Microsoft Skype for Business

Installation Guide for Patton SmartNode eSBC & VoIP Gateway

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Document Revision History

Version	Reason for Change	Date	Author
1.0	Document created	2019-02-14	Nenad Rajkovic

1 Introduction

This Install Guide includes a general overview of requirements and provides the configuration basics to interconnect Patton SmartNode VoIP Gateways and SBC's with Microsoft® Skype for Business infrastructure.

Content of this document:

- Presentation of the Patton SmartNode VoIP Gateway concept
- Basics for a simple setup
- Sample SmartNode configuration file & Web Wizard working with Microsoft® Skype for Business 2015

NOT part of this document:

- Detailed configuration of Microsoft® Skype for Business 2015
- Detailed configuration capabilities of Patton SmartNode VoIP Gateways

For more technical details, please visit the Patton SmartNode webpage (http://www.patton.com/smartnode).
More configuration notes, samples and manuals are available.
https://www.patton.com/manuals/

2 SmartNode overview

Patton's SmartNode eSBC & VoIP Gateway have been certified for Skype for Business 2015 by Tekvision accredited lab.
The SmartNoed products may be used in conjunction with Skype for Business for

- VoIP Gateway connecting legacy equipment to SfB
- PSTN Gateway (ISDN BRI / PRI, FXO)
- eSBC (Enterprise Session Border Controller
    - Service demarcation
    - Protocol conversion (SIP TCP to SIP UDP)
    - VoIP Security – SIP TLS / SRTP
    - IPv4 to IPv6 conversion

The SmartNode products support the following features:

- Media bypass (enabled or disabled)

- Caller ID Restriction
- Call Park and Retrieve
- Simultaneous Ringing
- Call On Hold
- Call Fork
- Call Forward
- Blind and Consultative Transfer
- Conference (ad-hoc and Dial-in)
- DNS Load Balancing and Failover
- Fax
- IPv4 and IPv6 dual stack
- TCP/TLS and SRTP

3 Configure Skype for Business

3.1 Configuring the E-SBC device as an IP/PSTN Gateway

This section describes how to configure the E-SBC device as an IP/PSTN Gateway in Skype for Business.

Configure the E-SBC device as an IP/PSTN Gateway and associate it with the Mediation Server:
On the server where the Topology Builder is located, start the Skype for Business Server 2015 Topology Builder (figure 1).
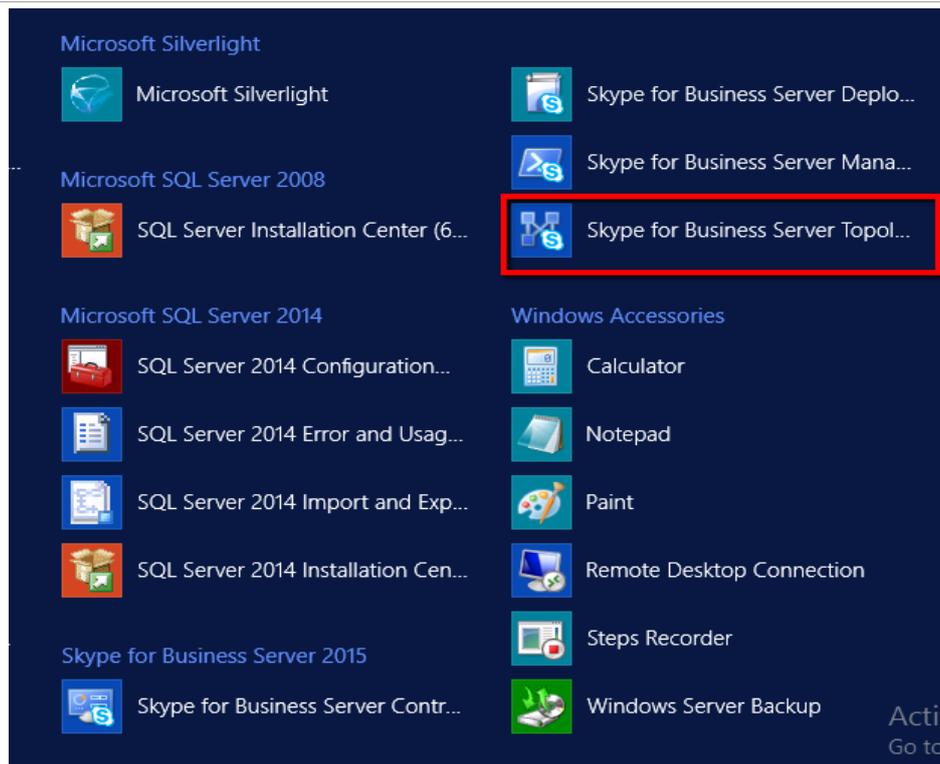
Figure 1

The following screen is displayed and Click the **Download Topology from the existing deployment** option and then click OK.
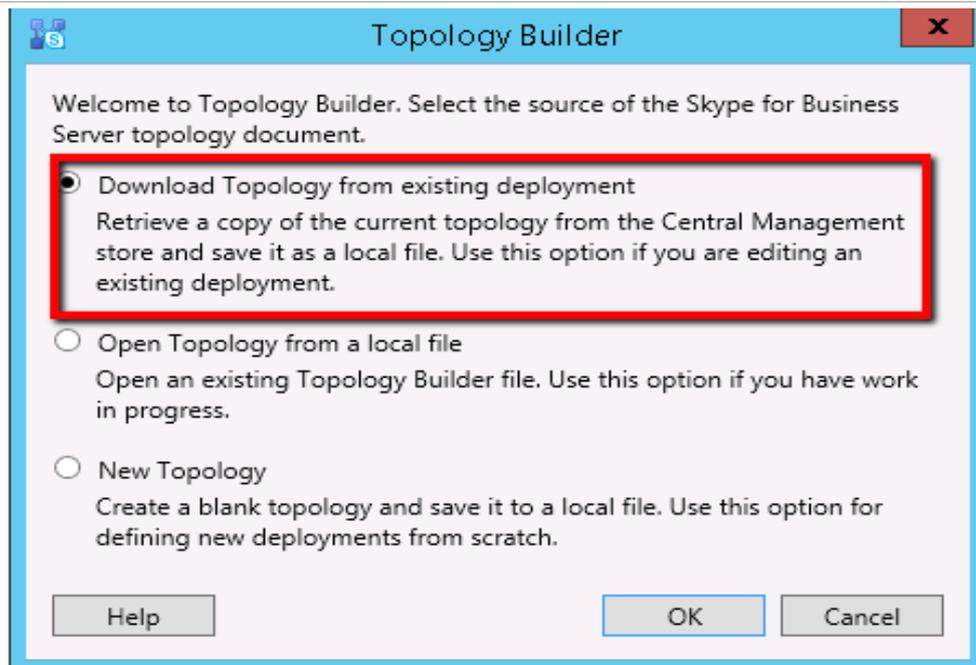
Figure 2

In the file name field, enter a name and Click **Save** to save the downloaded topology.
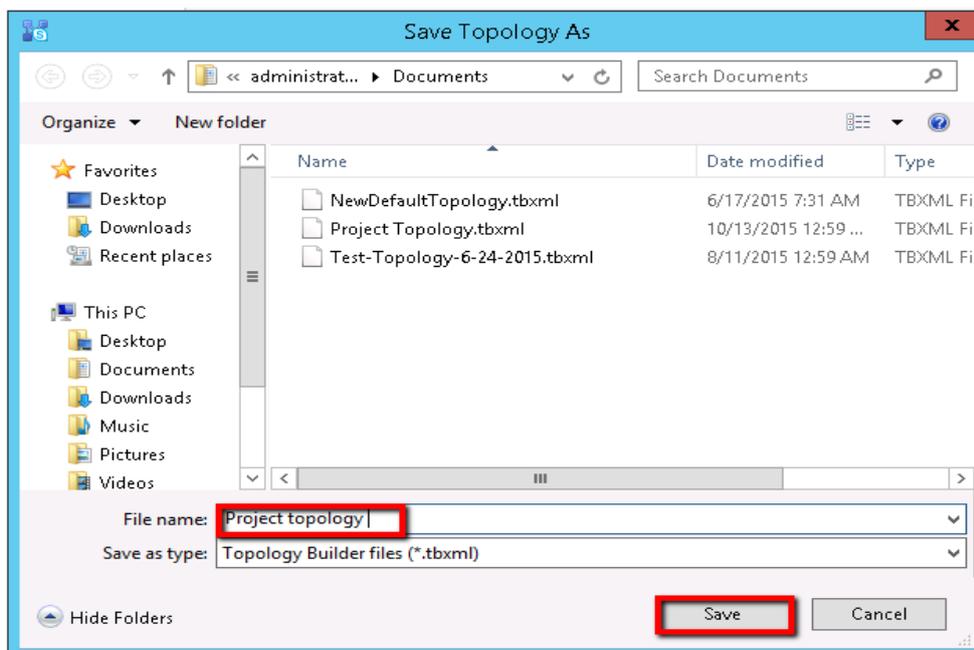
Downloaded Topology will be as shown below:
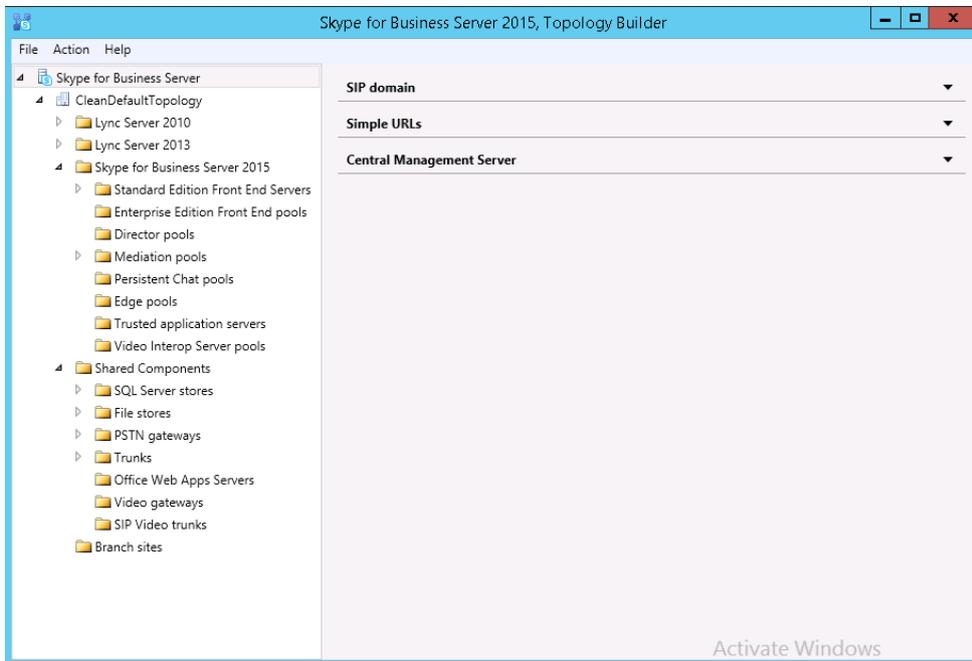
Right-click **PSTN Gateway** under shared components and from the pop-up menu, choose **New IP/PSTN Gateway**.
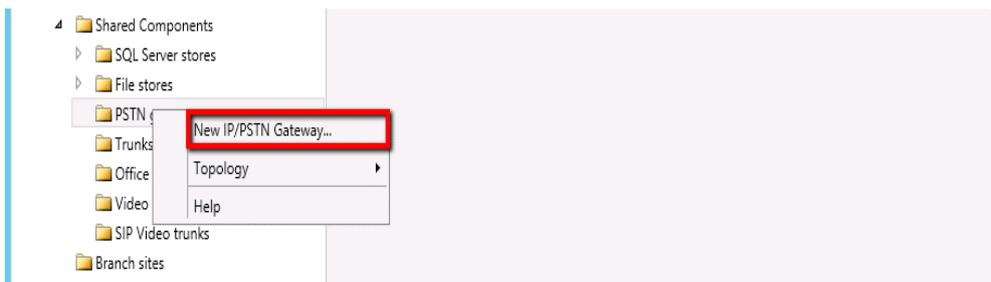
Define the PSTN Gateway FQDN by providing an FQDN as shown below and click **Next.**

Select Enable IPv4 and Click **Next** to proceed,
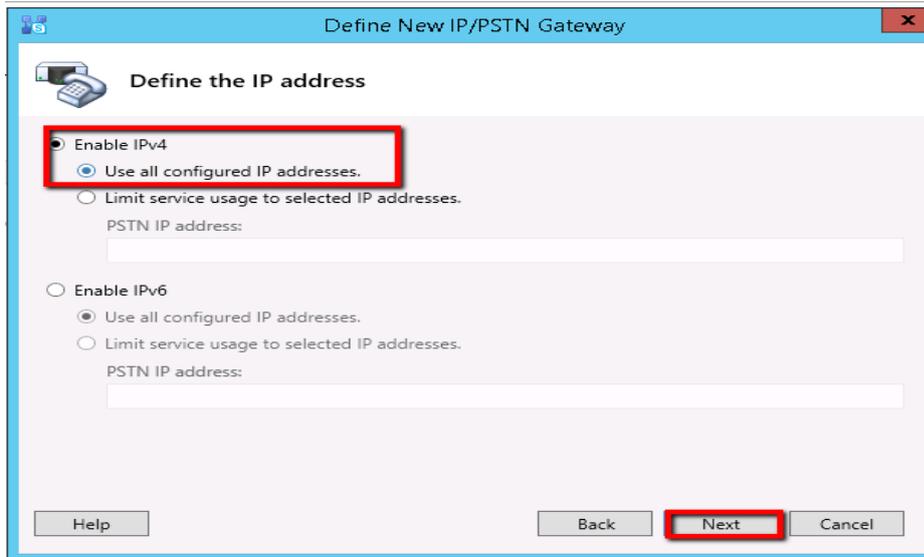
Define the root trunk by providing the Listening port as **5060**, Select SIP Transport Protocol as **TCP**, Select the **Mediation pool** as Associated Mediation Server and Associated Mediation Server port as **5060** as shown below and Click **Finish.**
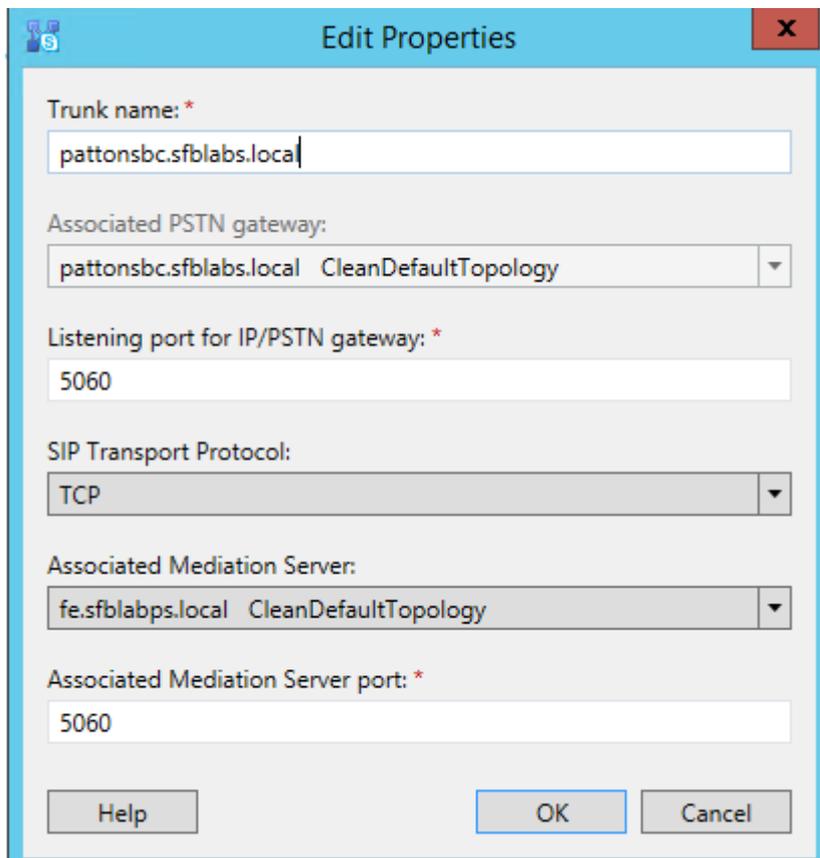
Configured **PSTN gateway** and **Trunk** will be listed in the Topology Builder as shown below.
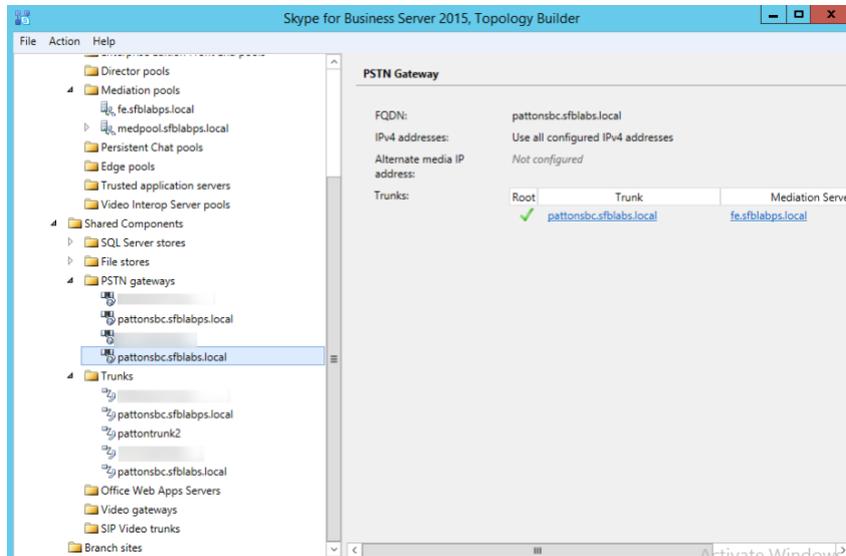
3.2 Associating the IP/PSTN Gateway with the Mediation Server

This section describes how to associate the IP/PSTN Gateway with the Mediation Server.

To associate the IP/PSTN Gateway with the Mediation Server:

- Expand the **Mediation pools** folder and then right-click the Mediation server pool.
- From the shortcut menu, choose **Edit Properties**, as shown in figure below.
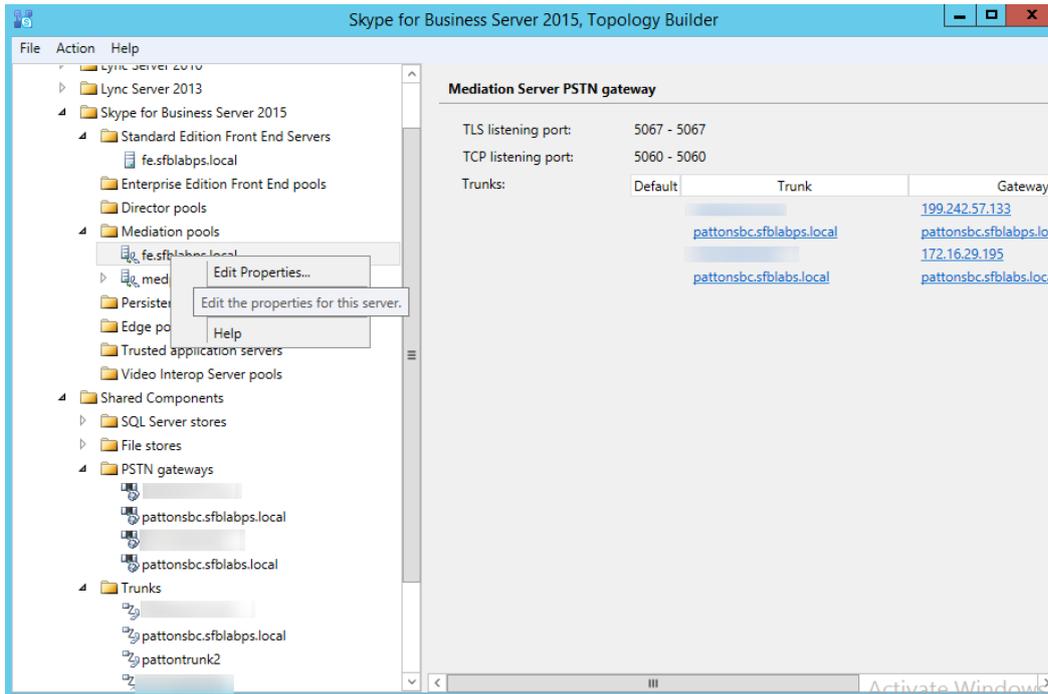
In Edit properties Window, Choose **PSTN gateway** and select the trunk listed under **Mediation server PSTN gateway** and click **Make Default** and click **OK** to associate the gateway with Mediation Server.
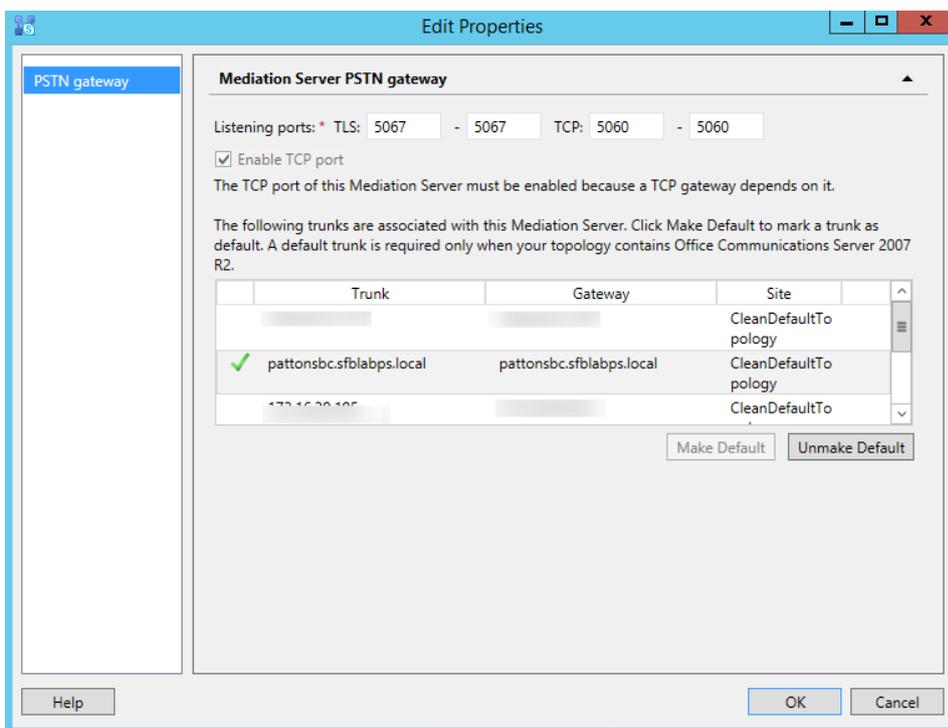
Publish the Topology by selecting **Action>Topology>Publish**
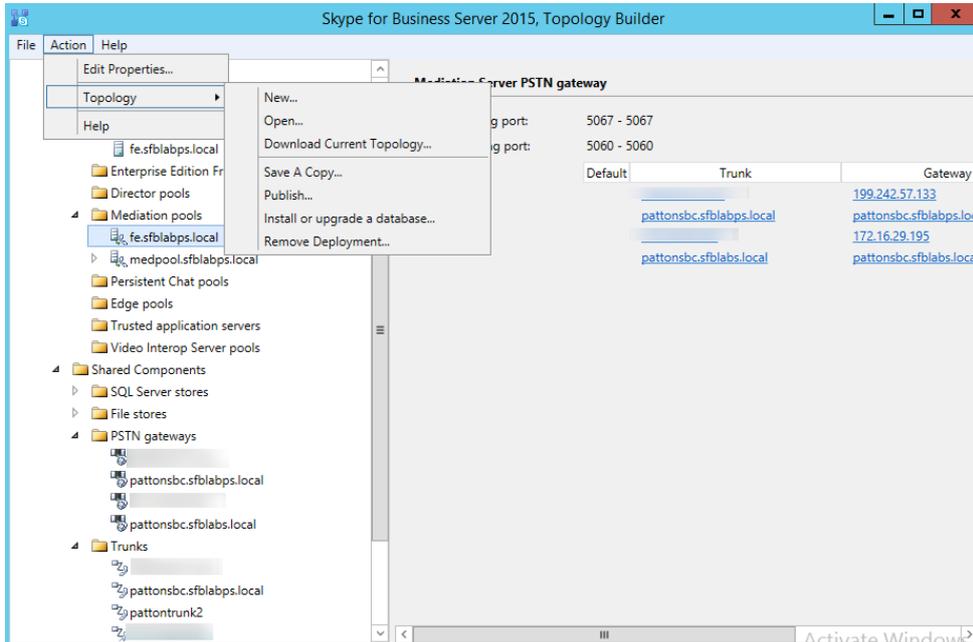
Click **Next** to proceed **Publish topology** in the conformation screen.
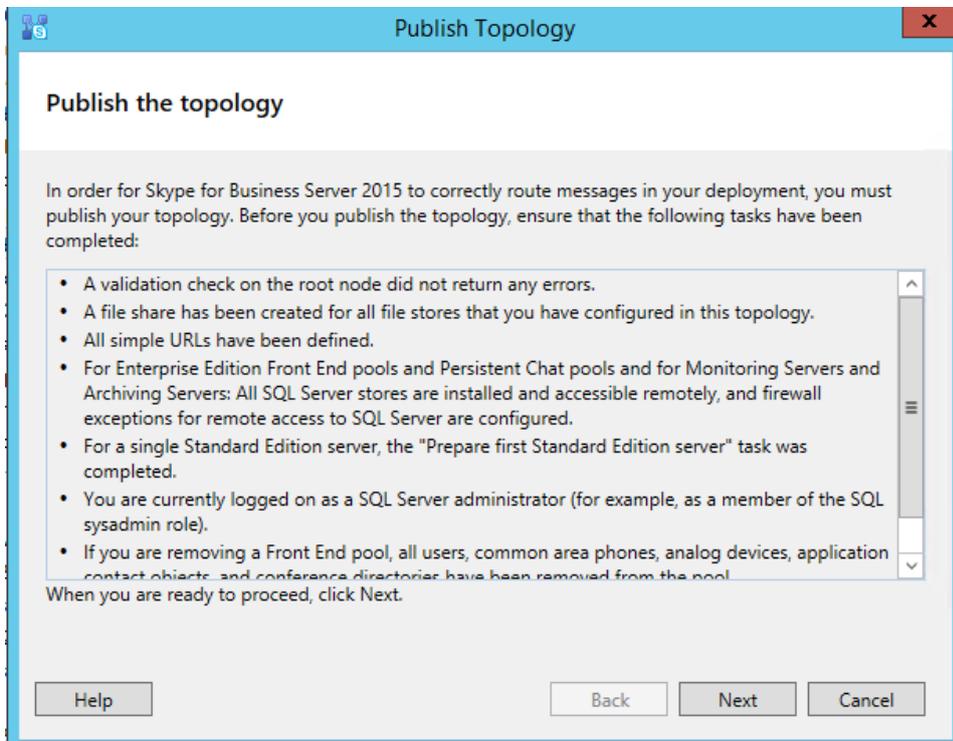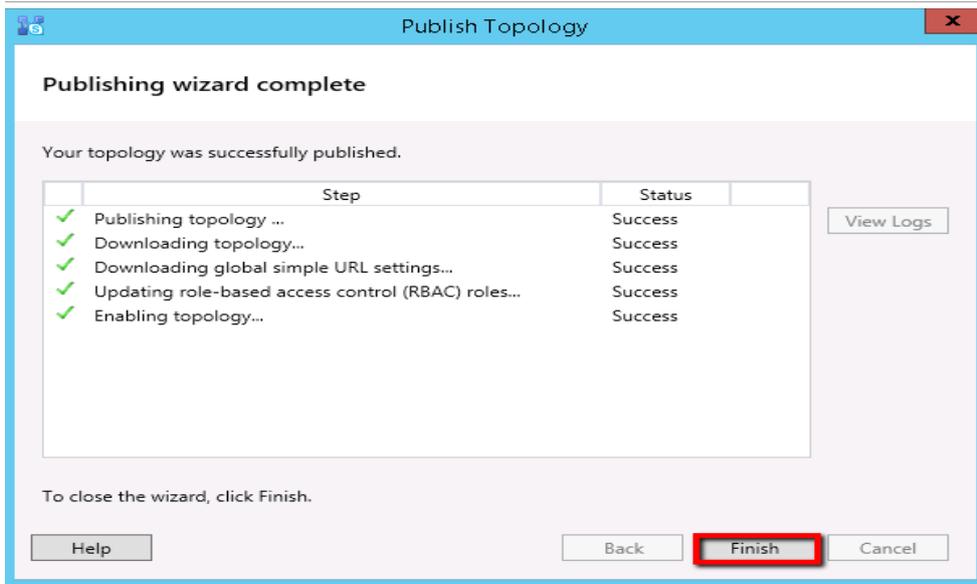
Once the topology is successfully Published, Click **Finish** to Exit the Wizard as shown in above figure.

3.3 Configurations in Skype for Business Server 2015 Control Panel

Adding the Trunk to the Skype for Business Control Panel.

In **Skype for Business Control panel**, Under **Voice routing**, choose **Trunk configuration**, Click **New** and select **Pool trunk**.
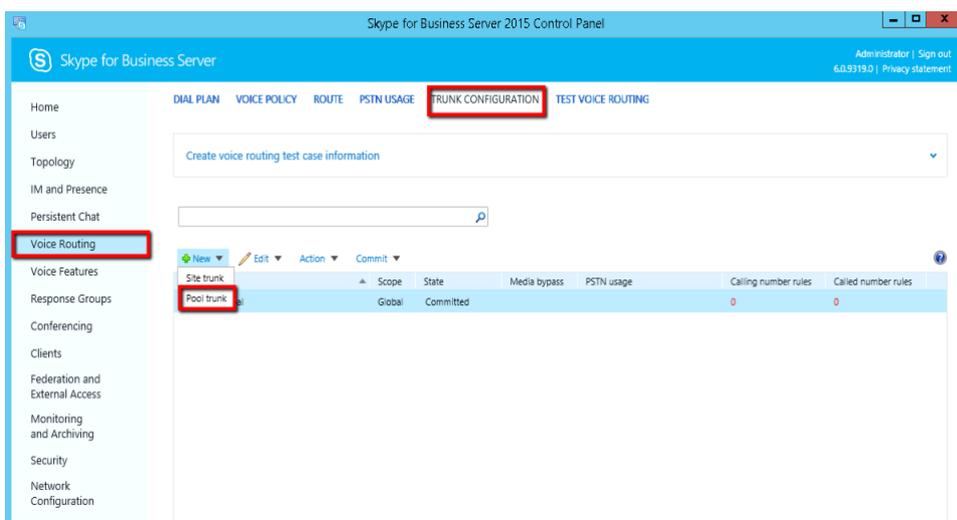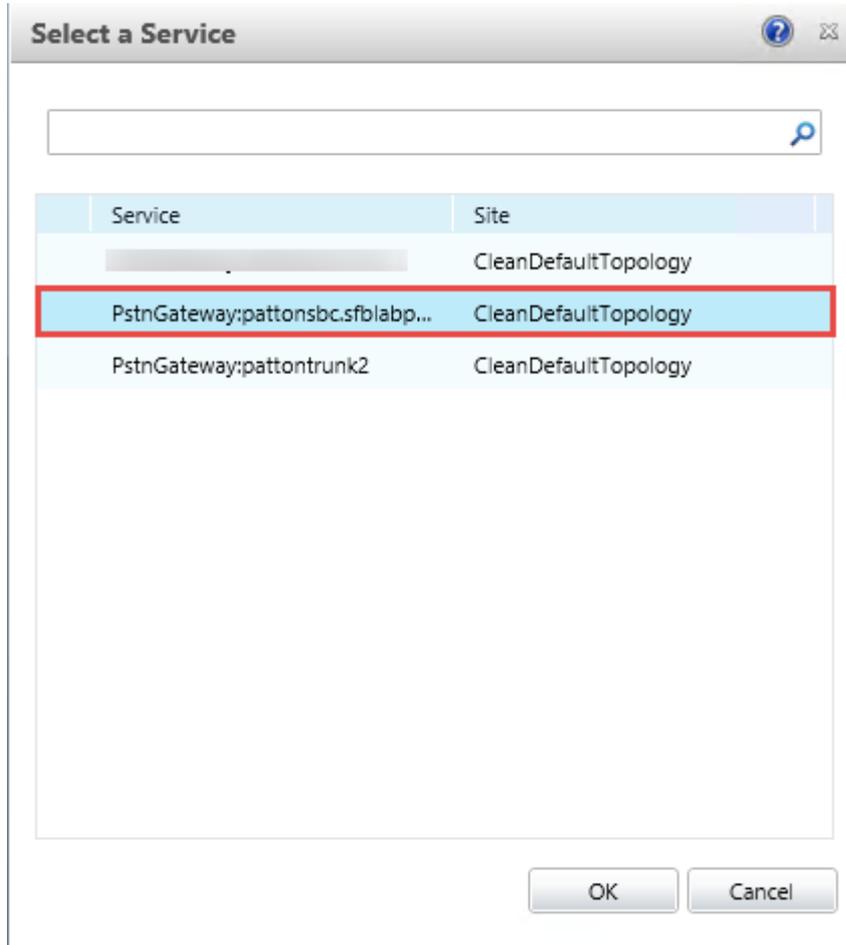
In the New Trunk configuration page select the parameters as shown below and click **OK**.
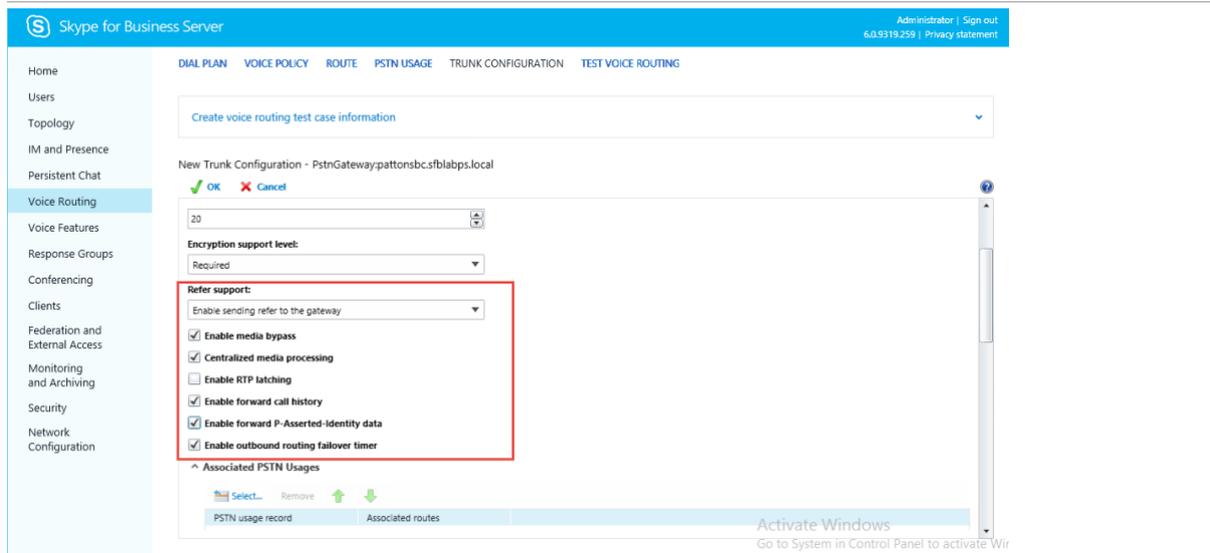
Select the newly added trunk and choose **commit** and Click **Commit all.**
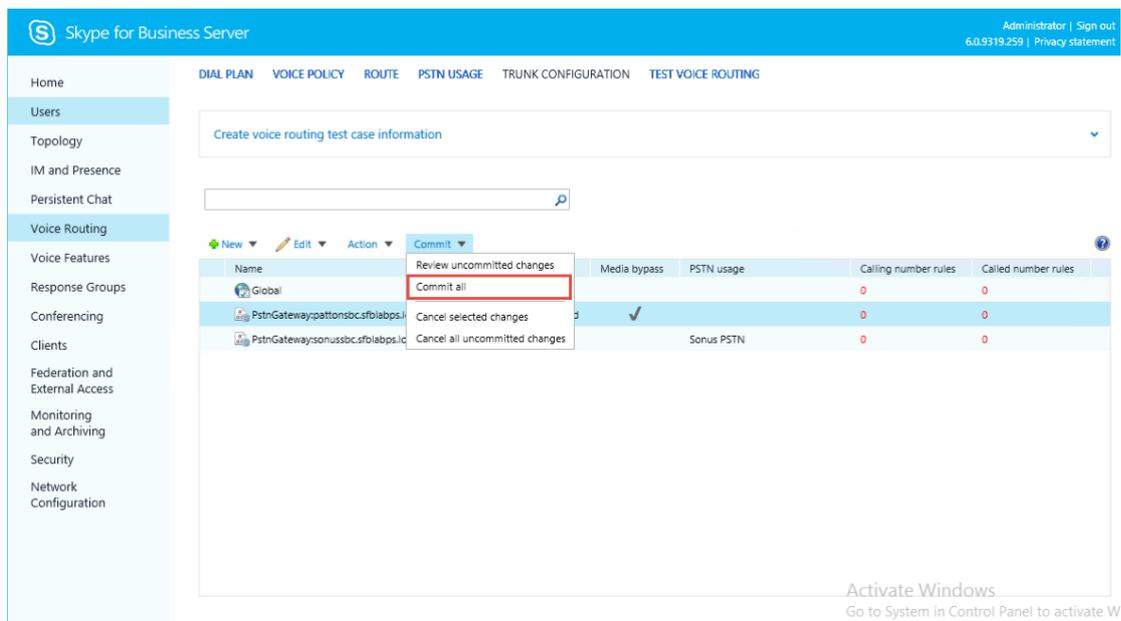
Configuring Voice Policy in Control panel. Under **Voice Routing >Voice Policy** Click **New** and choose **User Policy**.
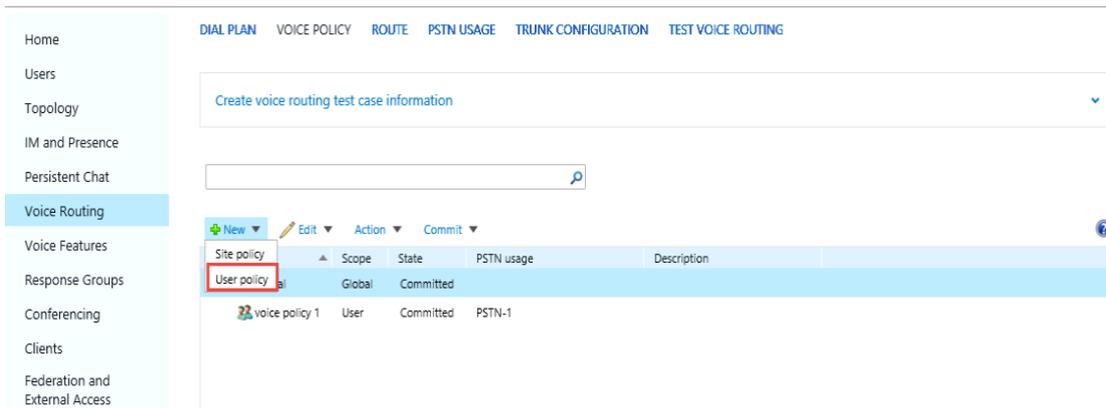
Name the New Voice Policy and Click **New** under **Associated PSTN Usages**.
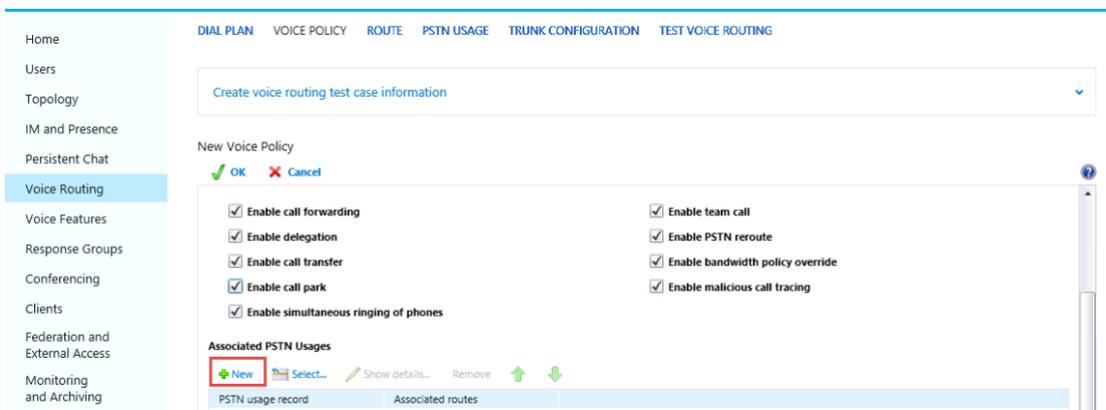
Name the **New PSTN Usage Record** and Click **New** under **Associated Routes**.
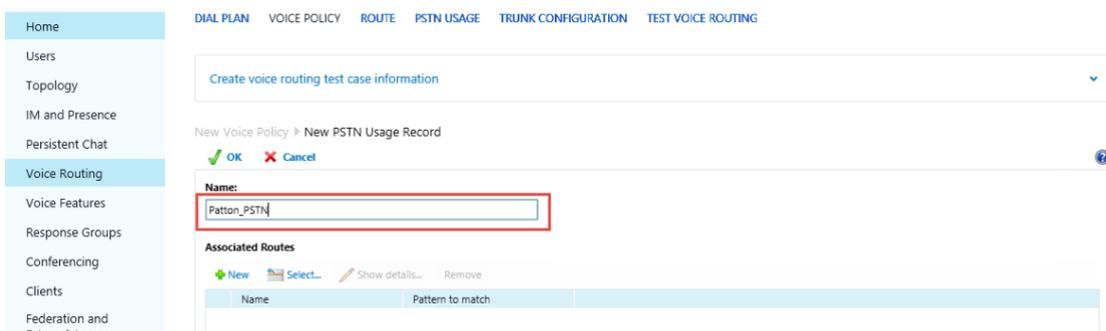
Name the **New voice Route** and add an associated trunk to it. To add trunk click the **Add** button under **Associated trunk** and choose the corresponding trunk and click **OK**.
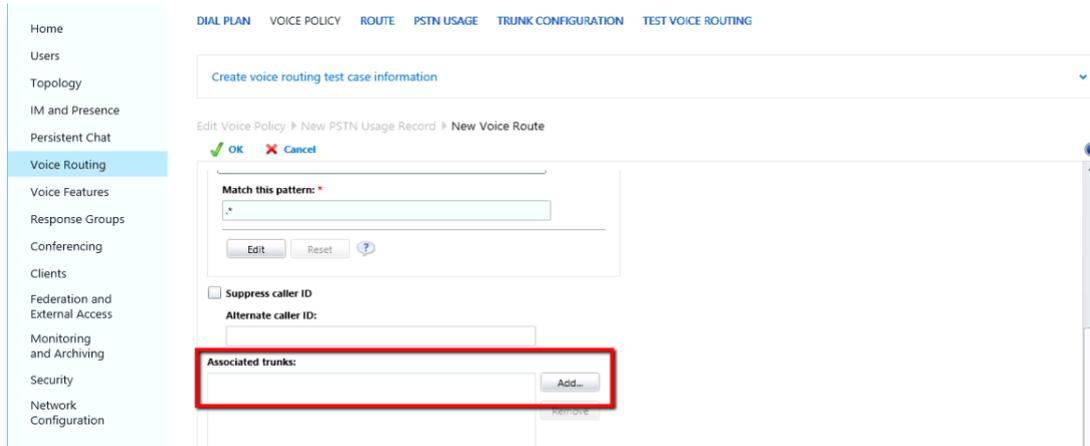
Select **OK** in **New voice route**, **New PSTN Usage record** and **Voice Policy** pages. Commit for the changes by selecting **Commit All**.
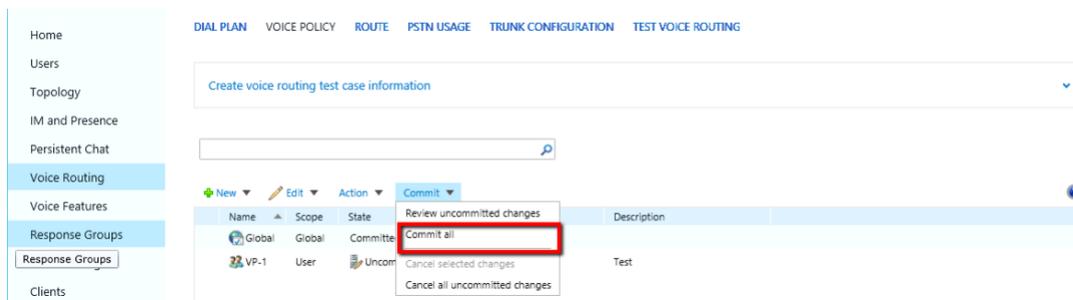
Under **Trunk Configuration** choose the corresponding Trunk and Select **Associated PSTN Usages**.

Once the appropriate PSTN usage is added to the Trunk, Click **OK** and commit for the changes made.

Note: The Route and PSTN Usage created under Voice policy will be listed in ROUTE and PSTN USAGE in Voice Routing section in Control panel. Also the

Route and PSTN usage can be configured separately and can be added while configuring Voice Policy.

3.4 Configuring Users in Skype for Business control panel

Click on **Users** in Control panel and click **Find** and select a test user. This test User is an Enterprise Voice enabled user for Skype for Business Server. Now, select a user and provide the corresponding **Voice Policy**, the **Line URI** and click **Commit**. Make sure the user is enabled for Enterprise voice.

Note: To add new users, Select **Users> Enable users>Add>Find** and select from listed. **Assign the new user** to a pool, specify a **SIP URI**, Select **Telephony** as Enterprise voice. Also provide Line URI and Voice policy and click **Enable,** to enable it for Skype for Business Server.

Similarly the other required users can be Configured. Provide the User credentials (SIP URI and Password) in the **Skype for Business Client** to login.

Sign in Address Example: user1@sfbdomain.local and Password. Change the DNS of the machine having the client to Domain Controller IP and Install the DC certificate if required.

3.5 Default Configurations:

Refer	Enabled
Media Bypass	Enabled
Centralized media processing	Enabled
RTP latching	Off (always)
History Info	Enabled
P-Asserted-Identity	Disabled
RTCP checks	RTCPActiveCalls- false RTCPCallsOnHold-false Enable sessionTimer - true.

Powershell comments for Configurations:

1. Set-CsTrunkConfiguration –Identity Service: PSTNGateway: trunk FQDN – RTCPActiveCalls $false –RTCPCallsOnHold $false –Enable SessionTimer $true.

1. "Get-CsTrunkConfiguraton" to get the current Trunk configuration.

4 Configure basic settings on the Patton device

4.1 Concept

This schema (figure xyz) describes the configuration concept of the Patton SmartNode PSTN gateway:
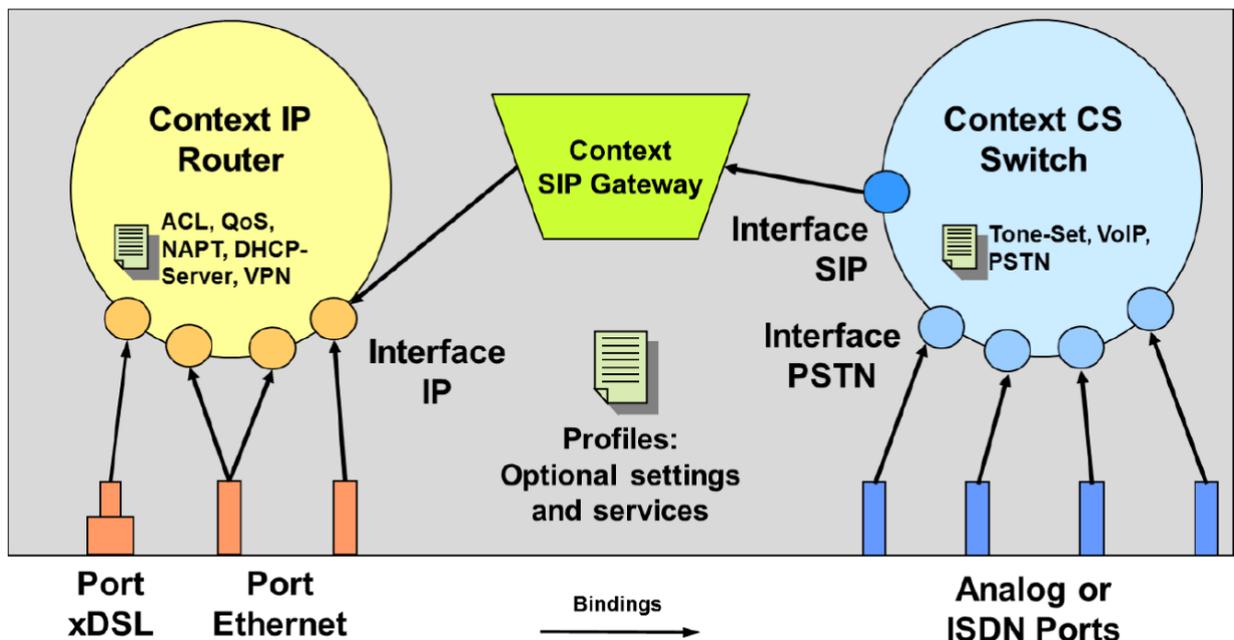
For more information on how to configure your Patton SmartNode SBC or Gateway, please refer to the corresponding software configuration guide:

https://patton.com/manuals/

4.1.1 Required Information

In order to configure your Patton SmartNode, be sure to have all the required information ready:

- IP addresses / FQDN's
- DNS servers
- NTP server
- PSTN trunk parameters

4. 2 Initial setup using Wizard

For ease of use, the Web Wizard is a simple, step by step based config tool. To make use of it, visit https://www.patton.com/wizard/ and download the corresponding Wizard to your SmartNode and execute it from there.

4.3 Manually Configure Patton's IP parameters

IP parameters of Patton device are being configured under *context ip*. Doing so, the following options are available:

<a.b.c.d/m>   Interface IPv4 address/mask

<a.b.c.d>   Interface IPv4 address

<a:b:c::x/m>   Interface IPv6 address/mask

<a:b:c::x>   Interface IPv6 address

dhcp   Acquire an IP address over DHCP

dhcp6   Acquire an IP address over DHCPv6

```
Config snipped of an example config for IP settings:

context ip ROUTER

 interface WAN
    ipaddress DHCP dhcp
```

```
      use profile napt NAPT_WAN DHCP

    interface LAN
      ipaddress LAN 192.168.1.1/24
```

4.4 Configure DNS

A DNS server is required when Skype for Business is configured with its DNS name on the Patton device, to resolve the DNS name to an actual IP address.

To configure DNS server reachable at x.x.x.x ip address configuration should look like:

```
dns-client
  name-server x.x.x.x
```

4.5 Configure Location Service applicable for Skype for Business

There are two key parameters required to be set:

Domain   FQDN or IP of the Mediation pool (in our example *fe.sfblabps.local*)

Transport protocol TCP   Skype for Business is supporting SIP over TCP therefore we should force TCP as transport protocol

```
location-service SER_LOCATION_S4B
  domain 1 fe.sfblabps.local
  match-any-domain

  identity-group DEFAULT

    call outbound
      transport-protocol force tcp
```

4.6 Configure Context SIP Gateway applicable for Skype for Business

Under context sip gateway the location service is to be bound, which was created before:

bind location-service SER_LOCATION_S4B

Under context sip gateway interface we should bind IP address which we will use for communication between Patton and Skype for Business:

bind ipaddress ROUTER LAN LAN

```
context sip-gateway GW_SIP_S4B
  bind location-service SER_LOCATION_S4B

  interface SIP
    transport-protocol udp+tcp 5060
    no transport-protocol tls
    bind ipaddress ROUTER LAN LAN

context sip-gateway GW_SIP_S4B
  no shutdown
```

4.7 Configure call routing and SIP interfaces

When it comes to call routing, number manipulation and various types of interfaces SIP or PSTN *context cs* is configuration module we need. Call routing and number manipulations are different from case by case but when we are about to configure SIP interface towards to Skype for Business we should pay attention on few things:

- **Check Skype for Business availability with periodical sip OPTIONS requests**
  This is typical requirement and it can be realized by using *penalty-box:*
  penalty-box sip-option-trigger interval 60 timeout 60 force tcp

Note: Pay attention that we are forcing tcp here, Skype for Business is supporting SIP over TCP

- **Skype for Business Mediation pool FQDN or IP**
  We should define it as *remote* parameter:
  remote fe.sfblabps.local

- **Associated PSTN gateway parameter**
  FQDN or IP which we configured on Skype for Business we should put as *local* parameter under SIP interface:
  local pattonsbc.sfblabps.local

- **Accept and send PRACK**
  One of the requirements was to enable sending and receiving PRACK messages:
  prack accept required
  prack emit supported

SIP interface towards to Skype for Business looks then as follows:

```
interface sip IF_SIP_S4B
  bind context sip-gateway GW_SIP_S4B
  route call dest-table RT_TO_WAN
  remote fe.sfblabps.local
  local pattonsbc.sfblabps.local
  no early-proceeding
  address-complete-indication accept set
  prack accept required
  prack emit supported
  use profile sip-tunneling in-out TRANSFER
  penalty-box sip-option-trigger interval 60 timeout 60 force tcp
  session-timer 1800
```

4.7.1 Configure SIP interface towards to PSTN

Every provider has its own requirements in terms of SIP trunk. In our example a SIP Trunk from the provider VERIZON was used.

SIP History-info header provides identity of the call forwarder, this identity is required by Verizon SIP trunk in the diversion header. To be able to do that we have to configure the following:

address-translation outgoing-call diversion-header user-part history-info host-part history-info

SIP interface towards Verizon SIP Trunk looks as follows:

```
interface sip IF_SIP_VERIZON
  bind context sip-gateway GW_SIP_VERIZON
  route call dest-table RT_TO_LAN
  remote x.x.x.x 5060
  hold-method direction-attribute sendonly
  no early-proceeding
  address-complete-indication accept set
  address-translation outgoing-call diversion-header user-part history-info host-part
history-info
  use profile sip-tunneling in-out TRANSFER
  penalty-box sip-option-trigger interval 60 timeout 60 force udp
  session-timer 1800
```

4.7 Context CS Configuration Sample

Here is the example of the *context cs* configuration. Please note that call routing and number manipulations are something which differ from case by case:

```
context cs SWITCH
  no shutdown

  mapping-table called-e164 to called-e164 MT_OUT_DNIS
    map (.%) to \1

  mapping-table called-e164 to called-e164 MT_IN_DNIS
    map (.%) to +1\1

  mapping-table calling-e164 to calling-e164 MT_IN_ANI
    map (.%) to +1\1
```

```
mapping-table calling-e164 to calling-e164 MT_OUT_ANI
  map (.%) to \1

routing-table called-e164 RT_TO_WAN
  route default dest-interface IF_SIP_VERIZON CF_OUTGOING

routing-table called-e164 RT_TO_LAN
  route default dest-interface IF_SIP_S4B CF_INCOMING

complex-function CF_INCOMING
  execute 1 MT_IN_DNIS
  execute 2 MT_IN_ANI

complex-function CF_OUTGOING
  execute 1 MT_OUT_DNIS
  execute 2 MT_OUT_ANI

interface isdn IF_ISDN

interface sip IF_SIP_VERIZON
  bind context sip-gateway GW_SIP_VERIZON
  route call dest-table RT_TO_LAN
  remote x.x.x.x 5060
  hold-method direction-attribute sendonly
  no early-proceeding
  address-complete-indication accept set
  address-translation outgoing-call diversion-header user-part history-info host-part
history-info
  use profile sip-tunneling in-out TRANSFER
  penalty-box sip-option-trigger interval 60 timeout 60 force udp
  session-timer 1800




interface sip IF_SIP_S4B
  bind context sip-gateway GW_SIP_S4B
  route call dest-table RT_TO_WAN
  remote fe.sfblabps.local
  local pattonsbc.sfblabps.local
  no early-proceeding
  address-complete-indication accept set
  prack accept required
  prack emit supported
  use profile sip-tunneling in-out TRANSFER
  penalty-box sip-option-trigger interval 60 timeout 60 force tcp
  session-timer 1800
```

5 Patton Configuration Sample

The SBC Configuration sample connecting the SIP provider and Skype for Business on premise is as follows. To adjust it according to your needs you will have to change the ==highlighted parts== of it. This configuration was generated for a **SN5571/2E30VRHP**

Note: The "context cs" part concerns the call handling of your configuration. For more information on how to configure the call routing on your Patton SmartNode, please refer to the official software configuration guide:

https://www.patton.com/manuals/

```
#---------------------------------------------------------------#
#                                                               #
# Patton Electronics Company                                    #
# SN5571/2E30VRHP v1.5 (SmartNode 5571 VoIP eSBC)               #
# S/N: 00A0BAXXXXXX                                             #
# Test: 3.14.T4991-2 2018/11/06                                 #
# Generated configuration file                                  #
#                                                               #
#---------------------------------------------------------------#

cli version 4.00
system hostname patton
rtp-port-range 6000 9999

actions

  rule PROV_STARTUP
    condition ip address:WAN.DHCP LINKUP initial
    condition system ntp TIME_INITIALIZED
    action 1 "provisioning execute PF_PROVISIONING_CONFIG"

profile aaa DEFAULT
  method 1 nodems continue-on-reject
  method 2 local
  method 3 none

console
  use profile aaa DEFAULT

telnet-server
  use profile aaa DEFAULT
  no shutdown

ssh-server
  use profile aaa DEFAULT
  no shutdown

snmp-server
  shutdown

web-server
```

```
   protocol http port 80
   protocol https port 443
   use profile aaa DEFAULT
   no shutdown

ntp
   server 0.patton.pool.ntp.org
   server 1.patton.pool.ntp.org
   server 2.patton.pool.ntp.org
   server 3.patton.pool.ntp.org
   no shutdown

profile napt NAPT_WAN

dns-server
   host 192.168.1.1 smartnode.local
   relay dns-client
   no shutdown

dns-client
   name-server x.x.x.x

profile dhcp-server DHCPS_LAN
   network 192.168.1.0/24
   lease 24 hours
   default-router 192.168.1.1
   domain-name-server 192.168.1.1
   include 192.168.1.10 192.168.1.99

profile tls DEFAULT
   authentication incoming
   authentication outgoing
   private-key pki:private-key/DEFAULT
   own-certificate 1 pki:certificate/DEFAULT
   diffie-hellman-parameters pki:diffie-hellman-parameters/DEFAULT-2048

profile provisioning PF_PROVISIONING_CONFIG
   destination configuration
   use profile tls DEFAULT
   location 1
https://redirect.patton.com/$(system.mac);mac=$(system.mac);serial=$(system.serial);hwMajor=$(syst
em.hw.major);hwMinor=$(system.hw.minor);swMajor=$(system.sw.major);swMinor=$(system.sw.minor);swDa
te=$(system.sw.date);productName=$(system.product.name);cliMajor=$(cli.major);cliMinor=$(cli.minor
);osName=Trinity;subDirTrinity=/Trinity;subDirSmartWare=;dhcp66=$(dhcp.66);dhcp67=$(dhcp.67)
   location 2 $(dhcp.66)
   location 3 $(dhcp.66)/$(system.mac).cfg
   location 4 http://$(dhcp.66)/$(dhcp.67)
   location 5 http://$(dhcp.66)/$(system.mac).cfg
   location 6 tftp://$(dhcp.66)/$(dhcp.67)
   location 7 tftp://$(dhcp.66)/$(system.mac).cfg
   activation reload immediate

profile tone-set DEFAULT

profile voip DEFAULT
   codec 1 g711ulaw64k rx-length 20 tx-length 20
   codec 2 g711alaw64k rx-length 20 tx-length 20
   media-processing forced
   dtmf-relay rtp
   sdp-ptime-announcement
   rtp statistics
   silence-suppression

profile pstn DEFAULT
```

```
profile rip DEFAULT

profile sip DEFAULT
  autonomous-transitioning

profile sip-tunneling TRANSFER
  header referred-by
  message INVITE
  message CANCEL
  message BYE
  message 180
  message 183
  message 200
  message 3xx
  message 4xx
  message 5xx

context ip ROUTER

 interface WAN
    ipaddress DHCP dhcp
    use profile napt NAPT_WAN DHCP

   interface LAN
    ipaddress LAN 192.168.1.1/24

   routing-table DEFAULT

context ip ROUTER
  use profile dhcp-server DHCPS_LAN

profile packetsmart DEFAULT

profile ppp DEFAULT

profile r2 DEFAULT

cwmp-client
  session-retry-maximum 1
  no shutdown

  stun
    shutdown

context cs SWITCH
  no shutdown

  mapping-table called-e164 to called-e164 MT_OUT_DNIS
    map (.%) to \1

  mapping-table called-e164 to called-e164 MT_IN_DNIS
    map (.%) to +1\1

  mapping-table calling-e164 to calling-e164 MT_IN_ANI
    map (.%) to +1\1

  mapping-table calling-e164 to calling-e164 MT_OUT_ANI
    map (.%) to \1

  routing-table called-e164 RT_TO_WAN
    route default dest-interface IF_SIP_VERIZON CF_OUTGOING

  routing-table called-e164 RT_TO_LAN
```

```
      route default dest-interface IF_SIP_S4B CF_INCOMING

   complex-function CF_INCOMING
      execute 1 MT_IN_DNIS
      execute 2 MT_IN_ANI

   complex-function CF_OUTGOING
      execute 1 MT_OUT_DNIS
      execute 2 MT_OUT_ANI

   interface sip IF_SIP_PSTN
      bind context sip-gateway GW_SIP_PSTN
      route call dest-table RT_TO_LAN
      remote x.x.x.x
      hold-method direction-attribute sendonly
      no early-proceeding
      address-complete-indication accept set
      use profile sip-tunneling in-out TRANSFER
      penalty-box sip-option-trigger interval 60 timeout 60 force udp
      session-timer 1800

   interface sip IF_SIP_S4B
      bind context sip-gateway GW_SIP_S4B
      route call dest-table RT_TO_WAN
      remote fe.sfblabps.local
      local pattonsbc.sfblabps.local
      no early-proceeding
      address-complete-indication accept set
      prack accept required
      prack emit supported
      use profile sip-tunneling in-out TRANSFER
      penalty-box sip-option-trigger interval 60 timeout 60 force tcp
      session-timer 1800

location-service SER_LOCATION_S4B
   domain 1 fe.sfblabps.local
   match-any-domain

   identity-group DEFAULT

      call outbound
         transport-protocol force tcp

location-service SER_LOCATION_PSTN
   domain 1 x.x.x.x
   match-any-domain

   identity-group DEFAULT

      call outbound
         transport-protocol force udp

      call inbound

context sip-gateway GW_SIP_S4B
   bind location-service SER_LOCATION_S4B

   interface SIP
      transport-protocol udp+tcp 5060
      no transport-protocol tls
      bind ipaddress ROUTER LAN LAN

context sip-gateway GW_SIP_S4B
   no shutdown
```

```
context sip-gateway GW_SIP_PSTN
  bind location-service SER_LOCATION_PSTN

  interface SIP_WAN
    transport-protocol udp+tcp 5060
    no transport-protocol tls
    bind ipaddress ROUTER WAN WAN

context sip-gateway GW_SIP_PSTN
  no shutdown

sip-survivability
  shutdown

port ethernet 0 0
  bind interface ROUTER WAN
  no shutdown

port ethernet 0 1
  bind interface ROUTER LAN
  no shutdown

port e1t1 0 0
  port-type e1
  clock master
  framing crc4
  shutdown

port e1t1 0 1
  port-type e1
  clock master
  framing crc4
  shutdown
```

6 Contacting Patton for Assistance

Patton Electronics offers a wide array of technical services.

https://www.patton.com/support/support.asp

If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

REGION	North America	Western Europe	Central & Eastern Europe
Location	Maryland, USA	Bern, Switzerland	Budapest, Hungary
Time Zone	EST/EDT UTC/GMT - 4/5 hours	CET/CEDT UTC/GMT + 1/2 hours	CET/CEDT UTC/GMT + 1/2 hours
Business Hours	Monday-Friday 8:00am to 5:00pm	Monday-Friday 09:00 to 12:00 13:30 to 17:30	Monday-Friday 8:30 to 17:00
Email	support@patton.com	support@patton.com	support@patton.com
Phone	+ 1 301 975 1007	+41 31 985 25 55	+36 439 3835
Fax	+1 301 869 9293	+41 31 985 2526	