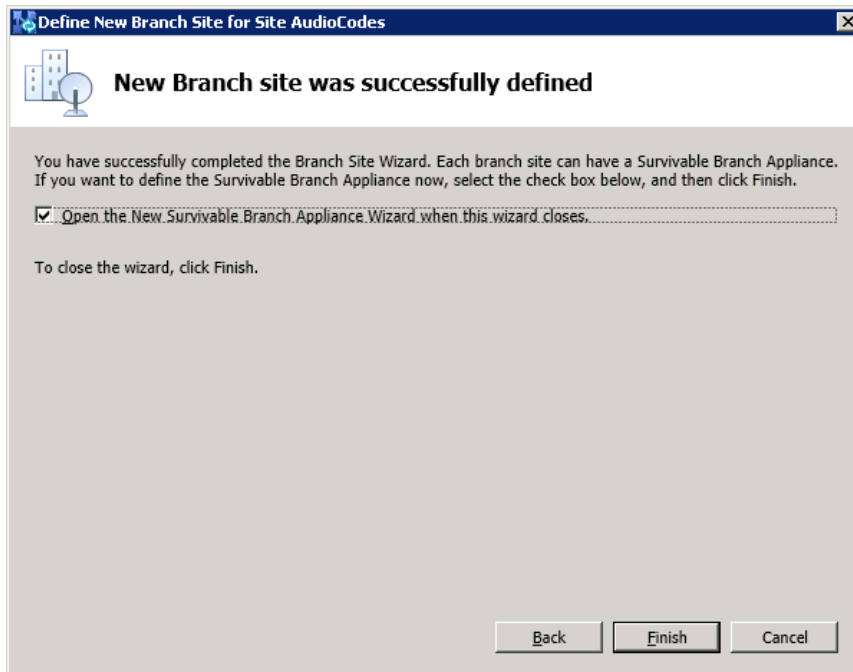
State/Province:

Country/Region Code:

Help Back Next Cancel

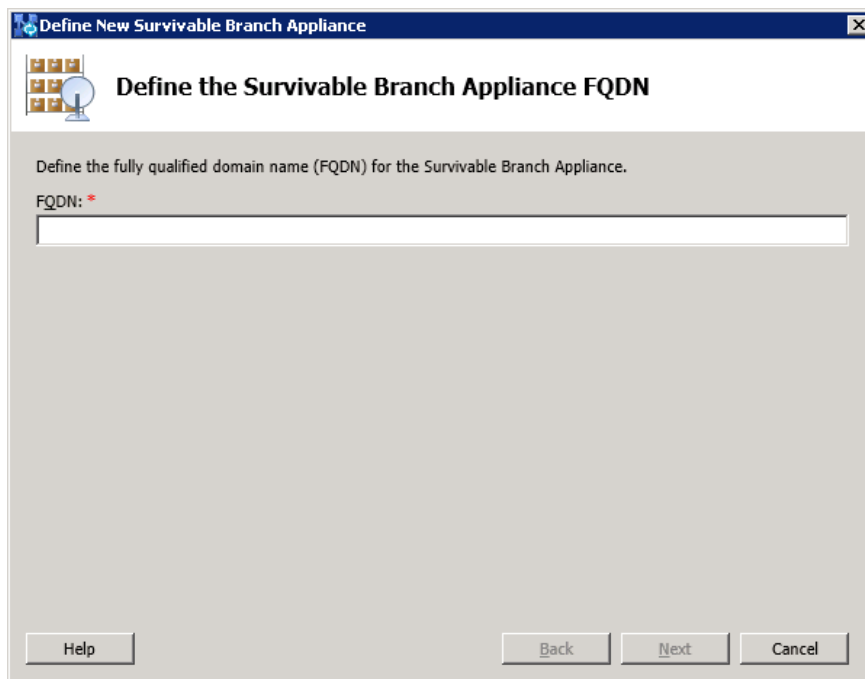
6. In the dialog box, do the following:
 - a. In the 'City' field, type the name of the city in which the branch site is located.
 - b. In the 'State/Province' field, type the name of the state or region in which the branch site is located.
 - c. In the 'Country/Region Code' field, type the two-digit calling code for the country in which the branch site is located.
 - d. Click **Next**; the following dialog box appears:

Figure 9-9: New Branch Site Successfully Defined



7. Select the check box 'Open the New Survivable Branch Appliance Wizard when this wizard closes', and then click **Finish**; the following dialog box appears:

Figure 9-10: Define the Survivable Branch Appliance FQDN



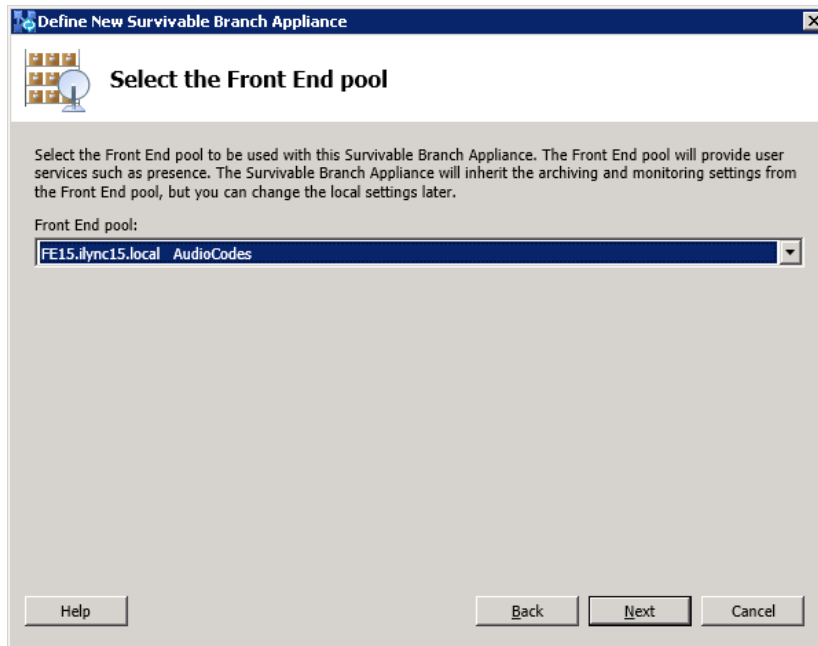
- In the 'FQDN' field, type the FQDN of the SBA, and then click **Next**.



Note: The Survivable Branch Appliance FQDN that you configured in the 'FQDN' field must be the same as the FQDN that you configured using the ADSI Edit program in Section 0 on page 37.

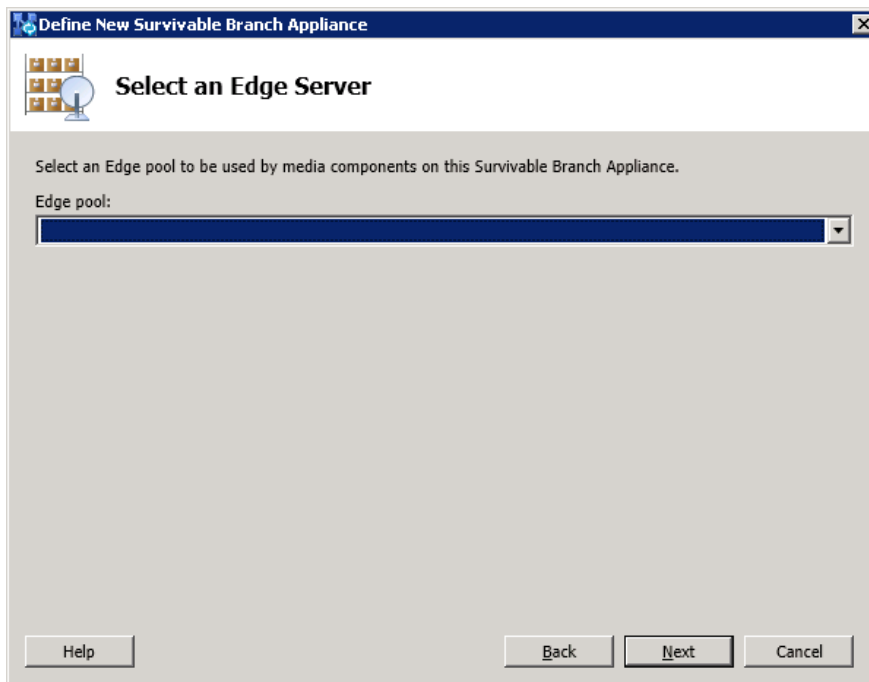
The following dialog box appears:

Figure 9-11: Select the Front End Pool



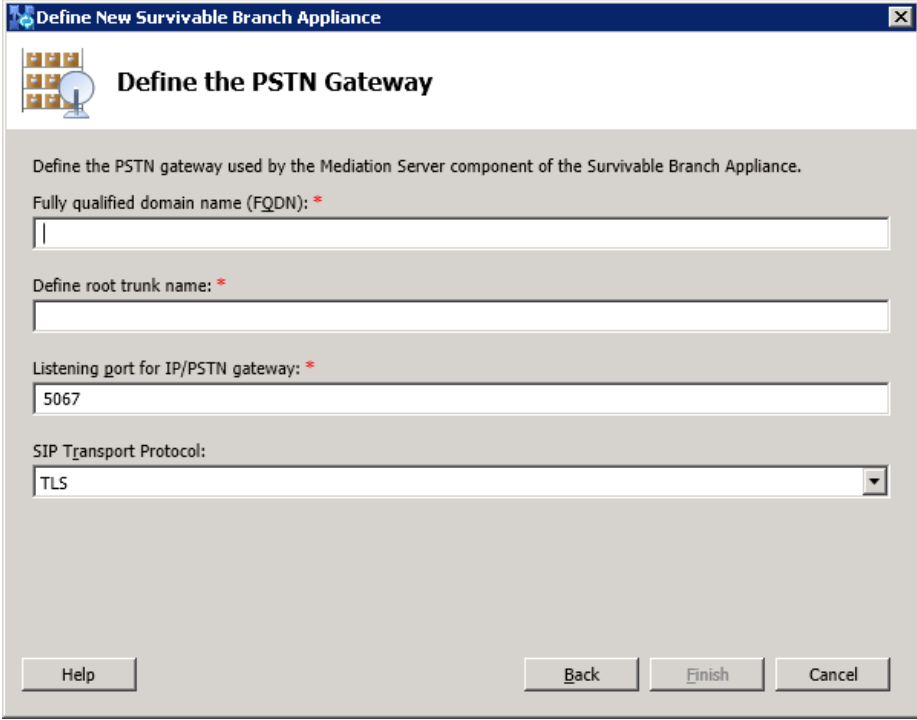
- From the 'Front End pool' drop-down list, select the Front End pool to be used with this SBA, and then click **Next**; the following dialog box appears:

Figure 9-12: Select an Edge Server



- From the 'Edge pool' drop-down list, select the Edge pool to be used with this SBA (optional), and then click **Next**; the following dialog box example screens appear:

Figure 9-13: Define the PSTN Gateway-Lync 2013

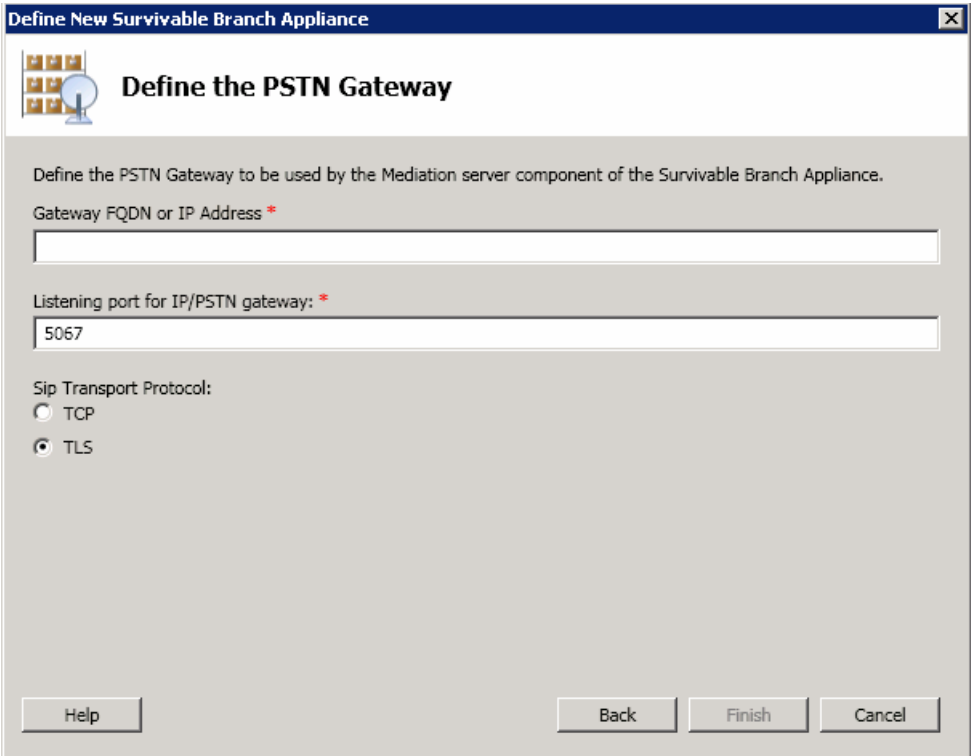


The screenshot shows a dialog box titled "Define New Survivable Branch Appliance" with a sub-header "Define the PSTN Gateway". The main text reads: "Define the PSTN gateway used by the Mediation Server component of the Survivable Branch Appliance." The form contains the following fields:

- Fully qualified domain name (FQDN): *
- Define root trunk name: *
- Listening port for IP/PSTN gateway: * (with the value 5067 entered)
- SIP Transport Protocol: (with a dropdown menu showing TLS selected)

At the bottom, there are four buttons: Help, Back, Finish, and Cancel.

Figure 9-14: Define the PSTN Gateway-Lync 2010



The screenshot shows a dialog box titled "Define New Survivable Branch Appliance" with a sub-header "Define the PSTN Gateway". The main text reads: "Define the PSTN Gateway to be used by the Mediation server component of the Survivable Branch Appliance." The form contains the following fields:

- Gateway FQDN or IP Address *
- Listening port for IP/PSTN gateway: * (with the value 5067 entered)
- Sip Transport Protocol: (with radio buttons for TCP and TLS, where TLS is selected)

At the bottom, there are four buttons: Help, Back, Finish, and Cancel.

11. Do the following:
 - a. In the 'Gateway FQDN or IP Address' field, type the PSTN Gateway FQDN or IP address on which the Mediation Server component of the SBA is running. This is the IP address as configured for the PSTN Gateway. If you are using FQDN, ensure that your DNS server is configured to resolve the FQDN into this IP address.
 - b. In the 'Listening port for IP/PSTN Gateway' field, type the Gateway listening port. This must be the same port as configured in the PSTN Gateway, as described in Section 0 on page 150.
 - c. Under the SIP Transport Protocol group, select the SIP Transport Protocol option. This must be the same transport type as configured in the PSTN Gateway, as described in Section 0 on page 150.



Note: For call security, it is highly recommended that you deploy a Survivable Branch Appliance using TLS.

- d. Click **Finish**.

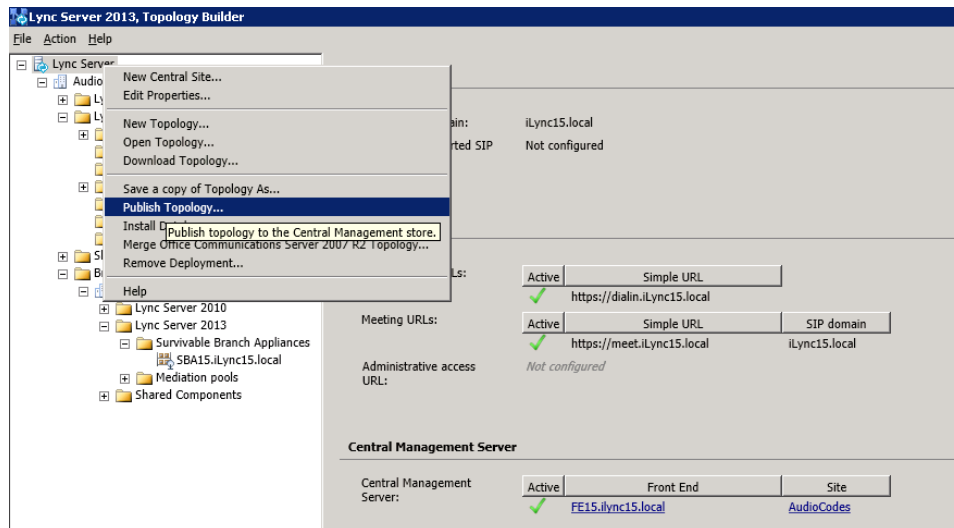
9.2 Publishing the Topology

Once you have defined the Branch Office (as described in the previous section), you need to publish this new topology, as described below.

➤ **To publish the topology:**

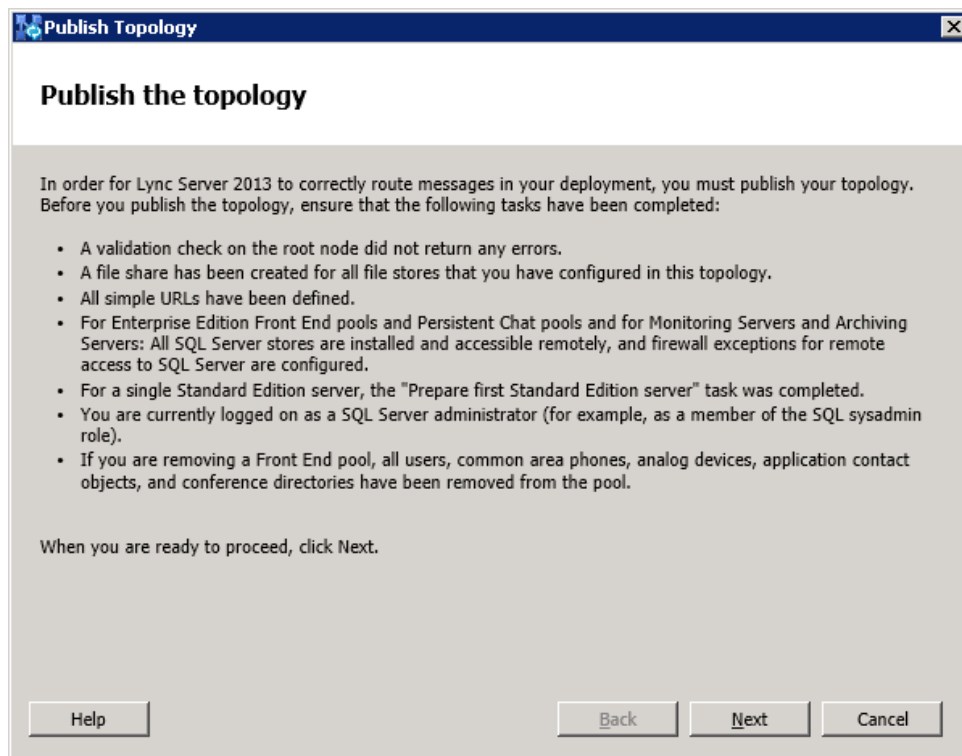
1. Right-click the root of the Lync Server 2013 node, and then choose **Publish Topology**.

Figure 9-15: Publish Topology Selection



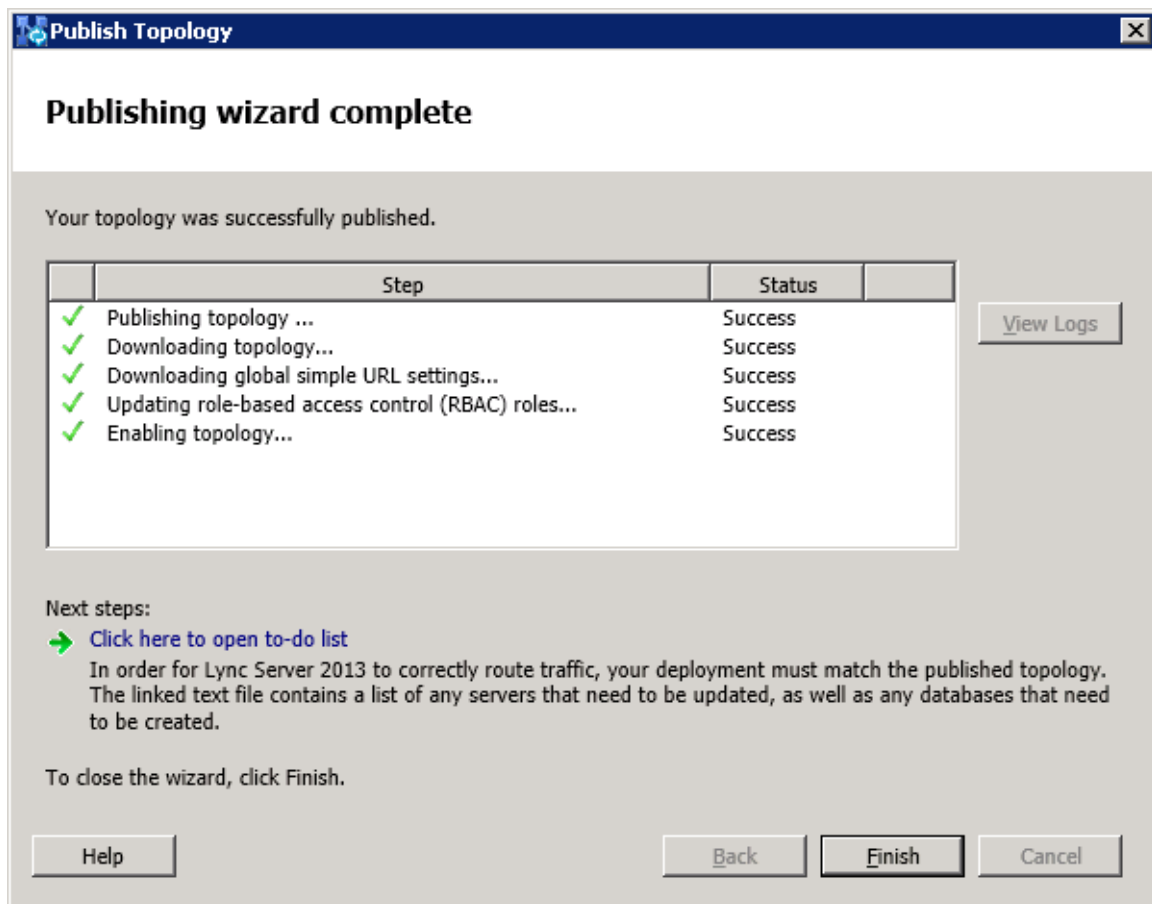
The following screen appears:

Figure 9-16: Publish the Topology



- Click **Next**; the following screen appears:

Figure 9-17: Publish Wizard Complete



- Verify that all steps display the 'Success' status, and then click **Finish**.

Part IV

Setting up the SBA Management Interface

This part describes how to connect to the SBA Management interface, and to install and configure the SBA.

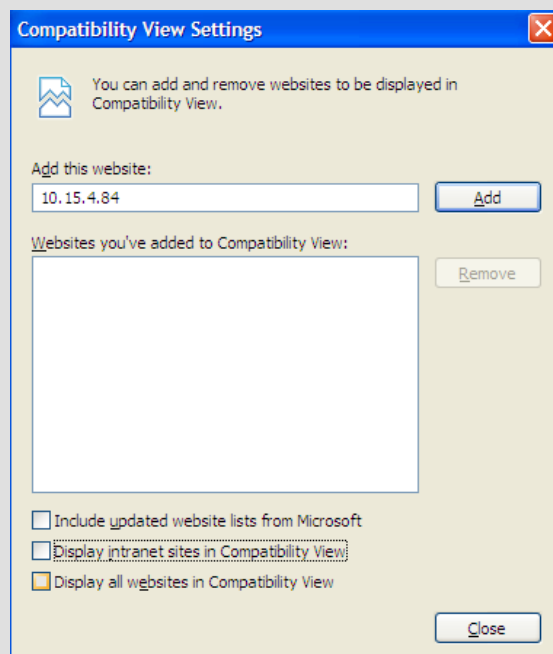


10 Initially Connecting to the SBA Management Interface

The SBA Web-based, graphical user interface (GUI) tool is used for installing and configuring the SBA application running on the Mediant 1000B SBA OSN server.

Note: The SBA Management Interface is supported from Internet Explorer 9 and later (Compatibility disabled), Firefox, and Google Chrome.

Internet Explorer 8 compatibility can be disabled by selecting Tools > Compatibility View Settings. The Display all websites in Compatibility View check box must be unchecked (cleared). The SBA server must not appear in the list of "Websites you've added to Compatibility View".



You can initially connect and log in to the SBA Management Interface using one of the following methods:

- **Using the internal NIC:** the SBA is connected to the network via the gateway/SBC Ethernet port and the device's internal switch. See below.
If this option is used, only a single network cable is required (for connecting to the gateway/SBC Ethernet port).
- **Using the external NIC:** the SBA is connected to the network via the Ethernet port on the OSN server. See Section 10.1.2 on page 76.
If this option is used, two network cables are required; one for connecting to the OSN server Ethernet port and the other for connecting to the gateway/SBC application Ethernet port.



Notes:

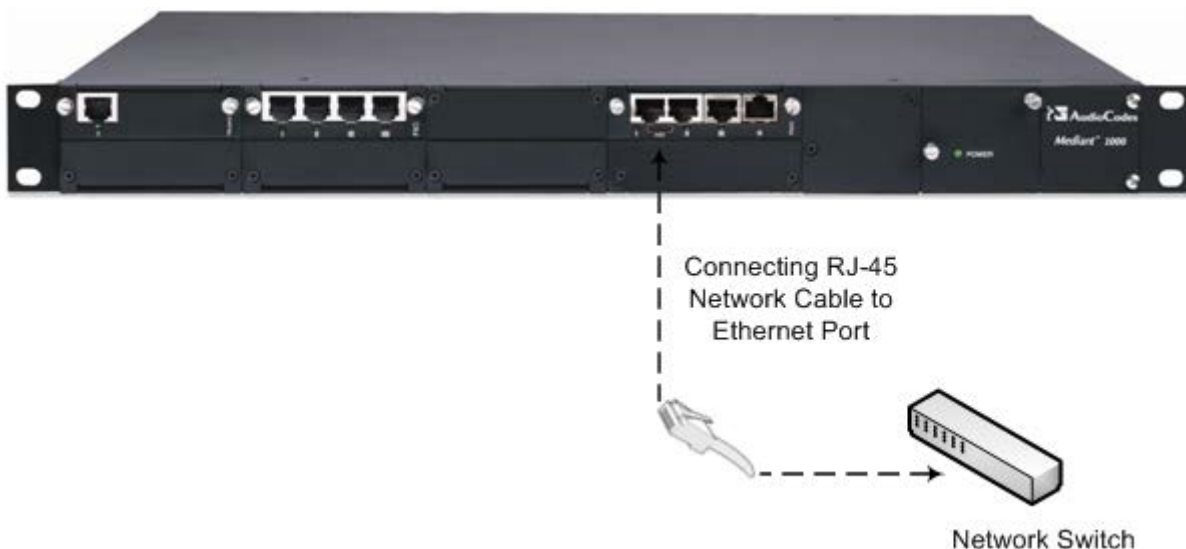
- It is highly recommended to use the external NIC option because when the internal NIC option is used and the gateway/SBC is reset via the device's Web server, then the SBA network connection is lost.
- The IP address of the OSN server is synonymous with the IP address of the SBA.

10.1.1 Initially Connecting to the SBA Using the Internal NIC

When you initially connect to the SBA using the internal NIC, the network cable should be connected to one of the gateway/SBC Ethernet ports on the device's front panel; this port connects to the device's internal switch, which then connects to the OSN module. When this option is used, there is no pre-configured factory default IP address, and therefore the network address must be acquired using DHCP or assigned with a static IP address.

- **To initially connect to the SBA using the internal NIC:**
 1. Connect one of the Ethernet ports on the CRMX module on the front panel of the device directly to the network using a straight-through Ethernet cable.

Figure 10-1: Connecting Mediant 1000B SBA LAN Port on CRMX Module (Front Panel)




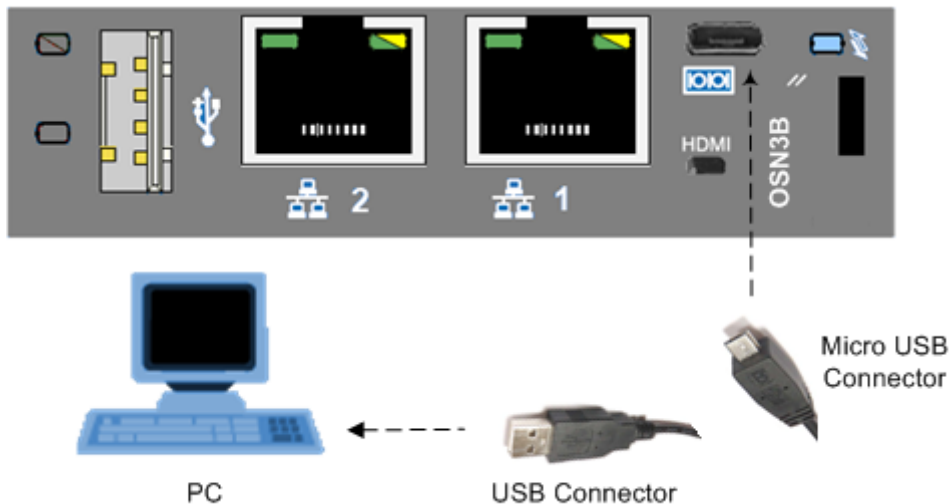
2. Connect the PC to the OSN server's serial port:
 - **OSN3B/OSN4:** Using the supplied micro USB to USB cable adapter, connect the micro USB connector end to the OSN3B/OSN4 serial port (), and then connect the other end of the cable (USB) to the serial interface port on your PC.

Figure 10-2: Cabling OSN3B and OSN4 to PC for Serial Communication




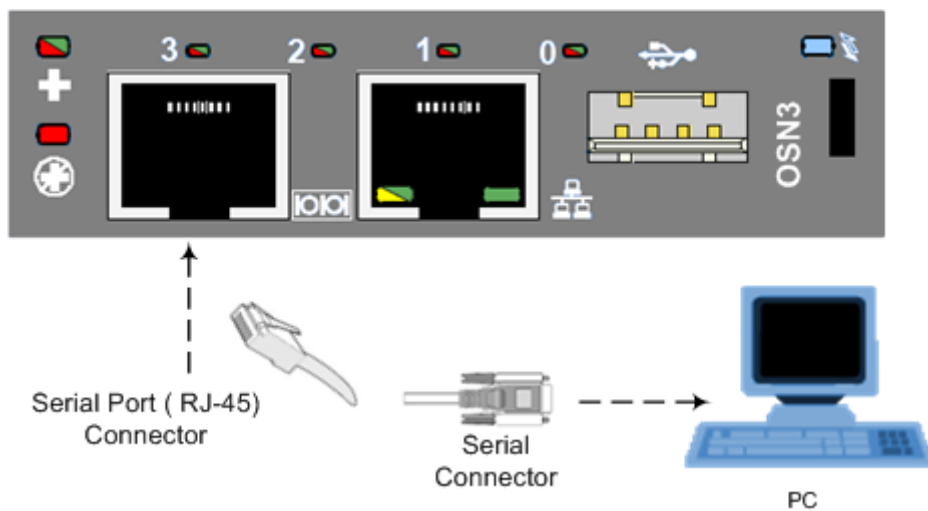
- **OSN3:** Connect an RJ-45 network cable to the RJ-45 serial port of the OSN3 module (), and then connect the other end of the cable to the serial port of your PC.

Figure 10-3: Cabling OSN3 to PC for Serial Communication



Notes:

- The OSN3 does not provide a direct monitor connection (HDMI port), and therefore, the serial port is used for determining the Ethernet port NIC.
- If you are running the OSN3B/OSN4 and wish to monitor the process using a monitor, see Section 30.2 on page 225.
- For the Mediant 1000B OSN3B/OSN4 serial interface port (micro-USB) to be operational, you must download a special USB driver from the Internet. Download this driver at <http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpcdrivers.aspx>



3. Establish a serial communication with the OSN server, using a terminal emulation program, such as HyperTerminal, with the following port settings:
 - Bits per second: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
4. Press Enter; the Serial Console prompt is displayed:

```
SAC>
```
5. Type the following to view all the NIC addresses:

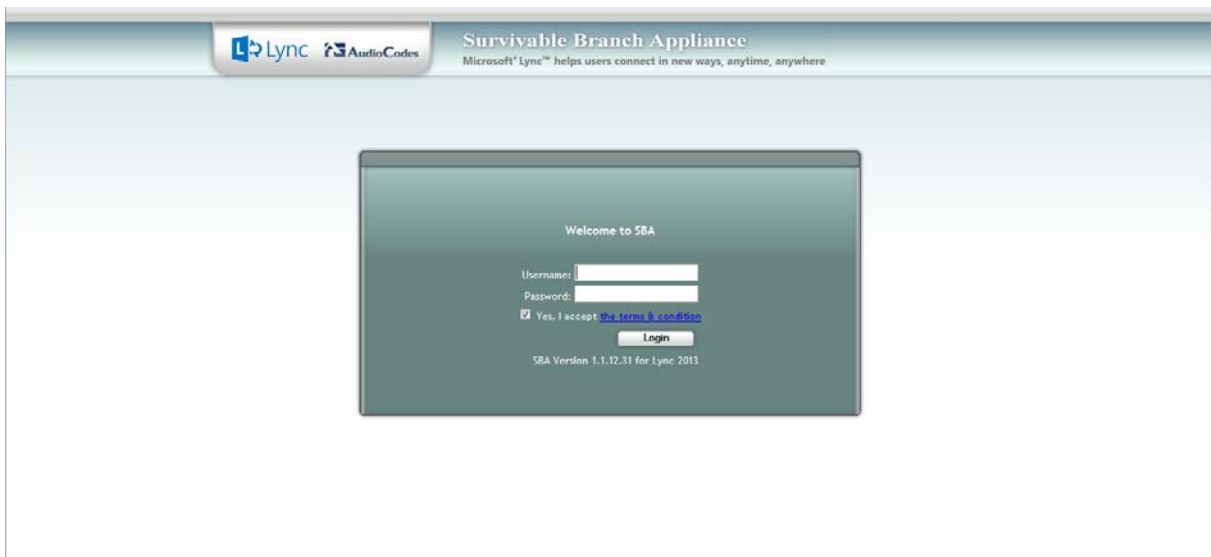
```
SAC>i
```

The displayed IP address should correspond to the internal NIC (the two external Ethernet ports should be displayed as "Disconnected").
6. Do one of the following:
 - If you have a DHCP server in your network, note the IP address assigned to the internal NIC (this IP address is used to connect to the SBA Management Interface).
 - If you are not using a DHCP server, assign a static IP address to the NIC of the internal Ethernet port :
At the prompt, type the following:

```
i <NIC ID> <IP address> <subnet> <default gateway>
```
7. Press **Enter** to apply your settings.
8. Disconnect the serial cable from the OSN server.
9. Open a standard Web browser (Firefox, Google Chrome, or Internet Explorer 9 and later is recommended), and then in the URL address field, enter the IP address that was assigned above.

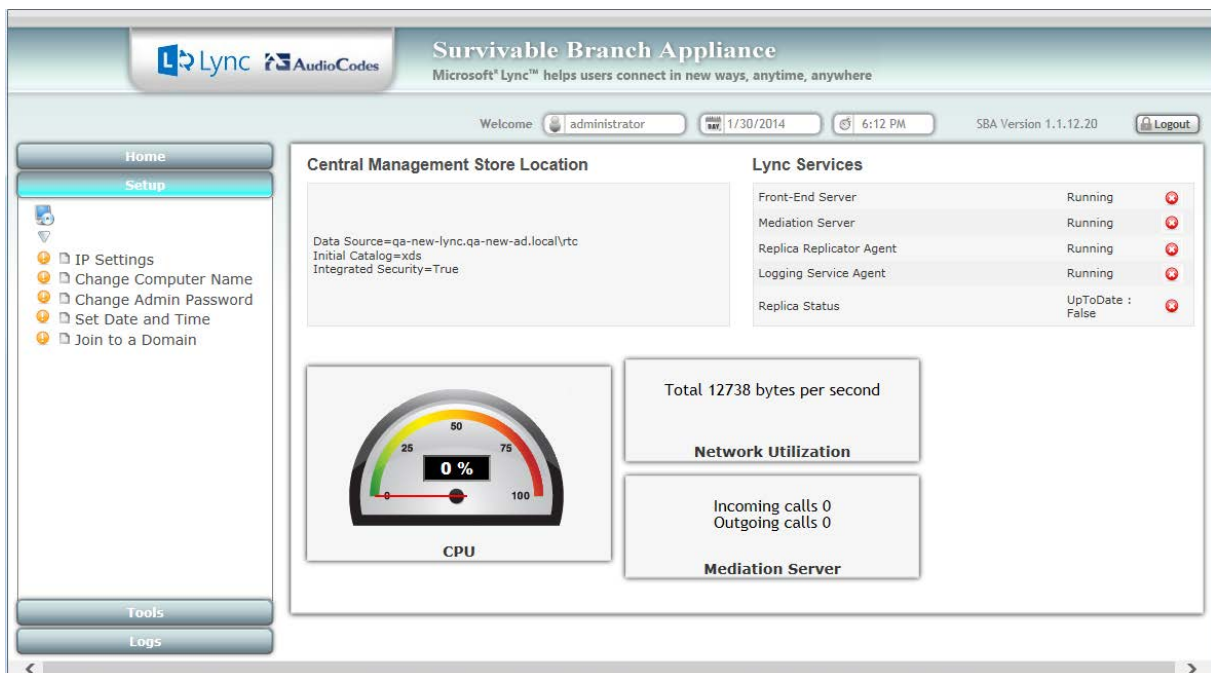
The Survivable Branch Appliance Management Interface opens:

Figure 10-4: Welcome to SBA Screen



10. Log in with the default username ("Administrator") and password ("Pass123"), Select the "Yes, I accept the term and condition" checkbox, and then click **Login**; the Home screen appears:

Figure 10-5: SBA Home Screen



11. Change the default IP address of the SBA Management Interface to suit your network environment (see Section 11.1 on page 81).

10.1.2 Initially Connecting to the SBA Using the External NIC

When you initially connect to the SBA using the external NIC, the network cable should be connected to Ethernet port 1 on the OSN module.

The SBA Management Interface is initially accessed using the pre-configured factory default IP address of the OSN server (**192.168.0.20/16**). You can then use the SBA Management interface to change this default IP address to suit your network environment.

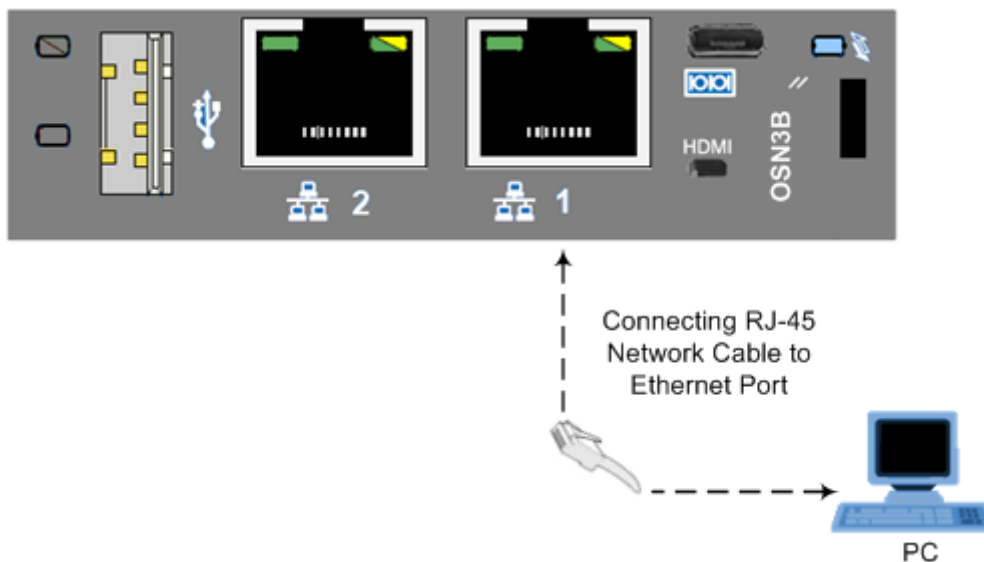


Note: If you have an OSN3B/OSN4 module and wish to monitor the connection process, you can connect an HDMI monitor (see Section 30.2 on page 225).

➤ **To initially connect to the SBA using the external NIC:**

1. Using a network cable, connect the PC to the appropriate Ethernet port:
 - On the OSN3B/OSN4 module, connect to Port 1:

Figure 10-6: Connecting to LAN Port on OSN3B/OSN4 Module (Rear Panel View)




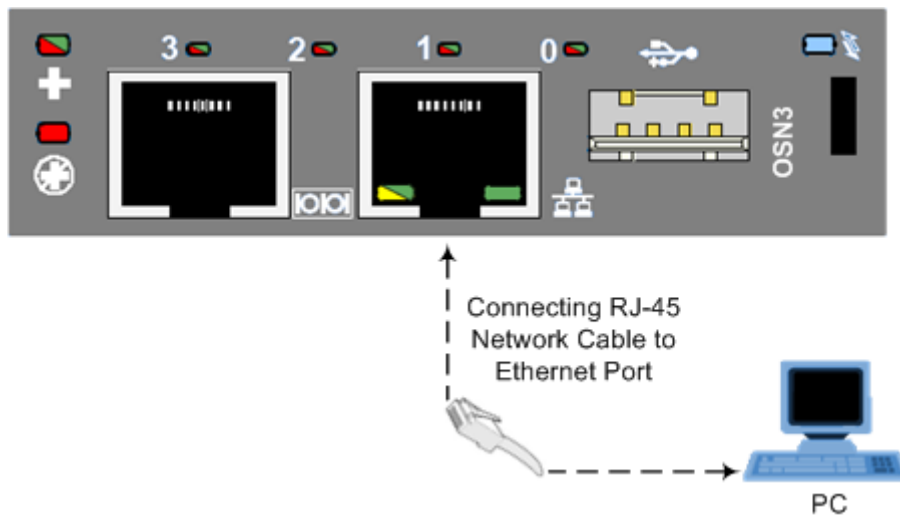
- On the OSN3 module, connect to the port labeled  :

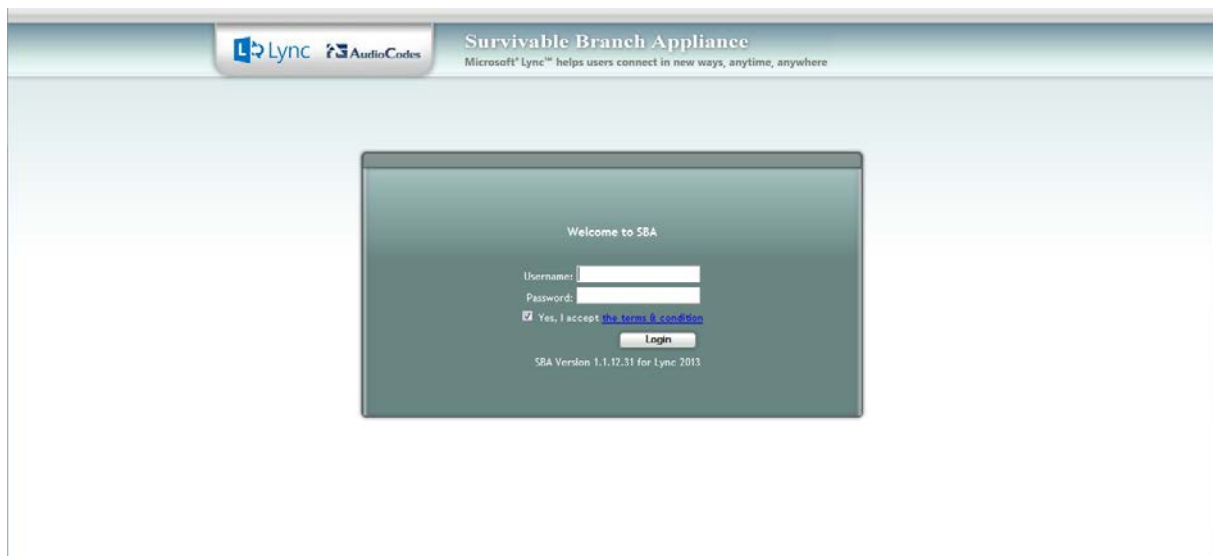
Figure 10-7: Connecting to LAN Port on OSN3 Module (Rear Panel View)



2. Change your computer's IP address so that it is in the same subnet as the default IP address of the OSN server hosting the SBA.
3. Open a standard Web browser (Firefox, Google Chrome, or Internet Explorer 9 and later is recommended), and then in the URL address field, enter the OSN server default IP address (**192.168.0.20/16**).

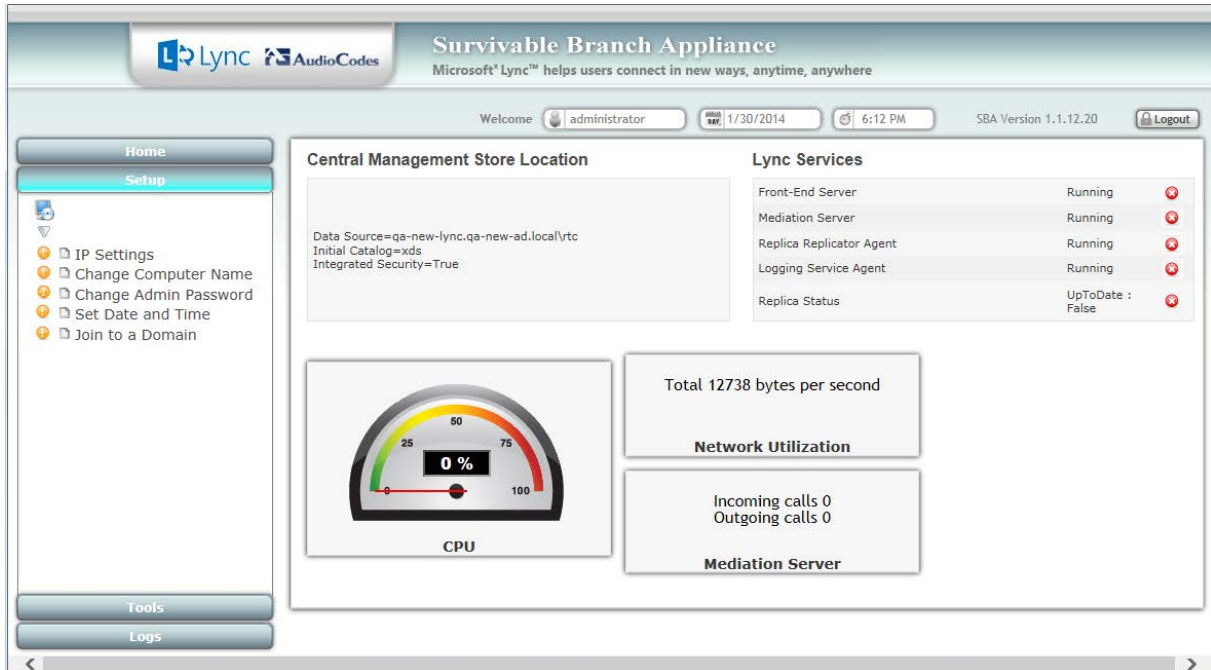
The Survivable Branch Appliance Management Interface opens:

Figure 10-8: Welcome to SBA Screen



4. Log in with the default username ("Administrator") and password ("Pass123"), Select the "Yes, I accept the term and condition" checkbox, and then click **Login**; the Home screen appears:

Figure 10-9: SBA Home Screen



5. Change the default IP address of the SBA Management Interface to suit your network environment (see Section 11.1 on page 81).

11 Installing and Configuring the SBA

Once you are logged in to the SBA Management Interface, you can start configuring SBA, as described in this section.

The SBA configuration is done in the Setup tab. For the configuration to be successful, it is imperative that all Setup options are performed correctly and in sequence (according to their order of appearance in the graphical user interface / GUI):

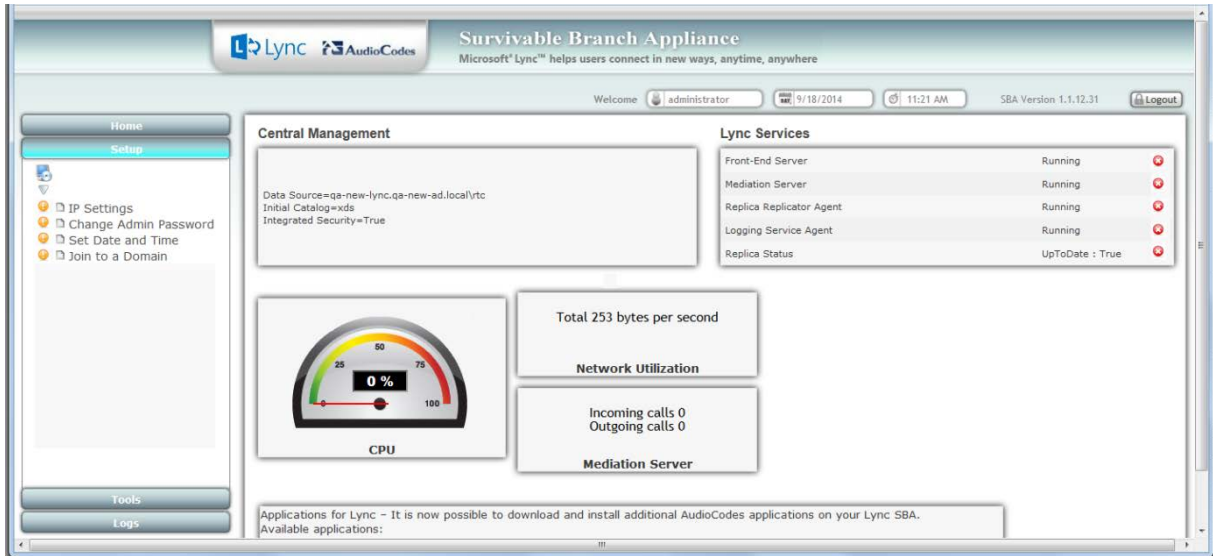
1. Define IP Settings - See Section 11.1 on page 81.
2. Change Computer Name - See Section 11.2 on page 85.
3. Change Admin Password - See Section 11.3 on page 88.
4. Set Date and Time - See Section 11.4 on page 90.
5. Join to a Domain - See Section 11.5 on page 93.
6. Device Preparation - See Section 11.6 on page 96.
7. Cs Database Installation - See Section 11.7 on page 99.
8. Backup - See Section 11.8 on page 101.
9. Enable Replication - See Section 11.9 on page 103.
10. Activate Lync - See Section 11.10 on page 105.
11. Lync Certificate - See Section 11.11 on page 107.
12. Start Lync Services - See Section 11.12 on page 113.
13. Configure Gateway and Test Calls - See Section 11.13 on page 115.
14. Test Lync Calls - See Section 11.14 on page 118.
15. Apply Security - See Section 11.15 on page 121.
16. (Optional) Remote Control - See Section 11.16 on page 129.
17. (Optional) SNMP - See Section 11.17 on page 131.
18. Complete SBA Setup - See Section 11.18 on page 136.

If a task fails, ensure you correct it before performing additional tasks. When a task is configured successfully, a check mark (green) appears alongside the option.






Note: Initially, the Setup menu displays only the first few options (until you Join to a Domain). The remaining options appear only after you successfully Join to the Active Directory Domain.

Figure 11-1: Setup Tab Displaying Tasks



In each of the configuration menu screens, the current CPU of the OSN module is displayed in the background. In the Setup pane, a list of all the configurable items is displayed.

Table 11-1: Setup Pane Icon

Setup Pane Icon	Description
	Indicates a successfully configured item.
	Indicates an item that has not yet been configured.
	Indicates an item whose configuration has failed.

11.1 Step 1: Define IP Settings

The IP Settings option defines the IP address and domain name server (DNS).

➤ **To set the IP address and DNS:**

1. Select the **Setup** tab, and then select the 'IP Settings' check box; the following screen is displayed:

Figure 11-2: Set IP Configuration Page

1. Clear the 'Enable / Disable NIC' check box for those interfaces that you are not using.
2. From the drop-down list, select one of the following NIC interface options:
 - **External1** – Corresponds to one of the physical Ethernet ports on the Mediant 1000B rear panel.
 - **External2** – Corresponds to one of the physical Ethernet ports on the Mediant 1000B rear panel.
 - **Internal1** – Internal port that connects the OSN server to the gateway's CRMX module.
 - **Internal2** – Internal port that is not in use.

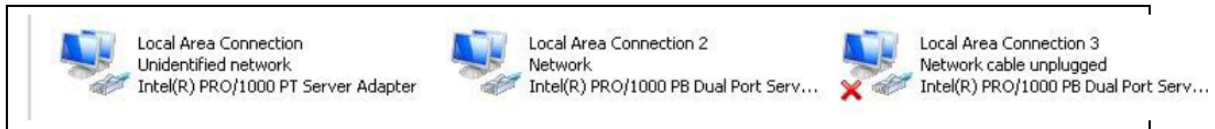


Note:

- The assignment of the physical ports (Port 1 and Port 2) to the **External1** and **External2** NICs is random.
- For the OSN3 module, only a single External port is available (labeled "External").

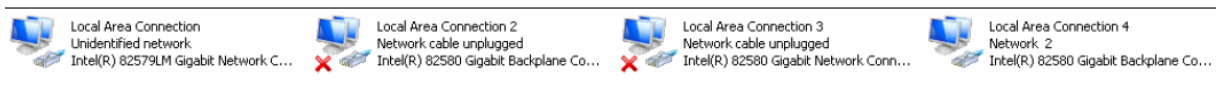
The following figure shows an example of the configured Ethernet ports on the OSN3 Windows server. In this example, the disconnected internal NIC is labeled "Local Area Connection", the connected external NIC is labeled "Local Area Connection 2" and the disconnected external NIC is labeled "Local Area Connection 3".

Figure 11-3: OSN3 SBA Server



The following screen shows an example of the configured Ethernet ports on the OSN3B Windows server. In this example, the disabled internal NIC is labeled "Local Area Connection", the disconnected external NIC is labeled "Local Area Connection 2", the disconnected internal NIC is labeled "Local Area Connection 3" and the connected external NIC is labeled "Local Area Connection 4". Note that whenever you connect or disconnect a network cable from one of the interfaces, the status changes.

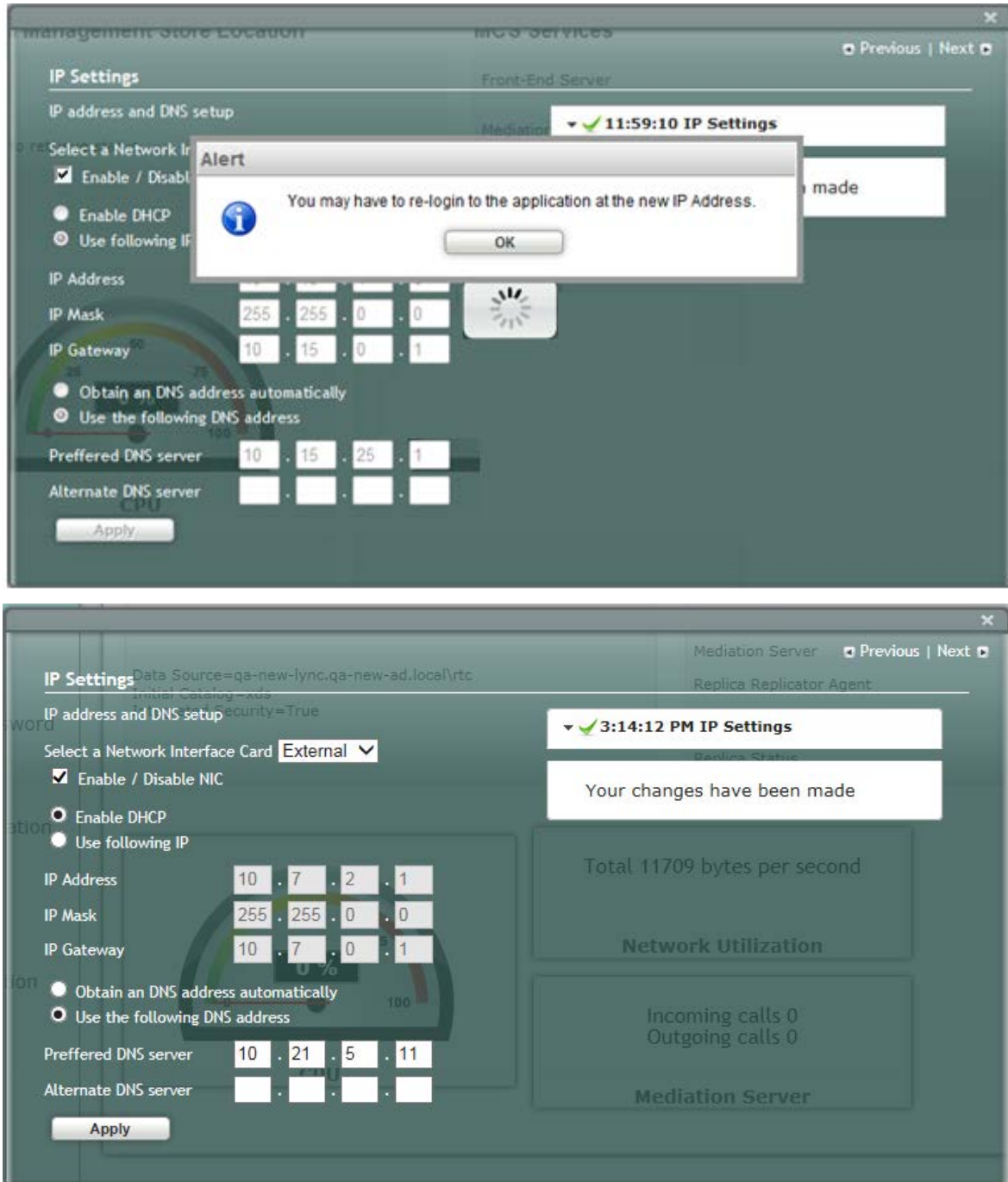
Figure 11-4: OSN3B SBA Server



Note: Whenever you connect or disconnect a network cable from one of the interfaces, the status icons displayed in the example screens above change.

3. Select the "Use following IP" option.
4. Confirm/change the IP address.
5. Confirm/change the IP mask.
6. Confirm/change the default IP gateway.
7. Select the "Use the following DNS address" option.
8. Enter the details of the DNS server.
9. Click **Apply**. If the IP address has changed, you will be required to login again.

Figure 11-5: IP Settings – Login Again



10. Click **OK**. A new login screen appears.
11. Enter the Username, Password and then click **Login**.

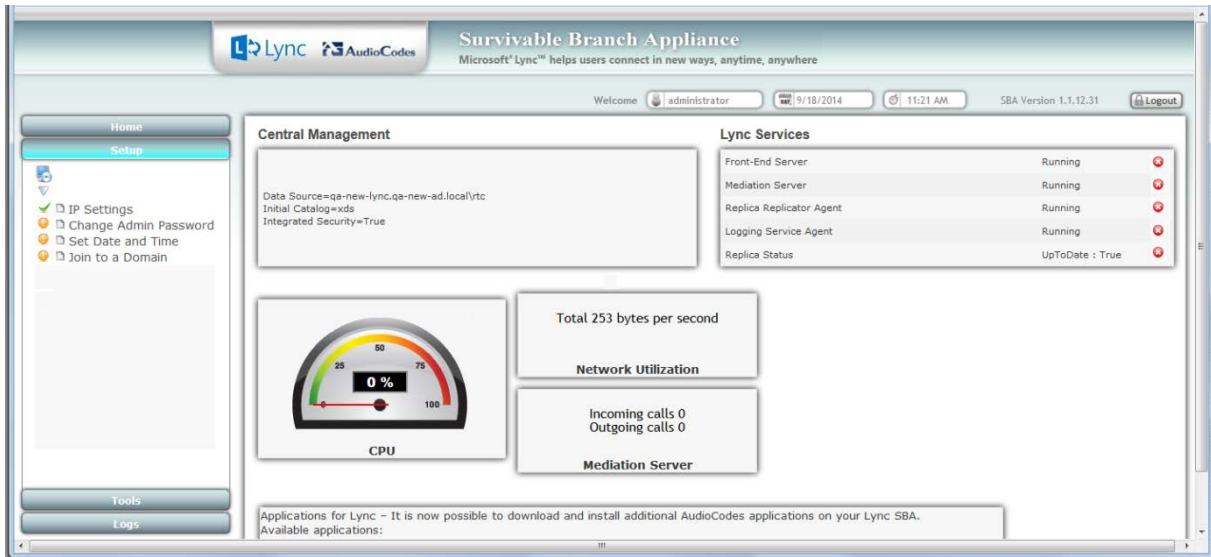


Notes:

- The system logs in with the new IP address.
- Every time you change the NIC interface option, click **Apply** for the change to take effect.

A green check mark is displayed next to the 'IP Settings' option under the Setup tab, as shown in the figure below.

Figure 11-6: IP Settings - Complete



11.2 Step 2: Change Computer Name

The Change Computer Name option defines the computer name of the SBA.



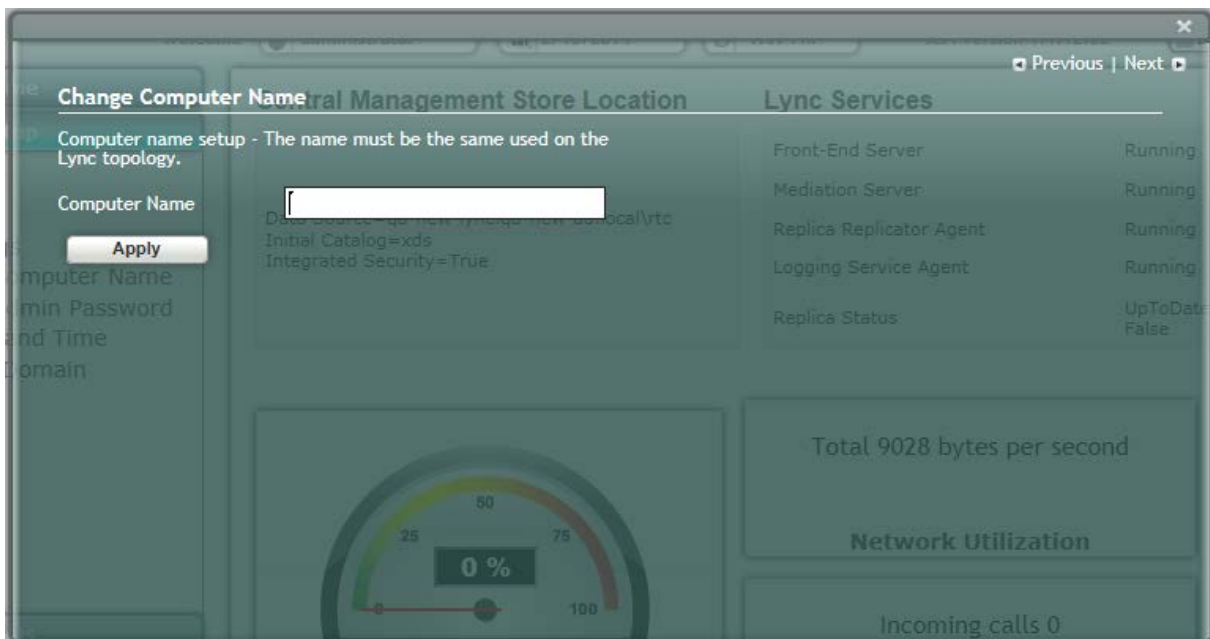
Note:

- This procedure requires you to reboot the SBA server to successfully apply the configuration. However, if you forget to do so, the server automatically reboots after a session timeout. When this occurs, the login screen appears with the following popup message: "The SBA server needs to be rebooted. Please insert your credentials and click on Login. The server will then be rebooted". After the server reboots, the following message appears: "The SBA server has been rebooted automatically". You can then login to the SBA Management Interface.
- Once you join to the Domain, this configuration option is only available when you login as a local user (not a Domain user).

➤ **To change the computer name of the SBA server:**

1. Select the **Setup** tab, and then select the 'Change Computer Name' check box; the following screen appears:

Figure 11-7: Change Computer Name Screen



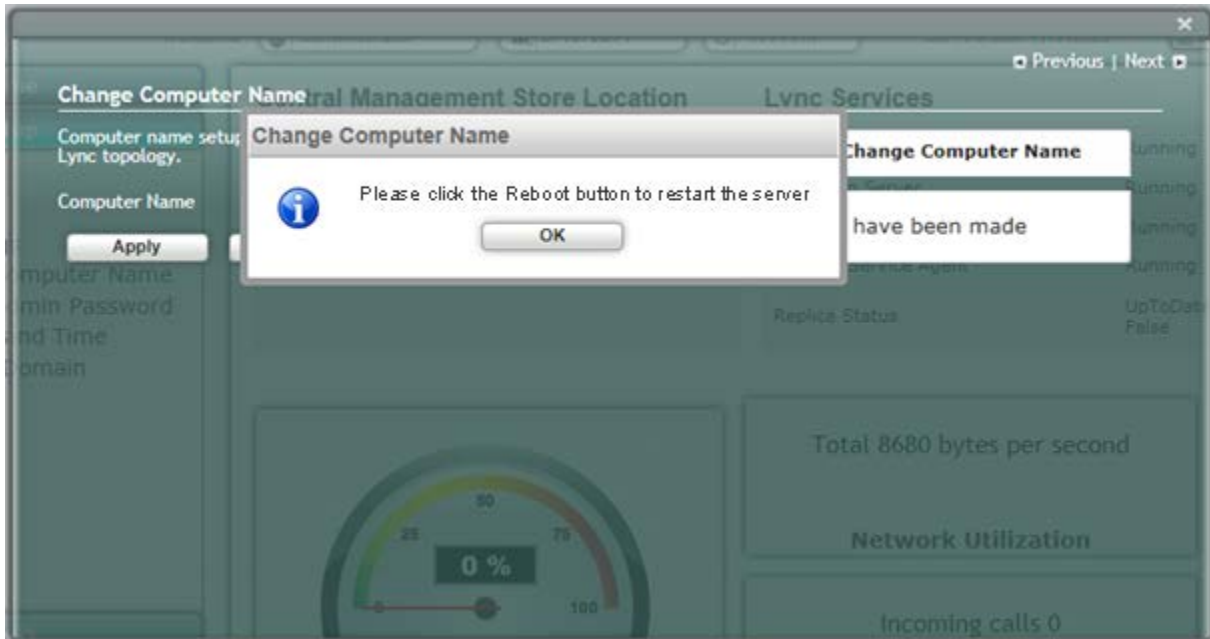
2. In the 'Computer Name' field, enter the computer name.



Note: The Computer Name must be the same as that used for the SBA in the Microsoft Active Directory (AD) and Topology during the pre-configuration steps performed at the datacenter (see Chapter 8 on page 55 and Chapter 9 on page 57).

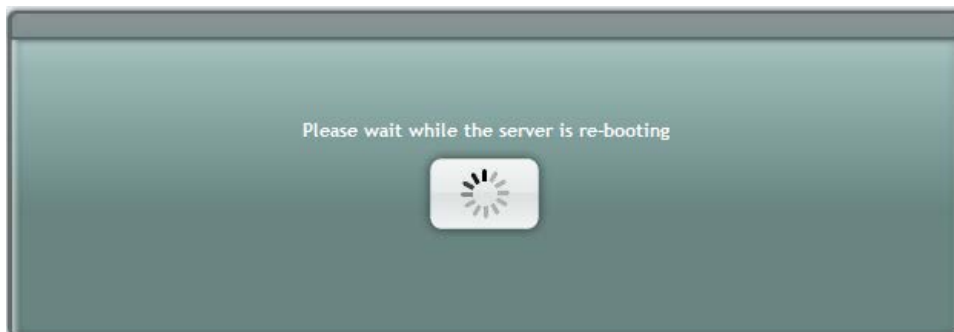
- Click **Apply**; the "Operation Completed Successfully" message appears on the bottom of the screen. A message also appears to advise that a re-boot is necessary for the setting to take effect:

Figure 11-8: Reboot Computer after Computer Name Change



- Click **Reboot**; the SBA server reboots and the following screen is displayed:

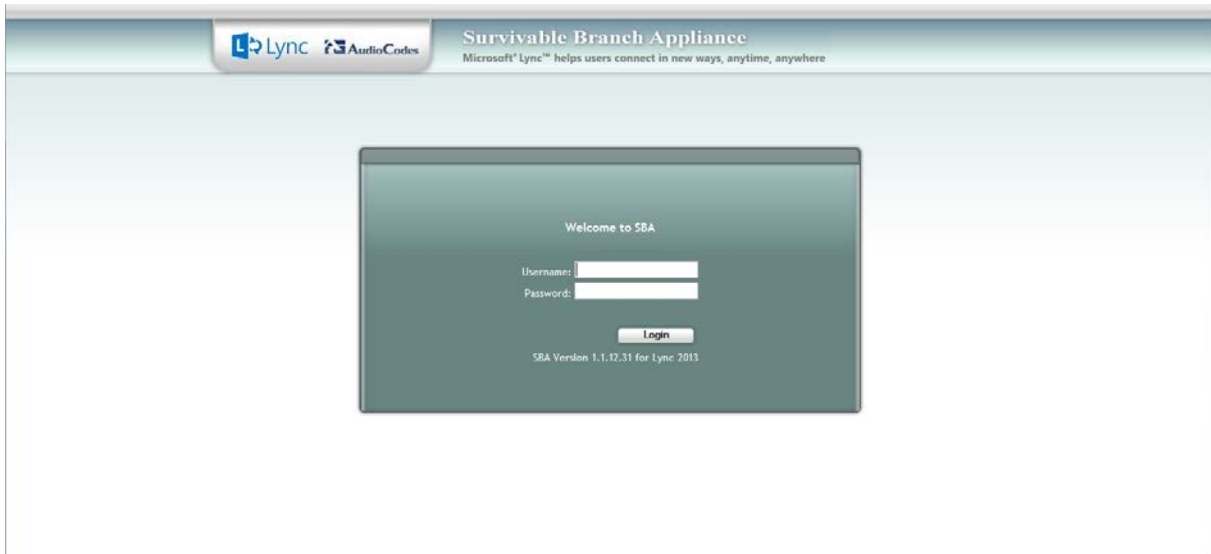
Figure 11-9: Server Re-booting



Note: The re-boot process takes approximately five minutes.

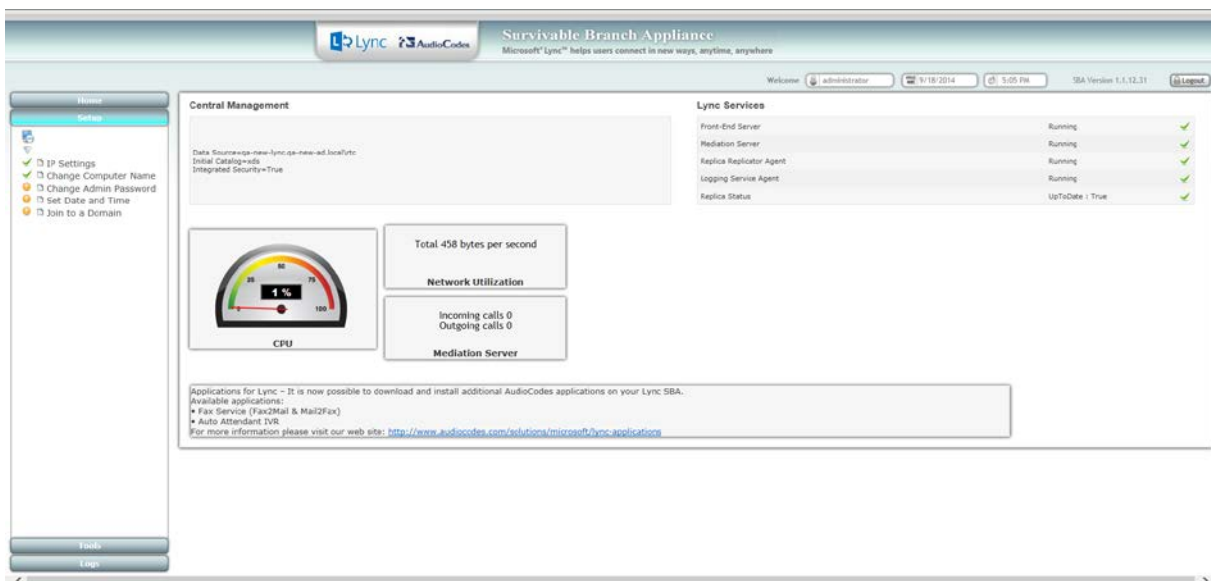
When the SBA completes its reboot, the Welcome to SBA screen appears again.

Figure 11-10: Login Screen



5. Enter your username and password and then click **Login** to log in once again to the SBA Management Interface; the Setup tab appears, displaying a green check mark next to the 'Change Computer Name' option, as shown in the figure below.

Figure 11-11: Change Computer Name – Completed Successfully



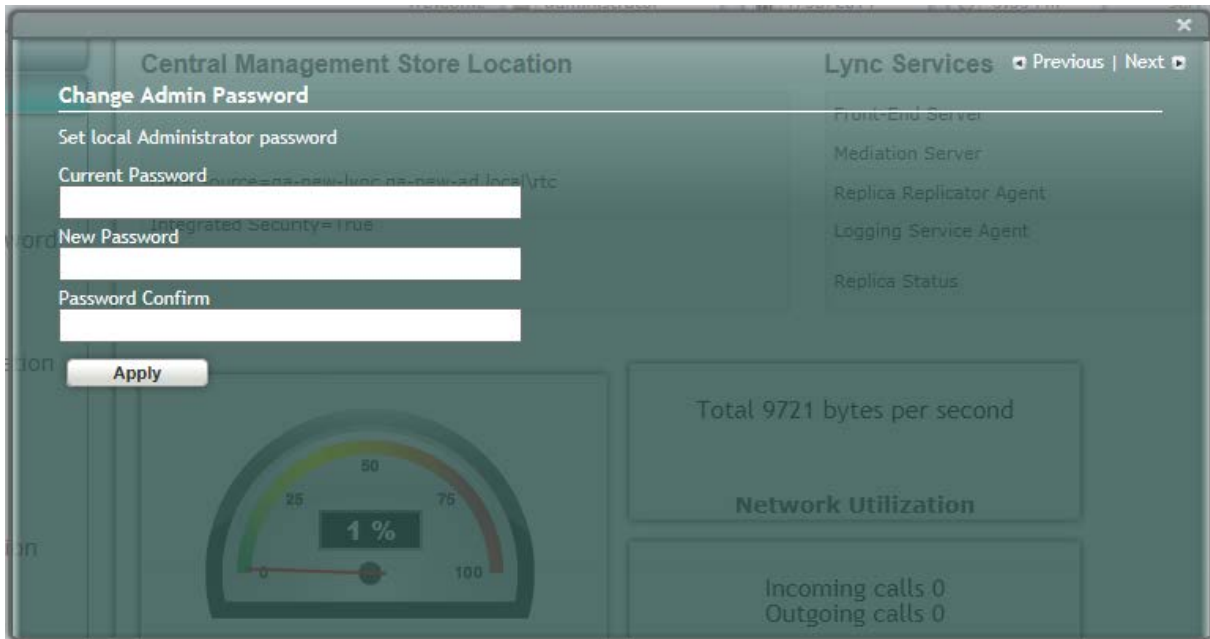
11.3 Step 3: Change Admin Password

The Change Admin Password option resets the local Administrator password.

➤ **To change the Administrator password:**

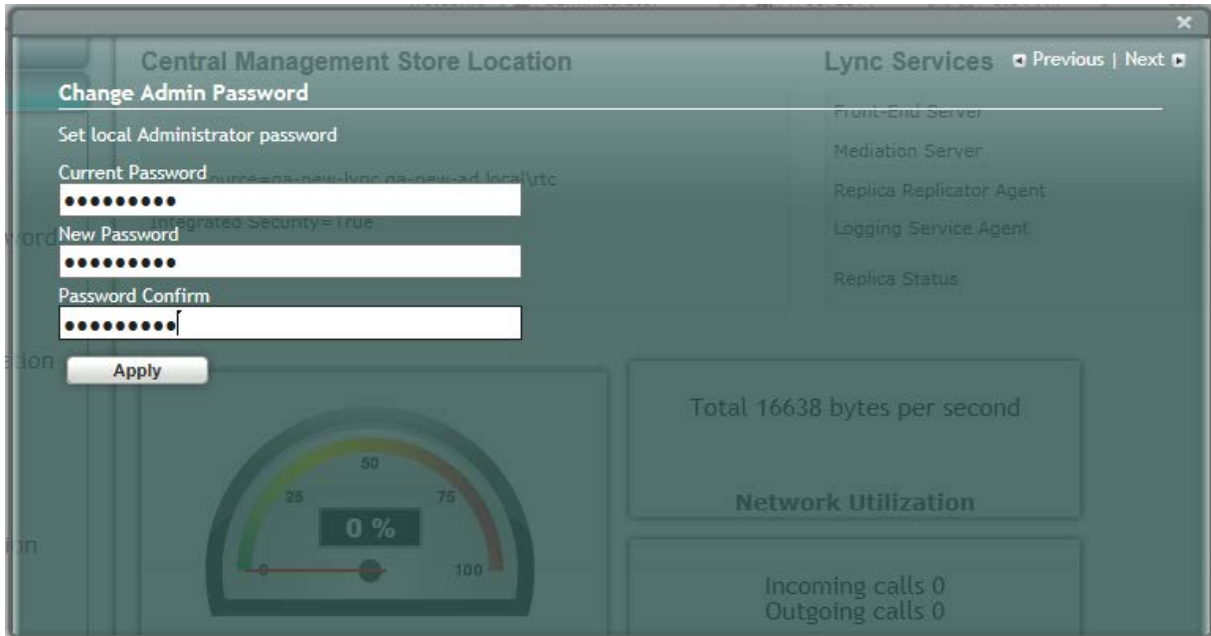
1. Select the **Setup** tab, and then select the 'Change Admin Password' check box; the following screen is displayed:

Figure 11-12: Change Admin Password Screen



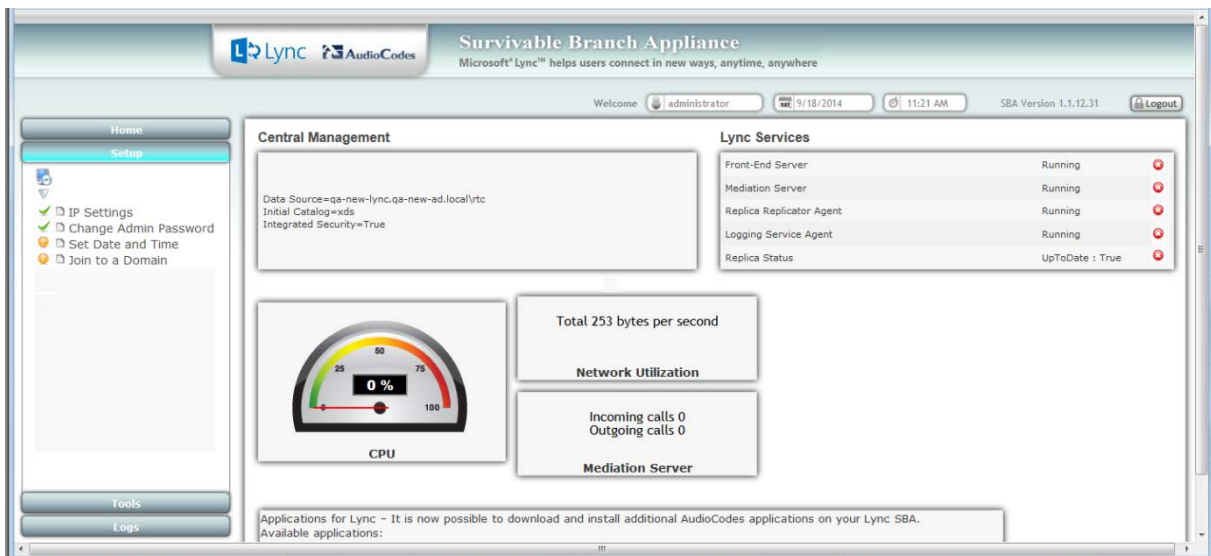
2. In the 'Current Password' field, enter the current password.
3. In the 'New Password' field, enter a new password, and then in the 'Password Confirm' field, enter the new password again.
4. Click **Apply**; the following screen appears:

Figure 11-13: Change Admin Password – Applied Changes



5. Click **Next** to proceed to the next setup task; a green check mark appears next to the 'Change Admin Password' option under the Setup tab, as shown in the figure below.

Figure 11-14: Change Admin Password – Completed Successfully



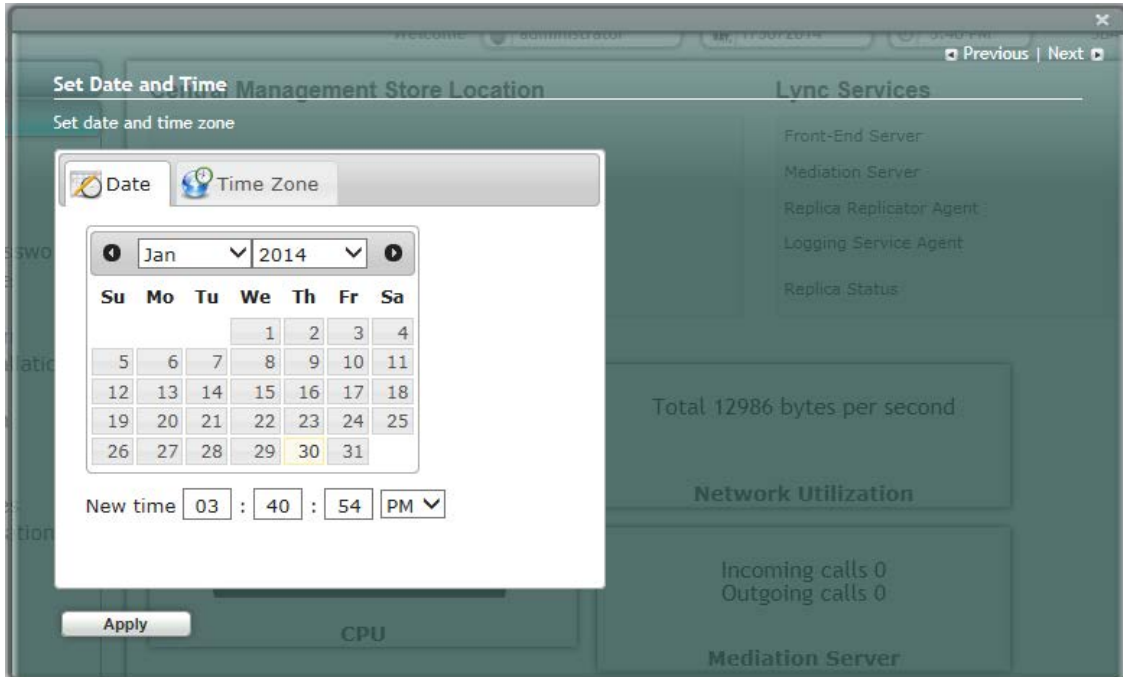
11.4 Step 4: Set Date and Time

The Set Date and Time option resets the date and time zone.

➤ **To set the date and time:**

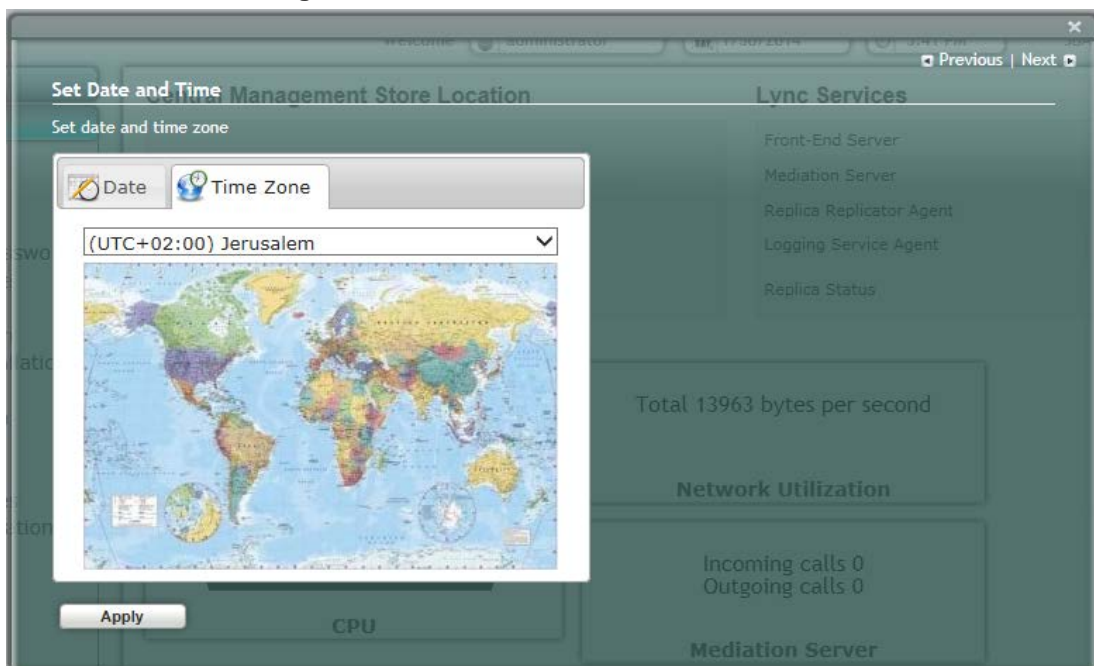
1. Select the **Setup** tab, and then select the 'Set Date and Time' check box; the following screen is displayed:

Figure 11-15: Set Date and Time Screen



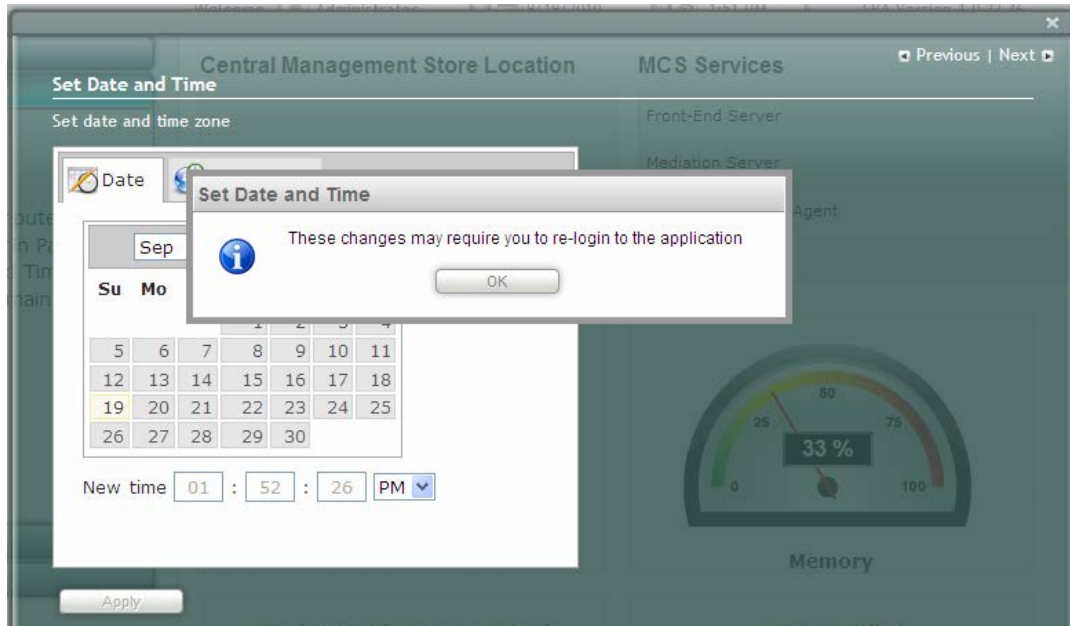
2. Select the **Time Zone** tab; the following screen appears:

Figure 11-16: Set Date and Time - Time Zone



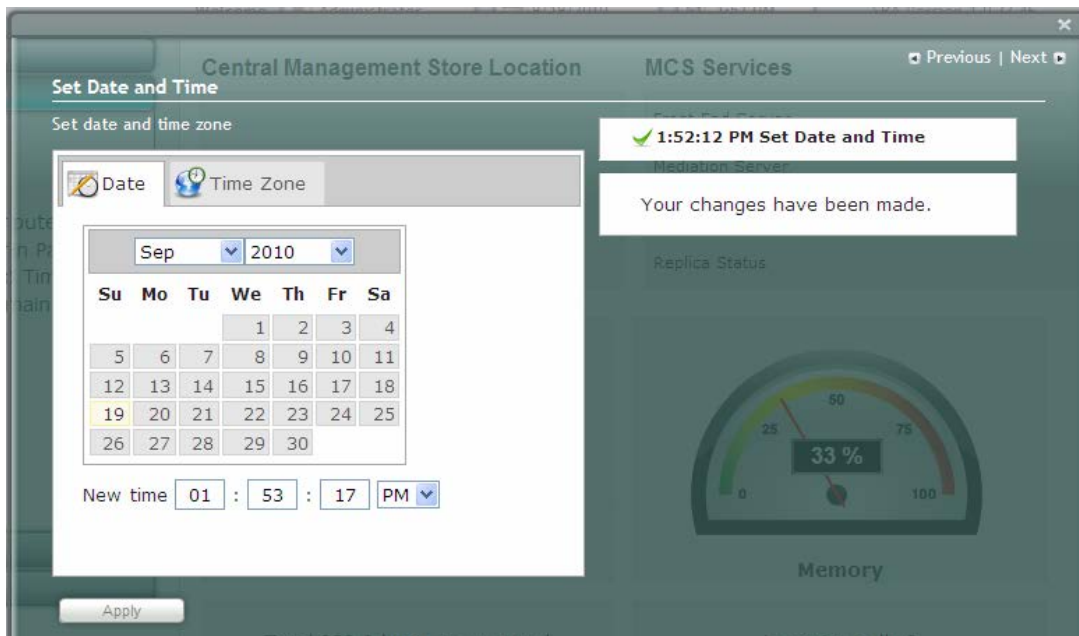
3. From the drop-down list, select the appropriate time zone.
4. Select the **Date** tab, and then define the date and time.
5. Click **Apply**; the “Operation Completed Successfully” message appears on the bottom of the screen.
6. Click **Apply**; a notification message box appears:

Figure 11-17: Set Date and Time – Notification Message



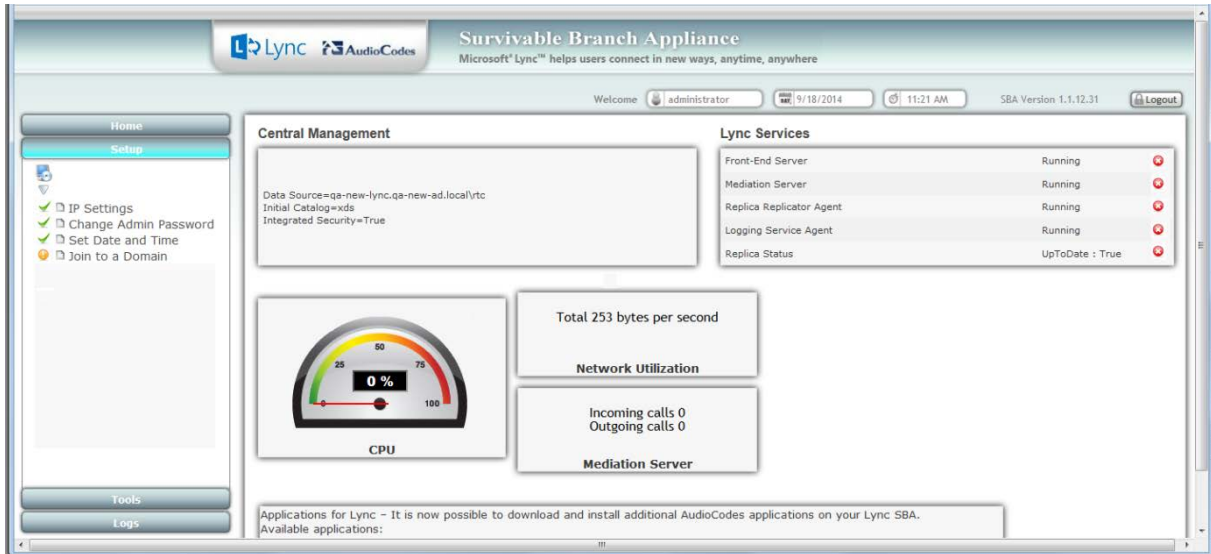
7. Click **OK**; the following confirmation screen appears:

Figure 11-18: Set Date and Time – Applied Changes



8. Click **Next** to proceed to the next setup task.
A green check mark appears next to the 'Set Date and Time' option under the Setup tab, as shown in the figure below.

Figure 11-19: Set Date and Time - Completed Successfully



11.5 Step 5: Join to a Domain

The Join to Domain option enables you to join the SBA application to a domain.



Note: This procedure requires you to reboot the SBA server to successfully apply the configuration. However, if you forget to do so, the server automatically reboots after a session timeout. When this occurs, the login screen appears with the following popup message: "The SBA server needs to be rebooted. Please insert your credentials and click on Login. The server will then be rebooted". After the server reboots, the following message appears: "The SBA server has been rebooted automatically". You can then login to the SBA Management Interface.

➤ **To join the SBA application to a domain:**

1. Select the **Setup** tab, and then select the 'Join to a Domain' check box; the following screen appears:

Figure 11-20: Join to a Domain Screen

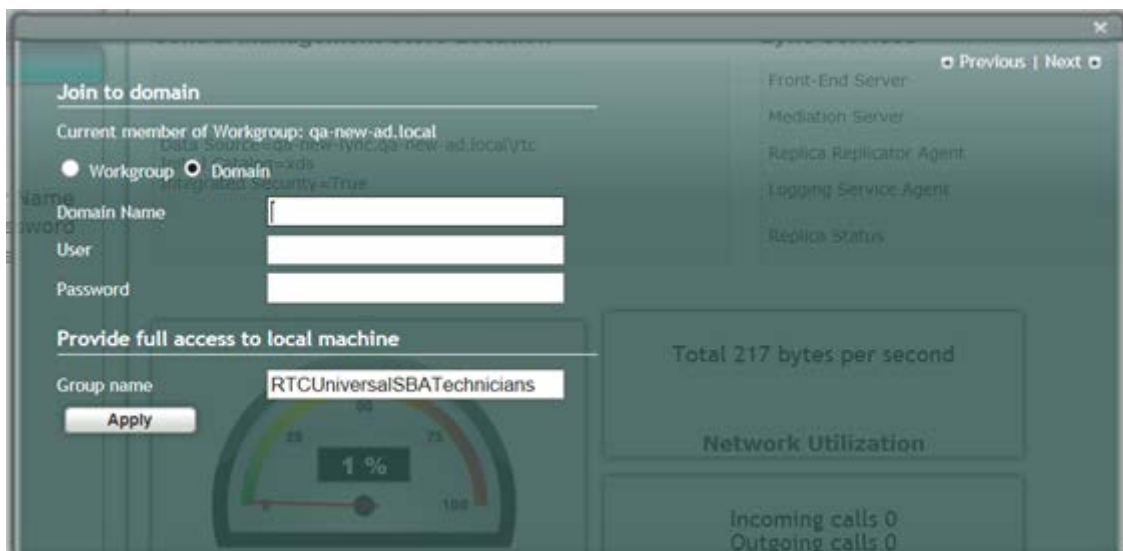
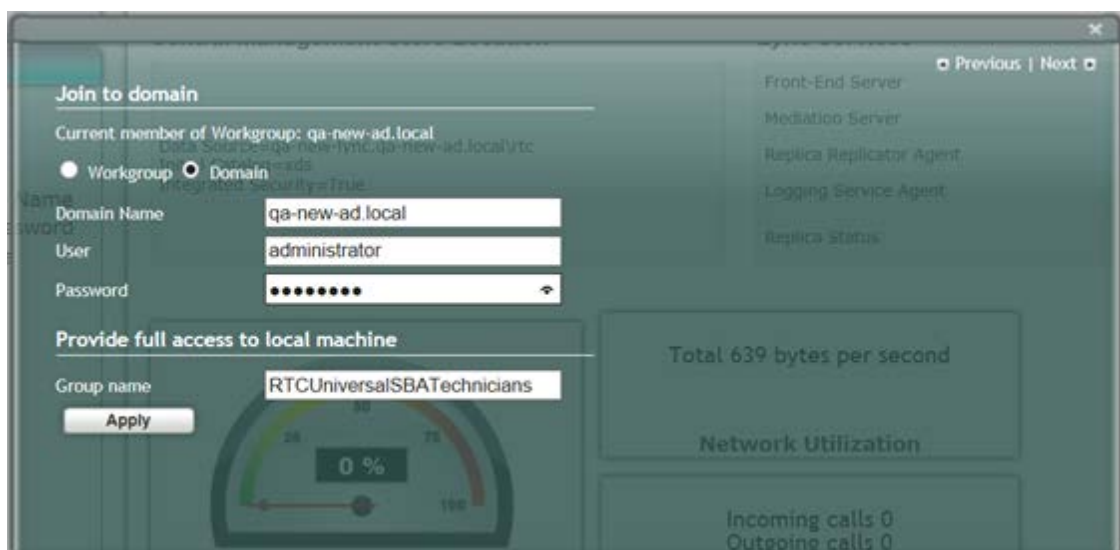
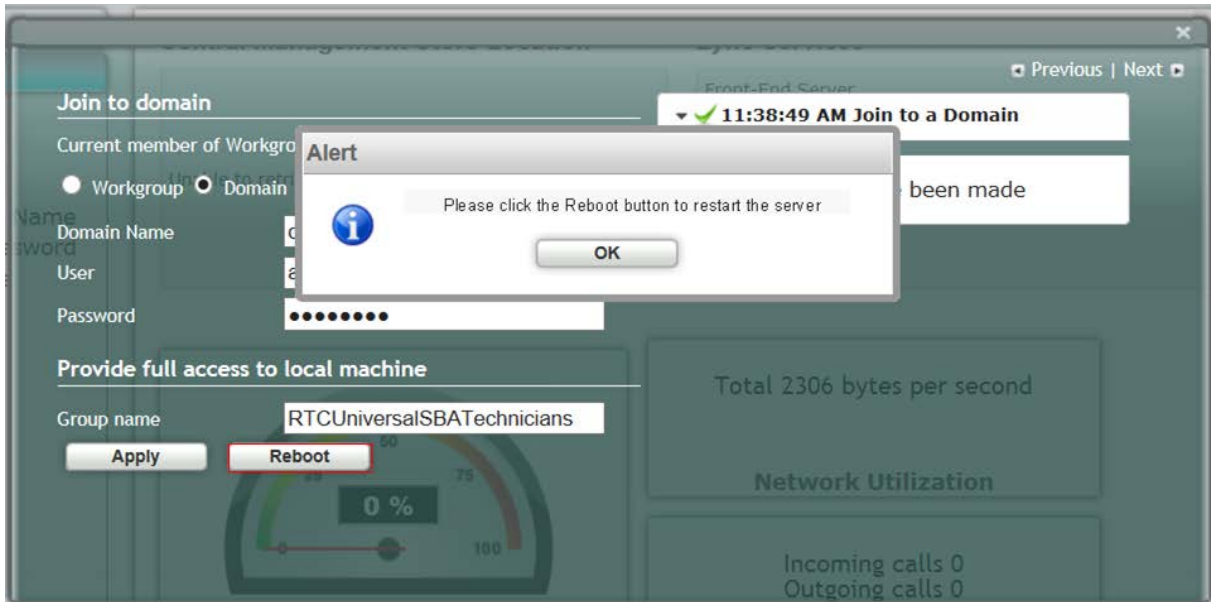


Figure 11-21: Domain Details



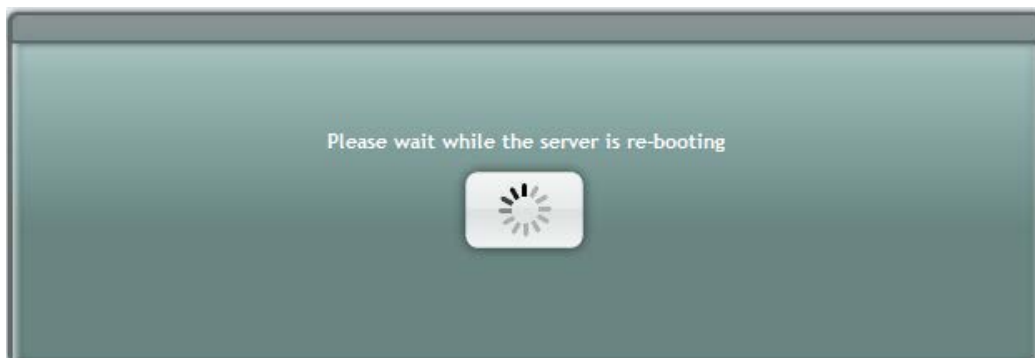
2. In the 'Domain Name' field, enter the domain name.
3. In the 'User' and 'Password' fields, enter the user and password of an account that has permission to join the SBA to the domain as configured in Section 0 on page 37.
4. In the 'Group name' field, ensure that the **RTCUniversalSBATechnicians** value is selected.
5. Click **Apply**; a message box appears requesting you to confirm reboot:

Figure 11-22: Join to a Domain – Reboot Message Box

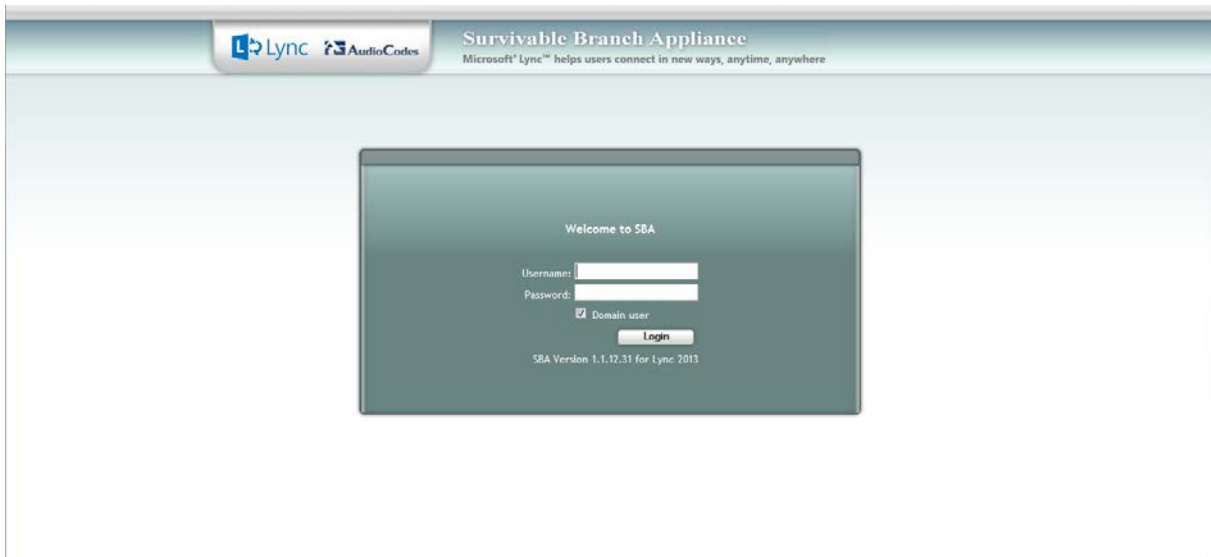


6. Click **OK** and then click **Reboot** to reboot the OSN server.

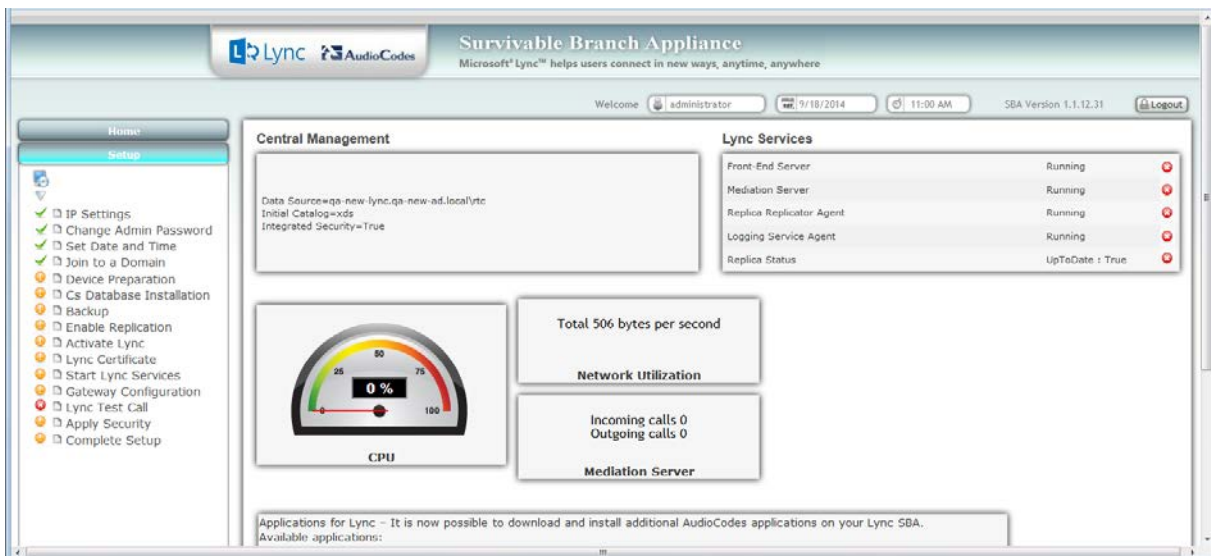
Figure 11-23: Server Rebooting



- When the reboot completes, the Welcome to SBA login screen appears, now displaying a Domain user check box (which is selected by default):

Figure 11-24: Welcome to SBA

- Log in with the Domain user username and password, and then click **Login**; a green check mark is displayed next to the 'Join to a Domain' option under the Setup tab, as shown in the figure below. In addition, the Setup tab now displays the remaining menu configuration options.

Figure 11-25: Join to a Domain - Completed Successfully

11.6 Step 6: Device Preparation

The Device Preparation menu option completes the SQL preparation and installs the Lync Server 2013 components.

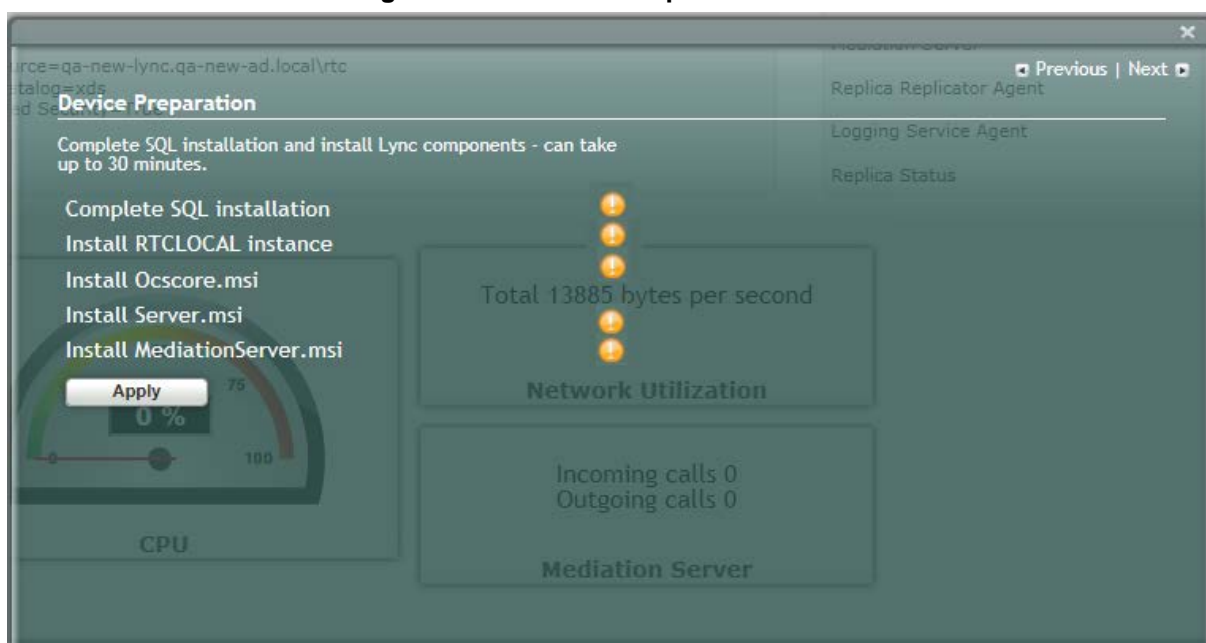


Note: This procedure requires you to reboot the SBA server to successfully apply the configuration. However, if you forget to do so, the server automatically reboots after a session timeout. When this occurs, the login screen appears with the following popup message: "The SBA server needs to be rebooted. Please insert your credentials and click on Login. The server will then be rebooted". After the server reboots, the following message appears: "The SBA server has been rebooted automatically". You can then login to the SBA Management Interface.

➤ **To prepare the device:**

1. Select the **Setup** tab, and then select the 'Device Preparation' check box; the following screen appears:

Figure 11-26: Device Preparation Screen



2. Click **Apply**; the SQL installation begins, and the following screens appear in sequence as the SQL installation progresses. You can view a detailed log after each installation phase, by clicking the Detailed Log link.

Figure 11-27: Device Preparation - Started

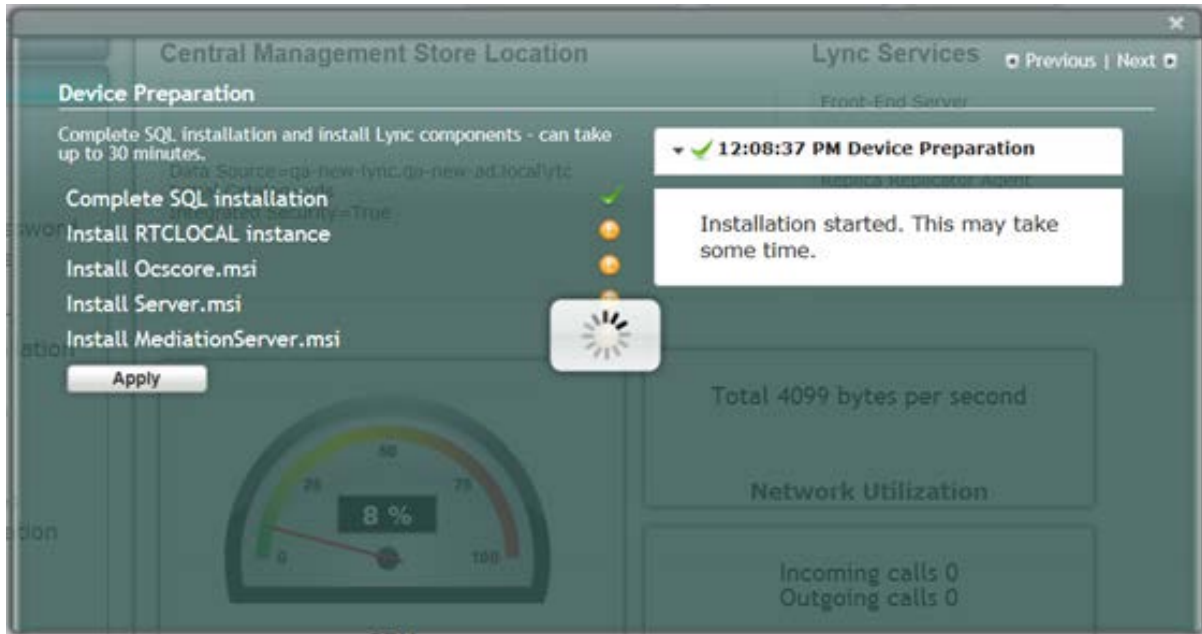
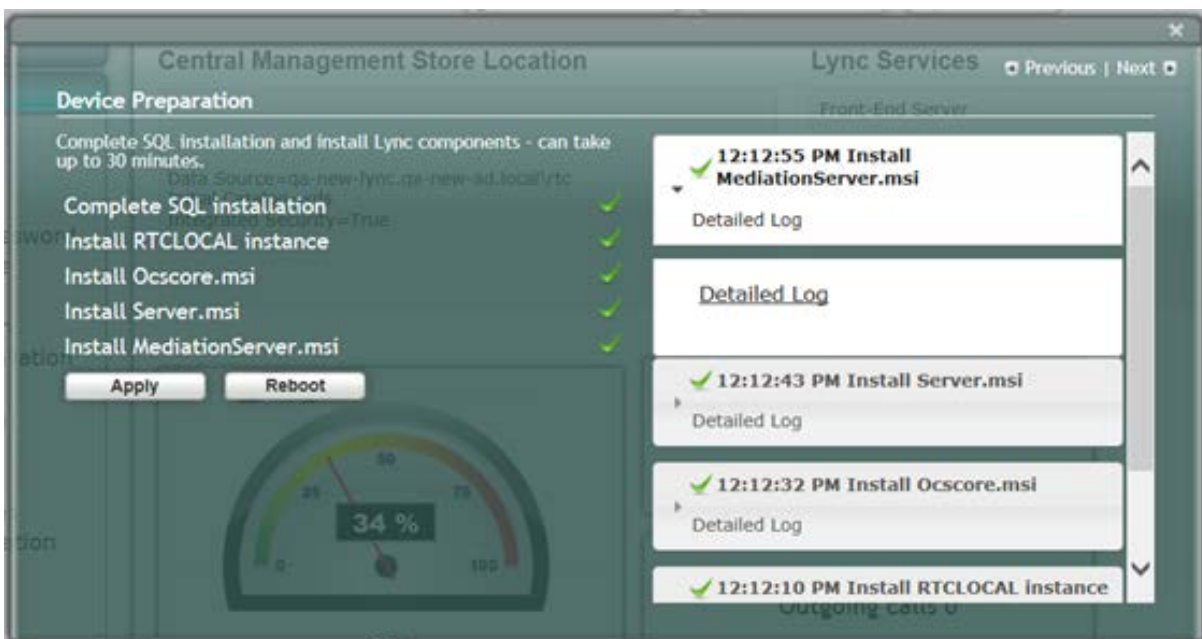
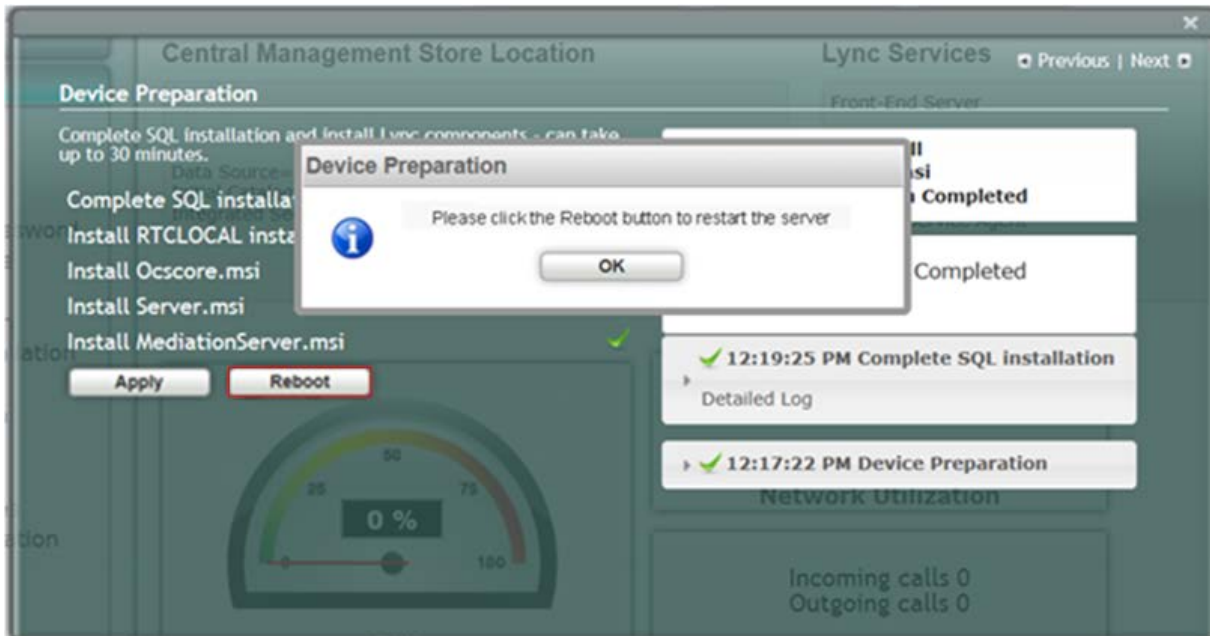


Figure 11-28: Device Preparation – All Components Installed



3. When the installation completes, you are prompted to reboot the SBA server.

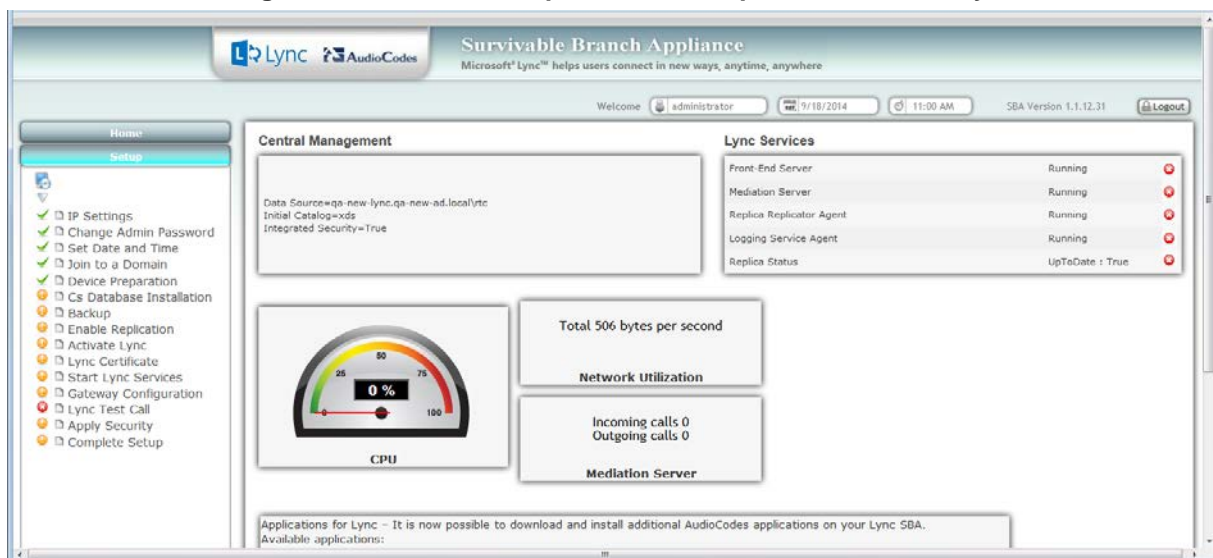
Figure 11-29: Device Preparation – Reboot Message Box



4. Click **OK**, and then do one of the following:
 - If all steps have been completed successfully, click **Reboot**.
 - If you wish to review some of the steps, refer to the Detailed Log for corrective information, rectify the problem, and then click **Apply** to install the remaining components.

When you relogin to the SBA, a green check mark appears next to the 'Device Preparation' option under the Setup tab, as shown in the figure below.

Figure 11-30: Device Preparation – Completed Successfully



11.7 Step 7: Cs Database Installation

The Cs Database installation option installs CsDatabase for Lyss and registrar.

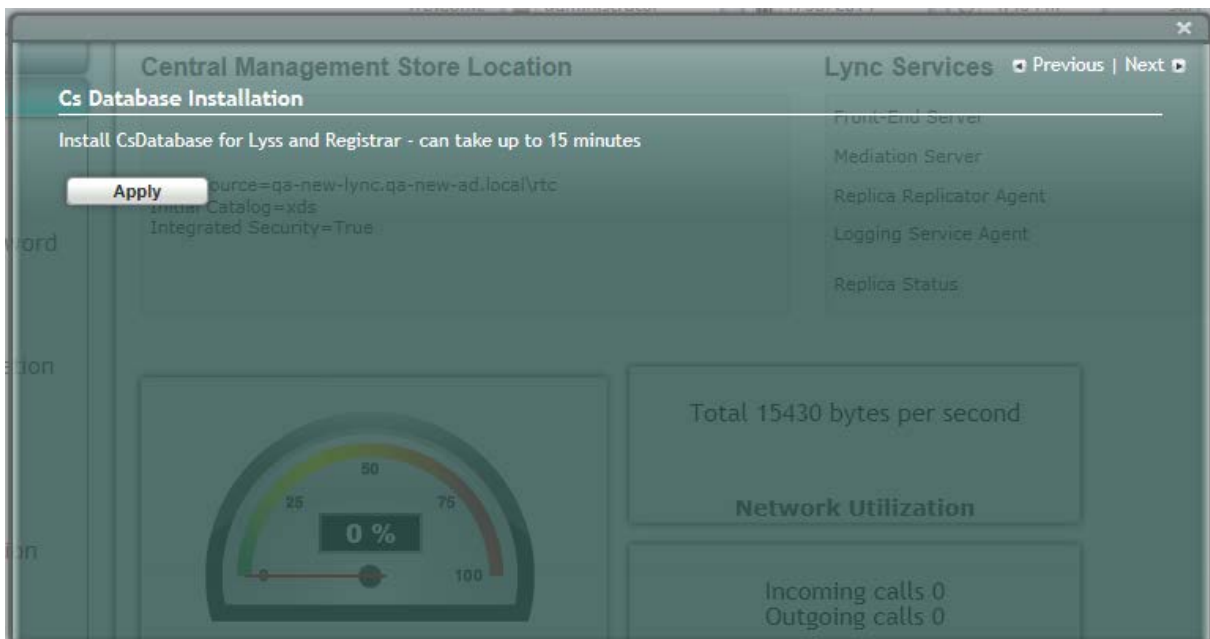


Note: This step is not relevant for Microsoft Lync Server 2010 deployments.

➤ **To install the CsDatabase:**

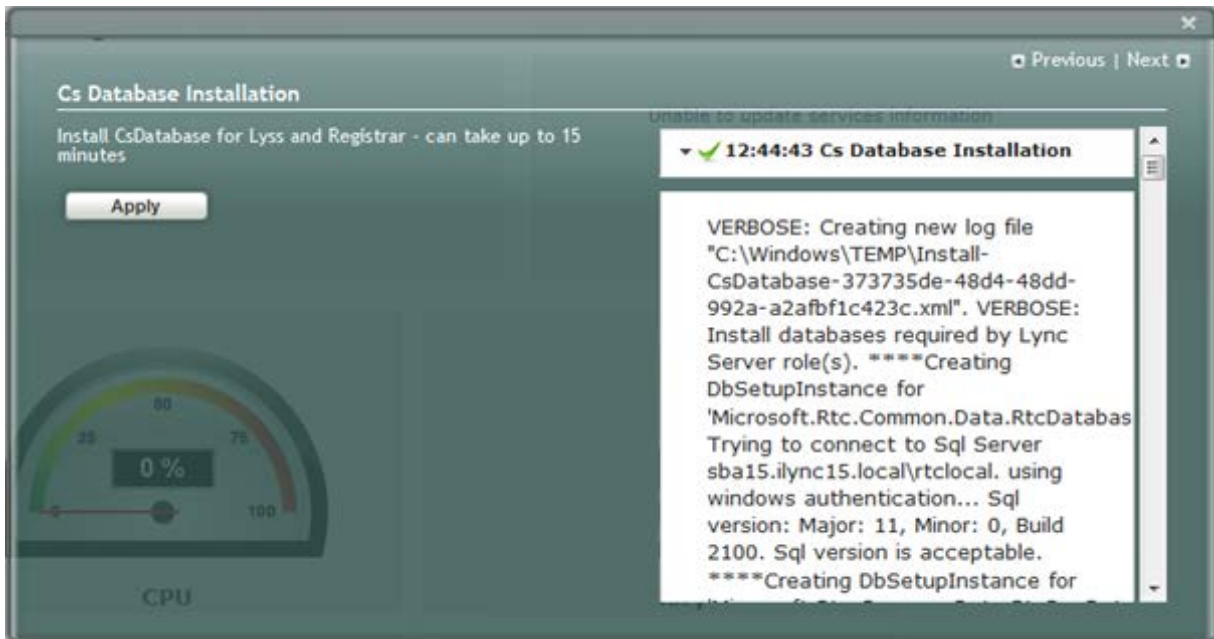
1. Select the **Setup** tab, and then select the 'Cs Database installation' check box; the following screen appears:

Figure 11-31: Cs Database installation Screen



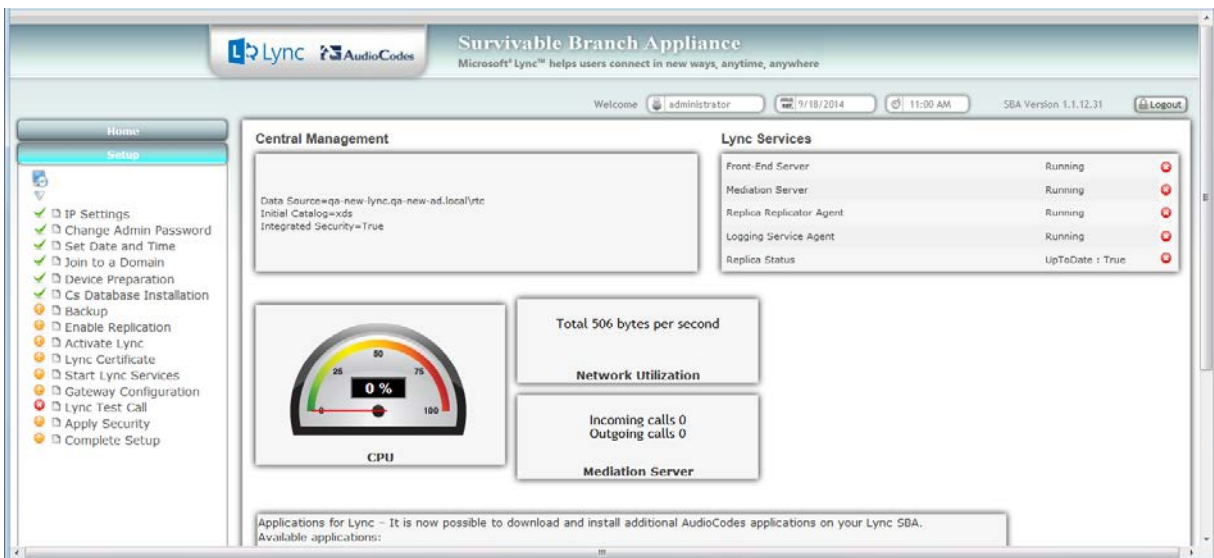
- Click **Apply**; the following screen appears:

Figure 11-32: Cs Database Installation – Applied Successfully



A green check mark appears next to the 'Cs Database' option under the Setup tab, as shown in the figure below.

Figure 11-33: Cs Database–Completed Successfully



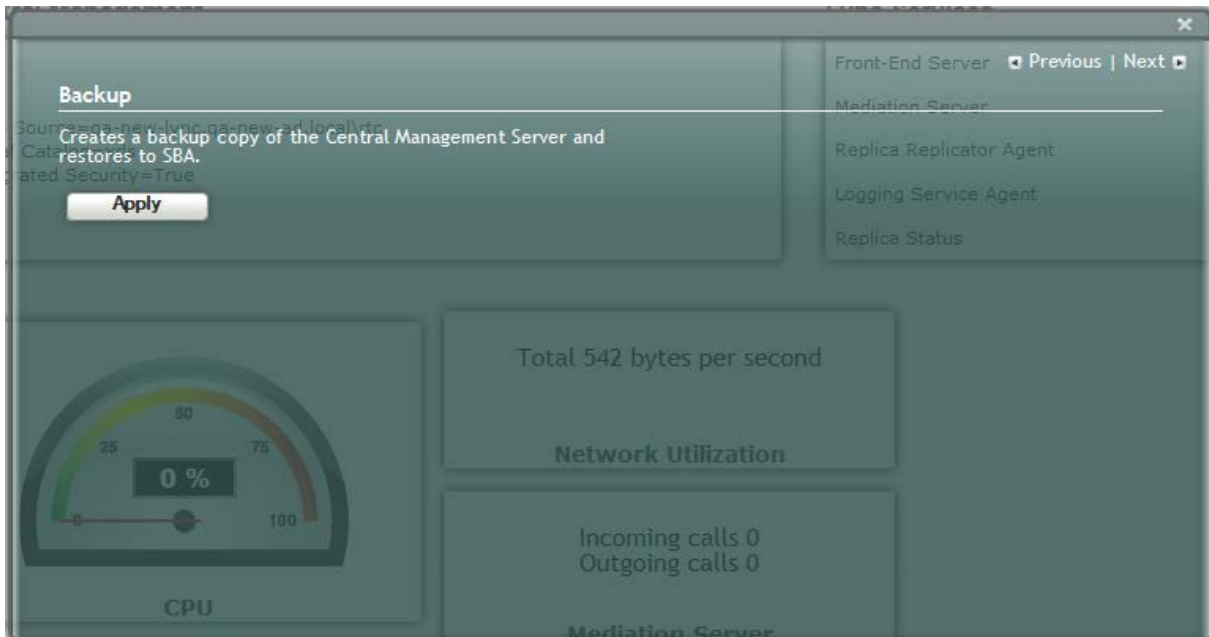
11.8 Step 8: Backup

The Backup option creates a backup copy of the Central Management Server on the SBA server.

➤ **To create a backup of the Central Management Server:**

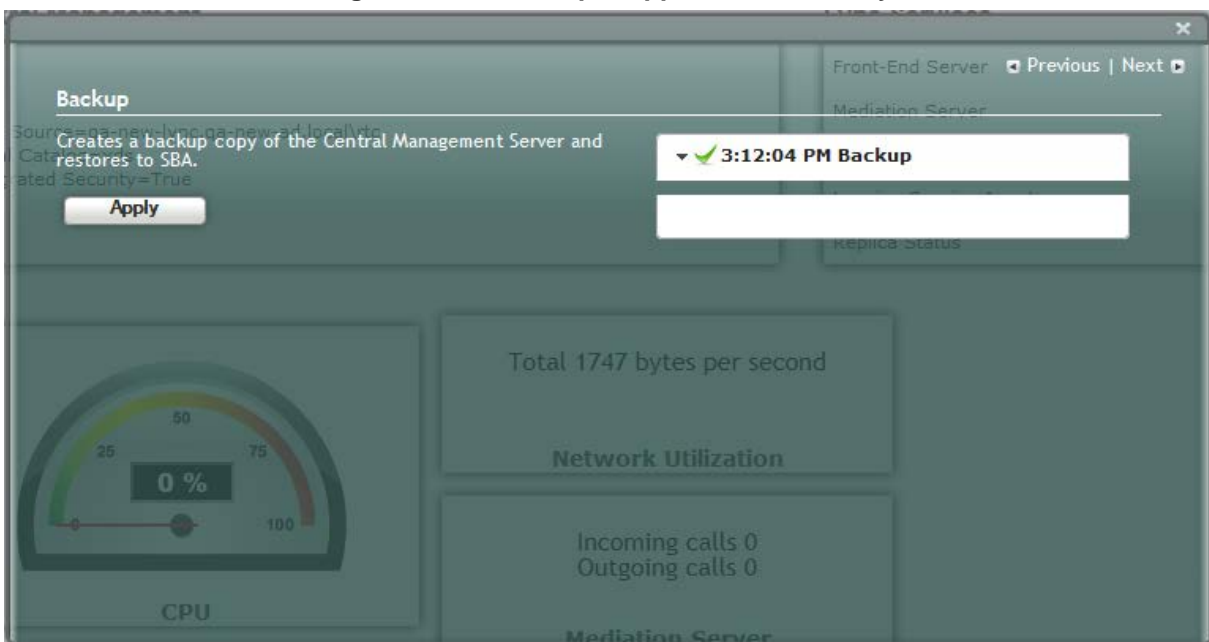
1. Select the **Setup** tab, and then select the 'Backup' check box; the following screen appears:

Figure 11-34: Backup Screen



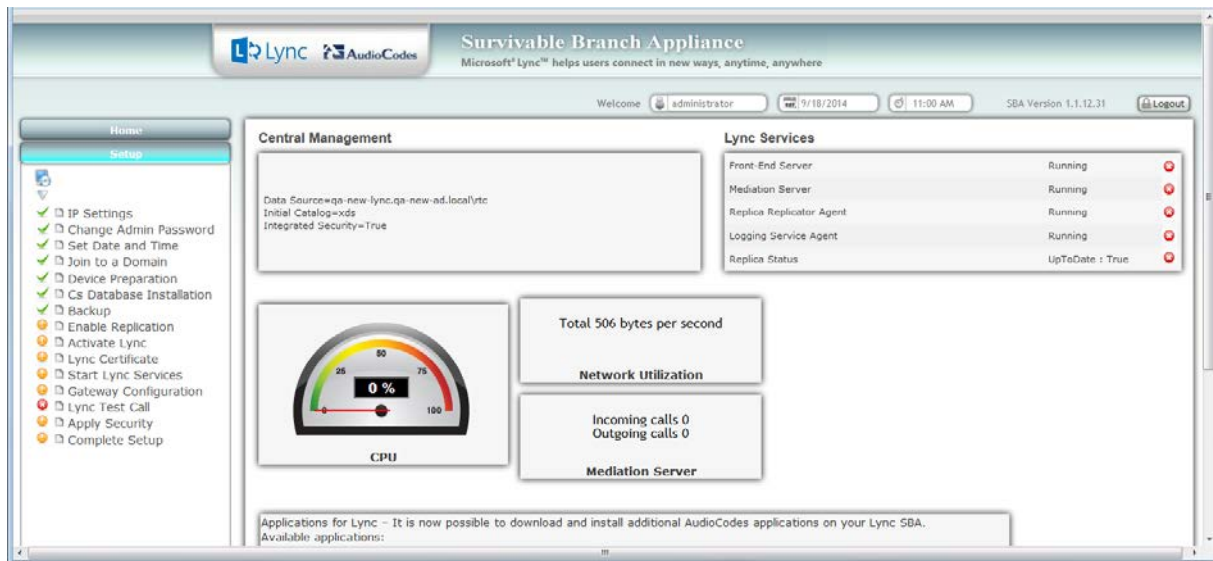
2. Click **Apply**; the following screen appears:

Figure 11-35: Backup – Applied Successfully



A green check mark appears next to the 'Backup' option under the Setup tab, as shown in the figure below.

Figure 11-36: Backup – Completed Successfully



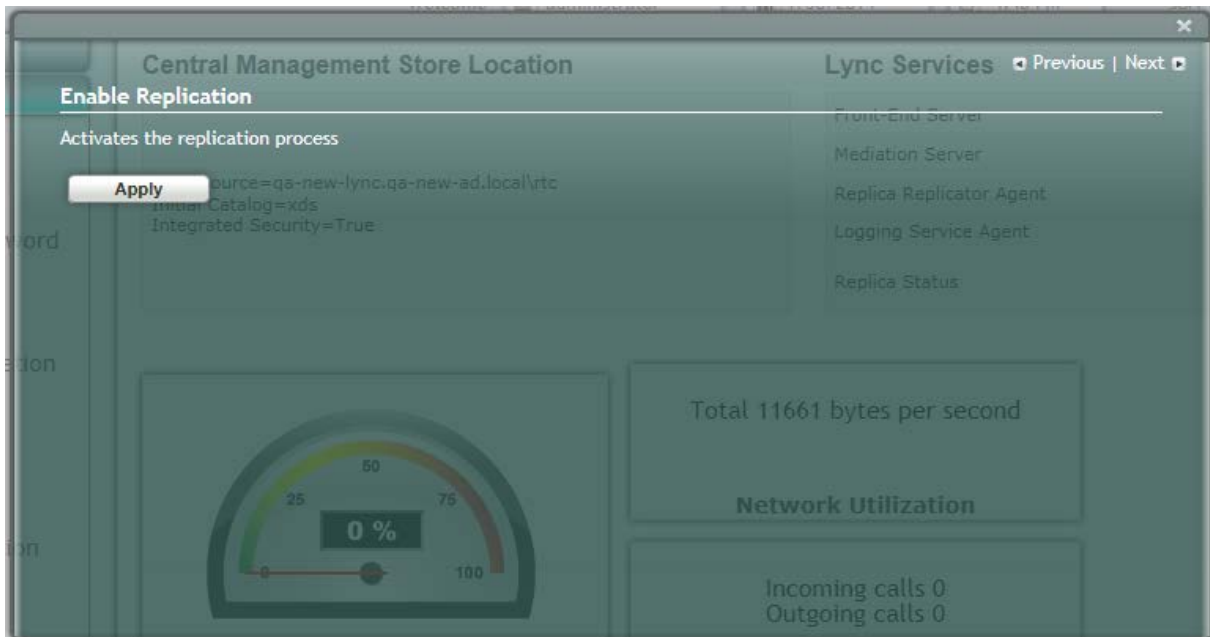
11.9 Step 9: Enable Replication

The 'Enable Replication' option enables the replication process with the Central Management Server. The actual replication is executed after all Lync services have been enabled (after Step 12 has been completed - see Section 11.12 on page 113).

➤ **To enable replication:**

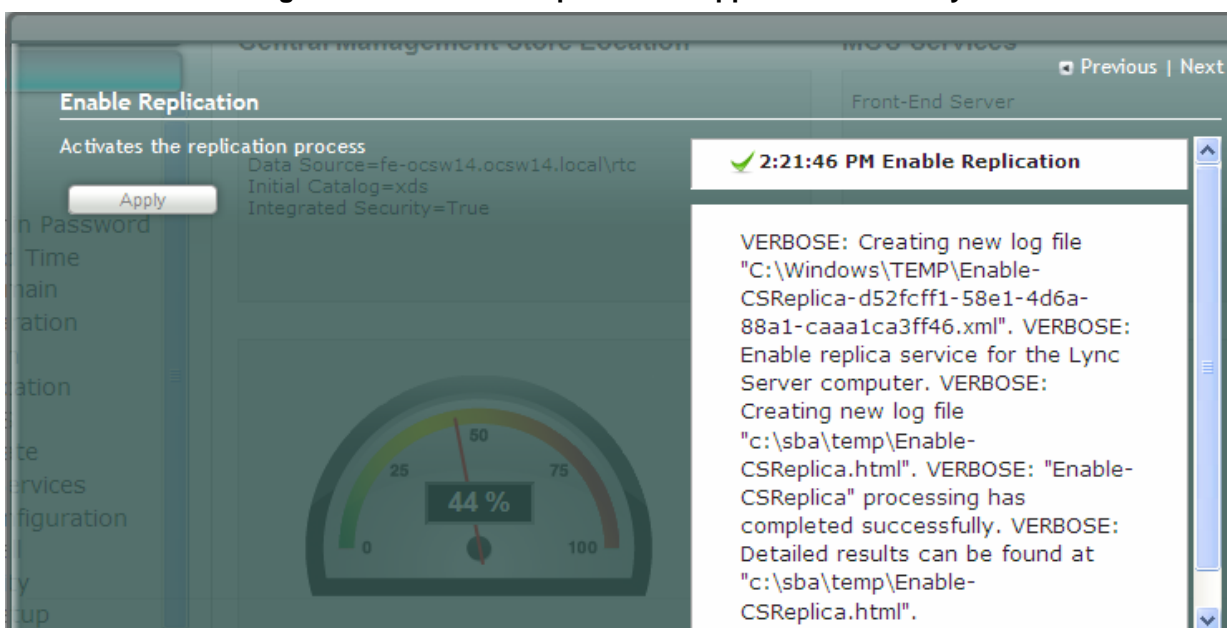
1. Select the **Setup** tab, and then select the 'Enable Replication' check box; the following screen appears:

Figure 11-37: Enable Replication Screen



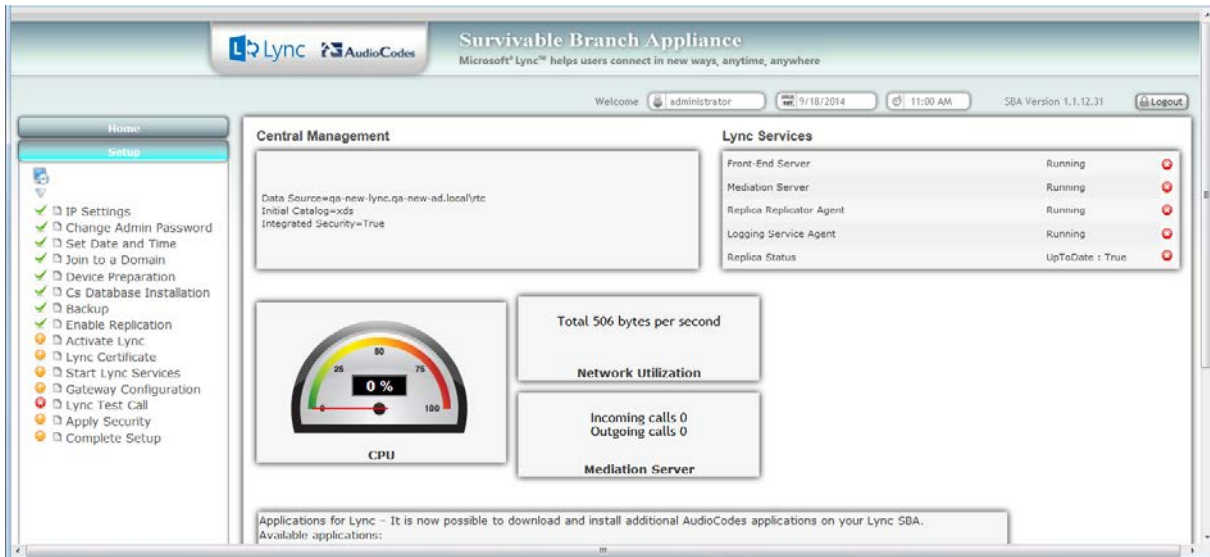
2. Click **Apply**; the following screen appears:

Figure 11-38: Enable Replication – Applied Successfully








A green check mark appears next to the 'Enable Replication' option under the Setup tab, as shown in the figure below.

Figure 11-39: Enable Replication – Completed Successfully



The screenshot displays the 'Survivable Branch Appliance' management console. The interface includes a navigation menu on the left with the 'Setup' tab selected. The 'Setup' list shows 'Enable Replication' with a green checkmark. The main dashboard features a 'Central Management' section with data source information, a 'Lync Services' table, and monitoring widgets for CPU, Network Utilization, and Mediation Server.

Lync Services	
Front-End Server	Running 
Mediation Server	Running 
Replica Replicator Agent	Running 
Logging Service Agent	Running 
Replica Status	UpToDate : True 



Note: The replication status may not immediately display the status "Up to Date-True or "Up to Date-False. These statuses should be displayed at a later stage in the configuration process.

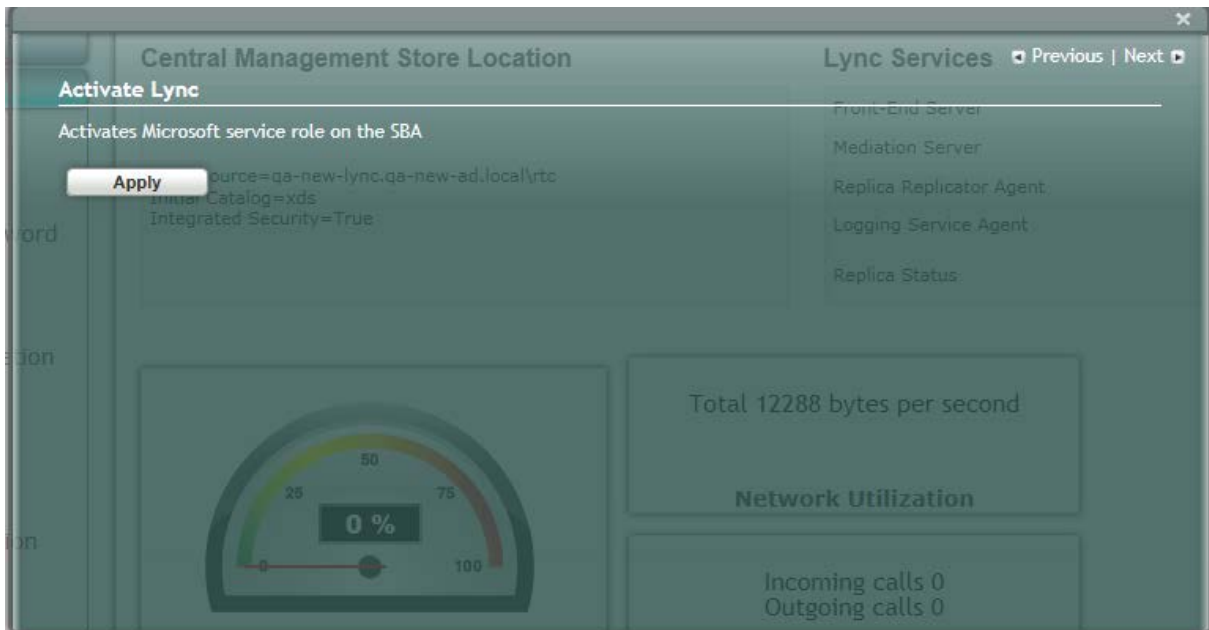
11.10 Step 10: Activate Lync

The Activate Lync option activates the SBA server machine to run a Lync server 2013 service role. Installing the required software does not automatically cause the SBA server machine to adopt a new service role; instead, it must be activated before it actually begins to function in its new role.

➤ **To activate Lync:**

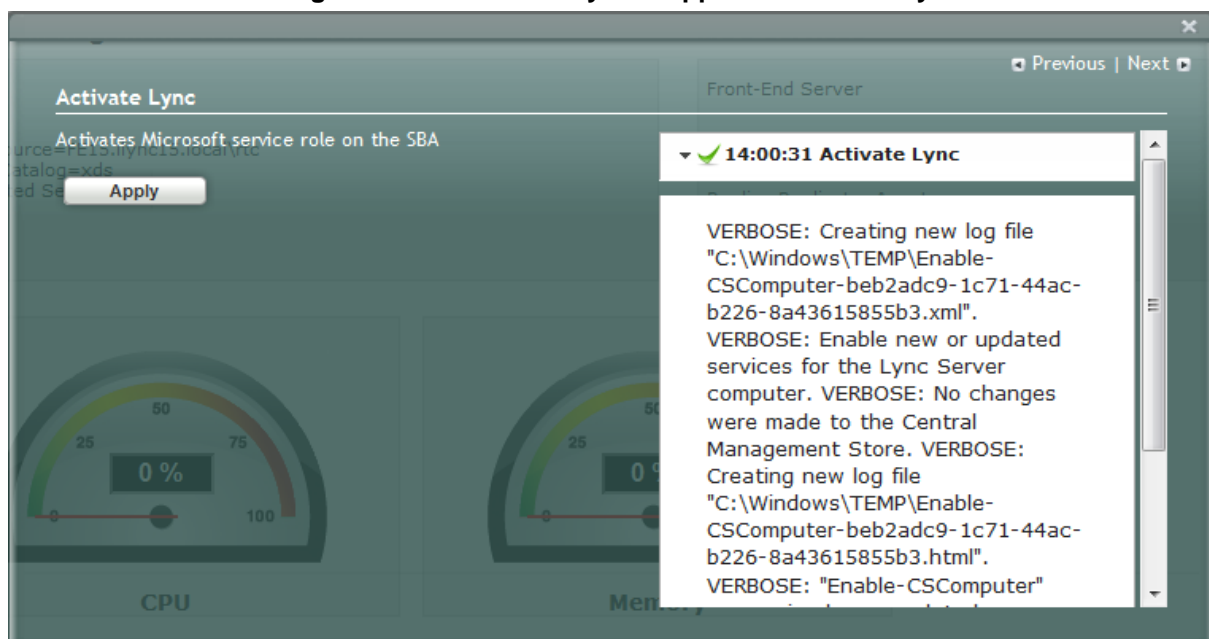
1. Select the **Setup** tab, and then select the 'Activate Lync' check box; the following screen appears:

Figure 11-40: Activate Lync Screen



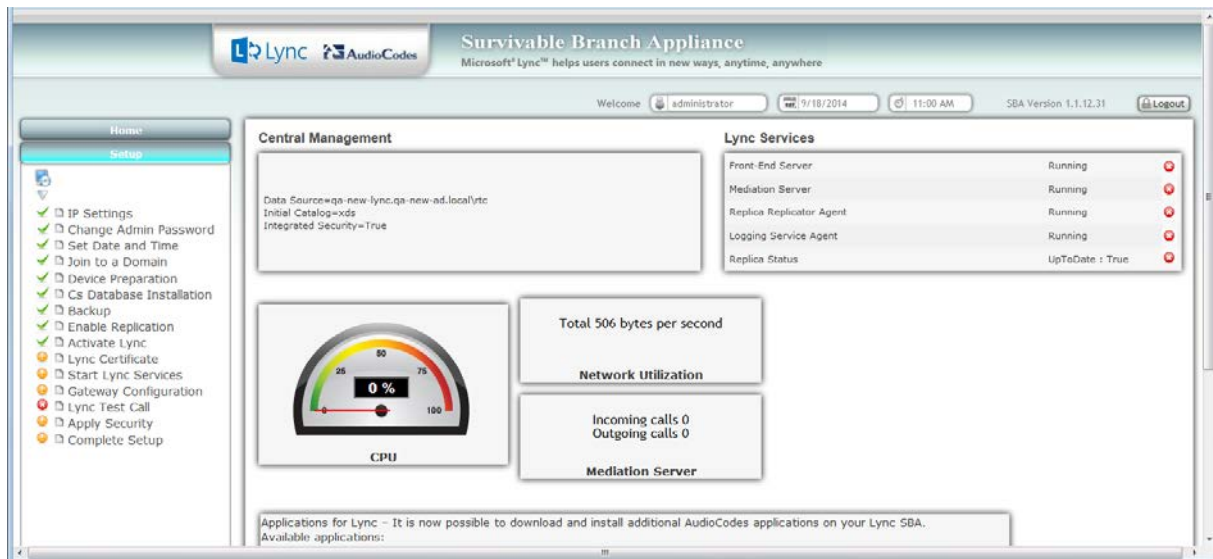
2. Click **Apply**; the following screen appears:

Figure 11-41: Activate Lync – Applied Successfully



A green check mark appears next to the 'Activate Lync' option under the Setup tab, as shown in the figure below.

Figure 11-42: Activate Lync – Completed Successfully



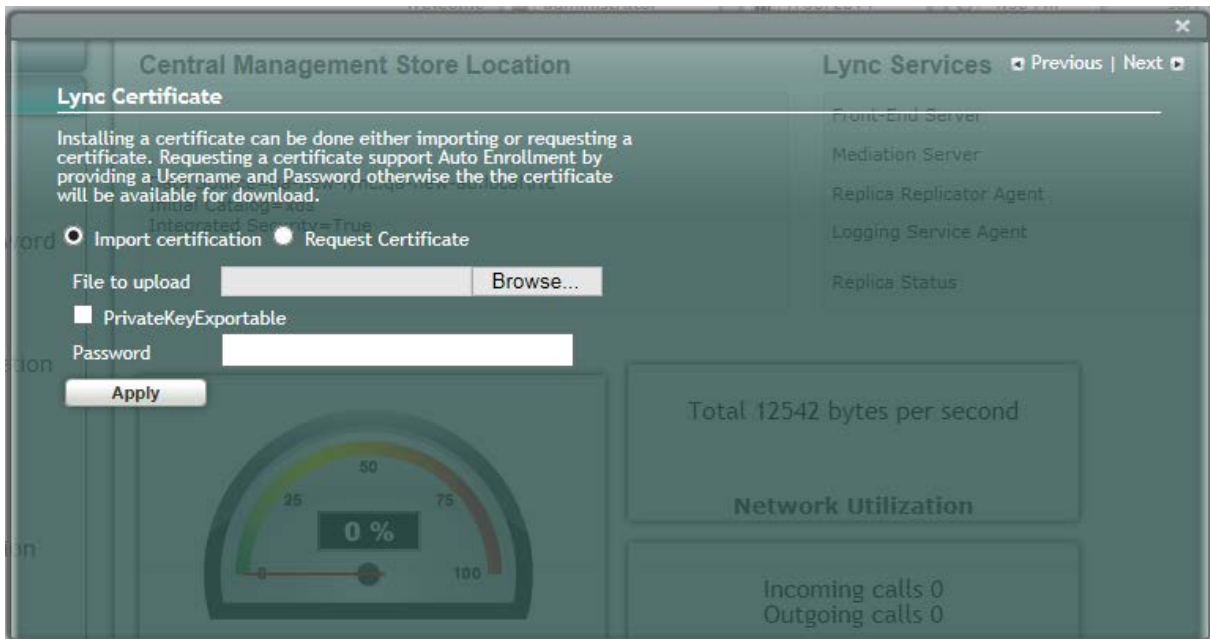
11.11 Step 11: Lync Certificate

The 'Lync Certificate' option installs a certificate from the domain's certificate authority. This certificate is used to secure the connection between the SBA server and the Central Management Server.

➤ **To install a Certificate:**

- Select the **Setup** tab, and then select the 'Lync Certificate' check box; the following screen appears:

Figure 11-43: Lync Certificate Screen



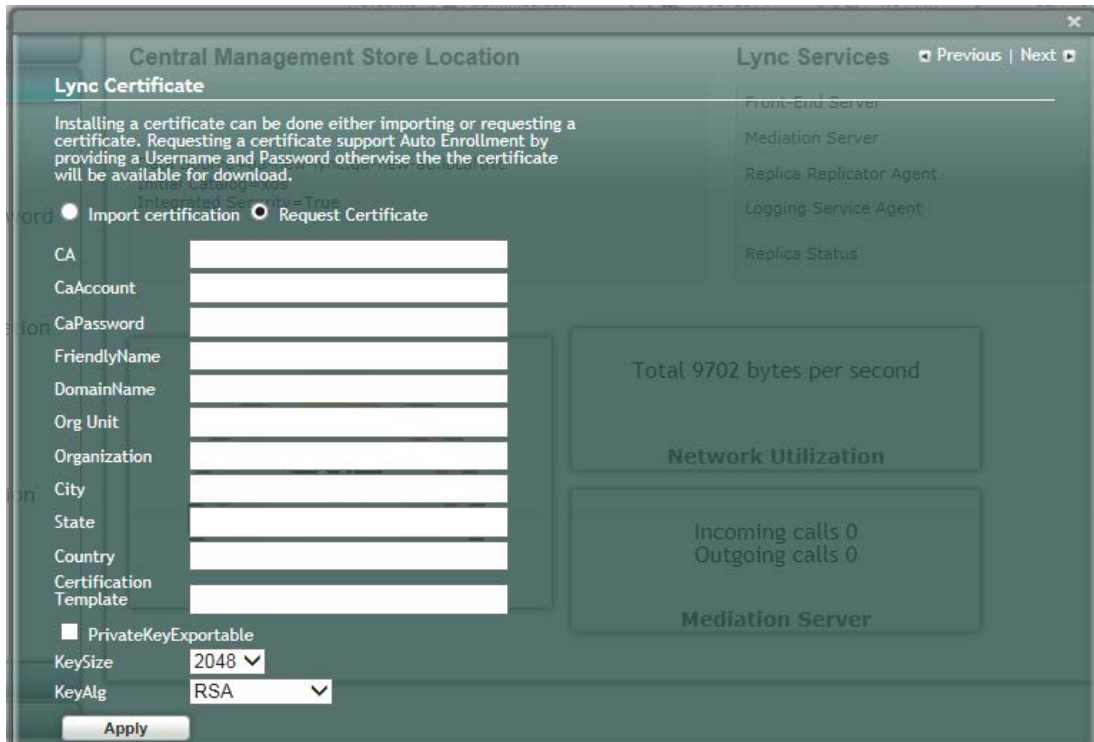
Certificates can be installed either by importing an existing certificate or requesting a new certificate.

➤ **To import an existing certificate:**

1. Select the **Import Certification** radio button.
2. Click **Browse** to select the File to Upload.
3. Enter the Password (optional) of the certificates.
4. Click **Apply**.

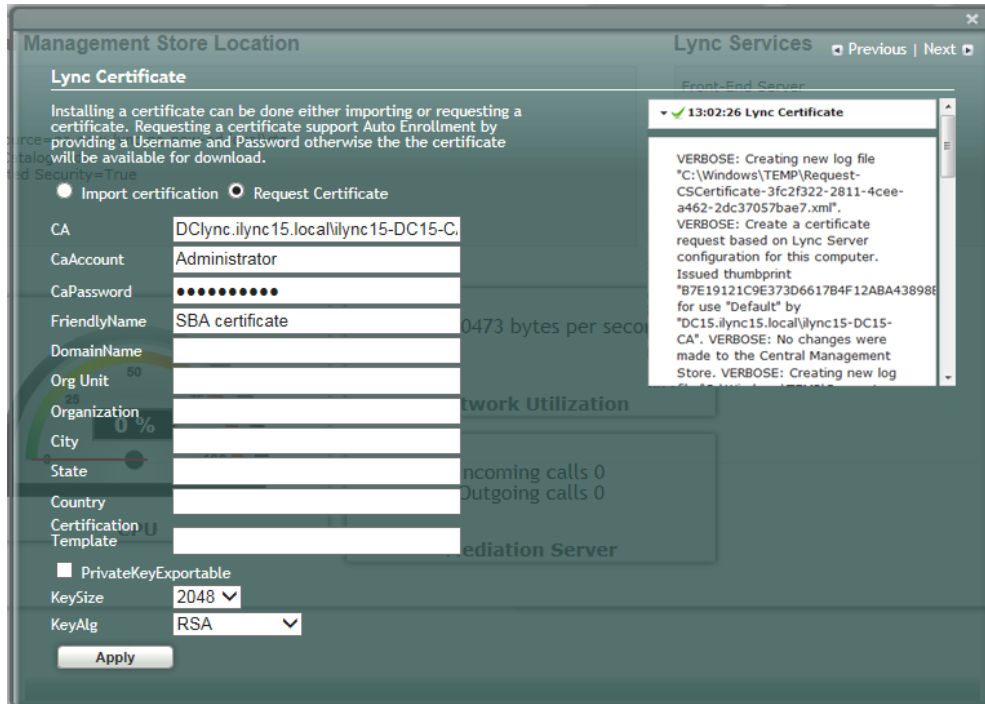
- **To request a new certificate:**
- 1. Select the **Request Certificate** radio button.

Figure 11-44: Request Certificate



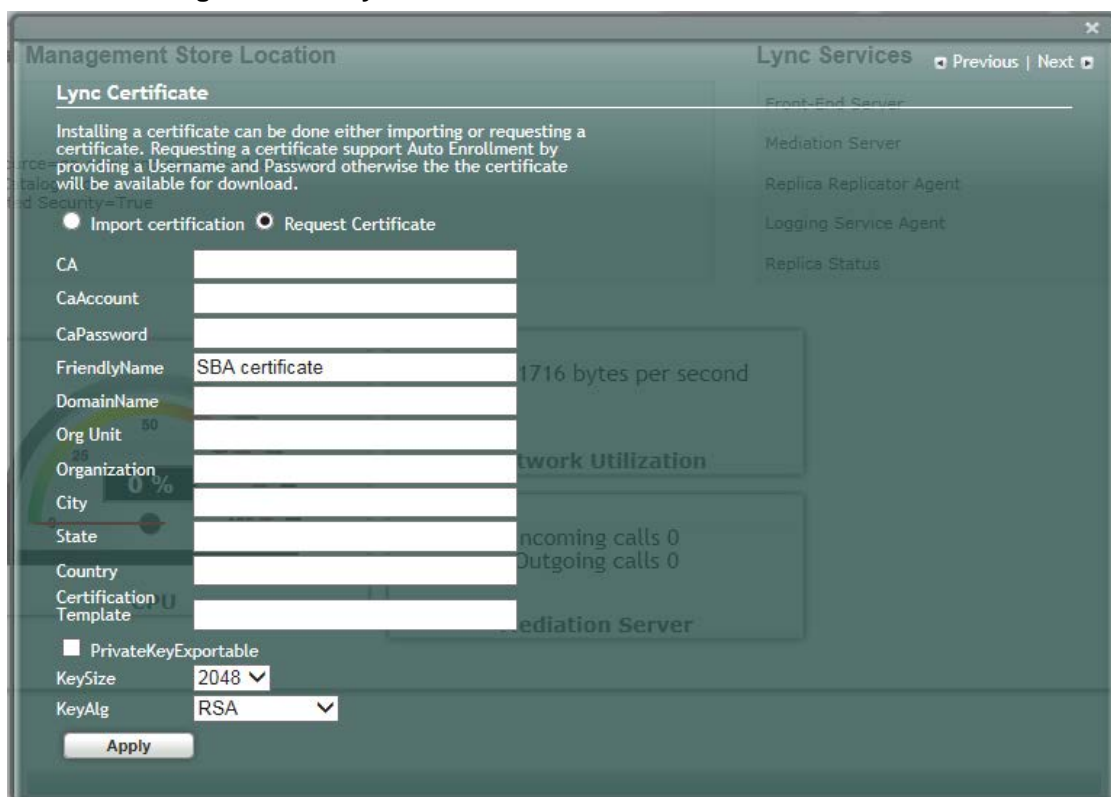
- 2. Requesting a certificate supports Auto-enrollment. Enter all fields. Those fields beginning with a CA prefix are mandatory. The correct Certificate Authority (CA), User and Password must also be supplied.
The CA field contains the <CA FQDN>\<CA Name> (e.g., CA.Lync.local\CA-DC-Lync-CA).

Figure 11-45: Lync Certificate – Detailed Log



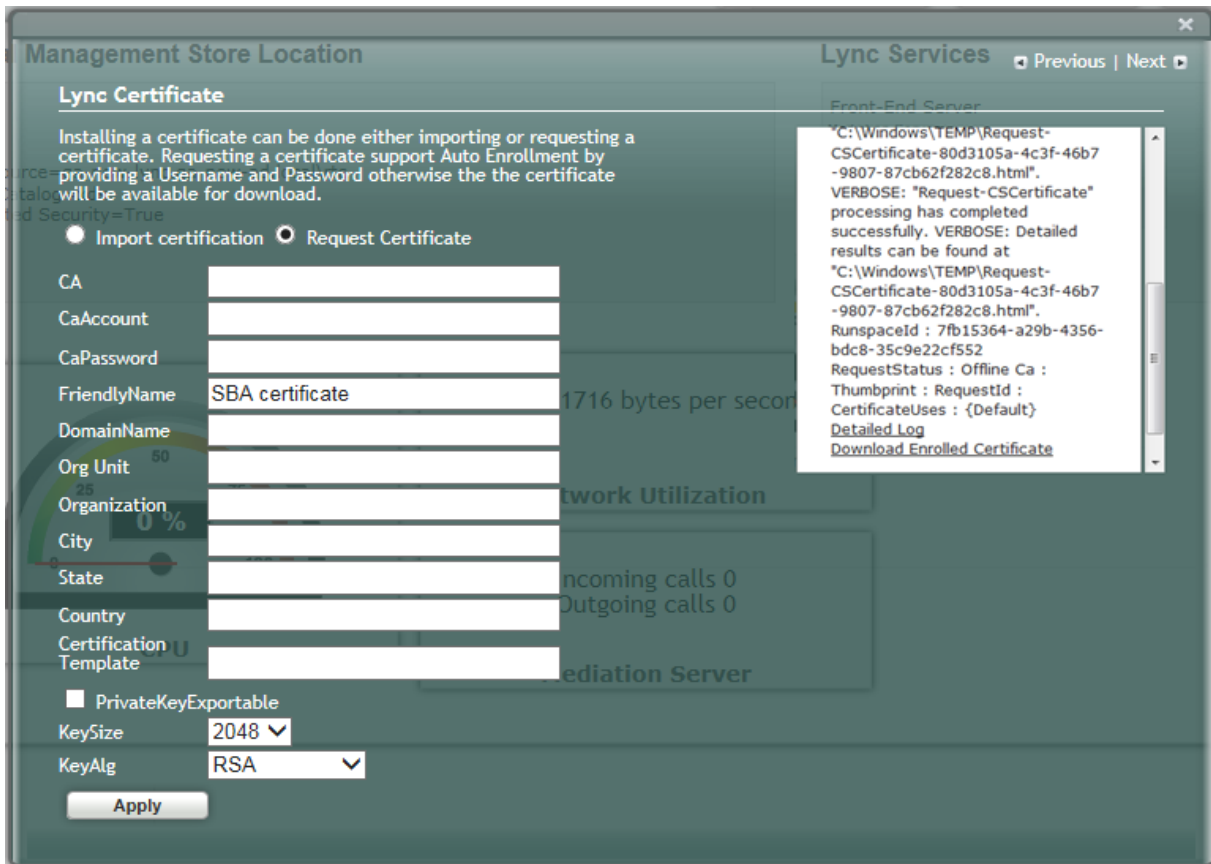
3. If the CA field is not entered, the system creates an enrollment certificate, which can be downloaded.

Figure 11-46: Lync Certificate – Download Enrolled Certificate



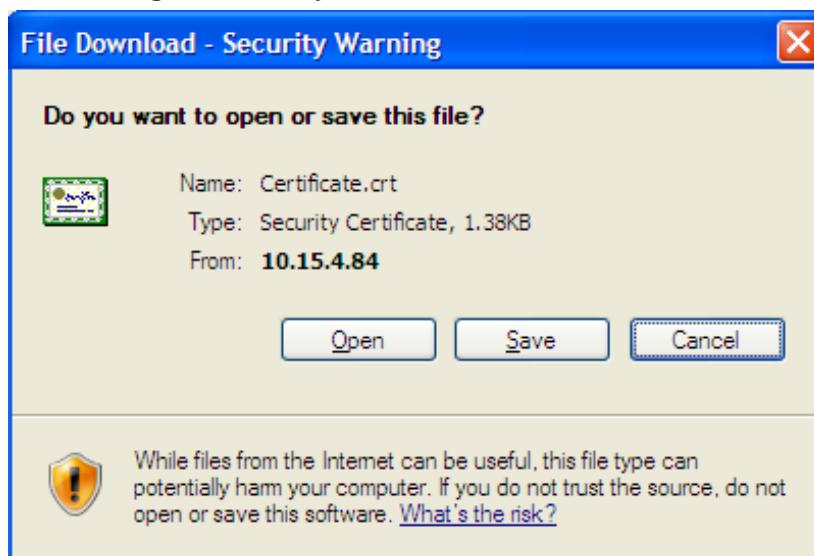
- Click **Apply**; the following screen appears.

Figure 11-47: Lync Certificate – Download Enrolled Certificate



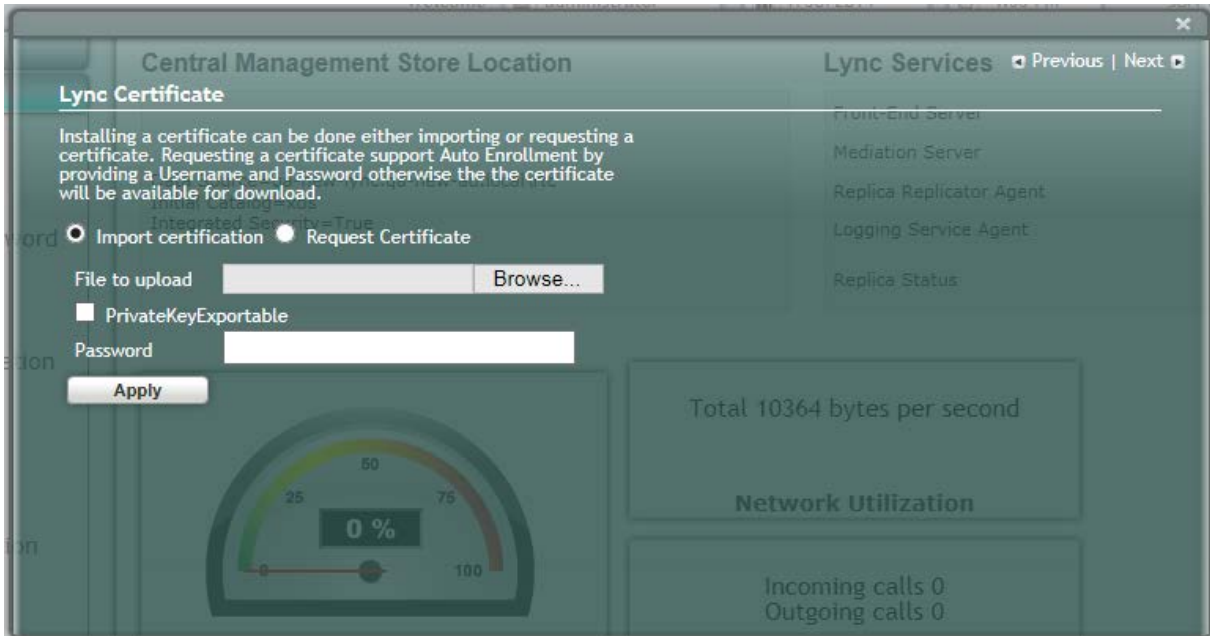
- Click the **Download Enrolled Certificate** link; the following screen appears.

Figure 11-48: Lync Certificate – File Download



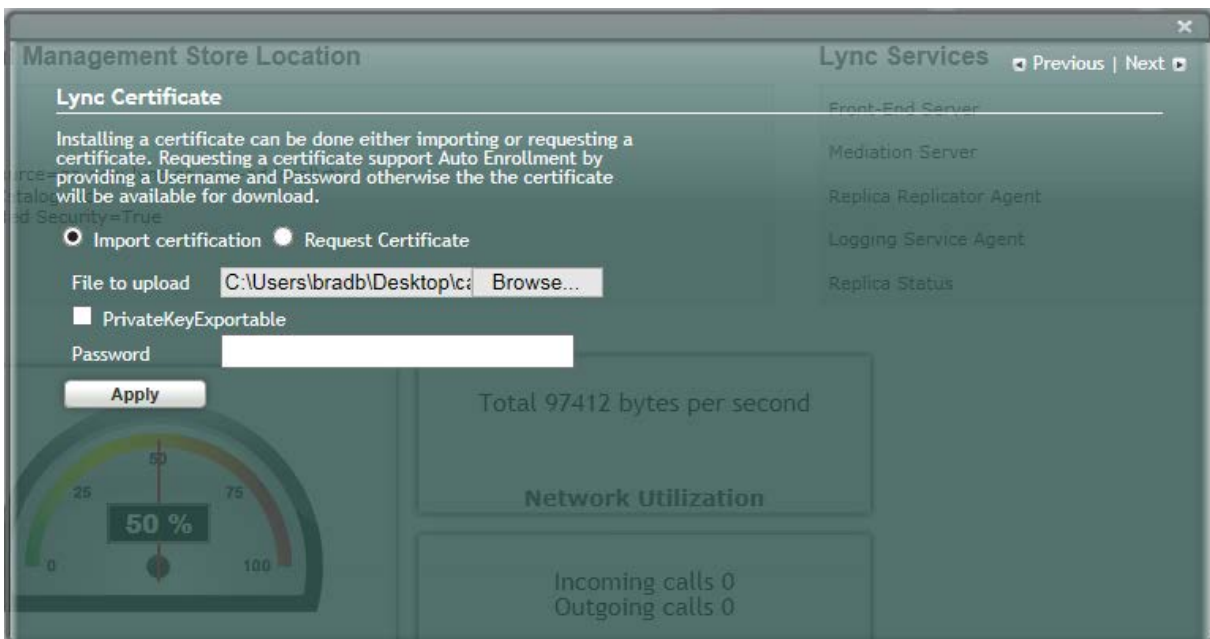
- Click **Save**.
- Once the Enrollment Certificate has been signed, select the Import Certification radio button as shown below and upload the signed certificate to be uploaded by using the Browse and File to Upload fields.

Figure 11-49: Lync Certificate – File Upload



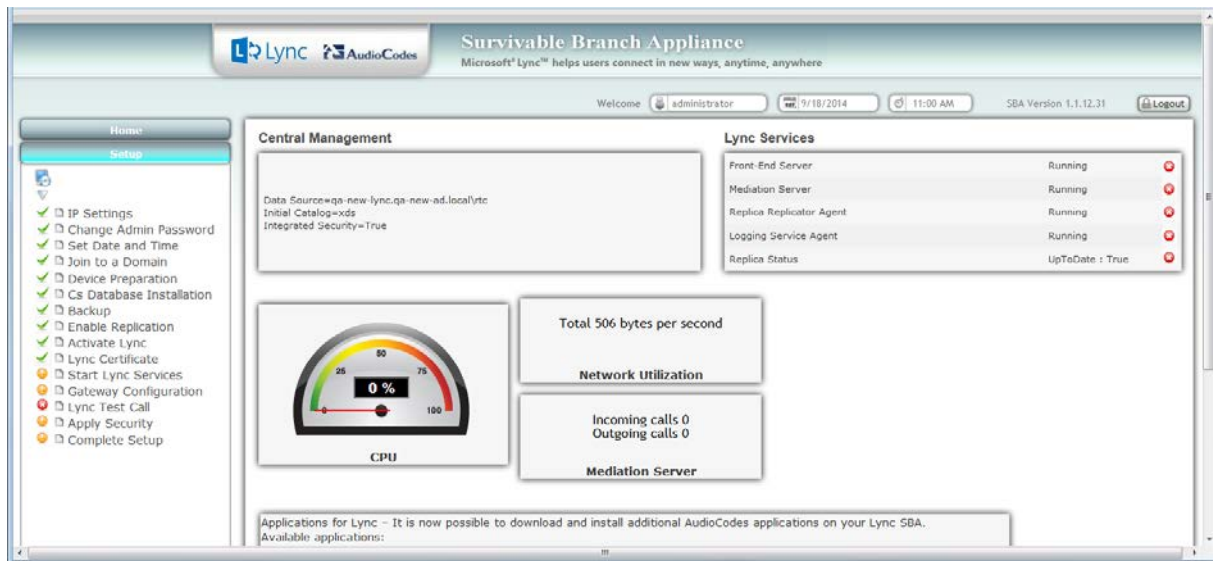
8. Click **Apply**; the following screen appears:

Figure 11-50: Lync Certificate – Detail Log



A green check mark appears next to the 'Lync Certificate' option under the Setup tab, as shown in the figure below.

Figure 11-51: Lync Certificate – Complete



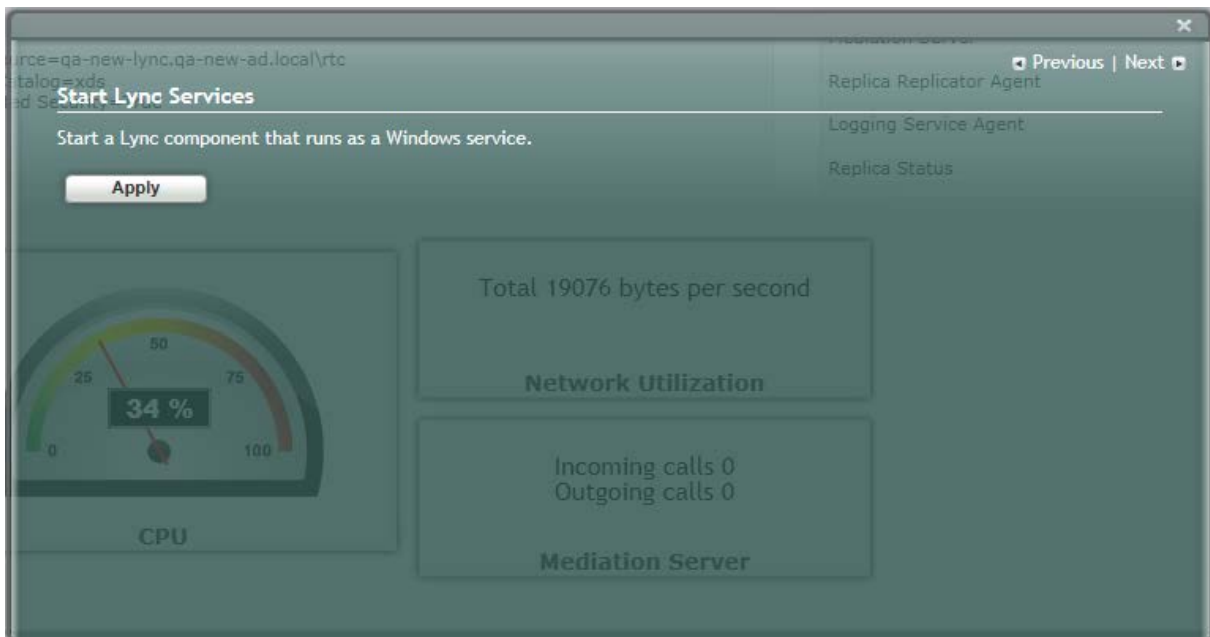
11.12 Step 12: Start Lync Services

The Start Lync Services option enables you to start a Lync Server 2013 (formerly, termed Communications Server) component that runs as a Windows service.

➤ **To start Lync services:**

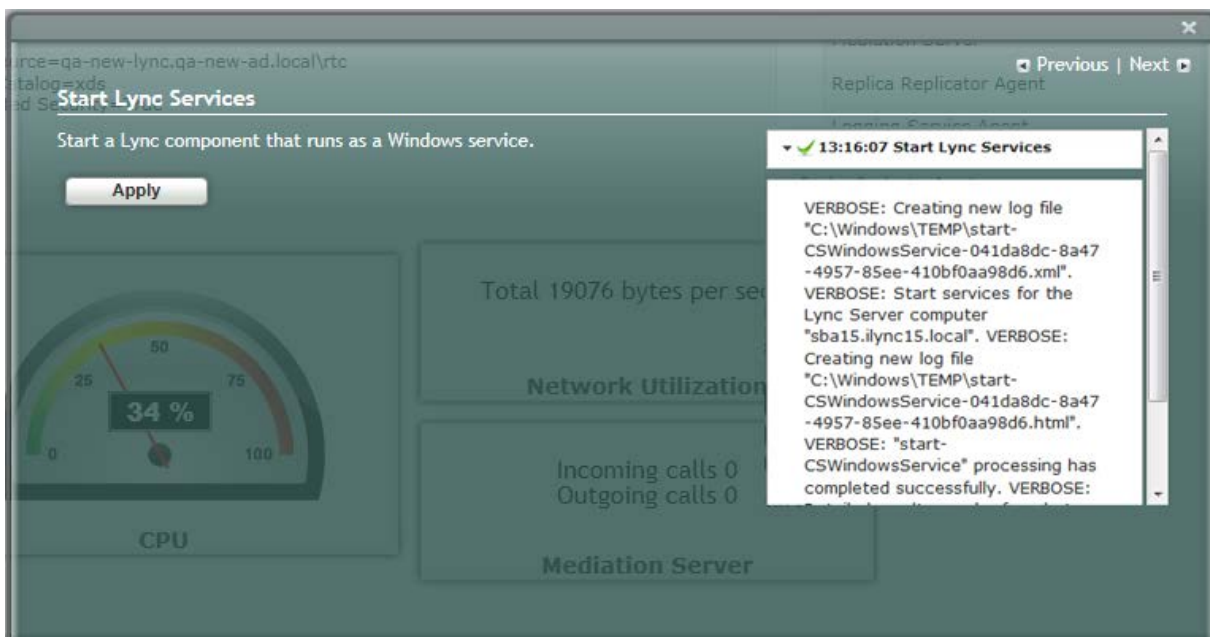
1. Select the **Setup** tab and then select the Start Lync Services check box; the following screen is displayed:

Figure 11-52: Start Lync Services Screen



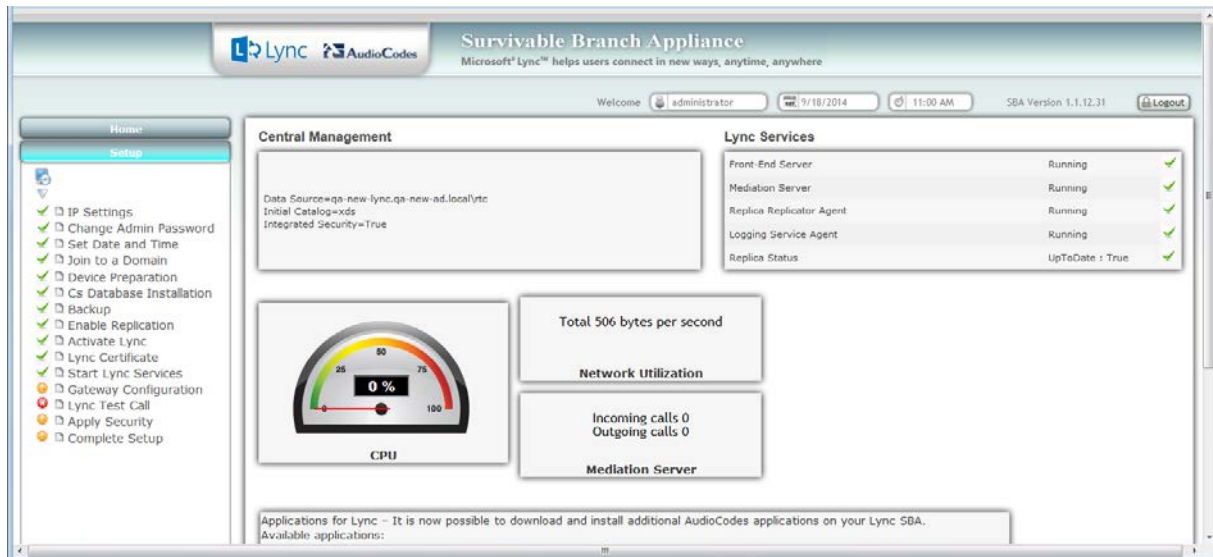
2. Click **Apply** to start the services as per the Lync configuration settings; the following screen is displayed:

Figure 11-53: Lync Services Started



A green check mark appears next to the 'Start Lync Services' option under the Setup tab, and in the Lync Services information pane all of the Lync Services are shown as "Running" as shown in the figure below.

Figure 11-54: Start Lync Services – Completed Successfully



Note: The Lync Services and Replication Status take time to update and therefore will not immediately be displayed as running.

11.13 Step 13: Configure Gateway and Test Calls

The Gateway Configuration option enables you to connect to the Web-based interface of the PSTN Gateway functionality of the Mediant 1000B SBA in order to configure the gateway for testing calls to the PSTN.



Note: Before testing gateway calls:

- Ensure that you have connected the PSTN gateway as described in Chapter 7.
- Ensure that you have configured PSTN call routing (for more information, refer to the *Mediant 1000B MSBR User's Manual*).

➤ **To configure the gateway and run test calls:**

1. Select the **Setup** tab, and then select the 'Gateway Configuration' check box; the following screen appears:

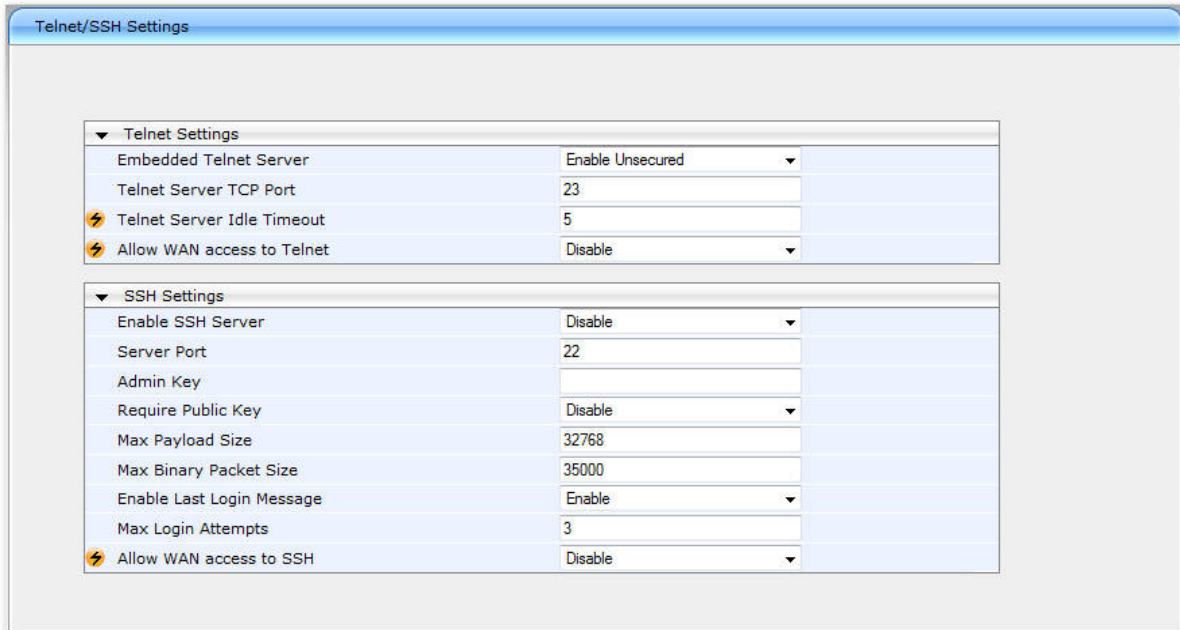
Figure 11-55: Gateway and Endpoint Configuration

Service	Status
Front-End Server	Running
Mediation Server	Running
Replica Replicator Agent	Running
Logging Service Agent	Running
Replica Status	UpToDate: False

2. In the 'Gateway' field, enter the IP address or DNS name of the Mediant 1000B.
3. In the 'Phone Number' field, enter the endpoint phone number for which you wish to test the call.
4. In the 'DTMF' field, enter any DTMF string. This DTMF string will be heard when the user picks up the phone handset (optional).
5. If you changed the Web/Telnet login username and password of the PSTN Gateway, then enter their values in the 'Username' and 'Password' fields respectively; otherwise, leave the fields as is.
6. Click **Connect**; the login screen for the gateway's Embedded HTTP/S-based Web server is displayed.

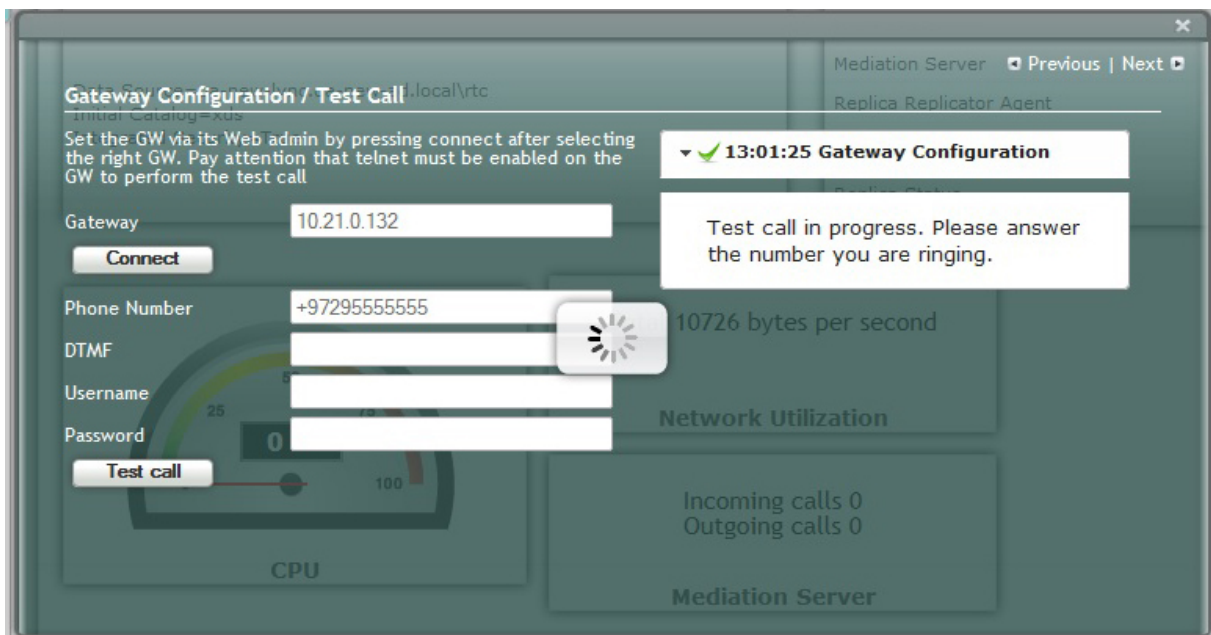
7. Establish a telnet session (enable Telnet on the PSTN Gateway):
 - a. Open the Telnet/SSH Settings page (**Configuration** tab > **System** menu > **Management** > **Telnet/SSH Settings**).
 - b. From the 'Embedded Telnet Server' drop-down list, select **Enable Unsecured**.
 - c. In the 'Telnet Server TCP Port' field, ensure that the port used for Telnet is '23' (default).

Figure 11-56: Enabling Telnet



8. Configure PSTN call routing (for more information, refer to the *Mediant 1000B MSBR User's Manual*).
9. In the SBA Management Interface, click **Test Call**; the test call in progress is displayed:

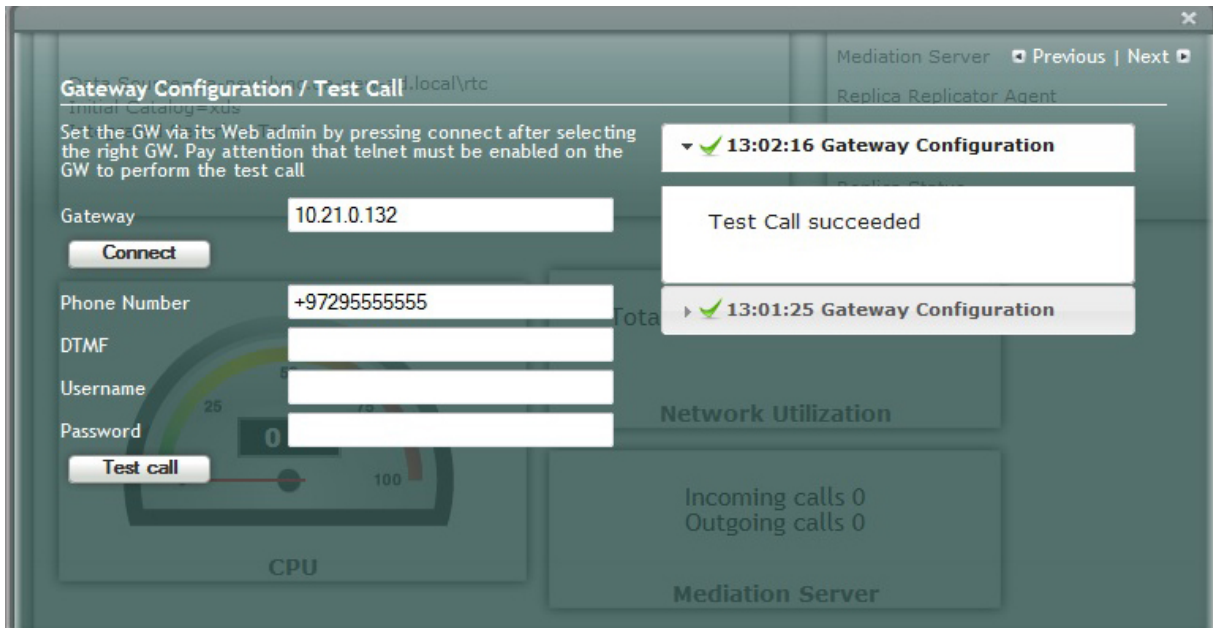
Figure 11-57: Test Call in Progress



- a. When the call has been successfully tested.

- b. If the phone does not ring, an error message is displayed and the call test fails. If the phone rings, lift the handset and confirm that you can hear the DTMFs. The following screen appears when you answer the phone:

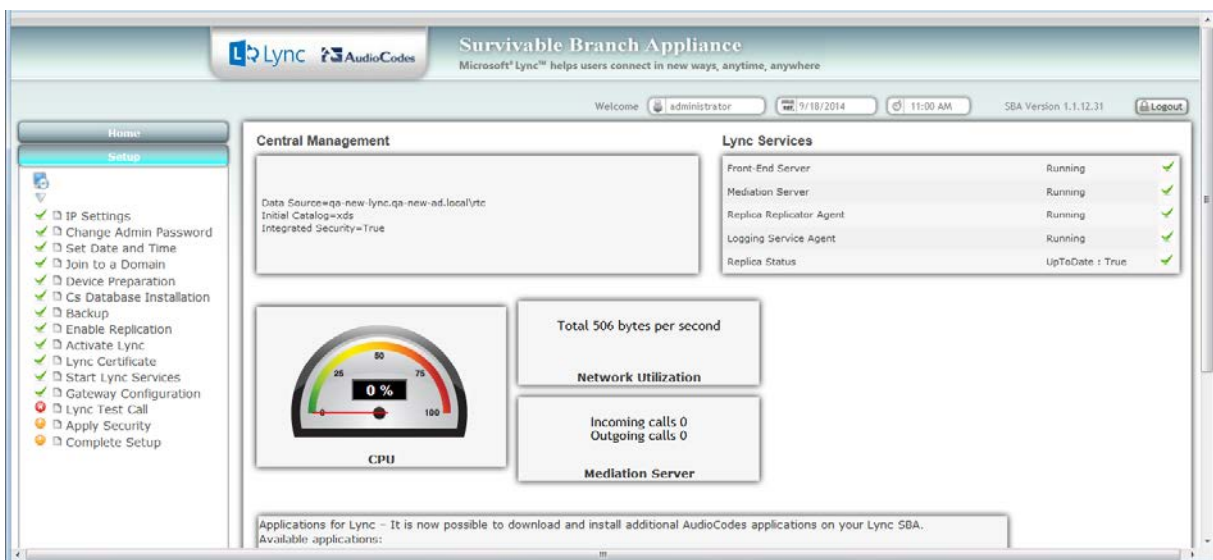
Figure 11-58: Test Call Succeeded



Note: It is recommended to disable Telnet after making the test call.

A green check marks appear next to the 'Gateway Configuration' (and Gateway test call) option under the Setup tab, as shown in the figure below.

Figure 11-59: Gateway Configuration Completed Successfully



11.14 Step 14: Test Lync Calls

The Lync Test Call option allows you to test a PSTN call initiated by the Lync Server 2013.

11.14.1 Test Prerequisites

Before running the Lync Test Call, the following prerequisites must be met :

- The gateway call has been successfully tested as described above in Section 11.13 on page 115.
- Test users have been created in the Lync Server 2013 and are voice-enabled.
- VoIP Outbound Routing configuration has been setup and the correct policies assigned to the test users (for more information, refer to the *Mediant 1000B MSBR User's Manual*).
- Built-in-users for HealthMonitoring have been configured using the following commands:

```
New-CsHealthMonitoringConfiguration -Identity
<XdsGlobalRelativeIdentity> -FirstTestUserSipUri <String> -
SecondTestUserSipUri <String>
```

Where:

- Identity the FQDN of the pool where the health monitoring configuration settings are to be assigned (i.e., SBA FQDN).
- FirstTestUserSipUri is the SIP address of the first test user to be configured for use by this collection of health monitoring settings. Note that the SIP address must include the sip: prefix, for example:

```
-FirstTestUserSipUri sip:kenmyer@litwareinc.com
```

- SecondTestUserSipUri is the SIP address of the second test user to be configured for use by this collection of health monitoring settings. Note that the SIP address must include the sip: prefix, for example:

```
-SecondTestUserSipUri sip:jhaas@litwareinc.com
```

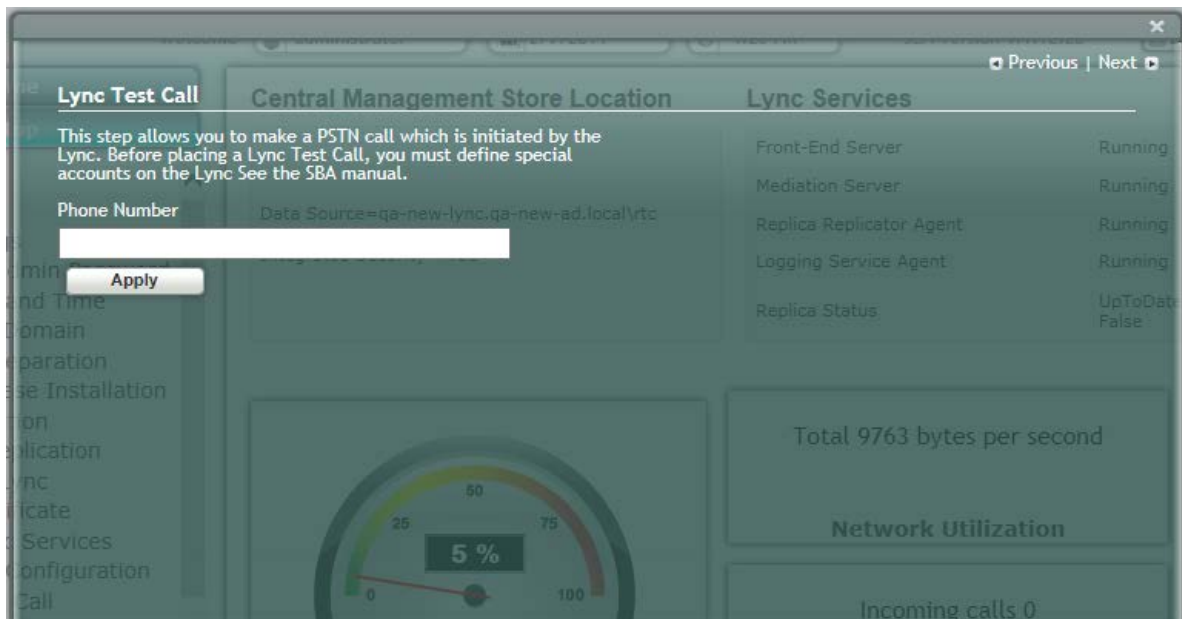
11.14.2 Running the Lync Call Test

The procedure for running the Lync test call is described below.

➤ **To run the Lync test call:**

1. Select the **Setup** tab, and then select the **Lync Test Call** option; the Lync Test Call screen is displayed:

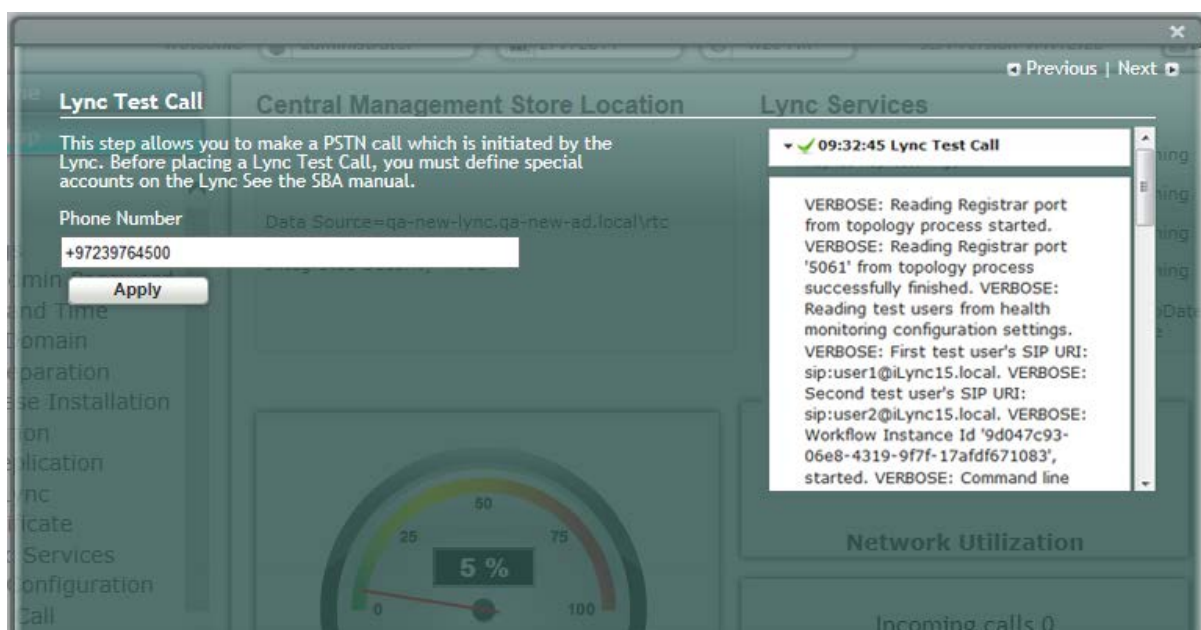
Figure 11-60: Lync Test Call Screen



2. In the 'Dial Check Phone Number' field, enter the PSTN phone number to dial.
3. Click **Apply** to start the test call.

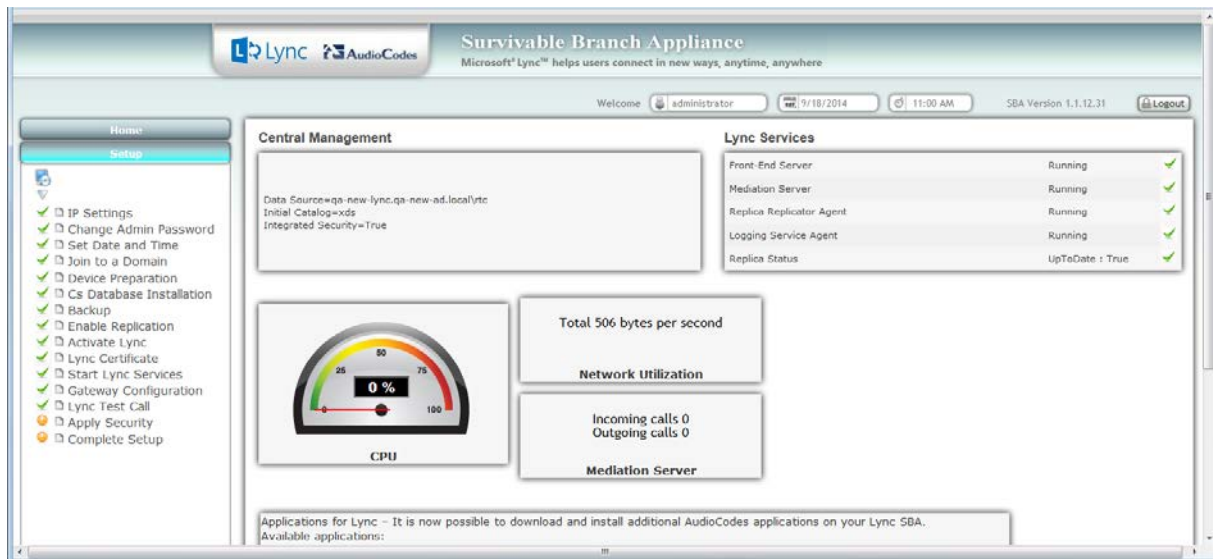
If the test is successful, the phone of the PSTN user rings and when the handset is lifted, the DTMF tones are heard. If the phone does not ring, an error message is displayed on the screen. The screen displays logged details of the call:

Figure 11-61: Lync Test Call – Logged Call Test Result



A green check mark appears next to the 'Lync Test Call' option under the Setup tab, as shown in the figure below.

Figure 11-62: Lync Test Call Completed Successfully



11.15 Step 15: Apply Security

You can apply a security template to the device. This template configures the security for various SBA services. For example, firewall policy, registeries and OS audit policy. You can apply one of the following security policies:

- No Policy-use a default hardening setup (no security template is loaded to the SBA device) as was the case until this release.
- Use default template-Load an AudioCodes built default security template to the SBA device.
- Upload a security template-Load an administrator-defined template to the SBA device.



Note: Once a template is loaded, you cannot perform rollback using the SBA GUI. To rollback the security settings, see the Microsoft document at: <http://technet.microsoft.com/en-us/library/cc733088.aspx>.

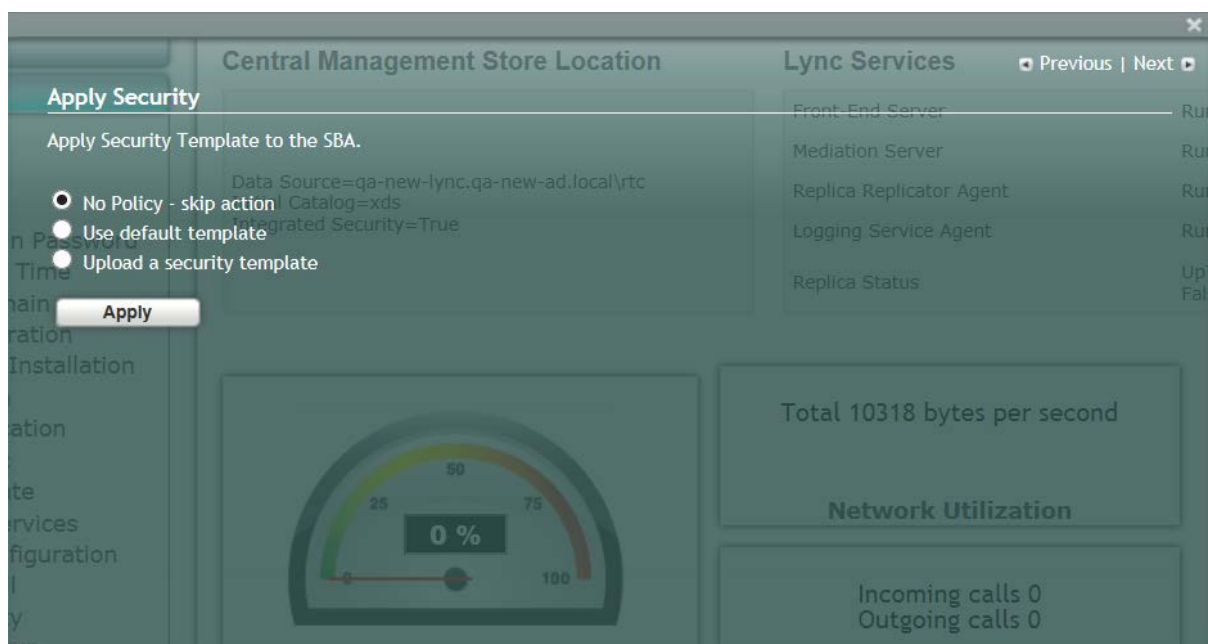
11.15.1 Apply No Policy

This procedure describes how to configure the 'No Policy' security option on the SBA device. When this option is configured, a default hardening setup is implemented and no security template is loaded to the SBA device.

➤ **To implement the No Policy option:**

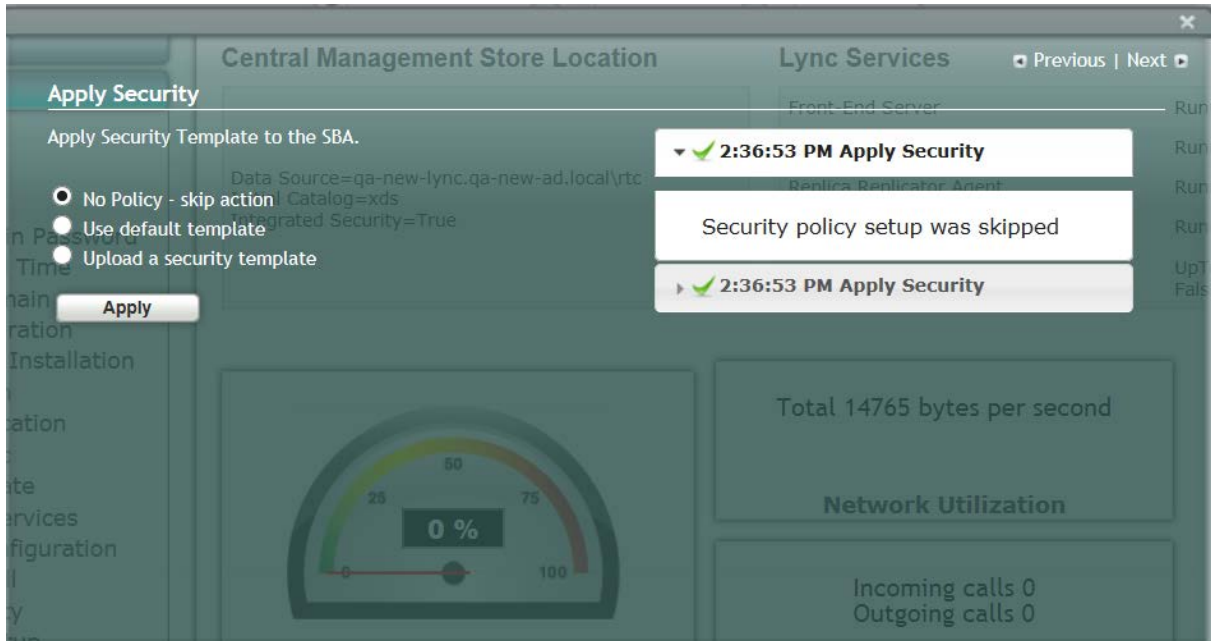
1. Select the **Setup** tab, and then click the **Apply Security** option; the following screen is displayed:

Figure 11-63: Apply Security-No Policy



2. Select the 'No Policy-skip action' check box option, and then click **Apply**; the following screen is displayed:

Figure 11-64: Confirmation-Security Policy Setup Skipped



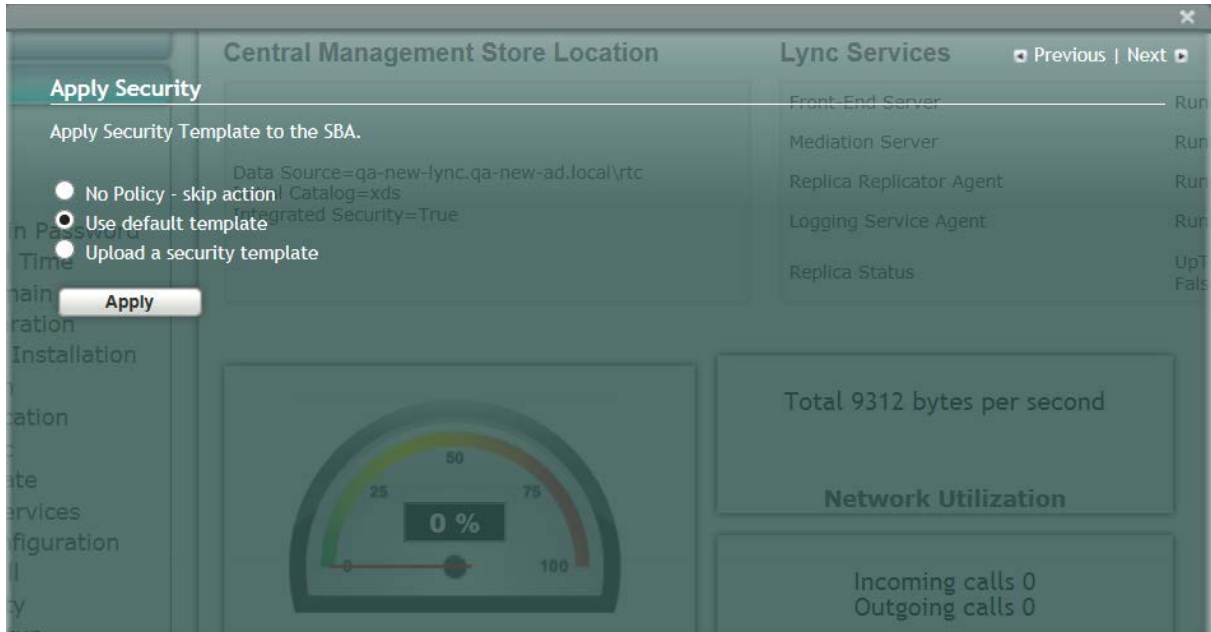
11.15.2 Apply Default Security Template

This procedure describes how to apply the default security template.

➤ **To apply the default security template:**

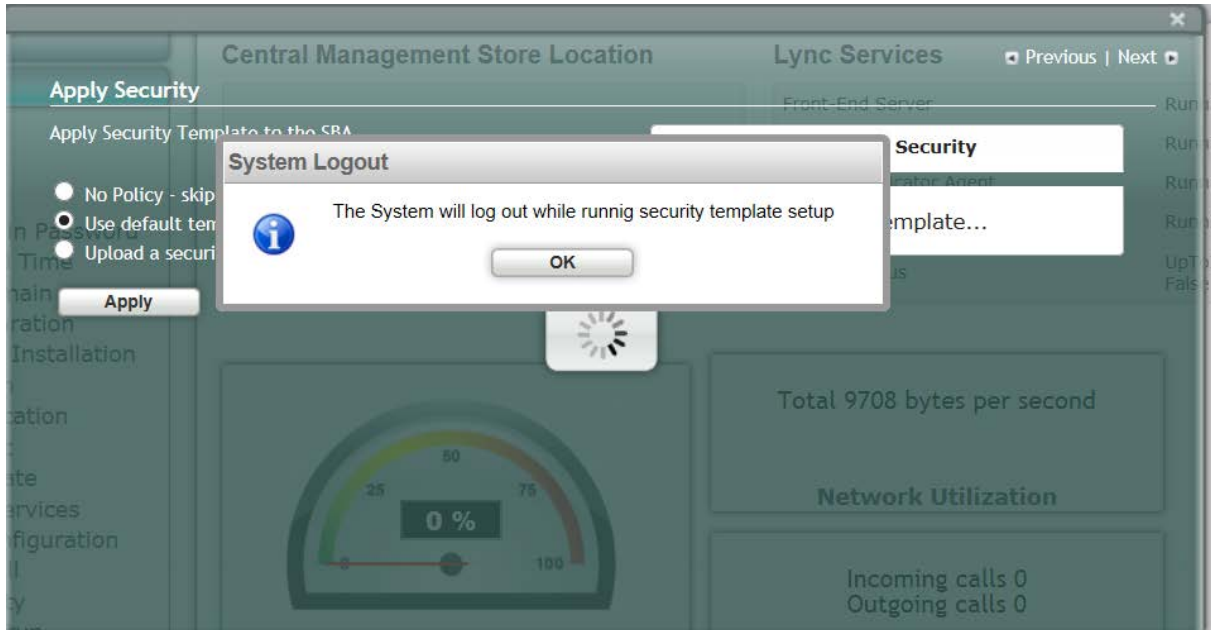
1. Select the **Setup** tab, and then click the **Apply Security** option; the following screen is displayed:

Figure 11-65: Apply Security Policy- Use Default Template



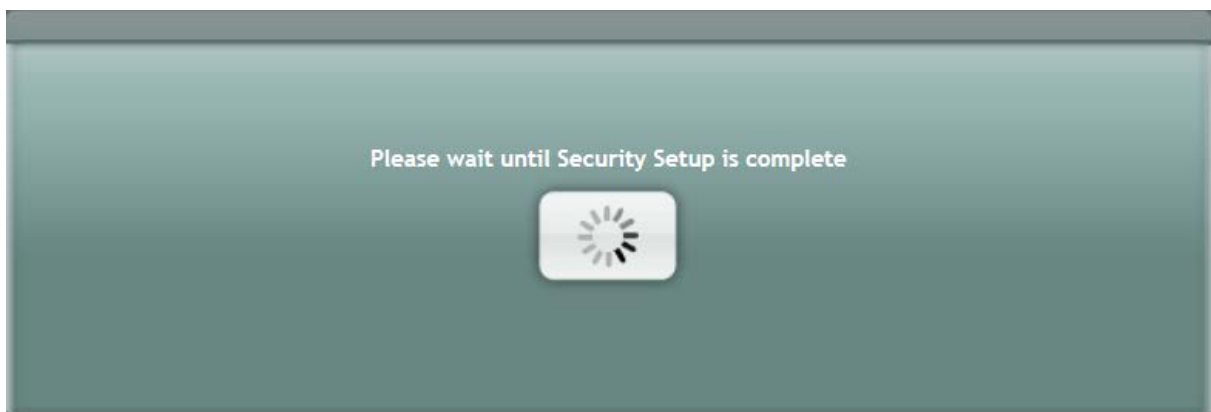
2. Select the 'Use default template' check box, and then click **Apply**; the SBA automatically logs out:

Figure 11-66: System Logout-Default Security Template Applied



3. Click **OK** for the system to log out while running the security template; the following screen appears:

Figure 11-67: System Logout-Security Template

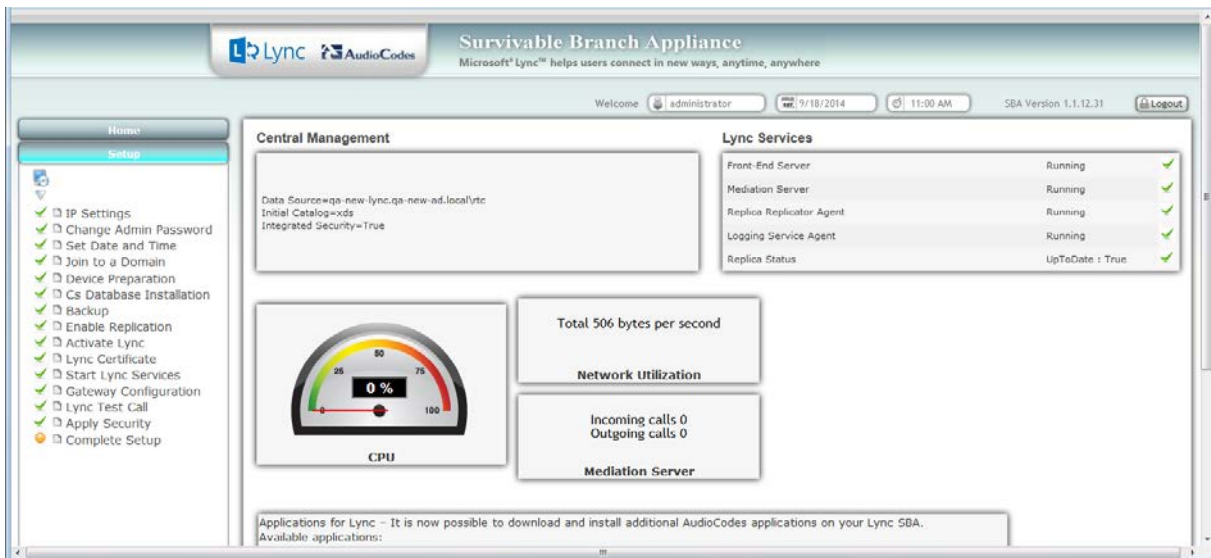


4. After a few minutes the security setup completes, and the SBA login screen appears.

5. Login and then select the **Setup** tab.

A green check mark appears next to the 'Apply Security' option, as shown in the figure below.

Figure 11-68: Security Template Successfully Applied



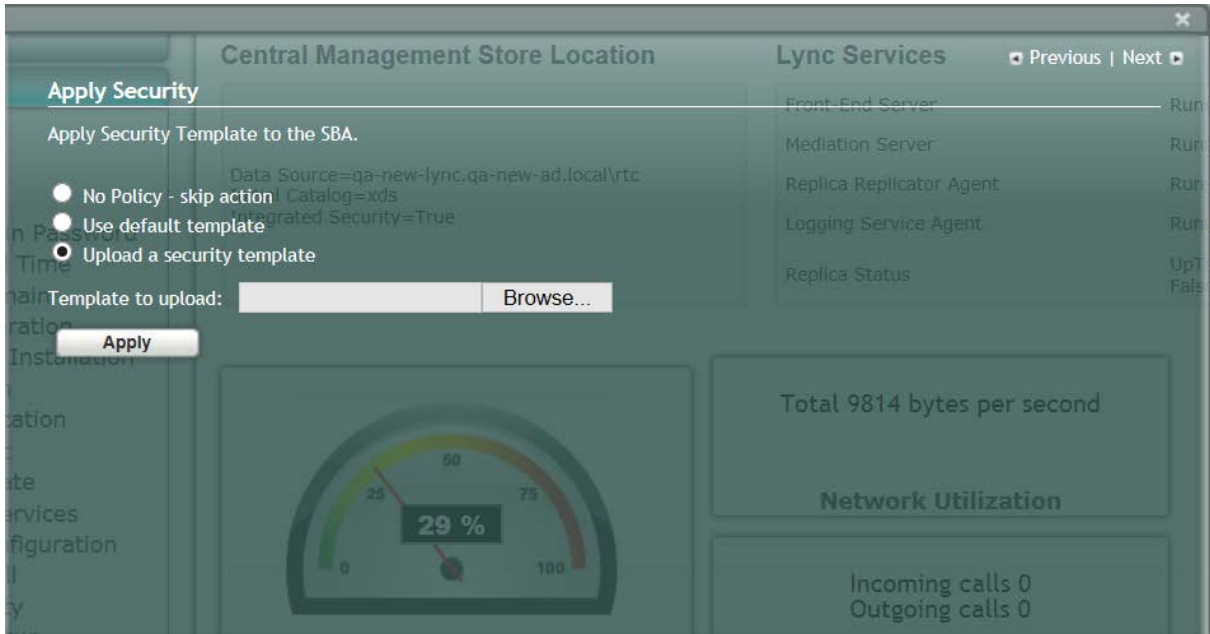
11.15.3 Apply User-Defined Security Template

This procedure describes how to apply a user-defined security template.

➤ **To apply a user-defined security template:**

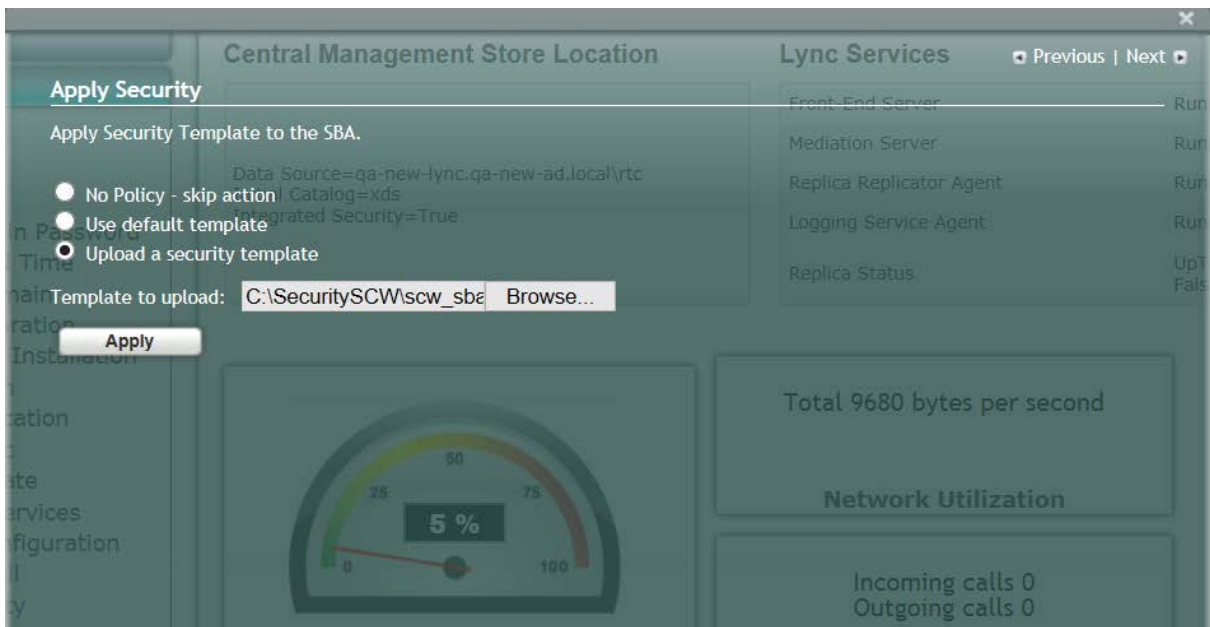
1. Select the **Setup** tab, and then select the 'Apply Security' check box, the following screen is displayed:

Figure 11-69: Apply Security Policy- Upload a Security Template



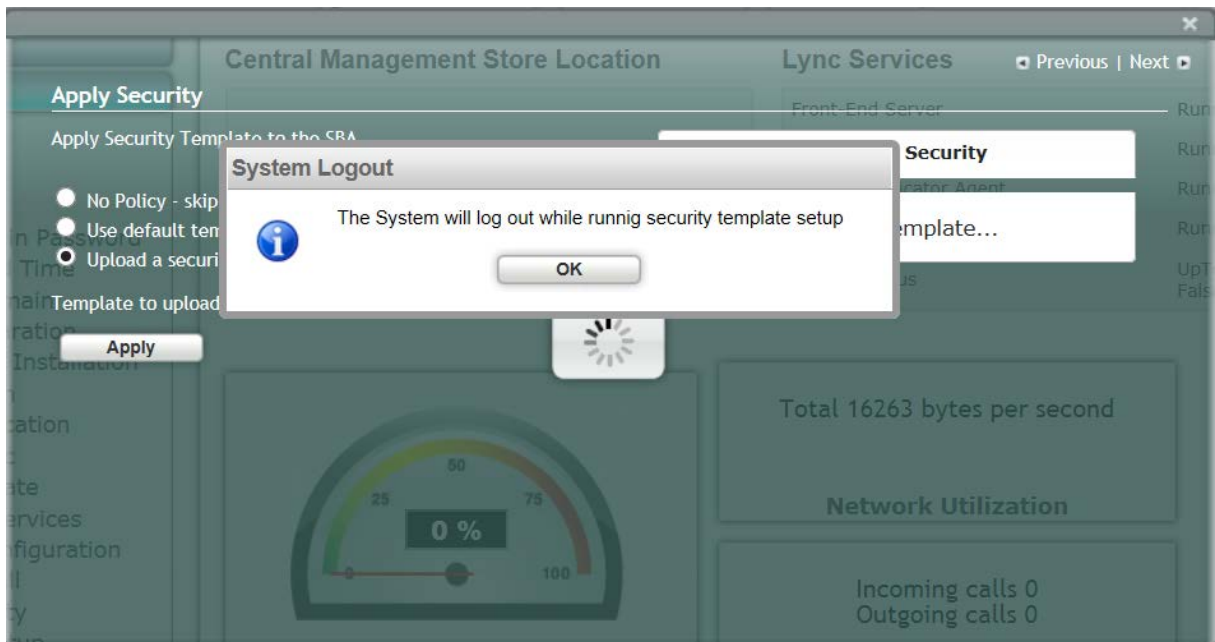
2. Select the 'Upload a security template' check box; the following screen appears:

Figure 11-70: Apply Security Policy- Browse to Security Template



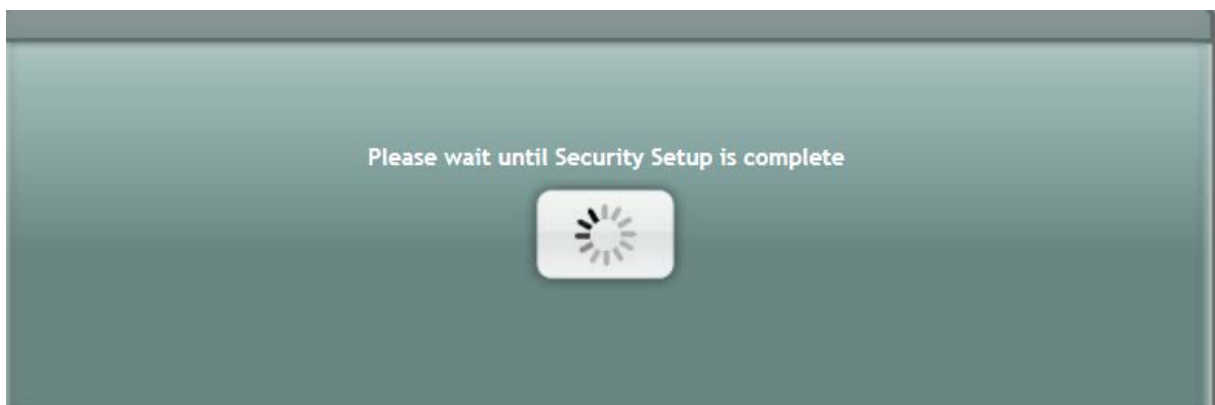
3. Browse to a custom security template to upload and run, and then click **Apply**; the SBA automatically logs out:

Figure 11-71: System Logout-Custom Security Template Applied



4. Click **OK** for the system to log out while running security template; the following screen appears:

Figure 11-72: System Logout-Security Template

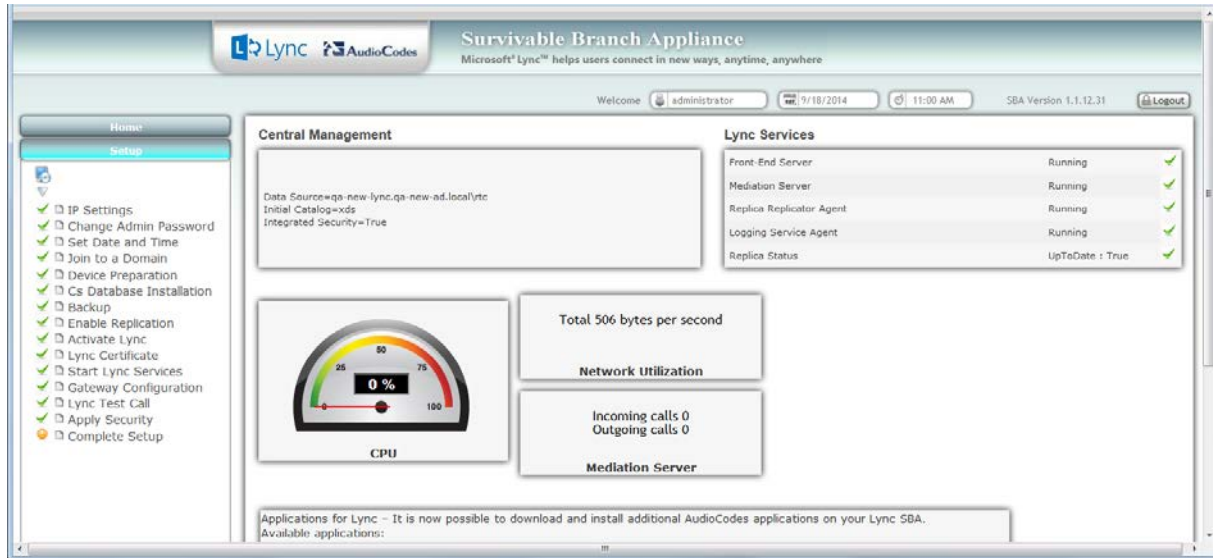


After a few minutes the security setup completes, and the SBA login screen appears.

5. Login and then select the **Setup** tab.

A green check mark appears next to the 'Apply Security' option, as shown in the figure below.

Figure 11-73: Custom Security Template Successfully Applied



11.16 Step 16: (Optional) Remote Control

This section describes how to enable or disable the RDP (Remote Desktop Protocol) and the Remote Windows Powershell on the SBA device.

Remote Power Shell - The Remote PowerShell is by default enabled. Note that for previous versions (prior to version 1.1.12.0), the Remote PowerShell was by default disabled, and could only be enabled by configuring the parameter 'PSRemoting = Force' in the PowerShell.

RDP (Remote Desktop Protocol): The RDP is enabled by default for all SBA versions.



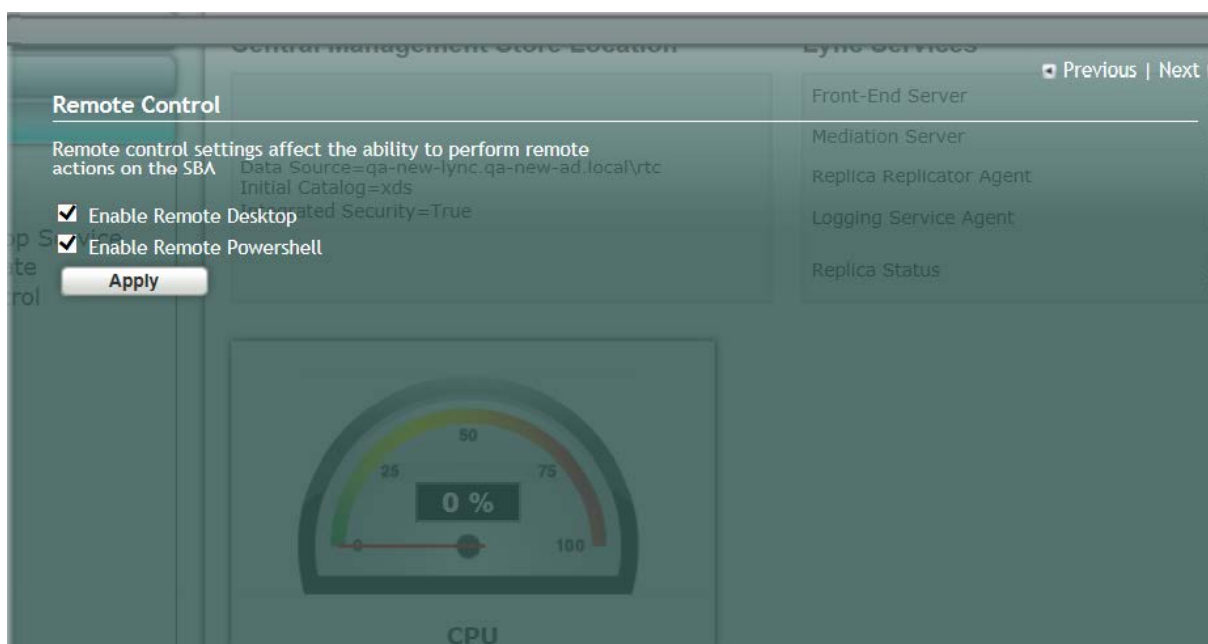
Note: If you are using the SBA Pro to upgrade the SBA, then you must enable the Remote Windows Powershell.

➤ **To enable/disable remote controls:**

1. Select the **Tools** tab, and then select the 'Remote Control' checkbox.

The Remote Control screen is displayed:

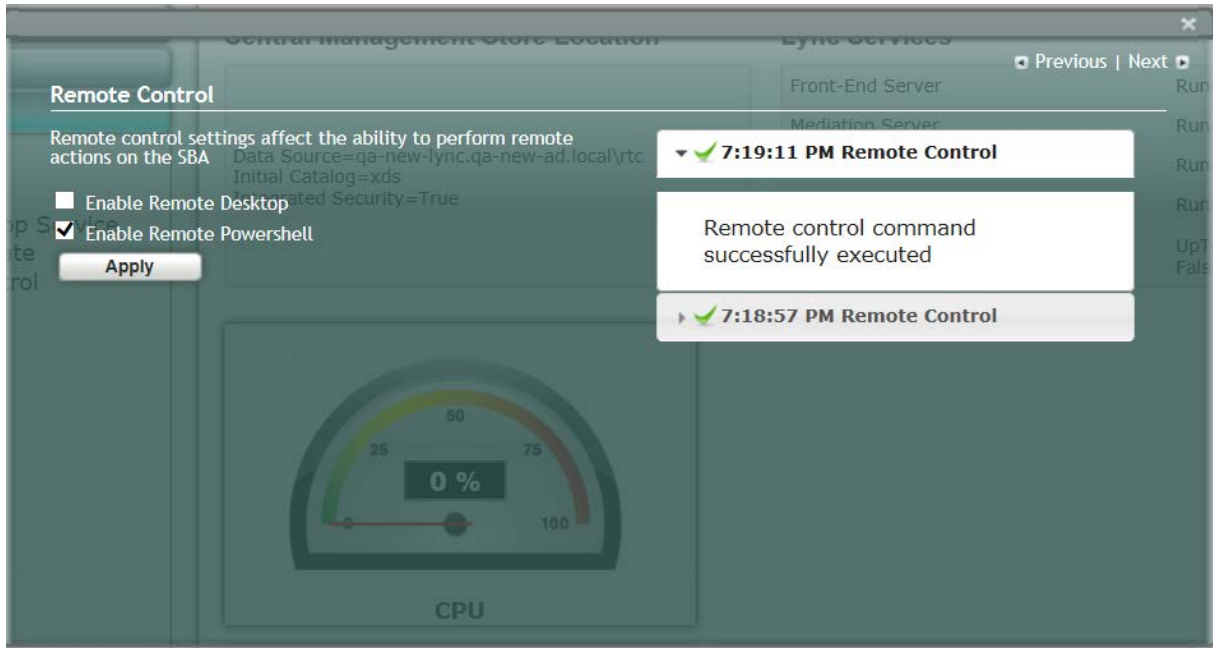
Figure 11-74: Remote Control



2. Select the 'Enable Remote Desktop' check box to enable the Remote Desktop on the SBA.
3. Select the 'Enable Remote Powershell' check box to enable the Remote Powershell on the SBA.
4. Click **Apply**.

The following screen is displayed after disabling the Remote Desktop and enabling the Remote Powershell:

Figure 11-75: Remote Desktop Disabled and Remote Powershell Enabled



11.17 Step 17 (Optional) SNMP Setup

The AudioCodes SBA device can be configured to report SNMP info and traps to an external SNMP Trap Manager, such as the AudioCodes Element Management System (EMS). You can configure the following:

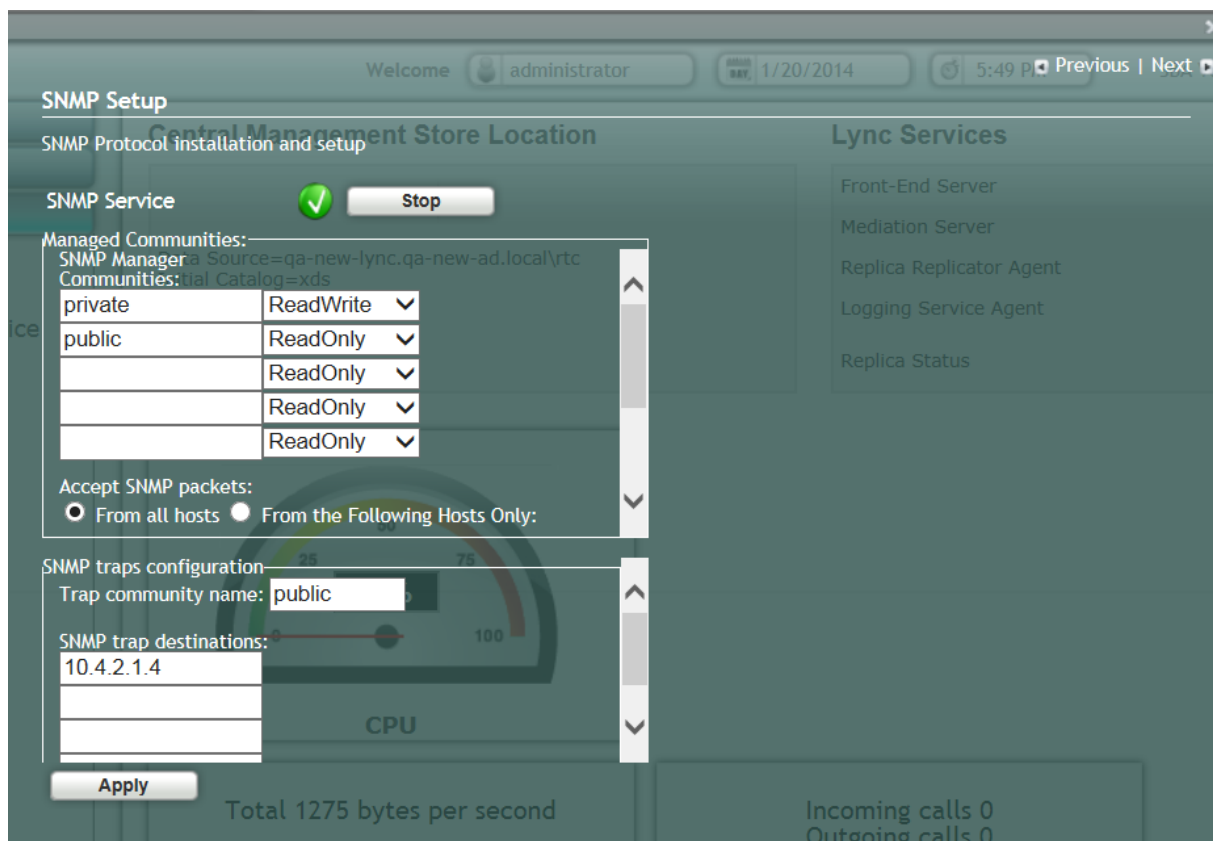
- Stop and start the SNMP service.
- Private and public community strings.
- SNMP trusted hosts
- SNMP Trap Destination i.e. the IP address of the SNMP trap destination. For example, EMS.

➤ **To setup SNMP:**

1. Select the **Tools** tab, and then select the 'SNMP Setup' check box.

The SNMP Setup screen is displayed:

Figure 11-76: SNMP Setup Screen

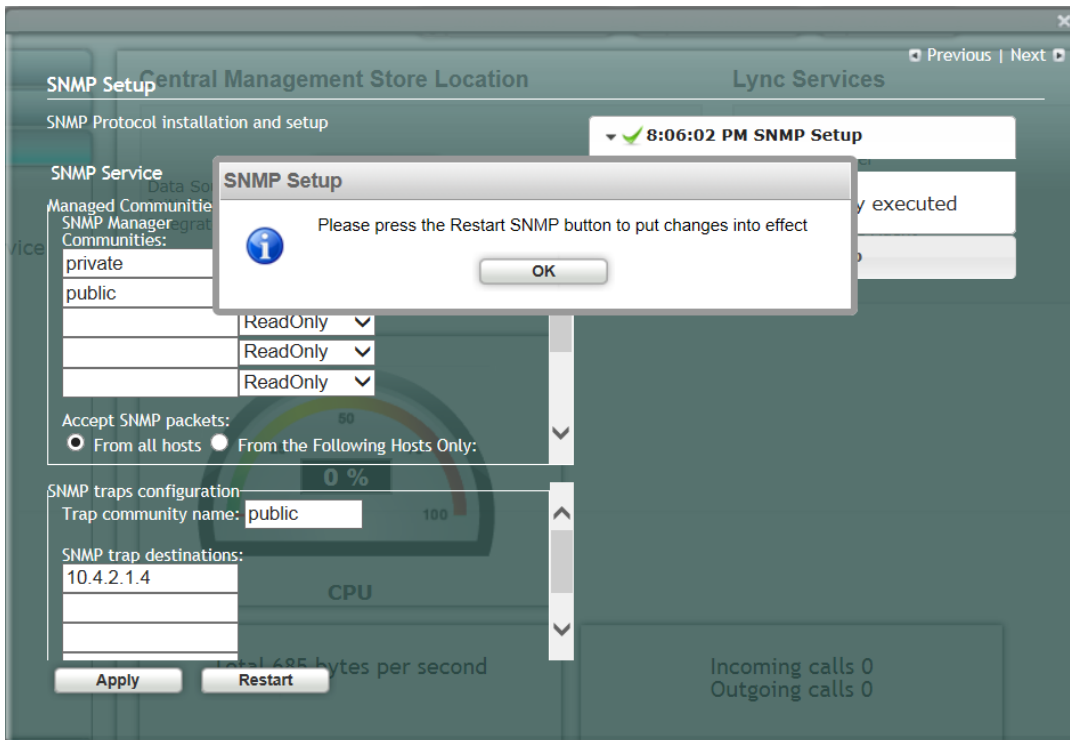


If the SNMP Service is running, an adjacent green sign is indicated.

2. In the SNMP Manager Communities pane, configure the public and private community strings.
3. If you wish to configure trusted hosts, select the 'From the Following Hosts Only' check box, and then in the 'SNMP Trusted Hosts' field, enter the names of the SNMP Trusted Hosts.
4. In the 'Trap Community Name' field, enter the name of the SNMPv2 community (user) name.
5. In the 'SNMP Trap Destination' field, enter the IP address of the destination trap manager e.g. EMS. You can enter up to five SNMP trap destinations.
6. Click **Apply**.

The following screen is displayed:

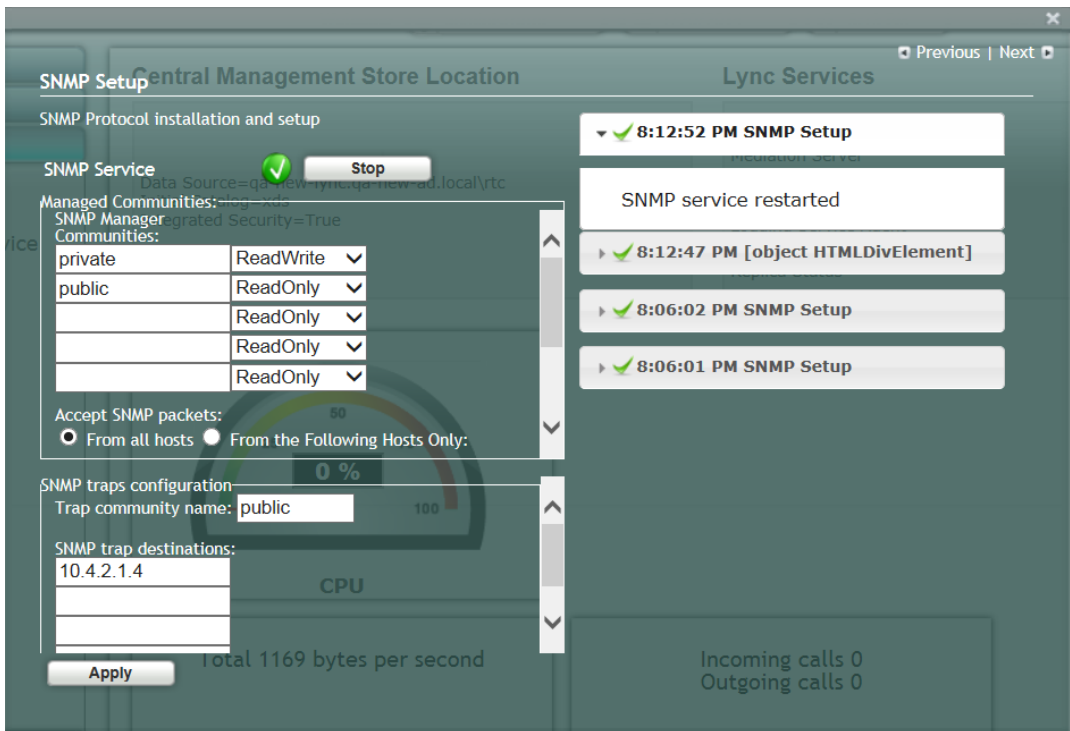
Figure 11-77: SNMP Setup-Restart Confirmation



7. Click **OK**, and then click **Restart**.

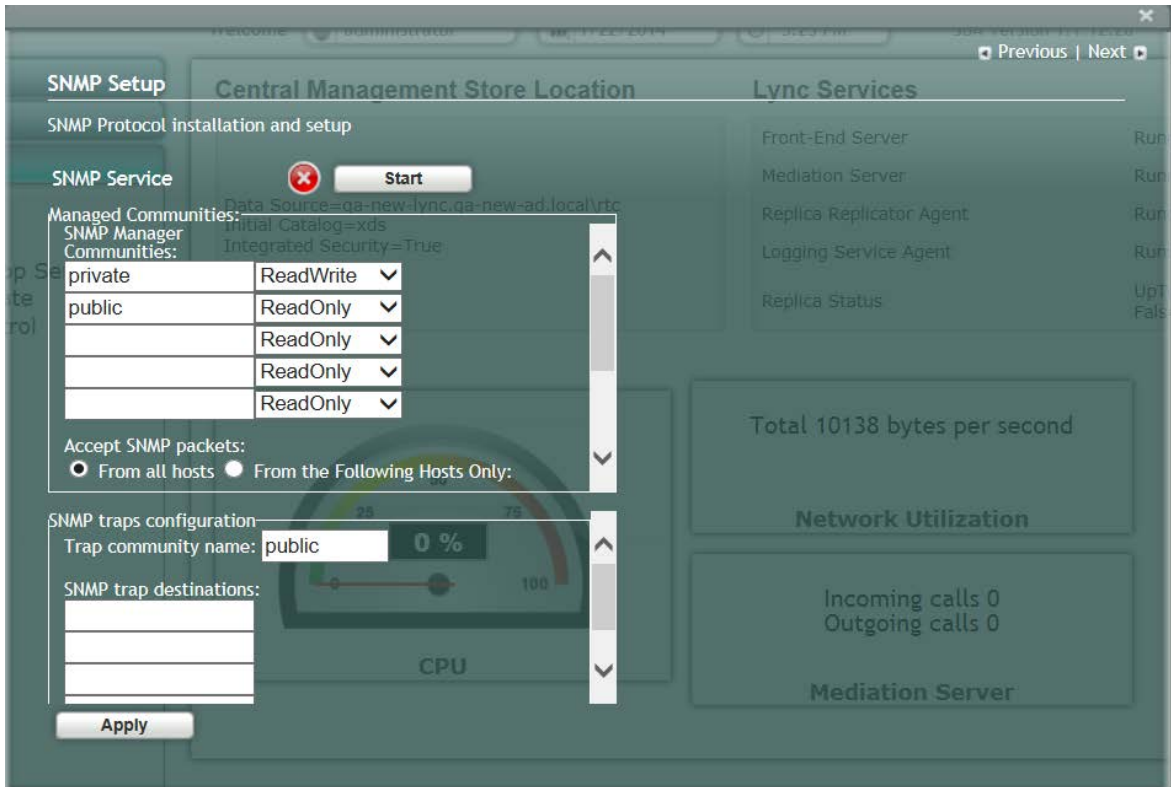
The following screen is displayed:

Figure 11-78: SNMP Setup after Restart



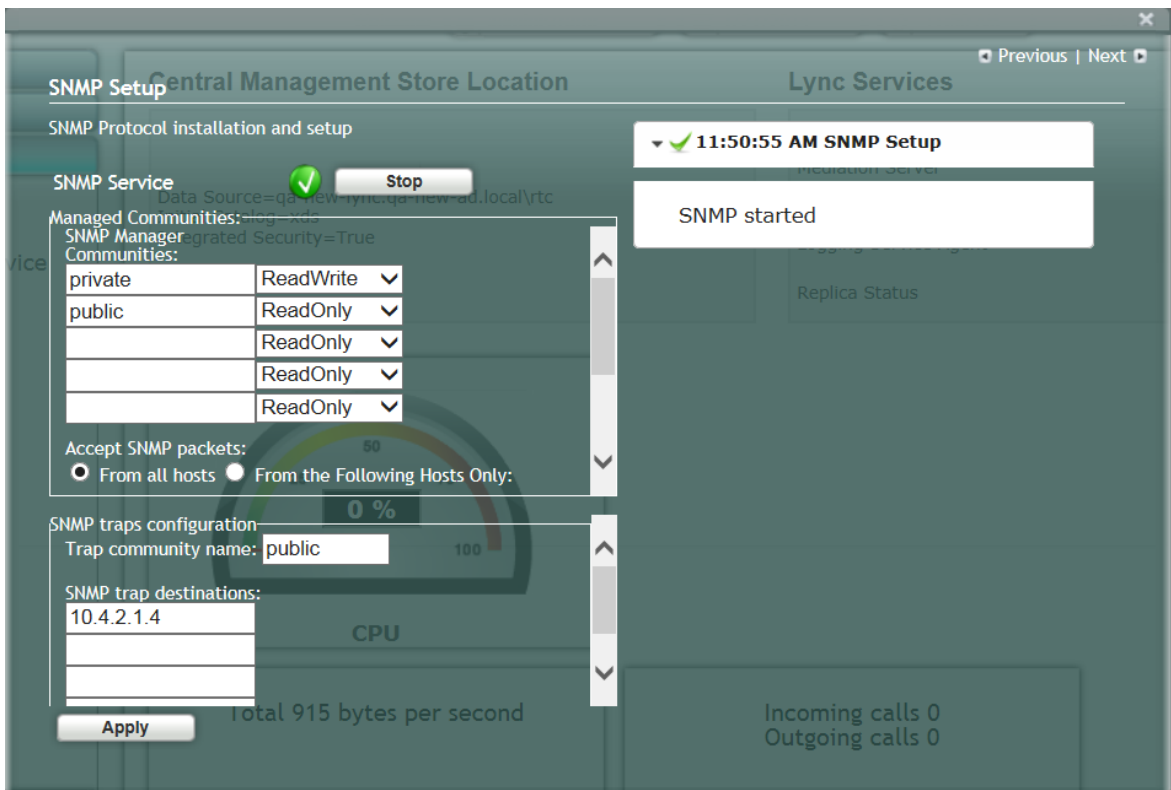
If the SNMP service is stopped, the following screen is displayed:

Figure 11-79: SNMP Service Started



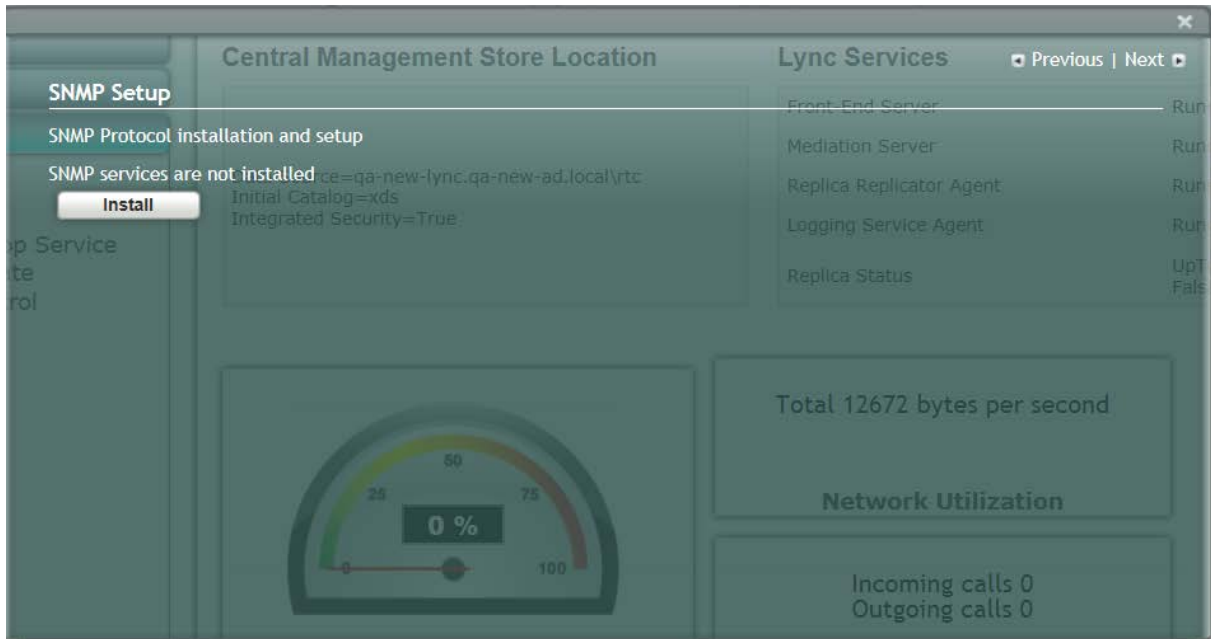
8. Click **Start** to start the SNMP service.
The following screen is displayed:

Figure 11-80: SNMP Service Confirmation



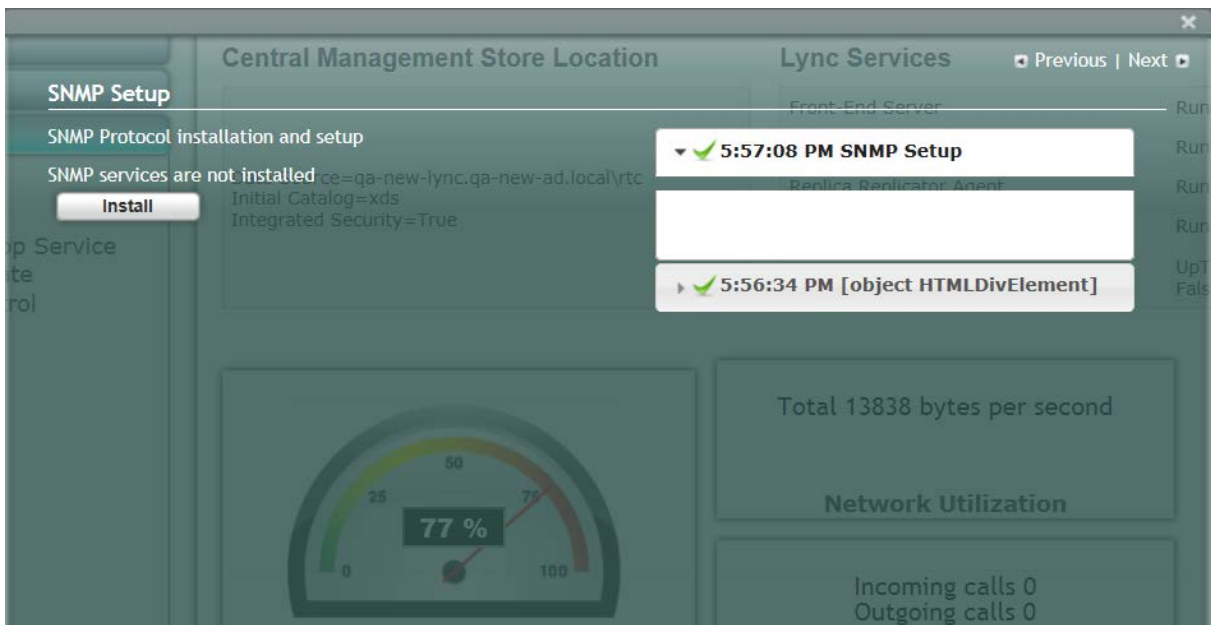
If SNMP service is not installed, the following screen is displayed:

Figure 11-81: SNMP Service is not Installed



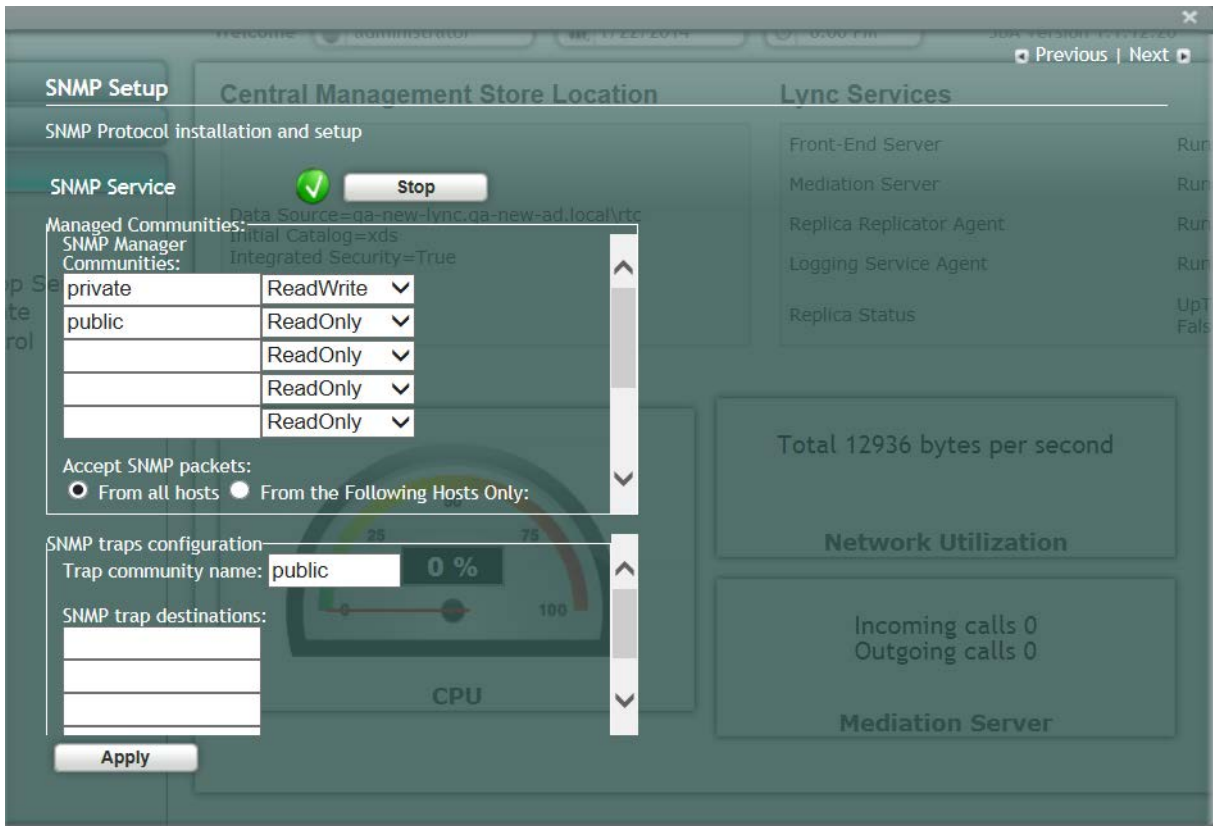
9. Click **Install** to install the SNMP service; the following screen is displayed:

Figure 11-82: SNMP Service Install Confirmation



- Click the **Tools** tab, and then select the 'SNMP Setup' check box ;the following screen is displayed:

Figure 11-83: SNMP Setup



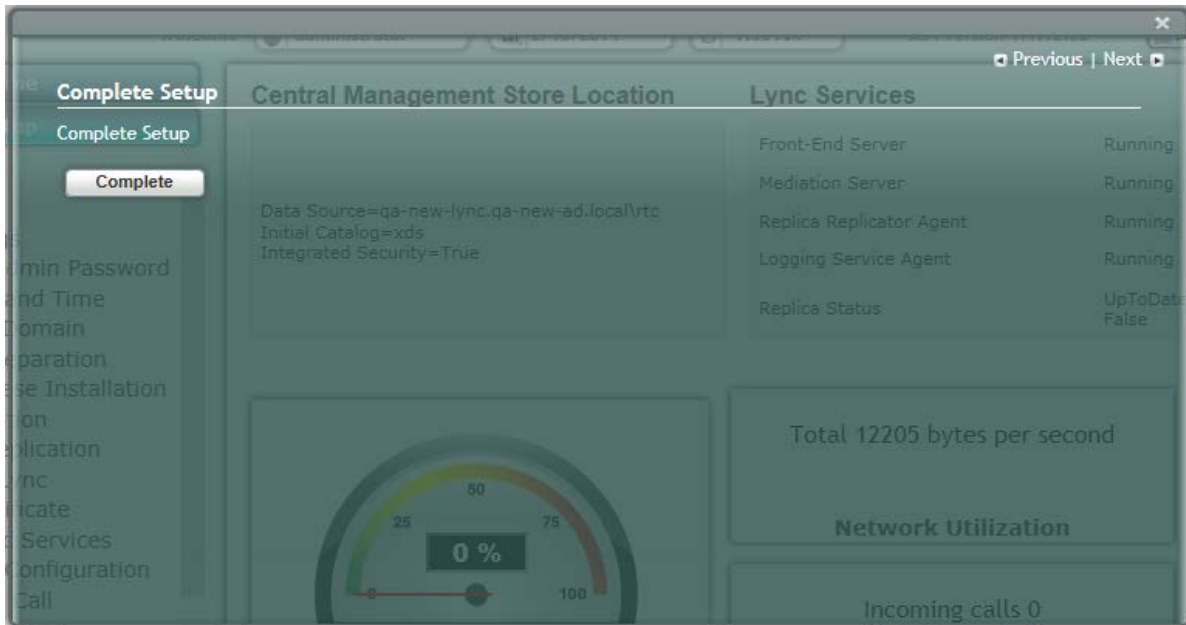
11.18 Step 18: Completing SBA Setup

Once you have completed all configurations as described in the previous sections, you need to perform the procedure described below to complete the SBA setup.

➤ **To complete SBA setup:**

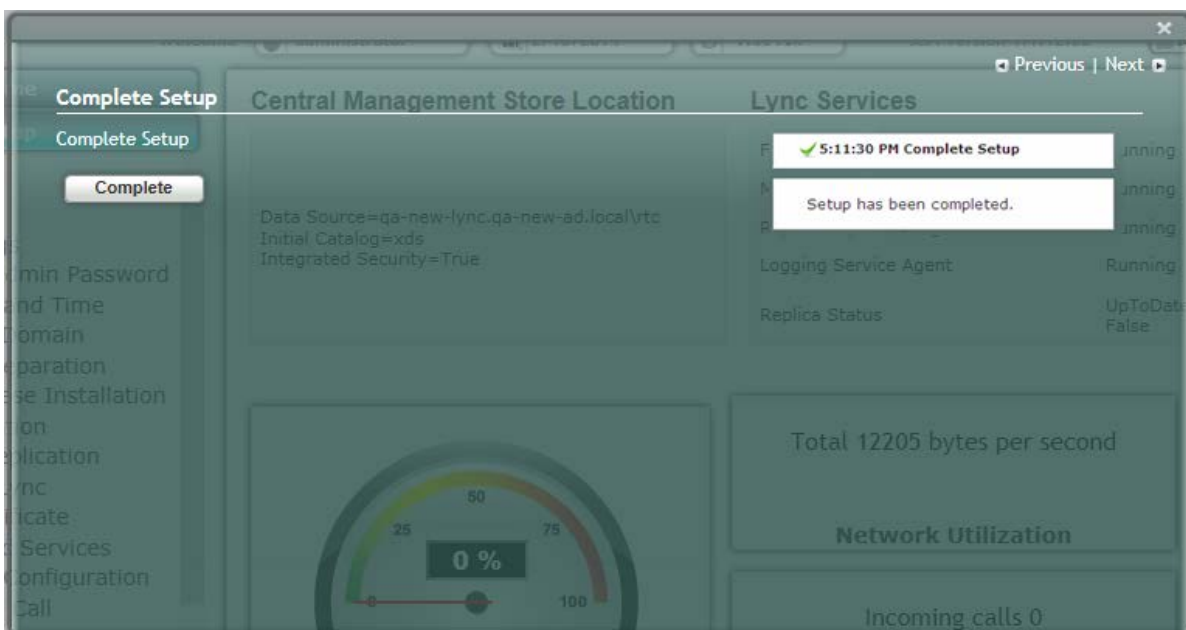
1. Log in to the SBA Web wizard (if not logged in already).
2. Select the **Setup** tab, and then select the 'Complete Setup' checkbox; the Complete Setup screen appears:

Figure 11-84: Complete Setup Screen



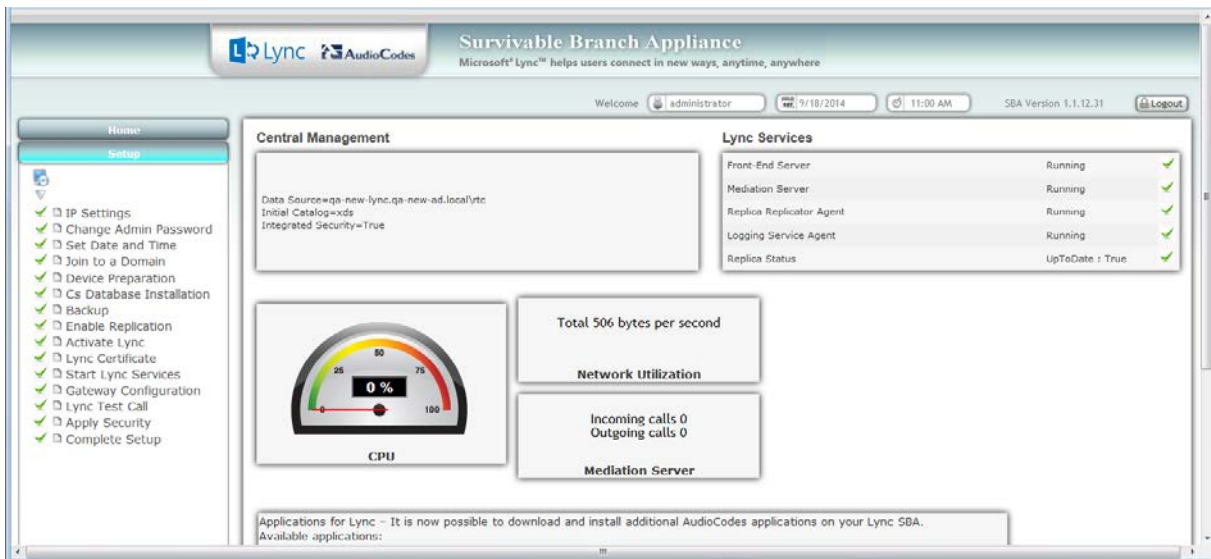
3. Click **Complete**; the following screen appears, indicating that the SBA setup is complete:

Figure 11-85: Complete Setup – Setup Completed



A green check mark appears next to the 'Complete Setup' option under the Setup tab, as shown in the figure below.

Figure 11-86: Complete Setup – Completed Successfully



11.19 Maintaining the SBA

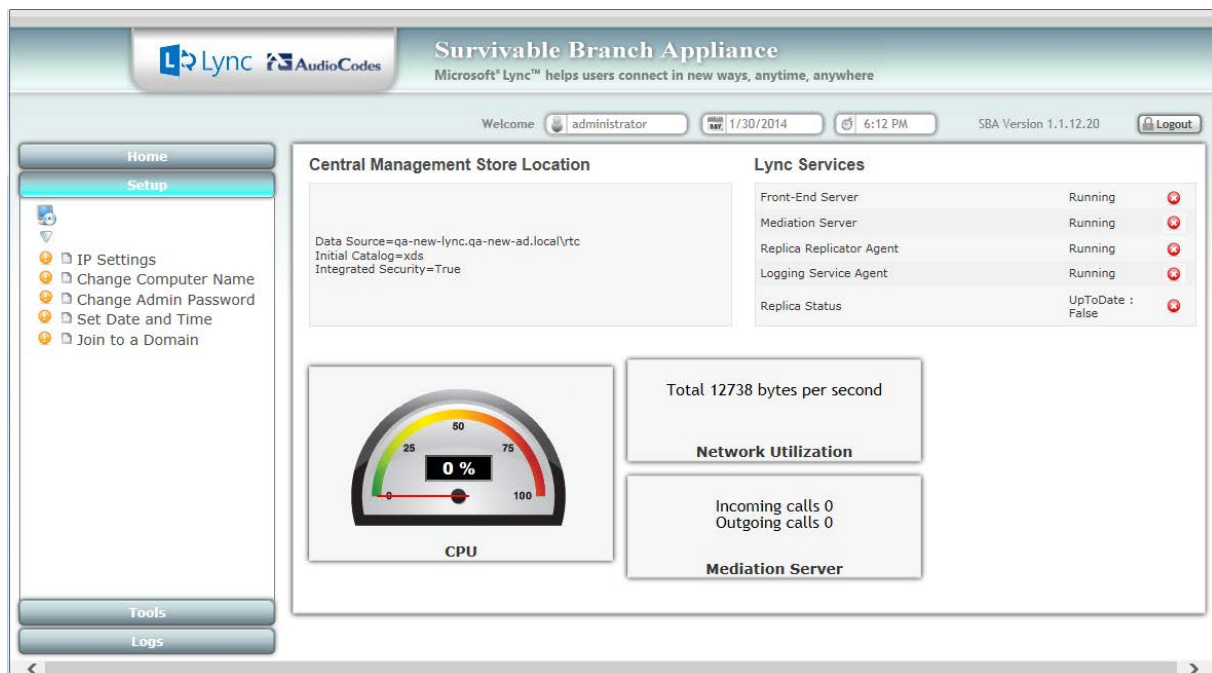
This chapter describes basic SBA maintenance activities.

11.19.1 Viewing General SBA Status in the Home Page

The general operating status of the SBA can be viewed in the Home page. This page displays the following:

- Central management store location
- SBA services status (stopped or running)
- CPU and network usages
- Number of incoming and outgoing calls

Figure 11-87: Home Page



Note: The components' statuses shown in the Home Page are also shown in the EMS GUI when the SBA is connected to the EMS. For more information, refer to the *EMS User's manual*.

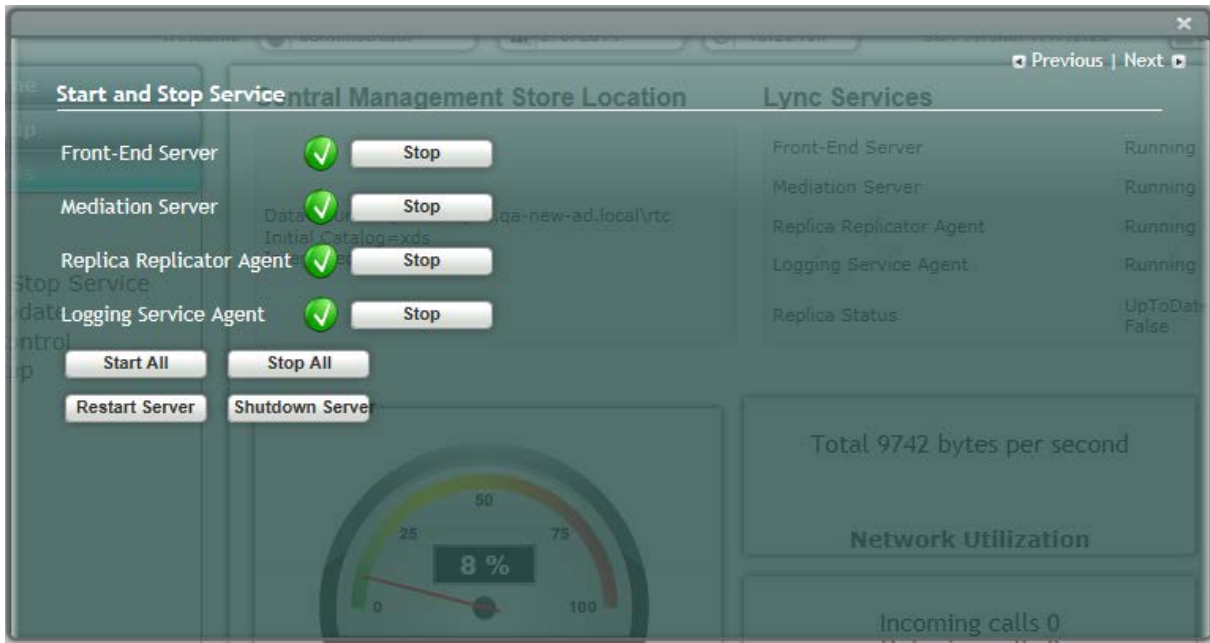
11.19.2 Starting and Stopping SBA Services

You can stop and start SBA services as described in the procedure below.

➤ **To start and stop services:**

1. Select the **Tools** menu tab, and then select the 'Start or Stop Service' check box; the Start and Stop Service page appears:

Figure 11-88: Start and Stop Service Page



2. Stop or Start the following services:
 - Front-End Server
 - Mediation Server
 - Replica Replicator Agent
 - Logging Service Agent
3. Select one of the following actions as required:
 - **Start All:** Starts the services on the SBA
 - **Stop All:** Stops the services on the SBA
 - **Restart Server:** Restarts the server
 - **Shutdown Server:** Shuts down the server

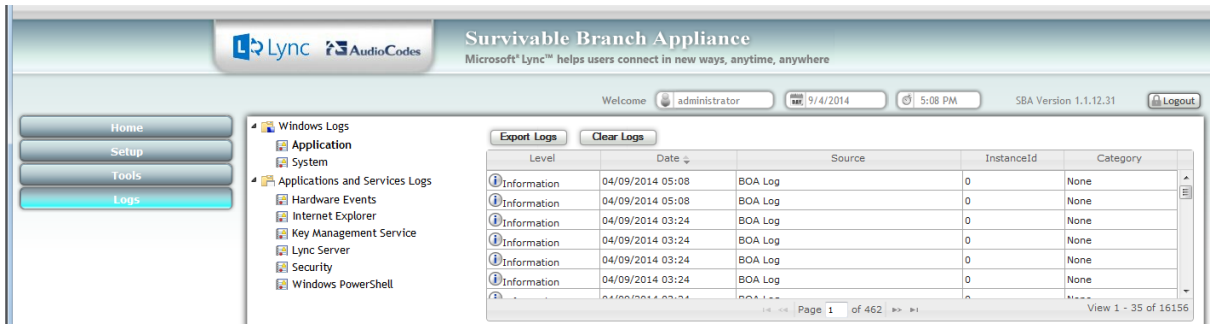
11.19.3 Viewing Logged Events

The procedure below describes how to view and handle logged events.

➤ **To view and handle logged events:**

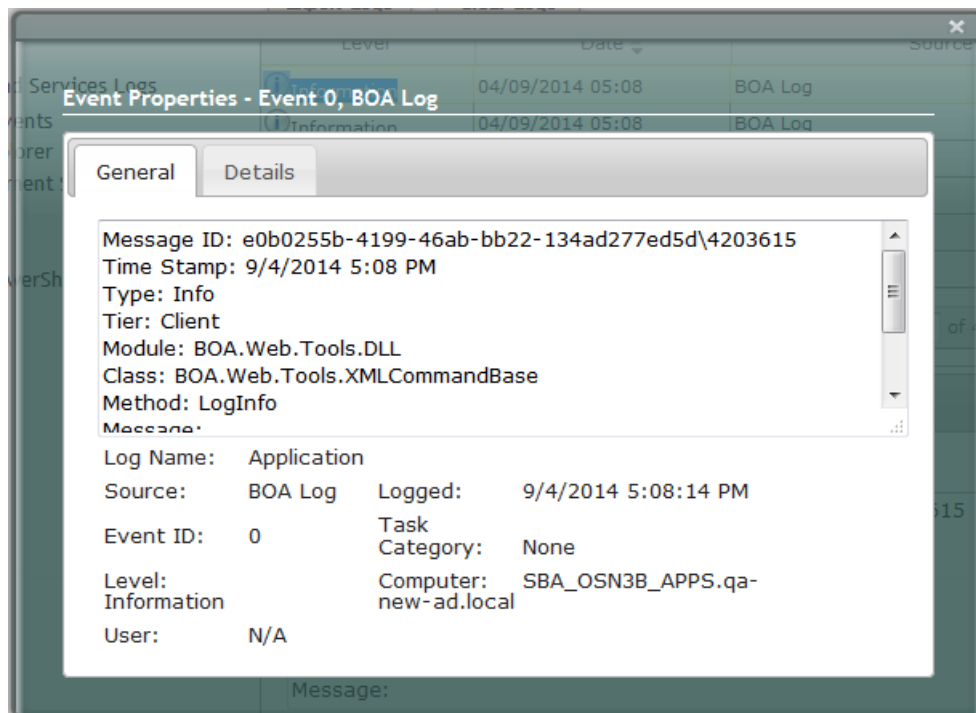
1. Select the **Logs** tab; the Logs screen appears displaying logged events:

Figure 11-89: Logs Screen Displaying Logged Events



2. To view details of a logged event, select the event.

Figure 11-90: Detailed Log Display



3. To clear the displayed log, click the Clear Logs button. To export the logged events, click the Export Logs.

11.19.4 Logging Out

The procedure below describes how to log out the SBA Management Interface.

➤ **To log out the SBA Web wizard:**

Click the **Logout** button in the top right-hand corner of the screen.

Part V

Configuring the PSTN Gateway

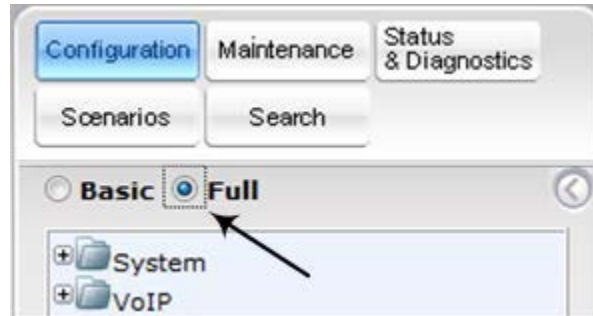
This part provides step-by-step procedures for configuring the PSTN Gateway functionality of the Mediant 1000B SBA located at the branch office. The configuration is done through the embedded Web server (Web interface) of the Mediant 1000B PSTN Gateway.



12 PSTN Gateway Pre-Requirements

Before configuring the PSTN Gateway, ensure the following:

- The PSTN Gateway is running latest GA 6.60A SIP firmware Version.
- The PSTN Gateway must be installed with the following Feature Keys:
 - MSFT - enables working with Microsoft Lync
 - IPSEC, MediaEncryption, StrongEncryption, and EncryptControlProtocol - enable working with TLS
 - Before beginning to configure the E-SBC, select the Full option in the Web interface to display the full Navigation tree:



- When the E-SBC is reset, the Web interface reverts to Basic display.

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13 Configuring the Mediation Server with the PSTN Gateway

The procedure below describes how to configure the address (IP address or FQDN) of the Mediation Server through which the PSTN Gateway communicates with Lync. The PSTN Gateway forwards all telephone calls (PBX/PSTN and analog devices) to the Mediation Server using this configured address. The address is configured in the PSTN Gateway as a proxy server. In other words, the Mediation Server acts as a proxy server (without registration) for the PSTN Gateway.

If you have more than one Mediation Server in the cluster, proxy redundancy functionality can also be configured. If the Mediation Server running on the Mediant 1000B SBA is unavailable (i.e., a SIP 503 is received in response to an INVITE), then the PSTN Gateway re-sends the INVITE to the next Mediation Server (located at the datacenter).

➤ **To configure the Mediation Server:**

1. Open the Proxy & Registration page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Proxy & Registration**).

Figure 13-1: Proxy & Registration Page

Proxy & Registration	
Use Default Proxy	Yes
Proxy Set Table	
Proxy Name	<input type="text"/>
Redundancy Mode	Homing
Proxy IP List Refresh Time	60
Enable Fallback to Routing Table	Disable
Prefer Routing Table	No
Use Routing Table for Host Names and Profiles	Disable
Always Use Proxy	Disable
Redundant Routing Mode	Proxy
SIP ReRouting Mode	Standard Mode

- a. From the 'Use Default Proxy' drop-down list, select **Yes** to enable the Mediation Server to serve as a proxy server.
- b. From the 'Redundancy Mode' drop-down list, select **Homing**. If the SBA application fails and the PSTN Gateway switches over to the Mediation Server at the datacenter, then when the SBA application resumes functionality again, the PSTN Gateway switches back to the Mediation Service on the SBA application.
- c. From the 'Redundant Routing Mode' drop-down list, select **Proxy**. This setting ensures that if a SIP 5xx message is received in response to an INVITE message sent to the primary proxy (i.e., Mediation Server on the Mediant 1000B SBA), the PSTN Gateway re-sends it to the redundant proxy (i.e., Mediation Server at the datacenter). To configure alternative routing upon receipt of a SIP 503 response (as required by Lync), see Step 3 on page 147.
- d. Click **Submit**.

2. Click the **Proxy Set Table** button to open the 'Proxy Sets Table' page:

Figure 13-2: Proxy Sets Table Page

Proxy Set ID		0
	Proxy Address	Transport Type
1	SBA15.ilync15.local:5067	TLS
2	FE15.ilync15.local:5067	TLS
3		
4		
5		
Enable Proxy Keep Alive		Using Options
Proxy Keep Alive Time		60
Proxy Load Balancing Method		Disable
Is Proxy Hot Swap		Yes

- a. In the 'Proxy Address' fields, configure two proxy servers for redundancy. If the SBA application fails (at the branch office), the PSTN Gateway switches over to the Mediation Server located at the datacenter.
 - ◆ Index 1: IP address or FQDN of the Mediation Server running on the Mediant 1000B SBA (configured in Section 15.1.4 on page 154).
 - ◆ Index 2: IP address or FQDN of the Mediation Server running at the datacenter.



Note: If you configured the Mediation Server address as an FQDN, ensure that you configure the DNS server (see Section 15.1.2 on page 153).

- b. In the 'Transport Type' drop-down list, select the Transport Type (TLS or TCP) for these proxies. For more information on TLS and TCP Transport Type configuration, see Section 15.1 on page 151.
- c. From the 'Enable Proxy Keep Alive' drop-down list, select **Using Options** to discover whether a particular Mediation Server in the cluster is available.
- d. From the 'Is Proxy Hot Swap' drop-down list, select **Yes**. If there is no response from the first Mediation Server after a user-defined number of retransmissions, the INVITE message is sent to the redundant Mediation Server. The number of retransmissions is configured by the Number of RTX Before Hot-Swap parameter in the 'Proxy & Registration' page (see Step 1 on page 145).
- e. Click **Submit** to apply your settings.

3. When the PSTN Gateway receives a SIP 503 response from the Mediation Server in response to an INVITE, it re-sends the INVITE to the redundant Mediation Server (located at the datacenter). To achieve this, you need to configure the receipt of a SIP 503 response as a reason for IP alternative routing:
 - a. Open the 'Reasons for Alternative Routing' page (**Configuration** tab > **VoIP** menu > **GW and IP to IP** > **Routing** > **Alternative Routing Reasons**).

Figure 13-3: Reasons for Alternative Routing Page

IP to Tel Reasons	
Reason 1	
Reason 2	
Reason 3	
Reason 4	
Reason 5	
Tel to IP Reasons	
Reason 1	503
Reason 2	
Reason 3	
Reason 4	
Reason 5	

Submit

- b. Under the Tel to IP Reasons group, from the 'Reason 1' drop-down list, select **503**.
- c. Click **Submit**.
- d. Open the 'SIP General Parameters' page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **General Parameters**).

Figure 13-4: SIP General Parameters Page

Basic Parameter List	
xxx Behavior	forward
Enable P-Charging Vector	Disable
Enable VoiceMail URI	Disable
Retry-After Time	0
Enable P-Associated-URI Header	Disable
Source Number Preference	
Forking Handling Mode	Sequential handling
Enable Comfort Tone	Disable
Add Trunk Group ID as Prefix to Source	No
Fake Retry After	60
Enable Reason Header	Enable

Submit

- e. In 'Fake Retry After' field, enter the time '60' (in seconds). When the PSTN Gateway receives a SIP 503 response (from the Mediation Server) without a Retry-After header, the PSTN Gateway behaves as if the 503 response includes a Retry-After header with this user-defined period.
- f. Click **Submit**.
- g. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

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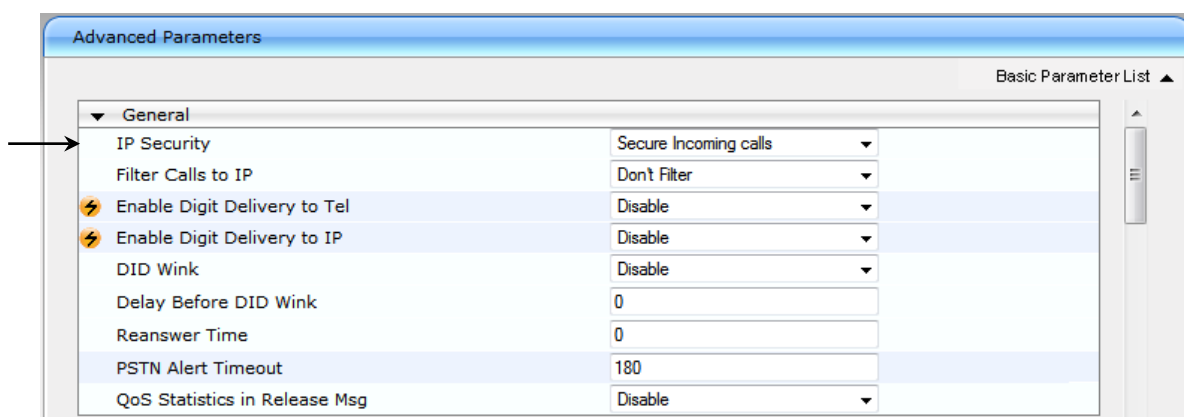
14 Restricting Communication to Mediation Server Only

The procedure below describes how to restrict IP communication, by allowing communication only between the PSTN Gateway and the Mediation Server. This ensures that the PSTN Gateway accepts and sends SIP calls only from and to the Mediation Server (as required by Microsoft). This is done by enabling the IP Security feature and then defining the allowed (“administrative” list) IP addresses (or FQDNs) in the Proxy Set table.

➤ **To allow IP communication only between the PSTN Gateway and Mediation Server:**

1. Open the Advanced Parameters page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Advanced Parameters**).

Figure 14-1: Advanced Parameters Page



2. From the ‘IP Security’ drop-down list, select **Secure Incoming calls** to enable the security feature to accept and send SIP calls only from and to user-defined IP addresses or FQDN (i.e., Mediation server) configured in the ‘Proxy Set table’ (see Step 1).
3. Click **Submit** to apply your settings.
4. On the toolbar, click **Burn** to save the changes to the Enhanced gateway flash memory.

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15 Configuring the SIP Transport Type

The following SIP transport types can be employed for communication between the PSTN Gateway and the Mediation Server:

- Transport Layer Security (TLS) – enabled by default (and recommended) - see Section 15.1 on page 151.
- Transmission Control Protocol (TCP) – see Section 15.2 on page 161.

15.1 Configuring TLS

TLS provides encrypted SIP signaling between the PSTN Gateway and the Mediation Server. When using TLS, you also need to configure the PSTN Gateway with a certificate for authentication during the TLS handshake with the Mediation Server.

15.1.1 Step 1: Enable TLS and Define TLS Port

The procedure below describes how to enable TLS and configure the PSTN Gateway ports used for TLS.

➤ **To enable TLS and configure TLS ports:**

1. Open the SIP General Parameters page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **General Parameters**).

Figure 15-1: SIP General Parameters Page

SIP General Parameters		Basic Parameter List ▲
Detect Fax on Answer Tone	Initiate T.38 on Preamble ▼	
SIP Transport Type	TLS ▼	
SIP UDP Local Port	5060	
SIP TCP Local Port	5060	
SIP TLS Local Port	5067	
Enable SIPS	Disable ▼	
Enable TCP Connection Reuse	Enable ▼	
TCP Timeout	0	
SIP Destination Port	5067	
Use user=phone in SIP URL	Yes ▼	
Use user=phone in From Header	No ▼	

Submit

2. From the 'SIP Transport Type' drop-down list, select **TLS**.
3. In the 'SIP TLS Local Port', enter **5067**. This port corresponds to the Mediation Server TLS transmitting port configuration.
4. In the 'SIP Destination Port', enter **5067**. This port corresponds to the Mediation Server TLS listening port configuration.
5. Click **Submit** to apply your settings.
6. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

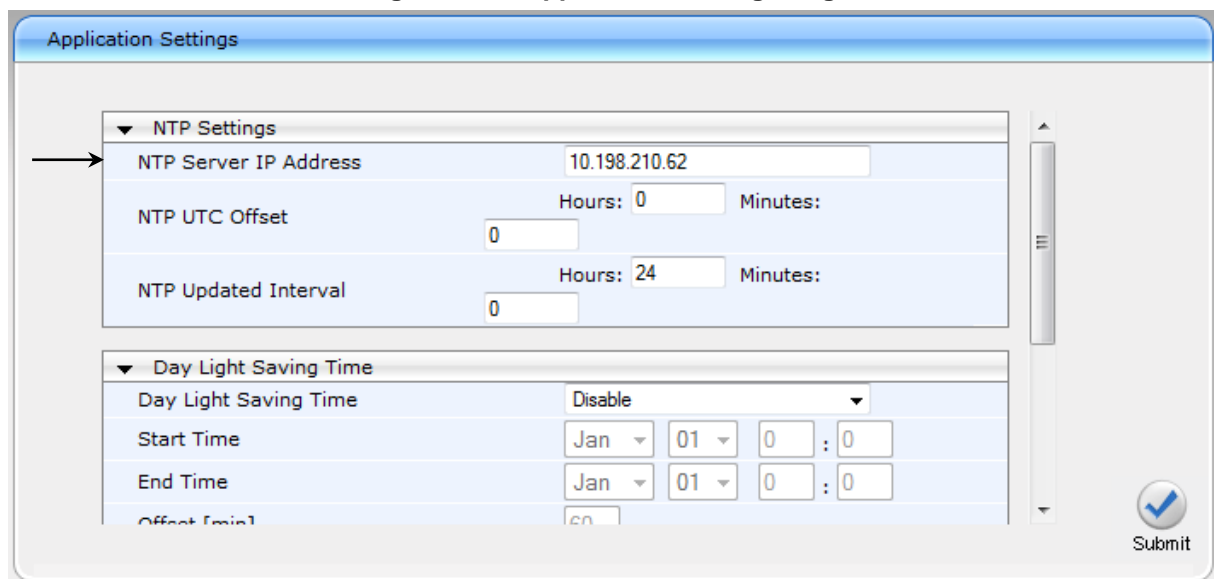
15.1.2 Step 2: Configure the NTP Server

The procedure below describes how to configure the Network Time Protocol (NTP) server. This is important for maintaining the correct time and date on the PSTN Gateway, by synchronizing it with a third-party NTP server. This ensures that the PSTN Gateway has the same date and time as the Certification Authority (CA), discussed later in Section 15.1 on page 151.

➤ **To configure the NTP server:**

1. Open the Application Settings page (**Configuration** tab > **System** menu > **Application Settings**).

Figure 15-2: Application Settings Page



The screenshot shows the 'Application Settings' page. The 'NTP Settings' section is expanded, and an arrow points to the 'NTP Server IP Address' field, which contains '10.198.210.62'. Below it are 'NTP UTC Offset' (Hours: 0, Minutes: 0) and 'NTP Updated Interval' (Hours: 24, Minutes: 0). The 'Day Light Saving Time' section is also expanded, showing 'Day Light Saving Time' set to 'Disable', 'Start Time' (Jan 01 0:00), and 'End Time' (Jan 01 0:00). A 'Submit' button is visible in the bottom right corner.

2. In the 'NTP Server IP Address' field, enter the IP address of the NTP server.
3. Click **Submit** to apply your changes.
4. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

15.1.3 Step 3: Configure the DNS Server

The procedure below describes how to configure the IP address of the Domain Name System (DNS) servers. This is required if the Mediation Server is configured with an FQDN, in which case, the DNS is used to resolve it into an IP address.

➤ **To configure the DNS servers:**

1. Open the IP Settings page (**Configuration** tab > **VoIP** menu > **Network** > **IP Settings**).

Figure 15-3: DNS Server Settings

IP Address	Prefix Length	Gateway	VLAN ID	Interface Name	Primary DNS Server IP Address	Secondary DNS Server IP Address
10.8.6.86	16	10.8.0.1	1	Voice	10.8.7.80	10.8.8.70

2. In the 'DNS Primary Server IP' and 'DNS Secondary Server IP' fields, enter the IP address of the primary and secondary DNS server, respectively.
3. Click **Submit** to apply your changes.
4. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

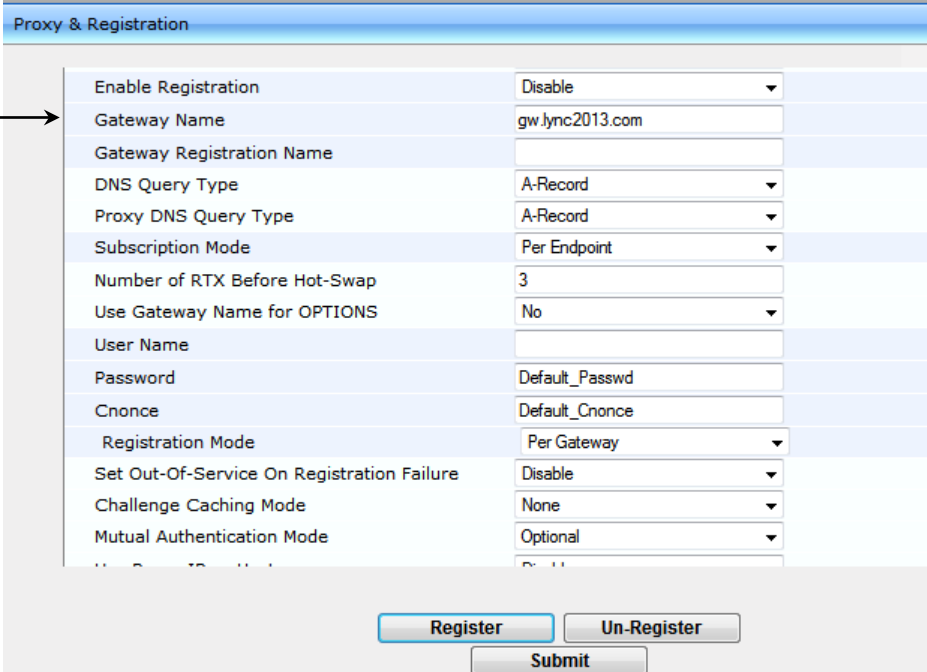
15.1.5 Step 4: Configure the Gateway Name

The procedure below describes how to configure the host name for the PSTN Gateway. This appears as the URI host name in the SIP From header in INVITE messages sent by the PSTN Gateway to the Mediation Server. This allows the Mediation Server to identify the PSTN Gateway (if required), when using certificates for TLS (see Section 15.1.6.1 on page 155).

➤ **To configure the SIP gateway name:**

1. Open the Proxy & Registration page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Proxy & Registration**).

Figure 15-4: Proxy & Registration Page



Proxy & Registration	
Enable Registration	Disable
Gateway Name	gw.lync2013.com
Gateway Registration Name	
DNS Query Type	A-Record
Proxy DNS Query Type	A-Record
Subscription Mode	Per Endpoint
Number of RTX Before Hot-Swap	3
Use Gateway Name for OPTIONS	No
User Name	
Password	Default_Passwd
Cnonce	Default_Cnonce
Registration Mode	Per Gateway
Set Out-Of-Service On Registration Failure	Disable
Challenge Caching Mode	None
Mutual Authentication Mode	Optional

2. In the 'Gateway Name' field, assign a unique FQDN name to the PSTN Gateway within the domain, for example, 'gw.lync2013.com'. This name is identical to the name that is configured in the Lync Topology Builder (see Section 9.1 on page 58).
3. Click **Submit** to apply your settings.
4. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

15.1.6 Step 5: Configure a Certificate

This step describes how to exchange a certificate with Microsoft Certificate Authority (CA). It is composed of the following steps:

1. Generating a certificate signing request (CSR).
2. Obtaining CA and Trusted Root certificates from Microsoft.
3. Installing Microsoft CA and Trusted Root certificates on the PSTN Gateway.

15.1.6.1 Generate a Certificate Signing Request

The procedure below describes how to generate a CSR by the PSTN Gateway. This CSR is later sent to Microsoft CA.

➤ **To generate a CSR:**

1. Open the 'Certificates Signing Request' page (**Configuration** tab > **System** menu > **Certificates**).

Figure 15-5: Certificates Page

▼ Certificate Signing Request	
Subject Name [CN]	ACGW1.jync15.local
Organizational Unit [OU] (optional)	Headquarters
Company name [O] (optional)	Corporate
Locality or city name [L] (optional)	Poughkeepsie
State [ST] (optional)	New York
Country code [C] (optional)	US
<input type="button" value="Create CSR"/>	
After creating the CSR, copy the text below (including the BEGIN/END lines) and send it to your Certification Authority for signing.	
<pre> -----BEGIN CERTIFICATE REQUEST----- MIIBwTCCAsoCAQAwgYAKHDAaBGNVBAMTE0FDR1cxLmlseW5jMTUubG9jYWwxFtAT BGNVBAStDEhlyWRkdWFydgVyczESMBAGA1UEChMJQ29ycG9yYXRlMRUwEwYDVQQH EwxQb3VnaGt1ZXBzaWUxETAPBgNVBAGTCE51dyB2b3JrMQswCQYDVQQGEwJVUzCB nzANBgkqhkiG9w0BAQEFAAOBjQAwgYKCGYEA6pCvYJUR4N6nWUQQ0iXncpjdi z 2OW 3JoJfj oKSM1gVbsDVBI3Dsr cUj 8M1 5HfKIurqLeFLB15NbPNBgvVYFP29hMQXbXD 2Mn6oyNqkL7b/gsfRwtROLWpK10xwSTyL7jYNSXnkYkqI5WksYiGvGLrIddideUu eCBC41o1AgT+SFECAwEAAAAMA0GCSqGSIb3DQEBAUAA4GBARpFNms/XNM7sjz S4VxK8rZXpMrzEK6nTkAdd85i6doA4/wGKMDVLYmN8xE4eDU+41ew1A6GNUIdbxf 2F+NIdclfsfYoanPJBX2mtRRQisOj5khGtw7n3bNeIb2d3eLEbx79X/s9iJzu0fQ u9v7juTwBdCfJA/CabJPsdBWPjwc -----END CERTIFICATE REQUEST----- </pre>	

2. In the 'Subject Name' field, enter the SIP URI host name that you configured for the PSTN Gateway in Section 15.1.4 on page 154.
3. Click **Create CSR**; a Certificate request is generated and displayed on the page.
4. Copy the certificate from the line “-----BEGIN CERTIFICATE” to “END CERTIFICATE REQUEST-----” to a text file (such as Notepad), and then save it to a folder on your PC with the file name certreq.txt.

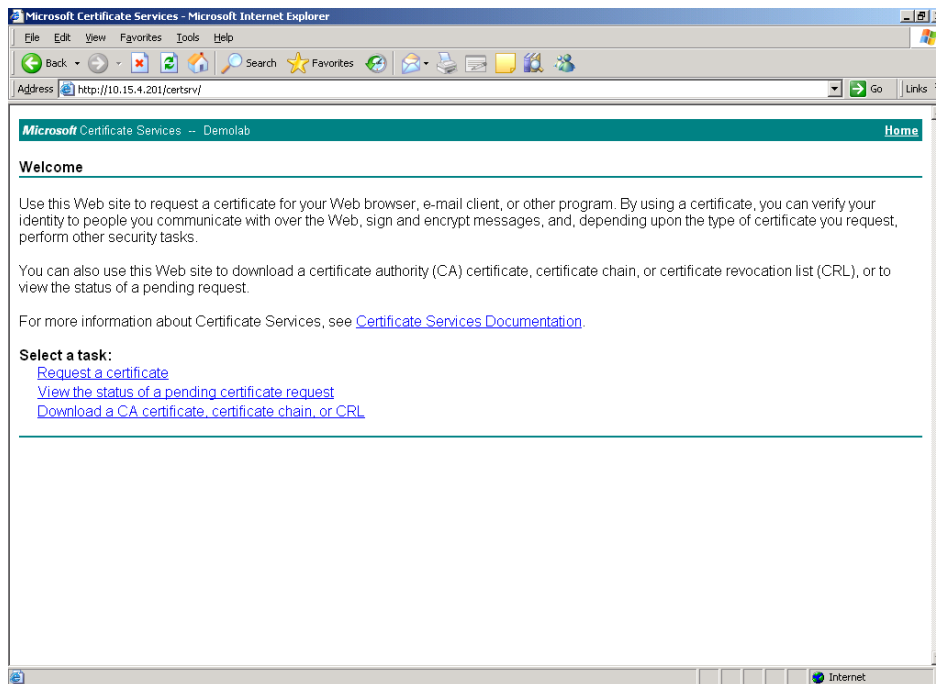
15.1.6.2 Obtain Microsoft CA and Trusted Root Certificates

Once you have generated a CSR (described in the previous section), you need to upload it to Microsoft Certificate server and request a CA and trusted root certificates.

➤ **To obtain Microsoft CA and trusted root certificates:**

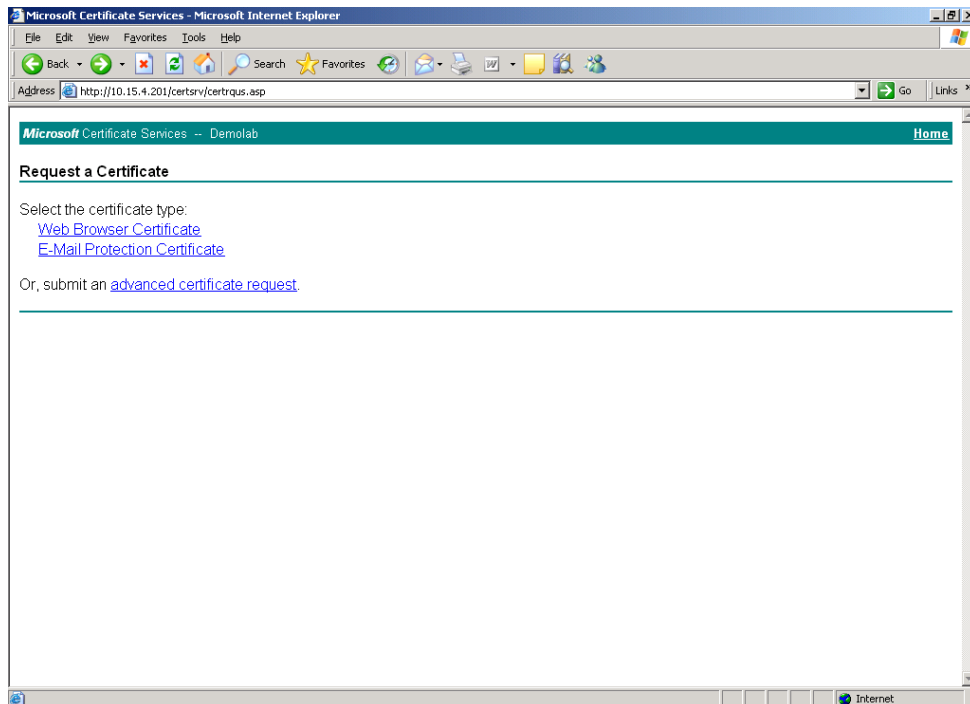
1. Open a Web browser and then navigate to Microsoft Certificate Services at `http://<certificate server address >/certsrv`.

Figure 15-6: Microsoft Certificate Services Web Page



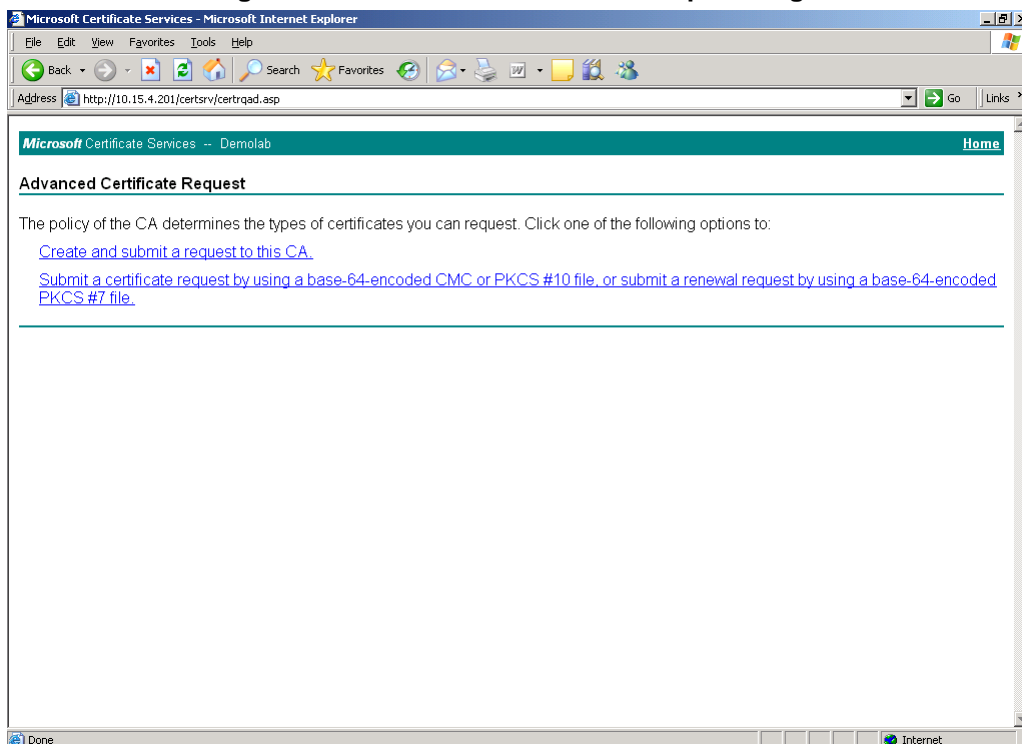
2. Click the **Request a certificate link**; the Request a Certificate page appears:

Figure 15-7: Request a Certificate Page

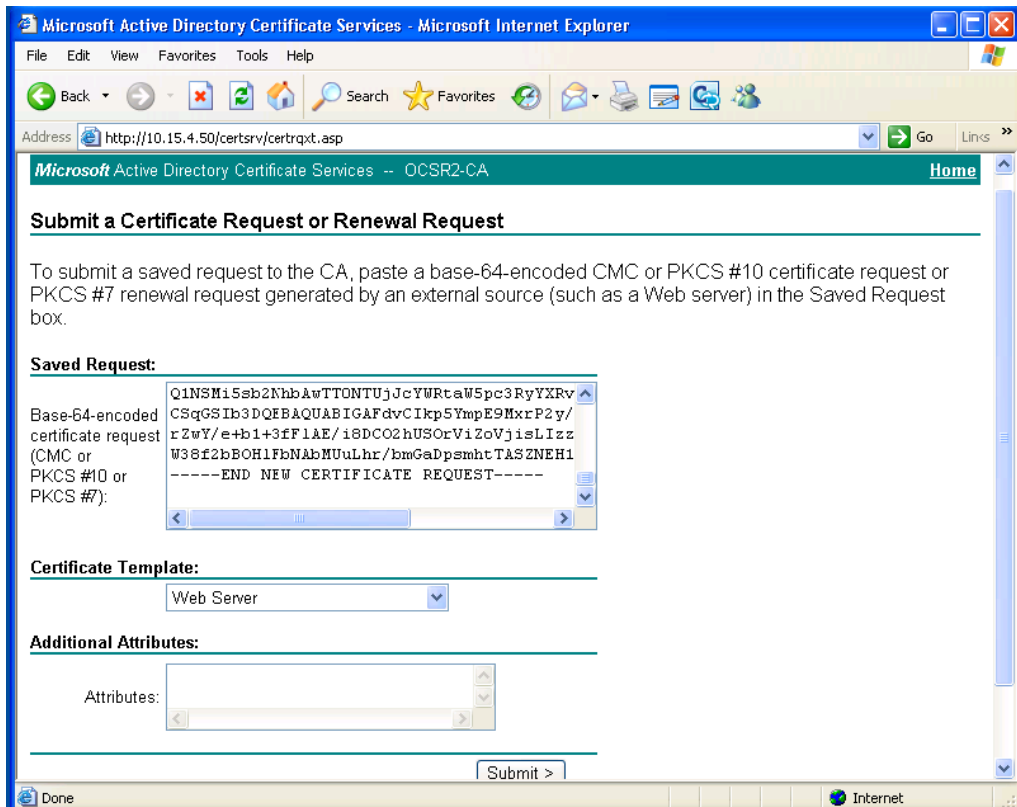


3. Click the **advanced certificate request** link; the Advanced Certificate Request page appears:

Figure 15-8: Advanced Certificate Request Page

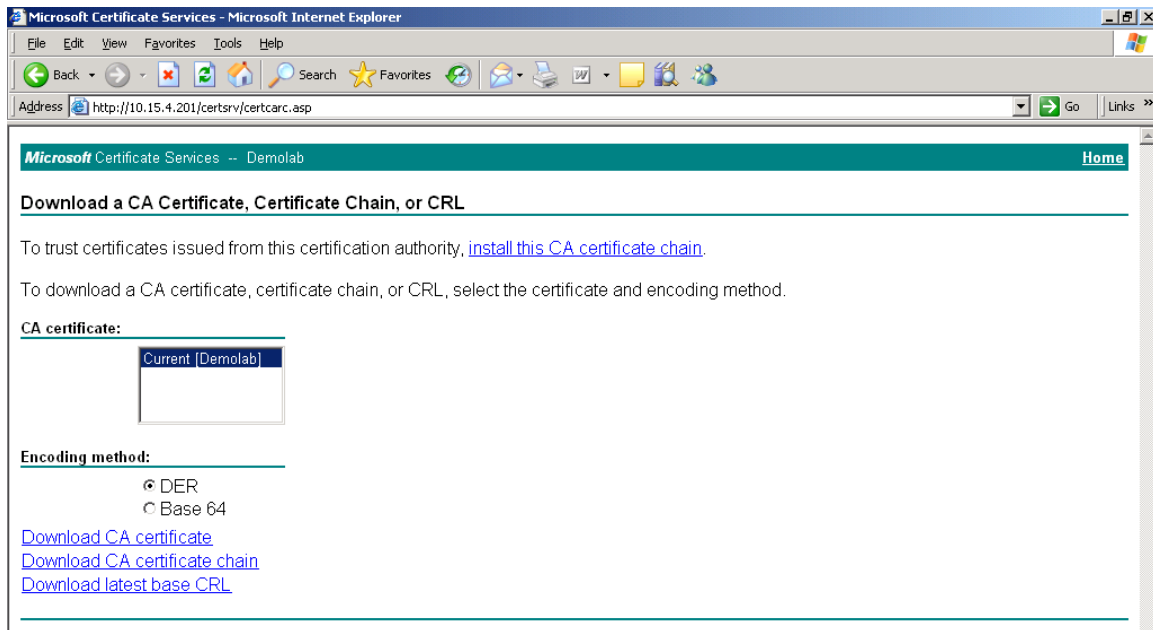


4. Click the **Submit a Certificate** request by using base-64-encoded... link; the Submit a Certificate Request or Renewal Request page appears:

Figure 15-9: Submit a Certificate Request or Renewal Request Page


The screenshot shows a web browser window titled "Microsoft Active Directory Certificate Services - Microsoft Internet Explorer". The address bar shows "http://10.15.4.50/certsrv/certrqxt.asp". The page title is "Microsoft Active Directory Certificate Services -- OCSR2-CA". The main heading is "Submit a Certificate Request or Renewal Request". Below the heading, there is a paragraph of instructions: "To submit a saved request to the CA, paste a base-64-encoded CMC or PKCS #10 certificate request or PKCS #7 renewal request generated by an external source (such as a Web server) in the Saved Request box." The form contains three main sections: "Saved Request:" with a text area containing a long base-64 encoded string; "Certificate Template:" with a dropdown menu set to "Web Server"; and "Additional Attributes:" with an empty text area. A "Submit >" button is located at the bottom right of the form.

5. Open the CSR file (certreq.txt) that you created and saved in Section 15.1.6.1 on page 155, and then copy its contents to the Saved Request text box.
6. From the Certificate Template drop-down list, select **Web Server**.
7. Click **Submit**.
8. Select the Base 64 encoding option.
9. Click the **Download CA certificate** link, and then save the file with the name, gateway.cer in a folder on your PC.
10. Navigate once again to the certificate server at `http://< certificate server address >/certsrv`.
11. Click the **Download a CA Certificate, Certificate Chain or CRL** link; the Download a CA Certificate, Certificate Chain, or CRL page appears:

Figure 15-10: Download a CA Certificate, Certificate Chain, or CRL Page

12. Under the Encoding method group, select the **Base 64** option.
13. Click the Download CA certificate link, and then save the file with the name certroot.cer in a folder on your PC.

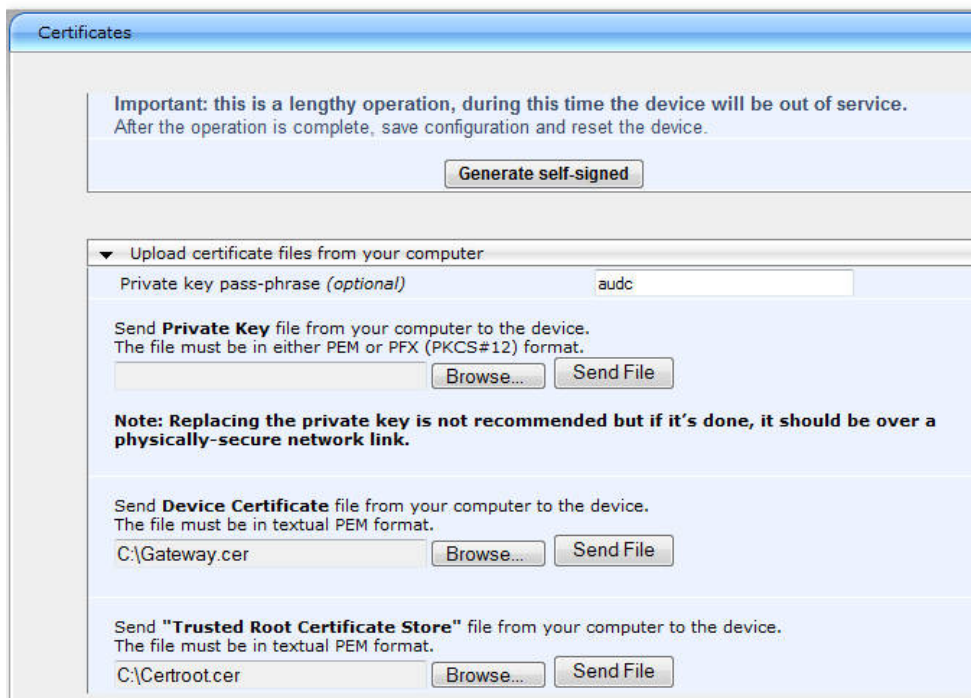
15.1.6.3 Load Microsoft CA and Trusted Root Certificates to PSTN Gateway

Once you have obtained the CA and trusted root certificates from Microsoft, you need to load these two certificates to the PSTN Gateway.

➤ **To load certificates to the PSTN Gateway:**

1. Open the Certificates Signing Request page (**Configuration** tab > **System** menu > **Certificates**).

Figure 15-11: Certificates Page



2. In the 'Device Certificate' field, click **Browse**, select the gateway.cer certificate file that you saved on your local disk (see Step 9 on page 158 in the previous section), and then click Send File to upload the certificate to the PSTN Gateway.
3. In the 'Trusted Root Certificate Store' field, click **Browse** to select the certroot.cer certificate file that you saved on your local disk (see Step 13 on page 159 in the previous section), and then click Send File to upload the certificate.
4. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

15.2 Configuring TCP Transport Type

TCP provides unencrypted SIP signaling between the PSTN Gateway and Mediation Server. The procedure below describes how to configure the SIP TCP transport type.



Note: Microsoft does not recommend implementing TCP for the SIP transport type between the PSTN Gateway and the Mediation Server.

➤ **To set SIP transport type to TCP:**

1. Open the SIP General Parameters page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **General Parameters**).

Figure 15-12: SIP General Parameters Page

SIP General	
NAT IP Address	0.0.0.0
PRACK Mode	Supported
Channel Select Mode	Cyclic Ascending
Enable Early Media	Enable
183 Message Behavior	Progress
Session-Expires Time	0
Minimum Session-Expires	90
Session Expires Method	Re-INVITE
Asserted Identity Mode	Disabled
Fax Signaling Method	No Fax
Detect Fax on Answer Tone	Initiate T.38 on Preamble
SIP Transport Type	TCP
SIP UDP Local Port	5060
SIP TCP Local Port	5068
SIP TLS Local Port	5067
Enable SIPS	Disable

2. From the 'SIP Transport Type' drop-down list, select **TCP**.
3. In the 'SIP TCP Local Port' field, enter the same Gateway listening TCP port number as was configured on the Topology Builder for the gateway.
4. Click **Submit** to apply your changes.
5. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

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16 Configuring Secure Real-Time Transport Protocol

If you configure TLS as the SIP transport type between the PSTN Gateway and Mediation Server, you must enable Secure RTP (SRTP) encryption and set its mode of operation to one of the following (and that which matches the SRTP supported at the Mediation Server):

- **Preferable (default):** The PSTN Gateway initiates encrypted calls. However, if negotiation of the cipher suite fails, an unencrypted call is established. Incoming calls that don't include encryption information are accepted. This option is not supported by the Mediation server.
- **Mandatory:** The PSTN Gateway initiates encrypted calls, but if negotiation of the cipher suite fails, the call is terminated. Incoming calls that don't include encryption information are rejected.
- **Preferable - Single Media:** The PSTN Gateway sends SDP with a single media ('m=') line only (e.g., m=audio 6000 RTP/AVP 8 0 101) with RTP/AVP and crypto keys. The remote SIP user agent (UA) can respond with SRTP or RTP parameters:
 - If the Mediation Server does not support SRTP, it uses RTP and ignores the crypto lines.
 - If the PSTN Gateway receives an SDP offer with a single media, it responds with SRTP (RTP/SAVP) if the Media Security parameter is set to 'Enable'. If SRTP is not supported (i.e., 'Media Security' is set to 'Disabled'), it responds with RTP.

➤ **To configure SRTP:**

1. Open the Media Security page (**Configuration** tab > **VoIP** menu > **Media** > **Media Security**).

Figure 16-1: Media Security Page

Media Security		
Basic Parameter List ▲		
▼ General Media Security Settings		
Media Security	Enable	⚙
Media Security Behavior	Preferable - Single media	⚙
Authentication On Transmitted RTP Packets	Active	
Encryption On Transmitted RTP Packets	Active	
Encryption On Transmitted RTCP Packets	Active	
▼ SRTP Setting		
Master Key Identifier (MKI) Size	1	⚙
Enable symmetric MKI negotiation	Enable	⚙
◊ SRTP offered Suites		
Submit		

2. From the 'Media Security' drop-down list, select **Enable** to enable SRTP.
3. From the 'Media Security Behavior' drop-down list, select one of the following:
 - **Mandatory**: To force Media Security, usually used when the Mediation Server is configured to Encryption "Required".
 - **Preferable-Single media**: To prefer Media Security but support RTP as well, usually used when the Mediation Server is configured to Encryption "Optional".
4. In the 'Master Key Identifier (MKI) Size' field, enter **1**. This configures the size (in bytes) of the MKI in SRTP Tx packets.
5. From the 'Enable Symmetric MKI Negotiation' drop-down list, select **Enable**.
6. Click **Submit** to apply your changes.
7. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.
8. On the toolbar, from the Device Actions drop-down list, choose **Reset**, and then in the 'Maintenance Actions' page, click the **Reset** button; the Mediant 1000B resets and your settings are saved to the flash memory.

17 Configuring Voice Coders (with Silence Suppression)

The PSTN Gateway communicates with the Mediation Server using either the G.711 A-law or G.711 μ -law (Mu-Law) voice coder. In addition, silence suppression can be enabled per coder, which is recommended for improving the performance of the Mediation Server. The procedure below shows how you can change the default coder.

➤ **To configure the voice coder and silence suppression:**

1. Open the Coders page (Configuration tab > VoIP menu > Coders And Profiles > Coders).

Figure 17-1: Coders Table Page

Coder Name	Packetization Time	Rate	Payload Type	Silence Suppression
G.711A-law	20	64	8	Enable
G.711U-law	20	64	0	Enable

Submit

2. From the 'Coder Name' drop-down list, select the required coder.
3. From the 'Silence Suppression' drop-down list, select Enable.
4. Click **Submit**.
5. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

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18 Configuring Comfort Noise and Gain Control

The Lync network provides high voice quality by implementing suppression of typing noise during calls and improved generation of “comfort noise,” which reduces hissing and smoothes over the discontinuous flow of audio packets. You may need to configure the PSTN Gateway to match these voice quality features, by enabling silence suppression, comfort noise generation, automatic gain control (AGC), and echo canceller (enabled by default).



Note: Silence suppression is configured per coder type, as described in Section 0 on page 165.

➤ **To configure voice quality:**

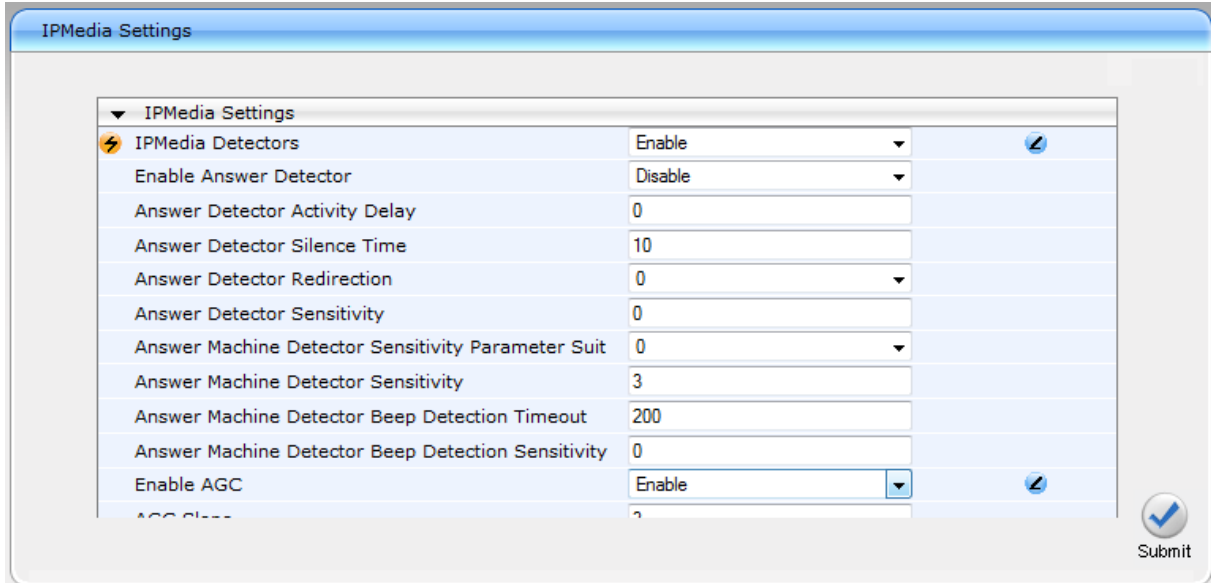
1. Open the RTP/RTCP Settings page (**Configuration** tab > **VoIP** menu > **Media** > **RTP/RTCP Settings**).



Figure 18-1: RTP/RTCP Settings Page


Basic Parameter List ▲	
Basic RTP Packet Interval	Default ▼
RFC 2833 TX Payload Type	96
RFC 2833 RX Payload Type	96
RFC 2198 Payload Type	104
Fax Bypass Payload Type	102
Enable RFC 3389 CN Payload Type	Enable ▼
→ Comfort Noise Generation Negotiation	Enable ▼
Remote RTP Base UDP Port	0
⚡ RTP Multiplexing Local UDP Port	0
⚡ RTP Multiplexing Remote UDP Port	0
⚡ RTP Base UDP Port	6000

Submit

2. From the ‘Comfort Noise Generation Negotiation’ drop-down list, set Enable to enable comfort noise generation.
3. From the ‘Enable RFC 3389 CN payload Type’ drop-down list, verify Enable
4. Click **Submit**.
5. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.
6. Open the ‘IPMedia Settings’ page (**Configuration** tab > **VoIP** menu > **Media** > **IPMedia Settings**).

Figure 18-2: IPMedia Settings Page


IPMedia Settings		
IPMedia Detectors	Enable	
Enable Answer Detector	Disable	
Answer Detector Activity Delay	0	
Answer Detector Silence Time	10	
Answer Detector Redirection	0	
Answer Detector Sensitivity	0	
Answer Machine Detector Sensitivity Parameter Suit	0	
Answer Machine Detector Sensitivity	3	
Answer Machine Detector Beep Detection Timeout	200	
Answer Machine Detector Beep Detection Sensitivity	0	
Enable AGC	Enable	
AGC Class	?	

 Submit

7. From the 'IPMedia Detectors' drop-down list, select **Enable**. This parameter requires a PSTN Gateway reset (see Step 8 below).
8. From the 'Enable AGC' drop-down list, select **Enable**.
9. Click **Submit** to apply your changes.
10. On the toolbar, click Burn to save the changes to the PSTN gateway flash memory.
11. On the toolbar, from the Device Actions drop-down list, choose **Reset**, and then in the 'Maintenance Actions' page, click the **Reset** button; the Mediant 1000B resets and your settings are saved to the flash memory.

19 Configuring Early Media

Early media refers to audio and video that is exchanged before a call is accepted by the recipient. Early media generated by the caller includes voice commands or dual-tone multi frequency (DTMF) tones to activate interactive voice response (IVR) systems. Early media generated by the call recipient include ringback tones, announcements, and requests for input.

Enhanced early media support in Lync enables a caller to hear a ringback tone generated by the call recipient's mobile phone. This is also the case in team-call scenarios, where a call is routed to two team members, one of whom has configured simultaneous ringing for his or her mobile phone.

According to Lync requirements, AudioCodes PSTN Gateway must send a SIP 183 with SDP immediately after it receives an INVITE. The RTP packets however, will not be sent until the PSTN Gateway receives an ISDN Progress, Alerting and Progress Indicator or Connect message. For example, if the PSTN Gateway receives ISDN Progress, it starts sending RTP packets according to initial negotiation, but there is no need to re-send the 183 response.

You may need to configure the PSTN Gateway's early media feature to support Lync 2013 enhanced early media feature.

➤ **To configure the Early Media feature:**

1. Open the SIP General Parameters page (**Configuration** tab > **VoIP** > **SIP Definitions** > **General Parameters**).

Figure 19-1: SIP General Parameters Page (1)

The screenshot shows the 'SIP General Parameters' configuration page. The 'Enable Early Media' dropdown menu is highlighted with a black arrow and is set to 'Enable'. Other parameters include NAT IP Address (0.0.0.0), PRACK Mode (Supported), Channel Select Mode (Cyclic Ascending), 183 Message Behavior (Progress), Session-Expires Time (0), Minimum Session-Expires (90), Session Expires Method (Re-INVITE), Asserted Identity Mode (Disabled), and Fax Signaling Method (No Fax). A 'Submit' button is visible at the bottom right.

Parameter	Value
NAT IP Address	0.0.0.0
PRACK Mode	Supported
Channel Select Mode	Cyclic Ascending
Enable Early Media	Enable
183 Message Behavior	Progress
Session-Expires Time	0
Minimum Session-Expires	90
Session Expires Method	Re-INVITE
Asserted Identity Mode	Disabled
Fax Signaling Method	No Fax

2. From the 'Enable Early Media' drop-down list, select **Enable**.
3. From the 'Play Ringback Tone to Tel' drop-down list, select **Play Local Until Remote Media Arrive**. If a SIP 180 response is received and the voice channel is already open (due to a previous 183 early media response or due to an SDP in the current 180 response), the PSTN Gateway plays a local ringback tone if there are no prior received RTP packets. The PSTN Gateway stops playing the local ringback tone as soon as it starts receiving RTP packets. At this stage, if the PSTN Gateway receives additional 18x responses, it does not resume playing the local ringback tone.


4. From the 'Forking Handling Mode' drop-down list, select **Sequential handling**. The PSTN Gateway opens a voice stream toward the first 18x SIP response that includes an SDP and disregards any 18x response with an SDP received thereafter.

Figure 19-2: SIP General Parameters Page (2)

SIP General Parameters

Basic Parameter List ▲

Play Ringback Tone to IP	Don't Play ▼
Play Ringback Tone to Tel	Play Local Until Remote Media A ▼
Use Tgrp information	Disable ▼
Enable GRUU	Disable ▼
User-Agent Information	<input type="text"/>
SDP Session Owner	AudiocodesGW
Play Busy Tone to Tel	Don't Play ▼
Subject	<input type="text"/>
Multiple Packetization Time Format	None ▼
Enable Semi-Attended Transfer	Disable ▼
3xx Behavior	Forward ▼
Enable P-Charging Vector	Disable ▼
Enable VoiceMail URI	Disable ▼
Retry-After Time	0
Enable P-Associated-URI Header	Disable ▼
Source Number Preference	<input type="text"/>
Forking Handling Mode	Sequential handling ▼
Enable Comfort Tone	Disable ▼



Submit

5. Click **Submit** to apply your changes.
6. Open the Advanced Parameters page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Advanced Parameters**).

Figure 19-3: Advanced Parameters Page

Advanced Parameters

Basic Parameter List ▲

Debug Level 0 ▼

▼ Misc. Parameters

Progress Indicator to IP	Not Configured ▼	
Enable X-Channel Header	Disable ▼	
→ Enable Early 183	Enable ▼	⚡
Enable Busy Out	Disable ▼	
Graceful Busy Out Timeout [sec]	0	
Default Release Cause	3	
Max Number of Active Calls	800	
Max Call Duration [min]	0	
⚡ Enable LAN Watchdog	Disable ▼	
Enable Calls Cut Through	Disable ▼	
Enable User-Information Usage	Disable ▼	
Out-Of-Service Behavior	! Reorder Tone ▼	
Delay After Reset [sec]	7	

Submit

7. From the 'Enable Early 183' drop-down list, select **Enable**.
8. Click **Submit** to apply your changes.
9. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

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20 Configuring FXS Ports and PSTN Trunks

This section describes how to configure FXS ports and PRI (i.e., E1/T1) or BRI trunks connected to the PSTN Gateway.

20.1 Enabling FXS Ports and PSTN Trunks

The procedure below describes how to enable the FXS ports and PSTN trunk (E1/T1) channels of the Enhanced gateway. This is done by defining telephone numbers for the channels and assigning them to Trunk Groups. To ensure correct routing of IP-to-Tel calls, you need to define different Trunk Groups for the digital trunk and the FXS module.

➤ **To enable the FXS ports and PSTN trunks:**

1. Open the Trunk Group Table page (**Configuration** tab > **VoIP** menu > **GW and IP to IP** > **Trunk Group** > **Trunk Group**).

Figure 20-1: Trunk Group Table Page

Trunk Group Table							
Add Phone Context As Prefix		Disable					
Trunk Group Index		1-10					
Group Index	Module	From Trunk	To Trunk	Channels	Phone Number	Trunk Group ID	Tel Profile ID
1	Module 1 PRI	1	1	1-31	1000	2	0
2	Module 2 FXS			1	+17326521000	1	0
3	Module 2 FXS			2	+17326521001	1	0

2. Define the following Trunk Groups:
 - Trunk Group #2: PRI module (E1/T1) with one span (1-31 channels)
 - Trunk Group #1: FXS module with two FXS channels – Channel 1 with phone number +17326521000 and Channel 2 with phone number +17326521001
 - Those numbers need to be configured as TelUri numbers for analog devices in Lync environment using the powershell command `New-CsAnalogDevice`.
3. Click **Submit** to apply your settings.
4. On the toolbar, click **Burn** to save the changes to the Enhanced gateway flash memory.

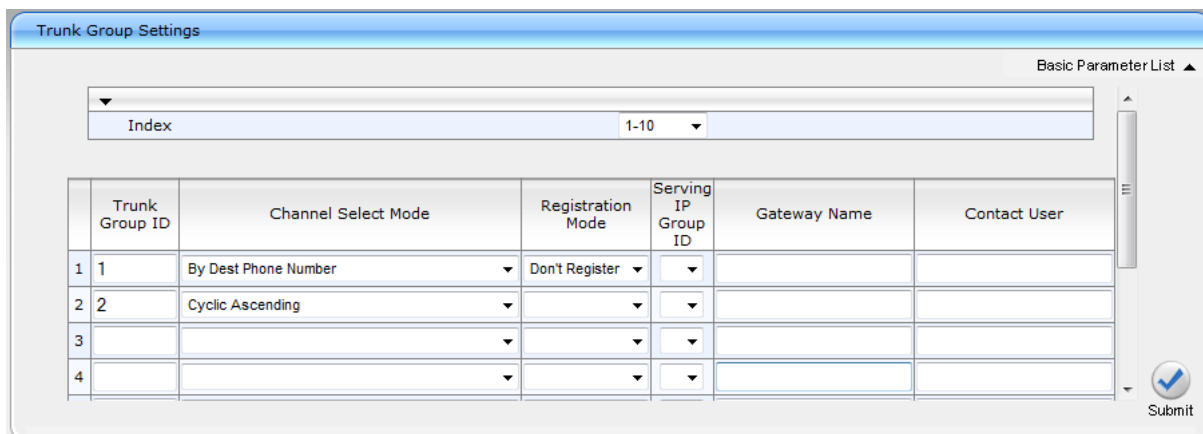
20.1.1 Configuring the Channel Select Method

Once you have enabled the PSTN trunk and FXS ports, and assigned them to Trunk Groups, you need to configure the method for which IP-to-Tel calls are assigned to channels within each Trunk Group.

➤ **To configure the channel select method for each Trunk Group:**

1. Open the Trunk Group Settings page (**Configuration** tab > **VoIP** menu > **GW and IP to IP** > **Trunk Group** > **Trunk Group Settings**).

Figure 20-2: Trunk Group Setting Page



Trunk Group ID	Channel Select Mode	Registration Mode	Serving IP Group ID	Gateway Name	Contact User
1	By Dest Phone Number	Don't Register			
2	Cyclic Ascending				
3					
4					

2. For the FXS ports (i.e., Trunk Group #1), from the 'Channel Select Mode' drop-down list, select By Dest Phone Number. This setting sends the call to a specific FXS user according to the called (destination) number.
3. For the PSTN trunk (i.e., Trunk Group #2), from the 'Channel Select Mode' drop-down select Cyclic Ascending. This setting sends the call to the next available channel, in ascending cyclic order.
4. Click **Submit** to apply your settings.
5. On the toolbar, click **Burn** to save the changes to the Enhanced gateway flash memory.

20.2 Configuring IP-to-Trunk Group Routing

The procedure below describes how to configure an IP-to-Trunk Group routing rule, whereby all calls to +17326521000 and +17326521001 from the Mediation Server need to be route to Trunk Group 1 (the internal FXS ports) all other calls from Mediation server need to be route to Trunk Group 2 (the PRI trunk)

➤ **To configure an IP-to-Trunk Group routing rule:**

1. Open the Inbound IP Routing Table page (**Configuration** tab > **VoIP** menu > **GW and IP to IP** > **Routing** > **IP to Trunk Group Routing**).

Figure 20-3: Inbound IP Routing Table Page

	Dest. Host Prefix	Source Host Prefix	Dest. Phone Prefix	Source Phone Prefix	Source IP Address	Source SRD ID	Trunk Group ID	IP Profile ID	Source IP Group ID
1			+1732652100[0-1]	*	*	-1	1	0	-1
2			*	*	*	-1	2	0	-1
3						-1			
4						-1			
5						-1			

2. In the first table entry row, enter the +1732652100[0-1] in the 'Dest. Phone Prefix'.
3. In the 'Trunk Group ID' field, enter the Trunk Group to where the calls must be routed (Trunk Group ID 1).
4. In the second table entry row, enter asterisk sign (*) in the 'Dest. Phone Prefix'.
5. In the 'Trunk Group ID' field, enter the Trunk Group to where the calls must be routed (Trunk Group ID 2).
6. Click **Submit** to apply your changes.
7. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

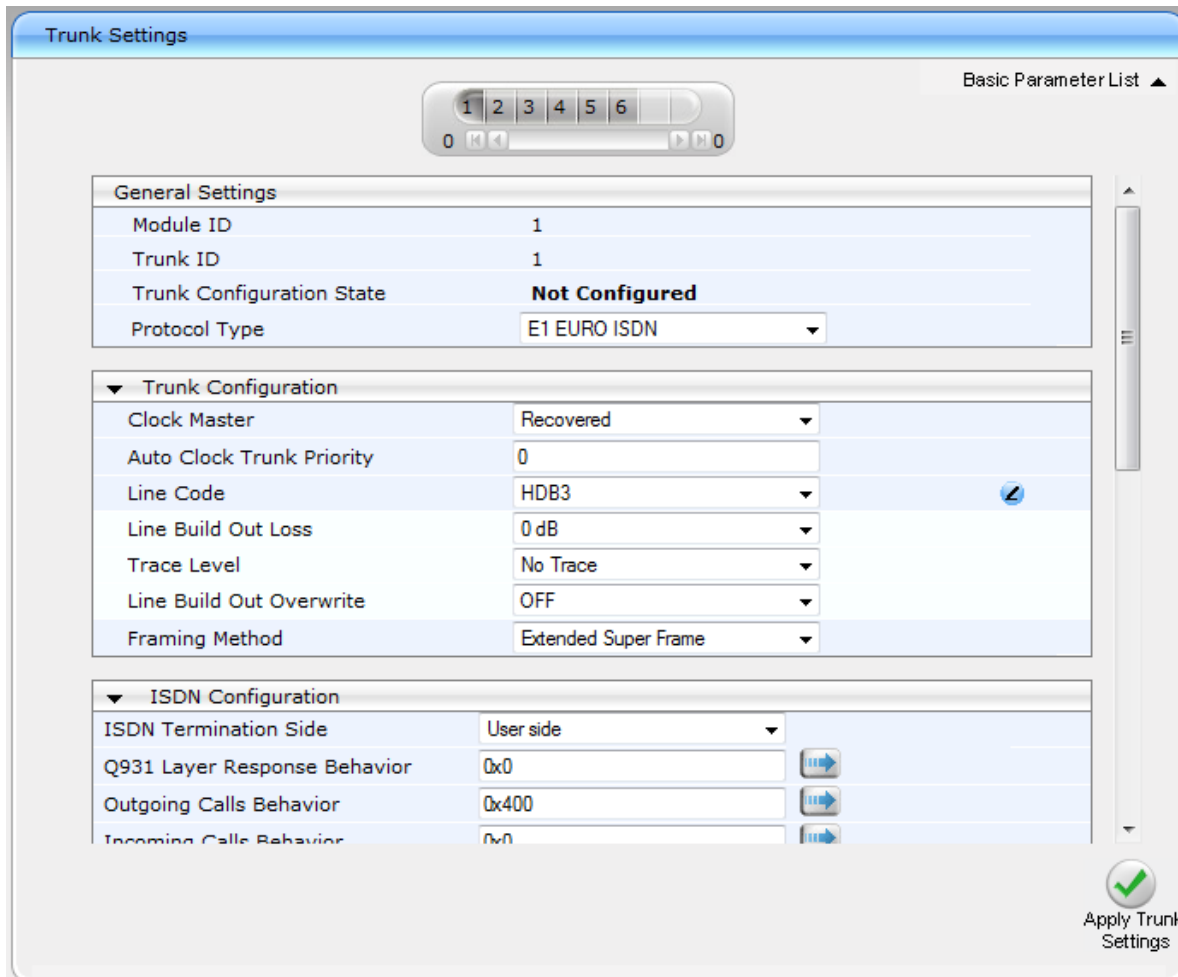
20.3 Configuring the Trunk

The procedure below describes basic configuration of the physical trunk.

➤ **To configure the physical trunk:**

1. Open the Trunk Settings page (**Configuration** tab > **VoIP** menu > **PSTN** > **Trunk Settings**).

Figure 20-4: Trunk Settings Page



Trunk Settings

Basic Parameter List ▲

1 2 3 4 5 6
0 [Left Arrow] [Right Arrow]


General Settings	
Module ID	1
Trunk ID	1
Trunk Configuration State	Not Configured
Protocol Type	E1 EURO ISDN ▼

Trunk Configuration	
Clock Master	Recovered ▼
Auto Clock Trunk Priority	0
Line Code	HDB3 ▼
Line Build Out Loss	0 dB ▼
Trace Level	No Trace ▼
Line Build Out Overwrite	OFF ▼
Framing Method	Extended Super Frame ▼

ISDN Configuration	
ISDN Termination Side	User side ▼
Q931 Layer Response Behavior	0x0 [Apply]
Outgoing Calls Behavior	0x400 [Apply]
Incoming Calls Behavior	0x0 [Apply]

Apply Trunk Settings


2. On the top of the page, a bar with trunk number icons displays the status of each trunk:
 - Grey - disabled
 - Green - active
 - Yellow - RAI alarm
 - Red - LOS / LOF alarm
 - Blue - AIS alarm
 - Orange - D-channel alarm (ISDN only)

Select the Trunk that you want to configure, by clicking the desired trunk number icon.
3. If the trunk is new, configure the trunk as required. If the trunk was previously configured, click the Stop Trunk  button to de-activate the trunk.

4. Basic trunk configuration:
 - a. From the 'Protocol Type' drop-down list, select the required trunk protocol.

**Notes:**

- If the 'Protocol Type' field displays 'NONE' (i.e., no protocol type selected) and no other trunks have been configured, after selecting a PRI protocol type, you must reset the PSTN Gateway.
- All PRI trunks of the PSTN Gateway must be of the same line type - E1 or T1. However, different variants of the same line type can be configured on different trunks, for example, E1 Euro ISDN and E1 CAS (subject to the constraints in the Release Notes).
- BRI trunks can operate with E1 or T1 trunks.
- If the trunk can't be stopped because it provides the clock (assuming the PSTN Gateway is synchronized with the E1/T1 clock), assign a different E1/T1 trunk to provide the clock or enable 'TDM Bus PSTN Auto Clock' in the 'TDM Bus Settings' page (see Section 20.4 on page 178).
- To delete a previously configured trunk, set the Protocol Type parameter to 'None'.

- b. From the 'Clock Master' drop-down list, select the trunk's clock source:
 - ◆ Recovered: Clock source is recovered from the trunk
 - ◆ Generated: Clock source is provided by the internal TDM bus clock source (according to the TDM Bus Clock Source parameter – see Section 20.4 on page 178)
 - c. From the 'Line Code' drop-down list, select the line code:
 - ◆ B8ZS: (bipolar 8-zero substitution) for T1 trunks only
 - ◆ HDB3: (high-density bipolar 3) for E1 trunks only
 - ◆ AMI: (for E1 and T1)
 - d. From the 'Framing Method' drop-down list, select the required framing method. For E1 trunks always select Extended Super Frame.
 - e. To configure whether the trunk connected to the PBX is User or Network side for QSIG, from the 'ISDN Termination' drop-down list, select User side or Network side.
 5. Continue configuring the trunk according to your requirements.
 6. When you have completed configuration, click the Apply Trunk Settings  button to apply the changes to the selected trunk.
 7. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.

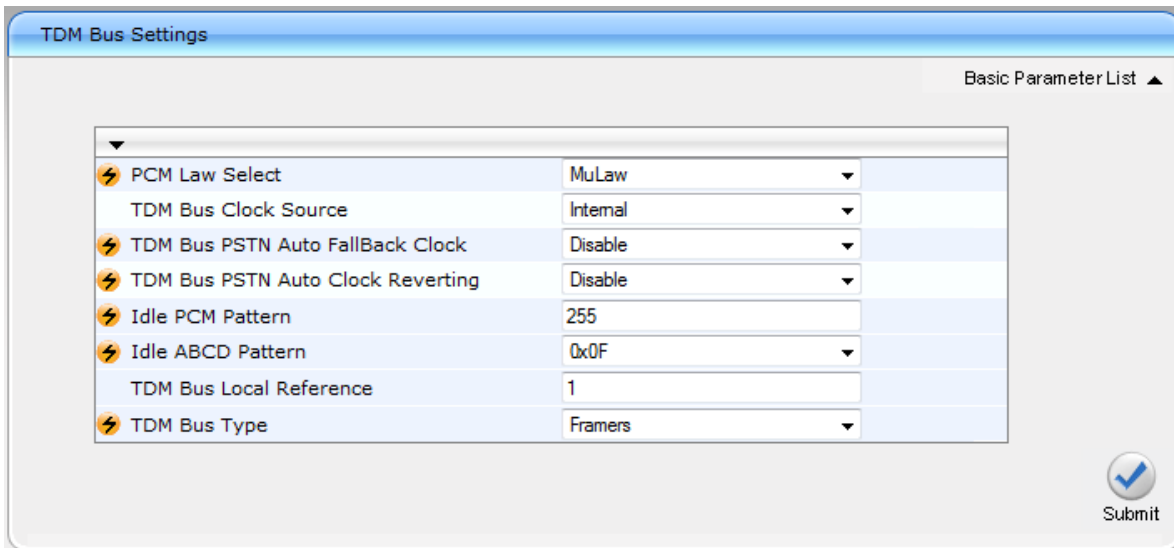
20.4 Configuring the TDM Bus

The procedure below describes how to configure the TDM bus of the PSTN Gateway.

➤ **To configure the TDM bus:**

1. Open the TDM Bus Settings page (**Configuration** tab > **VoIP** menu > **TDM** > **TDM Bus Settings**).

Figure 20-5: TDM Bus Settings Page



Parameter	Value
PCM Law Select	MuLaw
TDM Bus Clock Source	Internal
TDM Bus PSTN Auto FallBack Clock	Disable
TDM Bus PSTN Auto Clock Reverting	Disable
Idle PCM Pattern	255
Idle ABCD Pattern	0x0F
TDM Bus Local Reference	1
TDM Bus Type	Framers

Submit

2. Configure the TDM bus parameters according to your deployment requirements. Below is a description of some of the main TDM parameters:
 - **PCM Law Select:** defines the type of PCM companding law in the input/output TDM bus. Typically, A-Law is used for E1 and Mu-Law for T1/J1.
 - **TDM Bus Clock Source:** defines the clock source to which the PSTN Gateway synchronizes - generate clock from local source (Internal) or recover clock from PSTN line (Network).
 - **TDM Bus Local Reference:** defines the physical trunk ID from which the PSTN Gateway recovers (receives) its clock synchronization when the TDM Bus Clock Source is configured to recover the clock from the PSTN line.
3. Click **Submit** to apply your changes.
4. On the toolbar, click **Burn** to save the changes to the PSTN gateway flash memory.
5. On the toolbar, from the Device Actions drop-down list, choose **Reset**, and then in the 'Maintenance Actions' page, click the **Reset** button; the Mediant 1000B resets and your settings are saved to the flash memory.

21 Configuring Normalization Rules for E.164 Format

Lync 2013 implements the standard E.164 format, while the PBX or PSTN implements other number formats for dialing. If the PSTN Gateway is connected to a PBX or directly to the PSTN, the PSTN Gateway may need to perform number manipulations for the called and/or calling number to match the PBX or PSTN dialing rules or to match Lync 2013 E.164 format.

Therefore, the PSTN Gateway must be configured with manipulation rules to translate (i.e., normalize) numbers dialed in standard E.164 format to various formats, and vice versa. Manipulation needs to be done for outbound calls (i.e., calls received from Lync clients through Lync 2013) and inbound calls (i.e., calls destined to Lync clients).

Number manipulation (and mapping of NPI/TON to SIP messages) rules are configured in the following Manipulation tables:

- For Tel-to-IP calls:
 - Destination Phone Number Manipulation Table for Tel-to-IP Calls
 - Source Phone Number Manipulation Table for Tel-to-IP Calls
- For IP-to-Tel calls:
 - Destination Phone Number Manipulation Table for IP-to-Tel Calls
 - Source Phone Number Manipulation Table for IP-to-Tel Calls

Number manipulation configuration examples are provided for inbound and outbound calls in Section 0 on page 183.

➤ To configure number manipulation rules:

1. Open the required number Manipulation table (**Configuration** tab > **VoIP** menu > **GW and IP to IP** > **Manipulations**); the relevant Manipulation table page is displayed
2. Click the **Add** button; the following dialog box appears:

Figure 21-1: Number Manipulation Table - Add Dialog Box

Rule	Action
Index	0
Destination Prefix	*
Source Prefix	*
Source IP Address	*
Source Host Prefix	*
Destination Host Prefix	*

3. Click the **Rule** tab, and then configure the matching characteristics. For a description of the parameters, see the table below.

4. Click the **Action** tab, and then configure the manipulation operation. For a description of the parameters, see the table below.
5. Configure manipulation rules as required.
6. Click **Submit** to apply your changes.
7. On the toolbar, click **Burn** to save the settings to the PSTN Gateway; the PSTN Gateway resets, saving the settings to flash memory.

Table 21-1: Number Manipulation Parameters Description

Parameter	Description
Matching Characteristics (Rule)	
Destination Prefix	Defines the destination (called) telephone number prefix and/or suffix. You can use special notations for denoting the prefix. For example, [100-199](100,101,105) denotes a number that starts with 100 to 199 and ends with 100, 101 or 105. You can also use the \$ sign to denote calls without a called number.
Source Prefix	Defines the source (calling) telephone number prefix and/or suffix. You can use special notations for denoting the prefix. For example, [100-199](100,101,105) denotes a number that starts with 100 to 199 and ends with 100, 101 or 105. You can also use the \$ sign to denote calls without a calling number.
Source IP Address	<p>Defines the source IP address of the caller. This is obtained from the Contact header in the INVITE message.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ This parameter is applicable only to the number manipulation tables for IP-to-Tel calls. ▪ The source IP address can include the 'x' wildcard to represent single digits. For example: 10.8.8.xx represents all IP addresses between 10.8.8.10 to 10.8.8.99. ▪ The source IP address can include the asterisk (*) wildcard to represent any number between 0 and 255. For example, 10.8.8.* represents all IP addresses between 10.8.8.0 and 10.8.8.255.
Source Host Prefix	<p>Defines the URI host name prefix of the incoming SIP INVITE message in the From header.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ This parameter is applicable only to the number manipulation tables for IP-to-Tel calls. ▪ The asterisk (*) wildcard can be used to denote any prefix. ▪ If the P-Asserted-Identity header is present in the incoming INVITE message, then the value of this parameter is compared to the P-Asserted-Identity URI host name (instead of the From header).
Destination Host Prefix	<p>Defines the Request-URI host name prefix of the incoming SIP INVITE message.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ This parameter is applicable only to the number manipulation tables for IP-to-Tel calls. ▪ The asterisk (*) wildcard can be used to denote any prefix.

Parameter	Description
Source Trunk Group	<p>Defines the source Trunk Group ID for Tel-to-IP calls. To denote all Trunk Groups, leave this field empty.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ The value -1 indicates that this field is ignored in the rule. ▪ This parameter is applicable only to the number manipulation tables for Tel-to-IP calls. ▪ For IP-to-IP call routing, this parameter is not required (i.e., leave the field empty).
Source IP Group	<p>Defines the IP Group from where the IP call originated. Typically, the IP Group of an incoming INVITE is determined or classified using the Inbound IP Routing Table. If not used (i.e., any IP Group), leave the field empty.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ The value -1 indicates that this field is ignored. ▪ This parameter is applicable only to the number manipulation tables for Tel-to-IP calls. ▪ If this Source IP Group has a Serving IP Group, then all calls from this Source IP Group are sent to the Serving IP Group. In this scenario, this table is used only if the PreferRouteTable parameter is set to 1.
Destination IP Group	<p>Defines the IP Group to where the call is sent.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ The value -1 indicates that this field is ignored. ▪ This parameter is applicable only to the Destination Phone Number Manipulation Table for Tel -> IP Calls.
Operation (Action)	
Stripped Digits From Left	<p>Defines the number of digits to remove from the left of the telephone number prefix. For example, if you enter 3 and the phone number is 5551234, the new phone number is 1234.</p>
Stripped Digits From Right	<p>Defines the number of digits to remove from the right of the telephone number prefix. For example, if you enter 3 and the phone number is 5551234, the new phone number is 5551.</p>
Prefix to Add	<p>Defines the number or string that you want added to the front of the telephone number. For example, if you enter 9 and the phone number is 1234, the new number is 91234.</p>
Suffix to Add	<p>Defines the number or string that you want added to the end of the telephone number. For example, if you enter 00 and the phone number is 1234, the new number is 123400.</p>
Number of Digits to Leave	<p>Defines the number of digits that you want to keep from the right of the phone number. For example, if you enter 4 and the phone number is 00165751234, then the new number is 1234.</p>

Parameter	Description
NPI	<p>Defines the Numbering Plan Indicator (NPI).</p> <ul style="list-style-type: none"> ▪ [0] Unknown (default) ▪ [9] Private ▪ [1] E.164 Public ▪ [-1] Not Configured = value received from PSTN/IP is used <p>Notes:</p> <ul style="list-style-type: none"> ▪ This parameter is applicable only to number manipulation tables for IP-to-Tel calls. ▪ NPI can be used in the SIP Remote-Party-ID header by using the EnableRPIHeader and AddTON2RPI parameters. ▪ .
TON	<p>Defines the Type of Number (TON).</p> <ul style="list-style-type: none"> ▪ If you selected 'Unknown' for the NPI, you can select Unknown [0]. ▪ If you selected 'Private' for the NPI, you can select Unknown [0], Level 2 Regional [1], Level 1 Regional [2], PISN Specific [3] or Level 0 Regional (Local) [4]. ▪ If you selected 'E.164 Public' for the NPI, you can select Unknown [0], International [1], National [2], Network Specific [3], Subscriber [4] or Abbreviated [6]. <p>The default is 'Unknown'.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ This parameter is applicable only to number manipulation tables for IP-to-Tel calls. ▪ TON can be used in the SIP Remote-Party-ID header by using the EnableRPIHeader and AddTON2RPI parameters. ▪ .
Presentation	<p>Enables Caller ID.</p> <ul style="list-style-type: none"> ▪ Not Configured = Privacy is determined according to the Caller ID table. ▪ [0] Allowed = Sends Caller ID information when a call is made using these destination/source prefixes. ▪ [1] Restricted = Restricts Caller ID information for these prefixes. <p>Notes:</p> <ul style="list-style-type: none"> ▪ This field is applicable only to number manipulation tables for source phone number manipulation. ▪ If this field is set to Restricted and the 'Asserted Identity Mode' (AssertedIdMode) parameter is set to P-Asserted, the From header in the INVITE message includes the following: From: 'anonymous' <sip: anonymous@anonymous.invalid> and 'privacy: id' header.

21.1 Number Normalization Examples

Two examples are provided below for number normalization. The examples are based on the following assumptions:

- PBX with prefix (local) number 333
- 4-digit extension numbers that begin with the digit 1 (i.e., 1xxx)
- National area code is 206
- Country code is 1

21.1.1 Modifying E.164 Numbers to PBX / PSTN Format for Outbound Calls

Outbound calls refer to calls made by Lync clients to a PBX / PSTN number. Each index entry is described below:

1. **Local Calls within PBX:** The caller dials only the last four digits (e.g., 1212). Lync translates (normalizes) the phone number into an E.164 number format: +12063331212 (where +1 is the country code, 206 the local area code, and 333 the PBX prefix number). The Manipulation table is configured to send only the last four digits to the PBX (i.e., 1212).
2. **National Calls to the Same Area Code:** The caller dials 9 for an external line, and then dials a 7-digit telephone number (e.g., 9-555-4321). Lync translates (normalizes) the phone number into an E.164 number format: +12065554321 (where +1 is the country code, 206 the local area code, 5554321 the phone number). The Manipulation table is configured to remove (strip) the first five digits and add 9 as a prefix to the remaining number. Therefore, the PSTN Gateway sends the number 95554321 to the PBX, and then the PBX sends the number 5554321 to the PSTN.
3. **National Calls to a Different Area Code:** The caller dials 9 for an external line, the out-of-area code, and then a 7-digit telephone number (e.g., 9-503-331-1425). Lync translates (normalizes) the phone number into an E.164 number format: +15033311425 (where +1 is the international code, 503 the out-of area code, 3311425 the phone number). The Manipulation table is configured to remove (strip) the first two digits (i.e., +1), add then add 9 as a prefix to the remaining number. Therefore, the PSTN Gateway sends the number 95033311425 to the PBX, and then the PBX sends the number 5033311425 to the PSTN.
4. **Dialing International Calls:** The caller dials 9 for an external line, the access code for international calls (e.g., 011 for the US), the country code (e.g., +44 for the UK), the area code (e.g., 1483), and then a 6-digit telephone number (e.g., 829827). Lync translates (normalizes) the phone number into an E.164 number format: +441483829827 (where +44 is the country code, 1483 the area code, 829827 the phone number). The Manipulation table is configured to remove the first digit (e.g., +), and add the external line digit (e.g., 9) and the access code for international calls (e.g., 011 for the US) as the prefix. Therefore, the PSTN Gateway sends the number 9011441483829827 to the PBX and the PBX, in turn, sends the number 011441483829827 to the PSTN.

The configuration of the above scenarios is shown in [Figure 21-2](#).

Figure 21-2: Destination Phone Number Manipulation Table for IP→Tel Calls

Destination Phone Number Manipulation Table for IP -> Tel Calls							
Add +		Insert +					
Index	Destination Prefix	Source Prefix	Source IP Address	Source Host Prefix	Destination Host Prefix	Prefix to Add	Suffix to Add
1	+1206333	*	*	*	*		
2	+206	*	*	*	*	9	
3	+1	*	*	*	*	9	
4	+	*	*	*	*	9011	

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21.1.2 Modifying PBX, Local, and National Calls to E.164 Format for Inbound Calls

Inbound calls refer to calls received by Lync clients from the PBX / PSTN. Each entry is described as follows:

1. Local Calls from the PBX / PSTN: The PBX user only dials a 4-digit extension number of the Lync client (e.g., 1220). The Manipulation table is configured to normalize the number into E.164 format and adds the prefix +1206333 to the extension number. Therefore, the PSTN Gateway sends the number +12063331220 to Lync, which relays the call to the Lync client.
2. National Calls with the Same Area Code: The PSTN user dials a 7-digit phone number (e.g., 333-1220), which is received by the PSTN Gateway. The Manipulation table is configured to normalize the number into E.164 format and adds the prefix +1206 to the number. Therefore, the PSTN Gateway sends the number +12063331220 to Lync, which relays the call to the Lync client.
3. National Calls from a Different Area Code: The PSTN user dials the national area code and then a 7-digit phone number (e.g., 206-333-1220), which is received by the PSTN Gateway. The Manipulation table is configured to normalize the number into E.164 format and adds the prefix +1 to the number. Therefore, the PSTN Gateway sends the number +12063331220 to Lync, which relays the call to the Lync client.



Note: Whether the area code is received by the PSTN Gateway depends on the country's PSTN numbering rules.

4. International Calls: The PSTN international (overseas) caller dials the international access and country code (e.g., 001 for the US), the national area code, and then a 7-digit phone number (e.g., 206-333-1220), which is received by the PSTN Gateway. The Manipulation table is configured to normalize the number into E.164 format, by removing the first two digits (e.g., 00) and adding the prefix plus sign (+). Therefore, the PSTN Gateway sends the number +12063331220 to Lync, which relays the call to the Lync client.



Note: Whether the area code is received by the PSTN Gateway depends on the country's PSTN numbering rules.

The configuration of the above scenarios is shown in the figure below:

Figure 21-3: Destination Phone Number Manipulation Table for Tel→IP Calls

Destination Phone Number Manipulation Table for Tel -> IP Calls						
Add +		Insert +				
Index	Destination Prefix	Source Prefix	Source Trunk Group	Destination IP Group	Prefix to Add	Suffix to Add
1	1xxx	*	-1	-1	+1206333	
2	333	*	-1	-1	+1206	
3	206	*	-1	-1	+1	
4	00	*	-1	-1	+	

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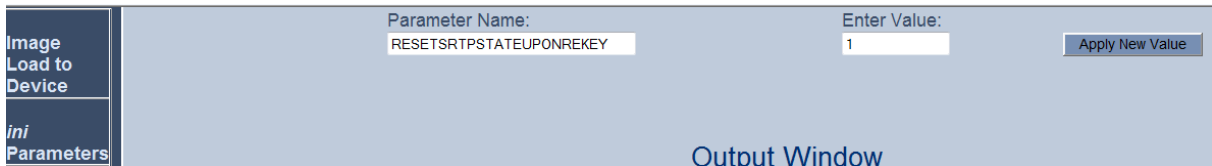
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22 Configuring SRTP Behavior upon Rekey Mode

➤ To configure the SRTP behavior upon rekey mode:

1. Open the Admin page by appending the case-sensitive suffix 'AdminPage' to the SBC's IP address in your Web browser's URL field (e.g., <http://10.15.9.101/AdminPage>).

Figure 22-1: AdminPage



The screenshot shows a web interface for configuring parameters. On the left, there is a vertical menu with two items: 'Image Load to Device' and 'ini Parameters'. The 'ini Parameters' item is selected. The main area of the interface is divided into two sections. The top section is for entering a parameter name and value. It has a label 'Parameter Name:' followed by a text input field containing 'RESETSRTPSTATEUPONREKEY'. To the right, there is a label 'Enter Value:' followed by a text input field containing '1'. An 'Apply New Value' button is located to the right of the 'Enter Value' field. Below this section is an 'Output Window' which is currently empty.

2. In the left menu, click ini Parameters.
3. In the 'Parameter Name' field, enter "RESETSRTPSTATEUPONREKEY".
4. In the 'Enter Value' field, enter 1.
5. Click the **Apply New Value** button.

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23 Configuring FXS Port Transfer Behavior

Since the Mediation server does not support receiving SIP Refer messages, you must configure the Enhanced gateway FXS port to send INVITE messages (in the event when call transfer is initiated from the FXS port).



Note: For this feature to work, an MPM module is required, and media channels should be configured according to the number of FXS ports (see below).

- **To configure the FXS port transfer feature using the re-invites parameter:**
1. Open the Advanced Parameters page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Advanced Parameters**).

Figure 8-34: Enable Call Transfer Using Re-invites

Advanced Parameters	
Max Number of Active Calls	800
Max Call Duration [min]	0
LAN Watchdog	Disable
Enable Calls Cut Through	Disable
Enable User-Information Usage	Enable
Out Of Service Behavior	1 Reorder Tone
Delay After Reset [sec]	7
Call Transfer using re-INVITES	Enable
T38 Fax Max Buffer	1024
Enable Microsoft Extension	Disable
Reliable Connection Persistent Mode	Disable

2. From the 'Call Transfer using re-INVITES' drop-down list, select **Enable**.
3. Click **Submit**.

- **To configure media channels:**
- 1. Open the IP Media Settings page (**Configuration** tab > **VoIP** > **IP Media** > **IP Media Settings**).

Figure 4-29: IP Media Settings

Number of Media Channels	<input type="text" value="30"/>
Voice Streaming	<input type="text" value="Disable"/>
NetAnn Announcement ID	<input type="text" value="annc"/>
MSCML ID	<input type="text" value="ivr"/>
Transcoding ID	<input type="text" value="trans"/>
▼ Conference	
Conference ID	<input type="text" value="conf"/>
Beep on Conference	<input type="text" value="Enable"/>
Enable Conference DTMF Clamping	<input type="text" value="Enable"/>
Enable Conference DTMF Reporting	<input type="text" value="Disable"/>

- 2. In the 'Number of Media Channels' field, enter the number of media channels; two media channels for each FXS port.
- 3. Click **Submit**.

Part VI

Upgrading the SBA Components

This part describes how to upgrade the SBA components.



24 Upgrading MSFT and CU System Components

This section describes how to update system components using the SBA interface. The following components can be updated:

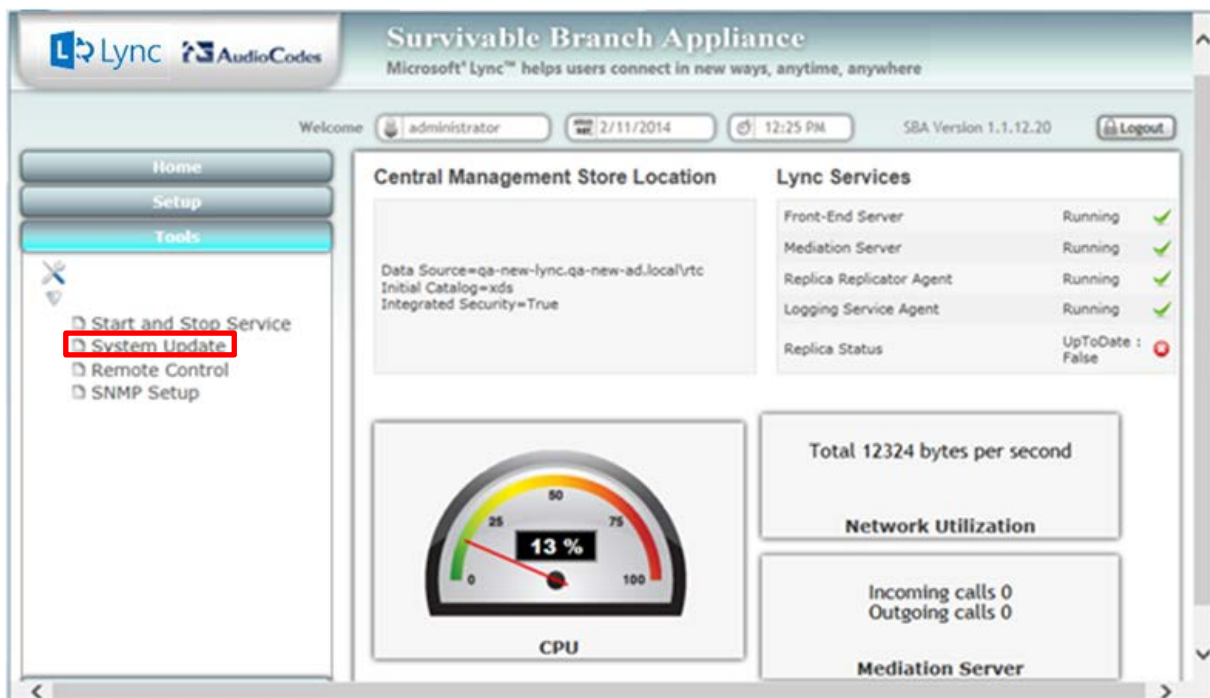
- Microsoft system components
- CU updates

The 'LyncServerUpdateInstaller.exe' provided by Microsoft installs all of the required Microsoft installation component files in a single action.

➤ **To update system components:**

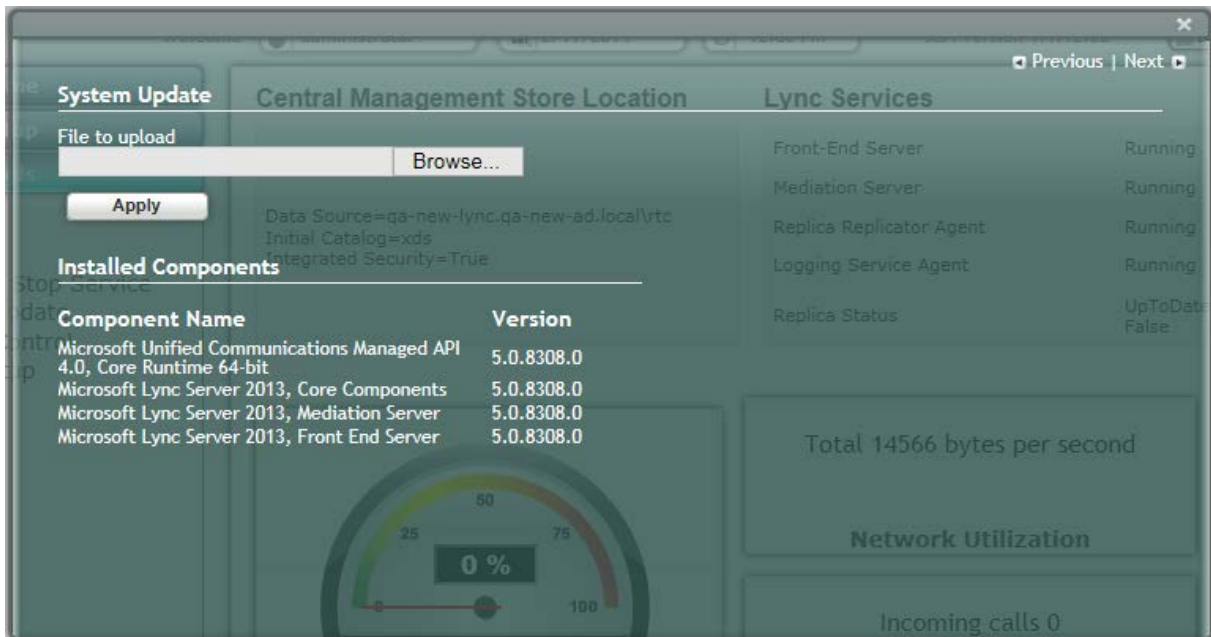
1. Login to the SBA Management Interface.
2. In the SBA Management Interface, select the **Tools** tab, and then select the 'System Update' check box.

Figure 24-1: Tools System Update Menu



The System Update screen is displayed:

Figure 24-2: System Update Screen

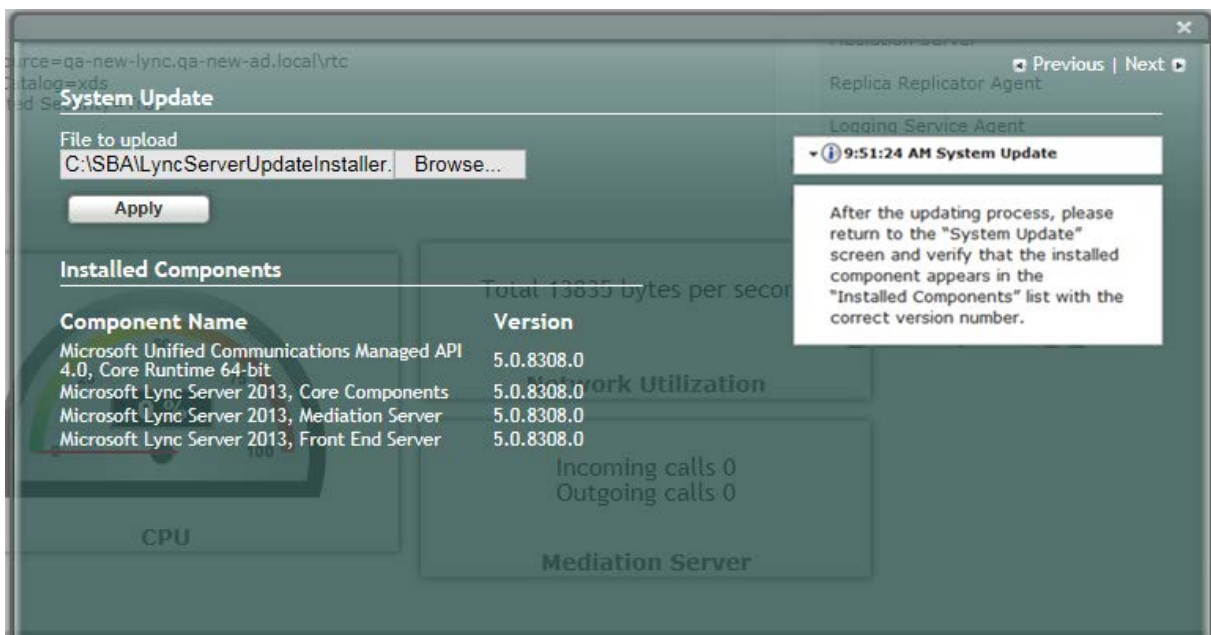


The currently installed Microsoft components are listed in the Installed Components pane.

3. In the 'File to upload' field, click **Browse** to select the 'LyncServerUpdateInstaller.exe' file to upload, and then click **Apply**.

The following screen is displayed:

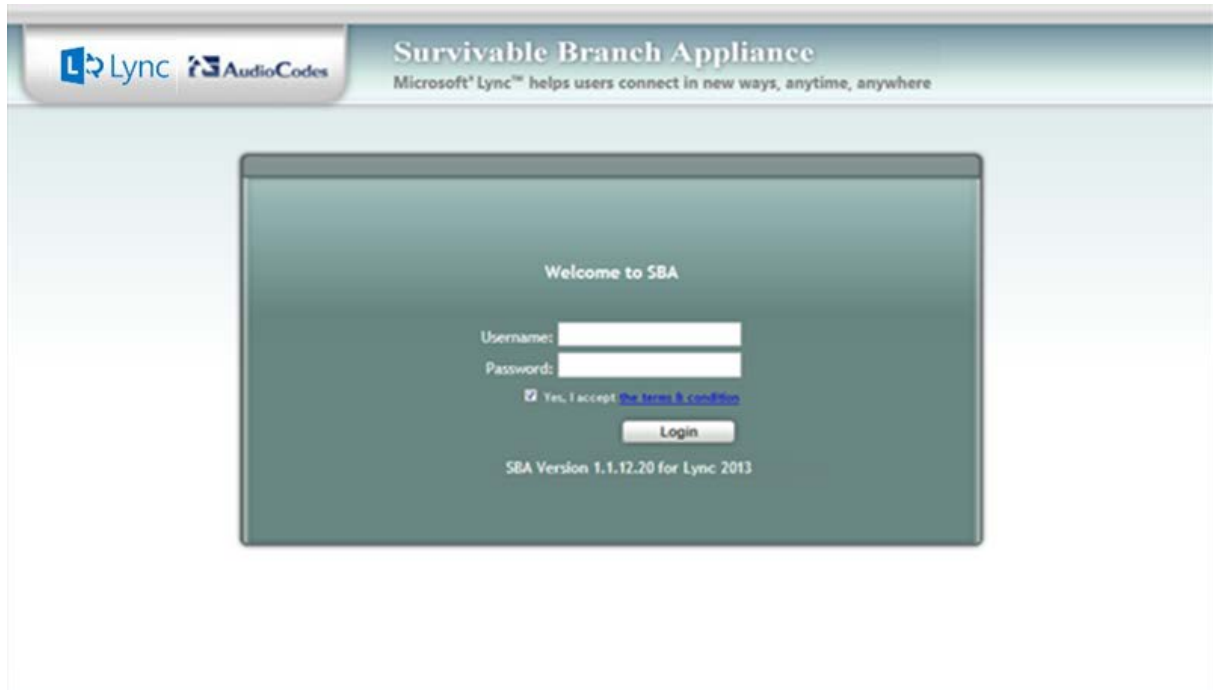
Figure 24-3: System Update Message-Microsoft System Components



A time-stamp of the time that you commenced the System Update is displayed in the right-hand pane.

Wait a few minutes for the update to apply. At the end of the process, the System Logs out automatically and the login screen is displayed:

Figure 24-4: Login Screen after Automatic Log Out



4. Enter your login and password details, and if the Terms and Conditions checkbox is displayed, select it and then click **Login**.
5. Select the **Tools** tab, and then select the 'System Update' check box.
6. Verify that the new components and respective version numbers are displayed in the Installed Components pane.

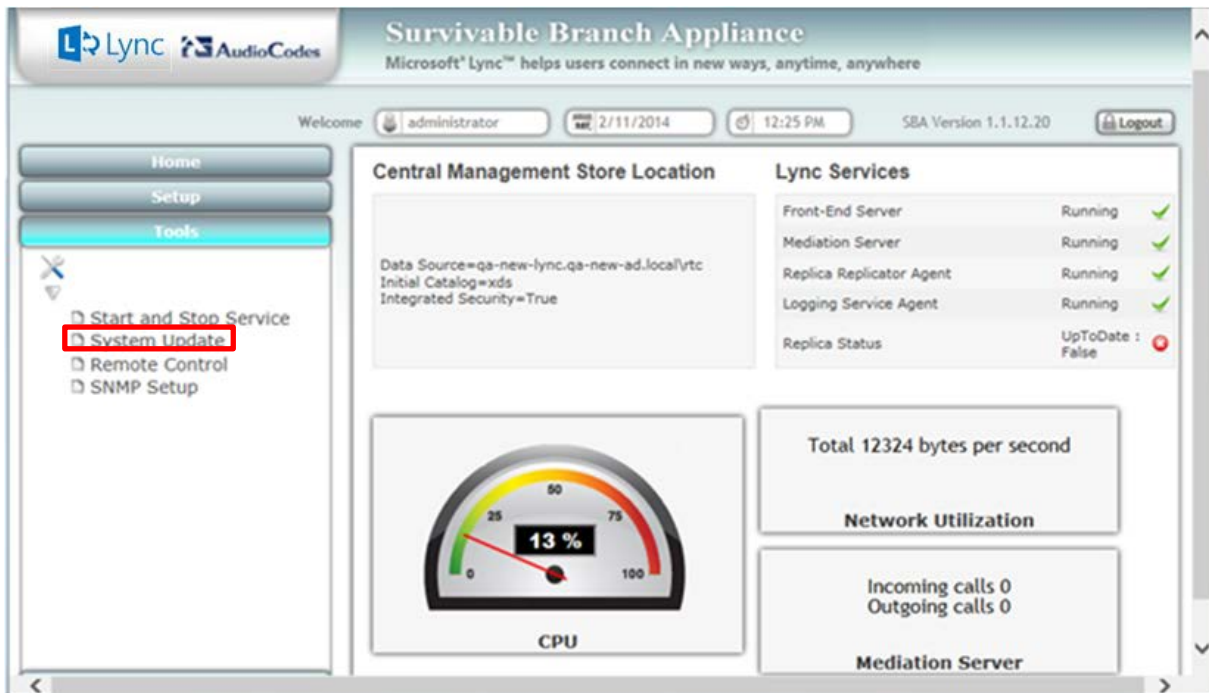
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25 Upgrading the Management Interface

This section describes how to update the SBA Management Interface.

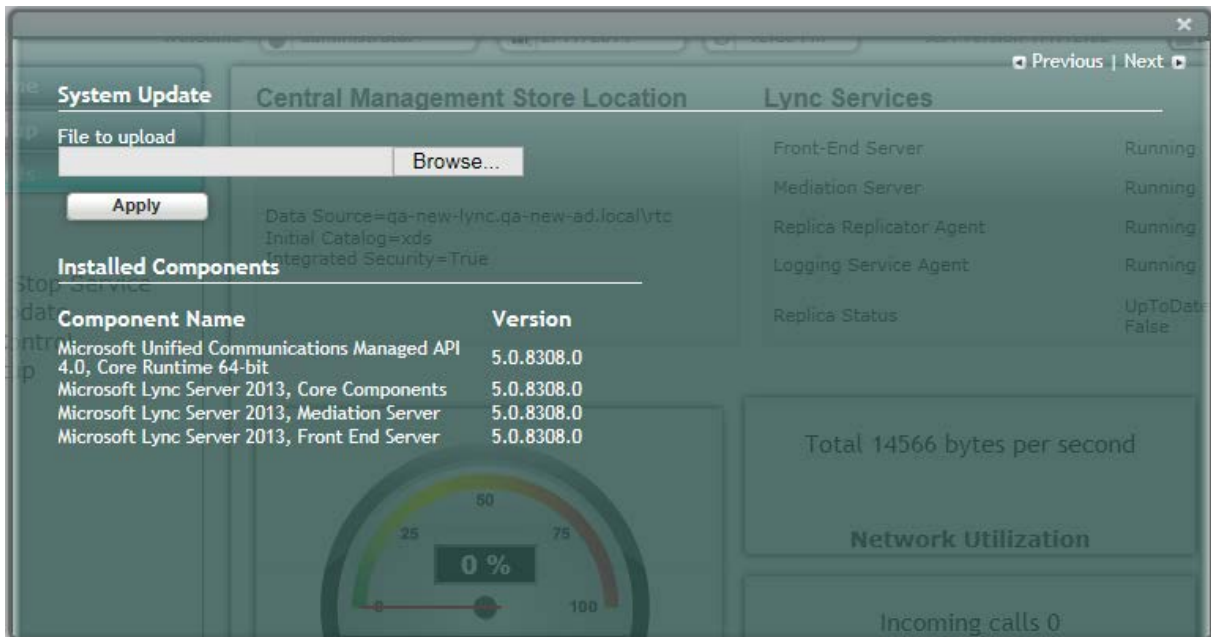
- **To update the SBA Management Interface:**
 1. Login to the SBA Management Interface.
 2. Select the **Tools** tab, and then select the 'System Update' check box.

Figure 25-1: Tools System Update Menu



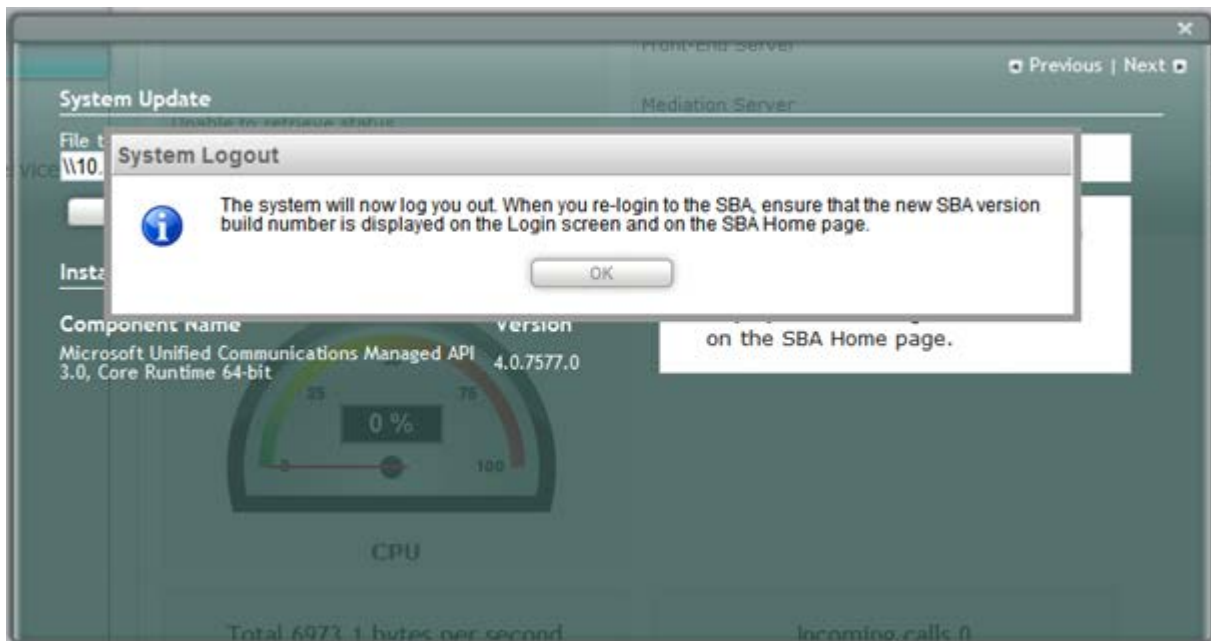
The System Update screen is displayed:

Figure 25-2: System Update Screen



- In the 'File to upload' field, click **Browse** to select the file to upload and then click **Apply**; the following screen is displayed:

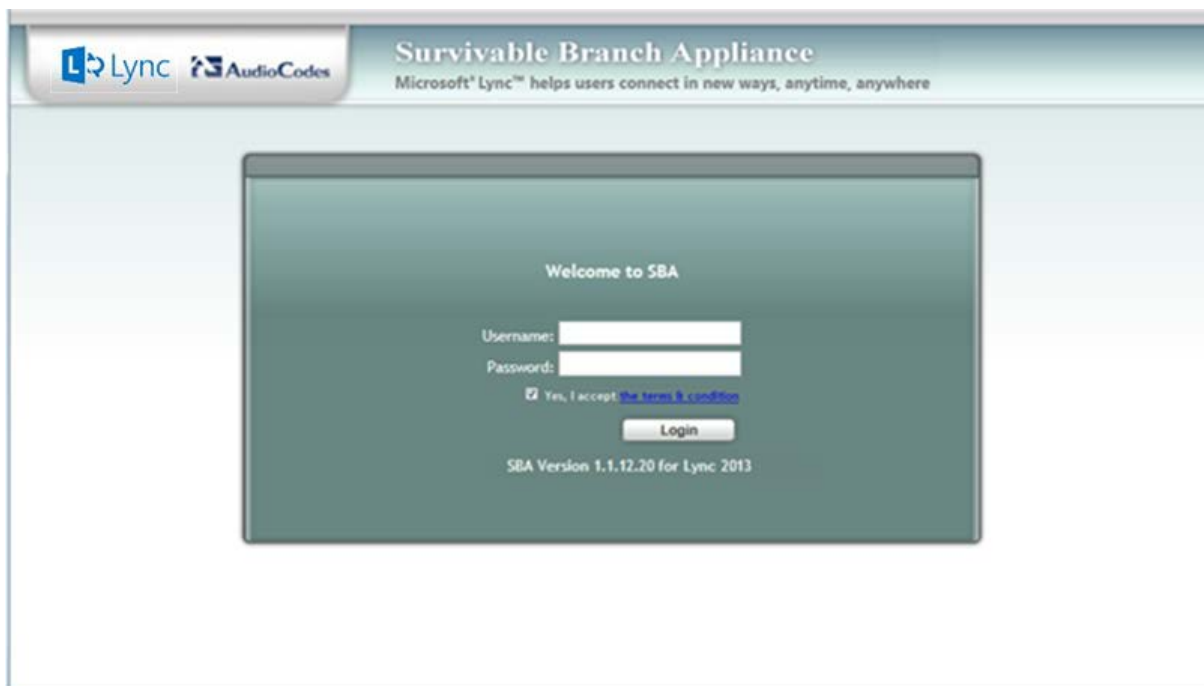
Figure 25-3: System Update Message-SBA Management Interface Version



A time-stamp of the time that you commenced the System Update is displayed in the right-hand pane.

Wait a few minutes for the update to apply. At the end of the process, the System Logs out automatically and the login screen is displayed.

Figure 25-4: Login Screen after Automatic Log Out



4. In the Login screen, verify that the new SBA version number is displayed.
5. Enter your login and password details, and if the Terms and Conditions checkbox is displayed, select it and then click **Login**.
6. Ensure that the new SBA Management Interface version number is displayed in the SBA Home Page.

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26 Upgrading using the SBA Pro

A customer with large SBA deployments might have difficulties updating their SBA manually. Consequently, for better servicing of such deployments, AudioCodes now offers a new application 'SBA PRO', which is a Web Management tool for the purposes of easily installing Microsoft Cumulative Updates (CU) and for upgrading Microsoft Lync Server from a central location to the SBA devices.



Note: For more information, refer to the *SBA Pro User's Manual* and contact your AudioCodes representative.

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Part VII

Upgrading and Recovering the SBA Image

This part describes how to upgrade the Survivable Branch Appliance (SBA) software application and how to recover it (in case of failure).

27 Upgrade and Recovery - Introduction

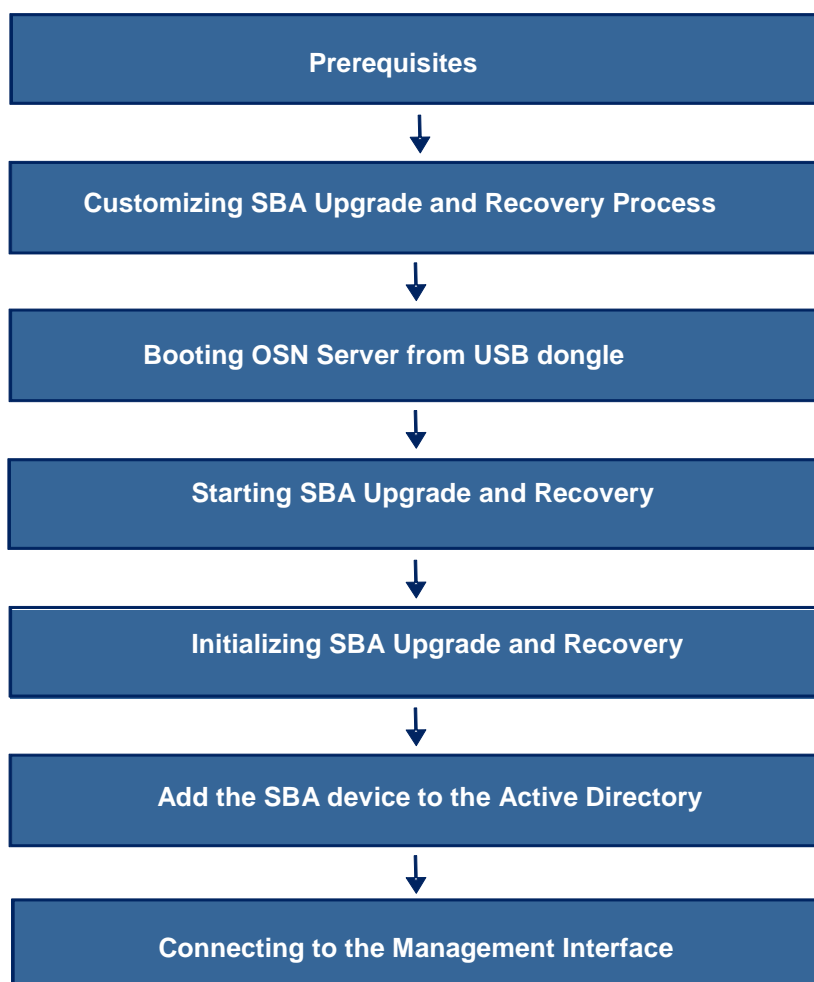
This chapter provides step-by-step instructions on how to upgrade the Survivable Branch Appliance (SBA) software application and how to recover it (in case of failure).

The SBA is hosted on the Mediant 1000B OSN server platform, which is deployed at the remote branch office in the Microsoft Lync Server 2013 environment. Upon a WAN outage, the Mediant 1000B SBA maintains call continuity among Microsoft Lync clients and devices within the branch office, and provides PSTN termination (if implemented) for these clients.

The SBA Upgrade and Recovery procedure is done using AudioCodes SBA Upgrade and Recovery USB dongle which contains a later version of the SBA image file. The USB dongle also provides a text-based file (RecoveryUtil.ini) that allows you to customize the upgrade and recovery process.

The SBA Upgrade and Recovery procedural steps can be summarized as follows:

Figure 27-1: Summary of Steps for SBA Upgrade and Recovery



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28 Upgrade and Recovery - Prerequisites

Before you can begin the SBA upgrade and recovery, do the following:

- Ensure that you have received the USB dongle in your SBA kit (from AudioCodes).

Figure 28-1: SBA Upgrade and Recovery USB Dongle



- Set the location of the SBA image file that you want to burn to the OSN server to one of the following:
 - SBA Upgrade and Recovery USB dongle
 - FTP server
 - Local network
 - Recovery Partition (drive D:\) on the OSN hard disk
- If you have recently obtained a later SBA image file version, it is recommended to copy it to the USB dongle (prior to performing the SBA upgrade and recovery), and then delete the old image from the USB dongle (the old image resides in the root folder with the file extension, *.wim).



Notes:

- The USB dongle is supplied with an image of the SBA upgrade and recovery.
- When using the recovery partition of the OSN server as the location for the SBA image file, you must disable the partitions and disable disk formatting capabilities, using the RecoveryUtil.ini file (see Section 29.4 on page 211).
- You can also download the SBA image file from AudioCodes Web site at <http://www.audiocodes.com/sba> or obtain a DVD from AudioCodes with the new version.

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29 Preparing SBA Upgrade and Recovery

The RecoveryUtil.ini file is a text-based file that is located in the root directory on the supplied USB dongle. This file contains parameters for defining various options relating to the SBA upgrade and recovery process. The RecoveryUtil.ini file is supplied with recommended configuration settings. However, you can modify them to suit your requirements.



Warning: Before plugging the USB dongle into the PC, ensure that the PC boot priority from the USB is disabled or it's set to the last priority. This setting is crucial. If your PC is set to boot from USB before it attempts to boot from the HDMX, then if your PC restarts while the USB dongle is plugged in, your PC boots from the USB dongle, thereby reformatting your PC and damaging your PC operating system.

The procedure below describes how to modify the RecoveryUtil.ini file.

➤ **To modify the RecoveryUtil.ini file:**

1. Plug the USB dongle into a USB port on the PC.
2. Open (using a text-based editor such as Notepad) the RecoveryUtil.ini file located on the USB dongle.
3. Perform the required modifications, as described in the subsequent subsections.
4. Save and close the file.
5. Remove the USB dongle from the PC.

29.1 Defining Manual or Automatic Start

You can configure the SBA upgrade and recovery to start manually or automatically, by using the RecoveryStartType parameter:

- **Manually (recommended and default):** To start the SBA upgrade and recovery manually, set the RecoveryStartType parameter to 1, as shown below:

```
[Execution] RecoveryStartType= 1
```

With this setting, you need to run the upgrade and recovery utility script manually from the DOS shell command line (using a serial communication console, i.e. HyperTerminal).

- **Automatic:** To start the SBA upgrade and recovery automatically, set the RecoveryStartType parameter to 0, as shown below:

```
[Execution] RecoveryStartType= 0
```

With this setting, the SBA upgrade and recovery process runs automatically when Windows Pre-installation Environment starts. This setting should be used in scenarios where you cannot connect the serial console to Mediant 1000B. In addition, it is highly recommended to set the parameter OnExit to 2 (see Section 29.6 on page 212) so that the Mediant 1000B OSN server shuts down when the procedure completes.

29.2 Running the Process Immediately or Upon User Confirmation

You can configure the SBA upgrade and recovery to start automatically (immediately) or only upon user confirmation, by using the Automatic parameter.

- **Upon Confirmation:** To start the SBA upgrade and recovery only after user confirmation, set the Automatic parameter to 0, as shown below:

```
[Execution] Automatic= 0
```

Once the process starts, you are prompted (via the console) to confirm the SBA upgrade and recovery.

- **Automatic (recommended and default):** To start the SBA upgrade and recovery automatically (without confirmation), set the Automatic parameter to 1, as shown below:

```
[Execution] Automatic= 1
```

With this setting, the SBA upgrade and recovery starts immediately after the OSN server boots from the USB dongle.

29.3 Checking Disk before Image Burn

You can configure the SBA upgrade and recovery to check the disk before burning the SBA image to the OSN server, using the CheckDisk parameter. The result of this disk check is logged to the RecoveryLog.txt file, located on the USB dongle.

- **Enable disk check (recommended and default):** To enable disk checking before burning the image, set the CheckDisk parameter to 0, as shown below:

```
[Execution] CheckDisk=0
```

- **Disable disk check:** To disable disk checking before burning the image, set the CheckDisk parameter to 1, as shown below:

```
[Execution] CheckDisk=1
```

29.4 Creating Disk Partitions

You can configure the SBA upgrade and recovery to create disk partitions on the OSN server, using the DiskPartitions parameter.

- To enable disk partitions (recommended and default): set the DiskPartitions parameter to 1, as shown below:

```
[Execution] DiskPartitions=1
```



Notes:

- The SBA is shipped with an image on the recovery partition (D:\ drive on the OSN hard disk). If the parameter DiskPartitions is set to 1, then this image is deleted. Therefore, before partitioning, it is recommended to backup the file to an external storage.
- If the parameter DiskPartitions is set to 1, then the image location can't be the recovery partition

With this setting, you must also set the following:

- Partition Size: Set the main partition size in Megabytes:

```
[DiskPartitions] MainPartitionSize=100000
```



Notes:

- The recommended main partition size is "100000" (i.e., "100" Gigabytes).
- Ensure that the secondary partition is at least 10 GB, as it is used to hold SBA image file, which is downloaded through FTP.

- Format Partitions: Format disk partitions into main (C:\) and secondary (D:\) partitions, by setting the FormatPartitions parameter to 1, as shown below. (If set to 0, disk partitions are not formatted).

```
[DiskPartitions] FormatPartitions=1
```

- To disable creation of disk partitions: set the DiskPartitions parameter to 0, as shown below:

```
[Execution] DiskPartitions=0
```

29.5 Enabling SBA Image Burn on Primary Partition

You can configure the SBA upgrade and recovery to burn the SBA image on the main partition, using the RecoverImange parameter.

- To enable image burn on primary partitions (recommended and default): Set the RecoverImange parameter to 1, as shown below:

```
[Execution] RecoverImange =1
```

- To disable image burn on primary partitions: Set the RecoverImange parameter to 0, as shown below:

```
[Execution] RecoverImange =0
```

29.6 Defining Exit Operation upon Process Completion

You can configure the SBA upgrade and recovery to perform a specific operation upon the completion of the process, using the OnExit parameter.

- Start command prompt: Set the OnExit parameter to 0 to start the command prompt upon process completion:

```
[Execution] OnExit = 0
```

- Reboot OSN server: Set the OnExit parameter to 1 to reboot the OSN server upon process completion:

```
[Execution] OnExit = 1
```

- Shut down OSN server: Set the OnExit parameter to 2 to shut down the OSN server upon process completion:

```
[Execution] OnExit = 2
```



Notes: The recommendation for this configuration is as follows:

- If you are monitoring the procedure by connecting a monitor or serial console, it's recommended to set OnExit to 0. This setting displays log messages on the console, indicating the progress of the SBA upgrade and recovery process.
- If the process is performing automatically without monitoring via a monitor or serial console, you must set OnExit to 2. In this case, at the end of the upgrade and recovery process, the OSN server shuts down.

29.7 Defining Network Parameters

You can configure the network parameters for the SBA upgrade and recovery process, using the parameters under the [NetworkCardConfiguration] section in the *.ini file.



Note: These network settings are used only for communication between the OSN and an FTP server or a local network for downloading the image file, as described in Section 29.9 on page 214. The IP address of the OSN LAN port is assigned only after initialization (by a DHCP server or manually), as described in Section [Error! Reference source not found.](#) on page [Error! Bookmark not defined.](#)

- Use DHCP for obtaining IP address (recommended and default): Set the EnableDhcp to 1, as shown below:

```
[NetworkCardConfiguration] EnableDhcp=1
```

This is only applicable if you have a DHCP server in your network.

- Manually (Static) define IP address: Set the EnableDhcp to 0, as shown below:

```
[NetworkCardConfiguration] EnableDhcp=0
```

When set for static IP address, configure the static network address, as shown below:

- IpAddress: Defines the static IP address:

```
[NetworkCardConfiguration] IpAddress=10.21.22.55
```
- SubnetMask: Defines the subnet:

```
[NetworkCardConfiguration] SubnetMask=255.255.0.0
```
- DefaultGateway: Defines the default gateway:

```
[NetworkCardConfiguration] DefaultGateway=10.21.0.1
```
- DnsServers: Defines the domain name server (DNS):

```
[NetworkCardConfiguration] DnsServers=10.1.1.11
```

29.8 Defining the SBA Image File Name

You can configure the SBA image file name for the SBA upgrade and recovery, using the Filename parameter.

```
[WIM Filename] Filename
```



Note: By default, the name of the image file is for example, SBA_OSN3_1_1_11_40.wim.

29.9 Defining the SBA Image File Source

You can configure the source (location) from where the image file can be obtained for the SBA upgrade and recovery process, using the Source parameter:

- FTP: Set Source to 1, as shown below:

```
[ImageSource] Source = 1
```

If the image file is located on an FTP server, then see Section 29.9.1 on page 214 to define the FTP server address and login credentials.

- Local network: Set Source to 2, as shown below:

```
[ImageSource] Source = 2
```

If the image file is located on the local network, then see Section 29.9.2 on page 215 to define the network path (URI) to where the file is located and the logon username and password.

- SBA Recovery USB dongle (recommended and default): Set Source to 3, as shown below:

```
[ImageSource] Source = 3
```

If the image file is located on the USB dongle, then see Section 29.9.3 on page 215 to define the directory path to where the image file is located.

- Recovery partition: Set Source to 4, as shown below:

```
[ImageSource] Source = 4
```

If the image file is located on the recovery partition, then see Section 29.9.4 on page 215 to define the directory path to where the file is located.



Note: For sources 1, 2, and 3, the image is also copied to the recovery (second) partition for future use.

29.9.1 Defining the FTP

If the image file is located on an FTP server (i.e., [ImageSource] Source = 1, as defined in Section 29.9 on page 214), then you need to define the FTP server address and login credentials:

- [FtpSettings] Site: Defines the IP address or FQDN of the FTP server (FTP server can be in the local network or on the Internet):

```
[FtpSettings] Site=10.13.4.115
```

- [FtpSettings] User: Defines the FTP login user name:

```
[FtpSettings] User=Admin
```

- [FtpSettings] Password: Defines the FTP login password:

```
[FtpSettings] Password=1234
```



Note: The image file must be located on the root of the FTP server.

29.9.2 Defining the Local Network

If the image file is located on a local network (i.e., [ImageSource] Source = 2, as defined in Section 29.9 on page 214), then you need to define the network path (URI) to where the file is located and the access username and password.

- [LocalNetworkSettings] Path: Defines the network URI:

```
[LocalNetworkSettings] Path=\\192.168.1.4\images
```

- [LocalNetworkSettings] User: Defines the login user name:

```
[LocalNetworkSettings] User=audiocodes\john.smith
```

- [LocalNetworkSettings] Password: Defines the password:

```
[LocalNetworkSettings] Password=1234
```

29.9.3 Defining the Disk On Key

If the SBA image file is located on the USB dongle (i.e., [ImageSource] Source = 3, as defined in Section 29.9 on page 214), then you must define the directory path to where the image file is located. This is defined using the [DOKsettings] DirectoryPath parameter.

The path must be set without the volume (for example, "\recovery\"). The application searches for this directory in all drives. For the USB root directory, set this parameter to "\" (default and recommended), as shown below:

```
[DOKsettings] DirectoryPath=\\
```

29.9.4 Defining the Recovery Partition

If the SBA image file is located on the recovery partition (i.e., [ImageSource] Source = 4), then you need to define the directory path to where the file is located. This is defined using the [RecoveryPartition] DirectoryPath parameter.

The path must be defined without the volume (for example, "\recovery\"). The application searches all the drives for this directory. For recovery partition root, set this parameter to "\" (recommended and default):

```
[RecoveryPartition] DirectoryPath=\\
```

29.10 Defining the MAC Address Prefix

You can configure the MAC address (prefix or full address) of the Mediant 1000B for which the SBA upgrade and recovery process can run, using the MacPrefix parameter. This prevents accidental running of the SBA upgrade and recovery on your PC. If not configured, the procedure runs on any system.

```
[User Confirm] MacPrefix=00-45-B1-22-49-B1
```

You can define several MAC addresses by suffixing the MacPrefix parameter with an index number for each MAC address, as shown in the example below:

```
[User Confirm]
MacPrefix=01034E
MacPrefix1=0
MacPrefix7=01-03-5C
MacPrefix3=01-03
```

The default MAC addresses set in the file include the following:

- MacPrefix=00-80-82
- MacPrefix1=00-40-9E
- MacPrefix2=00-0B-AB

30 SBA Upgrade and Recovery

After you have customized the SBA upgrade and recovery process using the RecoveryUtil.ini file (see Section 29), you can start the upgrade and recovery process. The process can be done with or without online monitoring.



Note: When the process completes, you can view the results of the SBA upgrade and recovery process in the log file RecoveryLog.txt. This file is located on the USB dongle.



Warnings: Before proceeding, note the following:

- Contact your AudioCodes representative to verify if there are any required updates to the OSN's BIOS.
- Enter the OSN server's BIOS setup and set the highest boot priority to the USB dongle and not the HDMX.

30.1 Upgrading or Recovering without Monitoring

The procedure below describes how to start the SBA upgrade and recovery process without monitoring.

➤ **To start SBA upgrade and recovery without monitoring:**

1. Open (using a text editor such as Notepad) the RecoveryUtil.ini file and then set the OnExit parameter to 2 so that the OSN server shuts down upon SBA upgrade and recovery completion:

```
[Execution] OnExit = 2
```


2. Save and close the RecoveryUtil.ini file.
3. Plug the USB dongle into the USB port OSN  on the Mediant 1000B OSN module, as shown below:

Figure 30-1: Plugging USB Dongle into OSN3B and OSN4 USB Port

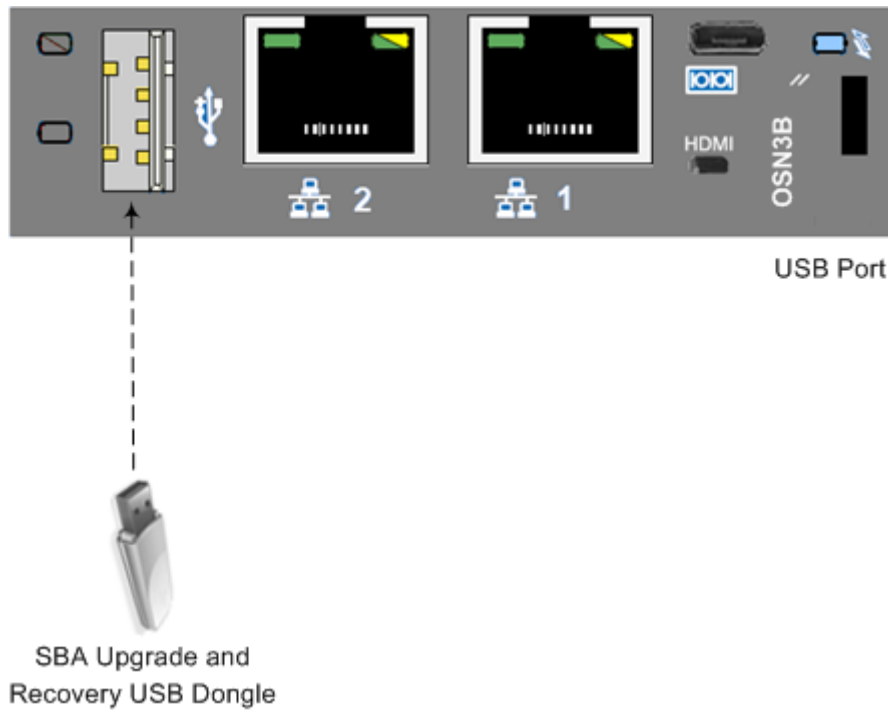
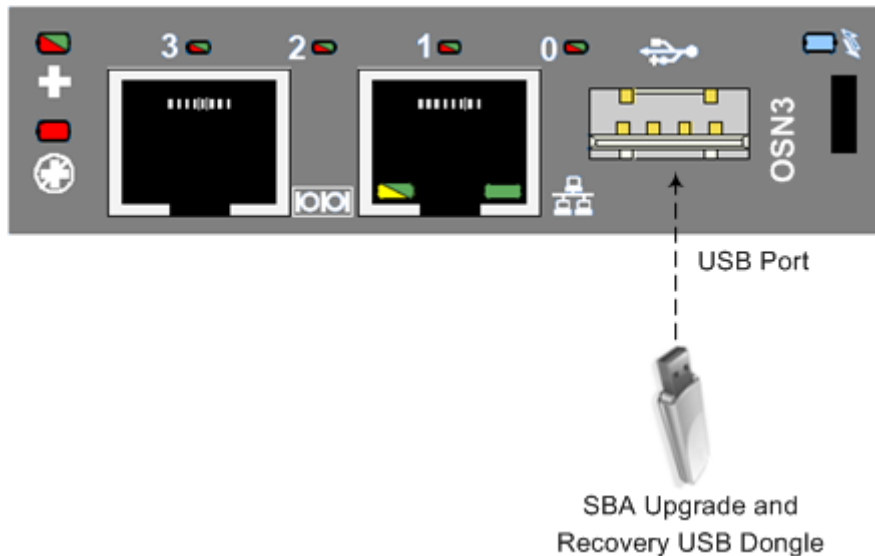
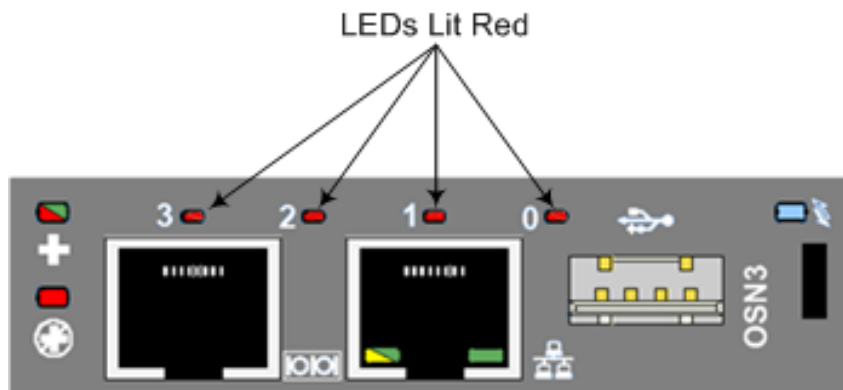


Figure 30-2: Plugging USB Dongle into OSN3 USB Port



4. Power off and then power on the Mediant 1000B chassis to boot the OSN server from the USB dongle; the SBA upgrade and recovery process begins.
5. Wait until the process completes, indicated by the OSN server shutting down (OSN LEDs are lit), as shown below:

Figure 30-3: OSN3 LED Indication for Shut Down



Note: If you are connecting to an OSN3B and OSN4 module, see Section 5.1.2 on page 29 for more information when monitoring LEDs.

6. Remove the USB dongle from the USB port on the OSN module.
7. Power off and then power on the Mediant 1000B to reboot the OSN server; the initialization process starts.



Notes:

- This step may take a while (about 10 minutes). While the Mediant 1000B is rebooting, DO NOT power off the Mediant 1000B.
- During initialization, the OSN server restarts twice.

30.1.1 Acquiring an IP Address

Once the OSN server has successfully rebooted, you need to identify the NIC corresponding to the Ethernet port. All Network Interface Cards (NIC) are assigned IP addresses by your enterprise's DHCP server (if it exists). If you are not using a DHCP server, you can assign a static IP address to this NIC.



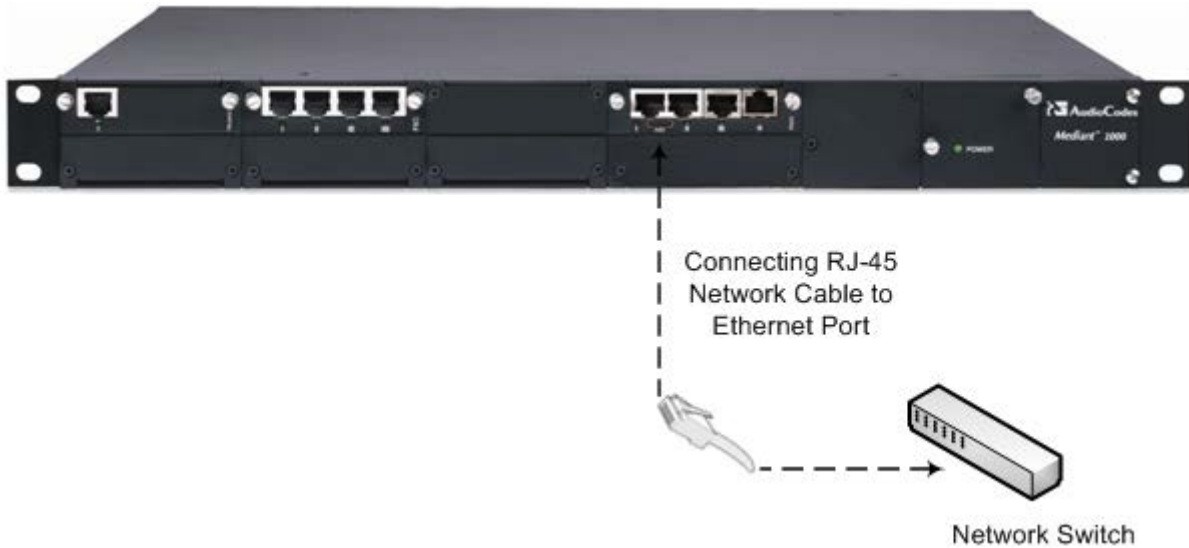
Note: If the SBA was recovered or upgraded using the AudioCodes Upgrade and Recovery USB dongle, the IP address of the OSN server is received from the DHCP server and therefore, the pre-configured IP address is no longer applicable.

➤ **To acquire an IP address:**

1. Do one of the following:

- If you are connecting to the network via the internal NIC:
Connect one of the Ethernet ports on the CRMX module on the front panel of the device directly to the network using a straight-through Ethernet cable.

Figure 30-4: Connecting Mediant 1000B SBA LAN Port on CRMX Module (Front Panel)




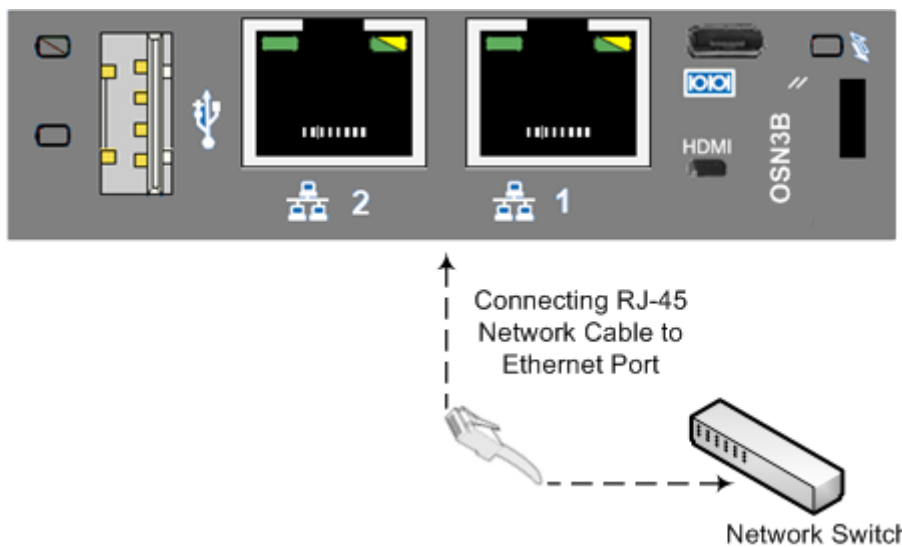
- If you are connecting to the network via an external NIC:
 - ◆ **OSN3B/OSN4:** Using a network cable, connect one of the Ethernet ports (1 or 2) (labeled ) on the OSN3B/OSN4 module to the network:

Figure 30-5: Connecting to LAN Port on OSN3B and OSN4 Module (Rear Panel View)




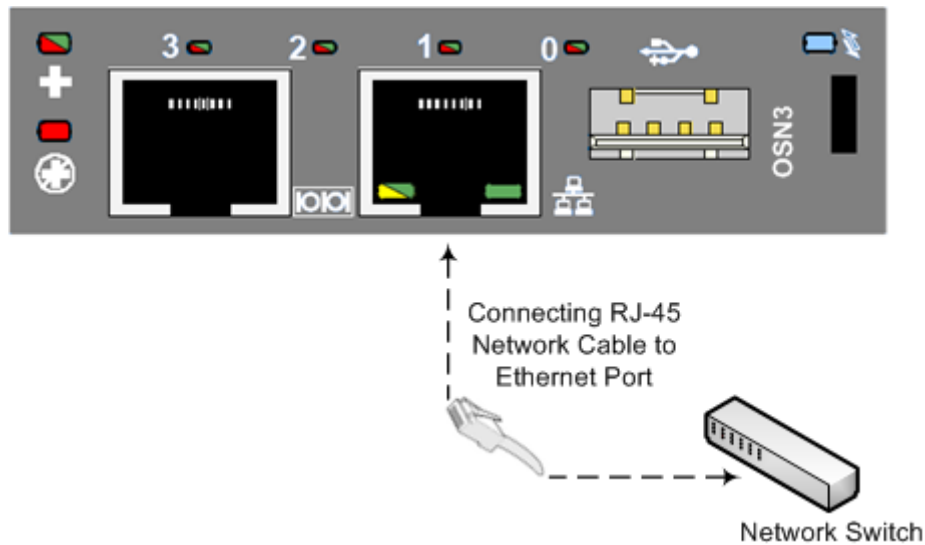
- ◆ **OSN3:** Using a network cable, connect the Ethernet port (labeled ) on the OSN3 module to the network:

Figure 30-6: Connecting to LAN Port on OSN3 Module (Rear Panel View)




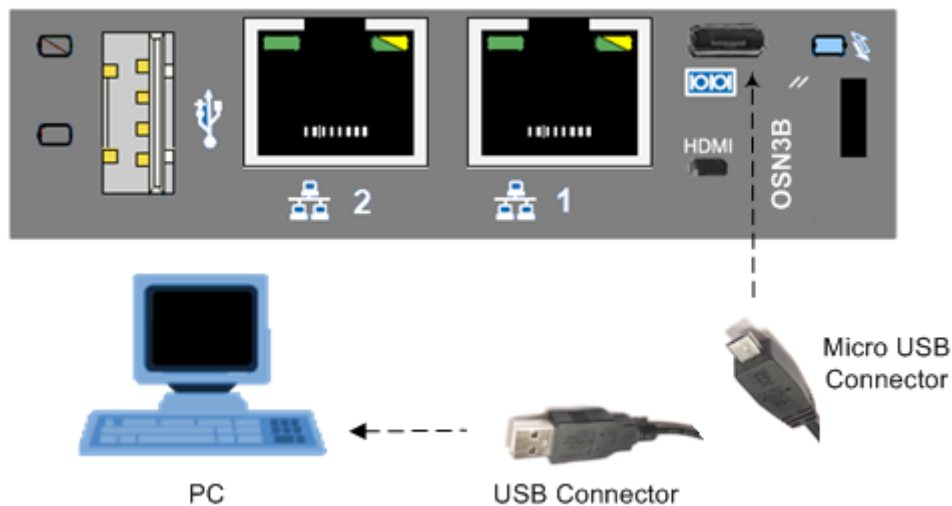
2. Connect to the OSN server's serial port:
 - **OSN3B/OSN4:** Using the supplied micro USB- to-USB cable adapter, connect the micro USB connector end to the OSN serial port on the OSN3B/OSN4 module (), and then connect the other end of the cable (USB) to the serial interface port on your PC.

Figure 30-7: Cabling OSN3B/OSN4 to PC for Serial Communication




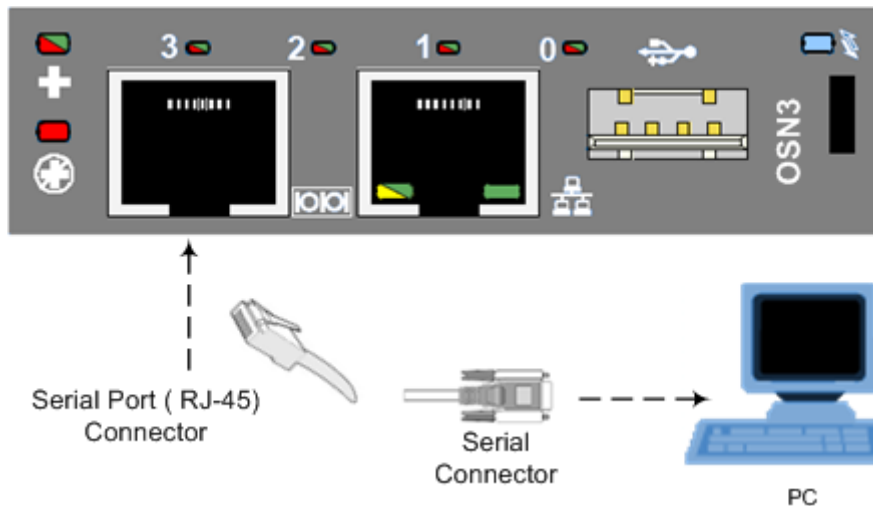
- **OSN3:** Connect an RJ-45 network cable to the RJ-45 serial port on the OSN3 module (), and then connect the other end of the cable to the serial port of your PC.

Figure 30-8: Cabling OSN3 to PC for Serial Communication


Notes:

- The OSN3 does not provide a direct monitor connection (HDMI port), and therefore, the serial port is used for determining the Ethernet port NIC.
- For the Mediant 1000B OSN3B/OSN4 serial interface port (micro-USB) to be operational, you must download a special USB driver from the Internet. Download this driver at <http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpcdrivers.aspx>

3. Establish a serial communication with OSN, using a terminal emulation program such as HyperTerminal, with the following port settings:

- Bits per second: 115200
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

4. Press Enter; the Serial Console prompt is displayed:

```
SAC>
```

5. Type the following to view all the NIC addresses:

```
SAC>i
```

6. Do one of the following:

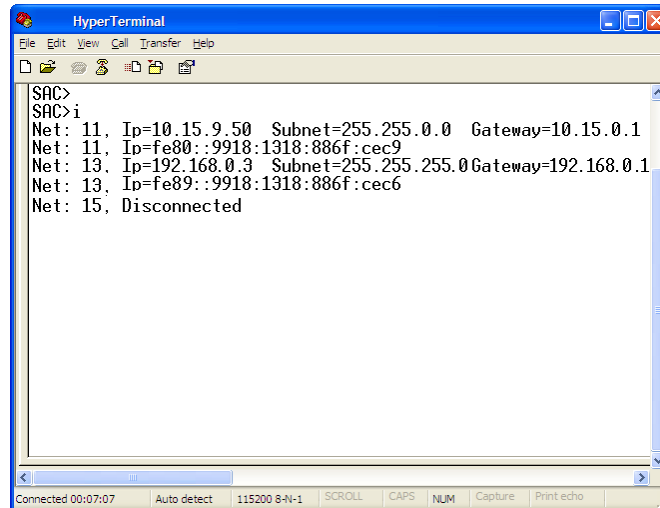
- If you are connecting to the network via the internal NIC:
 - ◆ If you have a DHCP server in your network, the internal NIC should be identified by a displayed IP address (the two external Ethernet ports should be displayed as "Disconnected").
 - ◆ If you do not have a DHCP server in your network, define a static IP address:
 - a. At the prompt, define the static IP address for the specific NIC, using the following command:


```
i <NIC ID> <IP address> <subnet> <default gateway>
```
 - b. Press **Enter** to apply your settings.

- If you are connecting to the network via the external NIC:
 - a. Determine the NIC used for the Ethernet port, by removing the network cable from the Ethernet port and viewing in the serial console that the NIC (ID) has changed to "Disconnected". This is the NIC corresponding to the external LAN port.

Two NICs are displayed with IP addresses and one NIC is displayed as "Disconnected": similar to as is shown in the figure below.

Figure 30-9: NIC Disconnected



```
SAC>
SAC>i
Net: 11, Ip=10.15.9.50 Subnet=255.255.0.0 Gateway=10.15.0.1
Net: 11, Ip=fe80::9918:1318:886f:cec9
Net: 13, Ip=192.168.0.3 Subnet=255.255.0.0 Gateway=192.168.0.1
Net: 13, Ip=fe89::9918:1318:886f:cec6
Net: 15, Disconnected
```

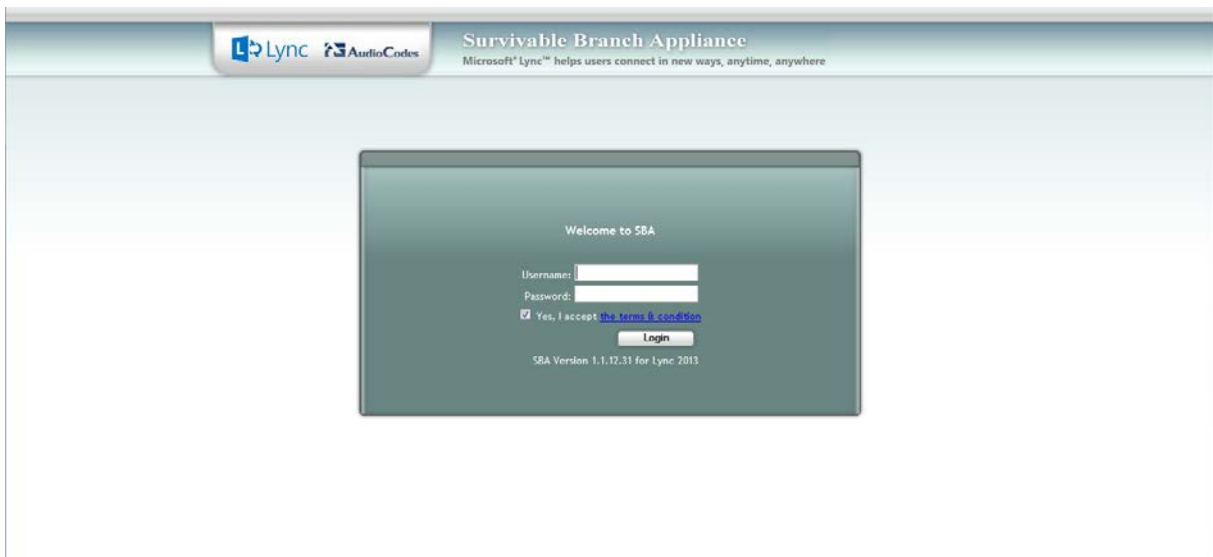
- b. Reconnect the network cable.

If you have a DHCP server in your network, note the IP address of the relevant Ethernet port. If you are not using a DHCP server, then assign a static IP address to the NIC of the Ethernet port:

 - ✓ At the prompt, define the static IP address for the specific NIC, using the following command:
i <NIC ID> <IP address> <subnet> <default gateway>
 - ✓ Press **Enter** to apply your settings.
 - c. Disconnect the serial cable from the OSN server.
7. Open a standard Web browser (Firefox, Google Chrome, or Internet Explorer 9 and later is recommended), and then in the URL address field, enter the IP address that was assigned above.

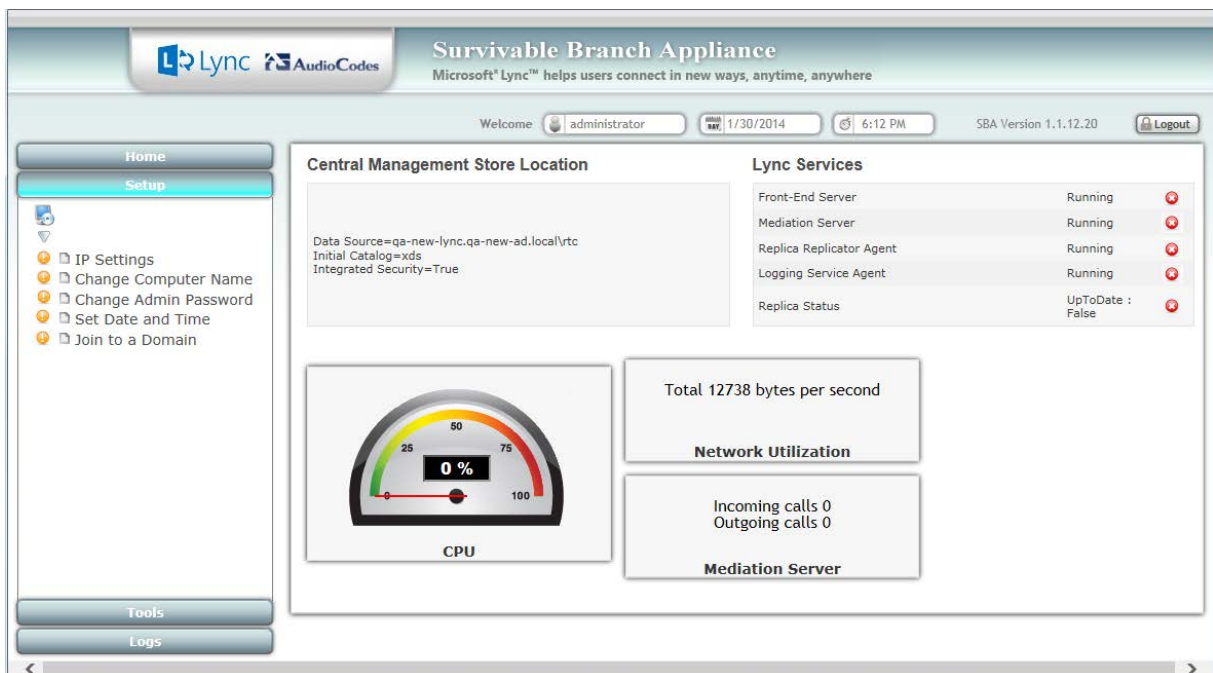
The Survivable Branch Appliance Management Interface opens:

Figure 30-10: Welcome to SBA Screen



8. Log in with the default username ("Administrator") and password ("Pass123"), Select the "Yes, I accept the term and condition" checkbox, and then click **Login**; the Home screen appears:

Figure 30-11: SBA Home Screen



9. Change the default IP address of the SBA Management Interface to suit your network environment (see Section 11.1 on page 81).

30.2 Upgrading or Recovering with Monitoring

You can monitor the SBA upgrade and recovery process for the OSN3B and OSN4 server using an HDMI monitor (via the HDMI port).



Notes:

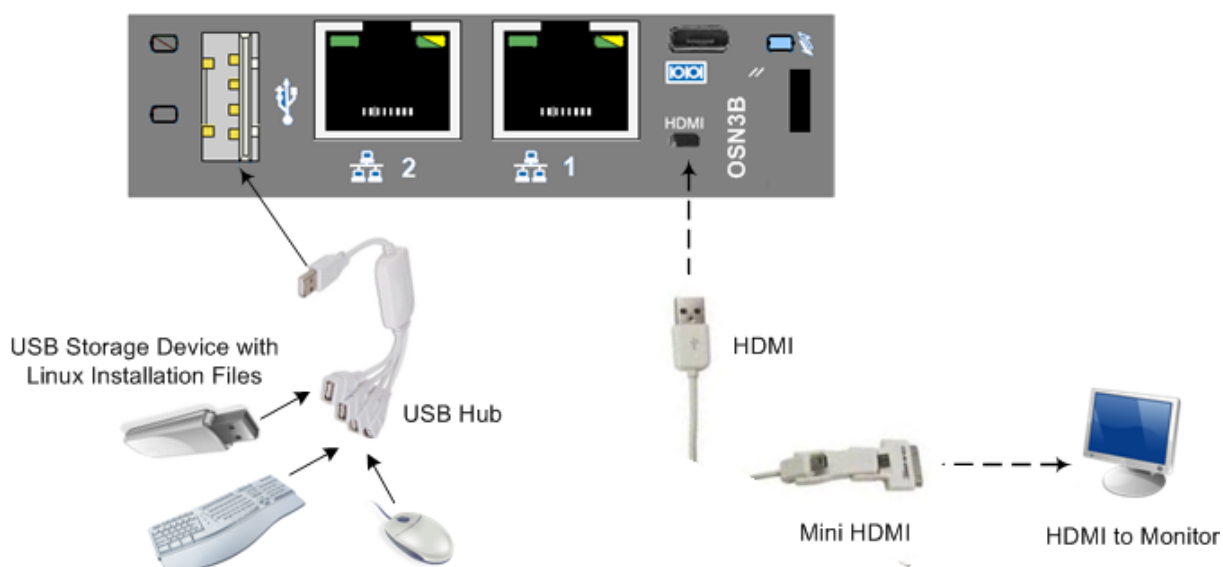
- This procedure is relevant for the OSN3B and OSN4 server only.
- This procedure describes how to connect to the OSN3B and OSN4 using a monitor (via the HDMI port).

➤ To connect to the OSN3B and OSN4 server:

1. Open (using a text editor such as Notepad) the *RecoveryUtil.ini* file and then do the following:
 - Set the 'RecoveryStartType' parameter to **0**, in order to start the process automatically when Windows PE starts.
 - Set the 'OnExit' parameter to **2** so that the OSN server shuts down upon SBA upgrade and recovery completion.

```
[Execution] RecoveryStartType= 0
[Execution] OnExit = 2
```
2. Save and close the *RecoveryUtil.ini* file.
3. Connect the USB hub into the USB hub port on the OSN3B and OSN4 server.
4. Plug the USB dongle into a USB hub connector.
5. Plug the mouse and keyboard into respective connectors on the USB hub.
6. Using the supplied MINI HDMI TO HDMI 1.5m cable, connect the HDMI connector end to the HDMI port on the OSN3B or OSN4 module and connect the Mini HDMI connector end to the HDMI port on the monitor.

Figure 30-12: Plugging OSN Server Accessories



7. Power off and then power on the Mediant 1000B to reboot the OSN server; the SBA Upgrade and Recovery process starts and logged messages are displayed on the HDMI monitor.

When the process completes, the following logged messages are displayed on the HDMI monitor:

Figure 30-13: Online Monitoring Using HDMI

```

Copyright (C) Microsoft Corp. All rights reserved.
Version: 6.1.7600.16385

[ 100% ] Applying progress
Successfully applied image.
Total elapsed time: 5 min 55 sec

INFO: ***** Set boot to be from image *****
bcdboot.exe C:\Windows /s C: /vBoot files successfully created.
The operation completed successfully.
The operation completed successfully.
The operation completed successfully.
INFO: Copying recovery image to second partition.
copy E:\imageM1K.wim D:\imageM1K.wim
      1 file(s) copied.

X:\windows\system32>
    
```

8. Remove the USB dongle from the USB port on the USB hub.
9. Power off and then power on the Mediant 1000B to reboot the OSN server; the initialization process starts.


Notes:

- This step may take a while (about 10 minutes). While the Mediant 1000B is rebooting, DO NOT power off the Mediant 1000B.
- During initialization, the OSN server restarts twice.

10. Determine the NIC that is assigned to the required Ethernet port and the corresponding IP address, and then use this IP address to connect to the SBA (see Section 30.1.1).

30.3 Upgrading or Recovering with Online Monitoring using EMS

You can monitor the SBA upgrade and recovery process using Emergency Management Services (EMS). EMS is a technology that supports remote management and system recovery for servers that are not accessible through an in-band connection. An in-band connection is a connection between two computers that relies on a standard network such as a LAN or the Internet, and on standard remote administration tools such as Remote Desktop or Telnet. You can use this type of connection to remotely manage computers only if both the local and remote computers are in a functional state and accessible on the network.

EMS redirects text output to the out-of-band connection. An out-of-band connection is a non-standard connection between two computers such as a serial port connection, and is useful when a remote server cannot access the network or is not fully functional. EMS provides a command-line environment for managing a server through the out-of-band port. The capability of redirecting text output is also known as console redirection.



Notes:

- The OSN3 does not provide a direct monitor connection (HDMI port), and therefore, the serial port is used for online monitoring (using EMS).
- For the Mediant 1000B OSN3B/OSN4 serial interface port (micro-USB) to be operational, you must download a special USB driver from the Internet. Download this driver at <http://www.silabs.com/products/mcu/pages/usbtouartbridgevcdrivers.aspx>

➤ To monitor SBA upgrade and recovery using EMS:

1. Open (using a text editor such as Notepad) the RecoveryUtil.ini file and then set the RecoveryStartType parameter to 1, as shown below:

```
[Execution] RecoveryStartType= 1
```

2. Save and close the RecoveryUtil.ini file.

Do one of the following:


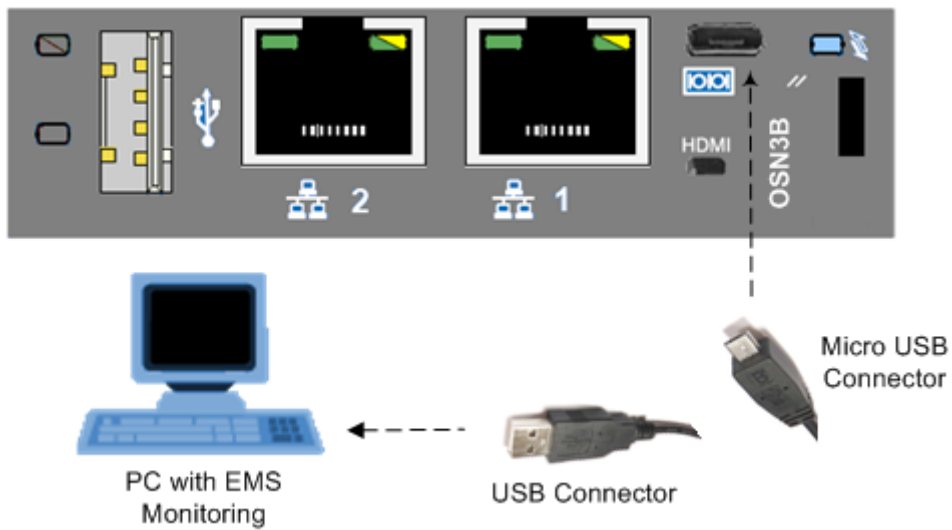
- **OSN3B and OSN4:** Using the supplied micro USB to USB cable adapter, connect the micro USB connector end to the Mediant 1000B OSN serial port (), and then connect the other end of the cable (USB) to the serial interface port on your PC.

Figure 30-14: Cabling OSN3B or OSN4 to PC for Serial Communication




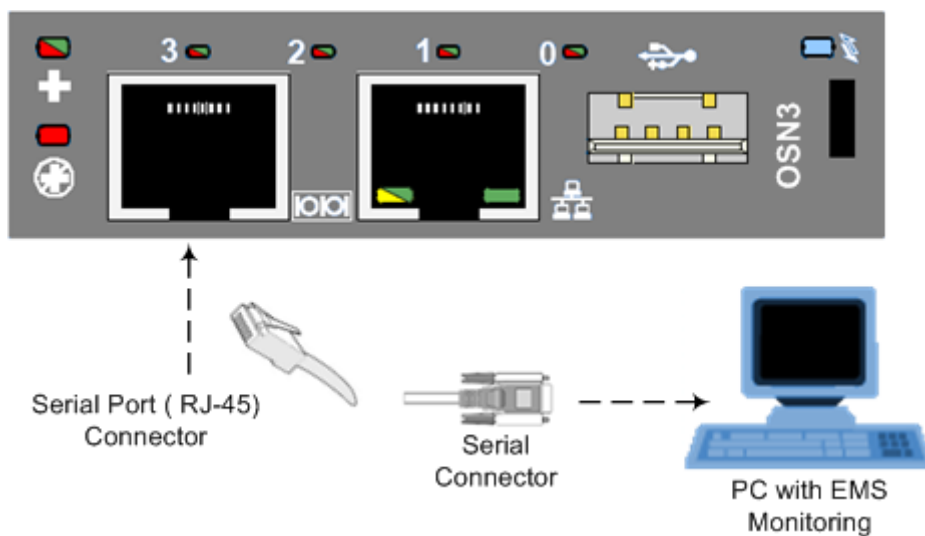
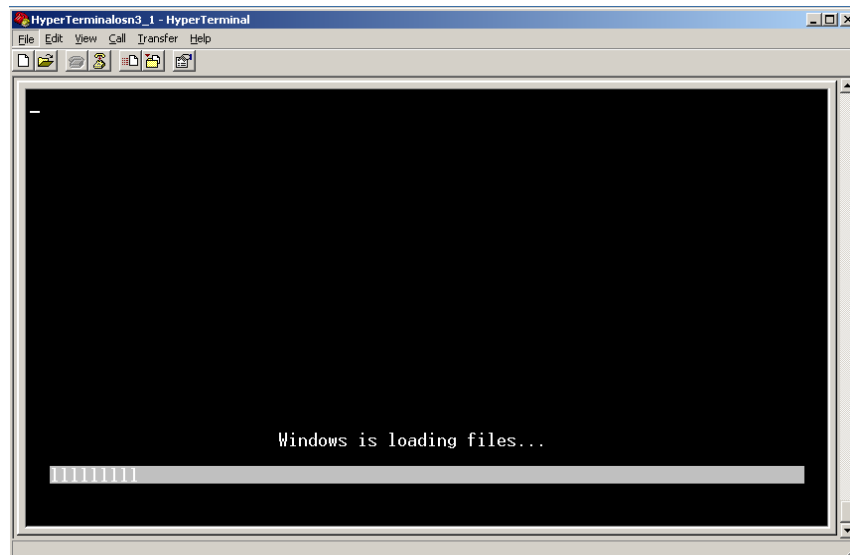
- **OSN3:** Connect an RJ-45 cable connector (not supplied) to the RJ-45 serial port of the Mediant 1000B OSN3 (), and then connect the other end of the cable to the serial port of your PC.

Figure 30-15: Cabling OSN3 to PC for Serial Communication



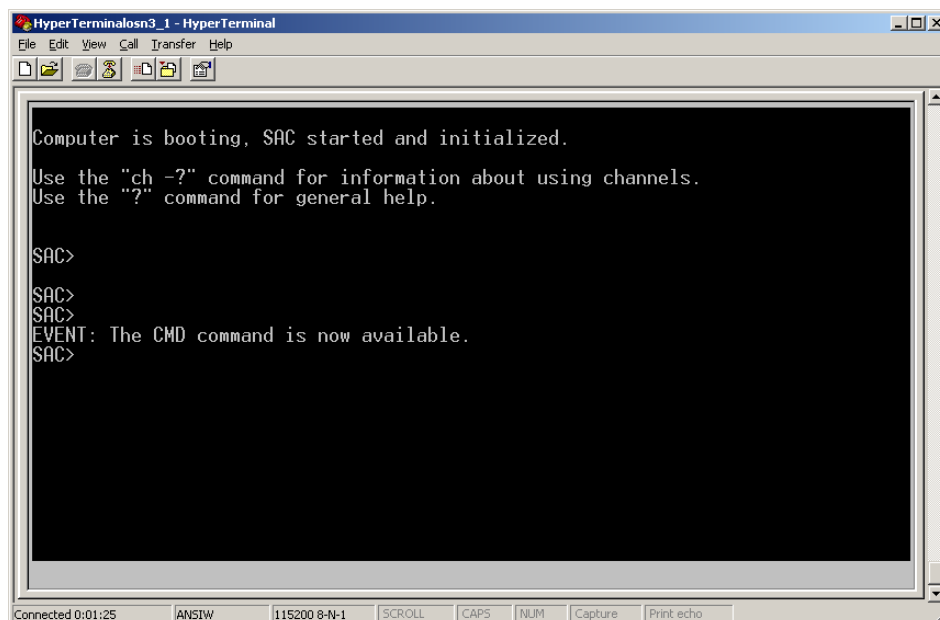
3. Establish a serial communication session with the following port settings:
 - Bits per second: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None

4. Plug the USB dongle into the USB port on the OSN module (see Figure 30-1 and Figure 30-2).
5. Power off and then power on Mediant 1000B to reboot the OSN server; during reboot, from the USB in the terminal window, the following message is displayed: "Windows is loading files...", as shown in the figure below.

Figure 30-16: Windows Loading Files

In a few moments, the special administration console (SAC) prompt appears and the following message is displayed: "Computer is booting. SAC is started and initialized."

6. Wait for the next message: "The CMD command is now available.", as shown in the figure below.

Figure 30-17: SAC Started

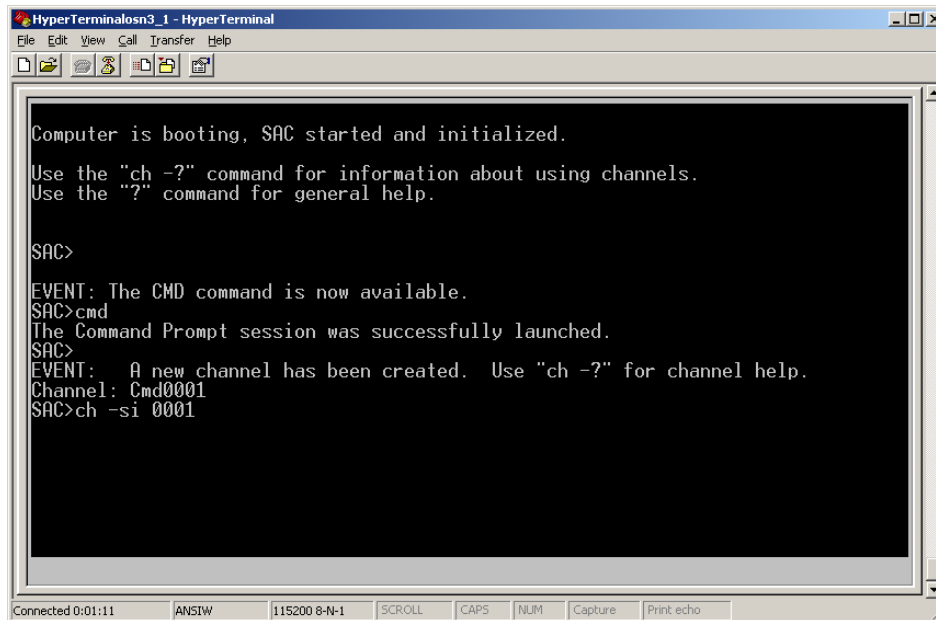
7. Start the command-line console, by typing the following:
SAC> cmd

8. When the message, "A new channel has been created" is displayed, type the following command:

```
SAC> ch -si 0001
```

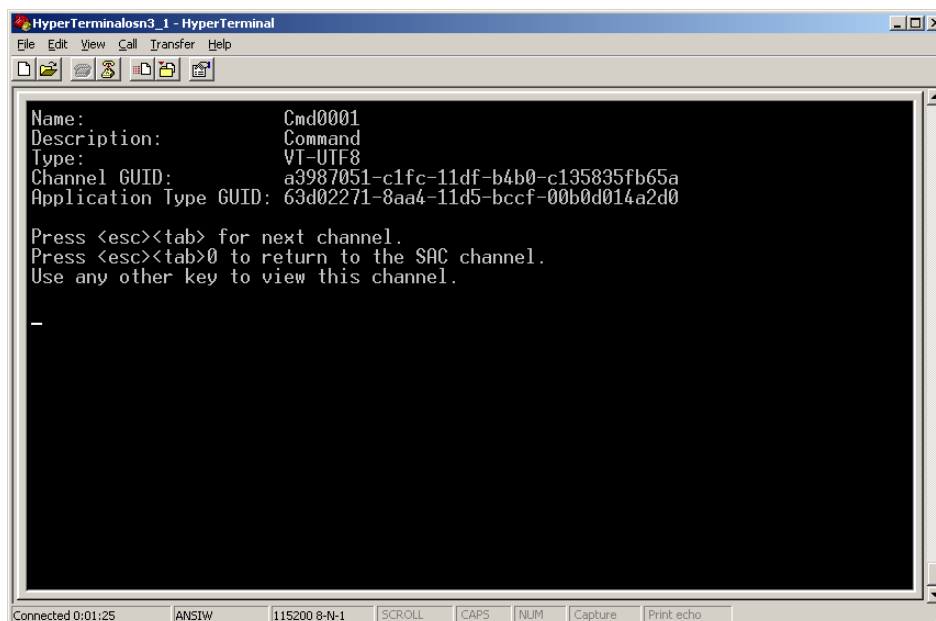
where 0001 is the number of the created channel.

Figure 30-18: SAC Initialized



The command console starts. When the command console is ready, the following is displayed:

Figure 30-19: HyperTerminal

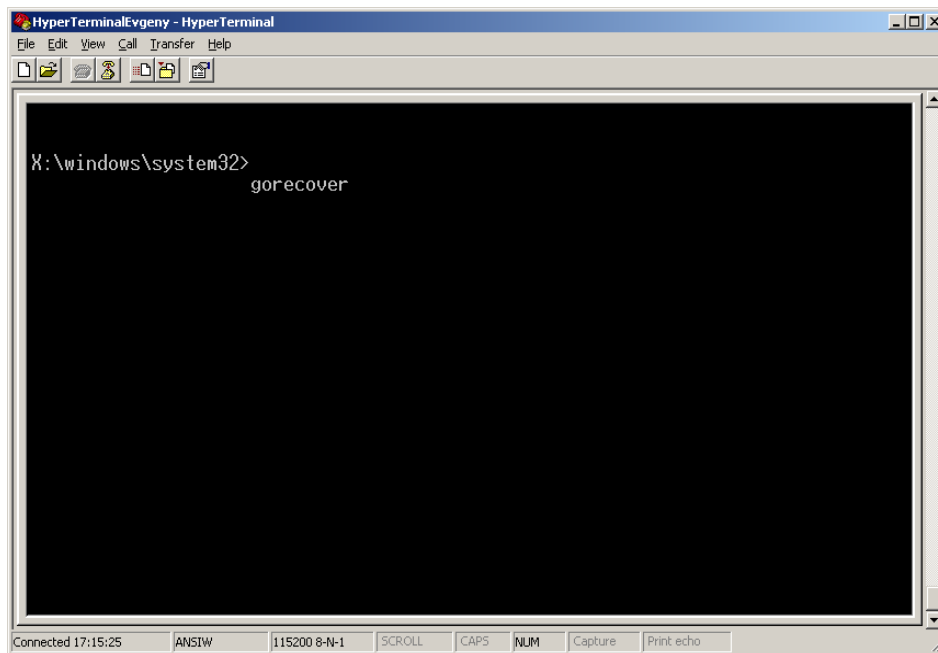


9. Press the <Enter> key to continue.

10. When the X:\windows\system32 prompt appears, type the following command:

```
X:\windows\system32>gorecover
```

Figure 30-20: GoreCover



The SBA Recovery and Upgrade process starts and logged messages are displayed in the console. When the procedure completes successfully, the following logged messages are displayed:

Figure 30-21: Logged Messages

```

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Version: 6.1.7600.16385

[ 100% ] Applying progress
Successfully applied image.
Total elapsed time: 5 min 55 sec

INFO: ***** Set boot to be from image *****
bcdboot.exe C:\Windows /s C:/\Boot files successfully created.
The operation completed successfully.
The operation completed successfully.
The operation completed successfully.
INFO: Copying recovery image to second partition.
copy E:\imageM1K.wim D:\imageM1K.wim
      1 file(s) copied.

X:\windows\system32>
    
```

11. Remove the USB dongle from the USB port on the OSN module.
12. Power off and then power on the Mediant 1000B to reboot the OSN server; the initialization process starts.



Notes:

- This step may take a while (about 10 minutes). While the Mediant 1000B is rebooting, DO NOT power off the Mediant 1000B.
- During initialization, the OSN server restarts twice.

13. Determine the NIC that is assigned to the required Ethernet port and the corresponding IP address, and then use this IP address to connect to the SBA (see Section 30.1.1).

Part VIII

Appendices



A SBA Security Default Template

This appendix describes the AudioCodes provided default SBA security template (configured in Section 11.15.2 on page 123). The Microsoft SCW security configuration database utility was used to prepare this template. This utility contains information on the following:

- Server roles. See Section A.1 on page 235.
- Client features. See Section A.2 on page 237.
- Administration and other options. See Section A.3 on page 238.
- Services. See Section A.4 on page 239.
- Firewall rules. See Section A.5 on page 258.

A.1 Server Roles

Each server role can be in one the following possible status:

- Installed and enabled
- Installed and disabled
- Not installed and disabled

The following list details the server roles which must be installed and enabled on the SBA.

The SCW uses the server role information to enable services and open ports in the local firewall.

Table A-1: Server Roles

Server Role	Description
Application Server – Application Server Foundation	Application Server Foundation provides technologies for deploying and managing .NET Framework 3.0 applications. These technologies include Windows Presentation Foundation (WPF), Windows Communication Foundation (WCF), and Windows Workflow Foundation (WF). Application Server Foundation provides the means for delivering managed-code applications with seamless user experiences, secure communication, and the ability to model a range of business processes.
Application Server – Message Queuing Activation	Message Queuing Activation supports process activation via Message Queuing. Applications that use Message Queuing Activation can start and stop dynamically in response to work items that arrive over the network via Message Queuing.
Application Server – Named Pipes Activation	Named Pipes Activation supports process activation via named pipes. Applications that use Named Pipes Activation can start and stop dynamically in response to work items that arrive over the network via named pipes.
Application Server – TCP Activation	TCP Activation supports process activation via TCP. Applications that use TCP Activation can start and stop dynamically in response to work items that arrive over the network via TCP.
ASP.NET State Service	The ASP.NET state service stores session state out of process from ASP.NET applications. It ensures that session state is preserved if an ASP.NET application is restarted and also makes session state available to multiple ASP.NET applications running in a Web farm.
Distributed Transactions	The middle-tier application server can coordinate or participate in distributed transactions.
File Server	A file server shares and stores files for users or applications.

Server Role	Description
Internet Printing	Internet Printing creates a Web site where users can manage print jobs on the server. It also enables users who have Internet Printing Client installed to use a Web browser to connect and print to shared printers on this server by using the Internet Printing Protocol (IPP).
Message Queuing Server	Message Queuing Server provides guaranteed message delivery, efficient routing, security, and priority-based messaging. It can be used to implement solutions for both asynchronous and synchronous messaging scenarios.
Microsoft iSCSI Initiator Service	Manages Internet SCSI (iSCSI) sessions from this computer to remote iSCSI target devices. If this service is stopped, this computer will not be able to login or access iSCSI targets. If this service is disabled, any services that explicitly depend on it will fail to start.
Middle Tier Application Server (COM +/DTC)	A Middle-tier application server provides the core technologies required to configure, deploy, and manage distributed, transactional, or multi-tiered applications.
Print Server	A print server provides and manages access to network printers and printer drivers so that network clients can submit print jobs to network printers.
Remote COM+	COM+ provides an enterprise development environment, based on the Microsoft Component Object Model (COM), for creating component-based, distributed applications. It also provides you with the tools to create transactional, multitier applications.
Remote SCW Configuration and Analysis	The server can be remotely configured, analyzed, or rolled back using the Security Configuration Wizard (SCW) user interface or command line tool.
Shadow Copies of Shared Folders	Shadow Copies of Shared Folders provides point-in-time copies of files that are located on shared resources, such as a file server, so that users can quickly retrieve previous versions of files.
SMTP Trap Server	An SNMP trap server receives Simple Network Management Protocol (SNMP) traps from SNMP servers.
Volume Shadow Copy	Manages and implements the backup infrastructure including shadow copies. If this service is disabled shadow copy creation and backup jobs will fail and any services that explicitly depend on it will fail to start.
Web Server	Web Server provides support for HTML Web sites and optional support for ASP.NET, ASP, and Web Server extensions. You can use the Web Server to host an internal or external Web site or to provide an environment for developers to create Web-based applications.
Window Event Collector Service	This service manages persistent subscriptions to events from remote sources that support WS-Management protocol. This includes Windows Vista event logs, hardware and IPMI-enabled event sources. The service stores forwarded events in a local Event Log. If this service is stopped or disabled event subscriptions cannot be created and forwarded events cannot be accepted.
Windows Process Activation Service	The Windows Process Activation Service (WAS) provides process activation, resource management and health management services for message-activated applications.
Windows Remote management (WS-Mangement)	The Windows Remote Management Service provides firewall-friendly remote administration using Web Services.

A.2 Client Features

Servers also act as clients to other servers. Each client feature can be in one the following possible status:

- Installed and enabled
- Installed and disabled
- Not installed and disabled

The following list details only the client features that must be installed and enabled on the SBA.

Table A-2: Client Features

Client Feature	Description
Background Intelligent Transfer Service (BITS)	Transfers files in the background using idle network bandwidth.
DNS Client	DNS clients, also known as resolvers, use the DNS (Domain Name System) protocol to send queries to DNS Servers to lookup the DNS name of a computer and retrieve information associated with the computer, such as its IP address or other services it provides. This process is called name resolution.
Domain Member	A domain member is a computer that is joined to an Active Directory domain.
Microsoft Networking Client	Creates and maintains client network connections to remote servers using the SMB protocol.
Time Synchronization	The server regularly contacts a Network Time Protocol (NTP) server in order to accurately maintain its clock.
WINS Client	A Windows Internet Name Service (WINS) client locates objects on a network using the NetBIOS Name Service (NBNS) protocol.

A.3 Administration and Other Options

Each entry can be in one the following possible statuses:

- Installed and enabled
- Installed and disabled
- Not installed and disabled

The following list details only the administration and other options that must be installed and enabled.

Table A-3: Administration and Other Options

Administration & Other Options	Description
.NET Framework 3.0	Microsoft .NET Framework 3.0 combines the power of the .NET Framework 2.0 APIs with new technologies for building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of business processes.
Local Application Installation	Programs can be added, removed, or repaired on the server using the Windows Installer Service.
Message Queuing Multicasting Support	Message Queuing Multicasting Support enables the queuing and sending of multicast messages to a multicast IP address.
Microsoft Fibre Channel Platform Registration Service	Registers the platform with all available Fibre Channel fabrics, and maintains the registrations.
Remote Desktop Services printer redirection	Remote Desktop Services users can redirect print jobs to their local printers.
Smart Card	Manages access to smart cards read by this computer.

A.4 Services

The SBA device doesn't require all of the default services. The services that are not required were disabled. Only the required services are enabled (either automatic or manual).

The following list details the services that are enabled during startup – manually or automatically.

Table A-4: Services

Service	Description	Startup Default
Active Directory Certificate Services	Issues, manages, and removes X.509 certificates for applications such as S/MIME and SSL. If the service is stopped, certificates will not be issued. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Active Directory Domain Services	AD DS Domain Controller service. If this service is stopped, users will be unable to log on to the network. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
AD FS Web Agent Authentication Service	The AD FS Web Agent Authentication Service validates incoming tokens and cookies.	Automatic
AdRmsLoggingService	Sends logging messages to the logging database when logging is enabled for the Active Directory Rights Management Services role. If this service is disabled or stopped when logging is enabled, logging messages will be stored in local message queues and sent to the logging database when the service is started.	Automatic
Application Experience	Processes application compatibility cache requests for applications as they are launched	Automatic
Application Host Helper Service	Provides administrative services for IIS, for example configuration history and Application Pool account mapping. If this service is stopped, configuration history and locking down files or directories with Application Pool specific Access Control Entries will not work.	Automatic
Application Identity	Determines and verifies the identity of an application. Disabling this service will prevent AppLocker from being enforced.	Manual
Application Information	Facilitates the running of interactive applications with additional administrative privileges. If this service is stopped, users will be unable to launch applications with the additional administrative privileges they may require to perform desired user tasks.	Manual
Application Layer Gateway Service	Provides support for 3rd party protocol plug-ins for Internet Connection Sharing	Manual

Service	Description	Startup Default
Application Management	Processes installation, removal, and enumeration requests for software deployed through the Group Policy. If this service is stopped, users will be unable to install, remove, or enumerate software deployed through the Group Policy. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
ASP.NET State Service	Provides support for out-of-process session states for ASP.NET. If this service is stopped, out-of-process requests will not be processed. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
AudioEndpointBuilder	Manages audio devices for the Windows Audio service. If this service is stopped, audio devices and effects will not function properly. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Audiosrv	Manages audio for Windows-based programs. If this service is stopped, audio devices and effects will not function properly. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Background Intelligent Transfer Service	Transfers files in the background using idle network bandwidth. If the service is disabled, then any applications that depend on BITS, such as Windows Update or MSN Explorer, will be unable to automatically download programs and other information.	Automatic
Base Filtering Engine	The Base Filtering Engine (BFE) is a service that manages firewall and Internet Protocol security (IPsec) policies and implements user mode filtering. Stopping or disabling the BFE service will significantly reduce the security of the system. It will also result in unpredictable behavior in IPsec management and firewall applications.	Automatic
Block Level Backup Engine Service	Engine to perform block level backup and recovery of data.	Manual
BOAService	–	Automatic
Certificate Propagation	Copies user certificates and root certificates from smart cards into the current user's certificate store, detects when a smart card is inserted into a smart card reader, and, if required, installs the smart card Plug and Play minidriver.	Automatic
Client for NFS	Enables this computer to access files on NFS shares.	Automatic
clr_optimization_v2.0.50727_I64	clr_optimization_v2.0.50727_I64	Manual

Service	Description	Startup Default
Cluster Service	Enables servers to work together as a cluster to keep server-based applications highly available, regardless of individual component failures. If this service is stopped, clustering will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
CNG Key Isolation	The CNG key isolation service is hosted in the LSA process. The service provides key process isolation to private keys and associated cryptographic operations as required by the Common Criteria. The service stores and uses long-lived keys in a secure process complying with Common Criteria requirements.	Manual
COM+ Event System	Supports System Event Notification Service (SENS), which provides automatic distribution of events to subscribing Component Object Model (COM) components. If the service is stopped, SENS will close and will not be able to provide logon and logoff notifications. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
COM+ System Application	Manages the configuration and tracking of Component Object Model (COM)+-based components. If the service is stopped, most COM+-based components will not function properly. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Computer Browser	Maintains an updated list of computers on the network and supplies this list to computers designated as browsers. If this service is stopped, this list will not be updated or maintained. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Credential Manager	Provides secure storage and retrieval of credentials to users, applications and security service packages.	Manual
Cryptographic Services	Provides four management services: Catalog Database Service, which confirms the signatures of Windows files and allows new programs to be installed; Protected Root Service, which adds and removes Trusted Root Certification Authority certificates from this computer; Automatic Root Certificate Update Service, which retrieves root certificates from Windows Update and enable scenarios such as SSL; and Key Service, which helps enroll this computer for certificates. If this service is stopped, these management services will not function properly. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic

Service	Description	Startup Default
DCOM Server Process Launcher	The DCOMLAUNCH service launches COM and DCOM servers in response to object activation requests. If this service is stopped or disabled, programs using COM or DCOM will not function properly. It is strongly recommended that you have the DCOMLAUNCH service up and running.	Automatic
Desktop Window Manager Session Manager	Provides Desktop Window Manager startup and maintenance services	Automatic
DFS Namespace	Integrates disparate file shares into a single, logical namespace and manages these logical volumes.	Automatic
DFS Replication	Replicates files among multiple PCs keeping them in sync. On the client, it is used to roam folders between PCs and on the server, it is used to provide high availability and local access across a wide area network (WAN). If the service is stopped, file replication does not occur, and the files on the server become out-of-date. If the service is disabled, any services that explicitly depend on it will not start.	Automatic
DHCP Client	Registers and updates IP addresses and DNS records for this computer. If this service is stopped, this computer will not receive dynamic IP addresses and DNS updates. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
DHCP Server	Performs TCP/IP configuration for DHCP clients, including dynamic assignments of IP addresses, specification of the WINS and DNS servers, and connection-specific DNS names. If this service is stopped, the DHCP server will not perform TCP/IP configuration for clients. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Diagnostic Policy Service	The Diagnostic Policy Service enables problem detection, troubleshooting and resolution for Windows components. If this service is stopped, diagnostics will no longer function.	Automatic
Diagnostic Service Host	The Diagnostic Service Host is used by the Diagnostic Policy Service to host diagnostics that need to run in a Local Service context. If this service is stopped, any diagnostics that depend on it will no longer function.	Manual
Diagnostic System Host	The Diagnostic System Host is used by the Diagnostic Policy Service to host diagnostics that need to run in a Local System context. If this service is stopped, any diagnostics that depend on it will no longer function.	Manual
Disk Defragmenter	Provides Disk Defragmentation Capabilities.	Manual
Distributed Link Tracking Client	Maintains links between NTFS files within a computer or across computers in a network.	Automatic

Service	Description	Startup Default
Distributed Transaction Coordinator	Coordinates transactions that span multiple resource managers, such as databases, message queues, and file systems. If this service is stopped, these transactions will fail. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
DNS Client	The DNS Client service (dnscache) caches Domain Name System (DNS) names and registers the full computer name for this computer. If the service is stopped, DNS names will continue to be resolved. However, the results of DNS name queries will not be cached and the computer's name will not be registered. If the service is disabled, any services that explicitly depend on it will fail to start.	Automatic
DNS Server	The DNS server service stores and resolves DNS names of clients in order to enable computers to locate other computers and services. If the service is stopped or disabled, DNS updates and queries from clients sent to the local computer will not be processed. Any services that explicitly depend on the DNS server on the local computer will start to see failures.	Automatic
Encrypting File System (EFS)	Provides the core file encryption technology used to store encrypted files on NTFS file system volumes. If this service is stopped or disabled, applications will be unable to access encrypted files.	Manual
Extensible Authentication Protocol	The Extensible Authentication Protocol (EAP) service provides network authentication in such scenarios as 802.1x wired and wireless, VPN, and Network Access Protection (NAP). EAP also provides application programming interfaces (APIs) that are used by network access clients, including wireless and VPN clients, during the authentication process. If you disable this service, this computer is prevented from accessing networks that require EAP authentication.	Manual
Fax	Enables you to send and receive faxes, using fax resources available on this computer or on the network.	Automatic
File Server Resource Manager	Provides services for quota and file screen management.	Automatic
File Server Storage Reports Manager	Provides services for configuration, scheduling, and generation of storage reports.	Manual
FTP Publishing Service	Enables this server to be a File Transfer Protocol (FTP) server. If this service is stopped, the server cannot function as an FTP server. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual

Service	Description	Startup Default
Function Discovery Provider Host	The FDPHOST service hosts the Function Discovery (FD) network discovery providers. These FD providers supply network discovery services for the Simple Services Discovery Protocol (SSDP) and Web Services – Discovery (WS-D) protocol. Stopping or disabling the FDPHOST service will disable network discovery for these protocols when using FD. When this service is unavailable, network services using FD and relying on these discovery protocols will be unable to find network devices or resources.	Manual
Function Discovery Resource Publication	Publishes this computer and resources attached to this computer so they can be discovered over the network. If this service is stopped, network resources will no longer be published and they will not be discovered by other computers on the network.	Manual
Group Policy Client	This service is responsible for applying settings configured by administrators for the computer and users through the Group Policy component. If this service is stopped or disabled, the settings will not be applied and applications and components will not be manageable through Group Policy. Any components or applications that depend on the Group Policy component might not be functional if the service is stopped or disabled.	Automatic
Health Key and Certificate Management	Provides X.509 certificate and key management services for the Network Access Protection Agent (NAPAgent). Enforcement technologies that use X.509 certificates may not function properly without this service.	Manual
Hyper-V Image Management Service	Provides Image Management servicing for Hyper-V.	Automatic
Hyper-V Networking Management Service	Provides Hyper-V Networking WMI management.	Automatic
Hyper-V Virtual Machine Management	Management service for Hyper-V, provides service to run multiple virtual machines.	Automatic
IAS JET Database Access	IASJet	Manual
IIS Admin Service	Enables this server to administer metabase FTP services. If this service is stopped, the server will be unable to run metabase or FTP sites. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic

Service	Description	Startup Default
IKE and AuthIP IPsec Keying Modules	The IKEEXT service hosts the Internet Key Exchange (IKE) and Authenticated Internet Protocol (AuthIP) keying modules. These keying modules are used for authentication and key exchange in Internet Protocol security (IPsec). Stopping or disabling the IKEEXT service will disable IKE and AuthIP key exchange with peer computers. IPsec is typically configured to use IKE or AuthIP; therefore, stopping or disabling the IKEEXT service might result in an IPsec failure and might compromise the security of the system. It is strongly recommended that you have the IKEEXT service running.	Automatic
Indexing Service	Indexes contents and properties of files on local and remote computers provide rapid access to files through flexible querying language.	Automatic
Intel(R) Capability Licensing Service Interface	Version: 1.23.605.1	Automatic
Intel(R) Dynamic Application Loader Host Interface Service	Intel(R) Dynamic Application Loader Host Interface Service - allows applications to access the local Intel (R) DAL.	Automatic
Intel(R) Management and Security Application Local Management Service	Allows applications to access the local Intel(R) Management and Security Application using its locally-available selected network interfaces.	Automatic
Intel(R) Management and Security Application User Notification Service	Intel(R) Management and Security Application User Notification Service - Updates the Windows Event Log with notifications of pre defined events received from the local Intel(R) Management and Security Application Device.	Automatic
Intel(R) PROSet Monitoring Service	The Intel(R) PROSet Monitoring Service actively monitors changes to the system and updates affected network devices to keep them running in optimal condition. Stopping this service may negatively affect the performance of the network devices on the system.	Automatic
Interactive Services Detection	Enables user notification of user input for interactive services, which enables access to dialogs created by interactive services when they appear. If this service is stopped, notifications of new interactive service dialogs will no longer function and there may no longer be access to interactive service dialogs. If this service is disabled, both notifications of and access to new interactive service dialogs will no longer function.	Manual
Intersite Messaging	Enables messages to be exchanged between computers running Windows Server sites. If this service is stopped, messages will not be exchanged, nor will site routing information be calculated for other services. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic

Service	Description	Startup Default
IP Helper	Provides tunnel connectivity using IPv6 transition technologies (6to4, ISATAP, Port Proxy, and Teredo), and IP-HTTPS. If this service is stopped, the computer will not have the enhanced connectivity benefits that these technologies offer.	Automatic
IPsec Policy Agent	Internet Protocol security (IPsec) supports network-level peer authentication, data origin authentication, data integrity, data confidentiality (encryption), and replay protection. This service enforces IPsec policies created through the IP Security Policies snap-in or the command-line tool "netsh ipsec". If you stop this service, you may experience network connectivity issues if your policy requires that connections use IPsec. Also, remote management of Windows Firewall is not available when this service is stopped.	Automatic
Kerberos Key Distribution Center	On domain controllers this service enables users to log on to the network using the Kerberos authentication protocol. If this service is stopped on a domain controller, users will be unable to log on to the network. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
KtmRm for Distributed Transaction Coordinator	Coordinates transactions between the Distributed Transaction Coordinator (MSDTC) and the Kernel Transaction Manager (KTM). If it is not needed, it is recommended that this service remains stopped. If it is needed, both MSDTC and KTM will start this service automatically. If this service is disabled, any MSDTC transaction interacting with a Kernel Resource Manager will fail and any services that explicitly depend on it will fail to start.	Automatic
Link-Layer Topology Discovery Mapper	Creates a Network Map, consisting of PC and device topology (connectivity) information, and metadata describing each PC and device. If this service is disabled, the Network Map will not function properly.	Manual
Lync Server Front-End	Lync Server Front-End	Automatic
Lync Server Mediation	Lync Server Mediation	Automatic
Lync Server Replica Replicator Agent	Lync Server Replica Replicator Agent	Automatic
Message Queuing	Provides a messaging infrastructure and development tool for creating distributed messaging applications for Windows-based networks and programs. If this service is stopped, distributed messages will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Message Queuing Downlevel Client Support	Allows MSMQ 2.0 clients to access MSMQ Active Directory features	Automatic

Service	Description	Startup Default
Message Queuing Triggers	Provides rule-based monitoring of messages arriving in a Message Queuing queue and, when the conditions of a rule are satisfied, invokes a COM component or a stand-alone executable program to process the message.	Automatic
Microsoft .NET Framework NGEN v2.0.50727_X64	Microsoft .NET Framework NGEN	Manual
Microsoft .NET Framework NGEN v2.0.50727_X86	Microsoft .NET Framework NGEN	Manual
Microsoft Fibre Channel Platform Registration Service	Registers the platform with all available Fibre Channel fabrics, and maintains the registrations.	Automatic
Microsoft iSCSI Initiator Service	Manages Internet SCSI (iSCSI) sessions from this computer to remote iSCSI target devices. If this service is stopped, this computer will not be able to login or access iSCSI targets. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Microsoft iSNS Server	Maintains a database of iSNS client registrations and notifies clients when changes are made to the database.	Automatic
Microsoft Software Shadow Copy Provider	Manages software-based volume shadow copies taken by the Volume Shadow Copy service. If this service is stopped, software-based volume shadow copies cannot be managed. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Net.Msmq Listener Adapter	Receives activation requests over the net.msmq and msmq.formatname protocols and passes them to the Windows Process Activation Service.	Automatic
Net.Pipe Listener Adapter	Receives activation requests over the net.pipe protocol and passes them to the Windows Process Activation Service.	Automatic
Net.Tcp Listener Adapter	Receives activation requests over the net.tcp protocol and passes them to the Windows Process Activation Service.	Automatic
Network Access Protection Agent	The Network Access Protection (NAP) agent service collects and manages health information for client computers on a network. Information collected by NAP agent is used to make sure that the client computer has the required software and settings. If a client computer is not compliant with health policy, it can be provided with restricted network access until its configuration is updated. Depending on the configuration of health policy, client computers might be automatically updated so that users quickly regain full network access without having to manually update their computer.	Manual

Service	Description	Startup Default
Network Connections	Manages objects in the Network and Dial-Up Connections folder, in which you can view both local area network and remote connections.	Manual
Network List Service	Identifies the networks to which the computer has connected, collects and stores properties for these networks, and notifies applications when these properties change.	Automatic
Network Location Awareness	Collects and stores configuration information for the network and notifies programs when this information is modified. If this service is stopped, configuration information might be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Network Policy Server	Manages authentication, authorization, auditing and accounting for virtual private network (VPN), dial-up, 802.1x wireless or Ethernet switch connection attempts sent by access servers that are compatible with the IETF RADIUS protocol. If this service is stopped, users might be unable to obtain a VPN, dial-up, wireless, or Ethernet connection to the network. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Network Store Interface Service	This service delivers network notifications (e.g. interface addition/deleting etc) to user mode clients. Stopping this service will cause loss of network connectivity. If this service is disabled, any other services that explicitly depend on this service will fail to start.	Automatic
Online Responder Service	Enables the Online Certificate Status Protocol (OCSP) services for a PKI based applications such as secure e-mail, smartcard logon, secure web servers. If this service is stopped or disabled then the revocation services may not be available thereby causing authentication or application failures.	Automatic
Peer Name Resolution Protocol	Enables Serverless Peer Name Resolution over the Internet. If disabled, some Peer to Peer and Collaborative applications, such as Windows Meetings, may not function.	Manual
Peer Networking Identity Manager	Provides Identity service for Peer Networking.	Manual
Performance Counter DLL Host	Enables remote users and 64-bit processes to query performance counters provided by 32-bit DLLs. If this service is stopped, only local users and 32-bit processes will be able to query performance counters provided by 32-bit DLLs.	Manual

Service	Description	Startup Default
Performance Logs & Alerts	Performance logs and alerts collect performance data from local or remote computers based on pre-configured schedule parameters, then writes the data to a log or triggers an alert. If this service is stopped, performance information will not be collected. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Plug and Play	Enables a computer to recognize and adapt to hardware changes with little or no user input. Stopping or disabling this service will result in system instability.	Automatic
PNRP Machine Name Publication Service	This service publishes a machine name using the Peer Name Resolution Protocol. Configuration is managed via the netsh context 'p2p pnrp peer'.	Manual
Portable Device Enumerator Service	Enforces group policy for removable mass-storage devices. Enables applications such as Windows Media Player and Image Import Wizard to transfer and synchronize content using removable mass-storage devices.	Manual
Power	Manages power policy and power policy notification delivery.	Automatic
Print Spooler	Loads files to memory for later printing.	Automatic
Problem Reports and Solutions Control Panel Support	This service provides support for viewing, sending and deletion of system-level problem reports for the Problem Reports and Solutions control panel.	Manual
Protected Storage	Provides protected storage for sensitive data, such as passwords, to prevent access by unauthorized services, processes, or users.	Manual
Quality Windows Audio Video Experience	Quality Windows Audio Video Experience (qWave) is a networking platform for Audio Video (AV) streaming applications on IP home networks. qWave enhances AV streaming performance and reliability by ensuring network quality-of-service (QoS) for AV applications. It provides mechanisms for admission control, run time monitoring and enforcement, application feedback, and traffic prioritization.	Manual
Remote Access Auto Connection Manager	Creates a connection to a remote network whenever a program references a remote DNS or NetBIOS name or address.	Manual
Remote Access Connection Manager	Manages dial-up and virtual private network (VPN) connections from this computer to the Internet or other remote networks. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Remote Access Quarantine Agent	Removes validated remote access client from the quarantine network.	Manual

Service	Description	Startup Default
Remote Desktop Configuration	Remote Desktop Configuration service (RDCS) is responsible for all Remote Desktop Services and Remote Desktop related configuration and session maintenance activities that require SYSTEM context. These include per-session temporary folders, RD themes, and RD certificates.	Automatic
Remote Desktop Gateway	Provides secure remote connectivity to remote computers on your corporate network, from anywhere on the Internet. If this service is stopped, connections to remote computers cannot be made through this Remote Desktop Gateway server.	Automatic
Remote Desktop Licensing	Provides registered licenses for Remote Desktop Services clients. If this service is stopped, the server will be unavailable to issue Remote Desktop Services client access licenses to clients when they are requested.	Automatic
Remote Desktop Services	Allows users to connect interactively to a remote computer. Remote Desktop and Remote Desktop Session Host Server depend on this service. To prevent remote use of this computer, clear the checkboxes on the Remote tab of the System properties control panel item.	Automatic
Remote Desktop Services UserMode Port Redirector	Allows the redirection of Printers/Drives/Ports for RDP connections.	Manual
Remote Desktop Services Connection Broker	Enables a user connection request to be routed to the appropriate Remote Desktop Session Host in a cluster. If this service is stopped, connection requests will be routed to the first available server.	Automatic
Remote Packet Capture Protocol v.0 (experimental)	Allows to capture traffic on this machine from a remote machine.	Manual
Remote Packet Capture Protocol v.0 (experimental)	Allows to capture traffic on this machine from a remote machine.	Manual
Remote Procedure Call (RPC)	The RPCSS service is the Service Control Manager for COM and DCOM servers. It performs object activations requests, object exporter resolutions and distributed garbage collection for COM and DCOM servers. If this service is stopped or disabled, programs using COM or DCOM will not function properly. It is strongly recommended that you have the RPCSS service running.	Automatic
Remote Procedure Call (RPC) Locator	In Windows 2003 and earlier versions of Windows, the Remote Procedure Call (RPC) Locator service manages the RPC name service database. In Windows Vista and later versions of Windows, this service does not provide any functionality and is present for application compatibility.	Manual

Service	Description	Startup Default
Remote Registry	Enables remote users to modify registry settings on this computer. If this service is stopped, the registry can be modified only by users on this computer. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Removable Storage	Manages and catalogs removable media and operates automated removable media devices. If this service is stopped, programs that are dependent on Removable Storage, such as Backup and Remote Storage, will operate more slowly. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Resultant Set of Policy Provider	Provides a network service that processes requests to simulate application of Group Policy settings for a target user or computer in various situations and computes the Resultant Set of Policy settings.	Manual
Secondary Logon	Enables starting processes under alternate credentials. If this service is stopped, this type of logon access will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Secure Socket Tunneling Protocol Service	Provides support for the Secure Socket Tunneling Protocol (SSTP) to connect to remote computers using VPN. If this service is disabled, users will not be able to use SSTP to access remote servers.	Manual
Security Accounts Manager	The startup of this service signals other services that the Security Accounts Manager (SAM) is ready to accept requests. Disabling this service will prevent other services in the system from being notified when the SAM is ready, which may in turn cause those services to fail to start correctly. This service should not be disabled.	Automatic
Server	Supports file, print, and named-pipe sharing over the network for this computer. If this service is stopped, these functions will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Server for NFS	Enables a Windows based computer to act as an NFS Server.	Automatic
Shell Hardware Detection	Provides notifications for AutoPlay hardware events.	Automatic
Simple Mail Transfer Protocol (SMTP)	Transports electronic mail across the network.	Manual
Simple TCP/IP Services	Supports the following TCP/IP services: Character Generator, Daytime, Discard, Echo, and Quote of the Day.	Automatic

Service	Description	Startup Default
Smart Card	Manages access to smart cards read by this computer. If this service is stopped, this computer will be unable to read smart cards. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
SNMP Service	Enables Simple Network Management Protocol (SNMP) requests to be processed by this computer. If this service is stopped, the computer will be unable to process SNMP requests.	Automatic
SNMP Trap	Receives trap messages generated by local or remote Simple Network Management Protocol (SNMP) agents and forwards the messages to SNMP management programs running on this computer. If this service is stopped, SNMP-based programs on this computer will not receive SNMP trap messages. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Software Protection	Enables the download, installation and enforcement of digital licenses for Windows and Windows applications. If the service is disabled, the operating system and licensed applications may run in a notification mode. It is strongly recommended that you not disable the Software Protection service.	Automatic
Special Administration Console Helper	Allows administrators to remotely access a command prompt using Emergency Management Services.	Manual
SPP Notification Service	Provides Software Licensing activation and notification	Manual
SQL Active Directory Helper Service	Enables integration with Active Directories	Automatic
SQL Server (RTCLOCAL)	Provides storage, processing and controlled access of data, and rapid transaction processing.	Automatic
SQL Server Agent (RTCLOCAL)	Executes jobs, monitors SQL Server, fires alerts, and allows automation of some administrative tasks.	Automatic
SQL Server Browser	Provides SQL Server connection information to client computers.	Automatic
SQL Server VSS Writer	Provides the interface to backup/restore Windows internal database through the Windows VSS infrastructure.	Automatic
SSDP Discovery	Discovers networked devices and services that use the SSDP discovery protocol, such as UPnP devices. Also announces SSDP devices and services running on the local computer. If this service is stopped, SSDP-based devices will not be discovered. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
System Event Notification Service	Monitors system events and notifies subscribers to COM+ Event System of these events.	Automatic

Service	Description	Startup Default
Task Scheduler	Enables a user to configure and schedule automated tasks on this computer. The service also hosts multiple Windows system-critical tasks. If this service is stopped or disabled, these tasks will not be run at their scheduled times. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
TCP/IP NetBIOS Helper	Provides support for the NetBIOS over TCP/IP (NetBT) service and NetBIOS name resolution for clients on the network, therefore enabling users to share files, print, and log on to the network. If this service is stopped, these functions might be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
TCP/IP Print Server	Enables TCP/IP-based printing using the Line Printer Daemon protocol. If this service is stopped, TCP/IP-based printing will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Telephony	Provides Telephony API (TAPI) support for programs that control telephony devices on the local computer and, through the LAN, on servers that are also running the service.	Manual
TPM Base Services	Enables access to the Trusted Platform Module (TPM), which provides hardware-based cryptographic services to system components and applications. If this service is stopped or disabled, applications will be unable to use keys protected by the TPM.	Manual
UPnP Device Host	Allows UPnP devices to be hosted on this computer. If this service is stopped, any hosted UPnP devices will stop functioning and no additional hosted devices can be added. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
User Profile Service	This service is responsible for loading and unloading user profiles. If this service is stopped or disabled, users will no longer be able to successfully logon or logoff, applications may have problems accessing users' data, and components registered to receive profile event notifications will not receive them.	Automatic
Virtual Disk	Provides management services for disks, volumes, file systems, and storage arrays.	Manual
Volume Shadow Copy	Manages and implements Volume Shadow Copies used for backup and other purposes. If this service is stopped, shadow copies will be unavailable for backup and the backup may fail. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual

Service	Description	Startup Default
Web Client	Enables Windows-based programs to create, access, and modify Internet-based files. If this service is stopped, these functions will not be available. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Web Management Service	The Web Management Service enables remote and delegated management capabilities for administrators to manage for the Web server, sites and applications present on this machine.	Automatic
Windows CardSpace	Securely enables the creation, management, and disclosure of digital identities.	Manual
Windows Color System	The WcsPlugInService service hosts third-party Windows Color System color device model and gamut map model plug-in modules. These plug-in modules are vendor-specific extensions to the Windows Color System baseline color device and gamut map models. Stopping or disabling the WcsPlugInService service will disable this extensibility feature, and the Windows Color System will use its baseline model processing rather than the vendor's desired processing. This might result in inaccurate color rendering.	Automatic
Windows Driver Foundation - User-mode Driver Framework	Manages user-mode driver host processes.	Manual
Windows Error Reporting Service	Allows errors to be reported when programs stop working or responding and allows existing solutions to be delivered. Also allows logs to be generated for diagnostic and repair services. If this service is stopped, error reporting might not work correctly and results of diagnostic services and repairs might not be displayed.	Automatic
Windows Event Collector	This service manages persistent subscriptions to events from remote sources that support WS-Management protocol. This includes Windows Vista event logs, hardware and IPMI-enabled event sources. The service stores forwarded events in a local Event Log. If this service is stopped or disabled event subscriptions cannot be created and forwarded events cannot be accepted.	Manual
Windows Event Log	This service manages events and event logs. It supports logging events, querying events, subscribing to events, archiving event logs, and managing event metadata. It can display events in both XML and plain text format. Stopping this service may compromise security and reliability of the system.	Automatic
Windows Firewall	Windows Firewall helps protect your computer by preventing unauthorized users from gaining access to your computer through the Internet or a network.	Automatic

Service	Description	Startup Default
Windows Font Cache Service	Optimizes performance of applications by caching commonly used font data. Applications will start this service if it is not already running. It can be disabled, though doing so will degrade application performance.	Automatic
Windows Installer	Adds, modifies, and removes applications provided as a Windows Installer (*.msi) package. If this service is disabled, any services that explicitly depend on it will fail to start.	Manual
Windows Internal Database	Windows Internal Database uses SQL Server 2005 Embedded Edition (Windows) as a relational data store for Windows roles and features only, such as Windows Sharepoint Services, Active Directory Rights Management Services, UDDI Services, Windows Server Update Services, and Windows System Resources Manager.	Automatic
Windows Management Instrumentation	Provides a common interface and object model to access management information about operating system, devices, applications and services. If this service is stopped, most Windows-based software will not function properly. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Windows Modules Installer	Enables installation, modification, and removal of Windows updates and optional components. If this service is disabled, install or uninstall of Windows updates might fail for this computer.	Manual
Windows Presentation Foundation Font Cache 3.0.0.0	Optimizes performance of Windows Presentation Foundation (WPF) applications by caching commonly used font data. WPF applications will start this service if it is not already running. It can be disabled, though doing so will degrade the performance of WPF applications.	Manual
Windows Process Activation Service	The Windows Process Activation Service (WAS) provides process activation, resource management and health management services for message-activated applications.	Automatic

Service	Description	Startup Default
Windows Remote Management (WS-Management)	Windows Remote Management (WinRM) service implements the WS-Management protocol for remote management. WS-Management is a standard web services protocol used for remote software and hardware management. The WinRM service listens on the network for WS-Management requests and processes them. The WinRM Service needs to be configured with a listener using winrm.cmd command line tool or through Group Policy in order for it to listen over the network. The WinRM service provides access to WMI data and enables event collection. Event collection and subscription to events require that the service is running. WinRM messages use HTTP and HTTPS as transports. The WinRM service does not depend on IIS but is preconfigured to share a port with IIS on the same machine. The WinRM service reserves the /wsman URL prefix. To prevent conflicts with IIS, administrators should ensure that any websites hosted on IIS do not use the /wsman URL prefix.	Automatic
Windows Search	Provides content indexing and property caching for file, email and other content (via extensibility APIs). The service responds to file and email notifications to index modified content. If the service is stopped or disabled, the Explorer will not be able to display virtual folder views of items, and search in the Explorer will fall back to item-by-item slow search.	Automatic
Windows SharePoint Services Timer	Sends notifications and performs scheduled tasks for Windows SharePoint Services	Automatic
Windows SharePoint Services Tracing	Manages trace output	Automatic
Windows SharePoint Services VSS Writer	Windows SharePoint Services VSS Writer	Manual
Windows System Resource Manager	Assigns computer resources to multiple applications running on Windows Vista Server. If this service is stopped or disabled, no management will occur, no accounting data will be collected, and the administrator will not be able to administer Windows System Resource Manager.	Automatic
Windows Time	Maintains date and time synchronization on all clients and servers in the network. If this service is stopped, date and time synchronization will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
Windows Update	Enables the detection, download, and installation of updates for Windows and other programs. If this service is disabled, users of this computer will not be able to use Windows Update or its automatic updating feature, and programs will not be able to use the Windows Update Agent (WUA) API. For more information, see Windows Update Policy	Disable

Service	Description	Startup Default
WinHTTP Web Proxy Auto-Discovery Service	WinHTTP implements the client HTTP stack and provides developers with a Win32 API and COM Automation component for sending HTTP requests and receiving responses. In addition, WinHTTP provides support for auto-discovering a proxy configuration via its implementation of the Web Proxy Auto-Discovery (WPAD) protocol.	Manual
WINS	Manages the Windows Internet Name Service (WINS), which translates NetBIOS computer names to IP addresses.	Automatic
Wired AutoConfig	The Wired AutoConfig (DOT3SVC) service is responsible for performing IEEE 802.1X authentication on Ethernet interfaces. If your current wired network deployment enforces 802.1X authentication, the DOT3SVC service should be configured to run for establishing Layer 2 connectivity and/or providing access to network resources. Wired networks that do not enforce 802.1X authentication are unaffected by the DOT3SVC service.	Manual
WMI Performance Adapter	Provides performance library information from Windows Management Instrumentation (WMI) providers to clients on the network. This service only runs when Performance Data Helper is activated.	Manual
Workstation	Creates and maintains client network connections to remote servers using the SMB protocol. If this service is stopped, these connections will be unavailable. If this service is disabled, any services that explicitly depend on it will fail to start.	Automatic
World Wide Web Publishing Service	Provides Web connectivity and administration through the Internet Information Services Manager.	Automatic

A.5 Windows Update Policy

Note the following in reference to Windows Update Policy:

- AudioCodes is obligated to test and approve all SBA Cumulative Updates (CU) within 1 month of Microsoft releasing them.
- AudioCodes ships all SBAs with the Windows Update service disabled as default (*Never check for updates (not recommended)*).
- AudioCodes does not test (as a rule) every Windows Update released by Microsoft.
- In case customers wish to enable the Windows Update service- *Install Updates automatically (recommended)* (according to their corporate update policy), they can verify the updates, based upon Microsoft's recommendations.

A.6 Firewall Rules

Many Firewall rules are required for normal SBA operation. The listing is extensive and therefore not all of the relevant Firewall rules are listed in the document. Retrieving the list of the Firewall rules (recommended configuration) – open the scw_sba_W14 XML file with the SCW tool and open the Firewall.

Table A-5: Firewall Rules

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Allow inbound connections for service: RTCMEDSRV for protocol: TCP	–	TCP	Inbound	RTCMEDSRV	–	–
Allow inbound connections for service: SQLBrowser for protocol: UDP	–	UDP	Inbound	SQLBrowser	–	–
Allow inbound connections for service: MSSQL\$RTCLocal for protocol: TCP	–	TCP	Inbound	MSSQL\$RTCLocal	–	–
Allow inbound connections for service: RtcSrv for protocol: TCP	–	TCP	Inbound	RtcSrv	–	–
Core Networking - Dynamic Host Configuration Protocol (DHCP-In)	Allows DHCP (Dynamic Host Configuration Protocol) messages for stateful auto-configuration.	UDP	Inbound	dhcp	68	67
Core Networking - Dynamic Host Configuration Protocol (DHCP-Out)	Allows DHCP (Dynamic Host Configuration Protocol) messages for stateful auto-configuration	UDP	Outbound	dhcp	68	67

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - DNS (UDP-Out)	Outbound rule to allow DNS requests. DNS responses based on requests that matched this rule will be permitted regardless of source address. This behavior is classified as loose source mapping. [LSM] [UDP 53]	UDP	Outbound	dnscache	–	53
Core Networking - Group Policy (LSASS-Out) Description: . Group: Core Networking Protocol Keyword: TCP Direction: Outbound Program: %systemroot%\system32\lsass.exe Enabled: True Action: AllowConnections Profiles: Domain	Outbound rule to allow remote LSASS traffic for Group Policy updates [TCP]	TCP	Outbound	lsass.exe	–	–
Core Networking - Group Policy (NP-Out)	Core Networking - Group Policy (NP-Out)	TCP	Outbound	–	–	445
Core Networking - Group Policy (TCP-Out)	Outbound rule to allow remote RPC traffic for Group Policy	TCP	Outbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Destination Unreachable Fragmentation Needed (ICMPv4-In)	Destination Unreachable Fragmentation Needed error messages are sent from any node that a packet traverses which is unable to forward the packet because fragmentation was needed and the don't fragment bit was set.	ICMP_V4	Inbound	–	–	–
Core Networking - Destination Unreachable (ICMPv6-In)	Destination Unreachable error messages are sent from any node that a packet traverses which is unable to forward the packet for any reason except congestion.	ICMP_V6	Inbound	–	–	–
Core Networking - Multicast Listener Done (ICMPv6-In)	Multicast Listener Done messages inform local routers that there are no longer any members remaining for a specific multicast address on the subnet.	ICMP_V6	Inbound	–	–	–
Core Networking - Multicast Listener Done (ICMPv6-Out)	Multicast Listener Done messages inform local routers that there are no longer any members remaining for a specific multicast address on the subnet	ICMP_V6	Outbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Multicast Listener Query (ICMPv6-In)	An IPv6 multicast-capable router uses the Multicast Listener Query message to query a link for multicast group membership	ICMP_V6	Inbound	–	–	–
Core Networking - Multicast Listener Query (ICMPv6-Out)	An IPv6 multicast-capable router uses the Multicast Listener Query message to query a link for multicast group membership	ICMP_V6	Outbound	–	–	–
Core Networking - Multicast Listener Report (ICMPv6-Out)	The Multicast Listener Report message is used by a listening node to either immediately report its interest in receiving multicast traffic at a specific multicast address or in response to a Multicast Listener Query	ICMP_V6	Outbound	–	–	–
Core Networking - Multicast Listener Report v2 (ICMPv6-In)	Multicast Listener Report v2 message is used by a listening node to either immediately report its interest in receiving multicast traffic at a specific multicast address or in response to a Multicast Listener Query	ICMP_V6	Inbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Multicast Listener Report v2 (ICMPv6-Out)	Multicast Listener Report v2 message is used by a listening node to either immediately report its interest in receiving multicast traffic at a specific multicast address or in response to a Multicast Listener Query	ICMP_V6	Outbound	–	–	–
Core Networking - Neighbor Discovery Advertisement (ICMPv6-In)	Neighbor Discovery Advertisement messages are sent by nodes to notify other nodes of link-layer address changes or in response to a Neighbor Discovery Solicitation request	ICMP_V6	Inbound	–	–	–
Core Networking - Neighbor Discovery Advertisement (ICMPv6-Out)	Neighbor Discovery Advertisement messages are sent by nodes to notify other nodes of link-layer address changes or in response to a Neighbor Discovery Solicitation request	ICMP_V6	Outbound	–	–	–
Core Networking - Neighbor Discovery Solicitation (ICMPv6-In)	Neighbor Discovery Solicitations are sent by nodes to discover the link-layer address of another on-link IPv6 node	ICMP_V6	Inbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Neighbor Discovery Solicitation (ICMPv6-Out)	Neighbor Discovery Solicitations are sent by nodes to discover the link-layer address of another on-link IPv6 node	ICMP_V6	Outbound	–	–	–
Core Networking - Parameter Problem (ICMPv6-In)	Parameter Problem error messages are sent by nodes as a result of incorrectly generated packets.	ICMP_V6	Inbound	–	–	–
Core Networking - Parameter Problem (ICMPv6-Out)	Parameter Problem error messages are sent by nodes as a result of incorrectly generated packets	ICMP_V6	Outbound	–	–	–
Core Networking - Packet Too Big (ICMPv6-In) Description: . Group: Core Networking Protocol Keyword: ICMP_V6 Direction: Inbound	Packet Too Big error messages are sent from any node that a packet traverses which is unable to forward the packet because the packet is too large for the next link	ICMP_V6	Inbound	–	–	–
Core Networking - Packet Too Big (ICMPv6-Out)	Packet Too Big error messages are sent from any node that a packet traverses which is unable to forward the packet because the packet is too large for the next link	ICMP_V6	Outbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Router Advertisement (ICMPv6-In)	Router Advertisement messages are sent by routers to other nodes for stateless auto-configuration	ICMP_V6	Inbound	–	–	–
Core Networking - Router Advertisement (ICMPv6-Out)	Router Advertisement messages are sent by routers to other nodes for stateless auto-configuration.	ICMP_V6	Outbound	–	–	–
Core Networking - Router Solicitation (ICMPv6-Out)	Router Solicitation messages are sent by nodes seeking routers to provide stateless auto-configuration	ICMP_V6	Outbound	–	–	–
Core Networking - Time Exceeded (ICMPv6-In)	Time Exceeded error messages are generated from any node that a packet traverses if the Hop Limit value is decremented to zero at any point on the path.	ICMP_V6	Inbound	–	–	–
Core Networking - Time Exceeded (ICMPv6-Out)	Time Exceeded error messages are generated from any node that a packet traverses if the Hop Limit value is decremented to zero at any point on the path.	ICMP_V6	Outbound	–	–	–
Core Networking - Internet Group Management Protocol (IGMP-In)	IGMP messages are sent and received by nodes to create, join and depart multicast groups.	IGMP	Inbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Internet Group Management Protocol (IGMP-Out)	IGMP messages are sent and received by nodes to create, join and depart multicast groups	IGMP	Outbound	–	–	–
Core Networking - IPHTTPS (TCP-In)	Inbound TCP rule to allow IPHTTPS tunneling technology to provide connectivity across HTTP proxies and firewalls.	TCP	Inbound	–	–	–
Core Networking - IPHTTPS (TCP-Out)	Outbound TCP rule to allow IPHTTPS tunneling technology to provide connectivity across HTTP proxies and firewalls	TCP	Outbound	–	–	–
Core Networking - IPv6 (IPv6-In)	Inbound rule required to permit IPv6 traffic for ISATAP (Intra-Site Automatic Tunnel Addressing Protocol) and 6to4 tunneling services.	IPV6	Inbound	–	–	–
Core Networking - IPv6 (IPv6-Out)	Outbound rule required to permit IPv6 traffic for ISATAP (Intra-Site Automatic Tunnel Addressing Protocol) and 6to4 tunneling services	IPV6	Outbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/ Service	Local Ports	Remote Ports
Core Networking - Teredo (UDP-In)	Inbound UDP rule to allow Teredo edge traversal, a technology that provides address assignment and automatic tunneling for unicast IPv6 traffic when an IPv6/IPv4 host is located behind an IPv4 network address translator.	UDP	Inbound	–	–	–
Core Networking - Teredo (UDP-Out)	Outbound UDP rule to allow Teredo edge traversal, a technology that provides address assignment and automatic tunneling for unicast IPv6 traffic when an IPv6/IPv4 host is located behind an IPv4 network address translator	UDP	Outbound	–	–	–
File and Printer Sharing (Echo Request - ICMPv4-In)	Echo Request messages are sent as ping requests to other nodes	ICMP_V4	Inbound	–	–	–
File and Printer Sharing (Echo Request - ICMPv4-Out)	Echo Request messages are sent as ping requests to other nodes. Group: File and Printer Sharing	ICMP_V4	Outbound	–	–	–
File and Printer Sharing (Echo Request - ICMPv6-In)	Echo Request messages are sent as ping requests to other nodes	ICMP_V6	Inbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/Service	Local Ports	Remote Ports
File and Printer Sharing (Echo Request - ICMPv6-Out)	Echo Request messages are sent as ping requests to other nodes	ICMP_V6	Outbound	_	_	_
File and Printer Sharing (NB-Datagram-In)	Inbound rule for File and Printer Sharing to allow NetBIOS Datagram transmission and reception. [UDP 138]	UDP	Inbound	_	138	_
File and Printer Sharing (NB-Datagram-Out)	Outbound rule for File and Printer Sharing to allow NetBIOS Datagram transmission and reception. [UDP 138]	UDP	Outbound	_	_	138
File and Printer Sharing (NB-Name-In)	Inbound rule for File and Printer Sharing to allow NetBIOS Name Resolution. [UDP 137]	UDP	Inbound	_	137	_
File and Printer Sharing (NB-Session-In)	Inbound rule for File and Printer Sharing to allow NetBIOS Session Service connections. [TCP 139]	TCP	Inbound	_	139	_
File and Printer Sharing (NB-Session-Out)	Outbound rule for File and Printer Sharing to allow NetBIOS Session Service connections. [TCP 139]	TCP	Outbound	_	_	139
File and Printer Sharing (Spooler Service - RPC-EPMAP)	Inbound rule for the RPCSS service to allow RPC/TCP traffic for the Spooler Service.	TCP	Inbund	rpcss	RPCEndPointMapper	_

Firewall Rule	Description	Protocol Keyword	Direction	Program/Service	Local Ports	Remote Ports
File and Printer Sharing (SMB-In)	Inbound rule for File and Printer Sharing to allow Server Message Block transmission and reception via Named Pipes. [TCP 445]	TCP	Inbound	–	445	–
File and Printer Sharing (SMB-Out)	Outbound rule for File and Printer Sharing to allow Server Message Block transmission and reception via Named Pipes. [TCP 445]	TCP	Outbound	–	–	445
World Wide Web Services (HTTP Traffic-In)	An inbound rule to allow HTTP traffic for Internet Information Services (IIS) [TCP 80]	TCP	Inbound	–	80	–
World Wide Web Services (HTTPS Traffic-In)	An inbound rule to allow HTTPS traffic for Internet Information Services (IIS) [TCP 443]	TCP	Inbound	–	443	–
Message Queuing	Message Queuing	TCP	Inbound	mqsvc.exe	–	–
Message Queuing Description: Group: Message Queuing Protocol Keyword: UDP Direction: Inbound	Message Queuing	UDP	Inbound	mqsvc.exe	–	–
Message Queuing	Message Queuing	TCP	Outbound	Mqsvc.exe	–	–
Message Queuing	Message Queuing	UDP	Outbound	Mqsvc.exe	–	–
Message Queuing	Message Queuing	PGM	Inbound	–	–	–
Message Queuing	Message Queuing	PGM	Outbound	–	–	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/Service	Local Ports	Remote Ports
Netlogon Service (NP-In)	Inbound rule for the NetLogon service to be remotely managed over Named Pipes	TCP	Inbound	–	445	–
Remote Administration (RPC)	Inbound rule for all services to be remotely managed via RPC/TCP	TCP	Inbound	–	DynamicRPC	–
Remote Administration (NP-In)	Inbound rule for all services to be remotely managed over Named Pipes	TCP	Inbound	–	445	–
Remote Administration (RPC-EPMAP) Description: .	Inbound rule for the RPCSS service to allow RPC/TCP traffic for all the local services	TCP	Inbound	rpcss	RPCEndpointMapper	–
Remote Desktop (TCP-In)	Inbound rule for the Remote Desktop service to allow RDP traffic. [TCP 3389]	TCP	Inbound	–	3389	–
Remote Event Log Management (RPC)	Inbound rule for the local Event Log service to be remotely managed via RPC/TCP.	TCP	Inbound	–	DynamicRPC	–
Remote Event Log Management (NP-In)	Inbound rule for the local Event Log service to be remotely managed over Named Pipes	TCP	Inbound	–	445	–
Remote Event Log Management (RPC-EPMAP)	Inbound rule for the RPCSS service to allow RPC/TCP traffic for the local Event Log Service.	TCP	Inbound	Rpcss	RPCEndpointMapper	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/Service	Local Ports	Remote Ports
Windows Firewall Remote Management (RPC)	Inbound rule for the Windows Firewall to be remotely managed via RPC/TCP	TCP	Inbound	policyagent	DynamicRPC	–
Windows Firewall Remote Management (RPC-EPMAP)	Inbound rule for the RPCSS service to allow RPC/TCP traffic for the Windows Firewall	TCP	Inbound	rpcss	RPC EndpointMapper	–
SCW remote access firewall rule - Scshost - Dynamic RPC	Allow inbound access for scshost using dynamic RPC and protocol TCP	TCP	Inbound	scshost	DynamicRPC	–
SCW remote access firewall rule - Scshost - End Point RPC Mapper	Allow inbound access for scshost using end point RPC mapper and protocol TCP	TCP	Inbound	scshost	RPC EndpointMapper	–
SCW remote access firewall rule - Svchost - TCP	Allow inbound access for svchost using port 135 and protocol TCP	TCP	Inbound	svchost	135	–
SCW inbound access firewall rule - System - TCP	Allow inbound access for system using ports 139, 445 and protocol TCP	TCP	Inbound	–	139, 445	–
SCW remote access firewall rule - System - UDP	Allow inbound access for system using port 137 and protocol UDP	UDP	Inbound	–	137	–
SNMP Service (UDP In)	Inbound rule for the Simple Network Management Protocol (SNMP) Service to allow SNMP traffic. [UDP 161]	UDP	Inbound	snmp	161	–

Firewall Rule	Description	Protocol Keyword	Direction	Program/Service	Local Ports	Remote Ports
SNMP Service (UDP In)	Inbound rule for the Simple Network Management Protocol (SNMP) Service to allow SNMP traffic. [UDP 161]	UDP	Inbound	snmp	161	–
SNMP Trap Service (UDP In)	Inbound rule for the SNMP Trap Service to allow SNMP traps. [UDP 162]	UDP	Inbound	snmptrap	162	LocalSubnet
SNMP Trap Service (UDP In)	Inbound rule for the SNMP Trap Service to allow SNMP traps. [UDP 162]	UDP	Inbound	snmptrap	162	–
Windows Communication Foundation Net.TCP Listener Adapter (TCP-In)	An inbound rule for Windows Communication Foundation to allow TCP traffic to the Net.TCP Listener Adapter [TCP 808]	TCP	Inbound	nettcpactivator	808	–
Windows Communication Foundation Net.TCP Listener Adapter (TCP-In)	An inbound rule for Windows Communication Foundation to allow TCP traffic to the Net.TCP Listener Adapter [TCP 808]	TCP	Inbound	nettcpactivator	808	–
Windows Management Instrumentation (ASync-In)	Inbound rule to allow Asynchronous WMI traffic for remote Windows Management Instrumentation. [TCP]	TCP	Inbound	Unsecapp	–	–

B Running Anti-Virus Software

When Anti-Virus software is run on SBA components, ensure that the Antivirus file scanning exclusions are based on the following Microsoft recommendations:

- SBA 2010: <https://technet.microsoft.com/en-us/library/gg195736.aspx>
- SBA 2013: <https://technet.microsoft.com/en-us/library/dn440138%28v=ocs.15%29.aspx>

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C Upgrading Hardware

This appendix describes the following upgrade procedures:

- Upgrading an Enhanced PSTN gateway to an SBA (see Appendix C.2 on page 276).
- Upgrading from a Hard Drive to a Solid State Disk (SSD) (see Appendix C.3 on page 278).
- Upgrading the OSN Platform to M1KB SBA ES/EO (see Appendix C.4 on page 280).
- Replacing the OSN module for RMA purposes (see Appendix C.5 on page 283).



Note: The OSN modules are hot-swappable and can be inserted and extracted without disrupting other non-related OSN services running on the device. Therefore, you can insert and replace the OSN modules without powering down the device.

C.1 Verifying the SBA Kit Items

Before you commence the SBA hardware upgrade, ensure that your SBA kit for upgrading the Mediant 1000B hardware is shipped with the following items:

- OSN Module
- HDMX Module
- SBA Upgrade and Recovery USB dongle
- License Stickers and Agreements for Microsoft Windows 2008 Server R2 and Microsoft Lync Server Std 2010 64Bit EMB.
- Cable mini HDMI to HDMI 1.5m for monitor connections.
- Cable micro USB to USB 1.5m for serial connections.

If any items are missing or damaged, contact your AudioCodes sales representative.

C.2 Upgrading Enhanced Gateway to SBA

This section describes how to upgrade the hardware of the Mediant 1000B Basic Gateway R1/R2 and Mediant 1000B Enhanced Gateway to a Mediant 1000B Survivable Branch Appliance (SBA).

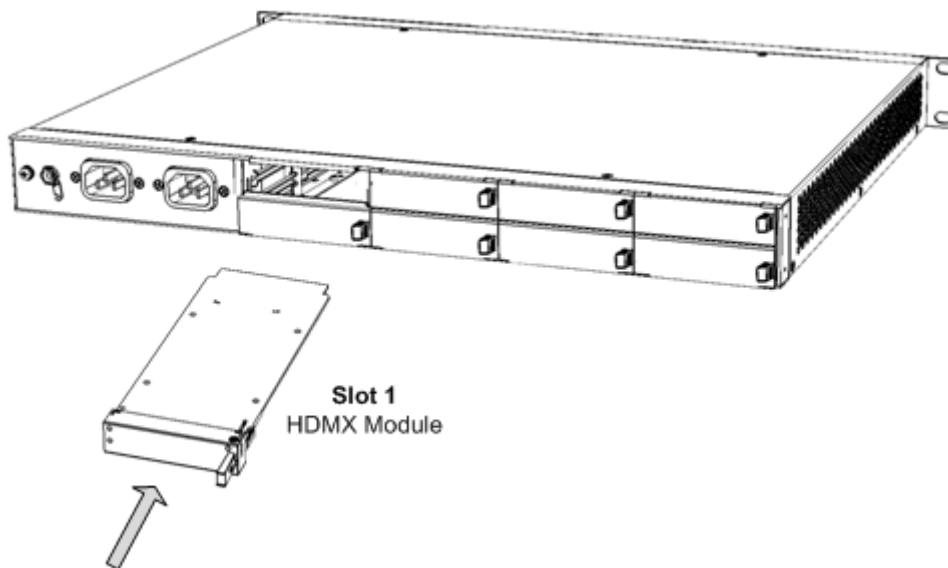


Note: You can upgrade to either the Mediant **1000B SBA-ES** SBA or to the Mediant **1000B SBA-EO** SBA. For more information, see Chapter 5 on page 27 or contact your AudioCodes sales representative.

➤ **To upgrade to an SBA gateway:**

1. Remove the new OSN server modules from their ESD shielding packets in which they were shipped.
2. Install the HDMX module:
 - a. Remove the blank-panel slot cover from Slot 1 by gently pulling on the handle of the module until it slides out of the slot.
 - b. Hold the HDMX module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector (located on the backplane).

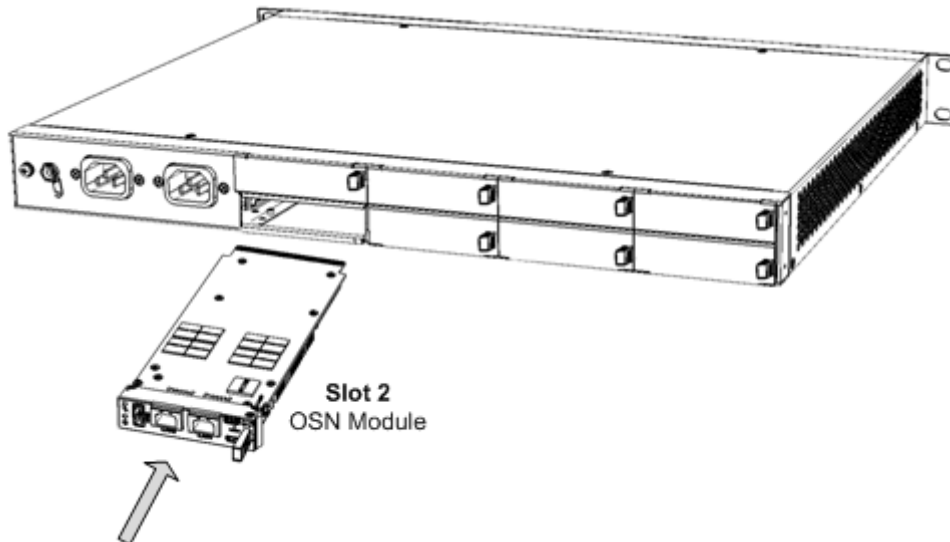
Figure C-1: Installing HDMX Module



- c. Push the module's handle until it clicks firmly into the slot.

3. Install the OSN module:
 - a. Remove the blank-panel slot cover from Slot 2, by gently pulling on the handle of the module until it slides out of the slot.
 - b. Hold the OSN module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure C-2: Installing OSN Module



- c. Push the module's handle until it clicks firmly into the slot.
4. Install the SBA application on the OSN platform using the supplied USB Upgrade and Recovery dongle (see Chapter 30 on page 217).
5. Prepare the SBA at the Data Center (see Chapter 8 on page 55 and Chapter 9 on page 57).
6. Connect to the SBA Management Interface (see Chapter 10 on page 71).
7. Complete the SBA installation and configuration (see Chapter 11 on page 79).

C.3 Upgrading the Hard Drive to an SSD

This section describes how to upgrade your OSN mechanical hard disk drive (HDD) to a Solid State Drive (SSD) drive. This involves replacing the HDMX module with an SSD module.



Notes:

- The procedure requires the SBA Upgrade and Recovery USB dongle.
- The procedure assumes that the upgraded OSN module uses the same FQDN as the replaced OSN module.

➤ To upgrade the hard drive to SSD:



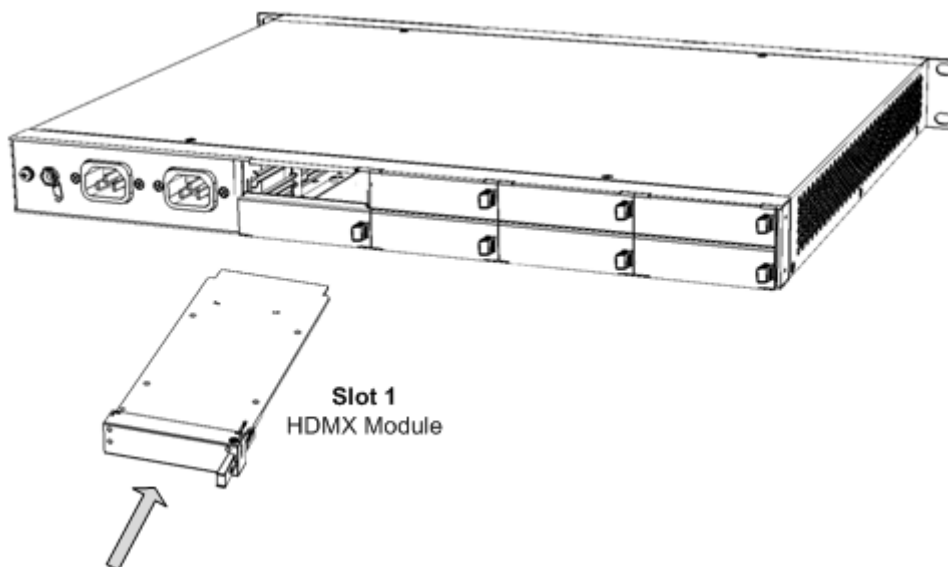
1. Shutdown the SBA server (see Section 0 on page 139).
2. Remove the HDMX module:
 - a. Gently pull the HDMX module's handle until you hear the first click sound; the handle is now partially pulled out and the module undergoes a shutdown sequence, indicated by the slow-flashing **Hot Swap Blue**  LED on the module.
 - b. When the  LED stops flashing and is constantly lit, indicating that the shutdown sequence is complete, grip and gently pull the HDMX module's handle to slide the module out of the slot.
3. Insert the new HDMX module:
 - a. Hold the new HDMX module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure C-3: Replacing HDMX Module



- b. Push the HDMX module's handle until it clicks firmly into the slot.

4. On the OSN module, gently pull the module's handle until you hear two click sounds (see figure below), indicating that the handle has been fully pulled out, and then push the handle all the way in again; the module undergoes a reset, indicated by the **Hot Swap Blue** LED switching off.

Figure C-4: OSN Module Reset

- 1 Module Handle Pulled Out Half-Way (First "Click")



- 2 Module Handle Pulled Out All-the-way (Second "Click")



- 3 Module Handle Pushed-in Half-way

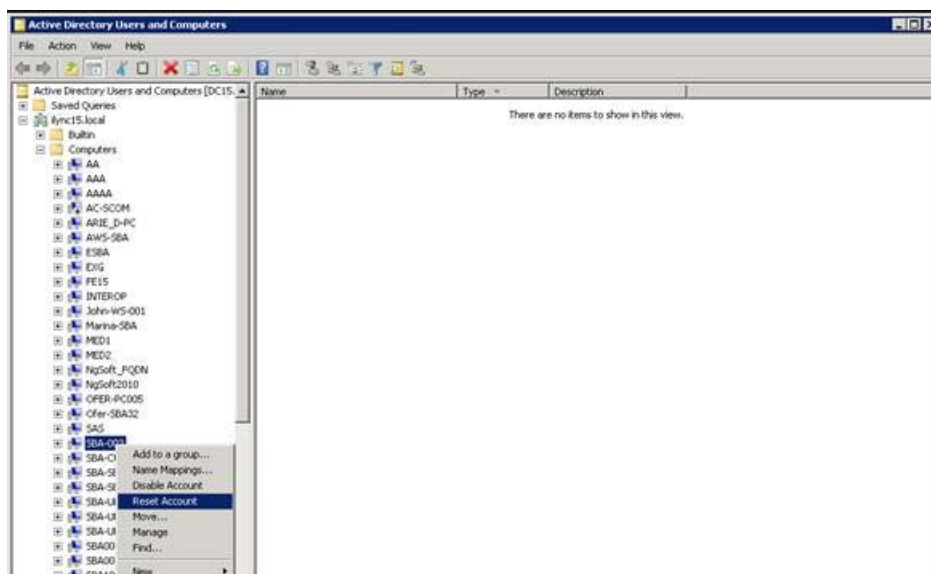


- 4 Module Handle Pushed-in All-the-way



5. Reset the SBA account on the Active Directory as shown in the screen example below:

Figure C-5: Reset SBA Account



6. Install the SBA application on the OSN platform using the supplied USB Upgrade and Recovery dongle (see Chapter 30 on page 217).
7. Connect to the SBA Management Interface (see Section 10 on page 71)
8. Complete the SBA installation and configuration (see Chapter 11 on page 79).

C.4 Upgrading the OSN Platform to M1KB SBA ES/EO

This section describes how to upgrade the OSN platform to M1KB SBA ES/EO. The M1KB SBA ES/EO includes the following:

- SDD disk storage
- Empowered OSN processor - OSN3B or OSN4 module

For more information, see Chapter 5.

The procedure below describes the following:





- How to replace the HDD disk storage with the SDD storage.
- How to replace the OSN3 module with the OSN3B or OSN4 modules.



Notes:

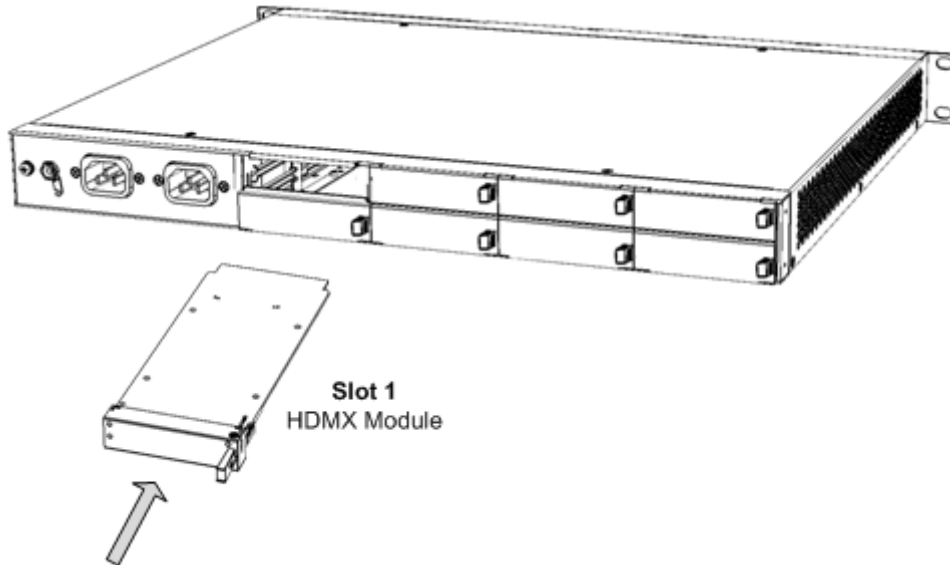
- To upgrade the OSN platform, order one of the following hardware upgrade kits: **M1KB-SBA-ES-OSN-KIT** or **M1KB-SBA-EO-OSN-KIT**. To order one of these kits, contact your AudioCodes sales representative.
- The procedure assumes that the upgraded OSN module uses the same FQDN as the replaced OSN module.

➤ To upgrade the OSN platform to M1KB SBA ES/EO:

1. Shutdown the SBA server (see Section 0 on page 139).
2. Remove the HDMX from Slot #1:
 - a. Gently pull the HDMX module's handle until you hear the first click sound; the handle is now partially pulled out and the module undergoes a shutdown sequence, indicated by the slow-flashing **Hot Swap Blue**  LED on the module.
 - b. When the  LED stops flashing and is constantly lit, indicating that the shutdown sequence is complete, grip and gently pull the HDMX module's handle to slide the module out of the slot.
3. Remove the OSN3 module from Slot #2:
 - a. Gently and slowly pull the OSN3 module's handle until you hear the first click sound; the handle is now partially pulled out and the module undergoes a shutdown sequence indicated by the slow-flashing **Hot Swap Blue**  LED on the module.
 - b. When the  LED stops flashing and is constantly lit, indicating that the shutdown sequence is complete, disconnect any cables that may be connected to the module.
 - c. Grip and gently pull the module's handle to slide the module out of the slot.

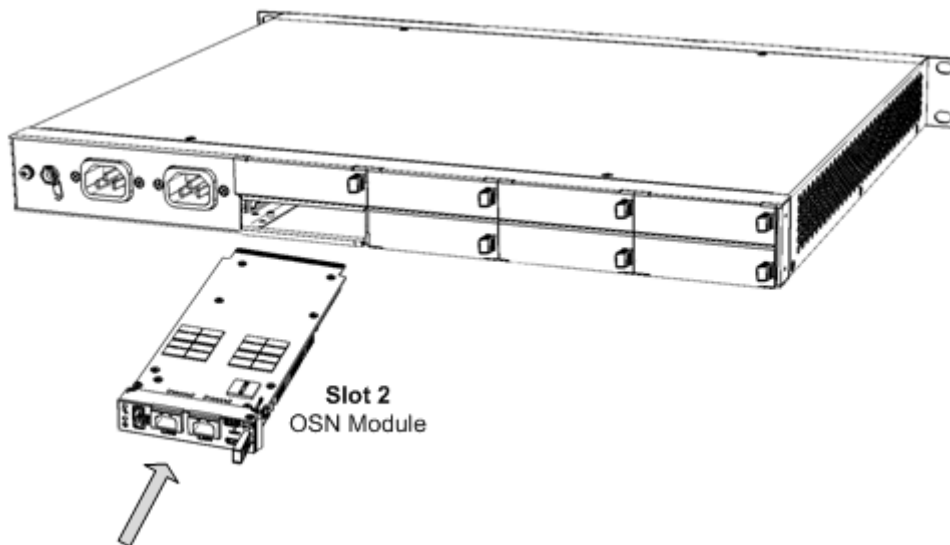
4. Insert the new HDMX module into Slot #1:
 - a. Hold the new HDMX module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure C-6: Replacing HDMX Module



- b. Push the module's handle until it clicks firmly into the slot.
5. Insert the new OSN3B or OSN4 module into Slot #2:
 - a. Hold the new OSN module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

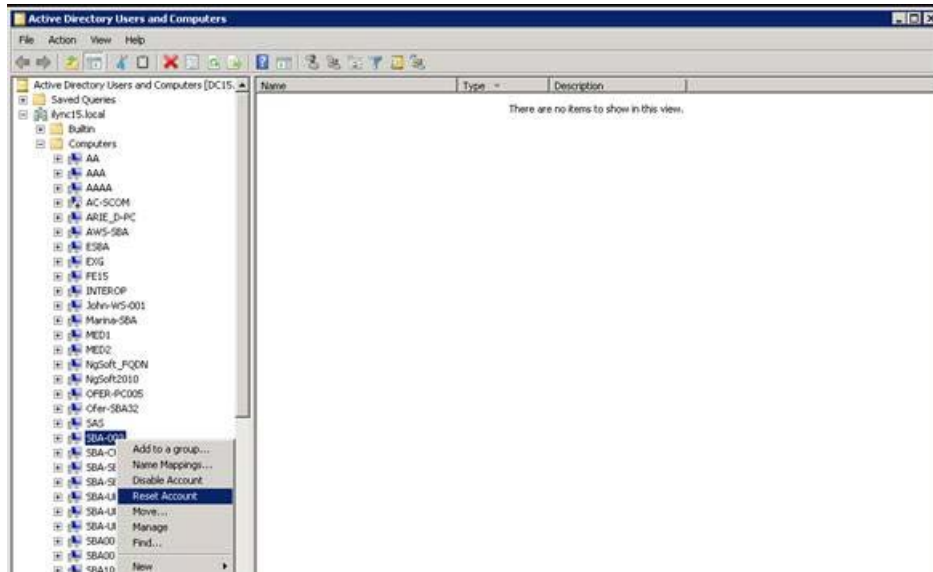
Figure C-7: Replacing OSN Module



- b. Push the module's handle until it clicks firmly into the slot; the operating system on the OSN server starts up.

6. Reset the SBA account on the Active Directory as shown in the screen example below:

Figure C-8: Reset SBA Account



7. Install the SBA application on the OSN platform using the supplied USB Upgrade and Recovery dongle (see Chapter 30 on page 217).
8. Connect to the SBA Management Interface (see Chapter 10 on page 53).
9. Complete the SBA installation and configuration (see Chapter 11 on page 79).

C.5 Replacing the OSN Module Only (RMA)

This procedure describes how to replace the OSN module for maintenance purposes (RMA). This procedure is intended for replacing an OSN module of the same type i.e. this is not an upgrade procedure.

➤ **To RMA the OSN module:**



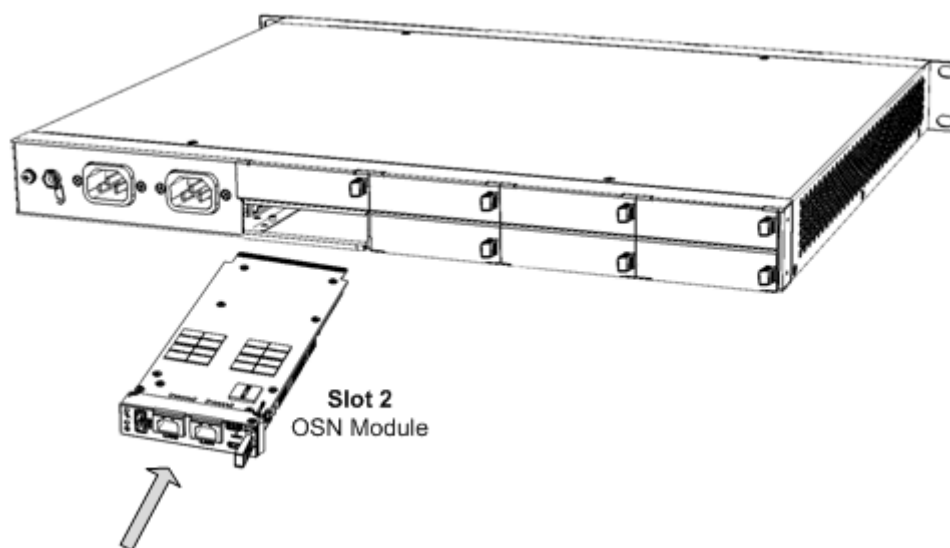
1. Shutdown the SBA server (see Section 0 on page 139).
2. Remove the OSN module from Slot #2:
 - a. Gently and slowly pull the OSN module's handle until you hear the first click sound; the handle is now partially pulled out and the module undergoes a shutdown sequence indicated by the slow-flashing **Hot Swap Blue**  LED on the module.
 - b. When the  LED stops flashing and is constantly lit, indicating that the shutdown sequence is complete, disconnect any cables that may be connected to the module.
 - c. Grip and gently pull the module's handle to slide the module out of the slot.
3. Perform the required maintenance actions.
4. Reinsert the OSN module into Slot #2 (see figure below):
 - a. Hold the new OSN module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure C-9: Replacing OSN Module



- b. Push the module's handle until it clicks firmly into the slot; the operating system on the OSN server starts up.

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D Configuring RAID

This appendix describes how to set up and enable RAID 1 (Redundant Array of Independent Disks) on the Mediant 1000B SBA. RAID 1 is achieved by using two installed OSN hard drives (HDMX) that serve as Master-Slave configuration, where the Slave disk has an exact copy (or mirror) of the data on the Master disk. Thus, RAID 1 provides redundancy of the SBA in case of failure of one of the disks.

D.1 Prerequisites

Before configuring RAID, ensure that you do the following:

- Complete the SBA installation and configuration as described in Chapter 11 on page 79.
- Ensure that the HDMX disk in Slot 8 (slave) is unallocated (without a volume allocated).
- Ensure that the storage capacity of both the HDMX disks is identical (e.g., 120 GB).

D.2 Slot Assignments for OSN Hard Drives

The Mediant 1000B SBA rear panel is displayed in the figure below and described in the subsequent table.

Figure D-1: Rear Panel Mediant 1000B SBA

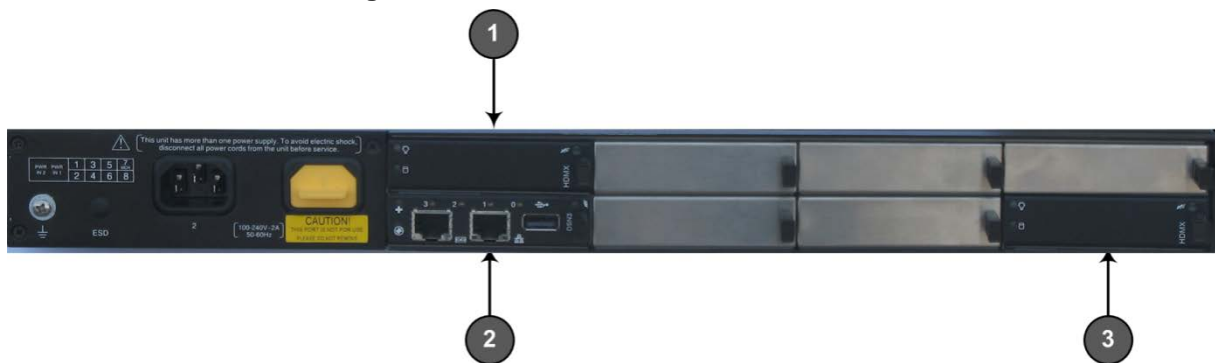


Table D-1: Mediant 1000B SBA Rear-Panel Description

Item #	Description
1	HDMX in Slot 1 (Master) – Hard Disk functionality for OSN platform.
2	OSN Module in Slot 2.
3	HDMX in Slot 8 (Slave) – Hard Disk functionality for OSN platform.



Note: Power down the device before inserting the HDMX into Slot 8.

Before inserting the second hard disk drive, ensure that this drive is compatible with the existing SBA hard disk drive storage.

Table D-2: Mediant 1000B SBA HDD Type RAID 1 Compatibility Table

SBA	Prime Storage Type	Second HDD for RAID	
M1KB SBA2G or 4G	HDMX	M1KB-HDD	
M1KB-4G-SBA-SSD	SSD	M1KB-SSD-120	
M1KB-SBA-SSD	SSD	M1KB-SSD-120	
M1KB-SBA-ES	SSD	M1KB-SSD-120	All SBA family products with a CPN which ends with ES

D.3 Configuring RAID 1

The procedure below describes how to configure RAID 1 on the Mediant 1000B SBA.



Note: As this is an uptime solution (i.e., it allows you to plan the installation and keep the SBA running using the secondary HDD), if there is a hard disk failure, a complete re-install of the SBA is required.

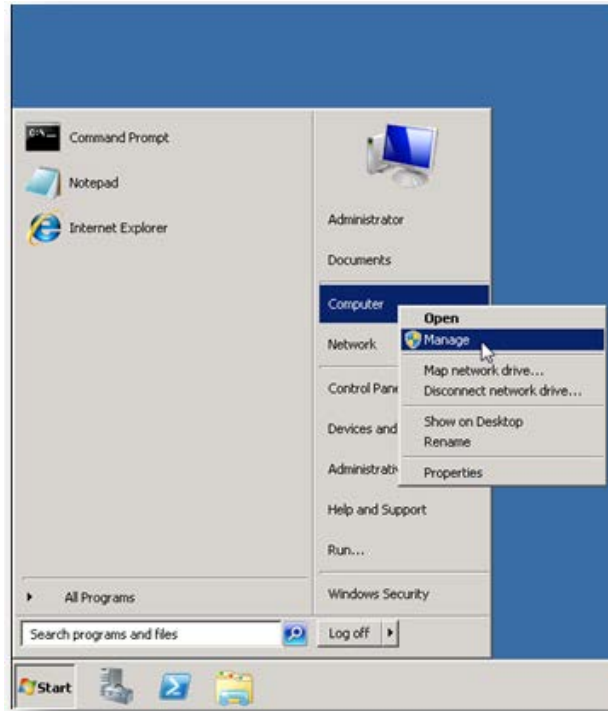
➤ How to configure RAID 1:

1. Connect to the SBA using Remote Desktop Connection (**Start > Accessories > Remote Desktop Connection**).

Figure D-2: Remote Desktop Connection

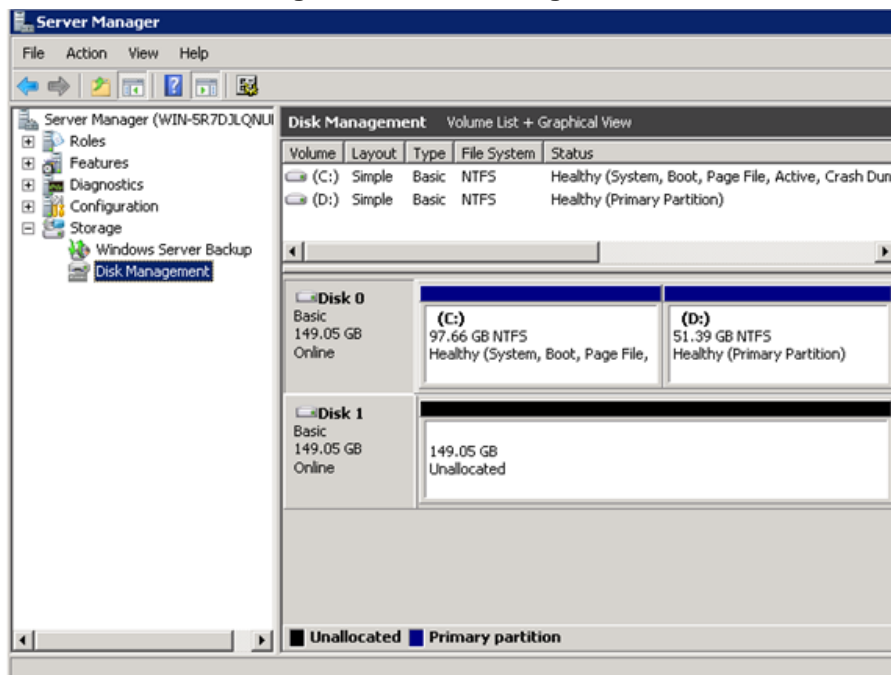

2. Open Computer Management (**Start Menu > right-click Computer > Manage** or 'compmgmt.msc').

Figure D-3: Computer Management



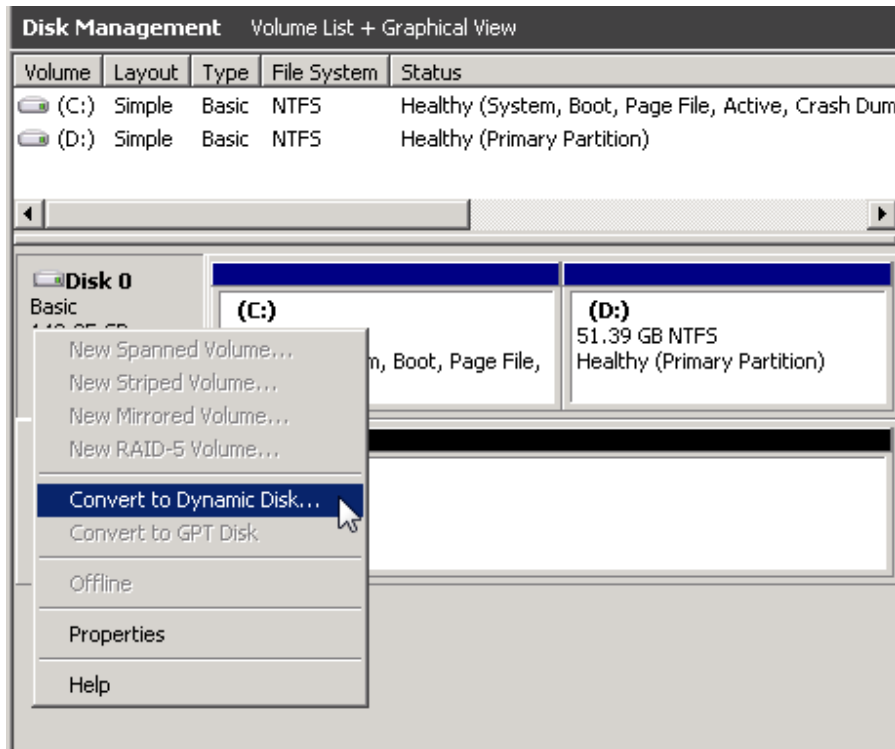
3. In the Server Manager, navigate to the **Disk Management** menu option.

Figure D-4: Disk Management



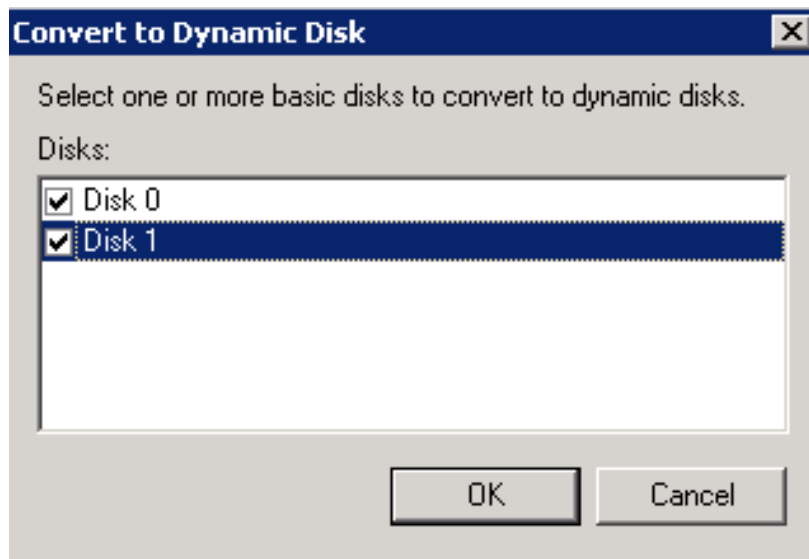
4. Convert the disks to 'Dynamic' by right-clicking **Disc 0**, and then selecting the **Convert to Dynamic Disk** menu option.

Figure D-5: Convert to Dynamic Disk



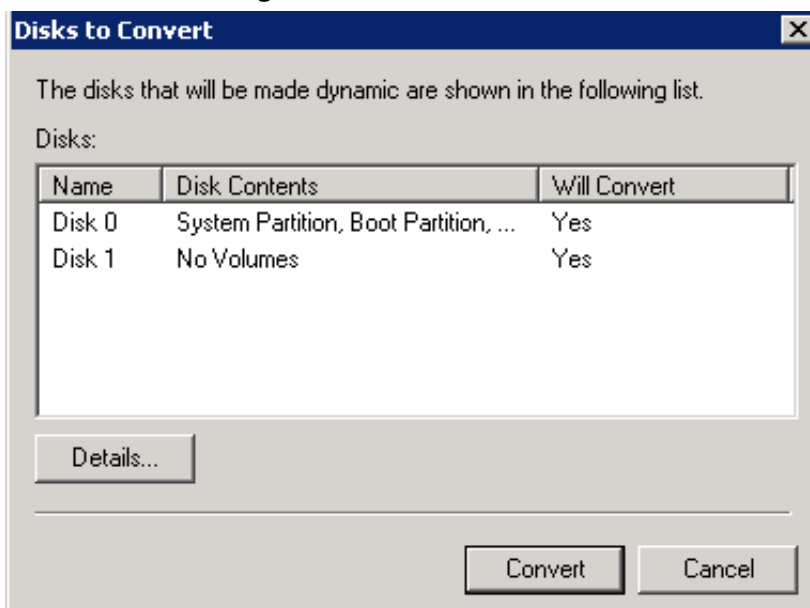
5. Select one or more basic disks to convert to dynamic disks, and then click **OK**.

Figure D-6: Convert to Dynamic Disk Selection



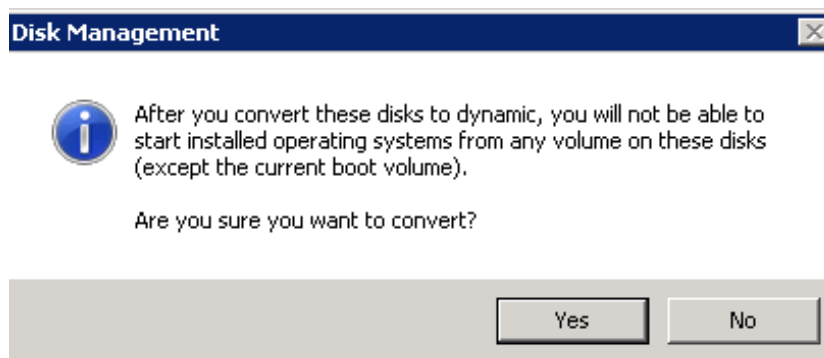
6. In the Disks to Convert screen, click **Convert**.

Figure D-7: Disks to Convert



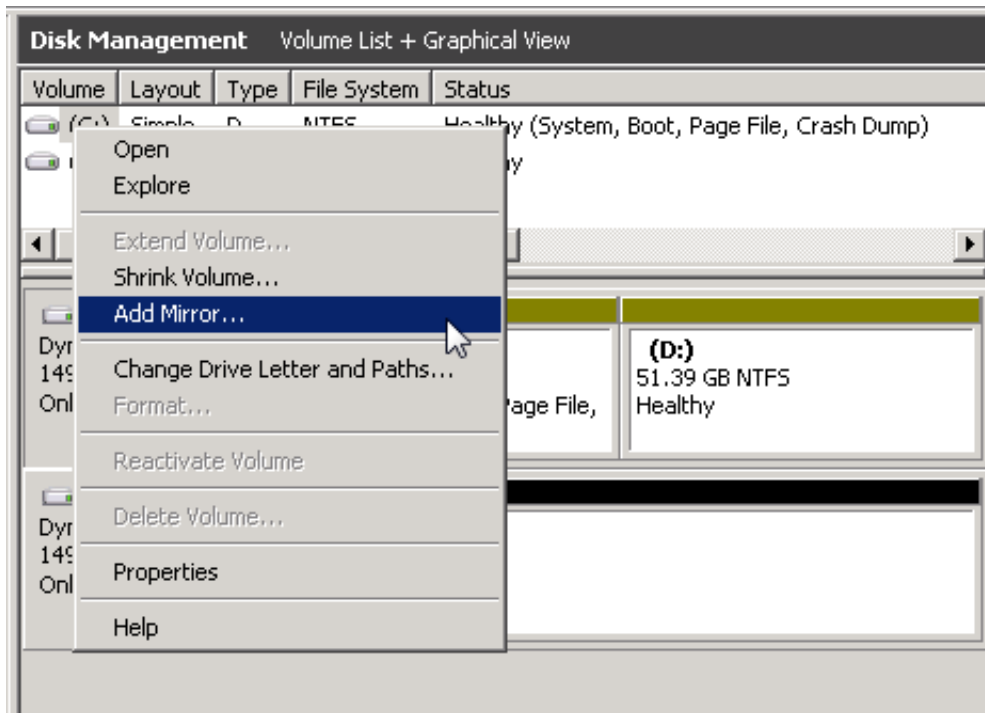
7. In the Disk Management screen, click **Yes**.

Figure D-8: Disks Management



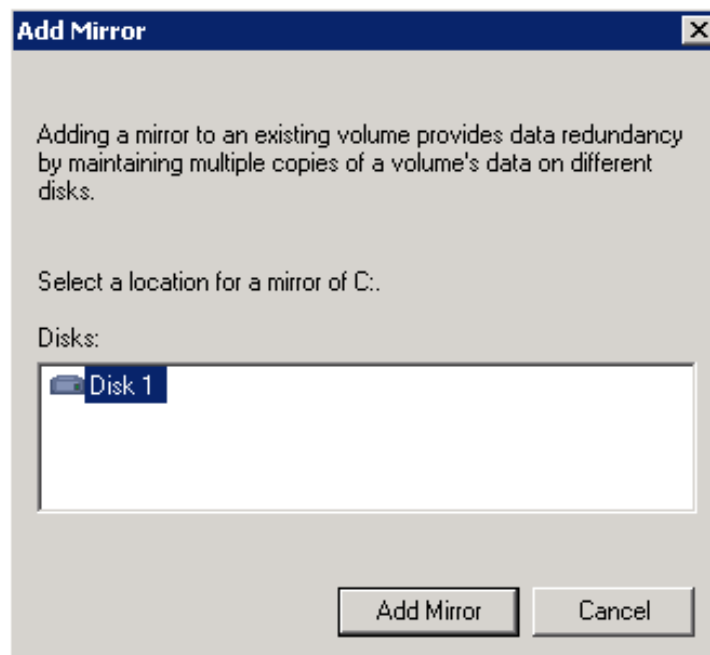
8. Add the Mirror, by right-clicking **Partition C**, and then select the **Add Mirror** menu option.

Figure D-9: Add Mirror



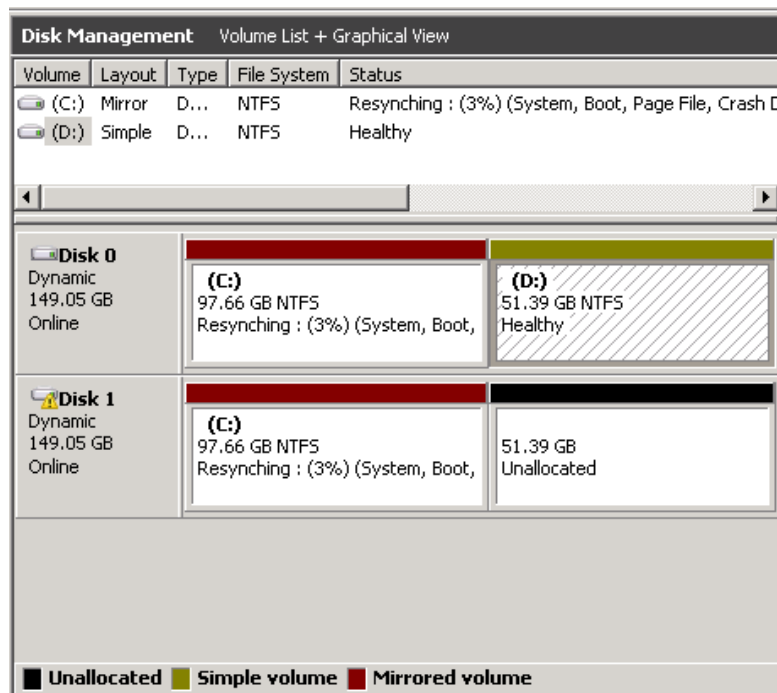
9. Select a location for a mirror of Disk C, and then click **Add Mirror**.

Figure D-10: Add Mirror Disk 1



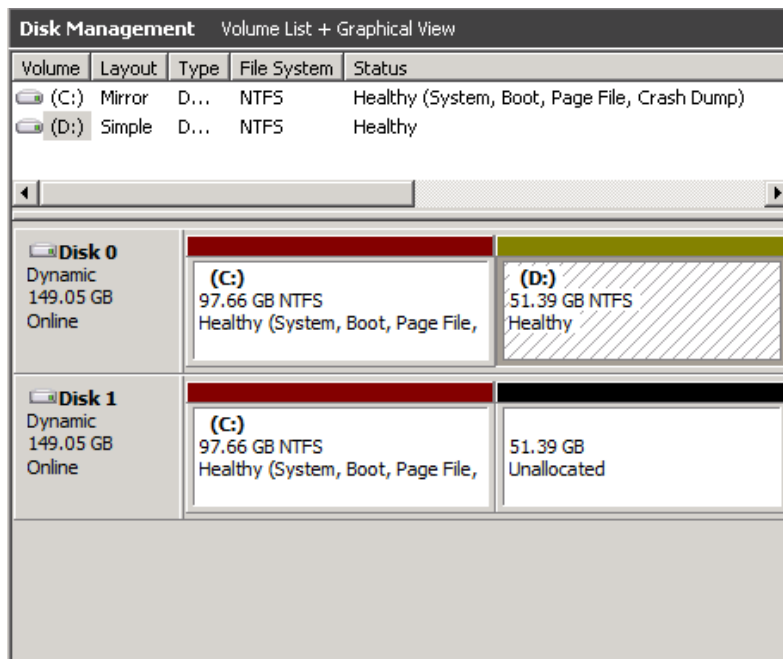
- The 'Add Mirror' process appears displaying progress in the Status column.

Figure D-11: Disk Management - Resyncing



- When the process has completed, the following screen appears:

Figure D-12: Disk Management – End of Process





SBA Installation and Maintenance Manual



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