



# Configuration – Command Line Interface

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## **BSG8ew and BSG12ew/aw/tw 1.0** Business Services Gateway

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## How to Get Help

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This section explains how to get help for Nortel products and services.

### Getting Help from the Nortel Web site

The best way to get technical support for Nortel products is from the Nortel Technical Support Web site:

<http://www.nortel.com/support>

This site provides quick access to software, documentation, bulletins, and tools to address issues with Nortel products. More specifically, the site enables you to:

- download software, documentation, and product bulletins
- search the Technical Support Web site and the Nortel Knowledge Base for answers to technical issues
- sign up for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

### Getting Help over the phone from a Nortel Solutions Center

If you don't find the information you require on the Nortel Technical Support Web site, and have a Nortel support contract, you can also get help over the phone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following Web site to obtain the phone number for your region:

<http://www.nortel.com/callus>

### Getting Help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the ERC for your product or service, go to:

<http://www.nortel.com/erc>

## **Getting Help through a Nortel distributor or reseller**

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

# Introduction

---

This document describes how to configure the Business Service Gateway (BSG) using the Web user interface.

## Navigation

- [WAN configuration \(page 9\)](#)
- [VLAN configuration \(page 25\)](#)
- [Wireless network configuration \(page 31\)](#)
- [SIP configuration \(page 35\)](#)
- [VPN configuration \(page 45\)](#)
- [QoS configuration \(page 57\)](#)



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## WAN configuration

---

This section describes the procedures to configure the Wide Area Network (WAN) setup for the Business Services Gateway (BSG) system.

### WAN configuration navigation

- [Ethernet \(page 9\)](#)
- [DSL \(page 16\)](#)
- [T1/E1 \(page 19\)](#)

### Ethernet

This section describes Ethernet configuration. Ethernet appears under WAN configuration if you are connected to a BSG8ew or BSG12ew.

#### Ethernet navigation

- [Ethernet WAN configuration \(page 9\)](#)
- [PPPoE WAN configuration \(page 12\)](#)

#### Ethernet WAN configuration

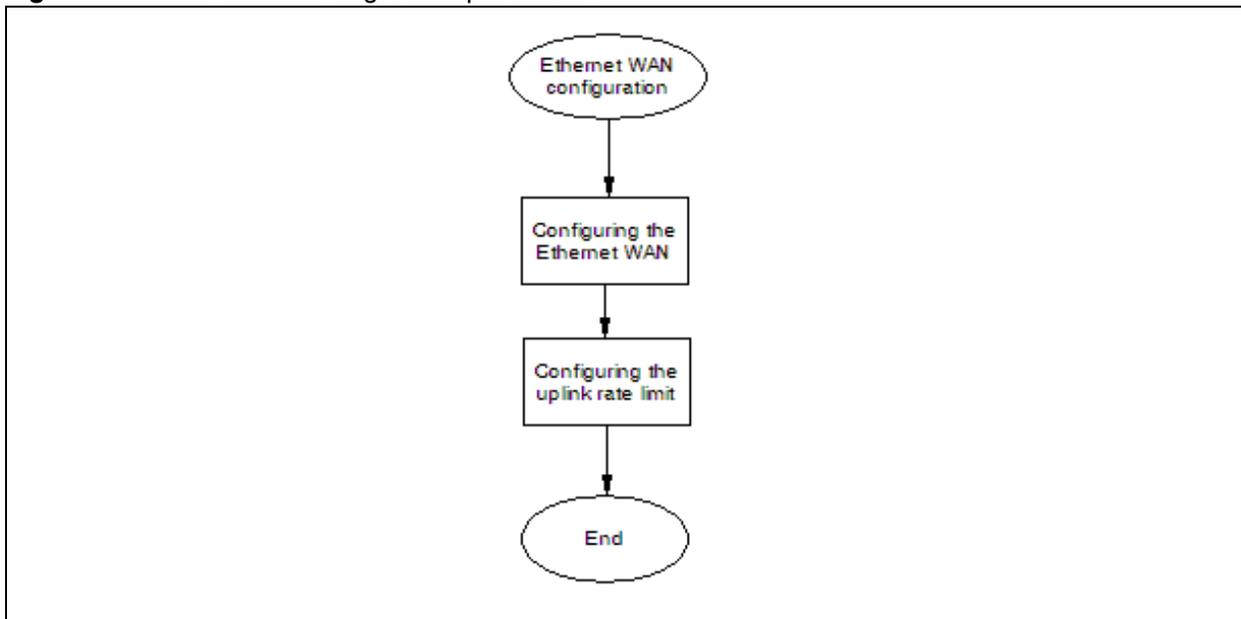
This section describes Ethernet WAN configuration.

#### Prerequisites for Ethernet WAN configuration

- You must have SYSTEM - READ WRITE permission.

#### Ethernet WAN configuration procedures

The following task flow shows the sequence of procedures to perform to configure the Ethernet WAN.

**Figure 1** Ethernet WAN configuration procedures

## Configuring the Ethernet WAN

Complete this procedure to configure the Ethernet WAN.

### Prerequisites

- Access the box through an interface other than the WAN as this procedure will take down the WAN.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Enter interface configuration mode on the WAN interface: <code>interface fastethernet 0/12</code>
3	Disable the physical interface: <code>shutdown</code>
4	Remove any configured IP address: <code>no ip address</code>
5	Set the IP address of the WAN interface: <code>ip address &lt;wan-ip-address&gt; &lt;subnet-mask&gt;</code>
6	Enable the interface: <code>no shutdown</code>

- 7 Exit interface configuration mode.  

```
exit
```

The system is now in global configuration mode.
- 8 Add a default route:  

```
ip route 0.0.0.0 0.0.0.0 <ip-address-of-router> 1
```
- 9 Assign the addresses of the DNS servers:  

```
dns-server forwarder primary <ip-addr-of-primary-dns>
secondary <ip-addr-of-secondary-dns>
```
- 10 Exit all levels of configuration mode:  

```
end
```

**End**

### Variable definitions

The following table describes the variables and values for configuring Ethernet WAN.

Variable	Value
wan-ip-address	Type the WAN IP address, if the IP Address Assignment is manual.
subnet-mask	Type the subnet mask, if the IP Address Assignment is manual.
ip-address-of-router	Type the gateway IP Address, if the IP Address Assignment is manual.
ip-addr-of-primary-dns	Type the primary DNS server IP address, if the IP Address Assignment is manual.
ip-addr-of-secondary-dns	Type the secondary DNS server IP address, if the IP Address Assignment is manual.

## Configuring the uplink rate limit

Complete this procedure to configure the uplink rate limit. This procedure is optional for the Ethernet WAN.

### Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><pre>configure terminal</pre>                     |
| 2    | Set the uplink rate limit speed:<br><pre>uplink rate limit &lt;speed-in-bps&gt;</pre> |
| 3    | Enable the uplink rate limit:<br><pre>uplink rate limit enable</pre>                  |

```
4      Exit all levels of configuration mode:
      end
```

**End**

### Variable definitions

The following table describes the variables and values for configuring the uplink rate limit.

Variable	Value
speed-in-bps	Specifies the uplink rate limit over the WAN interface (in bps). The range is 100,000 to 100,000,000 bps.

### PPPoE WAN configuration

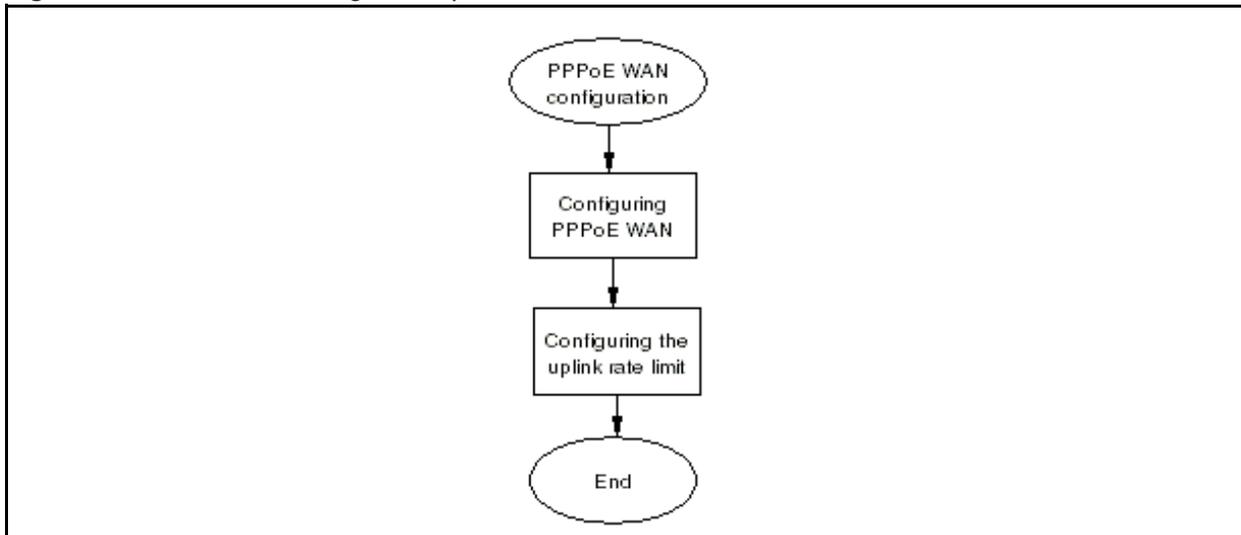
This section describes PPPoE WAN configuration.

### Prerequisites for WAN configuration

- You must have SYSTEM - READ WRITE permission.

### PPPoE WAN configuration procedures

The following task flow shows the sequence of procedures to perform to configure the PPPoE WAN.

**Figure 2** PPPoE WAN configuration procedures

## Configuring the PPPoE WAN

Complete this procedure to configure the PPPoE WAN.

### Prerequisites

- Access the box through an interface other than the WAN because this procedure closes down the WAN.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Enter interface configuration mode on the WAN interface: <code>interface fastethernet 0/12</code>
3	Disable the physical interface: <code>shutdown</code>
4	Exit from interface configuration mode: <code>exit</code> The system is now in global configuration mode.
5	Enter interface configuration mode on the PPP interface: <code>interface ppp 1</code>
6	Attach a PPP link to a physical ethernet: <code>layer fastethernet 0/12</code>
7	Configure the PPP interface with the username and password:

```
ppp username <username> password <password>
8 Enable the interface:
no shutdown
9 Exit from PPP interface configuration mode:
exit
The system is now in global configuration mode.
10 Enter interface configuration mode on the WAN interface:
interface fastethernet 0/9
11 Enable the interface:
no shutdown
12 Exit all levels of configuration mode:
end
```

**End**

### Variable definitions

The following table describes the variables and values for configuring PPPoE WAN.

Variable	Value
username	The PPPoE user name.
password	The PPPoE password.
hostname-of-BSG	The BSG host name.

### Configuring the uplink rate limit

Complete this procedure to configure the uplink rate limit. Only limit the uplink speed if your WAN bandwidth is less than 100Base-T.

#### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Set the uplink rate limit speed: <code>uplink rate limit &lt;speed-in-bps&gt;</code>
3	Enable the uplink rate limit: <code>uplink rate limit enable</code>
4	Exit all levels of configuration mode:

end

**End**

### **Variable definitions**

The following table describes the variables and values for configuring the uplink rate limit.

<b>Variable</b>	<b>Value</b>
speed-in-bps	Specifies the uplink rate limit over the WAN interface (in bps). The range is 100,000 to 100,000,000 bps.

## DSL

DSL appears under WAN configuration if you are connected to a BSG12aw.

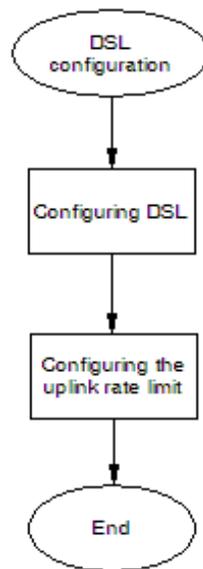
### Prerequisites for DSL configuration

- You must have access read/write permission to configure DSL.

### DSL configuration procedures

The following task flow shows the sequence of procedures to perform to configure DSL.

**Figure 3** DSL configuration procedures



### Configuring DSL

Complete this procedure to configure DSL.

#### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Enter interface configuration mode on the WAN interface: <code>interface pvc 1/1</code>
3	Configure the Virtual Path Identifier:

```

vpi 0
4  Configure the Virtual Channel Identifier:
vci 35
5  Configure the Maximum Receivable Units:
mru 1492
6  Exit from interface configuration mode:
exit
7  Enter interface configuration mode on the PPP interface:
interface ppp 1
8  Bind the PPP to the PVC:
layer pvc 1/1
9  Configure the username and password for the PPP interface:
ppp username user_name password pass_word
10 Enable the interface:
no shutdown
11 Exit from PPP interface configuration mode:
exit
12 Enter interface configuration mode on the WAN interface:
interface pvc 1/1
13 Enable the interface:
no shutdown
14 Exit all levels of configuration mode:
end

```

**End**

### Variable definitions

The following table describes the variables and values for configuring DSL WAN.

Variable	Value
mru	The Maximum Receivable Unit (MRU) value.
vpi	The Virtual Path Identifier (VPI) used by the DSL modem to make a connection.
vci	The Virtual Channel Identifier (VCI) used by the DSL modem to make a connection.
user_name	The user name for the specified PPP interface, used for authentication.
pass_word	The password for the specified PPP interface, used for authentication.

## Configuring the uplink rate limit

Complete this procedure to enable the uplink rate limit. The rate limit value is based on the uplink bandwidth of the ADSL service.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Set the uplink rate limit speed: <code>uplink rate limit &lt;speed-in-bps&gt;</code>
3	Enable the uplink rate limit: <code>uplink rate limit enable</code>
4	Exit all levels of configuration mode: <code>end</code>

**End**

### Variable definitions

The following table describes the variables and values for configuring the uplink rate limit.

Variable	Value
<code>speed-in-bps</code>	Specifies the uplink rate limit over the WAN interface (in bps). The range is 100,000 to 100,000,000 bps.

## T1/E1

T1/E1 appears under WAN configuration if you are connected to a BSG12tw.

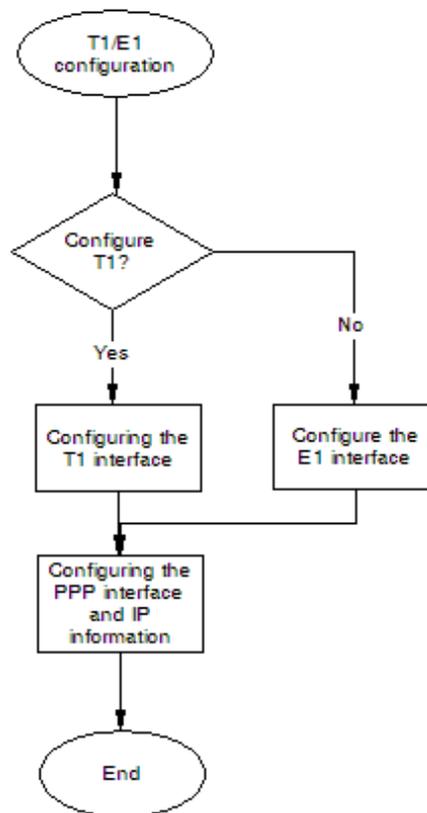
### Prerequisites for T1/E1 configuration

- You must have access read/write permission to configure T1/E1.

### T1/E1 configuration procedures

The following task flow shows the sequence of procedures to perform to configure T1/E1.

Figure 4 T1/E1 configuration procedures



### Configuring the T1 interface

Complete this procedure to configure the T1 interface.

This procedure guides you through setting up one T1 interface.

## Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Enter interface configuration mode on the T1 interface: <code>controller t1 1</code>
3	Configure framing: <code>framing {esf sf}</code>
4	Configure line code: <code>linecode b8zs</code>
5	Configure line mode: <code>mode {csu dsu}</code>
6	Configure long cablelength (if mode is csu): <code>cablelength long {neg225db neg15db neg75db zerodb}</code>
7	Configure short cablelength (if mode is dsu): <code>cablelength short {133 266 399 533 655}</code>
8	Configure clock source: <code>clock source {local loop}</code>
9	Configure channel group index and time slots: <code>channel-group 1 timeslots 1-24</code>
10	Exit all levels of configuration mode: <code>end</code>

**End**

## Variable definitions

The following table describes the variables and values for configuring T1 WAN.

Variable	Value
<code>framing</code>	The framing type for the T1 data line. Options for T1: Extended Super Frame (ESF)— 24 consecutive 193-bit frames of data. Super Frame (SF)—12 consecutive 193-bits of data. The default value is ESF.
<code>linecode</code>	binary eight zero substitution (bz8s)

Variable	Value
mode	The line mode. Options: channel service unit (csu)—select if cable length is equal to or more than 655 feet. data service unit (dsu)—select if cable length is less than 655 feet. The default value is csu.
cablelength long	Cable length options (if mode is csu). Options are: neg225db, neg15db, neg75db, zerodb.
cablelength short	Cable length options (if mode is dsu). Options are: 133, 266, 399, 533, 655
clock source	The clock source. Options are: Local Timing - A local clock source is used or an external clock is attached to the box containing the interface. Loop Timing - Recovered received clock is used to transmit the clock. The default value is Loop Timing.
channel-group	The channel group index. This identifies a grouping of channels on the T1 interface. The range is 1 to 64.
timeslots	The time slots. The range is 1 to 24 for T1.

## Configuring the E1 interface

Complete this procedure to configure the E1 interface.

This procedure guides you through setting up one E1 interface.

### Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><code>configure terminal</code> |
| 2    | Enter e1 mode:<br><code>controller mode e1</code>                   |



**Warning:** Mode change takes effect after you reboot the BSG.

- |   |  |
|---|--|
| 3 | Exit all levels of configuration mode:<br><code>end</code> |
| 4 | Save changes:  |

```

write startup-config
5 Reboot the BSG:
  reload
6 Enter global configuration mode:
  configure terminal
7 Enter interface configuration mode on the E1 interface:
  controller e1 1
8 Configure framing:
  framing {e1|e1crc}
9 Configure line code:
  linecode b8zs
10 Configure line mode:
  mode {csu|dsu}
11 Configure long cablelength (if mode is csu):
  cablelength long {neg225db|neg15db|neg75db|zerodb}
12 Configure short cablelength (if mode is dsu):
  cablelength short {133|266|399|533|655}
13 Configure clock source:
  clock source {local|loop}
14 Configure channel group index and time slots:
  channel-group 1 timeslots 1-24
15 Exit all levels of configuration mode:
  end

```

**End**

### Variable definitions

The following table describes the variables and values for configuring E1 WAN.

Variable	Value
framing	The framing type for the E1 data line. Options for E1: E1 - a single E1 frame consists of 256 bits, grouped into 32 octets or time slots. The timeslots are numbered 0 to 31. E1CRC The default value is E1CRC.
linecode	binary eight zero substitution (bz8s)

Variable	Value
mode	The line mode. Options: channel service unit (csu)—select if cable length is equal to or more than 655 feet. data service unit (dsu)—select if cable length is less than 655 feet. The default value is csu.
cablelength long	Cable length options (if mode is csu). Options are: neg225db, neg15db, neg75db, zerodb.
cablelength short	Cable length options (if mode is dsu). Options are: 133, 266, 399, 533, 655
clock source	The clock source. Options are: Local Timing - A local clock source is used or an external clock is attached to the box containing the interface. Loop Timing - Recovered received clock is used to transmit the clock. The default value is Loop Timing.
channel-group	The channel group index. This identifies a grouping of channels on the E1 interface. The range is 1 to 64.
timeslots	The time slots. The range is 2 to 32 for E1.

## Configuring PPP interface and IP information

Complete this procedure to configure the PPP interface and IP information.

### Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>   |
| 2    | Enter interface configuration mode on the PPP interface:<br><code>interface ppp 1</code>                              |
| 3    | Bind the PPP to the serial interface:<br><code>layer serial 1/1</code>  |
| 4    | Configure the ip address and subnet mask for the PPP interface:<br><code>ip address 47.129.66.70 255.255.255.0</code> |
| 5    | Configure the peer IP address:<br><code>peer ip address &lt;ip address&gt;</code>                                     |
| 6    | Configure the PPP interface as a public interface:  |

- ```
no private link
```
- 7 Enable the interface:
- ```
no shutdown
```
- 8 Exit from PPP interface configuration mode:
- ```
exit
```
- 9 Configure the DNS server:
- ```
dns-server forwarder primary 47.129.66.100 secondary  
47.129.66.101
```
- 10 Exit all levels of configuration mode:
- ```
end
```

**End**

### Variable definitions

The following table describes the variables and values for configuring the PPP interface and IP information.

| Variable                          | Value                                |
|-----------------------------------|--------------------------------------|
| ip address                        | The IP address of the PPP interface. |
| subnet mask                       | The subnet mask of the IP address.   |
| DNS server forwarder<br>primary   | The primary DNS server IP address.   |
| DNS server forwarder<br>secondary | The secondary DNS server IP address. |

## VLAN configuration

---

This section describes the procedures for configuring the virtual local area network (VLAN) settings for the Business Service Gateway (BSG).

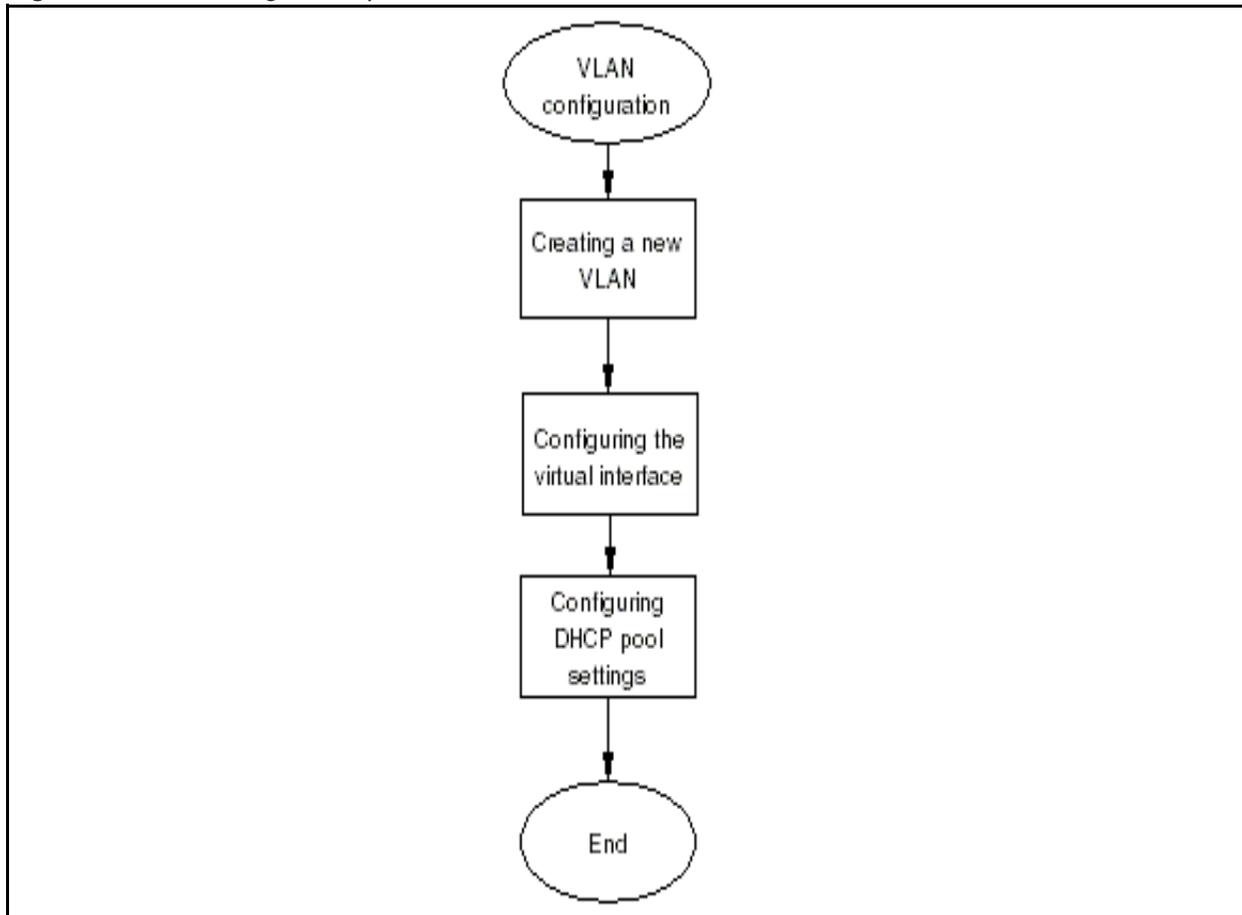
VLAN1 is the default VLAN. The BSG provides VLAN1 as a fully functioning VLAN using all eight ports.

### Prerequisites to VLAN configuration

- You must have SYSTEM - READ WRITE, L2 - READ WRITE, and L3 - READ WRITE permission to access the information on the VLAN configuration panels.

### VLAN configuration procedures

The following task flow shows the sequence of procedures to perform to configure a VLAN.

**Figure 5** VLAN configuration procedures

## VLAN configuration navigation

- [Creating a new VLAN \(page 26\)](#)
- [Configuring the virtual interface \(page 28\)](#)
- [Configuring DHCP pool settings \(page 29\)](#)

## Creating a new VLAN

Complete this procedure to create a new VLAN.

### Procedure steps

| Step | Action                                                                     |
|------|----------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>        |
| 2    | Enter vlan configuration mode:<br><code>vlan &lt;vlan-id-number&gt;</code> |

- 3 Assign the ports to the vlan:
 

```
ports <interface-type> <tagged-port(s)> untagged
<interface-type> <untagged-port(s)> name <vlan-name>
```
- 4 Exit from vlan configuration mode:
 

```
exit
```

The system is now in global configuration mode.
- 5 For each one of the interface ports in the `ports` command, do steps 6 through 8.
- 6 Enter interface configuration mode on the interface port.
 

```
interface fastethernet <port>
```
- 7 For this interface, assign the specified port to the VLAN:
 

```
switchport pvid <vlan-id-number>
```
- 8 Exit the interface configuration mode:
 

```
exit
```

The system is now in global configuration mode.
- 9 After configuring all ports, exit all levels of configuration mode:
 

```
end
```

**End**

### Variable definitions

The following table describes the variables and values for creating a VLAN.

| Variable                      | Value                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>vlan-id-number</code>   | A unique VLAN ID that you want to configure as a static VLAN.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <code>interface-type</code>   | The type of port. Valid values are <code>fastethernet</code> and <code>gigbitethernet</code>                                                                                                                                                                                                                                                                                                                                                                    |
| <code>tagged-port(s)</code>   | <p>The member port number list for a VLAN.</p> <p>Member ports represent the set of ports permanently assigned to the VLAN egress list. Frames that belong to the specified VLAN are forwarded on the ports in the egress list.</p> <p>Enter a comma separated list of ports or port ranges. For example, 0/1-6, 0/11.</p> <p>Valid values for <code>fastethernet</code> are 0/1 to 0/6</p> <p>Valid values for <code>gigabitethernet</code> are 0/7 to 0/8</p> |
| <code>untagged-port(s)</code> | <p>The untagged port number list for a VLAN.</p> <p>Enter a comma separated list of ports or port ranges. For example, 0/1-6, 0/11.</p> <p>The Untagged Ports list must be a subset of the Member Ports.</p> <p>Valid values for <code>fastethernet</code> are 0/1 to 0/6</p> <p>Valid values for <code>gigabitethernet</code> are 0/7 to 0/8</p>                                                                                                               |

| Variable  | Value                                         |
|-----------|-----------------------------------------------|
| vlan-name | The VLAN name.                                |
| port      | The port number of a tagged or untagged port. |

## Configuring the virtual interface

Complete this procedure to configure the virtual interface.

### Procedure steps

| Step | Action                                                                                                         |
|------|----------------------------------------------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>                                            |
| 2    | Enter vlan configuration mode:<br><code>interface vlan &lt;vlan-id-number&gt;</code>                           |
| 3    | Assign the ip address of the vlan:<br><code>ip address &lt;vlan-ip-address&gt; &lt;vlan-subnet-mask&gt;</code> |
| 4    | Set the Maximum Transmission Unit size:<br><code>mtu &lt;frame-size&gt;</code>                                 |
| 5    | Enable the interface:<br><code>no shutdown</code>                                                              |
| 6    | Exit all levels of configuration mode:<br><code>end</code>                                                     |

**End**

### Variable definitions

The following table describes the variables and values for configuring the virtual interface.

| Variable         | Value                                                                                                                                                                   |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| vlan-id-number   | The VLAN identifier.                                                                                                                                                    |
| vlan-ip-address  | The IP address, if the IP address assignment is Manual.                                                                                                                 |
| vlan-subnet-mask | The subnet mask for the LAN, if the IP address assignment is Manual.                                                                                                    |
| frame-size       | The Maximum Transmission Unit value.<br>The range is 90 to 9902. The default value is 1500.<br>If using Fast Ethernet, the MTU frame size must not be larger than 1522. |

## Configuring DHCP pool settings

Complete this procedure to configure DHCP pool settings.

### Procedure steps

| Step | Action                                                                                                                                  |
|------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>                                                                     |
| 2    | Enable the DHCP server:<br><code>service dhcp-server</code>                                                                             |
| 3    | Enter DHCP configuration mode:<br><code>ip dhcp pool &lt;dhcp-pool-number&gt;</code>                                                    |
| 4    | Set the pool addresses:<br><code>network &lt;network-ip-addr&gt; &lt;subnet-mask&gt;</code><br><code>&lt;end-of-pool-ip-addr&gt;</code> |
| 5    | Set the DNS server address that will be passed to the DHCP clients:<br><code>dns-server &lt;ip-addr-of-dns-server-for-pool&gt;</code>   |
| 6    | Set the default router that will be passed to the DHCP clients:<br><code>default-router &lt;ip-addr-of-router&gt;</code>                |
| 7    | Exit all levels of configuration mode:<br><code>end</code>                                                                              |

**End**

### Variable definitions

The following table describes the variables and values to configure DHCP settings.

| Variable                                    | Value                                                                         |
|---------------------------------------------|-------------------------------------------------------------------------------|
| <code>dhcp-pool-number</code>               | The pool ID for the DHCP pool.                                                |
| <code>network-ip-addr</code>                | The subnet of the IP address in the pool.                                     |
| <code>subnet-mask</code>                    | The subnet mask of the IP address in the pool.                                |
| <code>end-of-pool-ip-addr</code>            | The last IP address in the pool.                                              |
| <code>ip-addr-of-dns-server-for-pool</code> | The IP address of the DNS server that will be passed to the DHCP clients.     |
| <code>ip-addr-of-router</code>              | The IP address of the default router that will be passed to the DHCP clients. |



---

## Wireless network configuration

---

This section describes the procedures to configure the wireless network for the Business Services Gateway (BSG) system.

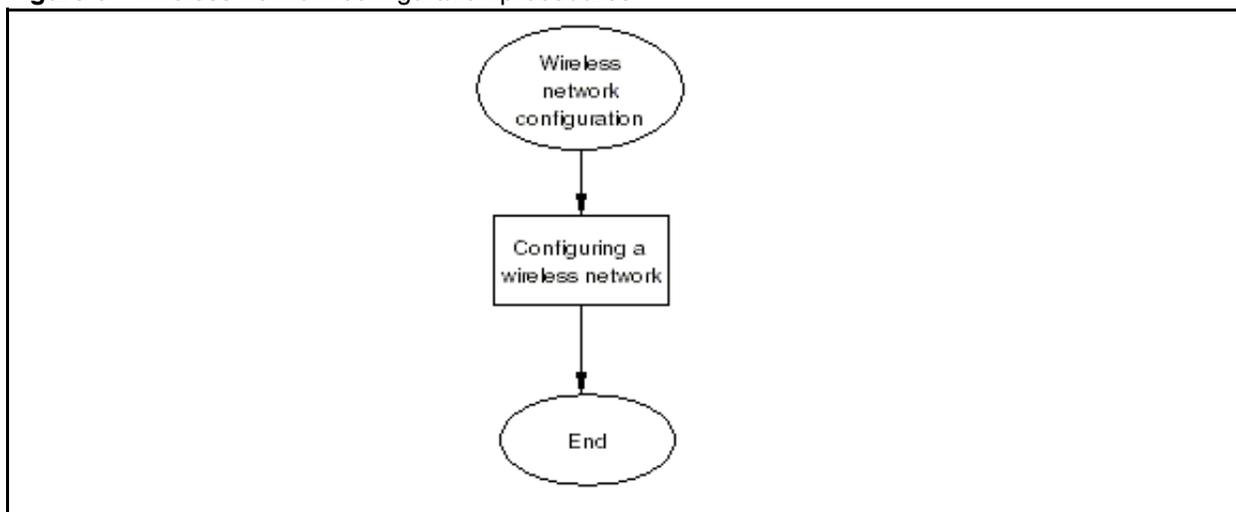
### Prerequisites to wireless network configuration

- You must have WIRELESS - READ WRITE permission.
- You must configure DHCP pool settings for the VLAN used for the wireless network.
- You must configure the radio port as a member port of the VLAN used for the wireless network.

### Wireless network configuration procedures

The following task flow shows the sequence of procedures to perform to configure a wireless network.

**Figure 6** Wireless network configuration procedures



### Configuring a wireless network

Complete this procedure to configure a wireless network.

Note: WLAN 1 exists by default and the SSID cannot be changed. WLAN 1 can be deleted and recreated with a different SSID.

## Procedure steps

- | Step | Action                                                                                                                                  |
|------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>                                                                     |
| 2    | Create a wireless LAN:<br><code>config wlan create &lt;wlan-id&gt; &lt;SSID&gt;</code>                                                  |
| 3    | Tie the WLAN to the VLAN:<br><code>config wlan interface &lt;wlan-id&gt; &lt;vlan-name&gt;</code>                                       |
| 4    | Set the WLAN authorization type<br><code>config wlan security auth-type &lt;auth-type&gt; &lt;wlan-id&gt;</code>                        |
| 5    | Configure the authorization key:<br><code>config wlan security pre-shared-key &lt;wlan-id&gt; &lt;key-format&gt;<br/>&lt;key&gt;</code> |
| 6    | Enable the WLAN:<br><code>config wlan enable &lt;wlan-id&gt;</code>                                                                     |
| 7    | Set the country code. The radio must be disabled before you set the country code:<br><code>config ap country us</code>                  |



**Warning:** Setting the incorrect region can result in the violation of applicable law.

---

- |    |                                                                                                                           |
|----|---------------------------------------------------------------------------------------------------------------------------|
| 8  | Enter radio interface configuration mode:<br><code>interface radio 1/1</code>                                             |
| 9  | Set the radio mode:<br><code>config dot11 mode &lt;radio-mode&gt;</code>                                                  |
| 10 | Turn on the radio. You must set the country code before you enable the radio:<br><code>config dot11 enable network</code> |
| 11 | Exit all configuration modes:<br><code>end</code>                                                                         |

**End**

## Variable definitions

The following table describes the variables and values for configuring the wireless network.

| Variable   | Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| wlan-id    | The ID number of the WLAN. Range is 1 to 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| SSID       | The SSID is alphanumeric and is mapped to the VLAN ID.<br>SSID length ranges between 1 and 32.<br>The mapping must be unique. Only one SSID number per VLAN ID is allowed.                                                                                                                                                                                                                                                                                                                                                                                                    |
| vlan-name  | The VLAN ID to which SSID users belong. Access points use this VLAN ID to tag the packets from the specified users of the given SSID.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| auth-type  | The authorization types are: <ul style="list-style-type: none"> <li>• open - use if authentication is not required.</li> <li>• shared - use for a shared key.</li> <li>• WPA, WPA2, or WPA-WPA2-Mixed- Use if Radius server is used for authentication.</li> <li>• WPA-PSK, WPA2-PSK, or WPA-WPA2-PSK-Mixed -- Use if authentication uses a preshared key.</li> <li>• open1x - use for 802.1x authentication.</li> </ul> <p>Note: Step 5 of this procedure specifies pre-shared-key. When pre-shared-key the auth-type in this command must be one of the "-PSK" options.</p> |
| key-format | The format of the authorization key. The values are either <code>ascii</code> or <code>hex</code> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| key        | The authorization key.<br>Hexadecimal keys can be 64 characters in length.<br>ASCII keys can be 8 to 63 characters in length.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| radio-mode | The required radio mode. Select one of the following options: <ul style="list-style-type: none"> <li>• <code>b</code> - For a network with all 802.11b clients, select 802.11b mode. The BSG has a single 802.11b radio.</li> <li>• <code>g</code> - For a network with all 802.11g clients, select the 802.11g mode.</li> <li>• <code>bg</code> - Mixed Mode for a network with many 802.11g devices with a lesser population of 802.11b clients. Performance degradation can occur.</li> </ul>                                                                              |



---

## SIP configuration

---

This section describes the procedures to configure SIP for the Business Services Gateway (BSG) system.



**Note:** You should configure the emergency number (for example, 911) before you use the SIP server. This ensures that an emergency call originating on your system reaches its destination if the SIP server becomes unavailable. To configure the emergency number, see [Configuring FXO \(page 41\)](#).

---

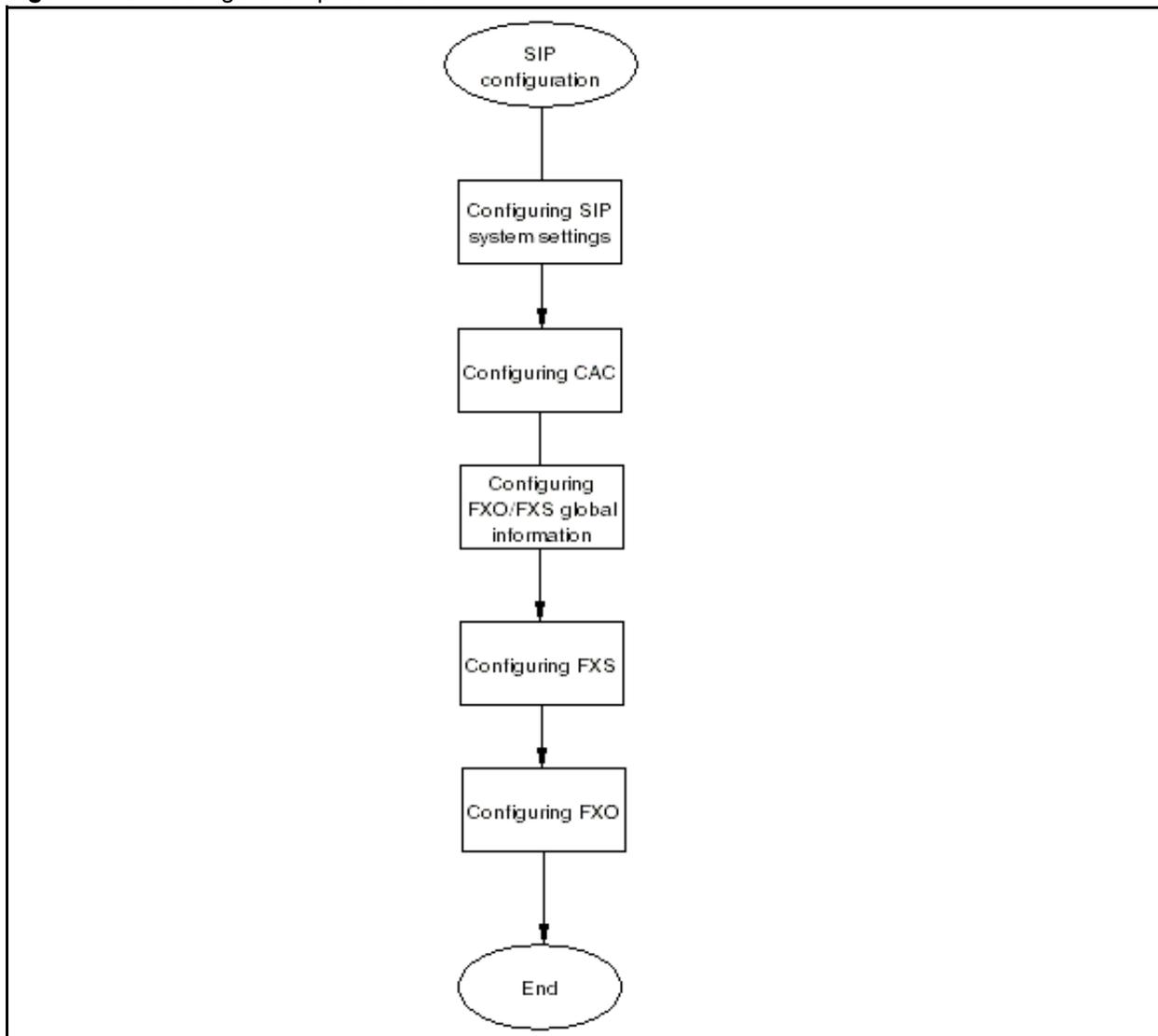
### Prerequisites to SIP configuration

- You must have VOICE - READ WRITE permission.
- The Internal SIP Server must be enabled. For details, refer to the BSG8ew 1.0 *Configuration* (NN47928-500) guide.

### SIP configuration procedures

The following task flow shows the sequence of procedures to perform to configure SIP.

**Figure 7** SIP configuration procedures



## SIP configuration navigation

- [Configuring SIP system settings \(page 37\)](#)
- [Configuring CAC \(page 38\)](#)
- [Configuring FXS/FXO global information \(page 39\)](#)
- [Configuring FXS \(page 40\)](#)
- [Configuring FXO \(page 41\)](#)

## Configuring SIP system settings

Complete this procedure to configure SIP system settings.

### Procedure steps

| Step | Action                                                                                                                                                                                                                                                            |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code><br>The system is now in global configuration mode.                                                                                                                                            |
| 2    | Enter sip configuration mode:<br><code>sip</code>                                                                                                                                                                                                                 |
| 3    | Enter sip domain configuration mode:<br><code>domain</code>                                                                                                                                                                                                       |
| 4    | Set the SIP server domain name:<br><code>set serverdomainname &lt;SIPDomainName&gt;</code>                                                                                                                                                                        |
| 5    | Configure the SIP settings:<br><code>set sipserver PolledServers Pollingaddress &lt;sip-server&gt;</code><br><code>port &lt;port-number&gt; pollinterval &lt;interval&gt; pollretries</code><br><code>&lt;retries&gt; transport &lt;transport-protocol&gt;</code> |
| 6    | Exit from sip domain configuration mode<br><code>exit</code>                                                                                                                                                                                                      |
| 7    | Exit from sip configuration mode:<br><code>exit</code>                                                                                                                                                                                                            |
| 8    | Exit from all configuration modes:<br><code>end</code>                                                                                                                                                                                                            |

**End**

### Variable definitions

The following table describes the variables and values for configuring SIP system settings.

| Variable                   | Value                                                                                                                                                                                                                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>SIPDomainName</code> | The domain name of the SIP server.<br>You can also type the IP address of the SIP server in this field.<br>The default name is mydomain.com.                                                                                                                                                       |
| <code>sip-server</code>    | The ip address or hostname of the central SIP server.<br>If specifying the IP address, use the IP address for this argument.<br>If specifying the hostname, enter <code>hostname &lt;hostname&gt;</code> where <code>&lt;hostname&gt;</code> is the fully qualified domain name of the SIP server. |

| Variable           | Value                                                                                                                                                                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| port-number        | The port number for the transport protocol. Values range from 1 to 65535. The default value is 5060                                                                                                                                                                                                                             |
| interval           | The polling interval in seconds. Enter a number between 10 and 600. The default value is 30 seconds.                                                                                                                                                                                                                            |
| retries            | The number of polling retries. Values range from 1 to 10. The default value is 2.                                                                                                                                                                                                                                               |
| transport-protocol | Select the required transport protocol for SIP. Select one of the following options: <ul style="list-style-type: none"> <li>• <code>udp</code> - User Datagram Protocol</li> <li>• <code>tcp</code> - Transmission Control Protocol</li> <li>• <code>tls</code> - Transport Layer Security</li> </ul> The default value is UDP. |

## Configuring CAC

Complete this procedure to configure CAC settings.



**Note:** If the maximum number of simultaneous SIP calls across the WAN is reached, the next SIP call attempt fails and the caller hears fast busy tone.

## Procedure steps

- | Step | Action                                                                                                                                                                         |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code><br>The system is now in global configuration mode.                                                         |
| 2    | Enter sip configuration mode:<br><code>sip</code>                                                                                                                              |
| 3    | Enter bsg configuration mode:<br><code>bsg</code>                                                                                                                              |
| 4    | Configure the maximum number of simultaneous SIP calls allowed:<br><code>set sipserver MaximumSimWANCallsAllowed &lt;WAN-interface&gt;</code><br><code>&lt;MaxCalls&gt;</code> |
| 5    | Exit from bsg configuration mode<br><code>exit</code>                                                                                                                          |
| 6    | Exit from sip configuration mode:<br><code>exit</code>                                                                                                                         |
| 7    | Exit from all configuration modes:<br><code>end</code>                                                                                                                         |

**End**

## Variable definitions

The following table describes the variables and values for configuring CAC settings.

| Variable      | Value                                                                                                                                                                             |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN-interface | Specifies the WAN interface. Valid values are:<br>Fa0/9 - for a direct ethernet connection<br>ppp1 - when using DSL                                                               |
| MaxCalls      | Type the maximum simultaneous calls allowed on the WAN link.<br>The range is from 1 to 100.<br>The default value for BSG8ew is 50.<br>The default value for BSG12ew/aw/tw is 100. |

## Configuring FXS/FXO global information

Complete this procedure to configure FXS/FXO global information.



**Note:** For BSG8ew, FXS2 (port 2) maintains connection to FXO during power outage for emergency dialing. For BSG12ew/aw/tw, FXS1 (port 1) maintains connection to FXO during power outage for emergency dialing.

## Procedure steps

| Step | Action                                                                      |
|------|-----------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>         |
| 2    | Enter VOIP configuration mode:<br><code>voip1000</code>                     |
| 3    | Disable VOIP:<br><code>shutdown</code>                                      |
| 4    | Set the country code:<br><code>set country code &lt;country-code&gt;</code> |
| 5    | Enable VOIP:<br><code>no shutdown</code>                                    |
| 6    | Exit from all configuration modes:<br><code>end</code>                      |

**End**

| Variable     | Value                                                                                                          |
|--------------|----------------------------------------------------------------------------------------------------------------|
| country-code | Valid options are:<br>us   uk   japan   china   india   germany  <br>south-africa   korea   brazil   australia |

## Configuring FXS

Complete this procedure to configure FXS information.

### Procedure steps

- | Step | Action                                                                                                |
|------|-------------------------------------------------------------------------------------------------------|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>                                   |
| 2    | Enter VOIP configuration mode:<br><code>voip1000</code>                                               |
| 3    | Disable VOIP:<br><code>shutdown</code>                                                                |
| 4    | Exit VOIP configuration mode:<br><code>exit</code><br>The system is now in global configuration mode. |
| 5    | Enter interface configuration mode on FXS channel 1:<br><code>interface fxs channel 1</code>          |
| 6    | Enable FXS line 1:<br><code>set fxs line enable</code>                                                |
| 7    | Set phone number for FXS line 1:<br><code>set fxs channel-number &lt;fxs-phone-number&gt;</code>      |
| 8    | Set the password for FXS line 1:<br><code>set fxs password &lt;fxs-password&gt;</code>                |
| 9    | Set the display name:<br><code>set fxs display-name "John Doe"</code>                                 |
| 10   | Exit to global configuration mode:<br><code>exit</code>                                               |
| 11   | Enter interface configuration mode on FXS channel 2:<br><code>interface fxs channel 2</code>          |
| 12   | Enable FXS line 2:                                                                                    |

- ```

set fxs line enable
13 Set phone number for FXS line 2:
set fxs channel-number <fxs-phone-number>
14 Set the display name:
set fxs display-name "John Doe"
15 Set the password for FXS line 2:
set fxs password <fxs-password>
16 Exit from interface configuration mode:
exit
17 Enter VOIP configuration mode:
voip1000
18 Enable VOIP:
no shutdown
19 Exit from all configuration modes:
end

```

**End**

## Variable definitions

The following table describes the variables and values for configuring FXS information.

Variable	Value
<code>fxs-phone-number</code>	The phone number assigned to the line. This is the number that will be dialed to access this phone. The maximum length is 31 digits.
<code>fxs-password</code>	The password to access the FXS line. The maximum length is 31 digits.

## Configuring FXO

Complete this procedure to configure FXO information.



**Note:** Use this procedure to configure the emergency number. You should configure the emergency number (for example, 911) before you use the SIP server. This ensures that an emergency call originating on your system reaches its destination if the SIP server becomes unavailable.

## Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>                                       |
| 2    | Enter VOIP configuration mode:<br><code>voip1000</code>   |
| 3    | Disable VOIP:<br><code>shutdown</code>  |
| 4    | Exit VOIP configuration mode:<br><code>exit</code><br>The system is now in global configuration mode.     |
| 5    | Enter interface configuration mode on FXO channel 1:<br><code>interface fxo channel 1</code>              |
| 6    | Enable FXO line 1:<br><code>set pstn-gateway enable</code>  |
| 7    | Set phone number for FXO line 1:<br><code>set fxo channel-number &lt;fxo-phone-number&gt;</code>          |
| 8    | Set the password for FXO line 1:<br><code>set fxo password &lt;fxo-password&gt;</code>                    |
| 9    | Set the forwarding number:<br><code>set fxo forward phone-no &lt;fxo-forward-phone-number&gt;</code>      |
| 10   | Set the maximum number of rings allowed:<br><code>set fxo ring count &lt;max-number-rings&gt;</code>      |
| 11   | Set the emergency number:<br><code>set fxo emergency-number &lt;emergency-phone-number&gt;</code>         |
| 12   | Set the on-hook detection time:<br><code>set fxo hook detect time &lt;detect-time&gt; milliseconds</code> |
| 13   | Exit from interface configuration mode:<br><code>exit</code>  |
| 14   | Enter VOIP configuration mode:<br><code>voip1000</code>   |
| 15   | Enable VOIP:<br><code>no shutdown</code>  |
| 16   | Exit from all configuration modes:<br><code>end</code>  |

---

**End**

### Variable definitions

The following table describes the variables and values for configuring FXO information.

Variable	Value
<code>fxo-phone-number</code>	The phone number assigned to the line.
<code>fxo-password</code>	The password to access the FXO line.
<code>fxo-forward-phone-number</code>	Number to use when an incoming call on the FXO channel requires forwarding.
<code>max-number-rings</code>	The ring count. This is the maximum number of rings within which FXO must get an answer from the remote number. The minimum value is 1 and maximum value is 6. The default value is 2.
<code>emergency-phone-number</code>	The emergency phone number to route emergency calls to.
<code>detect-time</code>	Type the on-hook detection time. The value ranges from 100 to 10000 milliseconds. The default value is 2000 milliseconds.



## VPN configuration

---

This section describes the procedures to configure the Virtual Private Network (VPN) for the Business Services Gateway (BSG) system.



**Note:** If you are connecting two BSG units at either end of the VPN tunnel, ensure the IP addresses are different.

---

### Prerequisites for VPN configuration

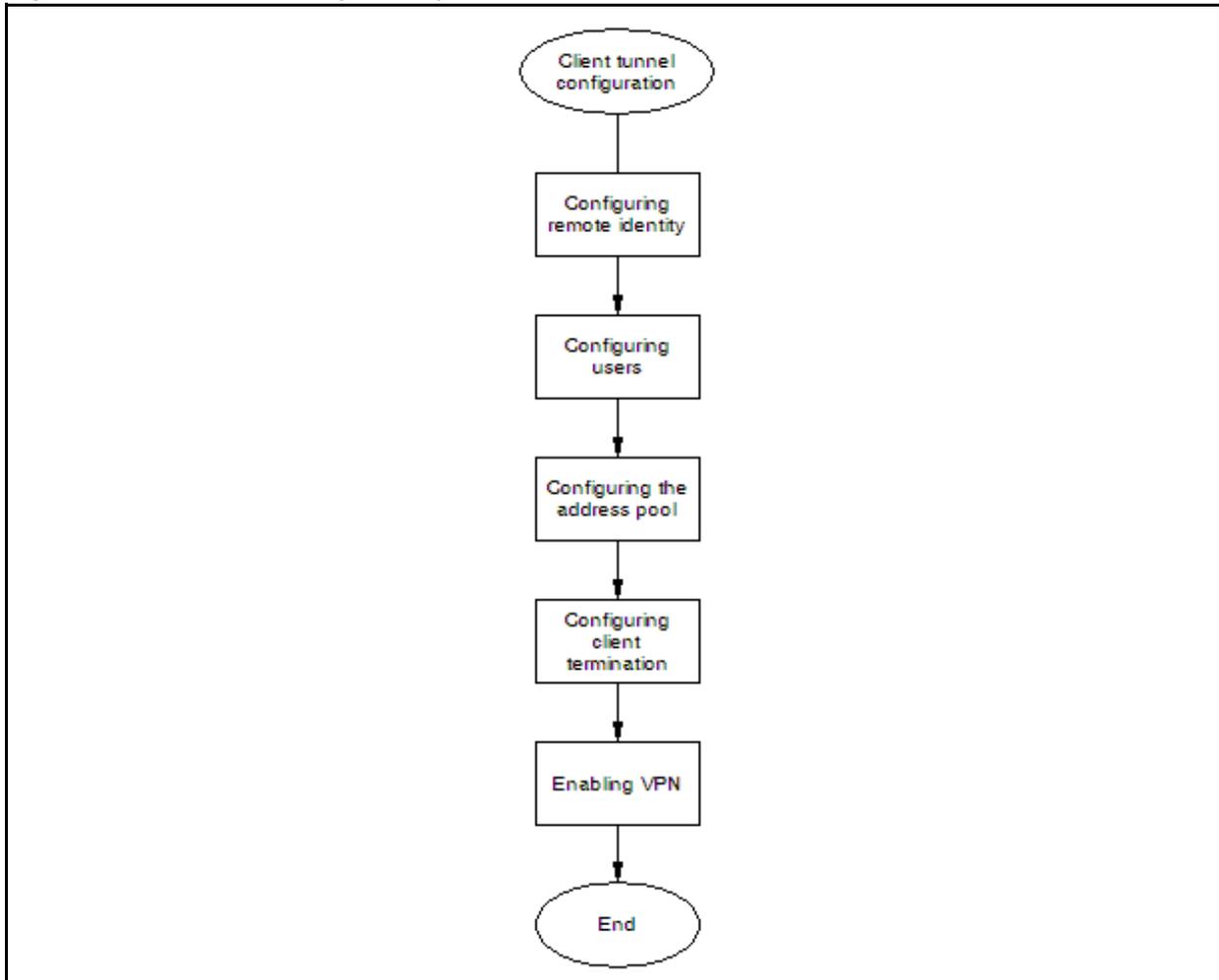
- You must have VPN - READ WRITE permission.

### VPN configuration navigation

- [Client tunnel configuration procedures \(page 45\)](#)
- [Branch office tunnel configuration procedures \(page 52\)](#)

### Client tunnel configuration procedures

The following task flow shows the sequence of procedures to perform to configure a client tunnel.

**Figure 8** Client tunnel configuration procedures

## Client tunnel configuration navigation

- [Configuring remote identity \(client\) \(page 46\)](#)
- [Configuring users \(page 47\)](#)
- [Configuring the address pool \(page 48\)](#)
- [Configuring client termination \(page 49\)](#)
- [Enabling VPN \(client\) \(page 50\)](#)

## Configuring remote identity (client)

Complete the following procedure to configure the remote identity.

### Procedure steps

Step	Action
------	--------

- 1 Enter global configuration mode:  

```
configure terminal
```
- 2 Assign a VPN remote identity:  

```
vpn remote identity <identity-type> <identity-value> psk  
<preshared-key>
```
- 3 Exit from all configuration modes:  

```
end
```

**End**

## Variable definitions

The following table describes the variables and values for configuring VPN global settings.

Variable	Value
identity-type	The user identity type that uniquely identifies the peer. Select one of the following: <ul style="list-style-type: none"> <li>• IPV4 - specifies the IP address</li> <li>• FQDN- specifies the fully qualified domain name (an unambiguous domain name that denotes the position of the node in the DNS tree hierarchy)</li> <li>• EMAIL - specifies the email of the peer</li> <li>• KEYID - specifies the string that uniquely identifies the peer</li> </ul>
identity-value	The value corresponding to the selected Remote Identity Type.
preshared-key	A string of text which is the key that VPN uses to authenticate before receiving any other credentials.

## Configuring users

Complete the following procedure for each remote user.

### Procedure steps

- | Step | Action   |
|------|--|
| 1    | Enter global configuration mode:<br><pre>configure terminal</pre>  |
| 2    | For each user, create a user name and password:<br><pre>ra-vpn username &lt;username&gt; password &lt;password&gt;</pre> |
| 3    | Exit from all configuration modes:<br><pre>end</pre>   |

**End**

## Variable definitions

The following table describes the variables and values for configuring the user database.

Variable	Value
username	The user name. The range is 1 to 31 characters.
password	The password for the user. The range is 1 to 31 characters.

## Configuring the address pool

Complete this procedure to configure the address pool.

### Prerequisites



**Note:** The address pool cannot be in the same subnet as DHCP addresses.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Configure the address pool for incoming VPN connections: <code>ip ra-vpn pool &lt;poolname&gt; &lt;start_ip-end_ip&gt;</code>
3	Exit from all configuration modes: <code>end</code>

**End**

### Variable definitions

The following table describes the variables and values for configuring the VPN address pool.

Variable	Value
poolname	The name of the address pool. Addresses within the pool are allocated to remote users when they make VPN connection requests.
start_ip	The first IP address of the pool.
end_ip	The last IP address of the pool.

## Configuring client termination

Complete this procedure to configure client termination.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Create a policy map and enter crypto configuration mode <code>crypto map &lt;policy-name&gt;</code>
3	Set the mode for the cryptographic key <code>crypto key mode ravpn-preshared-key</code>
4	Set the cryptographic IPsec mode <code>crypto ipsec mode tunnel</code>
5	Set the identity of the other end of the connection. The local type and value must match the "VPN remote identity" values set in 'Configuring remote identity': <code>isakmp peer identity &lt;id-type&gt; &lt;id-value&gt;</code>
6	Set the identity of the BSG of the connection <code>isakmp local identity ipv4 &lt;IP-addr-of-BSG&gt;</code>
7	Set the IKE phase 1 values <code>isakmp policy encryption aes-192 hash sha1 dh group5 exch aggressive lifetime &lt;lifetime-units&gt; &lt;lifetime-value&gt;</code>
8	Set the IKE phase 2 values <code>crypto map ipsec encryption esp aes-192 authentication esp sha1 pfs group5 lifetime &lt;lifetime-units&gt; &lt;lifetime-value&gt;</code>
9	Configure the sources and destinations to which this policy applies <code>access-list apply any source &lt;source-IP&gt; &lt;source-subnet-mask&gt; destination &lt;dest-IP&gt; &lt;dest-subnet-mask&gt;</code>
10	Exit crpto configuration mode: <code>exit</code> The system is now in global configuration mode.
11	Enter interface configuration mode on the WAN interface: <code>interface &lt;WAN-interface-type&gt; &lt;WAN-interface-id&gt;</code>
12	Assign the cryptographic policy to the WAN interface: <code>crypto map &lt;policy-name&gt;</code>
13	Exit from all configuration modes: <code>end</code>

**End**

## Variable definitions

The following table describes the variables and values for configuring client termination.

Variable	Value
policy-name	A IPsec policy name. Each policy must have a unique name. The range is 1 to 63 characters. Policy name <b>ALL</b> is not allowed.
id-type	The id-type has to match an id type that was set in the remote identity. The valid values are: <ul style="list-style-type: none"> <li>• IPV4 - IP address</li> <li>• FQDN - Fully Qualified Domain Name</li> <li>• EMAIL - email address of the user</li> <li>• KEYID - uniquely identifies the peer</li> </ul>
id-value	The id-value has to match the id-value set in the remote identity.
IP-addr-of-BSG	The IP address of this BSG.
lifetime-units	The life time unit. Valid values are secs   mins   hrs
lifetime-value	The life time value. The range is 5 minutes to 8 hours.
source-IP	The Source IP address of the outbound traffic.
source-subnet-mask	The Network mask of the outbound traffic.
dest-IP	The Destination IP address of the outbound traffic.
dest-subnet-mask	The Destination mask of the outbound traffic.
WAN-interface-type	The valid values are: ppp - use for DSL fastethernet - use for direct connection to ethernet or cable modem
WAN-interface-id	The valid values are: 1 - use for DSL 0/9 - user for direct connection to ethernet or cable modem

## Enabling VPN (client)

Complete this procedure to enable VPN.

### Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><code>configure terminal</code> |
| 2    | Enable VPN:   |

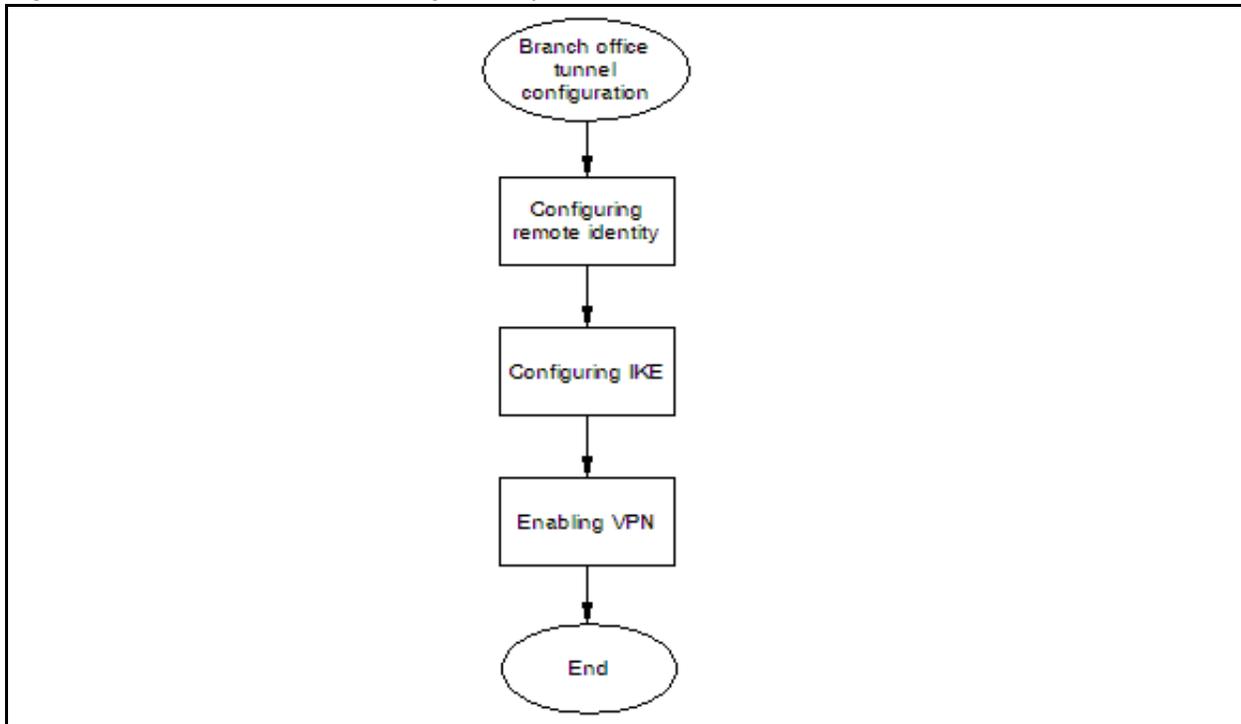
```
set vpn enable  
3 Exit from all configuration modes:  
end
```

**End**

## Branch office tunnel configuration procedures

The following task flow shows the sequence of procedures to configure a branch office tunnel.

**Figure 9** Branch office tunnel configuration procedures



### Branch office tunnel configuration navigation

- [Configuring remote identity \(branch office\) \(page 52\)](#)
- [Configuring IKE \(page 53\)](#)
- [Enabling VPN \(branch office\) \(page 55\)](#)

### Configuring remote identity (branch office)

Complete the following procedure to configure the remote identity.

#### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Assign a VPN remote identity: <code>vpn remote identity &lt;identity-type&gt; &lt;identity-value&gt; psk &lt;preshared-key&gt;</code>

- 3 Exit from all configuration modes:  
end

**End**

## Variable definitions

The following table describes the variables and values for configuring VPN global settings.

Variable	Value
identity-type	The user identity type that uniquely identifies the peer. Select one of the following: <ul style="list-style-type: none"> <li>• IPV4 - specifies the IP address</li> <li>• FQDN- specifies the fully qualified domain name (an unambiguous domain name that denotes the position of the node in the DNS tree hierarchy)</li> <li>• EMAIL - specifies the email of the peer</li> <li>• KEYID - specifies the string that uniquely identifies the peer</li> </ul>
identity-value	The value corresponding to the selected Remote Identity Type.
preshared-key	A string of text which is the key that VPN uses to authenticate before receiving any other credentials.

## Configuring IKE

Complete the following procedure to configure the IKE pre-shared secret.

### Prerequisites

- Before you modify a policy, you must set the Policy Status to INACTIVE.

### Procedure steps

- | Step | Action   |
|------|--|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>                                    |
| 2    | Create a policy map and enter crypto configuration mode<br><code>crypto map &lt;policy-name&gt;</code> |
| 3    | Set the mode for the cryptographic key<br><code>crypto key mode preshared-key</code>                   |
| 4    | Set the cryptographic IPsec mode<br><code>crypto ipsec mode tunnel</code>                              |

- 5 Set the identity of the other end of the connection. The address must match the "VPN remote identity" value set in the 'Configuring remote identity':  

```
isakmp peer identity ipv4 <remote-IP-address>
```
- 6 Configure the IP address of the remote end of the tunnel:  

```
set peer <remote-IP-address>
```
- 7 Set the identity of the BSG of the connection:  

```
isakmp local identity ipv4 <IP-addr-of-BSG>
```
- 8 Set the IKE phase 1 values  

```
isakmp policy encryption aes-192 hash sha1 dh group5 exch  
<exch-mode> lifetime <lifetime-units> <lifetime-value>
```
- 9 Set the IKE phase 2 values  

```
crypto map ipsec encryption esp aes-192 authentication esp  
sha1 pfs group5 lifetime <lifetime-units> <lifetime-value>
```
- 10 Configure the sources and destinations to which this policy applies  

```
access-list apply any source <source-IP>  
<source-subnet-mask> destination <dest-IP>  
<dest-subnet-mask>
```
- 11 Exit crypto configuration mode:  

```
exit
```

The system is now in global configuration mode.
- 12 Enter interface configuration mode on the WAN interface:  

```
interface <WAN-interface-type> <WAN-interface-id>
```
- 13 Assign the cryptographic policy to the WAN interface:  

```
crypto map <policy-name>
```
- 14 Exit from all configuration modes:  

```
end
```

**End**

### Variable definitions

The following table describes the variables and values for configuring IKE preshared secret.

Variable	Value
policy-name	A IPsec policy name. Each policy must have a unique name. The range is 1 to 63 characters. Policy name <b>ALL</b> is not allowed.
remote-IP-address	IP address of the other end of the VPN connection.
IP-addr-of-BSG	The IP address of this BSG.

Variable	Value
exch-mode	The exchange mode. Valid values are: <ul style="list-style-type: none"> <li>• Main - for the highest level of Security.</li> <li>• Aggressive - for speed</li> </ul>
lifetime-units	The life time unit. Valid values are secs   mins   hrs
lifetime-value	The life time value. The range is 5 minutes to 8 hours.
source-IP	The Source IP address of the outbound traffic.
source-subnet-mask	The Network mask of the outbound traffic.
dest-IP	The Destination IP address of the outbound traffic.
dest-subnet-mask	The Destination mask of the outbound traffic.
WAN-interface-type	The valid values are: ppp - use for DSL fastethernet - use for direct connection to ethernet or cable modem
WAN-interface-id	The valid values are: 1 - use for DSL 0/9 - user for direct connection to ethernet or cable modem

## Enabling VPN (branch office)

Complete this procedure to enable VPN.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Enable VPN: <code>set vpn enable</code>
3	Exit from all configuration modes: <code>end</code>

**End**



## QoS configuration

---

This section describes the procedures to configure Quality of Service (QoS) for the Business Services Gateway (BSG) system.

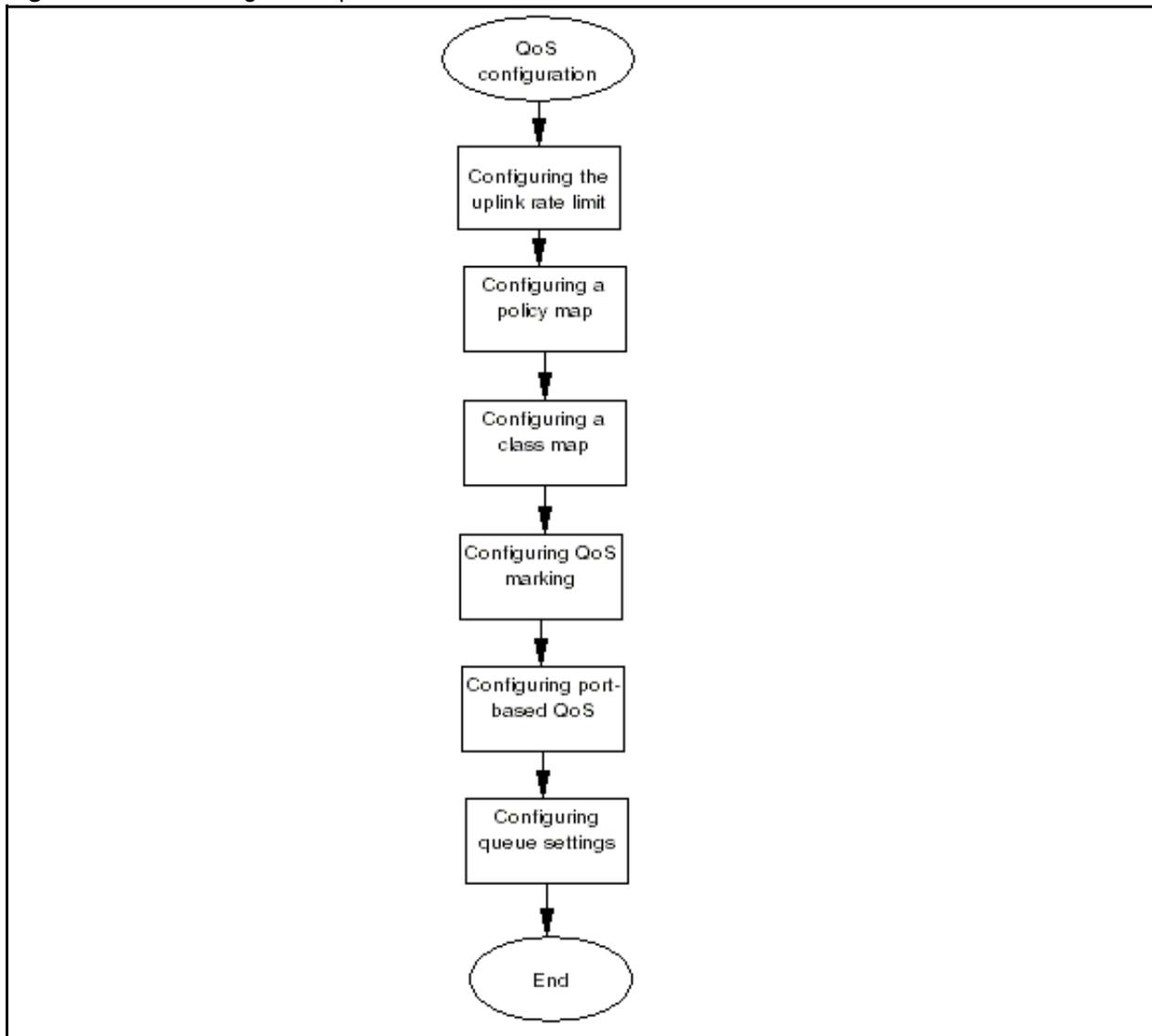
QoS provides different types and levels of service for network traffic. With QoS you can assign different priorities for different types of data and guarantee a certain level of performance.

### Prerequisites for QoS configuration

- You must have SYSTEM - READ WRITE permission to configure QoS.
- QoS Status must be enabled (it is enabled by default).
- You must know the uplink rate limit. This is provided by your ISP. The total bandwidth you assign to all flows must be less than or equal to the uplink rate.
- You must calculate how much bandwidth to give to the various flows (for example, voice, data, and video).

### QoS configuration procedures

The following task flow shows the sequence of procedures to perform to configure QoS.

**Figure 10** QoS configuration procedures

### QoS configuration navigation

- [Configuring the uplink rate limit \(page 59\)](#)
- [Configuring a policy map \(page 59\)](#)
- [Configuring a class map \(page 60\)](#)
- [Configuring QoS marking \(page 61\)](#)
- [Configuring port-based QoS \(page 62\)](#)
- [Configuring queue settings \(page 63\)](#)

## Configuring the uplink rate limit

Complete this procedure to configure the uplink rate limit. This procedure is optional for the Ethernet WAN.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Set the uplink rate limit speed: <code>uplink rate limit &lt;speed-in-bps&gt;</code>
3	Enable the uplink rate limit: <code>uplink rate limit enable</code>
4	Exit all levels of configuration mode: <code>end</code>

**End**

### Variable definitions

The following table describes the variables and values for configuring the uplink rate limit.

Variable	Value
<code>speed-in-bps</code>	Specifies the uplink rate limit over the WAN interface (in bps). The range is 100,000 to 100,000,000 bps.

## Configuring a policy map

Complete this procedure to configure a policy map. A policy map defines the committed and peak bandwidth for a type of traffic.

Using TRTCM, the BSG meters the IP packet stream and marks the packets based on Peak Information Rate (PIR) and Committed Information Rate (CIR), and their associated burst sizes (CBS and PBS). TRTCM marks the packet red if it exceeds PIR, yellow if it exceeds CIR, and green if it does not exceed CIR.

### Procedure steps

Step	Action
1	Enter global configuration mode: <code>configure terminal</code>
2	Create the policy map and assign rate values:

```

police <policer-id> type trtcm PIR <PIR-value> CIR
<CIR-value> PBS <PBS-value> CBS <CBS-value>

```

**3** Exit all levels of configuration mode:

```
end
```

**End**

## Variable definitions

The following table describes the variables and values for configuring policy map settings.

Variable	Value
policer-id	The unique ID of the policer.
PIR-value	The PIR key value in bytes per second. The default value is 3250000.
CIR-value	The CIR key value in bytes per second. The default value is 3000000.
PBS-value	The Peak frame size PBS key value in bytes per second. The default value is 15000.
CBS-value	The Committed frame size CBS key value in bytes per second. The default value is 10000.

## Configuring a class map

A class map classifies a stream of traffic. The BSG uses a class map to decide whether a stream of traffic is voice, Web, email, video, or some other type. Any packets flowing between the source and destination IP addresses are classified according to the class map.

## Procedure steps

**Step**    **Action**

**1**    Enter global configuration mode:

```
configure terminal
```

**2**    Create the class map:

```

class-map <classifier-id> permit <protocol> source-net
<source-network> <source-mask> dest-net
<destination-network> <destination-mask> source-port
<source-port> dest-port <destination-port> dscp <dscp-
value> interface <interface-type> <interface-id>

```

**3**    Connect the policy map to the class map:

```
policy-map <policer-id> class <classifier-id>
```

**4**    Exit all levels of configuration mode:

```
end
```

**End**

## Variable definitions

The following table describes the variables and values for configuring class maps.

Variable	Value
<b>class-map</b>	
classifier-id	The Class Map identifier. The value ranges from 1 to 2147483647.
protocol	The protocol ID to identify the packet flow. Valid values are: <ul style="list-style-type: none"> <li>TCP – only TCP packets are classified using the class map.</li> <li>UDP – only UDP packets are classified using the class map.</li> </ul>
policer-id	The Policy Map identifier. The value ranges from 1 to 2147483647.
source-network	The source IP address that uniquely defines a packet flow.
source-mask	The subnet mask for the source IP address.
destination-network	The destination IP address that uniquely defines a packet flow.
destination-mask	The destination subnet mask address for the destination IP address.
source-port	The source port. The value ranges from 1 to 65535.
destination-port	The destination port. The value ranges from 1 to 65535.
dscp-value	The incoming Differentiated Services Code Point (DSCP). The value ranges from 0 to 63.
interface-type	Type of the ingress L3 interface. The physical or virtual interface type.
interface-id	The specific interface of the interface type.
<b>policy-map</b>	
policer-id	The Policy Map identifier. The value ranges from 1 to 2147483647.
classifier-id	The Class Map identifier. Use the same value as in class-map. The value ranges from 1 to 2147483647.

## Configuring QoS marking

Complete this procedure to mark outgoing packets with a DSCP value and a 802.1p value, and place the outgoing packets in a specific QoS queue. The queue where the packet is placed determines the priority of transmission for the packet. For example, voice packets should be destined for strict priority queues, while email packets have lower priority and can be delayed without notice. On the WAN port, the following equation determines the packet destination queue:  $\text{queue} = 7 - 802.1 \text{ priority}$ .

## Procedure steps

- | Step | Action   |
|------|--|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>  |
| 2    | Set the priority and the DSCP of the class:<br><code>class &lt;classifier-id&gt; set ip dscp &lt;dscp-value&gt; priority &lt;priority-value&gt;</code> |
| 3    | Exit all levels of configuration mode:<br><code>end</code>   |

**End**

## Variable definitions

The following table describes the variables and values to configure markings.

Variable	Value
<code>classifier-id</code>	The Class Map identifier. The value ranges from 1 to 2147483647.
<code>dscp-value</code>	Specifies Differentiated Services Code Point (DSCP) value. The value frames from 0 to 63.
<code>priority-value</code>	Select the 802.1p priority. The value ranges from 1 to 7. The default value is 7–802.1p.

## Configuring port-based QoS

Complete this procedure to set the priority of each queue on a particular port. Each port has eight queues, and each queue has eight priority settings.

## Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>   |
| 2    | Enter:interface configuration mode:<br><code>interface &lt;interface-type&gt; &lt;interface-id&gt;</code>   |
| 3    | Configure the priority and traffic class of the interface:<br><code>vlan map-priority &lt;priority-value&gt; traffic-class &lt;traffic-class&gt;</code> |
| 4    | Exit all levels of configuration mode:<br><code>end</code>  |

End

## Variable definitions

The following table describes the variables and values for configuring port-based QoS.

Variable	Value
interface-type	Type of the ingress L3 interface. The physical or virtual interface type.
interface-id	The specific interface of the interface type.
priority-value	The priority for the traffic class. Values range from 0 to 7.
traffic-class	The traffic classes supported on the port. The values ranges from 0 to 7.

## Configuring queue settings

Complete this procedure to define the queue settings for a specific port. Set the minimum and maximum threshold values for the Two Rate Three Color Marker (TRTCM) police type.

Queues 0, 1, and 2 are configured as strict priority queues. The weights for these queues default to 0 and cannot be changed. The weights of the remaining queues (queues 3 to 7) can be any value within the range except 0. The remaining queues are configured as weighted round robin (WRR). Packets received in strict priority queues receive immediate service from the scheduler, thereby pre-empting scheduling for WRR queues.



**Note:** If you add a DSL or T1/E1 WAN configuration, the PPP interface you created appears in the Port No drop-down list. You can select and configure the PPP interface. The defaults for the PPP interface are the same as the defaults for the other ports. If you delete the DSL or T1/E1 WAN configuration, it no longer appears as a selection in the Port No drop-down list.

## Procedure steps

- | Step | Action  |
|------|---|
| 1    | Enter global configuration mode:<br><code>configure terminal</code>   |
| 2    | Enter interface configuration mode:<br><code>interface &lt;interface-type&gt; &lt;interface-id&gt;</code>   |
| 3    | Configure the RED parameters of a queue:<br><code>queue threshold &lt;queue-number&gt; &lt;min-green-threshold&gt;<br/>&lt;max-green-threshold&gt; &lt;min-amber-threshold&gt;<br/>&lt;max-amber-threshold&gt;</code> |
| 4    | Configure the weight of the queue:<br><code>queue weight &lt;queue-number&gt; &lt;queue-weight&gt;</code>   |

Repeat steps 3 and 4 for each queue that you need to configure.

- 5 Exit all levels of configuration mode:  
end

**End**

## Variable definitions

The following table describes the variables and values for configuring QoS queue settings.

Variable	Value
interface-type	Type of the ingress L3 interface. The physical or virtual interface type.
interface-id	The specific interface of the interface type.
queue-number	Specifies the value for the queue number.
min-green-threshold	Type the minimum Green Threshold value. Green packets start to drop at the configured minimum depth. The default value is 100.
max-green-threshold	Type the maximum Green Threshold value. All green packets are dropped at the configured maximum depth. The default value is 200.
min-amber-threshold	Type the minimum Amber Threshold value. Amber packets start to drop at the configured minimum depth. The default value is 50.
max-amber-threshold	Type the maximum Amber Threshold value. All amber packets are dropped at the configured maximum depth. The default value is 75.
queue-weight	Type the queue weight. The default weights are: <ul style="list-style-type: none"> <li>• queue 0 - 0 (cannot be changed)</li> <li>• queue 1 - 0 (cannot be changed)</li> <li>• queue 2 - 0 (cannot be changed)</li> <li>• queue 3 - 512 (cannot be set to 0)</li> <li>• queue 4 - 256 (cannot be set to 0)</li> <li>• queue 5 - 128 (cannot be set to 0)</li> <li>• queue 6 - 64 (cannot be set to 0)</li> <li>• queue 7 - 32 (cannot be set to 0)</li> </ul> Configure the weight to zero to make the queue to be a part of strict priority scheduler.