BCM50 Rls 6.0

Router - Network Address Translation (NAT)

Task Based Guide

Downloading documents
For the most current versions of documentation, see the Avaya Support. Web site: http://www.avaya.com/support

Contact Avaya Support
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Network Address Translation (NAT)

Overview

Many people view the Internet as a "one-way street"; they forget that while their computer is connected to the Internet, the Internet is also connected to their computer. That means that anybody with Net access can potentially access resources on their computers (such as files, email, company network etc). Most personal computer operating systems are not designed with security in mind, leaving them wide open to attacks from the Internet.

Network address translation (NAT) is a scheme that allows two connected networks (for example your Private LAN connected to the Internet) to use different and incompatible IP addressing schemes. Address translation allows hosts on a private internal network to transparently communicate with destinations on an external network or vice versa. In this way, NAT is being used as a security mechanism to hide the internal IP addresses.
This also means that NAT allows the connecting of multiple computers to the Internet (or any other IP network) using one IP address, providing small businesses the means to connect their network to the Internet cheaply and efficiently.

Note: This guide relates to the BCM50a/ba and BCM50e/be models only.

Note: Although the BCM50a/ba models will not be supplied with BCM 6.0, it is possible to upgrade the variants of these models to BCM 6.0, if they were originally supplied with BCM50 R2 or BCM50 R3 software.

Note: The BCM50 Integrated Router is almost identical to the Business Secure Router (BSR) models. BCM50a/ba routers are based on the BSR252 and BCM50e/be routers are based on the BSR222.

BCM50 and NAT

The BCM50 Integrated Router enables a LAN network consisting of multiple computers to access the Internet, even though there may only be a single or a few WAN IP Addresses available. The process is roughly described as follows:

- A PC on the network makes a request for information from the Internet
- The BCM50 Integrated Router keeps a track of IP and port information for the outgoing packets, and replaces the source information with its own WAN information
- Returning packets are checked and the original IP and port information is applied, to ensure that the packets return to the originator

BCM50 Integrated Router NAT is able to perform with either a single ISP-allocated WAN IP address, or multiple ISP-allocated WAN IP addresses. If a

single WAN IP Address is used, then the Single User Account (SUA) feature can be used. If multiple IP Addresses are used then the Full Feature NAT service can be used.

BCM50 NAT Modes

There are a total of five NAT modes on the BCM50 Integrated Router. Which modes you can use depends on the number of WAN IP Addresses have been issued by the ISP.

Single WAN IP Address

The following BCM50 Integrated Router NAT modes are supported for use with a single ISP-assigned WAN IP Address:

- Many-to-one: Many LAN Addresses are mapped to a single WAN IP Address.
- SUA Server: Forwards external requests for certain services – essentially ports – to specific LAN IP Addresses. An example of this would be an FTP Server (FTP uses port 21). External FTP requests can be forwarded to the FTP Server IP Address.

Note: For the SUA Server rules to function, Firewall rules need to be set up to allow e.g. FTP traffic through to the specified Server IP Address.

Multiple WAN IP Addresses

The following BCM50 Integrated Router NAT modes are supported for use with multiple ISP-assigned WAN IP Addresses:

- One-to-one: Maps a single unique LAN IP Address to a single unique WAN IP Address. Only that LAN IP Address can access the Internet
- Many to Many Overload: LAN IP Addresses are mapped to multiple WAN IP Addresses on a shared basis.
- Many one-to-one: Maps each unique LAN IP Address to each unique WAN IP Address. You should ensure that there are as many WAN IP Addresses available as there are LAN IP Addresses that require external access.

Note: If the ISP assigns multiple WAN IP Addresses to the BCM50e/be/a/ba but you do not want to use more than one, the Many-to-one modes and SUA Server modes can still be employed.

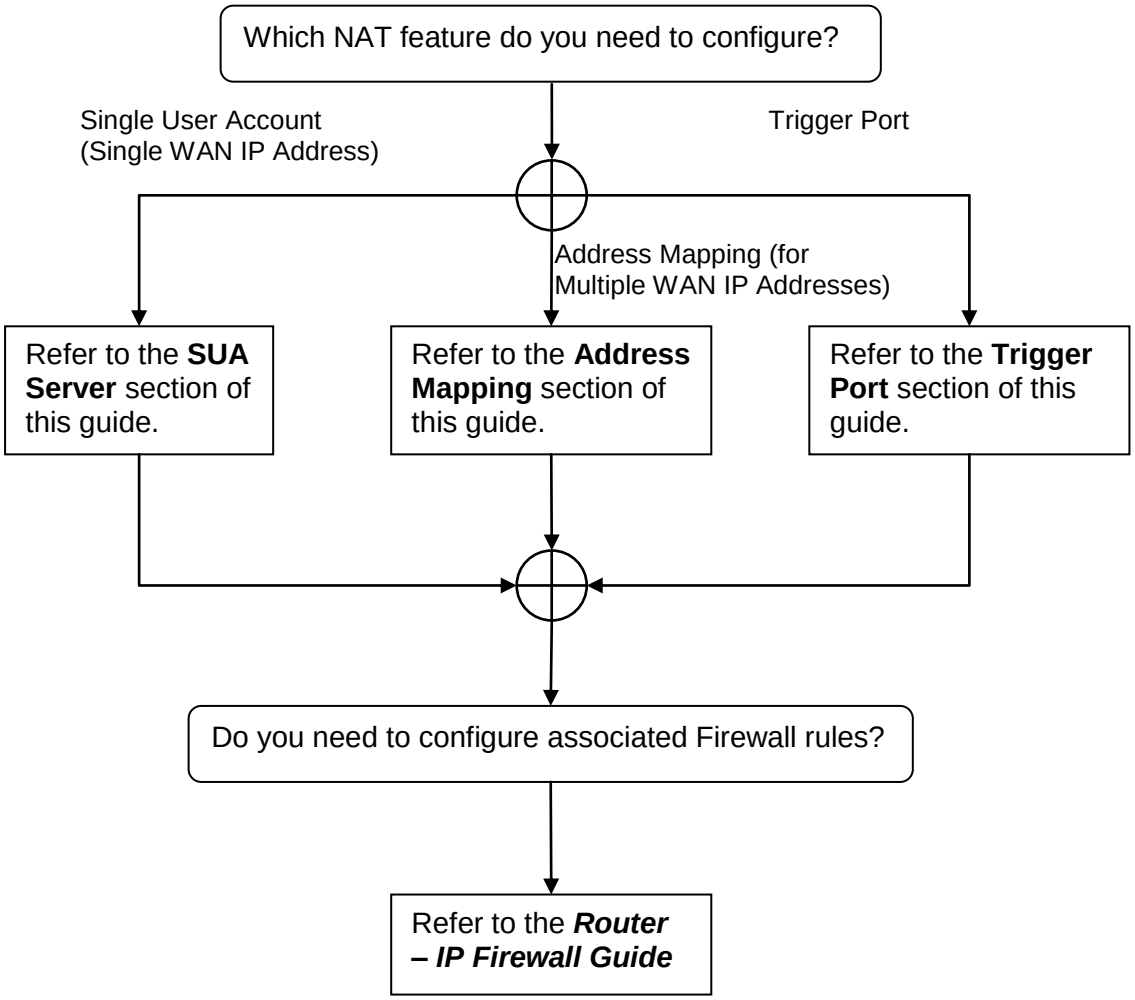
Required Information

Before configuring NAT, the following information is required:

- How many WAN IP Addresses will the BCM50 Integrated Router be using?
- If using multiple WAN IP Addresses, will a mapping mode be used?
- Are there any Servers on the network that need to be accessed from the external network?

Flow Chart

The flow chart below shows which sections of the guide should be used.



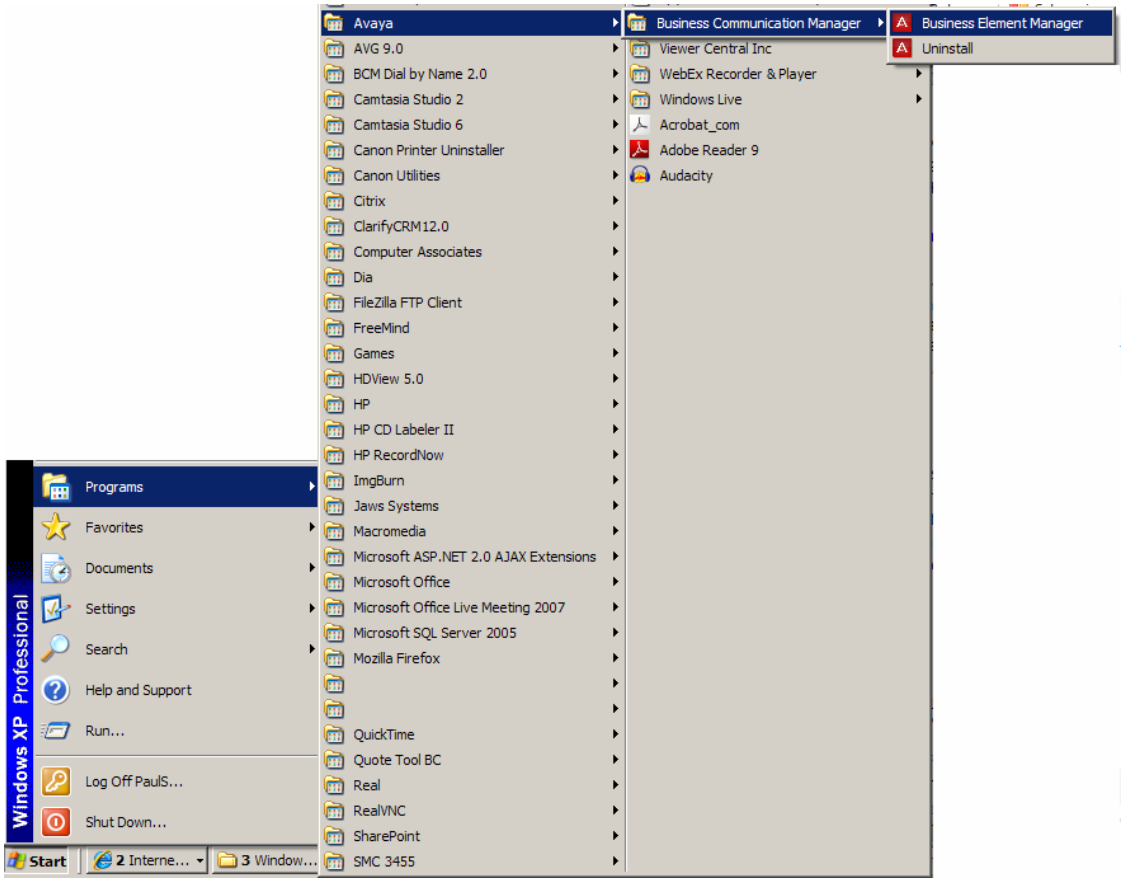
Accessing the Web Router GUI

There are two methods of accessing the Web Router GUI, independent on which model you are configuring:

- Via Element Manager (management application for all BCM50 models)
- Directly from a web browser

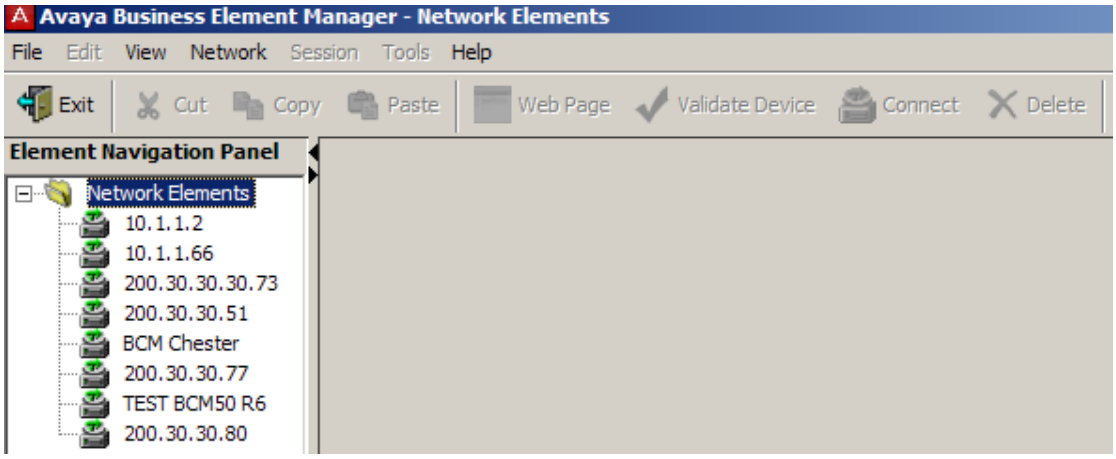
From Element Manager

1. To access the Business Element Manager application from the Start Menu, navigate to **Start**, **Programs**, **Avaya**, **Business Communications Manager**, **Business Element Manager**.

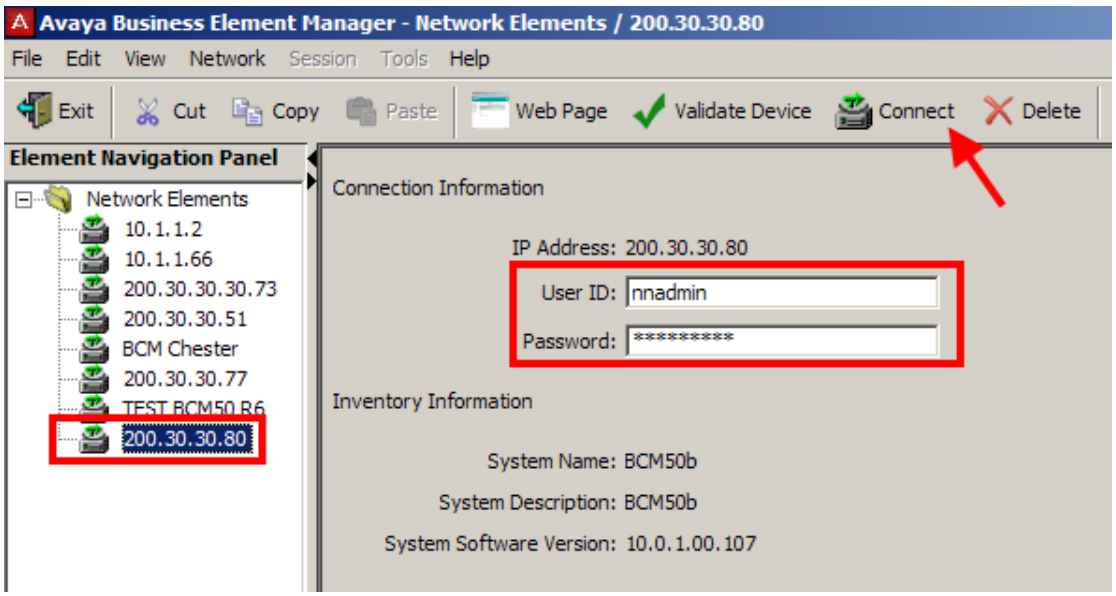


2. Alternatively, double-click on the **Business Element Manager** desktop icon.

3. You will be presented with the **Element Manager** interface.

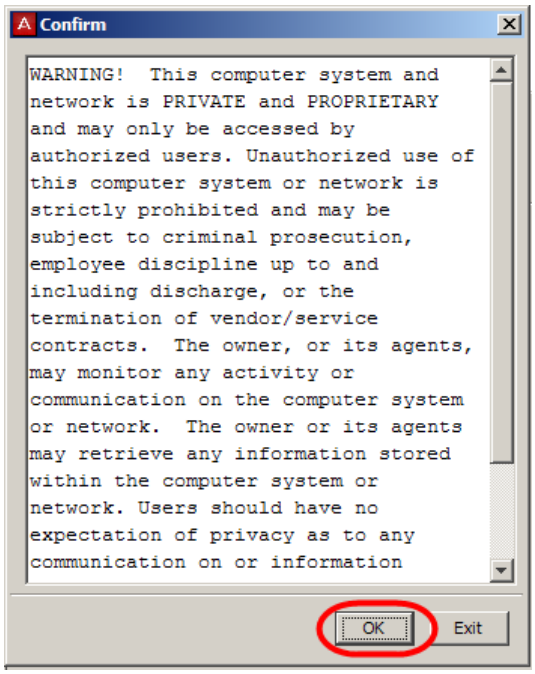


4. Open the **Network Elements** folder and select the IP Address of the BCM.

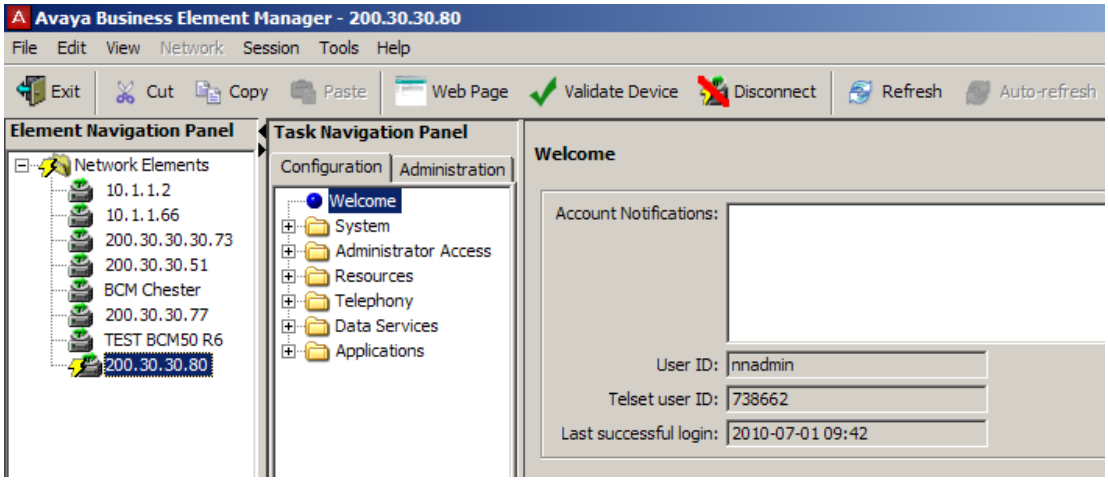


5. Enter the User Name of the BCM in the User Name field, by default this is **nnadmin**. Then enter the Password in the Password field, by default the password is **PlsChgMe!**. Click the **Connect** button.

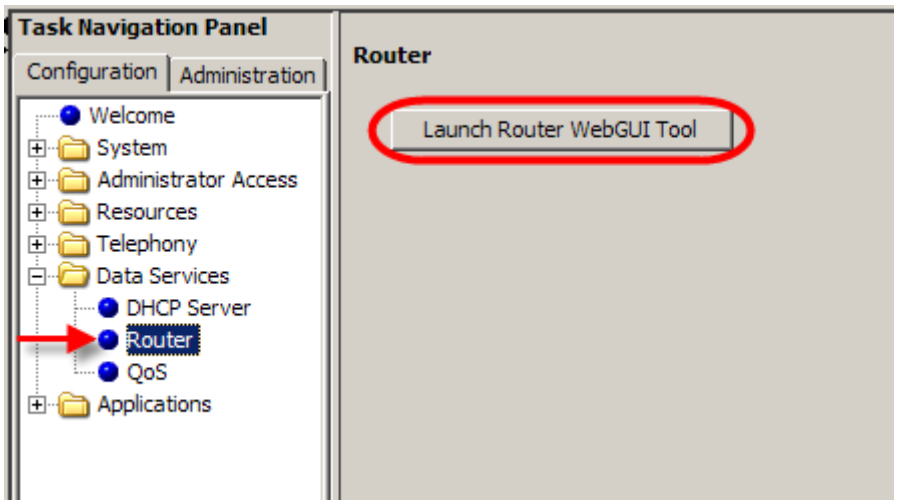
6. A warning screen will appear, read the warning and click **OK**.



7. You will be presented with the Element Manager interface.

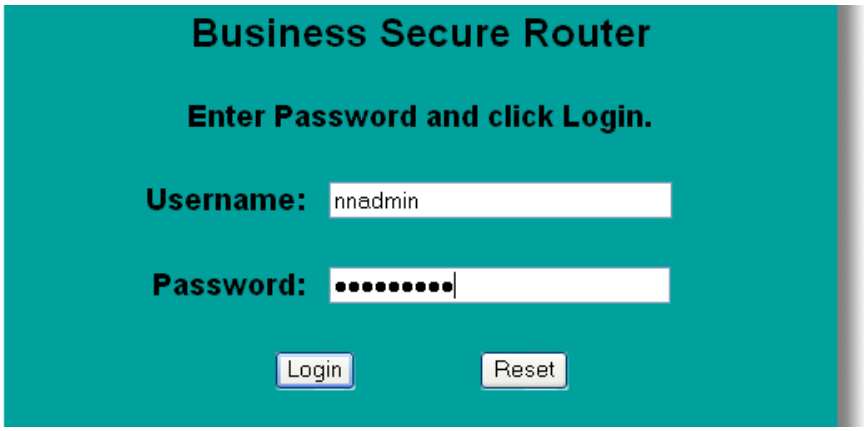


8. Click the **Data Services** link, select the **Router** link and click the **Launch Router Web GUI Tool** button.

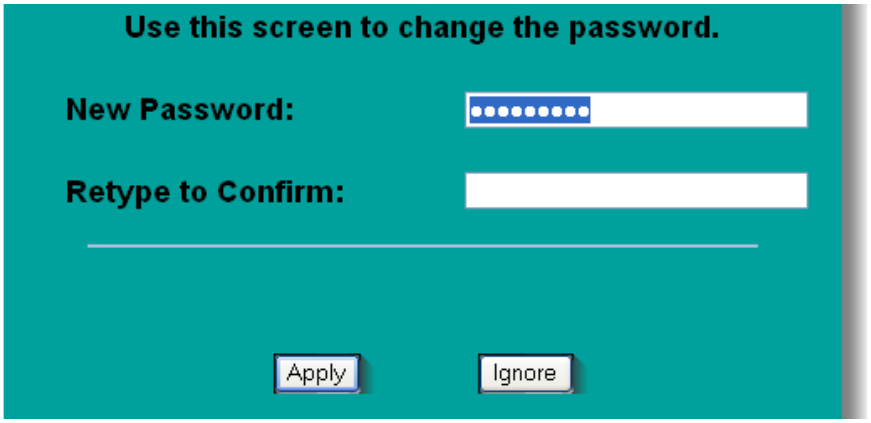


9. The Business Secure Router logon screen will be displayed. Enter the Username (default = **nnadmin**) and Password (default = **PlsChgMe!**) and click **Login**.

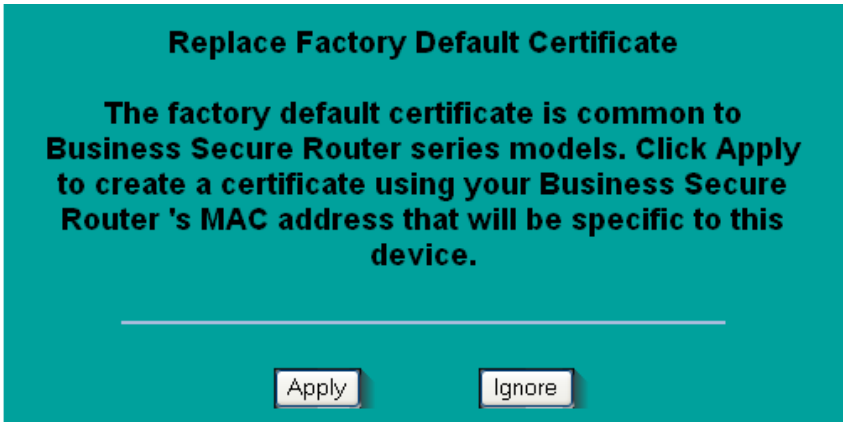
Note: if the above logon details do not work, try Username = **admin**, and Password = **setup.**



10. Change the password and click **Apply**, or click **Ignore** to continue.



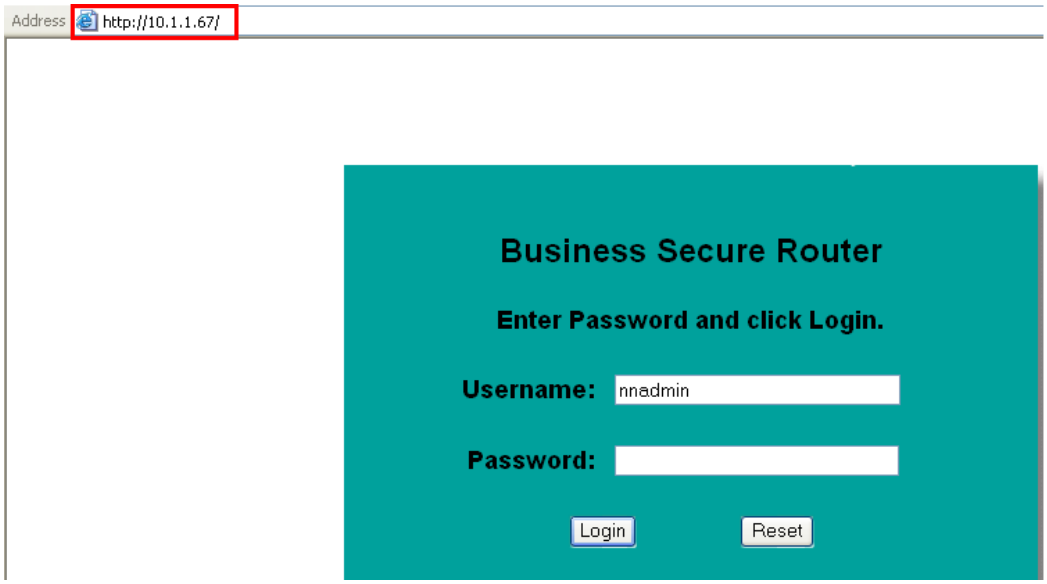
11. To replace factory certificate click **Apply** or **Ignore** to continue.



12. The Main Menu screen will display.

Access Directly via a Web Browser

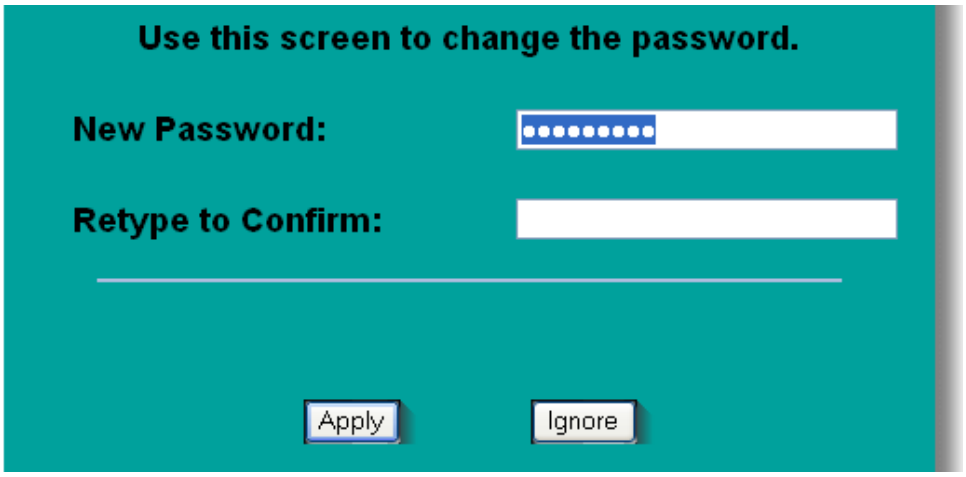
1. Open your web browser. In the address bar, type in **http://<router card LAN IP Address>/** and press **Enter**.



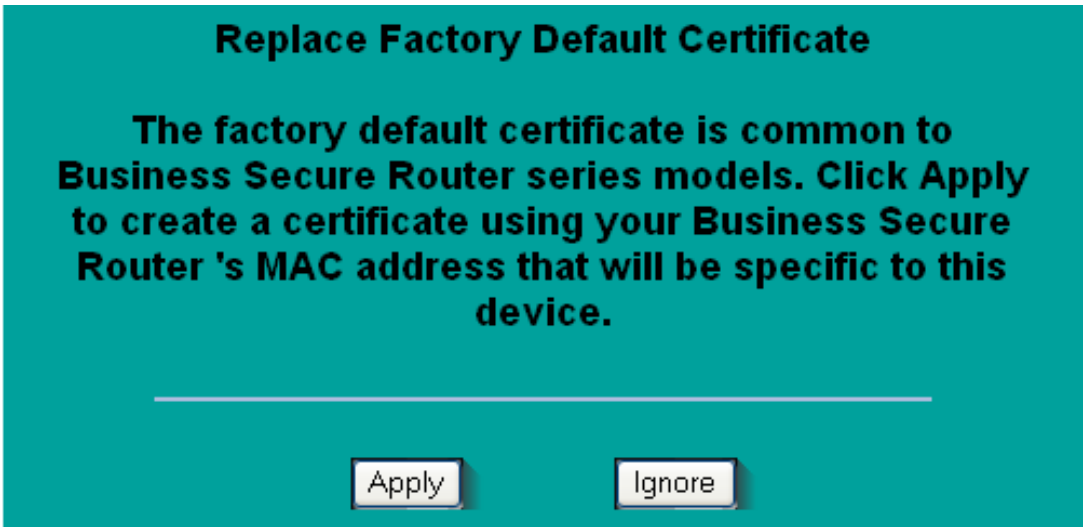
2. The Business Secure Router logon screen will be displayed. Enter the Username (default = **nnadmin**) Password (default = **PlsChgMe!**) and click **Login**.

Note: if the above logon details do not work, try Username = **admin** Password = **setup.**

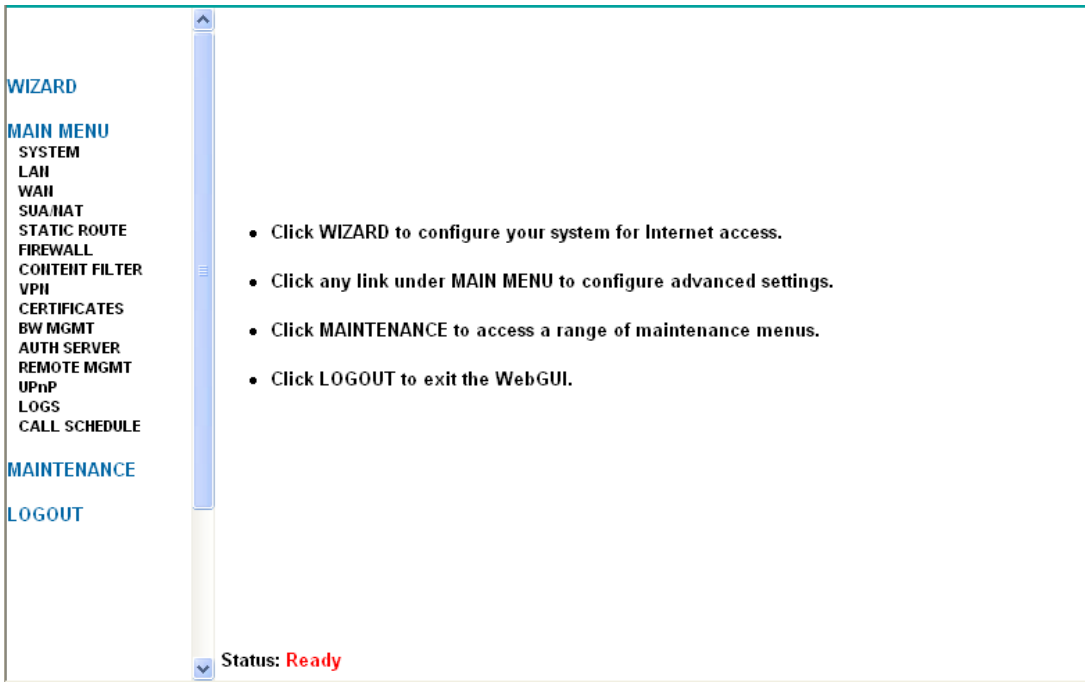
3. Change the password and click **Apply**, or click **Ignore** to continue.



4. To replace factory certificate click **Apply** or **Ignore** to continue.



5. The Main Menu screen will display.



NAT Configuration

There are 2 main areas of NAT configuration for the BCM50 Integrated Router:

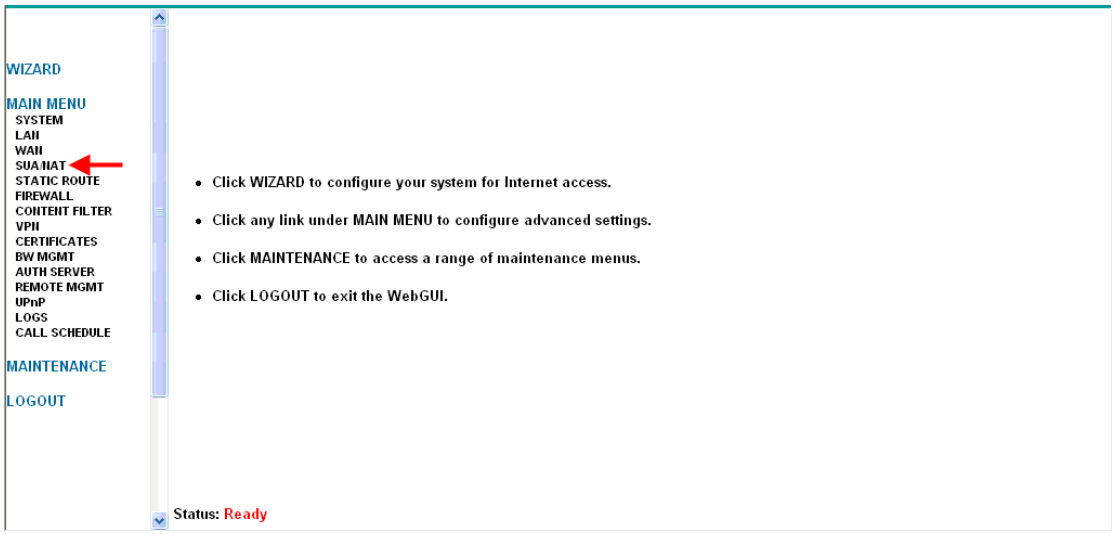
- SUA (Single User Account) Server: Even if a single WAN IP Address is being assigned to the BCM50 Integrated Router it is still possible to allow traffic from the WAN port (i.e. outside network devices) access to servers on the LAN side of the BCM50 Integrated Router. For example you may wish to offer outside users an FTP service (port 21) from a server residing on the LAN. Multiple servers can presented to outside users via the SUA Server option.
- Address Mapping: All of the BCM50 Integrated Router NAT Modes can be configured on this screen.

SUA Server

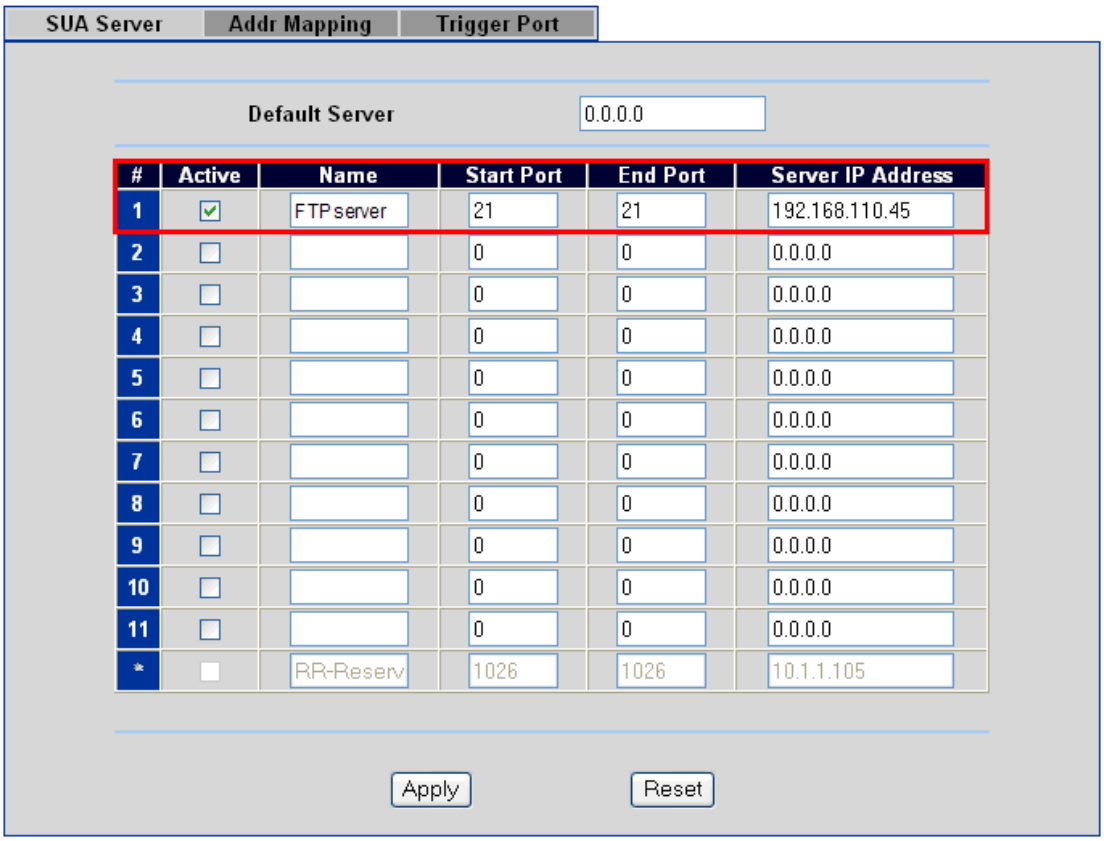
Use the following section to allow users on the WAN side of the BCM50 Integrated Router access to any services (essentially servers) on the LAN side of the BCM50 Integrated Router.

1. Access the Web Router GUI (refer to the **Accessing the Web Router GUI** section of this guide).

2. From the **Main** menu, select **SUA/NAT**.



3. Tick the checkbox for the first available rule. Enter the **Name**, **Start** and **End** port ranges to specify the service (e.g. FTP uses port 21) and the IP Address of the PC providing that service in the **Server IP Address** field.



4. A **Default Server** can be specified for requests for services that do not match any ports listed.

5. Click on **Apply** to save your settings.

Note: Firewall rules will still have to be configured to allow requests for these services through the BCM50 Integrated Router Firewall.

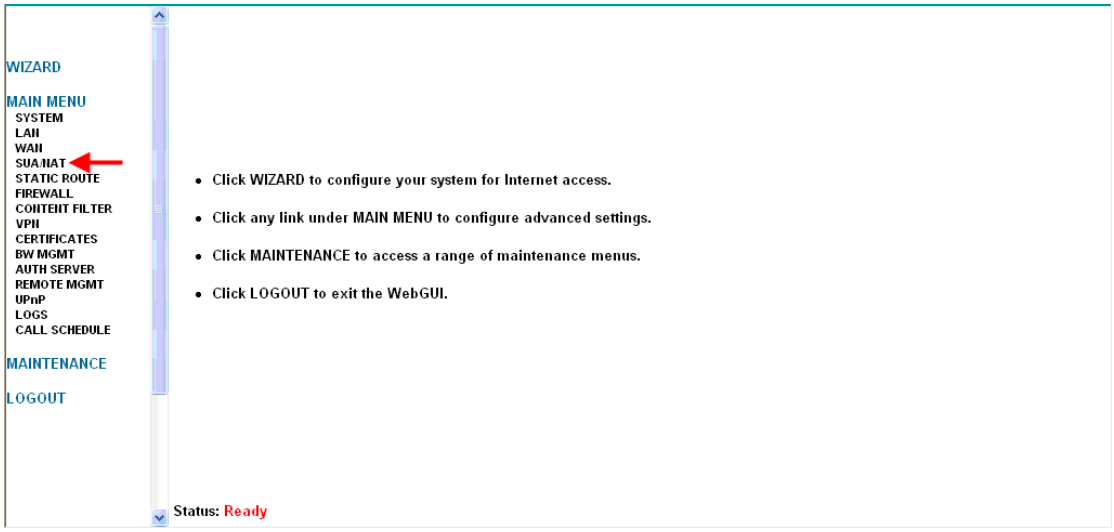
Address Mapping

Use this section to configure how your BCM50 Integrated Router maps LAN IP Addresses to WAN IP Addresses. If you have a single WAN IP Address, then you will be using the **Many-to-one** NAT mode.

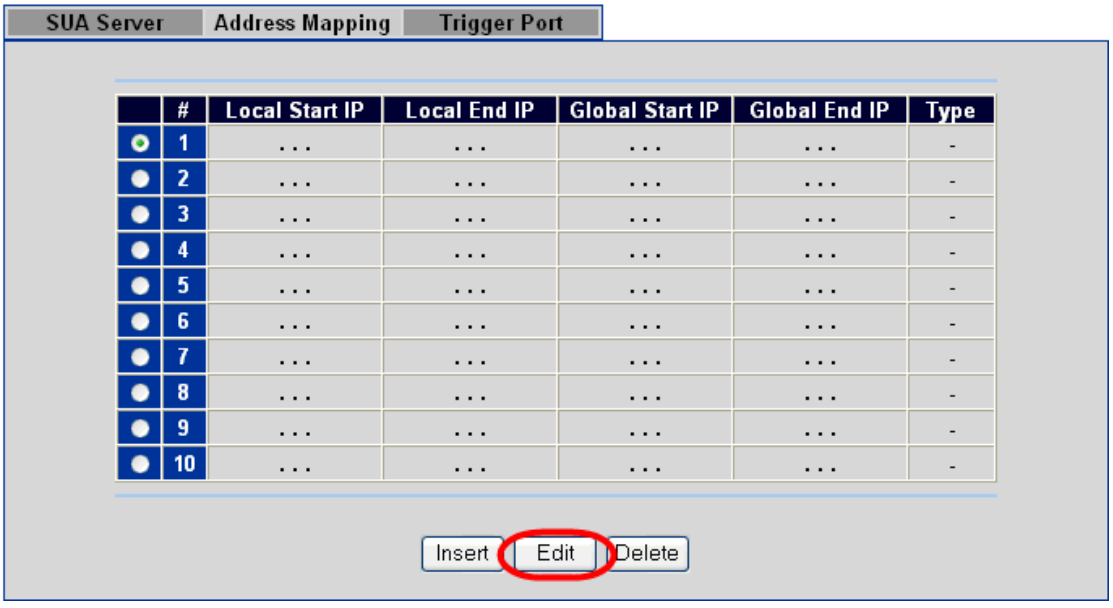
You should think about the order of the rules to be configured. Ordering your rules is important because the BCM50 Integrated Router applies the rules in the order that you specify. When a rule matches the current packet, the BCM50 Integrated Router takes the corresponding action and the remaining rules are ignored.

1. Access the Web Router GUI (refer to the **Accessing the Web Router GUI** section of this guide).

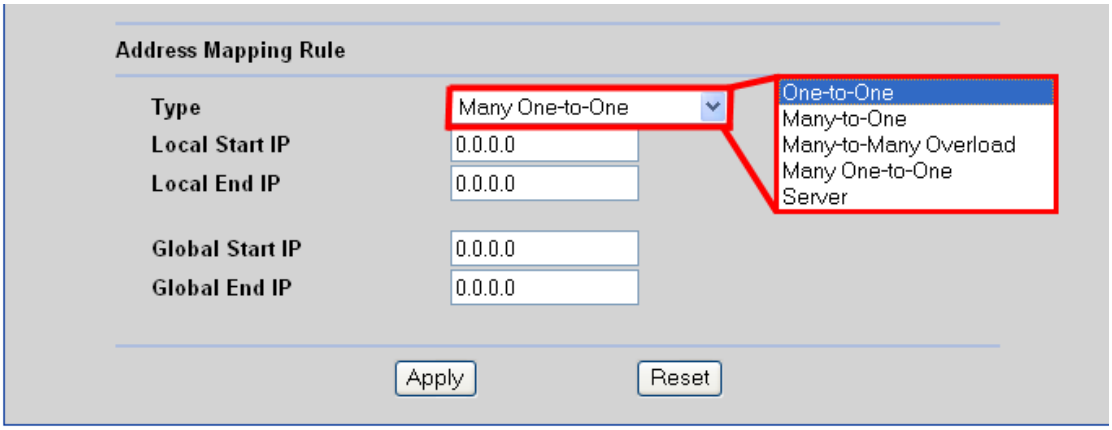
2. From the **Main** menu, select **SUA/NAT**.



3. In the **Address Mapping** tab, select the rule you want to configure and click on **Edit**.



4. Configure the NAT rule as required. Click on **Apply** to save your settings.



Address Mapping Settings

Field	Description
Type	Choose the port mapping type from one of the following. 1. **One-to-One**: One-to-one mode maps one local IP address to one global IP address. Note that port numbers do not change for One-to-one NAT mapping type. 2. **Many-to-One**: Many-to-One mode maps multiple local IP addresses to one global IP address. This is equivalent to SUA (i.e., PAT, port address translation), Business Secure Router's Single User Account feature. 3. **Many-to-Many Ov** (Overload): Many-to-Many Overload mode maps multiple local IP addresses to shared global IP addresses. 4. **Many One-to-One**: Many One-to-one mode maps each local IP address to unique global IP addresses. 5. **Server**: This type allows you to specify inside servers of different services behind the NAT to be accessible to the outside world.
Local Start IP	This refers to the Inside Local Address (ILA), that is the starting local IP address. Local IP addresses are **N/A** for **Server** port mapping.
Local End IP	This is the end local IP address (ILA). If your rule is for all local IP addresses, then enter 0.0.0.0 as the **Local Start IP** address and 255.255.255.255 as the **Local End IP** address. This field is **N/A** for **One-to-one** and **Server** mapping types.
Global Start IP	This is the starting global IP address (IGA). Enter 0.0.0.0 here if you have a dynamic IP address from your ISP.
Global End IP	This is the ending global IP address (IGA). This field is **N/A** for **One-to-one**, **Many-to-One** and **Server** mapping types.

Trigger Port

Some services use a dedicated range of ports on the client side and a dedicated range of ports on the server side. With regular port forwarding you set a forwarding port in NAT to forward a service (coming in from the server on the WAN) to the IP address of a computer on the client side (LAN). The problem is that port forwarding only forwards a service to a single LAN IP address. In order to use the same service on a different LAN computer, you have to manually replace the LAN computer's IP address in the forwarding port with another LAN computer's IP address, Trigger port forwarding solves this problem by allowing computers on the LAN to dynamically take turns using the service. The BCM50 Integrated Router records the IP address of a LAN computer that sends traffic to the WAN to request a service with a specific port number and protocol (a "trigger" port). When the BCM50 Integrated Router's WAN port receives a response with a specific port number and protocol ("incoming" port), the BCM50 Integrated Router forwards the traffic to the LAN IP address of the computer that sent the request. After that computer's connection for that service closes, another computer on the LAN can use the service in the same manner. This way you do not need to configure a new IP address each time you want a different LAN computer to use the application.

For example:

1. Jane requests a file from the Real Audio server (port 7070).

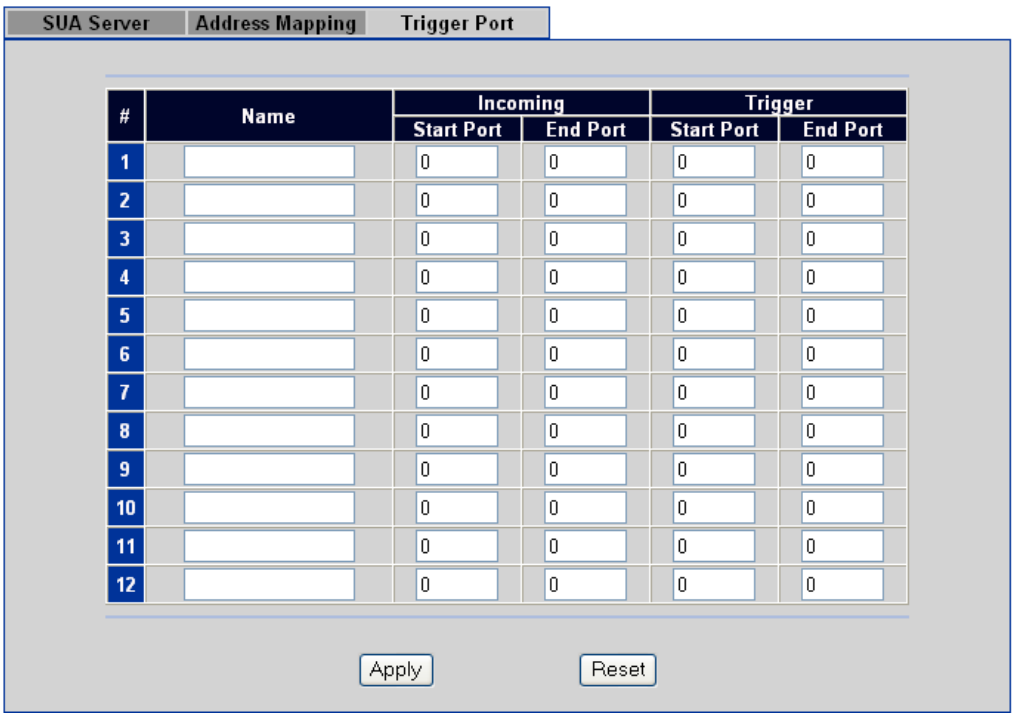
2. Port 7070 is a "trigger" port and causes the BCM50 Integrated Router to record Jane's computer IP address. The BCM50 Integrated Router associates Jane's computer IP address with the "incoming" port range of 6970-7170.

3. The Real Audio server responds using a port number ranging between 6970-7170.

4. The BCM50 Integrated Router forwards the traffic to Jane's computer IP address.

5. Only Jane can connect to the Real Audio server until the connection is closed or times out. The Business Secure Router times out in three minutes with UDP (User Datagram Protocol) or two hours with TCP/IP (Transfer Control Protocol/Internet Protocol).

Select the **Trigger Port** tab and configure the rules as required (see table below).



Trigger Port Settings

Label	Description
No.	This is the rule index number (read-only).
Name	Type a unique name (up to 15 characters) for identification purposes. All characters are permitted - including spaces.
Incoming	Incoming is a port (or a range of ports) that a server on the WAN uses when it sends out a particular service. The Business Secure Router forwards the traffic with this port (or range of ports) to the client computer on the LAN that requested the service.
Start Port	Enter a port number or the starting port number in a range of port numbers.
End Port	Enter a port number or the ending port number in a range of port numbers.
Trigger	The trigger port is a port (or a range of ports) that causes (or triggers) the Business Secure Router to record the IP address of the LAN computer that sent the traffic to a server on the WAN.
Start Port	Enter a port number or the starting port number in a range of port numbers.
End Port	Enter a port number or the ending port number in a range of port numbers.

Avaya Documentation Links

- BCM50e/be Integrated Router Configuration - Basics
- BCM50a/ba Integrated Router Configuration - Basics