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Configuring Basic Features for the Contivity Secure IP Services Gateway

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Contents

Figures

Tables

Preface

This guide introduces the Nortel Networks* Contivity* Secure IP Services Gateway. It also provides overview and basic configuration information to help you initially set up your Contivity Secure IP Services Gateway.

Before you begin

This guide is for network managers who are responsible for setting up and configuring the Contivity Secure IP Services Gateway. This guide assumes that you have experience with windowing systems or graphical user interfaces (GUIs) and familiarity with network management.

Text conventions

This guide uses the following text conventions:

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: If the command syntax is **`ping`** <*`ip_address`*>, you enter **`ping 192.32.10.12`**
`bold Courier text`	Indicates command names and options and text that you need to enter. Example: Use the **`show health`** command. Example: Enter **`terminal paging`** {**`off`** | **`on`**}.

braces ({})	Indicate required elements in syntax descriptions where there is more than one option. You must choose only one of the options. Do not type the braces when entering the command. Example: If the command syntax is **ldap-server source {external | internal}**, you must enter either **ldap-server source external** or **ldap-server source internal**, but not both.
brackets ([ ])	Indicate optional elements in syntax descriptions. Do not type the brackets when entering the command. Example: If the command syntax is **show ntp [associations]**, you can enter either **show ntp** or **show ntp associations**. Example: If the command syntax is **default rsvp** [**token-bucket** {**depth** | **rate**}], you can enter **default rsvp**, **default rsvp token-bucket depth**, or **default rsvp token-bucket rate**.
ellipsis points (. . .)	Indicate that you repeat the last element of the command as needed. Example: If the command syntax is **more disk***n***:***<directory>***/...***<file_name>*, you enter **more** and the fully qualified name of the file.
italic text	Indicates new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is **ping** *<ip_address>*, *ip_address* is one variable and you substitute one value for it.
`plain Courier text`	Indicates system output, for example, prompts and system messages. Example: `File not found.`

separator (>)	Shows menu paths. Example: Choose Status > Health Check.
vertical line (|)	Separates choices for command keywords and arguments. Enter only one of the choices. Do not type the vertical line when entering the command. Example: If the command syntax is **`terminal paging`** {**`off`** | **`on`**}, you enter either **`terminal paging off`** or **`terminal paging on`**, but not both.

Acronyms

This guide uses the following acronyms:

ACK	acknowledgement
CA	certificate authority
CHAP	Challenge Handshake Authentication protocol
CRL	certificate revocation list
DN	distinguished name
DNS	domain name system
EAC	Extranet Access Client
FIPS	Federal Information Processing Standards
FTP	File Transfer Protocol
IP	Internet Protocol
IKE	IPsec Key Exchange
ISAKMP	Internet Security Association and Key Management Protocol
ISP	Internet service provider
L2TP	Layer2 Tunneling Protocol
LDAP	Lightweight Directory Access Protocol
LAN	local area network

MAC	media access control address
NAT	network address translation
NOC	network operations center
NTP	Network Time Protocol
OSPF	Open Shortest Path First
OSS	operations support systems
PAP	Password Authentication Protocol
PDN	public data networks
POP	point-of-presence
PPP	Point-to-Point Protocol
PPTP	Point-to-Point Tunneling Protocol
RSVP	Resource Reservation Protocol
RIP	Routing Information Protocol
SNMP	Simple Network Management Protocol
UDP	User Datagram Protocol
URL	uniform resource locator
VPN	virtual private network
VRRP	Virtual Router Redundancy Protocol
WAN	wide area network

Related publications

For more information about the Contivity Secure IP Services Gateway, refer to the following publications:

- Release notes provide the latest information, including brief descriptions of the new features, problems fixed in this release, and known problems and workarounds.
- *Configuring SSL VPN Services on the Contivity Secure IP Services Gateway* provides instructions for configuring services on the SSL VPN Module 1000, including authentication, networks, user groups, and portal links.
- *Configuring Servers, Authentication, and Certificates for the Contivity Secure IP Services Gateway* provides instructions for configuring authentication services and digital certificates.
- *Configuring Firewalls, Filters, NAT, and QoS for the Contivity Secure IP Services Gateway* provides instructions for configuring the Contivity Stateful Firewall and Contivity interface and tunnel filters.
- *Configuring Advanced Features for the Contivity Secure IP Services Gateway* provides instructions for configuring advanced LAN and WAN settings, PPP, frame relay, PPPoE, ADSL and ATM, T1CSU/DSU, dial services and BIS, DLSw, IPX, and SSL VPN.
- *Configuring Tunneling Protocols for the Contivity Secure IP Services Gateway* configuration information for the tunneling protocols IPsec, L2TP, PPTP, and L2F.
- *Configuring Routing for the Contivity Secure IP Services Gateway* provides instructions for configuring RIP, OSPF, and VRRP, as well as instructions for configuring ECMP, routing policy services, and client address redistribution (CAR).
- *Managing and Troubleshooting the Contivity Secure IP Services Gateway* provides information about system administrator tasks such as backup and recovery, file management, and upgrading software, and instructions for monitoring gateway status and performance. Also, provides troubleshooting information and inter operability considerations.
- *Reference for the Contivity Secure IP Services Gateway Command Line Interface* provides syntax, descriptions, and examples for the commands that you can use from the command line interface.
- *Configuring TunnelGuard for the Contivity Secure IP Services Gateway* provides information about configuring and using the TunnelGuard feature.

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From the Technical Support page, you can open a Customer Service Request online or find the telephone number for the nearest Technical Solutions Center. If you are not connected to the Internet, you can call 1-800-4NORTEL (1-800-466-7835) to learn the telephone number for the nearest Technical Solutions Center.

An Express Routing Code (ERC) is available for many Nortel Networks products and services. When you use an ERC, your call is routed to a technical support person who specializes in supporting that product or service. To locate an ERC for your product or service, go to the http://www.nortelnetworks.com/help/contact/erc/index.html URL.

Chapter 1 Overview

This chapter introduces the Nortel Networks Contivity Secure IP Services Gateway. The Contivity Secure IP Services Gateway is a family of products that deliver security and IP services in a single integrated platform. With IP routing, Virtual Private Networking (VPN), stateful firewall, policy management and QoS services, a single Contivity gateway device offers the IP services that normally require multiple purpose devices. Designed for enterprise networks, the Contivity gateway leverages the cost advantages of the Internet while providing secure communications across the public IP infrastructure.

As a highly scalable device, the Contivity gateway can address the security and IP services needs of the smallest branch site or largest headquarters environment. A Contivity gateway can be installed as an IP access router, VPN gateway, or stateful packet firewall.

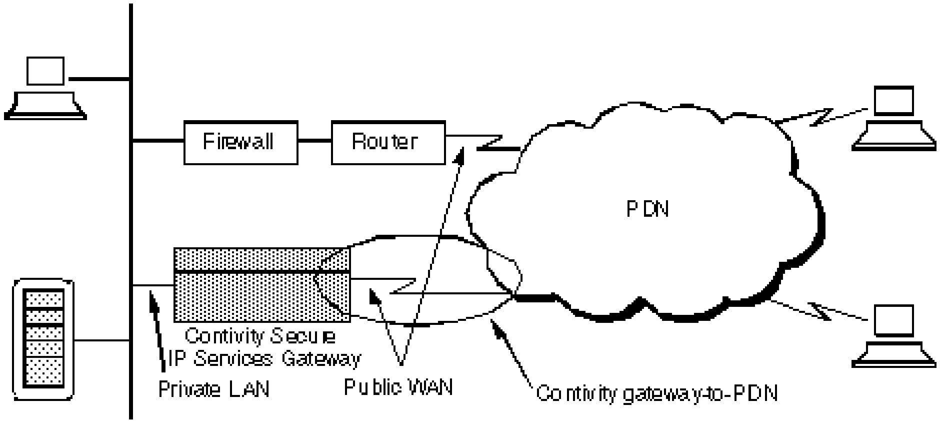
The Contivity Secure IP Services Gateway incorporates Nortel Networks Secure Routing Technology (SRT). SRT is a software framework that provides a security structure through all Contivity gateway operational components, including IP routing, VPN, firewall, and policy services. This allows for management consistency and scalable performance even when running multiple IP services in the same device. SRT also provides dynamic routing (RIP/OSPF) over secure IPsec tunnels, uniform security policies across VPN, routing, and firewall services and a flexible software licensing scheme.

Network deployment alternatives

With its combination of secure, manageable, and scalable features, you can shift information technology resources from solving the current remote user access problems to other, more proactive administrative and management areas. And you can eliminate modem-management pool problems from your organization and shift them to your extranet provider.

Extranet access allows remote users to dial in to an Internet Service Provider (ISP) anywhere and reach corporate headquarters or branch offices. The extranet provides remote users access to corporate databases, mail servers, and file servers. Figure 1 shows a typical packet data network (PDN).

Figure 1 Typical PDN



The Contivity gateway allows ISPs to take over the role of point-of-presence (POP) providers of modem access. It improves performance while lowering overhead, which translates to significant corporate savings.

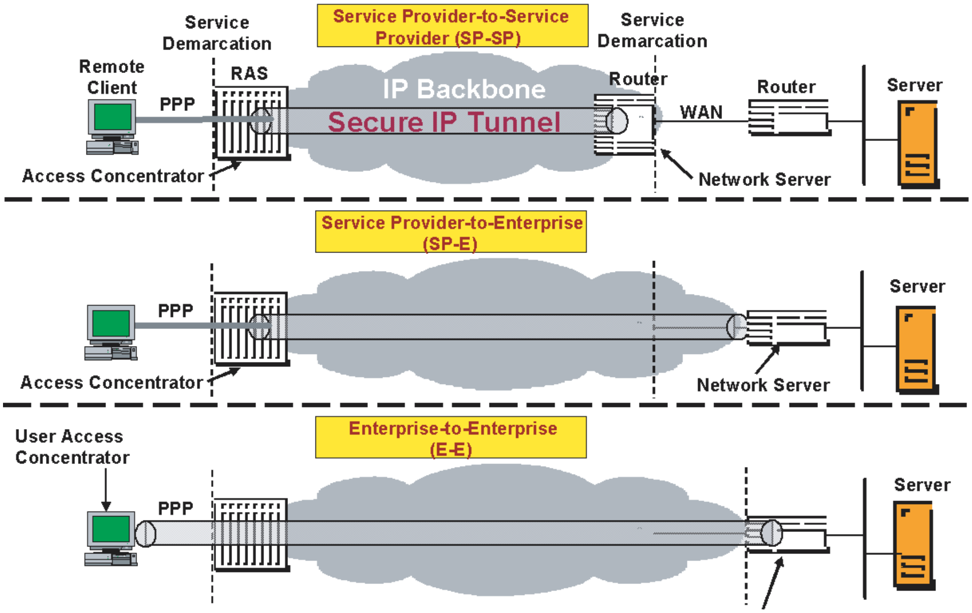
Virtual private networking

A VPN is a private data communication channel that uses a public IP network as the basic transport for connecting corporate data centers, remote offices, mobile employees, telecommuters, customers, suppliers, and business partners. Physically discontiguous networks are made to appear logically connected and contiguous.

A remote access VPN service requires the creation and operation of a secure tunnel between client software on a remote device, such as a PC, and host software on a VPN security gateway, such as a Contivity gateway.

Figure 2 shows examples of VPN services.

Figure 2 VPN service models



The Contivity gateway uses a combination of authorization, authentication, privacy, and access control for each user.

Licensing features

Licence keys can be obtained through Nortel Networks customer support. The Contivity Secure IP Services Gateway provides several license key options:

- Advanced Routing
- Contivity Stateful Firewall
- VPN Tunnels

The Advanced Routing License key must be installed to enable OSPF on the Contivity gateway. (The Firewall License Key is required only when the redistribution capabilities of RIP and OSPF are necessary).

The Contivity Stateful Firewall License key must be installed to enable the Contivity Stateful firewall.

Tunnel keys are specific to the Contivity gateway hardware model that you are using. Contivity gateway switches are manufactured to allow either access to the maximum number of tunnels (VPN bundle) or support for 5 tunnels (Base Unit). This feature offers reduced cost for users who want fewer tunnels. The existing VPN bundle does not add a cost increase nor a need for a tunnel license key.

Note: It is only necessary to install a key once on each Contivity gateway. To enter the license key, go to the Admin > Install screen. You must reboot the Contivity gateway to gain access to the new tunnel limit.

Command line interface

The command line interface allows you to make configuration changes to the Contivity gateway via Telnet. You can access the command line interface by initiating a Telnet session to the Contivity gateway management IP address. For further information, see *Reference for Contivity Secure IP Services Command Line Interface*.

Federal Information Processing Standard (FIPS)

You must separately order, purchase, and implement a FIPS kit to be FIPS compliant. This kit contains detailed documentation concerning setting up, operating, and configuring the Contivity Secure IP Services Gateway to be FIPS compliant. The FIPS kit also includes tamper-resistant labels to be put on the hardware as instructed in the FIPS kit documentation.

Chapter 2
Getting started

This chapter describes methods for configuring and managing the Contivity Secure IP Services Gateway.

➡ **Note:** If you are setting up a Contivity 1010, 1050 or 1100, see Chapter 3, “Setting up the Contivity 1010, 1050, and 1100.” These gateways have unique set up and configuration considerations.

Full details on hardware installation, including adding local area network (LAN) or wide area network (WAN) cards, are in the *Getting Started* or installation guide that came with the Contivity gateway. You should complete the hardware installation before starting this chapter.

Table 1 describes the choices you have when first configuring the required parameters. Either option allows you to set the management IP Address, subnet mask, and default Contivity gateway (optional)

Table 1 Configuration options

Initial configuration method	**Advantages and disadvantages**
IP Address Configuration Utility (recommended)	Utility on the CD makes initial configuration easy
Serial Interface Configuration Menu (optional)	Must connect the serial interface cable

IP addressing

Figure 3 shows sample IP address assignments in a network using a Contivity gateway. Refer to Table 2 to see the IP address associations.

Figure 3 Sample IP addressing scheme

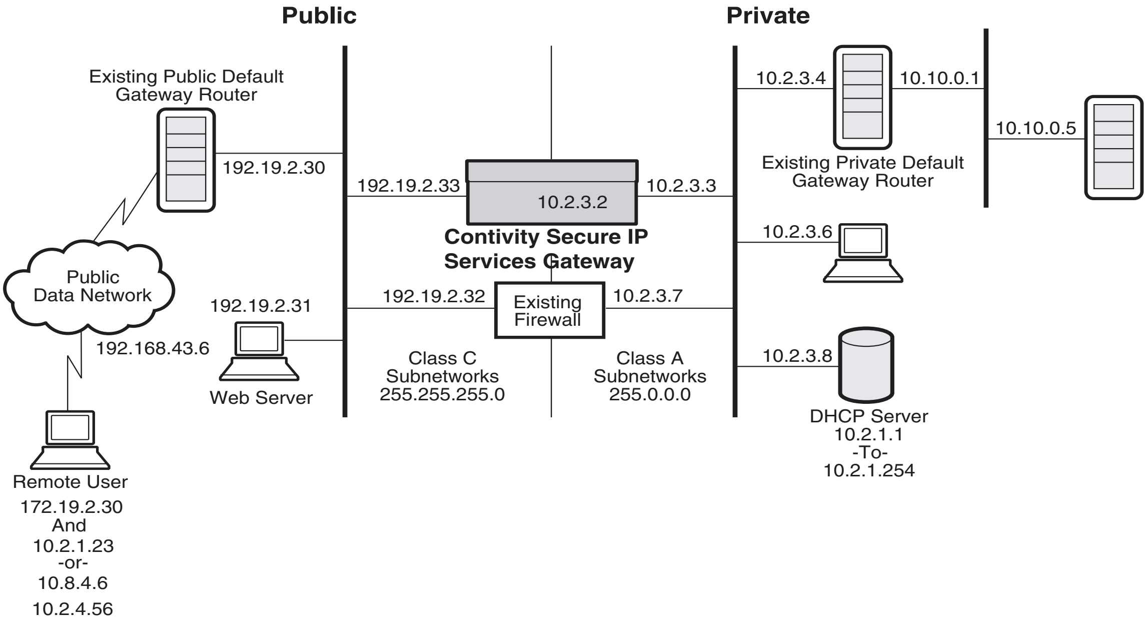


Table 2 Sample IP addressing associations

IP address	Description (when applicable, where configured)
192.168.43.6	Dial-up networking to ISP (Internet access, ISP assigned)
192.19.2.30	Public default Internet gateway router
192.19.2.33	Public LAN port IP address (remote user destination address)
192.19.2.32	Firewall public network address
10.2.3.2	Contivity gateway management IP address: System > Identity
10.2.3.3	Contivity gateway private LAN interface IP address: System > LAN Edit IP address
10.2.3.4	Private network default gateway router: System > Routing Add/Edit Default Route
10.2.3.6	Sample partners FTP server for inventory and price list
10.2.3.7	Firewall private network address
10.2.3.8	DHCP server IP address
10.2.1.1 to 10.2.1.254	Private Network Addresses Assigned to Remote Tunnel Sessions: DHCP pool: Servers > User IP Addr
172.19.2.30	ISP-assigned address

Table 2 Sample IP addressing associations (continued)

10.2.1.23	DHCP-assigned IP address for a remote user
10.8.4.6	Sample remote user static IP address: Profiles > Users Edit
10.2.4.56	Sample client-specified address: Profiles > Groups Edit IPsec/PPTP/ L2TP/L2F

The Contivity gateway supports the Internetwork Packet Exchange (IPX) protocol. This allows the Contivity gateway to transmit and receive IPX packets over PPTP.

Note: PPTP supports IPX traffic only for remote access connections. IPX is not supported in branch office tunnels.

The Contivity gateway supports IPX by encapsulating IPX traffic within IP tunnels over PPTP. The private interfaces and public interfaces can carry IP and IPX traffic simultaneously. The IP addresses are not shown in the preceding illustration.

Configuring the serial interface

The Serial Interface allows you to give the Contivity gateway a management IP address and subnet mask so that you can then use a Web browser for management. As an alternative to the Serial Interface configuration, you can use the Nortel Networks IP Address Configuration Utility, which Nortel Networks recommends for an initial configuration.

Your terminal emulator must use the following communications parameters:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- No flow control

The Serial Interface configuration procedure is typically only necessary in a system recovery situation.

1. Connect the serial cable (supplied with your Contivity gateway) from the Contivity gateway’s serial port to a terminal or a communications port of a PC.
2. Power on the terminal or PC.
3. Using a terminal emulation program, such as HyperTerminal on the PC, click on Enter. The Welcome screen appears and you are prompted to supply a user name and password.

```
Welcome to the Contivity VPN Switch
Copyright 1999,2000,2001 Nortel Networks
Version: V03_50.44
Creation date: Dec. 7, 2000, 20:51:06
Date: 04/27/2001
Unit Serial Number: 17563

Please enter the administrator's user name: admin

Please enter the administrator's password: setup
```

The factory default user name is *admin* and the default password is *setup*.

Before moving the Contivity gateway from one network to another, change the management IP address, subnet mask, and default Contivity gateway. Otherwise, you will need to follow the Serial Interface configuration procedure to access your Contivity gateway because it will not be accessible from a Web browser with an invalid address.

Before proceeding, verify that you have selected a management IP address that can be routed on the subnet attached to the private interface of the Contivity gateway and have this information available.

4 After the user name and password have been entered, the following menu appears:

```
Main Menu: System is currently in NORMAL mode.

1) Interfaces
2) Administrator
3) Default Private Route Menu
4) Default Public Route Menu
5) Create A User Control Tunnel(IPsec) Profile
6) Restricted Management Mode FALSE
7) Allow HTTP Management TRUE
8) Firewall Options
9) Shutdown
B) System Boot Options
P) Configure Serial Port
C) Controlled Crash
L) Command Line Interface
R) Reset System to Factory Defaults
E) Exit, Save and Invoke Changes

Please select a menu choice (1 - 9,B,P,C,L,R,E):_
```

5 Enter **1** and press **Enter** to enter the Interface menu:

```
Interface Menu

0) Slot 0, Port 1, Private LAN
   Management IP Address = 11.0.0.100
   Subnet Mask = 255.0.0.0
   Interface IP Address = 11.0.0.10 (Subnet Mask = 255.0.0.0)
   Speed/Duplex = AutoNegotiate

1) Slot 1, Port 1, Public LAN
   IP Address = 192.168.1.20
   Subnet Mask = 255.255.255.0
   Speed/Duplex = AutoNegotiate

R) Return to the Main Menu.

Please select a menu choice:_
```

6 Select **0** and press **Enter** to enter the Slot 0, Port 1, Private LAN menu and add the management IP address.

The default settings appear, followed by the Configuration menu for the management IP address. The Old Management IP Address field is blank on a new Contivity gateway.

```
Slot 0, Port 1, Private LAN
  Interface IP Address =
  Subnet Mask = 0.0.0.0
  Speed/Duplex = AutoNegotiate

  * Type 0.0.0.0 to delete.

Old Management IP Address =
New Management IP Address =
```

If you are prepared to assign a management IP address to the private interface, do so at this time at the New Interface IP Address prompt and click on Enter. If you do not wish to assign a private IP address at this point, simply click on Enter.

```
Old Interface IP Address =
New Interface IP Address =
```

7. The subnet mask menu will appear next. Enter the desired subnet mask and click on Enter.

   ```
   Old Subnet Mask = 0.0.0.0
   New Subnet Mask =
   ```

   The Interface Configuration menu appears. Select the menu option desired and click on Enter.

8. Follow the screen prompts. The descriptions of the fields required to complete this procedure are in the “Startup configuration requirements” section at the beginning of this chapter.

9 After you complete the configuration, type E and click on Enter to save the settings and exit. You can then manage the Contivity gateway from a Web browser.

Note: This administrator's password is also the primary administrator's password. This password guarantees access to the Contivity gateway via the serial port or a Web browser. This administrator's user ID (default=admin) and password (default=setup) combination is also called the *primary administrator*. This person always has access to all screens and controls, including the serial port and the recovery disk. There can be only one primary administrator.

Changing the management IP address

The management IP address must reside on a defined subnet. If there are no defined subnets, the management IP address can reside on any one that you create. You cannot change your management IP address to a subnet different from an already defined subnet.

To change the management IP address when an interface IP address is defined:

1 Select Option 1 (Interfaces) and then select 0.

2 Type the new management IP address and press Enter.

To reset the Contivity gateway IP address values using the serial interface:

- Change the management IP address, subnet mask, or Contivity gateway address to another set of values on the same logical network.
- Move the Contivity gateway to a different logical or physical network.
- Completely reset the management IP addresses.
- Reset the Contivity gateway so that it can be moved to a currently unknown logical network, which allows the network administrator to reuse the IP Address Configuration utility to assign new addresses to the Contivity gateway when it gets there. You might use this option if you do not know the addresses in advance.

To change IP addresses or move the Contivity gateway to another network:

1 Log in to the serial interface.
2 Select Option 3 (Switch IP Address). Set the address to 0.0.0.0.
3 Select Option 1 (Management IP Address). Set the address to 0.0.0.0.
4 Choose E.
5 Wait at least 15 seconds. Serial interface data is only written to the hard disk at 15-second intervals.

Using boot modes

The Contivity gateway can be booted in one of two system modes: Safe mode or Normal mode. Each mode has its own software image, configuration files, and LDAP database.

Note: The Contivity 1010, 1050, and 1100 do not implement safe mode.

A system booted in Safe mode is only allowed to accept secured management tunnel establishment. When the secured management tunnel is established, Telnet, HTTP, and FTP traffic is allowed to come into the Contivity gateway; no other VPN traffic is allowed through the secured management tunnel of the Contivity gateway.

In Normal mode, the system operates with the normal software and configuration and transports both VPN traffic and management traffic.

To save your configuration into the Safe Mode boot directory:

1 Select B) System Boot options.
2 Select 2) System Reset options.
3 Select 1) Reset system to Normal Mode.
4 Select 2) Reset system to Safe Mode.

Managing through a Web browser

After you run the IP address configuration utility or use the serial interface configuration, launch a Web browser of your choice.

1. Enter the management IP address to invoke the Nortel Networks Login screen. For example, if the management IP address is 10.2.3.2, then the Uniform Resource Locator (URL) is http://10.2.3.2.
2. Select an option in the navigation menu and submenu, and then you are prompted for the login and password.
3. Enter the system default login and password in lowercase characters, as follows:

   Login: **`admin`**
   Password: **`setup`**

At this point, follow the Quick Start Configuration procedure or the Guided Configuration procedure. Refer to Table 3 on page 33 for help in determining which procedure to use.

Preparing for configuration

To properly prepare for configuration of the Contivity Secure IP Services Gateway, you should have the following items available:

- A plan to distribute IP addresses to clients when connections are requested; for example, via a DHCP server or an internal client address pool (with an address pool you need a range of IP addresses).
- An Authentication database. If you are not using internal authentication via the LDAP database, then make sure you have either the external LDAP or the RADIUS server's IP address and password or Shared Secret (password).
- An external accounting server, such as RADIUS, with its IP address and Shared Secret (password).
- Prepare the clients for the type of tunneling protocol they need to use. The PPTP client application is available on the Nortel Networks CD for Windows 95, and it comes with Windows 98 and Windows NT. Nortel Networks also provides the IPsec client on the Nortel Networks CD.

You should develop a complete network topology (physical and logical) of the environment in which you are testing the Contivity gateway. This should include the following:

- Details of physical communication links, such as cable length, grade, and approximation of the physical paths of the wiring, analog, fiber and ISDN lines.
- Contivity gateway and router types.
- Servers, with computer name, IP address (if static), server role, and domain membership.
- Location of devices such as printers, hubs, Contivity gatewayes, modems, routers, bridges, proxy servers and firewalls (intranet & Internet) on the network.
- WAN communication links (analog / ISDN / ATM) and the available bandwidth between sites, either an approximation or the actual measured capacity.
- Number of users at each site, including mobile users.
- Manufacturer of device as well as firmware version, throughput, and any special configuration requirements for any devices on the network. If you assign static IP addresses to any of these devices, record them and a brief explanation why they required static addresses.
- Include brief explanations with the layout.
- Domain architecture, including the existing domain hierarchy, names, and addressing scheme.
- Trust relationships, including representations of transitive, one-way, and two-way trust relationships.
- Mixed environments (HP-UX, AIX, Linux, Solaris, Windows NT/ 2000, Macintosh).
- All protocols that exist within the network.

Table 3 shows the alternatives when first configuring your Contivity gateway. Begin with either the Quick Start or the Guided Configuration. After you are familiar with the Contivity gateway's navigational menu and capabilities, select Manage Switch.

Table 3 Web interface configuration options

Configuration type	Results
Quick Start	Configure and test a basic PPTP configuration
Guided Config	Structured Contivity gateway configuration and management
Manage Switch	Comprehensive Contivity gateway configuration and management

Table 4 provides a place for you to record the information that you need to configure basic Contivity Secure IP Services Gateway parameters.

Table 4 Configuration checklist

Screen	Values required	Your Values
System > Identity	Management IP address	
System > Domain Identity	Host name Domain name	
System > DNS Service	Primary IP address Secondary IP address Tertiary IP address	
System > LAN	Private IP address Public IP address	
System > WAN (if using T1, V.35, or T3)	ISP provided information	
System > Date and Time	Manual entry of date and time or NTP configuration server broadcast or multicast IP address	
Services > Available	IPsec private address IPsec public address PPTP private address PPTP public address L2TP and L2F public address L2TP and L2F private address	

Table 4 Configuration checklist (continued)

Screen	Values required	Your Values
Services > Management	HTTP private address HTTP public address SNMP private address SNMP public address FTP private address FTP public address TELNET private address TELNET public address CRL retrieval private address CRL retrieval public address	
Routing > Static Routes Enabled/Disabled	Public Contivity gateway IP address Private Contivity gateway IP address	
Routing > OSPF Enabled/Disabled	Router ID AS boundary router (true or false)	
Routing > Rip Enabled/ Disabled	True or false	
Routing > Interfaces LAN IP Address	OSPF (enabled or disabled) RIP (enabled or disabled) VRRP (enabled or disabled)	
Servers > Radius Auth	Access (enabled or disabled Server-Supported Option (enabled or disabled) Radius Servers (enabled or disabled) Primary host name or IP addresses, public or private, Port, Shared secret/confirmed Alternate 1 host name or IP addresses, public or private, Port, Shared secret/confirmed Alternate 2 host name or IP addresses, public or private, Port, Shared secret/confirmed	

Table 4 Configuration checklist (continued)

Screen	Values required	Your Values
Servers > LDAP	Internal or external Base DN Master IP address, port or SSL Bind DN, Bind password, Confirmed Slave 1 IP address, port or SSL Bind DN, Bind password, Confirmed Slave 2 IP address, port or SSL Bind DN, Bind password, Confirmed	
Servers > User IP addr	Broadcast Any DHCP or DHCP servers: Primary IP address Secondary IP address Tertiary IP address Address pool: Pool name Start End Subnet mask	
Admin > Key Installation	Advanced routing install key Contivity Stateful Firewall install key	
Admin > Auto Backup	Automatic Backup file servers IP address of FTP servers for backup: Host Path User ID Password	

Welcome screen

The Welcome screen allows access to any of the configuration areas for the Contivity Secure IP Services Gateway.

Before entering the configuration options, first register your Contivity gateway to activate licenses, warranties, and services.

To start using your Contivity gateway, choose from one of the following options:

- Click on Manage Switch to begin a configuration management session. This option allows access to all Configuration Management facilities. For your first configuration, follow the Quick Start or Guided Configuration.
- Click on Manage from Notebook to run the Contivity Secure IP Services Gateway Manager in notebook display mode.
- Click on Quick Start to begin the Quick Start Configuration. This option allows you to configure interfaces, set up PPTP tunnels for up to three users, and establish a connection to the Contivity gateway. If you prepare for the configuration as recommended, the Quick Start can take as little as 15 minutes to complete.
- Click on Guided Config to begin the Guided Configuration. This option allows access to all Configuration Management facilities. The design and structure of the Guided Configuration, however, is such that you might want to follow the top-to-bottom layout provided. This approach walks you through the entire navigational menu from the Profiles to the Admin selections.

  Each functional area begins with a summary of the objectives of the area and then steps you through the area (for example, profiles), one subsection at a time. Context-sensitive help is available at each subsection to supplement the summary.

  Provided you have the information required to set up the Contivity gateway, the Guided Configuration is estimated to take two to three hours to complete, depending on how extensive your configuration is.

The Contivity gateway navigational menu options include the top-level configuration and monitoring areas of the Contivity gateway. Each of these key areas has secondary levels, which appear once you click on an area; for example, when you click on System, the secondary level listings appear. The menu is structured to provide system configuration details, followed by profiles for groups and users. Then you can configure authentication servers, secure tunnels, administrative details, and monitor the status of the Contivity gateway.

Chapter 3
Setting up the Contivity 1010, 1050, and 1100

This chapter provides instructions for the network administrator who is responsible for the Contivity 1010, 1050, 1100 gateways located at branch office sites. If you are at a branch office site and you need to connect the Contivity 1010, 1050, or 1100 to the network, see "Connecting for Internet access" on page 46. (This information was also included with the gateway.) Unless you are the network administrator, you need not read the rest of this chapter

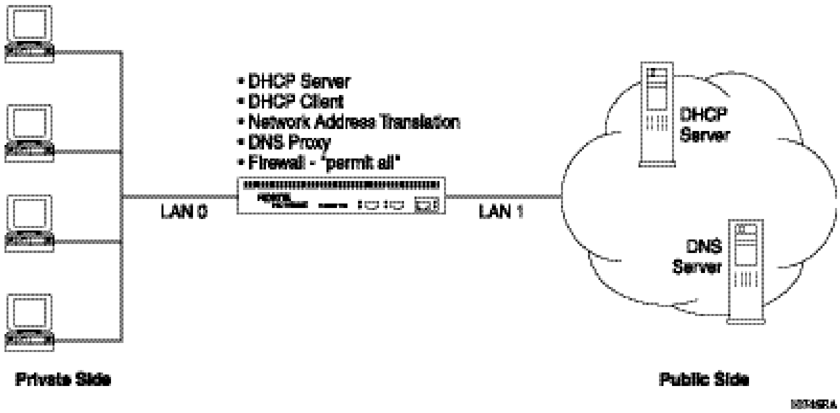
The Contivity 1010, 1050, and 1100 series of switches provides support for five (5) tunnels at introduction and 30 tunnels for licensing. The maximum tunnels include the sum of all branch office, client, and management tunnels combined. For example, if one management tunnel and two branch office tunnels are open, only two client tunnels can be connected initially (27 client tunnels with the 30 tunnel license). The license is for 25 additional tunnels. LDAP supports 150 entries.

Default configuration

The 1010, 1050, 1100 default configuration is set up to meet requirements for the majority of small office connections. This configuration includes a public interface configured for IP and can receive an address via DHCP from the ISP. The private side has the DHCP server enabled and the DHCP address pool set to 192.168.1.1/24. If you require a configuration such as PPPoE, you must first delete the IP protocol and a drop down list appears. Available configuration details do not appear on the default configuration screen unless this is deleted first.

Figure 4 show a typical default configuration.

Figure 4 Default configuration



By default, the Contivity 1010, 1050, and 1100 are configured with the following parameters:

- The DHCP server is configured on the switch's private interface, with a default range of 192.168.1.3/24 to 192.168.1.255/24. By default, 192.168.1.1 and 192.168.1.2 are assigned to the branch office switch's private and management interfaces, respectively. The DHCP server provides its own address for the DNS server and default Contivity gateway.
- The DHCP client is configured on the switch's public interface to retrieve its IP address from the ISP's DHCP server. Other parameters retrieved from the DHCP server should include the default Contivity gateway and the DNS server.
- DNS proxy is configured to forward DNS requests to an external DNS server. The address of the DNS server is obtained during startup from the ISP's DHCP.
- Network Address Translation (NAT) translates the private IP address space (determined by default configuration of the DHCP server) into one public address assigned to the public interface by your ISP.
- Port NAT maps multiple IP addresses in the private space to a single public IP address. The default configuration only supports initiating IP sessions from the private side of the switch, which reduces security risks.
- The Contivity gateway Interface Filter is set as the default firewall.
- The firewall setting PermitAll is the default for both the public and private interfaces. This default is different from the DenyAll default setting for other Contivity gateways.

Branch office quick start utility

The branch office quick start utility (BOQS) simplifies deployment of the Contivity gateway in the branch office environment. BOQS converts the Contivity 1010, 1050, or 1100 device from an Internet access gateway into a secure access gateway by provisioning a VPN connection to a central office or optionally, to a network operation center (NOC). BOQS allows a NOC or central office management to access the Contivity 1010, 1050, or 1100 so that network administrators can further configure the these units without going to the remote site.

Network administrators and service providers can use the branch office quick start for provisioning IP-based VPN services on a large scale. It provides VPN services using Contivity 1010, 1050, or 1100 devices as branch office VPN switches and other Contivity gateways as central office switches.

In addition to connectivity, the central office switch must be able to accept newly created secure connections from the Contivity 1010, 1050, or 1100. Therefore, the BOQS must be used with the knowledge and approval of a network administrator. It can only be initiated after IP addressing has been planned and the central office switch has been configured. Then you can send the provisioning parameters to the remote branch office locations.

The Contivity 1010, 1050, and 1100 must be connected to a public network and have access to the Internet before local users can use BOQS. The unique default configuration allows easy deployment of Contivity 1010, 1050, and 1100 switches in DHCP configurations (where a DHCP server is used on the public network). However, if you use static IP addressing or PPPoE on the public side, the Contivity 1010, 1050, or 1100 must be configured manually before local users can use BOQS.

All users on the private network must renew their IP addresses. For further information, see your Microsoft documentation. When the branch office tunnels are established, public access to the Internet is replaced with access to the central office.

Note: The BOQS will remain accessible after the information is entered. The network administrator must change the admin account (**username/ password**) to restrict access.

After the VPN services are provisioned, branch office networks are logically connected to a central office network or to a NOC network. Branch office end users can rerun BOQS multiple times to restore the initial VPN configuration or to fix data errors.

BOQS supports two network topologies:

- Enterprise topology where the network operations center is located within the central office.
- Service Provider topology where the network operations center is an independent entity from the central office

Enterprise environment

Before you deploy the Contivity 1010, 1050, or 1100 switches at the local sites, you must configure routing and tunnels on the switch at the central office.

For routing, you must do the following:

- Enable global RIP service.
- Enable RIP on private interface.
- Disallow importing default routes in the group where responder tunnels are created.

For tunnels, you must do the following:

- Create one responder tunnel for each branch office Contivity 1010/1050/1100 device.
- Set the Connection Type to Responder.
- Be sure that the Control Tunnel option is NOT selected.
- Determine the connection name for the tunnel. Nortel Networks recommends that the name be the same as the initiator ID, but it could be the same as the central office tunnel name.
- Set the state to Enabled.
- Set the Local Filter to permit all.
- Set IPSEC Authentication to Text Pre-Shared Key.
- Set the Initiator ID to the same name as the central office tunnel name.

- Set the Text Pre-Shared Key to the same name as central office tunnel password.
- Set Dynamic Routing to enabled.
- Set RIP to enabled.

After the central office setup and the BOQS are complete, the Contivity 1010, 1050, or 1100 is directly accessible from the central office. This means that there is just one hop between the central office and the branch office. RIP propagates routes to this subnet across the tunnel created by BOQS.

You must have at least two more IP addresses than IP workstations on the Contivity 1010, 1050, or 1100 private network. The first address from the subnet is assigned to the private interface of the branch office switch and the second address becomes the management IP address of the switch. Each branch office must be in its own subnet.

Table 5 shows how offices with approximately 50 workstations can each have subnets assigned.

Table 5 Subnet assignments

Private Network IP address	Private Network IP Mask	Contivity 1010/ 1050/1100 Private Interface Address	Contivity 1010/1050/ 1100 Management Interface Address	BO Workstations Addresses (assigned by DHCP Server)
200.1.1.0	255.255.255.192	200.1.1.1	200.1.1.2	From 200.1.1.3 to 200.1.1.62
200.1.1.64	255.255.255.192	200.1.1.65	200.1.1.66	From 200.1.1.67 to 200.1.1.126
200.1.1.128	255.255.255.192	200.1.1.129	200.1.1.130	From 200.1.1.131 to 200.1.1.190

Service provider environment

Service providers generally have an isolated NOC from which all devices are managed. The addressing scheme could be different from a central office and require a separate designated tunnel to configure the Contivity 1010/1050/1100 series of switches.

Every Contivity 1010, 1050, and 1100 must have a distinct IP address that is visible from the NOC subnet. A NOC can assign any address reachable from a NOC network to a Contivity 1010, 1050, or 1100. BOQS configures NAT on the NOC tunnel to translate the address specified in the "Branch office switch manage NAT IP address" and "management address from branch office private subnet." If the field is empty, the NOC must use an actual management address to access the Contivity 1010, 1050, or 1100.

Because the NOC tunnel uses static routing, all Contivity 1010, 1050, and 1100 devices must be configured with a static route to the NOC private network. The NOC private address and NOC private mask fields are where a BOQS user enters this information. This information is the same for all Contivity 1010, 1050, and 1100 devices.

You must provision the NOC switch to accept control tunnel connections from the branch office. Because static routing is used in control tunnels, you do not have to enable routing protocols on the NOC switch. Use the following guidelines:

- All responder tunnels should be created in one group or in subgroups of one group for easy management. Connection Name of the tunnel should correspond to NOC tunnel name and created in an enabled state with local filter set to Permit All.
- Text Pre-Shared Key should be selected as the IPSEC authentication method, Initiator ID set to the value of Control Tunnel Name, and Text Pre-Shared Key should be equal to Control Tunnel password.
- Select Static routing. Accessible local networks should be added. All networks from which the Contivity 1010, 1050, or 1100 will be managed must be on that list.
- NAT Local option should NOT be used.
- Accessible Remote Networks should contain one address subnet (mask equal to 255.255.255.255) with Contivity 1010, 1050, or 1100 Management IP. Contivity 1010, 1050, or 1100 Management IP is either explicitly provided in the field "Branch office switch manage NAT IP address" or if this field is left empty, it is the second address from the subnet specified in the Branch Office Private IP Address and Mask fields.

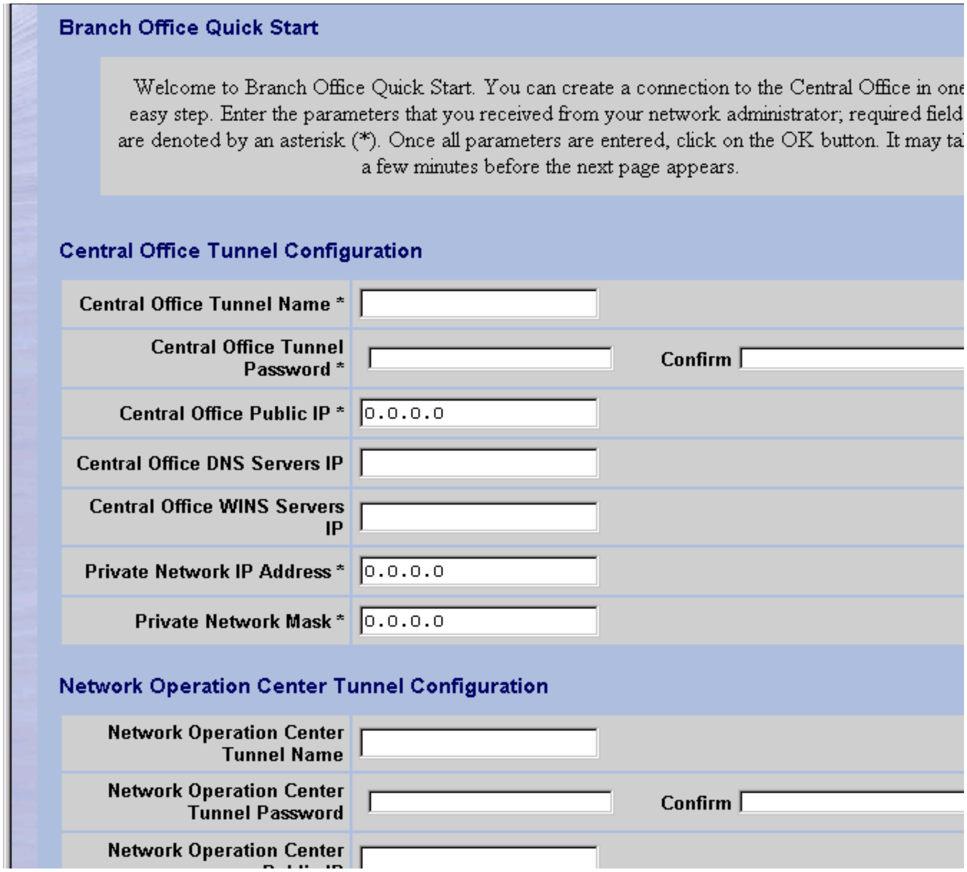
Deployment procedure

The following sequence of events illustrates the deployment procedure.

- Factory configured Contivity 1010, 1050, 1100 boxes are shipped directly to the end customer. A provisioning worksheet is either sent or faxed from the network operations center separately from the device.
- The end user unpacks and connects the Contivity gateway to the network using the readme included with the Contivity device. The Contivity gateway is deployed between the internet access device (cable or DSL modem) and the local network (Ethernet segment).
- The end user restarts the PC to request a new IP address from the branch office DHCP server (not all operating systems require rebooting).
- The end user opens the Web browser and types **http://192.168.1.2**, then clicks on Manage Switch and enters **admin** and **setup** as the username and password. This displays the BOQS screen.

Figure 5 shows the branch office quick start screen.

Figure 5 Branch office quick start screen



Branch Office Quick Start

Welcome to Branch Office Quick Start. You can create a connection to the Central Office in one easy step. Enter the parameters that you received from your network administrator; required field are denoted by an asterisk (*). Once all parameters are entered, click on the OK button. It may ta a few minutes before the next page appears.

Central Office Tunnel Configuration

Central Office Tunnel Name *			
Central Office Tunnel Password *		Confirm	
Central Office Public IP *	0.0.0.0		
Central Office DNS Servers IP			
Central Office WINS Servers IP			
Private Network IP Address *	0.0.0.0		
Private Network Mask *	0.0.0.0		

Network Operation Center Tunnel Configuration

Network Operation Center Tunnel Name			
Network Operation Center Tunnel Password		Confirm	
Network Operation Center			

- The BOQS displays one screen to collect the IP and VPN configuration parameters. The end user enters the required parameters using the worksheet prepared by the NOC.
- The BOQS configures a tunnel from the branch office Contivity gateway to a Contivity gateway located at the central office and a management connection (responder control tunnel) to enable further configuration from the NOC. The NOC can take over configuring the box once the connection is established and additional configuration is required.

Table 6 contains the BOQS parameters.

Table 6 BOQS parameters

Central office tunnel configuration	
Central office tunnel name	Name of the branch office tunnel on the central office switch.
Central office tunnel password	Password for the branch office tunnel.
Central office public IP address	Public address of the central office switch (same for all branch offices).
Central office DNS server IP address	IP address of the DNS server in the central office. The DHCP server configured on private interface distributes this address to the branch office. You can configure multiple addresses, but you must separate them with commas. This field is optional and can be left empty.
Central office WINS sever IP address	IP address of WINS server in the central office. The DHCP server configured on private interface distributes this address to the branch office workstations. You can configure multiple addresses, but you must separate them with commas. This field is optional and can be left empty.
Private network IP address	Subnet address of the branch office network.
Private network mask	Subnet mask of the branch office network.
Network Operation Center tunnel configuration	
Network operation center tunnel name	Name of the branch office tunnel configured on NOC switch (same as initiator id on the NOC switch).
Network operation center tunnel password	Text pre-shared key used in branch office tunnel.
Network operations center public IP address	Public address of NOC switch (same for all branch offices).
Network operations center private network IP address	IP Address part of subnet address in which NOC is located (private subnet of NOC switch).
Network operations center private net mask	IP mask of subnet address in which NOC is located (private subnet of NOC switch).
Branch office switch management IP address	Address used by NOC to manage switch. Must be unique for each Contivity 1010/1050/1100 and reachable from the NOC. If left empty, can be managed with the second address of the subnet configured in branch office private network IP address/ IP mask field

Branch office quick start template

The branch office quick start template provides a list of values that the local Contivity 1010, 1050 or 1100 users will need to enter on the BOQS screen. See Appendix A, "Branch office quick start template," for a copy of the template. You can enter the appropriate values in the right-hand column and then fax, send, or email the template to the local user along with any other information that they may need, such as who to contact for further information or questions.

Connecting for Internet access

This section provides information on how to set up the Contivity 1010, 1050, and 1100 series of switches for basic Internet access through a cable or DSL modem. This set of instructions in also provided on the readme that is shipped with the hardware.

Before you begin

Before you connect the Contivity 1010, 1050, or 1100, you must have the following:

- Internet connection—If your DSL or cable modem is not yet installed, contact your Internet service provider (ISP). The ISP may need the LAN 1 MAC address on the back of the gateway.
- Provisioning worksheet—The company or service provider that supplied the gateway sends this worksheet separately via e-mail or fax. The worksheet provides information that you will type into a quick-start tool to complete the configuration of your gateway

➡ **Note:** If you did not receive the worksheet, call the ISP or the company that supplied the Contivity 1010, 1050, or 1100. Do not connect the gateway until you have the worksheet.

Check that you received the following items

Make sure that you received the following items with your Contivity 1010, 1050, or 1100:

- Power cord
- AC to DC external power supply
- Molded serial cable RJ-45 to DB9
- Ethernet crossover cable (Contivity 1010 only)
- Contivity CD (**Note**: the documentation on this CD is for reference only)

Cable the gateway and turn the power on

To set up your Contivity 1010, 1050, or 1100:

1 Connect a PC to the LAN 0 (**private**) port located on the front panel of the gateway.

   - To connect a PC directly to the Contivity 1010, use the Ethernet crossover cable that was shipped with it. To connect more than one PC to the Contivity 1010, connect an Ethernet switch or hub to the LAN 0 port and then connect the PCs to the switch or hub.
   - To connect PCs and other devices to the Contivity 1050 or 1100, use standard Ethernet cables to connect the devices to the LAN 0 ports (labeled A–D).

2 If you have a Contivity 1100 that has one or two optional interface cards, connect the appropriate cables to the ports on the interface cards.

3 Using a standard Ethernet cable (not included with the gateway), connect your cable or DSL modem to the LAN 1 (**public**) port located on the front panel of the gateway.

4 Plug the power cord into the AC receptacle on the external power supply shipped with the gateway.

5 Plug the power cord into the AC power outlet.

Caution: Protect the Contivity 1010, 1050, or 1100 by plugging it into a surge suppressor.

6 Plug the external power supply into the port labeled “DC Input” on the back of the gateway.

7 Press the power switch to the “on” position and wait for the gateway to boot.

Note: The boot process can take as long as 3 minutes.

Make sure that your PCs can obtain IP addresses automatically

By default, DHCP server is enabled on the private side of the gateway to assign IP addresses to the PCs that you connect to the LAN 0 ports.

1 Make certain that each PC is configured to obtain its IP address automatically. (Following are instructions for Windows* 2000; for other operating systems, see the user documentation.)

   a Choose Start > Settings > Network and Dial-up Connections > Local Area Connections.

   b Click on Properties.

   c From the component list, select Internet Protocol (TCP/IP) and then click on Properties.

   d Select the “Obtain an IP address automatically” option and click on OK.

2 Reboot the PC to obtain a new IP address from the gateway (192.168.1.3–192.168.1.254).

Test the gateway and start the quick-start tool

Depending on the type of addressing that your ISP uses, go to the appropriate section:

- If your ISP uses DHCP, go to “DHCP instructions.”
- If your ISP uses Point-to-Point Protocol over Ethernet (PPPoE), go to “PPPoE instructions.”
- If your ISP uses static IP addressing, go to “Static IP instructions.”

Note: If you complete the steps in the appropriate section and your gateway is not up and running, contact the service provider or company that provided the gateway.

DHCP instructions

If your ISP uses DHCP to assign an IP address to your PCs, verify that your gateway is connected to the Internet and start the quick-start tool as follows:

1 Start your Web browser to verify connectivity to the Internet. (By default, the LAN 1 port on the gateway acts as a DHCP client and receives an IP address from the public side.)

2 Locate the provisioning worksheet sent by the company or provider that sent you the gateway.

3 Enter the following URL in your browser window: **http://192.168.1.2/manage/qs.pyc**.

4 Click on Manage Switch, and then type **admin** and **setup** as the user name and password.

5 Follow the instructions on the screen that appears.

PPPoE instructions

If your ISP uses PPPoE to assign an IP address to your PCs, connect the gateway to the Internet and then start the quick-start tool as follows:

1 Open a Web browser and enter the following URL in the browser window: **http://192.168.1.2**.

2 Click on Manage Switch, and then type **admin** and **setup** as the user name and password.

3 From the menu bar, choose System > LAN to display the LAN Interfaces screen and select Cancel Acquisition.

4 From the Select Protocol list, choose PPPoE and click on Apply.

5 The Add PPPoE Interface screen appears.

6 Set the Administrative State option to Enabled.

7 From the Interface Filter list, choose **permit all**.

8 Click on OK.

9 Locate the provisioning worksheet sent by the company or provider that sent you the gateway.

10 Enter the following URL in your browser window: **http://192.168.1.2/manage/qs.pyc**.

11 Click on Manage Switch, and then type **admin** and **setup** as the user name and password.

12 Follow the instructions on the screen that appears.

Static IP instructions

If your ISP assigns static IP addresses to your PCs, connect the gateway to the Internet and then start the quick-start tool as follows:

1 Contact the ISP for the address to use.

2 Open a Web browser and enter the following URL in the browser window: **http://192.168.1.2**.

3 Click on Manage Switch, and then type **admin** and **setup** as the user name and password.

4 From the menu bar, choose System > LAN to display the LAN Interfaces screen and select Cancel Acquisition.

5 From the Select Protocol list, choose IP and click on Apply.

6 The Add IP Address screen appears.

7 Select the Static option and type the IP address and subnet mask that the ISP provided.

8 From the Interface Filter list, choose **permit all**.

9 Click on OK.

10 From the menu bar, choose Routing > Static Routes.

11 Click on Add Public Route (located under the Default Routes list).

12 The Add Public Default Route screen appears.

13 In the Gateway Address field, type the default route address that the ISP provided.

14 Click on OK.

15 Locate the provisioning worksheet sent by the company or provider that sent you the gateway.

16 Enter the following URL in your browser window: **http://192.168.1.2/manage/qs.pyc**.

17 Click on Manage Switch, and then type **admin** and **setup** as the user name and password.

18 Follow the instructions on the screen that appears.

Compact flash disk

The Contivity 1010, 1050, and 1100 use a compact flash disk instead of a traditional hard disk that provides 32 MB of flash disk storage. Because of the limited storage capacity, the following functionality is not provided:

- Safe mode
- Java runtime plug-in
- Graphs
- Japanese strings
- Context-sensitive help

The help files are located on the CD and on the Nortel Networks documentation Web site. When you click on the Help menu from the UI, you can enter the location of the help files on a server.

File compression is used extensively on the Contivity 1010, 1050, and 1100. Compressed files will retain their original names and all existing directory operations that the software performs will continue to work. The following functionality is compressed:

- VXworks image
- All Web pages
- All scripts
- Numerous text files

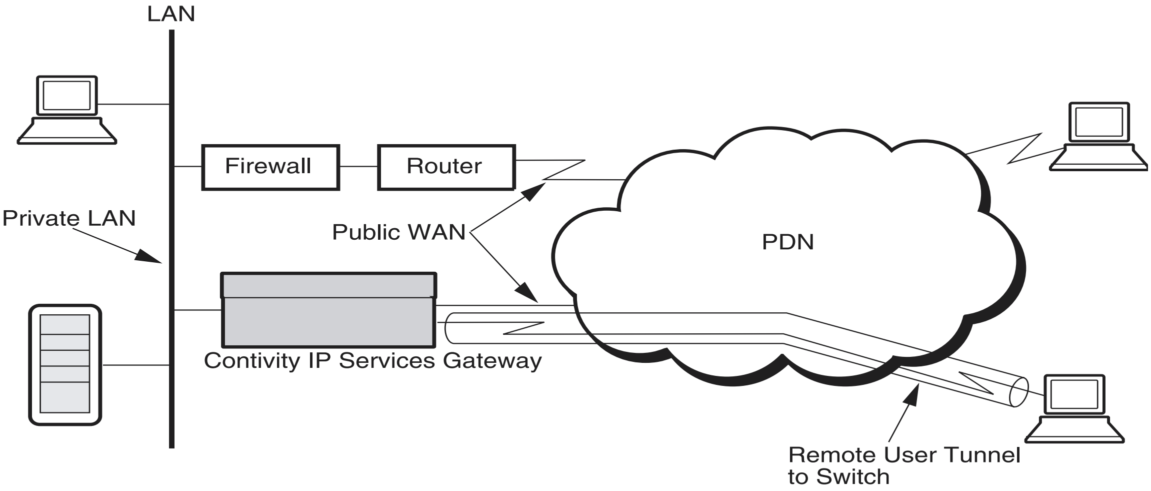
Two software images can be stored on the flash disk at the same time. Operational changes for the compact flash disk are:

- The config file is saved every minute and the past three versions are kept. The config file is only written when the configuration changes.
- The on-disk system log (syslog) is not be supported. However, you can configure an external syslog server.
- No accounting information is stored on the compact flash disk. However, an external RADIUS accounting server is supported.
- The data collection log (DCLOG) is not supported, which means that the graphing capabilities of the UI are also not supported.
- The core is not saved on the compact flash disk. It is sent to an FTP server. Configuration parameters for the FTP server are stored in flash. The core file is placed on the server. To set up the FTP coredump, got to the FTP Coredump section of the Admin > Admintstrator screen, click on Enabled and enter the appropriate FTP server information. Because many switches may be configured to coredump to the same location, the core files will have a more descriptive name: core*_date_24-hour-time_management_ip*.mem. For example, a core file generated by 10.0.8.186 on Oct.12th, 2001, at 4:46:06 PM will be named core_20011012_164606_10.0.8.186.mem.

Chapter 4
Configuring user tunnels

The Contivity Secure IP Services Gateway uses the Internet and tunneling protocols to create secure extranets. The following sections describe configuring the tunnel portion of the Contivity gateway. The configuration process includes setting up the authentication table and specific tunnel parameters, such as IPsec encryption, L2TP access concentrators, and L2F network access servers. Figure 6 shows a typical network illustration with the Contivity gateway connected to the PDN (public data network) and to a remote user through a tunnel.

Figure 6 Tunnel connection configuration



The connection attributes that you configure in the Contivity gateway enable the remote user to create a tunnel into the Contivity gateway. However, you are not configuring the connection from the remote user to the Internet Service Provider (ISP) at this point. The actual connection to the Contivity gateway is a tunnel that is started from the remote user's PC through its dial-up connection. That connection is to the Internet (typically using an ISP), through the Internet, and ends at the Contivity gateway on the private, corporate network.

The Contivity gateway associates all remote users with a group, which dictates the attributes that are assigned to a remote user session. A group can even consist of a single user, thereby creating a personal extranet.

The Contivity gateway organizes groups in a hierarchical manner. At the top of the hierarchy is the base group. The base group \Base contains the default characteristics that each new group inherits. You add additional groups to the hierarchy as children of the base group.

The Contivity gateway takes precautions against unauthorized users potentially hacking tunneled information when the Contivity gateway is operating in split tunnel mode. The primary precaution is to drop packets that do not have the IP address that is assigned to the tunnel connection as its source address. For example, you establish a PPP dial-up connection to the Internet with an IP address of 192.168.21.3. When you start the tunneled connection to a Contivity gateway, you are assigned a tunnel IP address of 192.192.192.192. Now, any packets that attempt to pass through the tunnel connection with a source IP address of 192.168.21.3 (or any address other than 192.192.192.192) are dropped. Furthermore, you can enable filters on the Contivity gateway to limit the protocol types that can pass through a tunneled connection.

Note: PPP multilink is not supported with branch office tunnels. It is only supported with end user tunnels.

Password aging does not work for administrator accounts. Also, the following are client-specific password management symptoms:

- If you are using the IPsec client, you are warned three times that there will be an impending password expiration. You should change the password immediately. IPsec clients using versions earlier than 1.5.2 do not receive a password expiration warning.
- If you are using the PPTP client with the Connection Manager, the Connection Manager generates an impending password expiration warning.
- Other clients (L2TP and L2F) and PPTP client users who are not using the Connection Manager have no warning and no longer can log on. You must contact your system administrator if this happens. In this case, the Contivity gateway is unable to notify the client because it has no actual control over the client. With PPTP, use the Connection Manager to establish a connection. With L2TP or L2F, set the Password Maximum Age to zero (never expires).

For example, \Base is the base group, Research and Development and Finance are child groups of the base group, and they are parent groups to groups below them.

Groups are collections of users with the same access attributes and rights. If all users have identical characteristics, then only one group is necessary. You create multiple groups when you need different attributes. A Lightweight Directory Access Protocol (LDAP) database stores users, groups, and their attributes. You can store this database internally (on the Contivity gateway's hard disk) or externally (on a network host running LDAP server software).

The Contivity gateway authenticates each user that tries to connect to the Contivity gateway by checking the user ID and password against a database. The Contivity gateway supports both LDAP and Remote Access Dial-In User Session (RADIUS) databases for authentication. When using LDAP for authentication, the user is always assigned to a group since LDAP also contains the user, group, and attribute information.

When authenticating a Point-to-Point Tunneling Protocol (PPTP) client against a RADIUS database, the group for a user requesting a session can be returned from the RADIUS server as a RADIUS class attribute.

When authenticating an IPsec client, the remote user is by default assigned to the group ID. If the group ID and group password are correct, the Contivity gateway passes the user ID and password (or token card) to the RADIUS server for authentication.

You define a set of group attributes and give it a name. This group name is known as the Relative Distinguished Name and it is added to the LDAP database name when performing the database lookup.

Note: The group name Certificates is not allowed as a valid group name when created under the /Base directory. If you change the name to Certificate, the group is created properly. If you create the group Certificates in a /Base subdirectory, it is created properly.

Configuring group characteristics

In addition to assigning users to groups and providing authentication access, you can configure other group characteristics:

1. Go to the Profiles > Groups screen and click on the Edit button next to the group that you want to configure.
2. Under the Connectivity section, click on the Configure button to change the any of the group characteristics.
3. Enter the name of someone who serves as the point of contact. This is typically the administrator.
4. Specify the time ranges during which access is allowed for users in a group. These time ranges are also configured from the Profiles > Hours screen.
5. Specify the call admission priority level (from low to highest) that you want to permit for the group. Each level is assigned a percentage of the total number of calls allowed access to the Contivity gateway. If there is a particularly high number of users logged in, new users could be denied call access, based on their call admission priority, until existing callers disconnect.
6. Specify the forwarding priority level (from low to highest) that you want to provide to sessions for users in this group. Forwarding priority assures a certain level of latency and bandwidth allocation. For example, a group with the highest forwarding priority has the highest possible bandwidth service and the lowest level of latency. Conversely, if there is a particularly high level of traffic on the line, packets for a low-priority group might be delayed or dropped. Since a low-priority group has the least amount of bandwidth and the highest level of latency, some of its packets would wait until the higher-priority-level packets have been forwarded or they would be dropped.
7. For number of logins, enter the maximum number of simultaneous logins IPsec clients in the group are allowed. The Contivity gateway does not enforce the maximum number of logins across tunnel types. If you set the number of simultaneous logins to 1, a client can still get another tunnel type connection if the client is configured to use multiple tunnel types. To limit the number of connections a client can have, configure the user for a single tunnel type.
8. Select Enabled to enable the password management facilities:

- Maximum password age is the time after which the login password expires. The Maximum Password Age range is from 0 (no password expiration) to 180 days (6 months). Default is 30 days. Users receive a warning that the password will expire each time they log in for two days prior to the expiration date. They also receive three warnings before access is denied. (If your clients are using a Microsoft Dial-up Networking connection instead of the Nortel Networks Connection Manager, then they are not be notified of a password expiration or be given the opportunity to change the password prior to expiration. You should not use this feature unless you also plan to distribute the Connection Manager.
- Minimum password length can be from 3 to 16 alphanumeric characters. If you set the minimum length to eight characters, then the remote user must use at least eight characters as the login password. Default is 16 characters.
- Alpha-numeric passwords forces remote users to log in with a combination of alphabetic (A to Z) and numeric (1 to 9) characters. Nortel Networks does not recommend using all alphabetic characters because this makes it easier for hackers to decode. The default is Disabled.

9 Enter the amount of time a connection can be idle (no data has been transmitted or received through the connection for the specified amount of time). When the idle timeout expires, the session is terminated. This option helps prevent allocation of resources on the Contivity gateway for sessions that are no longer active. The default Idle Timeout is 00:15:00 minutes; the range is 00:00:00 to 23:59:59. The maximum number of days is 29. A setting of 00:00:00 specifies no Idle Timeout. All sessions check their configuration at startup time. Therefore, if you change the time of the idle timeout during a session, the change only affects new sessions and not any existing ones.

10 For Access Network Name, specify a source IP address that restricts user access. Users may tunnel into the Contivity gateway only if they are tunneling from a source IP network defined by the access network. If they tunnel from a network outside the defined access network, the tunnel is refused. Access Network Names must be previously defined on the Profiles > Networks screen to appear in the list. Use the link to create an access network if one does not exist.

11 Packet filters control the type of access allowed for users in a group, based on various parameters, including Protocol ID, Direction, IP addresses, Source, Port, and TCP Connection establishment. Go to the Profiles > Filters screen to create tunnel filters.

12 Select Enable to enable IPX support for the group.

13 Enter the Maximum Number of PPP Links that you want the Contivity gateway to support. The range is 1 to 5; default is 1. The Multilink PPP (MP) implementation allows tunneling multilink connections to the Contivity gateway when the tunneling is being done by the ISP.

14 RSVP allows you to signal the network for required bandwidth. The client must be configured appropriately for RSVP to work. Also, only the controlled load-service is supported. This option is disabled by default.

15 The Token Bucket Depth influences packet flow delays within the Contivity gateway and participating routers in the Internet. The largest amount of data the Contivity gateway holds in its queue determines latency. New packets arriving are delayed by a time that is proportional to the amount of traffic that is ahead of them in the queue, which is no greater than the Token Bucket Depth. When the queue exceeds the Token Bucket Depth, incoming packets are dropped. To guarantee reduced latency, the Bucket Depths should be small. Typically, you should not change this setting. Default is 3000 bytes.

16 The Token Bucket Rate is the highest long-term average data rate (in Kbps) required over time for the connection. It informs the Contivity gateway and participating routers in the Internet how much bandwidth to reserve for the RSVP session. Typically, you should not change this setting. Default is 28 Kbps.

17 Click on the drop-down menu to select the Address Pools used by remote users to access this Contivity gateway. The drop-down list shows all pools that have been defined on the Contivity gateway. (Address pools are defined on the Servers > User IP Addr screen). Select the New Address Pool link to define a new pool. Refer to “Remote User IP Address Pool” for details. This option is set to Default Pool by default.

18 Click on the Configure button in the User Bandwidth Policy section to modify bandwidth characteristics for this group. Click on the Use Inherited button to apply the settings of the parent group to this group.

19 Click on the Configure button in the User Bandwidth Policy section to modify bandwidth characteristics for this group. Click on the Use Inherited button to apply the settings of the parent group to this group.

   a Select a Committed Rate from the list of available bandwidth rates. If the desired bandwidth rate is not listed, click on Define new bandwidth rate to create a new one.

b Select an Excess Rate from the list.

c Choose an Excess Action for traffic handling, either Drop or Mark.

A group inherits attributes from its parent group. For example, if the Research and Development group attributes include All Access Hours and Allow Static Addresses but deny Client-Supplied addresses, PPTP and IPsec tunneling, then the New Products (child) group would inherit these attributes.

Setting up user tunnels

To implement user tunnels, you must configure the following:

- Allowed tunnel access to the Contivity gateway
- Tunneling protocol settings
- A user group
- Add users to the group
- A means, such as DHCP or pool, for assigning IP addresses to the client to allow user access

All tunneling protocols are enabled on the public and private networks by default. Since data in tunnels is encrypted, the default setting guarantees that all interactions with the Contivity gateway are private. To prevent tunnel connections of a particular type (for all users, including administrators), you can simply disable the tunnel type.

For example, if you want to use IPsec as your only public tunneling protocol, then disable the Public selection for PPTP, L2TP, and L2F. By leaving IPsec, PPTP, L2TP, and L2F enabled on the private side, you can establish tunneled connections to the Contivity gateway using any of the tunnel types from within your corporation.

To configure tunnel access to the Contivity gateway:

1. Choose Services > Available.
2. Select the tunnel type.
3. Select the Management Protocol for the Contivity gateway’s private interface.

4 Use the RADIUS check boxes to permit RADIUS requests on the public and private interfaces of the Contivity gateway. If you enable RADIUS traffic, you must also enable RADIUS on the Services > RADIUS screen.

Configuring the Contivity gateway tunneling protocol settings is dependent on the tunnel type.

- For IPsec, choose Services > IPsec and select the required authentication, encryption, and authentication order.
- For PPTP, choose Services > PPTP and select the required authentication and authentication order.
- For L2TP, choose Services > L2TP and select the required authentication and authentication order and configure required L2TP access concentrators.
- For L2F, choose Services > L2F and select the required authentication and authentication order, and configure required network access servers.

To add a user group:

1 Go to Profiles > Groups and click on the Add button.

2 Enter a group name of up to 64 characters (spaces are permitted).

For example, you could use Research and Development. The new group is a child of the selected parent group. Therefore, the new group initially inherits the parent group’s network access attributes, including authentication, tunnel types, filtering, and priorities. When created, these inherited options can be overwritten for the new group.

3 Click on Apply and OK to add the group name.

To add a user profile in a group:

1 Select a group to which you want to add users from among those in the Group list. If you need to add a new group, select Profiles > Groups.

2 After selecting a group, you must click on Display to view the group members. This allows you to quickly change from viewing one group to another. The last names and first names of the selected group’s users appear, sorted by last name.

3 Click on Add to add a user to the group; the Add User screen appears.

Note: To configure firewall user authentication, see *Configuring Authentication and Certificates for the Contivity Secure IP Services Gateway.*

This screen allows you to add a user profile. Only options that are enabled for the specified group appear on this screen. Also, only options that the administrator who is currently viewing the screen has rights to appear. A user profile includes:

- User IDs
- Passwords for the various tunneling protocols
- Assignment of administrative rights
- An IP address that is always associated with the remote user

Note: You can assign a user to two different groups, but only if the user has two different user IDs. You cannot enter the same user ID in two different groups. A user account can have up to four user IDs, depending on the group configuration, the account. If you are creating an enterprise user ID standard, you should try to avoid schemes that might potentially create conflicts as your company grows. For example, you should not use the user's full first name and last initial.

4 Enter the first and last name of the user whose profile you want to add. This is the regular name associated with a person (for example, Mario Smith). This user can have different IDs and passwords for each tunnel type. You can move the user to a another group by selecting a different group name.

Note: The GUI ignores leading and trailing spaces, but these must be specified if you then use CLI to edit the user name.

5 Enter a remote user static IP address to use in place of a pool (client-specified or DHCP) server-assigned IP address. This IP address is associated with the Static IP Address option in the Groups > Connectivity option (it is only used if the group allows it). If an IP address that is entered here is used instead of a DHCP server-assigned IP address, then only one login is allowed.

6 Enter the subnet mask. Assigning the correct subnet mask to a remote IPsec client is important when using split tunneling. When you enable split tunneling, packets destined to a host in the Split Tunnel Network list are directed into the tunnel by the IPsec client. All other traffic goes through a standard LAN or dial-up interface. This occurs on the client by adding the routes listed on the Split Tunnel Network list to the route table of the Microsoft TCP/IP stack and pointing those routes to the tunnel adapter interface. A route is also added to the route table based on the subnet mask assigned to the tunnel adapter. The IPsec Subnet Mask field allows you to specifically assign a subnet mask to a remote IPsec client that obtains an IP address either from the IP address pool, DHCP, RADIUS, or a static user configuration.

Note: If a host route for the destination address of the Contivity gateway exists in the TCP/IP route table prior to launching the Contivity VPN Client, the route is deleted when the tunnel is closed.

To search within a selected group and then configure a user's account:

1 Go to Profiles > Users > User Management.

2 Select a group from which you want to search for a particular user from the Group drop-down list box (at the top of the screen), and click on Display. The search is limited to the available groups.

3 Enter the appropriate text to search for in the input box.

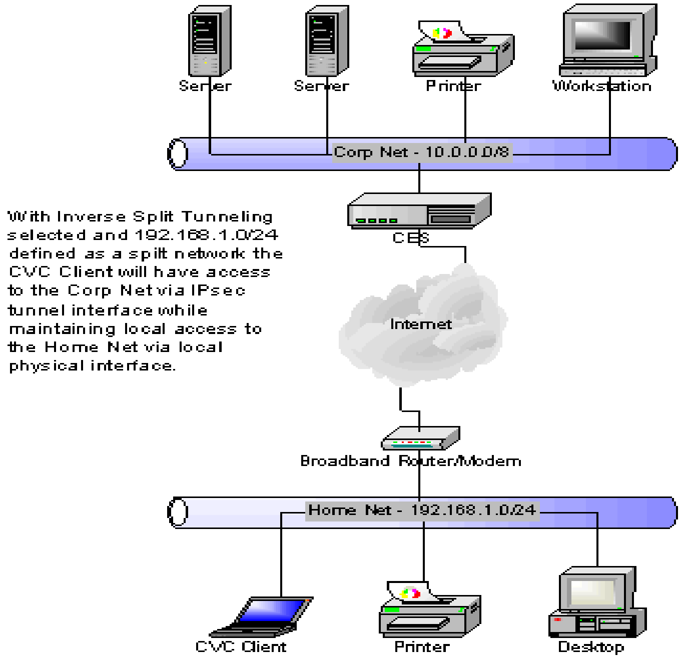
4 Select one of the following as the preferred search method, then click on Search.

- Last Name searches for a last name. You must enter the entire last name.
- UID searches for a user ID.
- Admin Rights searches for anyone who has View or Manage administrator privileges.
- LDAP search allows you to enter any LDAP database attribute that is part of the person, organizational Person, or inetOrgPerson object database (for example, cn=common name or sn=surname) to generate the associated user's profile. Refer to your LDAP vendor's documentation for complete details.

Configuring inverse split tunneling

Inverse split tunneling provides the flexibility of allowing remote users access to network resources outside of the mandatory tunnel while still maintaining most of the security advantages of this tunnel type.

Figure 7 Inverse Split Tunneling

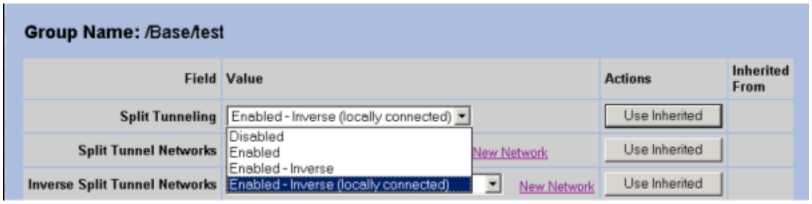


With Inverse Split Tunneling selected and 192.168.1.0/24 defined as a spilt network the CVC Client will have access to the Corp Net via IPsec tunnel interface while maintaining local access to the Home Net via local physical interface.

The security of a mandatory tunnel is partially compromised by the addition of inverse split tunneling in a way similar to that of split tunneling. However, inverse split tunneling does have a significant security advantage over split tunneling in that you specify the network resources that are allowed outside the tunnel. Split tunneling allows access to any network resource outside of specified split tunnel networks.

Configuration is available through the GUI and the CLI of the Contivity gateway. The Profile > Groups screen of the Contivity gateway GUI allows the addition of inverse split tunnels.

Figure 8 Inverse Split Tunneling



Group Name: /Base/test

Field	Value	Actions	Inherited From
Split Tunneling	Enabled - Inverse (locally connected)	Use Inherited	
Split Tunnel Networks	New Network	Use Inherited	
Inverse Split Tunnel Networks	New Network	Use Inherited	

To select the split tunneling mode in which you wish to operate, the Split Tunneling drop down menu has been modified to include two new options. Enabled – Inverse and Enabled – Inverse (locally connected). The default will remain Disabled.

Chapter 5
Configuring the system

This chapter describes how to configure various system-level features:

- LAN interfaces
- WAN interfaces
- 802.1q VLAN subinterfaces
- MTU and TCP MSS
- Circuitless IP
- NTP
- Safe mode configuration
- Proxy ARP

Configuring the system identity

Each Contivity Secure IP Services Gateway is uniquely identified by the system's address and domain name system (DNS) name. The DNS name can be used instead of the IP address to identify the Contivity gateway and launch its management interface through a Web browser.

The System Identity screen allows you to optionally change your Contivity Management IP address, and provide the DNS Host Name and Domain Name. Additionally, you can assign up to three DNS addresses to resolve IP address name resolution requests. You can also reset the Contivity Management IP address values using the serial interface.

To configure the System Identity:

1. Enter a Management IP Address for the system. You need this address to contact all system services, such as HTTP, FTP, and SNMP. To be accessible,

the Management IP Address must map to the same network as one of the private interfaces. For example, if you are planning on assigning IP address 10.2.3.3 with the subnet mask 255.255.0.0 to the private physical interface, the Management IP Address must reside in the 10.2.x.x network.

If you configure the Contivity gateway on one network and plan to move it to another network, change the Management IP address and private LAN interface addresses before moving the Contivity gateway. Then, communicate with the Contivity gateway using the new Management IP address from your browser's URL address field.

2 Under Domain Identity, enter the DNS Host Name to identify the system. This should be the same name that is used by the DNS server to identify the management address of the Contivity gateway that is located on your private network. You can enter up to 64 characters maximum.

3 Enter the Name of the Internet Domain into which this system is being placed. This must be the same Internet Domain as the System Name in the Domain Name System (DNS) server. A domain is a part of the Internet naming hierarchy that refers to general groupings of networks that are based on organization-type or geography. For example, mycompany.com is the domain name for a commercial (.com) enterprise.

4 Under DNS Server Address, enter the address of the DNS server that is located on your private network. The DNS server translates textual host names into IP addresses. For example, DNS can translate the fully-qualified host name www.mycompany.com to its IP address192.19.2.33. The Primary DNS server is the first one addressed for servicing name resolution requests that are needed by the system; if the Primary DNS server is unavailable, service is requested of the Secondary DNS server. This is the DNS entry that management tools use to resolve names in configurations. Always use the IP address for setting a DNS server host instead of a domain name.

Note: If no DNS servers are specified, management requests that are using names rather than network addresses fails.

5 Enter an address for the Secondary Domain Name System (DNS) server. If the Primary DNS server is unavailable, service is requested of the Secondary DNS server (if present).

6. Enter an address for the Tertiary Domain Name System (DNS) server. If the Primary and Secondary DNS servers are unavailable, service is requested of the Tertiary DNS server (if present).
7. The DNS Proxy Enabled/Disabled check box allows you to select whether you want the DNS Proxy to act as a DNS server to the private side. It it enabled by default.
8. Click on the Split DNS check box if you have a split name space.
9. For Primary, enter the address of the DNS server that the DNS proxy tries to contact first.
10. For Second, enter an address for the Second Domain Name System (DNS) server. If the Primary DNS server doesn't respond in a few seconds, service is requested of the Second DNS server (if present).
11. For Third, enter an address for the Third Domain Name System (DNS) server. If the Primary and Secondary DNS servers doesn't respond, service is requested of the third DNS server (if present).
12. For Fourth, enter an address for the Fourth Domain Name System (DNS) server. If the preceding servers doesn't respond, service is requested of the fourth DNS server (if present).
13. Click on OK. The Contivity gateway checks all of the DNS addresses to see if they respond and then provides an operational or error status.

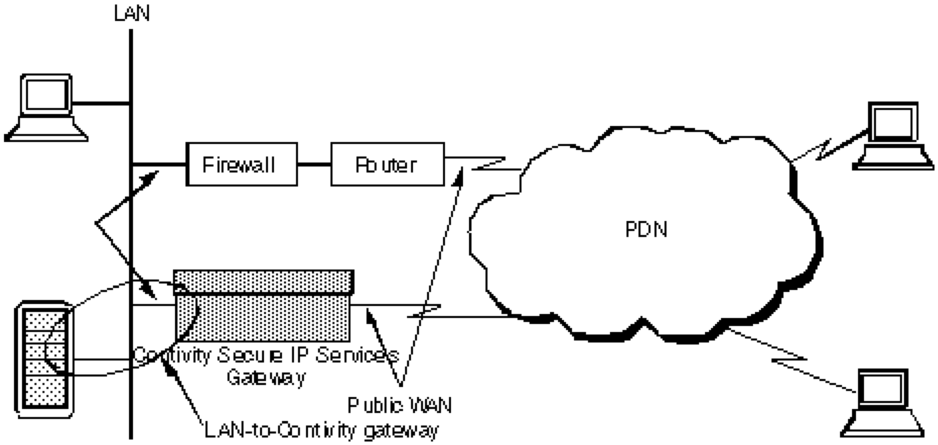
The ISP Provided Server is not user configurable. It is provided by the ISP. The ISP may assign more than one DNS server, but only one of them (primary) is shown on the screen.

Setting up LAN interfaces

The LAN interface that is available on the system board is configured to be private by default. Connect its interface to your corporate LAN. Additional interfaces that are inserted into the expansion slots are public by default.

The private LAN interface and the management IP address must be on the same network, and the public LAN interface should be on a different network, both physically and logically. If your Contivity gateway has a single network interface and you want to position the Contivity gateway behind the firewall and router, then you should set the Contivity gateway's interface type to private. Figure 9 shows a connection from a LAN to a Contivity gateway.

Figure 9 LAN-to-Contivity gateway connection



A host can send only enough packets to a public interface to establish a tunnel connection. If the tunnel is not established before a preset maximum number-of-packets-allowed counter is reached, then the packets from that host are discarded.

Public indicates that this interface is attached to a public data network like the Internet. The Contivity gateway rejects nontunneled protocols and only accepts tunneled protocols like IPsec, PPTP, L2TP, L2F, and diagnostic ping on a public interface. A host can send only enough packets to a public interface to establish a tunnel connection. If the tunnel is not established before a preset maximum number-of-packets-allowed counter is reached, then the packets from that host are discarded.

When the public interface is configured to act as a DHCP client, the DHCP client needs to correspond to an external DHCP server to acquire the IP address, subnet mask and default route parameters. You can set a cost value to give preferential routing when two or more public DHCP clients are configured. In this situation, DSL and cable modem are the preferred choice for connections to the internet.

Private indicates that an interface is attached to the private network and it can accept nontunneled networking protocols such as TCP/IP, FTP, and HTTP. The Private interface also accepts tunneled protocols (for example, IPsec, PPTP, L2TP, L2F) that can be used for secure management access to the Contivity gateway.

Note: The private LAN interface and the management IP address should be on the same network, and the public LAN interface should be on a different network, both physically and logically.

If you have one network only and want to position the Contivity gateway behind the firewall and router, then you should use a private LAN interface only (do not use a public LAN interface).

From the System > LAN screen, you can:

- Click on Configure to modify the interface characteristics.
- Click on Statistics to view the Link Statistics.
- From the Select Protocol list, select the tunneling protocol to use: IP is the standard Internet Protocol. and Point to Point Protocol over Ethernet (PPPoE) allows PPP to run over Ethernet.

Note: You cannot use dynamic routing on PPPoE interfaces. DHCP is configured by default on the Contivity 1010, 1050, and 1100 so you must first select Cancel Acquisition and then select PPPoE from the Select Protocol menu. You can use PPPoE on only one interface at a time. IPX is not supported.

This screen also provides the following information about the LAN interfaces:

- IP Address shows the current IP address that is assigned to the interface.
- Subnet Mask defines which bits of the IP address represent the network the device is on and which bits represent the host’s ID on the network. The device uses the Subnet Mask to determine which IP addresses are directly reachable on the network and which must be routed through a Contivity gateway. A sample IP address is 10.2.3.3 with a subnet mask of 255.255.0.0. This indicates that all hosts with addresses 10.2.*n.n* are directly reachable.

- Interface Filter shows whether the Contivity Stateful Firewall is in use on this LAN interface (this reflects the selection on the Services > Firewall screen). This entry also shows the interface filter that is currently being used by the Contivity Firewall. This is the interface filter that is selected on the System > LAN Interfaces > Edit IP Address screen. If no interface filter has been selected, the default of Deny All is used. The Deny All and the Deny All (default filter) have the same effect. The Deny All (default filter means that there is no filter selected so the default behavior applies, which is to deny all packets.

Note: The management screen can take up to 3 minutes to return if Ethernet parameters are changed when the link is not active on the Ethernet port.

The Configure button on the System > LAN Configure screen allows you to provide optional information for the LAN interfaces.

This information then appears on the System > LAN screen. Additional fields appear on the Edit LAN Interface screen for optional network cards. LAN represents the physical port interface to which you assign an IP address. Slot *n* Interface *n* represents an optional LAN card in expansion Slot *n* using Interface *n*.

1 Under the Configuration section, use the Speed/Duplex field to automatically or manually configure the LAN interface’s port speed and mode.

Note: You can also use the Interface selection on the Contivity gateway’s Serial Port menu to set auto negotiation.

Select Auto-Negotiate to specify that the Contivity gateway automatically set the port speed and mode to match the best service provided by the connected station, up to 100 Mbps in full-duplex mode. Auto-Negotiate is the default selection, and complies with the IEEE 802.3u auto negotiating standard.

Select one of the following selections to manually set the LAN interface’s port speed and mode to match the speed and mode used by the connected station.

- 100Mbs/Full duplex
- 100Mbs/Half duplex
- 10Mbs/Full duplex

- 10Mbs/Half duplex

Note: You might not be able to connect to the remote system if the system is not using auto negotiation or if it uses an incompatible form of auto negotiation. If this occurs, manually set your Contivity gateway's speed and mode settings to match those used by the remote system.

2 You can provide an optional description for the LAN interface. The description appears on the LAN Interfaces screen.

3 Enter the MTU value. The MTU sets the maximum size of a data packet transmitted from the interface. It does not affect the size of a packet accepted by the interface. Packets larger than the MTU are either fragmented or dropped. The DF (don't fragment) bit in the IP header determines what action is taken.

4 MAC Pause (Ethernet packet flow control) section enables the Contivity gateway to automatically adjust and control the flow of incoming and/or outgoing packets from any standard speed LAN device.

Check to enable MAC Pause (Frame-based flow control) on the selected interface port.

When enabled, specify the appropriate Pause parameters to be set in the hardware. Specify a value for MAC Pause Ticks. Select a value from the Free Receive FIFO Threshold list. The default is 0.

5 The State field appears on the screen for an optional LAN card in expansion Slot *n* using Interface *n*. Click to enable or disable the card.

6 The Interface Type field appears on the screen for an optional LAN card in expansion Slot *n* using Interface *n*. Click to specify whether the interface is public or private.

The Add IP address screen (System > LAN Add) allows to you assign an IP address and subnet mask to the interface. Use the Edit IP Address screen (System > LAN Edit) to modify the information.

To obtain an IP address:

1 Check the Static button to assign a static, unchanging IP address.

The IP address consists of 32 bits, which are written as four octets (8-bit bytes) in dotted-decimal format; for example 192.168.34.21.

The subnet mask defines how many bits of the IP address represent the network the device is on and how many bits represent the host's ID on the network.

The device uses the Subnet Mask to determine which IP addresses are directly reachable on the network and which must be routed through a Contivity gateway. A sample IP address is 10.2.3.3 with a subnet mask of 255.255.0.0. This indicates that all hosts with addresses 10.2.*n.n* are directly reachable.

2 Check the DHCP button to have the IP address assigned by a DHCP server.

3 Enter a cost. The default is 10.

4 Interface filter shows whether or not the Contivity Firewall is in use (this reflects the selection on the Services > Firewall screen).

5 This entry also shows the interface filter that is currently being used by the Contivity Firewall. Select from a list of all interface filters that have been set up on the Contivity gateway (on the Profiles > Filters screen), and to select a different filter for the Contivity Firewall.

➡ **Note:** If you change the interface filter setting, a message informs you that you must restart your Contivity gateway before the new interface filter is used. If the Contivity Firewall is not enabled, the new selection has no effect.

6 Use the New Interface Filter link to go to the Profiles > Filters screen and create a new filter. The default Interface Filter setting is Deny All.

You can copy an existing tunnel filter for use as an interface filter or vice versa. However, when you copy a filter, the operation does not copy any components (such as a rule, port, protocol, or address) that have the same name as an existing component in the destination filter set. You should use unique names for the device in all filter rules.

Configuring Network Time Protocol (NTP)

NTP synchronizes the clocks of various devices across networks. It also automatically adjusts the time of network devices so that they are synchronized within milliseconds. The Contivity gateway receives NTP updates from an NTP time server and continuously synchronizes its clock to universal standard time. The Contivity gateway supports up to eight NTP (unicast) servers and broadcast, multicast servers.

Note: Previously the NTP server would open the NTP port for the management IP address rather than the filter. Now if the Management IP address is higher than the LAN IP and an NTP server is configured as accessible from the private network, NTP operates properly, but the local address will show up as 0.0.0.0 on the Status > Statistics > NTP Stats screen.

The System > Date and Time > Network Time Protocol screen allows you to set up NTP on the Contivity gateway. NTP synchronizes the clocks of various devices across networks.

It also automatically adjusts the time of network devices so that they are synchronized within milliseconds. The Contivity gateway receives NTP updates from an NTP time server and continuously synchronizes its clock to universal standard time. The Contivity gateway supports up to eight NTP (unicast) servers and broadcast, multicast servers.

To configure NTP:

1 Click on the Enable check box.

2 If you want the Contivity gateway to listen for and respond to broadcast messages, check the Synchronize time with NTP Broadcast Server box. If you want the Contivity gateway to listen for and respond to multicast messages, check the Synchronize time with NTP Multicast Server box. The IP multicast address is 224.0.1.1 for NTP. NTP listens for both broadcast and multicast messages at the group address of the global network. To avoid disruption in multicast mode, both the client and servers should use authentication and the same trusted key and key identifier.

3 Under Servers, click on the Add button to add a server:

- **a** IP address of the NTP (unicast) server.
- **b** Under Interface, for security, you can specify either a private or public interface. The private interface is the management IP address. When adding a public interface, you can choose from a list of public interfaces. If you are using the Contivity Firewall, you need to configure an interface filter to add NTP.
- **c** Enter the Key ID. This specifies the Key ID for Message Digest (MD5) authentication. In authentication mode, each packet transmitted has a 32-bit Key ID and a 64/128-bit cryptographic checksum using MD5 algorithms. With MD5, the receiving peer recomputes the checksum and compares it with the one in the packet. They must share at least one MD5 key (trusted key) and must associate the shared key with the same Key ID.
- **d** Enable Bursting to send a burst of eight packets at each poll interval.
- **e** Select the NTP version number (1, 2, 3, or 4) used on the NTP server. The default is 3.
- **f** Click OK.

4. Under Trusted Keys, click on the Add button to add an area key ID. The Contivity gateway displays the Add/Edit Trusted Key screen. Enter the key ID, the password and the password confirmation.
5. Click on the Return to the Date and Time page link to return to the previous page.

Using safe mode configuration

The Contivity gateway can be booted in one of the two system modes: safe mode or normal mode. Each mode has its own software image, configuration files, and LDAP database.

A system booted in Safe mode is only allowed to accept secured management tunnel establishment. When the secured management tunnel is established, Telnet, HTTP, and FTP traffic is allowed to come into the Contivity gateway; no other VPN traffic is allowed through the secured management tunnel or the Contivity gateway. In Normal mode, the system operates with the normal software and configuration and transports both VPN traffic and management traffic.

To configure safe mode:

1 Go to the System > Settings screen.

2 Click on the Enable check box to enable and disable Safe Mode.

3 Type in the number of minutes to determine how the long the system operates in Safe Mode before attempting to reboot in Normal Mode.

4 Under the Serial Port Configuration section, you configure the serial port. The parameters that you must set to allow the Contivity gateway to communicate via the serial port. Whenever you change from either serial menu mode to PPP mode, or vice versa, you must restart the Contivity gateway for the change to take effect.

a The Menu Access Level setting determines which commands are available in a serial console port menu.

- Unrestricted - All commands are available to the user (default).
- Restricted 1 - System Reset commands plus the commands to change interface IP address and mask.
- Restricted 2 - Only Reset commands are available.

b Select one of the following Modes of operation:

- Serial Menu (default). In this mode, a standard menu interface is presented. You can use an application such as Hyper Terminal, when directly connected to the Contivity gateway, to access the menu interface. The Contivity gateway uses the COM port for a serial menu terminal session. The Contivity gateway's serial port baud rate is 9600 by default. When you change the serial interface baud rate, you must press the Reset button.
- PPP allows you to set up the Contivity gateway to use the Point-to-Point Protocol (PPP) over the serial port. This feature allows you to manage the Contivity gateway from a remote location using PPP and the serial interface. If the Contivity gateway were to become unreachable over the Internet, you could still dial up and manage it through the serial interface menu.
- Auto Detect allows you to access all of the management services (HTTP, Telnet, FTP, SNMP) through the Web interface. When a session is established through PPP, the serial interface acts as a private WAN interface with an internal IP address.

- Auto Detect automatically detects whether the Contivity gateway is using PPP or serial menu mode at startup. It cannot determine the Contivity gateway’s baud rate, nor can it determine a change from PPP to serial menu mode, except upon startup. Auto Detect checks the mode each time the Contivity gateway is restarted. When performing its Auto Detect check, the Contivity gateway sends out AT command set characters to configure a modem if one is attached. When the Contivity gateway is in Auto Detect mode, and if a terminal session is connected and the terminal baud rate is the same as the Contivity gateway’s, the terminal displays the AT command sets on the screen. Simply press Enter more than five times before a serial menu session is started.

c Select one of the following Baud Rates to match the baud rate of your terminal:

- 57600
- 38400
- 19200
- 9600 (default)

d Enter the modem initialization string. Refer to the manufacturer’s documentation to learn the vendor-specific character initialization string. If you pre-configure the modem and use the Contivity gateway’s default initialization string (ATZ) it will provide the best results.

e When you select the baud rate, you must click the Reset button to change the port to the new baud rate.

5 The Log File Configuration sets the life time of the log files. The default log file life time is 60 days. Select a value for the log file life time from the list.

6 The data collection interval specifies how the long the system should wait before collecting new system data for logging. Enter the time in minutes.

Using proxy ARP

You can configure the Contivity gateway to respond to ARP requests on any of its physical interfaces. The Contivity gateway responds to the following types of routes:

- User tunnels are routes created for user tunnels. This entry is enabled by default and cannot be changed.
- Branch office tunnels are routes available through branch office connections. This option is disabled by default.
- Physical interfaces are routes available through physical interfaces. This option is disabled by default.

To configure proxy ARP:

1. Go to the System > Forwarding screen.
2. Click the appropriate check boxes to enable the different types of tunnel-to-tunnel traffic. All of these options are disabled by default for security reasons.
3. Click on Enable Gratuitous ARP to enable it.
4. Under Tunnel to Tunnel Traffic, select from:
   - Allow End User to End User to allow a remote user who is tunneled into the corporate Contivity gateway to access other remote users that are also tunneled into the Contivity gateway.
   - Allow End User to Branch Office to allow a remote user who is tunneled into the corporate Contivity gateway to access the resources of branch offices that are connected to the Contivity gateway.
   - Allow Branch Office to Branch Office to allow users who are on one branch office connected to your Contivity gateway to access resources on other branch offices that are connected to your Contivity gateway.

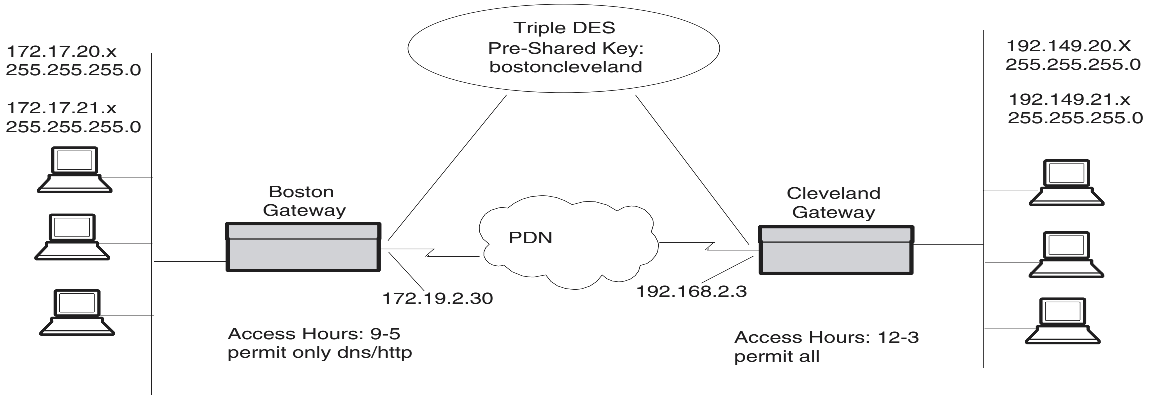
Chapter 6
Configuring branch office tunnels

The branch office feature allows you to configure a secure tunnel connection between two private networks. Typically, one private network is behind a locally configured Contivity Secure IP Services Gateway while the other is behind a remote Contivity gateway. Branch office configuration allows you to configure the accessible subnetworks behind each Contivity gateway. The configuration also contains the information that is necessary to set up the connection, such as the Contivity gateway's IP addresses, encryption types, and authentication methods. You can apply local policy restrictions, such as access hours, filter sets, and call admission priorities, to limit connectivity into local subnetworks.

The Contivity gateway supports symmetric, or peer-to-peer branch office tunnels with fixed endpoints, and asymmetric branch office tunnels. An asymmetric branch office tunnel is a branch office tunnel where one of the endpoints does not have a fixed IP address. Such situations exist in the small branch office or SOHO environments where the Contivity gateway's public interface is behind a DSL or cable modem. The DSL or cable modem services typically do not guarantee a static IP address. Branch office tunnels in these situations are asymmetric because only one side of the tunnel can initiate a connection.

Figure 10 shows a typical branch office environment.

Figure 10 Typical branch office environment



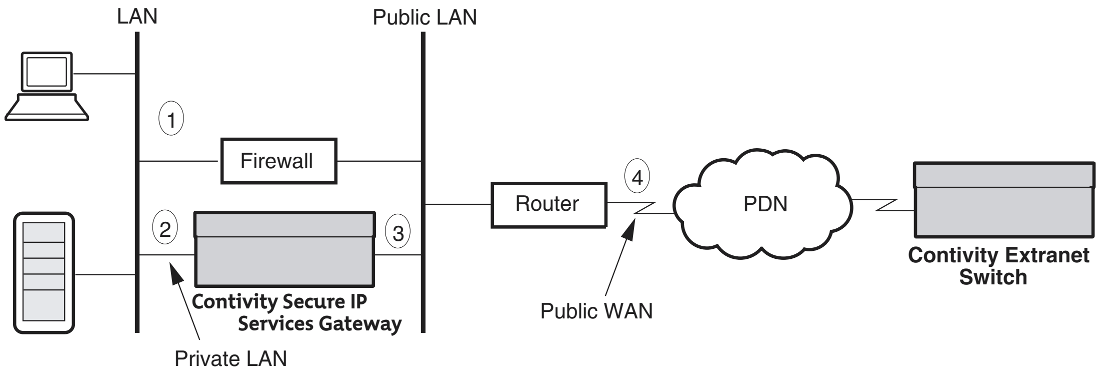
The section “Configuring a branch office” provides sample branch office configurations for two locations, Boston and Cleveland. The initial configurations show connections established with pre-shared keys.

In a mixed environment, you might want to tunnel connections to certain networks, and have all other traffic go to the Internet. You must configure the default Contivity gateway with a static route to the Contivity gateway for accessible networks (refer to Profiles > Branch Office > Edit Branch Office Connection). The default private LAN router (the firewall) must redirect packets intended for remote branch office subnets.

In this case, as with any branch-to-branch configuration, you must configure each branch Contivity gateway with the same encryption settings and pre-shared key (password). Of course, the accessible local and remote subnetwork addresses and subnet masks would be inverted in each Contivity gateway’s configuration.

Figure 11 shows a branch-to-branch configuration with a firewall and a router.

Figure 11 Branch-to-branch with a firewall and a router


LAN
Public LAN
1
Firewall
2
3
Contivity Secure IP Services Gateway
Private LAN
Router
4
Public WAN
PDN
Contivity Extranet Switch

In the branch-to-branch illustration, the following interactions take place with a Contivity gateway:

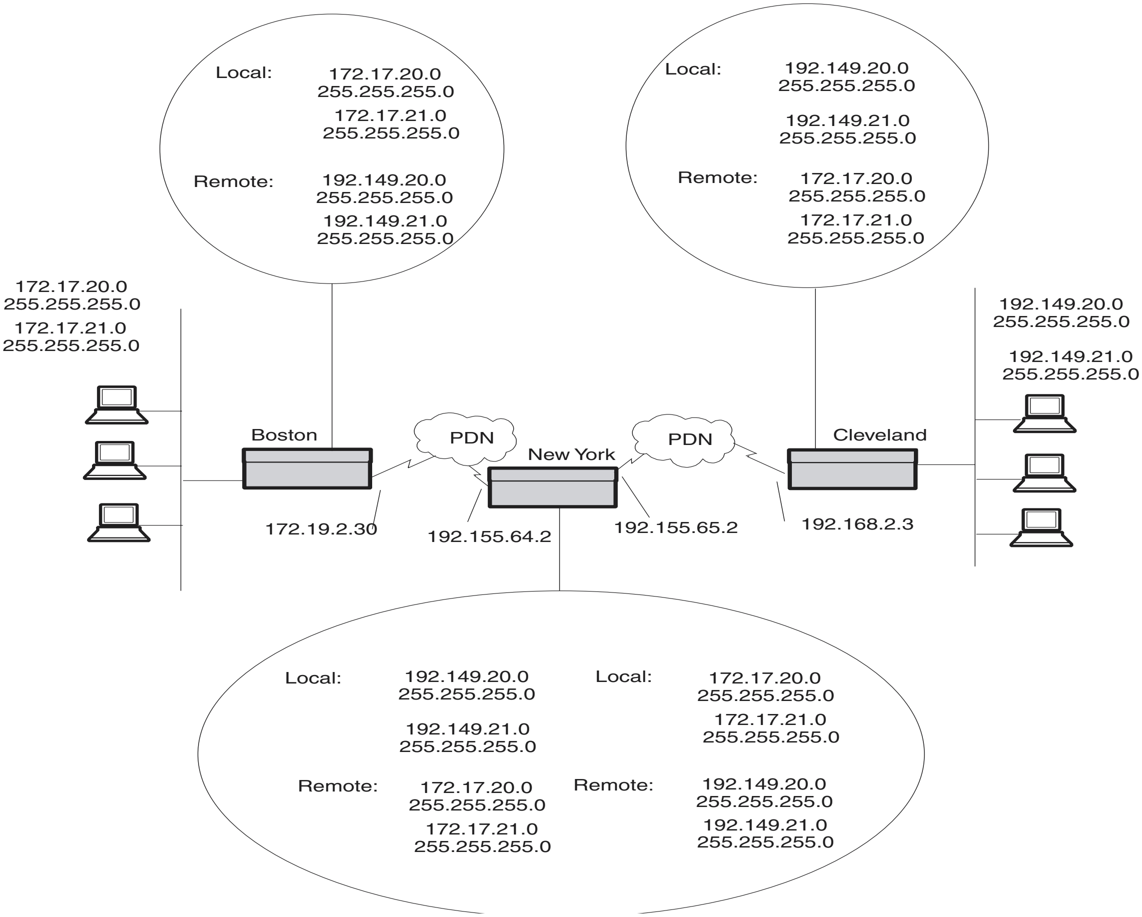
1. The PC sends packets to the default route (the firewall).
2. The firewall redirects the packets to the local Contivity gateway branch office connection.
3. The encapsulated data goes onto the public LAN.
4. The default public LAN route directs the encapsulated data to the remote Contivity gateway branch office connection.

For a Contivity gateway that has a WAN link, actions 3 and 4 collapse together, and the encapsulated data is directed to the remote server.

In a three-Contivity gateway topology, the two indirectly connected Contivity gateways can create tunnels at will as long as each Contivity gateway properly includes all of the local and remote subnetworks and subnetwork masks as accessible networks. Figure 12 shows the relationship between three Contivity gateways and the local and remote networks that must be configured for each link to allow indirectly connected branch offices to bring up tunnels at will. The New York Contivity gateway in the middle has two branch office connections configured.

All connections must have identical encryption settings. However, only adjacent connections are required to share keys. For example in the following figure, the Boston – New York connection shares keys and the New York – Cleveland connection shares keys. Boston and Cleveland are not required to share keys.

Figure 12 Indirectly connected branch offices



In branch offices, you might have two or more branches that use the same LAN addressing scheme. Nonetheless, users still have to communicate with one another across the branches.

Note: PPP multilink is not supported with branch office tunnels. It is only supported with end user tunnels.

NAT allows branch office connections to eliminate problems with overlapping addresses on both sides of the connection, and it allows you to hide the LAN addresses. To set up branch offices with NAT, see *Configuring Firewalls, Filters, NAT, and QOS for the Contivity Secure IP Services Gateway.*

PPTP nested tunnels

Nested tunnels allow you to create a PPTP end user tunnel inside an IPSec branch office tunnel or an asynchronous branch office tunnel. You can have a nested tunnel from within the private network or from the public side.

A nested tunnel from within the private network allows an end user to originate a PPTP connection from a client PC located on the on the private network. When the client connects, PPTP control packets for establishing the tunnel arrive at the Contivity gateway where it enters the IPsec branch office tunnel. The Contivity gateway at the entry point routes the control packets to the other end of the branch office connection. The PPTP connection ends at the Contivity gateway at the exit node of the branch office connection on the private interface. The control packets for the PPTP tunnel are processed and the Contivity gateway at the exit node of the branch office creates a new PPTP tunnel inside the branch office tunnel.

Even though the nested PPTP tunnel sessions are similar to a regular end user tunnels at the terminating contivity switch, they are listed separately under the branch office as nested tunnels on the status page. This indicates that the nested tunnel cannot stay active after the branch office connection is terminated. The nested PPTP tunnel is created assuming the branch office connection as virtual link. In cases where the branch office session is deleted or logged off, the nested PPTP sessions will be applied the same processing as loss of physical link.

Nested tunnels from the public side allow remote users to connect from the Internet to a private network through the IPSec client to the Contivity gateway. After connecting the IPSec client, the end user can start a nested PPTP tunnel to the other end of the established branch office.

You can individually log off nested tunnel sessions from the Status > Sessions > Active Session screen.

DNS for branch office tunnel endpoints

When configuring branch office tunnels with the Contivity gateway, you can enter a DNS name for the tunnel endpoint. The Contivity gateway uses domain name address resolution to resolve the actual IP address of the endpoint. The Contivity client already supports this ability.

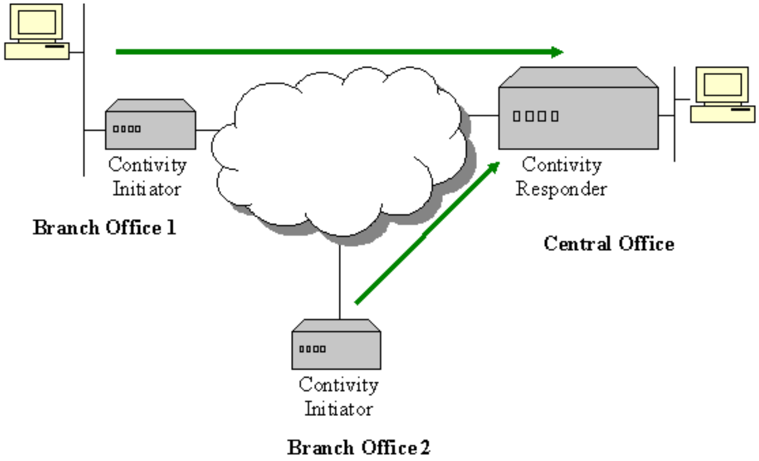
The Contivity gateway provides the following DNS services:

- VPN DNS allows asymmetric branch office tunnels (ABOT) to be configured using domain name for remote peer rather than IP address.
- Round Robin DNS provides a form of failover and load balancing.

VPN DNS

IPSec asynchronous branch off tunnels on the Contivity gateway can be configured to use DNS name of a remote peer rather than IP address. In Figure 13. the initiator from the branch office brings up a tunnel to a responder in the central office. Without the VNP DNS, the initiator needs to know the IP address of the responder and reconfigure the address every time address changes. With VPN DNS, the initiator can refer to the remote side by its name. Thus, when the IP address changes, no reconfiguration on initiator sites is required. This reduces the configuration time and simplifies the management. The Contivity VPN client supports this feature and the client can use the Contivity gateway domain name to bring up an IPSec user tunnel.

Figure 13 VPN DNS



When you configure an initiator for an asynchronous branch office tunnel, you can use a domain name of a remote peer instead of the IP address.

1 Go to the Profiles > Branch Office.

2 Under Connections, click on Select next to the connection that you want to configure.

3 Click on Configure to go to the Connection Configuration screen.

4 In the Remote IP Address or Host Name field, enter a DNS name of a responder endpoint.

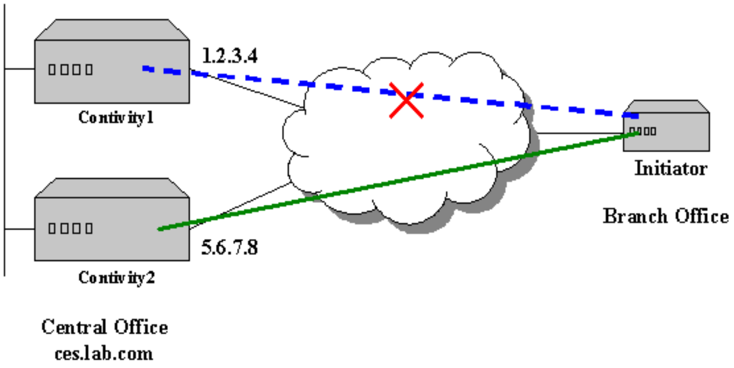
Round robin DNS

Round Robin DNS is used in IP networks to provide a form of load balancing. Services on the Internet typically have more than one server that is public facing to share the load. Each of these servers has a unique IP address, but share a common DNS name.

A DNS server will be aware of all the IP addresses that correspond to a particular domain name. When a user requests a lookup for that domain, the DNS will provide all the known addresses in a random order. The user can pick one of the addresses to communicate with the service. The Contivity gateway always uses the first address provided. If the first address is unresponsive, the Contivity gateway performs a new query.

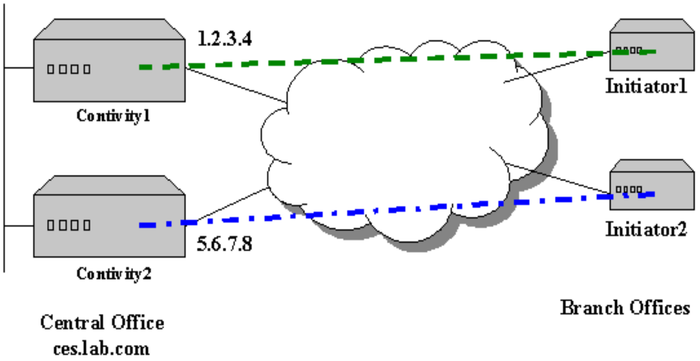
Round robin DNS can be used to achieve failover. Figure 14 shows a central office that has two Contivity gateways. The first gateway has a public IP address 1.2.3.4 and the second has public IP address 5.6.7.8. Both addresses have been mapped to the same DNS name ces.lab.com. The initiator is configured with the remote endpoint set to the domain name of the responder ces.lab.com. When the initiator performs a DNS query, the DNS server returns IP addresses 1.2.3.4 and 5.6.7.8. The initiator selects 1.2.3.4 because it is first in the list of addresses and establishes a tunnel. If 1.2.3.4 goes down, the initiator must reestablish the tunnel and send a new DNS query. The DNS server returns addresses 5.6.7.8 and 1.2.3.4 because of the round robin operation. The initiator selects address 5.6.7.8 because it is the first in the list and establishes a tunnel with the second Contivity gateway, achieving a failover.

Figure 14 Failover example



Round robin DNS can be used to achieve a simple load balancing between Contivity gateways. Figure 15 shows a central office that has two Contivity gateways. The first gateway has public IP address 1.2.3.4 and the second has public IP address 5.6.7.8. Both addresses are mapped to the same DNS name, such as ces.lab.com. There are multiple branch offices and the initiators at the branch offices are configured to use a domain name as a remote endpoint of the ABOT tunnel. When two initiators at the remote sites need to establish a tunnel, a DNS query resolves the configured domain name ces.lab.com to the IP address. DNS returns 1.2.3.4 and 5.6.7.8 for branch one and 5.6.7.8 and 1.2.3.4 for branch two using round robin DNS. The initiator at branch office one uses 1.2.3.4 as a remote point because it was the first response in the list. The initiator at branch office two uses 5.6.7.8 as a remote point because it was the first DNS response in the list.

Figure 15 Load balancing example



Dynamic DNS

Dynamic DNS (DDNS) allows a dynamically addressed host computer to use a static DNS name. The DNS name system is used both throughout the Internet and corporations to provide both host to server and host to host communication for many applications. A DNS name space is typically set up by the system administrator. Increased use of dynamic IP-based Internet connectivity and the need to publish well-known host names on the Internet has led to demand for dynamic DNS capabilities.

The DDNS user is assigned a dynamic IP address, which may change every time they connect. In general, the address rarely change because in most environments, users connectivity is outbound so there is no need to advertise a DNS name. However, users that host a Web server, FTP server, or game servers need to advertise an address or DNS name to allow their clients to connect to the server.

The Contivity VPN Client supports dynamic DNS registration. The Client Dynamic DNS Registration setting on the Profiles > Groups > Edit > IPsec screen enables you to select whether to enable or disable DDNS. It is enabled by default. You can use this parameter only with the Contivity VPN Client. Also, your DNS server must support Dynamic DNS and be configured to allow Dynamic DNS registration.

Configuring a branch office

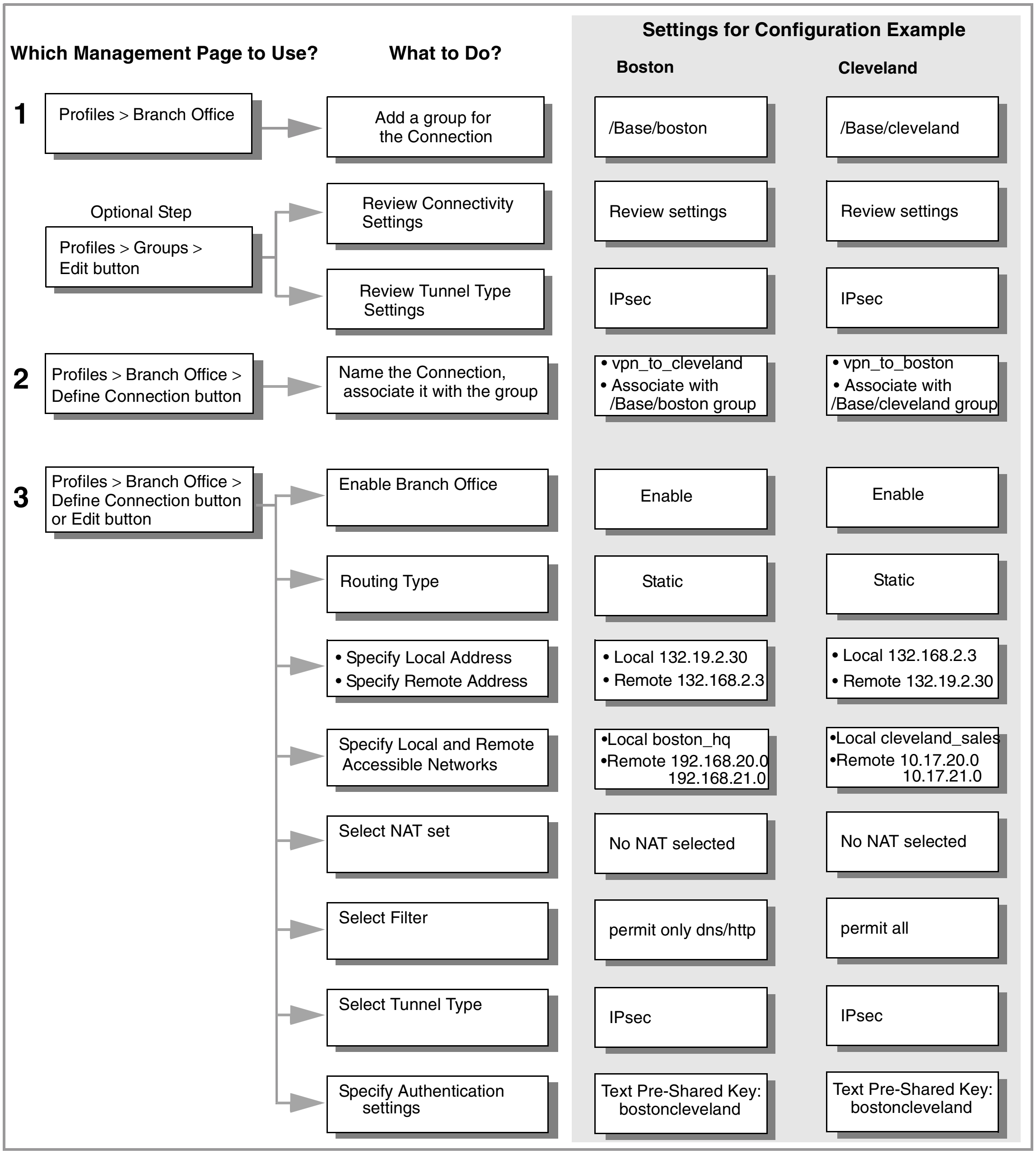
To create a new branch office connection, give it a name and associate it with a group. You can choose an existing group or create a new one. The branch office connection then uses that group’s attributes, such as password management and encryption. You set the group’s attributes on the Profiles > Groups screen.

The branch office connection then inherits the attributes of that group. You can associate multiple branch offices with the same group, thereby saving setup time and increasing management efficiency. For example, you might plan on creating several VPN connections from various remote sales offices into your enterprise headquarters. In this case, you create all of the connections in the same group so they all have the same attributes, such as hours of access, encryption method, and password management.

Use the Branch Office screen to create new branch office connections and to edit or delete existing connections. You can also add or edit the group that is associated with your branch office connection.

Note: Certain configuration changes are not reflected in the active branch office tunnel until it is disabled then re-enabled. Examples of these types of configuration changes are: changes to the tunnel filter used by the branch office (changing which filter is applied is reflected in the active branch office tunnel); changes to the NAT policy used by the branch office; routing changes, such as adding or deleting a default route.

Figure 16 Setting up a branch office configuration



	Which Management Page to Use?	What to Do?	Settings for Configuration Example Boston	Cleveland
1	Profiles > Branch Office	Add a group for the Connection	/Base/boston	/Base/cleveland
	Optional Step Profiles > Groups > Edit button	Review Connectivity Settings	Review settings	Review settings
		Review Tunnel Type Settings	IPsec	IPsec
2	Profiles > Branch Office > Define Connection button	Name the Connection, associate it with the group	• vpn_to_cleveland • Associate with /Base/boston group	• vpn_to_boston • Associate with /Base/cleveland group
3	Profiles > Branch Office > Define Connection button or Edit button	Enable Branch Office	Enable	Enable
		Routing Type	Static	Static
		• Specify Local Address • Specify Remote Address	• Local 132.19.2.30 • Remote 132.168.2.3	• Local 132.168.2.3 • Remote 132.19.2.30
		Specify Local and Remote Accessible Networks	•Local boston_hq •Remote 192.168.20.0 192.168.21.0	•Local cleveland_sales •Remote 10.17.20.0 10.17.21.0
		Select NAT set	No NAT selected	No NAT selected
		Select Filter	permit only dns/http	permit all
		Select Tunnel Type	IPsec	IPsec
		Specify Authentication settings	Text Pre-Shared Key: bostoncleveland	Text Pre-Shared Key: bostoncleveland

To define a new branch office connection:

1. Go to the Profiles > Branch Office screen.
2. In the Group section, the list shows all the branch office groups on the Contivity gateway. Select the group whose attributes you want the new group to inherit.
3. Click on the Add button to create a new group. The group name can be a maximum of 64 characters (spaces are permitted). The new group inherits the attributes (for example, Access Hours) of its parent group, which are then used by the branch office connection.
4. In the Connections section, select the search criteria: off, on, apply filter, or operator.
5. Click on the appropriate button to add, delete, configure, change group, or test the connection.
6. Click on the Search All Groups to use a connection name or partial connection name to locate and display all matching groups. You can then configure the specific group or groups that you want.

   Enter the name your want to search for in the Search Criteria screen and click on Search. The Search All Groups Results screen appears, listing any groups that match all or part of the specified connection name.

To configure a connection:

1. Select the button next to connection name and click on Configure

2. Select the tunnel type for the connection from the list. The default type is IPsec. Click the drop-down list and select either IPsec, PPTP, or L2TP.

Note: If you change the tunnel type, the fields in the Authentication portion of this screen change to reflect the different configuration requirements for the selected tunnel type.

3. Select the type of branch office connection that you want this branch office to use.

   - Peer to peer connection type is the traditional branch office tunnel, where either side can initiate traffic.

- Initiator, where with asynchronous branch office tunnels (ABOT), one side must be configured as the initiator and the other as the responder. Only the Initiator can bring up the tunnel. When the connection type is set to initiator, there is no need to define a local endpoint. You should only configure an IPsec tunnel type. IPsec authentication requires an initiator ID.

Note: Asynchronous branch office tunnels work only on public interfaces.

- Responder, where neither local or remote endpoints are required. You must configure IPsec authentication to specify the same initiator ID as in the associated initiator branch office tunnel.

4 Click on Enable to enable the branch office connection.

Note: For security, the Enable Branch Office Connection selection is automatically disabled when you attempt to save an incorrect configuration.

5 Select the Endpoints for the initiator and responder connection types.

- The local IP address of the branch office connection.
- The remote IP address of the connection. For Initiator connection types, you can enter the DNS host name.

6 Click the drop-down list and choose the filter that you want this branch office connection to use. The default is permit all. You can specify one filter. Packet filtering controls the types of access allowed for users of this branch connection. Filters are based on various parameters, including protocol ID, direction, IP addresses, source, port, and TCP connection establishment. Filters are defined on the Profiles > Filters screen.

7 For Authentication, configure the authentication that is used between the local and remote branch office. The fields that appear in this screen depend on whether you are using an IPsec, PPTP, or L2TP tunnel type.

Note: If you create a branch office connection using any IPsec certificate and you choose IP address as the alternate name, you must use the IP address of the public interface that is on the branch office end of the connection.

8 Under NAT, select either PortNAT or none. NAT enables you to build your VPN without requiring that you reconfigure or rename your existing network. NAT sets are defined on the Profiles > NAT screen. For further information on NAT, see *Configuring Firewalls, Filters, NAT, and QOS for the Contivity Secure IP Services Gateway* book.

9 For IP Configuration, select either Static or Dynamic routing for this branch office connection:

- If you choose Static routing, you must manually specify the Accessible Networks (the private internal networks behind a gateway that can be accessed via the branch office connection).
- If you choose Dynamic, the routing protocol automatically determines the accessible networks based on information that is entered on the System > LAN Interfaces > Edit IP Address screen.

10 Click on the Create Local Network button to go the Profiles > Networks screen and define a local network. The Local networks are the subnetworks on the private internal network of the local gateway.If you want to edit an existing local network, select it from the list and the Connection Configuration screen appears. These networks have been previously set up on the Profiles > Networks screen.

11 To specify the remote network, click on the Add button to go to the Add Networks screen and add the remote networks for the branch office configuration. Remote networks are the subnetworks on the private network of the remote gateway.

Sample branch office configuration

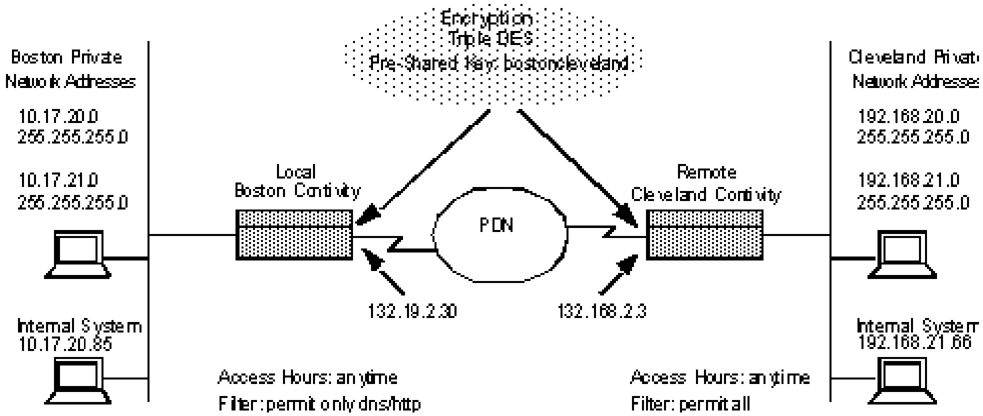
This section describes an example of the procedure used to create a branch office VPN connection between two Contivity gateways. In this example, the local Contivity gateway is at the enterprise headquarters in Boston and the remote Contivity gateway is at a sales office in Cleveland.

When you set up a branch office connection, you must perform the configuration procedure twice, once for each of the two Contivity gateways that make up the connection. The branch office settings for the two Contivity gateways mirror each other. For example, the local address setting that you configure on the Boston Contivity gateway would be considered the remote address setting when you configure the Cleveland Contivity gateway.

Figure 17 shows the configuration information and the addresses that are used in this example. It lists the procedure for setting up a branch office connection and the management Web pages that are used during the configuration process.

Figure 16 also shows where the information from the figure is entered on the management Web pages.

Figure 17 Sample branch office configuration



As the administrator of a branch office connection, you can manage the level of access that you give to users of the connection. You specify when the connection is used, what operations can be done through the connection, and which systems on the private networks can be accessed.

Before configuring a branch office connection, check that the following management Web pages are set up in accordance with your management policies and the planned usage for the connection. You use the settings on these pages when you configure the branch office connection.

- The System > Forwarding page must allow branch office-to-branch office traffic.
- The Profiles > Networks page must list the Contivity gateway's private networks. In the sample configuration, the local Contivity gateway's internal network name is boston_hq and the subnets are 10.17.20.0 and 10.17.21.0. The remote systems behind the remote Contivity gateway can reach systems in these networks.

  The remote Contivity gateway's internal network name is cleveland_sales and the subnets are 10.17.20.0 and 10.17.21.0. The remote systems behind the local Contivity gateway can reach systems in these networks.
- The Profiles > Hours page must have the Hours of Access setting that you want to use. The example uses the setting of Anytime.
- The Profiles > Filters page must have the filters that you want to use for the branch office connection. For the example, the local Contivity gateway uses a filter of permit only dns/http, and the remote Contivity gateway uses permit all.

Sample branch office procedure

To create a dynamic peer-to-peer branch office tunnel over ISDN with local/peer authentication that includes MS-ChapV2 and RC4-40 encryption, enabled compression and a permit all filter:

1. Launch the Web browser and enter the IP of the Contivity gateway.
2. Enter the user name and password.
3. Select Profiles > Branch Office.
4. Click on the Add Group name and OK.

5. Select your group from the group pull down menu.
6. Click on Add Connection.
7. Connection screen, enter the connection name (up to 128 characters).
8. Select the tunnel type PPTP and Peer to Peer and Click on OK.
9. On the Connection Configuration screen:
   - a Select the Local IP from the Endpoints and enter the remote IP that this PPTP tunnel will connect to.
   - b In the Authentication section, enter a local UID and the remote peer UID and password (must match the remote tunnel).
   - c Select the MS-CJAP V2 authentication and RC4-40 encryption.
   - d Enable Compression and Compression Stateless Mode.
   - e Select Dynamic from the IP Configuration menu, and keep the RIP and OSPF defaults.
   - f Click on OK.
10. Configure the other end of the tunnel with the same information.
11. Click on the Test button on each end of the tunnel to verify connectivity.
12. Try to ping from on PC to the other PC through the branch office.

Chapter 7
Configuring control tunnels

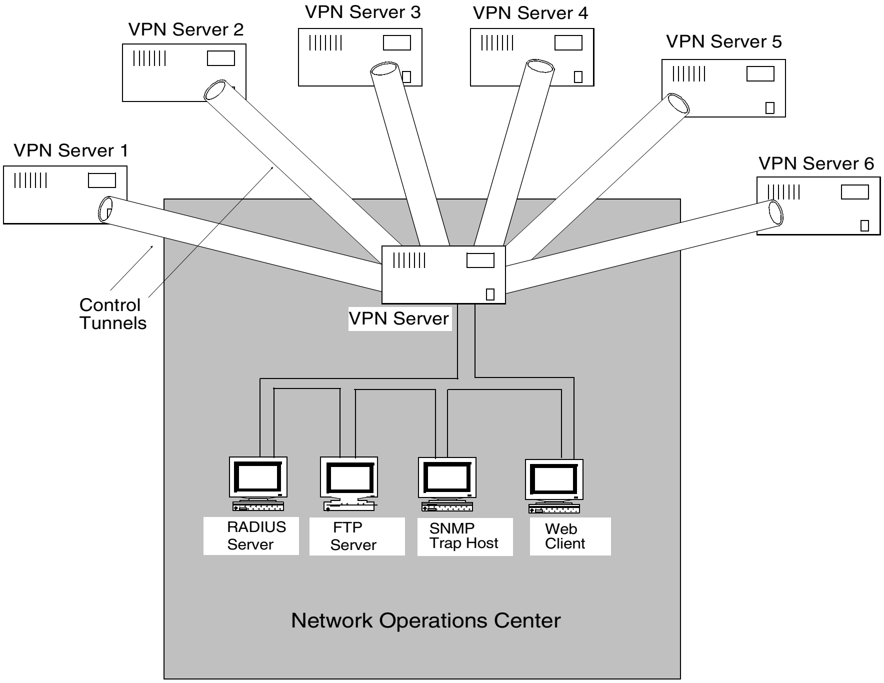
Control tunnels are special tunnels that allow you to securely manage a Contivity Secure IP Services Gateway over the Internet. The primary reasons for creating control tunnels are secure management and network data integrity. Control tunnels provide secure access to a customer's remote Contivity gateway so that you can manage it over a network. Control tunnels also guarantee that no data from the network behind that customer's Contivity gateway could be accessed by anyone on the network who manages the Contivity gateway.

You can allow access to FTP, DHCP, RADIUS, and DNS servers from the Contivity gateway through the control tunnel. Control tunnels allow you to easily configure secure tunnels to any Contivity gateway that you want to manage. This allows you to set up an encrypted tunnel to a customer's Contivity gateway. Through that tunnel you can perform all the necessary management tasks, such as HTTP, FTP, SNMP, and Telnet.

Note: To establish a control tunnel over a NAT connection, use IPSec-capable NAT. Control tunnels cannot establish a connection while the Contivity Stateful Firewall is enabled when you use the Autodetect IPSec-capable NAT feature.

Figure 18 shows a sample branch office control tunnel environment where a central VPN server can control several VPN devices and configure services, such as RADIUS, FTP backup, SNMP Traps through Web client management, or Telnet.

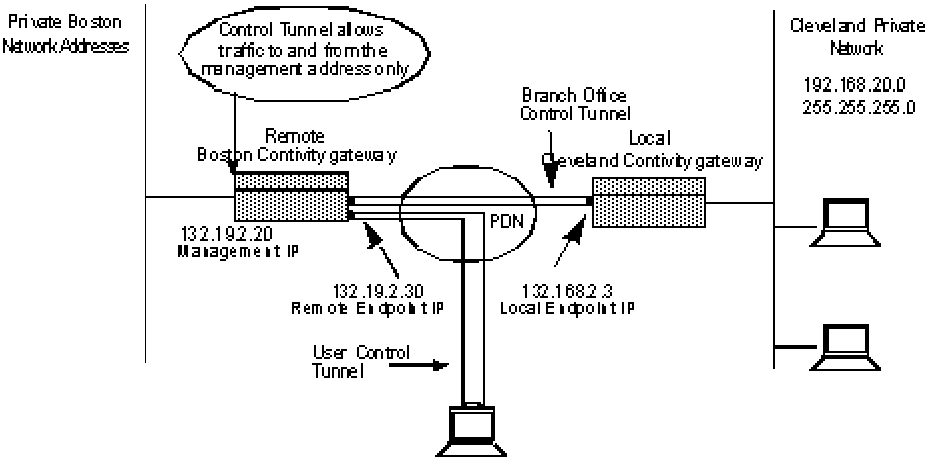
Figure 18 Branch office control tunnel



Control tunnel types

There are two types of control tunnels: a branch office control tunnel and a user control tunnel. With both tunnel types, you can establish a secure IPsec tunnel to a system that you want to manage. The traffic inside the tunnels is limited to the Contivity gateway’s management IP address only, which is unique to control tunnels. Figure 19 shows a special branch office control tunnel from a network operations center in Cleveland, and also a user control tunnel.

Figure 19 Sample control tunnel environment



Branch office control tunnels allow anyone on the configured network to communicate with the Contivity gateway being managed. This allows a Contivity gateway to communicate with various systems within a company’s network operations center or corporate headquarters (the Cleveland private network).

A user control tunnel allows a Contivity VPN Client to communicate with a Contivity gateway that is being managed. This allows network management personnel from anywhere in the world access to the management tasks.

If you work at a NOC in Cleveland and you manage a customer’s Contivity gateway that is located in Boston, you would want to use control tunnels. On one end of the control tunnel (the Contivity gateway under management), access is always restricted to the management address only. Access to the Boston Contivity gateway is limited. The Cleveland end of the tunnel could allow access to its entire private network. This allows multiple systems in your Cleveland NOC to communicate with the management address only of the Boston Contivity gateway; or for the Boston Contivity gateway to use remote servers (FTP, DHCP, RADIUS, and DNS servers) on the Cleveland private network.

In this environment, the remote Boston Contivity gateway is a control tunnel to the local Cleveland Contivity gateway. From any system on the Cleveland network, you can access the management address for the Boston Contivity gateway. This allows systems on the Cleveland network to initiate management operations on the Boston Contivity gateway, such as HTTP, FTP, and Telnet. Yet because it is a control tunnel, users on the Cleveland private networks cannot exchange packets with users on the private Boston Network.

Additionally, a user control tunnel is configured so that a remote user can establish a control tunnel when using the IPsec client. You create this user account with password authentication in the Control Tunnels group using the serial port.

Restricted mode

The Restricted mode feature prevents management of the Contivity gateway except through a control tunnel. This limits the scope of management to someone who has the proper credentials both to set up the tunnel (if it is an end user) and to log in as an administrator (administrative access privileges). Having the proper access privileges acts as a level of security. Additionally, since in restricted mode you are forced to manage the Contivity gateway through a tunnel, you are guaranteeing data protection through encryption.

You enable Restricted mode through the Serial Interface menu or the command line interface available through Telnet. In Restricted mode, you can perform the key management functions through the control tunnel, including HTTP, FTP, SNMP, and Telnet. All other attempts to perform these actions outside of the control tunnel will fail. You cannot enter Restricted mode unless there is an active control tunnel. This ensures there is a mechanism to manage the Contivity gateway in restricted mode.

Nailed-up control tunnels

You may want to have some control tunnels remain up even when there is no traffic traversing the control tunnel. This is generally the case for branch office versus end user control tunnels.

➡ **Note:** If you change any settings to the branch office connection when using nailed up tunnels, you must bring down the tunnel for the changes to take effect.

To create a nailed-up control tunnel using the nailed-up parameter:

1 Go to Profiles > Branch Office screen and click on the Edit button next to the group that you want to have nailed up.

2 On the Edit Group screen, click on the Configure button under the Connectivity section.

3 On the Connectivity screen, when you click on the Configure button next to the Nailed Up field, a drop-down list gives you the option to select Enabled or Disabled. You should enable this parameter only on the initiating side of the tunnel.

Another way to nail up control tunnels, is to create a script that continuously sends ping packets to the management IP address of the Contivity gateway on the customer premise through the control tunnel from a host at the network operations center. The pings must occur at an interval that is less than the Idle Timeout value. These pings act as a liveliness detection and perform keepalive signals for the end connection, and report to the sender that the packet was received or that there was no response.

4 Click on Enabled. Disabled is the default.

5 Click on OK.

Creating control tunnels

To create a special branch office connection, you must create a control tunnel definition on the remote customer Contivity gateway. There are two methods you can use to create control tunnels:

- On the Contivity gateway’s GUI, use the Profiles > Branch Office screens to create the branch office connection and specify that it is for a control tunnel.
- For the command line interface, use the Contivity gateway’s command line interface (described in *Reference for the Contivity Secure IP Services Gateway Command Line Interface*) to set up the connection as a control tunnel. This procedure is described in the following example.

To configure the local Contivity gateway:

1 Initiate a Telnet session to the customer's Contivity gateway.

2 Enter the appropriate control create string, following the required control create parameters already described. A sample string follows:

```
control create boston bostoncleveland 132.19.2.20 132.19.2.30
192.168.2.3 192.168.20.0 255.255.255.0
```

Management Only (a special control tunnel filter) is used by default with control tunnels to maximize security.

3 To view Help, enter control help create. These are control create parameters that you must enter:

```
CONTROL CREATE <name> <password> <MGMT/Local_P> <Local_endpoint>
<Remote_endpoint> <Remote_Subnet_Address> <Remote_Subnet_Mask>
```

If you are using the local Contivity gateway current Management IP address (132.19.2.20) rather than a substitute, then the network address translation feature is unnecessary. If not, enable control on the remote Contivity gateway and enter the control address through the command line interface. If you enter an address other than the management IP address (MGMT), NAT creates a NAT set with a static rule. The NAT set is called Control plus the name of the connection (for example, Control Boston). This also creates a network definition that is named Control and the name of the connection. The network definition contains the NAT management address. In this case, the branch office connection automatically fills in the correct NAT rule and accessible network. When using the control create commands, you must enter them in a complete string. The Contivity gateway that you are controlling sets a management only filter by default that restricts access to the management IP address only. You can verify the control tunnel connection from the Profiles > Branch Office: Control Tunnels connection field.

After you configure the local Contivity gateway, you must configure the Contivity gateway located at the remote site. Complete the following steps to define the branch office connection for the remote Contivity gateway.

To create a new group:

1 Access the Profiles > Branch Office screen.

2 Click on the Add Group button.

3 From the list, select the parent group whose attributes the new group inherits; for example, /Base.

4 Enter the name for the new group. Click on OK to save the settings and return to the Profiles > Branch Office screen. You can use the Edit button next to the group name on the Profiles > Branch Office screen to review or modify the group's attributes.

To define the branch office connection, specify a name for the connection, then associate the connection with a group:

1 On the Profiles > Branch Office screen, click on Define Branch Office Connection.

2 On the initial Define Connection screen, name the connection, for example vpn_to_boston which is specified on the Profiles > Networks screen.

3 Click on the name in the list to associate the connection with the group, for example /Base/cleveland.

4 Click on OK. The configuration screen for the new branch office connection appears.

On the Define Connection configuration screen, you enter required configuration information for the local branch office connection, for example, static routing and the IPsec tunnel type.

1 Enable the branch office connection by selecting the check box.

2 Click on the list and select the routing type that you want to use for your branch office connection, for example, static routing. You *cannot* use control tunnels with RIP.

3 Specify the addresses of the public interfaces of the two Contivity gateways forming the connection.

   a For the local endpoint address, click on the list and select the address of the local Contivity gateway (for example, 132.168.2.3).

   b In the remote endpoint address field, enter the address of the remote Contivity gateway (for example, 132.19.2.30) that you want to form the opposite end of the branch office connection.

4 Specify the private subnetworks that can be reached through the tunnel connections of this branch office connection.

   a Click on the list and select the network address(es), for example, the cleveland entry previously created. The local network is the Contivity gateway's private network, which is specified on the Profiles > Networks screen.

b Click on Add in the Remote Endpoint field, and enter the Management IP address of the local Contivity gateway and its mask (for example, a host mask of 255.255.255.255).

5 Click on the list, then select the No NAT Translation option.

6 Click on the desired filter for the connection.

7 Select the IPsec tunnel type.

8 Set up the authentication method for the connection, for example, text pre-shared key. Enter the key (for example, bostoncleveland), then retype it in the Confirm Text String field.

9 Click OK to save the configuration settings.

Next, you should verify your branch office connection by sending ping packets to the management IP address of the local Contivity gateway. Or, you can establish a Web connection to the local Contivity gateway and attempt to configure it.

Creating a user control tunnel from the serial interface

You can create a user tunnel using the serial interface. Control tunnels allow the management of the Contivity gateway without access to anything on the network other than the management IP address. This is used to force management through an encrypted tunnel and restricts access to the local resource such as outsourcing management of a Contivity gateway. You create the control tunnel user in the group /Base/Control Tunnels.

1 Open a connection to the serial interface.

2 Type **5** to Create a user management tunnel.

3 Enter a user name and password.

4 When prompted for an IP address, enter an address that would be a static IP address for the control tunnel or leave it blank to use the IP Addr Pool. This creates a group called Control and places this user within this group.

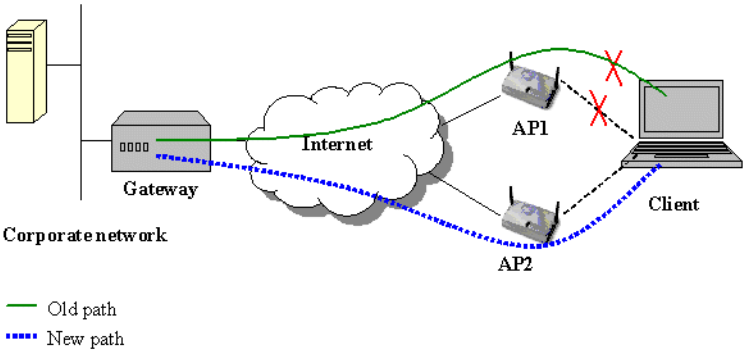
Chapter 8
Configuring IPSec mobility and persistent mode

A large number of companies choose to secure access to their corporate networks via VPN using the IPSec protocol. IPSec allows corporate employees, located outside the corporate network to establish a secure tunnel to a private corporate network through the Internet. With the growing popularity of wireless access, it is important to have the ability to move freely among multiple networks without losing a secure connection.

Currently, IPSec does not support this movement without tearing down and reestablishing the VPN connection. Breaking and reestablishing a secure connection could cause disruptions to applications running across the tunnel. For example in Figure 20, if a client has a wireless connection to the Internet and has established a secure tunnel to the corporate private network via access point 1 (AP1) and the client's connection to AP1 goes down for some reason, the client roams to the access point 2 (AP2) and obtains a new IP address.

The gateway on the corporate network brings the secure IPSec connection down because of a lack of response from client's original IP address and absence of security associations (SA) for the new IP address. Thus, the client has to reestablish a tunnel again via AP2. If the client had an open FTP session to the server on the private side of the corporate network, this session would have been closed.

Figure 20 Example configuration



One solution to this problem is to use mobile IP technology (described in RFC 3344) to maintain IPSec connections. In this configuration, the IP address of the mobile machine does not change when it moves from a home network to a foreign network. Each mobile node is always identified by its home address, regardless of its current point of attachment to the Internet. While situated away from its home, a mobile node is also associated with a care-of address, which provides information about its current point of attachment to the Internet. When away from home, mobile IP uses protocol tunneling to hide a mobile node's home address from intervening routers between its home network and its current location. The home agent sends datagrams destined for the mobile node through a tunnel to the care-of address. After arriving at the end of the tunnel, each datagram is then delivered to the mobile node.

However, IP mobility technology for IPSec is inefficient due to double tunneling, which can be an issue for resource-limited wireless networks. In addition, mobile IP requires deployment of extra equipment and administration that could increase the cost of the solution and could be a potential cause of inter-operability problems between different vendors and providers.

Nortel Networks solves the IPSec mobility problem by enhancing its IPSec implementation.

IPSec mobility on Contivity

Contivity Secure IP Services Gateway provides a new concept of IPSec mobility. The Contivity IPSec implementation allows support for mobile clients to maintain tunnel connectivity while roaming from one access point to another. It maintains TCP-based applications and provides minimum disruptions to UDP-based applications.

With IPSec mobility, configuration parameters are passed to the Contivity client after a successful IPSec tunnel establishment that instruct the client to operate in IPSec mobility mode. These parameters force the client to monitor and communicate any address changes due to roaming to the server. When a mobile node changes its IP address, the client is notified by the operating system of the change. The IP address change is then communicated to the Contivity gateway so that the IKE and IPSec SA databases are updated with the new address. ISAKMP informational exchange messages are used to send the change to the Contivity gateway. Once a notify message with a new client IP address is received by the Contivity gateway, it updates its databases, uses the received IP as the outer IP address, and responds to the client with an acknowledgment.

Roaming performance factors

Factors that impact the performance of the roaming on the Contivity gateway:

- How quickly the adaptor or operating system detects changes in interface state
- DHCP settings of the PC or the DHCP server
- How quickly the operating system acquires the new IP address from the network
- Network delays or congestion

Logging and status for clients and servers

The Contivity VPN Client logs events to the log file. This includes events such as Contivity VPN Client sending messages that the IP address changed, and receiving acknowledgement that these messages were received by the Contivity gateway.

The Contivity VPN Client status monitor reports if roaming is enabled for the session. The event log on the Contivity gateway reports on IPSec mobility actions.

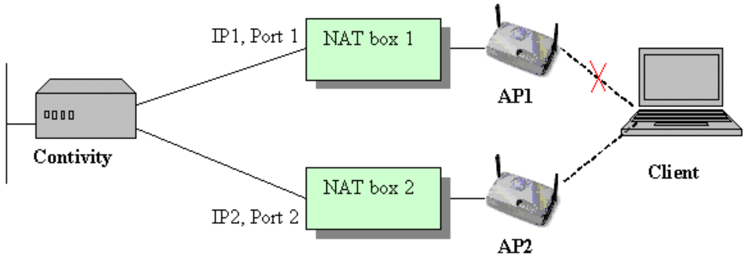
IPSec mobility and NAT

If Contivity VPN Client is behind a NAT box with NAT traversal enabled and encapsulation for ESP protocol is used, UDP encapsulation is preserved after roaming.

Roaming from behind NAT to behind NAT

In Figure 21, before roaming the client was connected via access point 1 (AP1) and NAT box 1 and had an IP1 IP address. After roaming, the client is connected via access point 2 (AP2) and NAT box 2 and gets an IP address IP2. In this case, the client IP address and UDP port have been changed after roaming. When a new IP address has been received by the client, it sends a NAT keep-alive so that the server can find the ESP UDP port mapping and send the data to the client using port mapping.

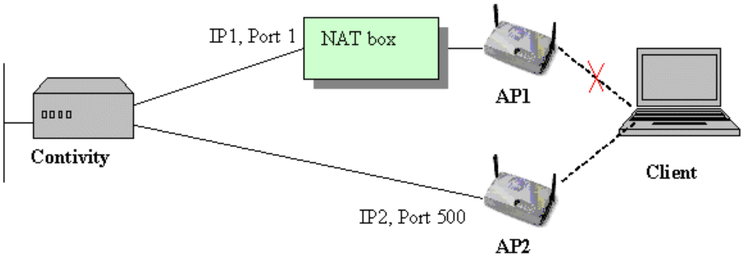
Figure 21 Roaming from behind NAT to behind NAT



Roaming from behind NAT to no NAT

In Figure 22 before roaming a client was connected via AP1 and NAT box and had IP1 IP address. After roaming, the client is connected via AP2 without NAT, UDP encapsulation will be used.

Figure 22 Roaming from behind NAT to no NAT



Roaming from no NAT to behind NAT

Before roaming, the client had access via AP2 and after roaming via AP1 and NAT box, a situation that's the reverse of the one in Figure 22. In this case, the IPSec connection will be dropped as NAT detection is made in IKE phase 1 and NAT traversal is negotiated in quick mode; therefore with the tunnel already negotiated and established, the change cannot take place unless re-negotiation occurs.

Similar problems may arise when roaming from behind IPSec aware NAT devices to behind other NAT devices. To avoid any NAT related problems, the "Always UDP Encap" option under the IPSec group configuration always forces UDP wrapping on IPSec user tunnels even if NAT was not detected during connection establishment.

IPSec mobility in NAT environment

In some situations roaming in the environment of NAT devices might prevent users from taking full advantage of IPSec mobility feature. Table 7 illustrates some configuration caveats that will allow to increase roaming effectiveness in NAT environment.

Table 7 Configuration considerations

Initial CVC connection was behind	After roaming CVC connection is behind	Contivity configuration caveats to make mobility work successfully
No NAT	No NAT	None
	IPSec unaware NAT	Always NAT Traversal
	IPSec aware NAT	Always NAT Traversal
IPSec aware NAT	No NAT	None*
	IPSec unaware NAT	Always NAT Traversal or auto-detect NAT
	IPSec aware NAT	None*
Non-IPSec aware NAT	No NAT	None*
	IPSec unaware NAT	None*
	IPSec aware NAT	None*

*The appropriate IPSec group settings (Auto-Detect NAT, Always UDP Encap, or Auto-Detect IPSec capable NAT) makes the initial connection successful. No changes are required for roaming to work.

Routing table changes

Routing table changes apply to the Contivity VPN Client. When operating in split tunneling mode, the CVC periodically checks the routing table on the client's PC to determine if the table has been altered in any way. This checking is done for security reasons to detect for intrusions and unauthorized access to the private network. When a routing table change is detected the tunnel is brought down.

When operating in IPSec mobility mode with split tunneling enabled, the Contivity VPN Client does not consider the routing table to be maliciously altered and will not bring down the tunnel in the following cases:

- IP address change for any adapter
- Adapter has been removed
- Adapter is plugged in and connects

Initial contact payload (ICP)

If the Contivity VPN Client fails to notify the Contivity gateway of the logoff or tunnel termination due to network problems (such as, the interface went down before sending logoff sequence), the client's session could still be in the session table for a period of time specified by the Idle Timeout. If the client tries to reconnect and the previous session has not expired yet, the client would not be able to log in, as only one active session is allowed per user by default.

The Initial Contact Payload feature could be used in this situation to clear up old sessions. This feature allows the server to terminate an old session if a new session has the same user ID as the old one.

➡ **Note:** With IPC the server cannot identify the session to terminate if a user is logged in multiple times. Nortel Networks recommends using IPC when the max login is set to 1.

Contivity VPN Client always sends the Initial Contact Payload; such behavior could be accepted or rejected by the Contivity gateway based on the gateway configuration. The “Accept ISAKMP Initial Contact Payload” parameter configured per group specifies Contivity gateway action towards received initial contact payload.

Maximum roaming time

Maximum roaming time is the time used by the Contivity VPN Client to keep the tunnel from going down after the IP address on the physical interface (on which tunnel was brought up) has been lost.

For example, if you move from area 1 (AP1) to area 2 (AP2) and the IP address on the interface is lost, it could take some time to establish contact with AP2 in area 2. Maximum roaming time allows you to tune this time such that the client can keep the connection up for 2 hours and then if necessary, the same session can be re-vitalized at another location.

You must use some caution and tune the idle timeout and the client failover tuning (legacy client keepalives) timers appropriately for this to work. For example, idle timeout may start during roaming time and as a result the Contivity gateway will logoff the session. When the client obtains a new IP address and sends an Address Change Notification, it will not be recognized by the Contivity gateway as the session has already been logged off. A similar situation may arise with the client failover tuning timers.

If a rekey is initiated by the Contivity gateway during the roaming time, it may not be able to reach the client (for example, it is out of area) and the rekey may fail. When the rekey fails, the Contivity gateway will bring down the session and roaming will not succeed even after the client obtains a new IP address. This occurs because the Contivity gateway has no knowledge about the client going through roaming time at rekey.

The forced logoff timer is independent of roaming time. The Contivity gateway is expected to logoff the session whether or not roaming is in progress.

NAT keepalive timers have no impact on roaming timeout because the Contivity gateway updates the UDP port numbers based on an encrypted Address Change Notification message.

Once the Contivity VPN Client obtains a new IP address, it retransmits the Address Change Notification message four times at 8 second intervals until an acknowledgement is received from the Contivity gateway. If no acknowledgement is received, the client disconnects.

Session persistence time has no direct impact on roaming time.

Persistent tunneling

A persistent VPN connection provides the ability to maintain a VPN connection without user intervention for a designated period of time. After successfully establishing a tunnel session to the Contivity gateway, the Contivity VPN Client makes every attempt to maintain a viable VPN connection.

Persistence makes use of the automatic failover capability already available with the Contivity gateway and extends this to allow the new tunnel to be established without having to re-enter user credentials. A configuration option on the Contivity gateway allows you to specify that VPN clients will cache their VPN credentials for a specified period of time. If failover is initiated during this time (persistent time), the client automatically sends the credentials the user submitted to set up the first tunnel session.

Note: If an authentication method with a challenge (such as Axent Defender), one time password (such as secure ID*), or Contivity one time password is enabled, it will not work for persistence. However, user name/password-based and certificate-based authentication will work.

The Contivity VPN Client accepts a list of failover hosts configured on the Contivity gateway and tries to connect to those servers if the connection with the primary server is lost. As each failover server destination is attempted, you are prompted, allowing you the option to cancel the operation. If the user doesn't intervene, the connection attempt continues. With persistence enabled, after going through the list of failover servers, the client tries the primary and then the initially supplied failover servers again in the loop until the client connects or until the persistency timer expires, whichever comes first.

Session persistence time

The purpose of this timer is to allow the persistent tunnel only for certain amount of time after the initial login. This prevents security threats such as a stolen laptop accessing the network due to persistence for longer durations. By setting this timer to 24 hours, users can use the VPN connectivity for work without requiring to login more than once.

Session persistence time should be longer than the roaming time as persistence starts only after roaming fails. There is no direct relation between persistence and any other timers on the Contivity gateway.

However, the Contivity VPN Client will not enter persistence mode if the previous log off happened due to a log off message received from the Contivity gateway. This allows you to force a rogue user log off any time even when persistence is on. The client continues to attempt connections to a list of servers cyclically when the existing tunnel goes down (due to events such as roaming timeout) for a period equal to persistence time after the initial login.

Persistent mode will work with no failover list by trying the connection to the same Contivity gateway.

Configuring IPSec mobility and persistence

IPSec mobility is a licensed feature. Contact your Nortel Networks representative to obtain a license key. To install the Advanced Routing license key:

1. Go to Admin > License Keys
2. Enter the Advance Routing license next the Advanced Routing.
3. Click on OK.

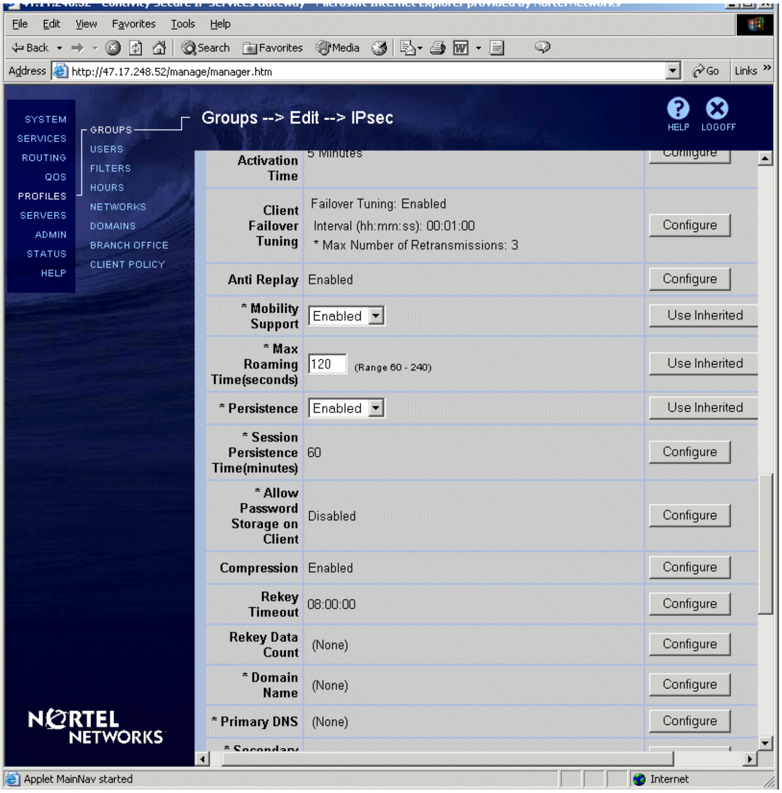
Configuring IPSec mobility

The IPSec mobility and persistence features are configured at the user/group level. To configure NAT traversal, see Chapter 4 in the *Configuring Firewalls, Filters, NAT, and QoS for the Contivity Secure IP Services Gateway* book. You do not have to enable IPSec mobility and persistence together. You can use either or both as is suitable for your environment.

To configure IPSec mobility and persistence through the GUI:

1. Go to Profiles > Groups > and click on Edit next to the group for which you want to enable the features. The Edit IPSec screen appears.

Figure 23 Groups edit IPSec screen



http://47.17.248.52/manage/manager.htm

Groups --> Edit --> IPsec

Activation Time	5 Minutes	Configure
Client Failover Tuning	Failover Tuning: Enabled Interval (hh:mm:ss): 00:01:00 * Max Number of Retransmissions: 3	Configure
Anti Replay	Enabled	Configure
* Mobility Support	Enabled	Use Inherited
* Max Roaming Time(seconds)	120 (Range 60 - 240)	Use Inherited
* Persistence	Enabled	Use Inherited
* Session Persistence Time(minutes)	60	Configure
* Allow Password Storage on Client	Disabled	Configure
Compression	Enabled	Configure
Rekey Timeout	08:00:00	Configure
Rekey Data Count	(None)	Configure
* Domain Name	(None)	Configure
* Primary DNS	(None)	Configure
* Secondary		

Applet MainNav started

2 Scroll to Mobility Support.

3 Select Mobility Support Enabled. The default is Disabled.

4 Scroll to Max Roaming Time (seconds) and enter the number of seconds. The default is 120 seconds. Maximum roaming time (1-7200 seconds) specifies how long the tunnel should stay in the suspended state, or time allowed for the roaming to take effect.

Note: IPSec Idle Timeout and rekey timeout settings must be taken into consideration when configuring Max Roaming Time. Max Roaming Time should not exceed the Idle Timeout interval, as with the Idle Timeout being less then Roaming time, session could timeout prior to roaming completion.

5 Select Persistence Enabled or Disabled. The default is Disabled.

6 Scroll to Session Persistence Time (1-1440 minutes) and enter the number of minutes. The default is 60 minutes.

7 Click on OK.

Note: IPSec mobility performs at higher level than physical adapters. As a result, the PC on which the Contivity VPN Client runs can change between any physical adapters (wireless or wireline) and roaming will continue to work as long as there is IP connectivity between the Contivity gateway and the client with the newly acquired address/ interface. If you have problems with roaming to specific interfaces, make sure that you can establish an initial connection with that adapter to prove that there is IP connectivity.

To configure the Contivity gateway using CLI, you need to either telnet to the Contivity gateway or connect to it through the Serial Interface > option L on the menu.

```
Enter the privileged mode:
CES>enable
Password:

Enter configuration mode:
CES#configure terminal
Enter configuration commands, one per line. End with Ctrl/z.
CES(config)#

To install advanced routing license:
CES(config)#license install ar <license key>

To verify the license has been installed:
CES(config)#show license
   Advanced Routing                     Installed
   Contivity Stateful Firewall          Not installed
   Data Link Switching                  Not installed

To enter a group IPSec configuration mode, for example, for group
Base:
CES(config)#group ipsec "/Base"
CES(config-group/ipsec)#

To enable IPSec mobility:
CES(config-group/ipsec)#mobility enable

To disable IPSec mobility:
CES(config-group/ipsec)#no mobility enable

To enable persistence:
CES(config-group/ipsec)#persistence enable

To disable persistence:
CES(config-group/ipsec)#no persistence enable

To change the maximum roaming time to, for example, 210 seconds:
CES(config-group/ipsec)#max-roamingtime 210

To change the persistence time to, for example, 1000 minutes:
CES(config-group/ipsec)#persistent-time 1000

To exit the IPSec group configuration mode:
CES(config-group/ipsec)#exit
```

```
To view the IPSec configuration for the group, for example Base:
CES(config)#show groups ipsec "/Base"
calling mangled usr grp
calling mangled usr grp
CES(config)#
IPSEC Settings:
  Rekey Timeout                                          : 08:00:00
  Rekey Data Count                                       : 0
  Perfect Forward Secrecy                                : Enabled
  Banner                                                 : Not
Configured
  Domain name                                            : Not
Configured
  Display Banner                                         : Disabled
  Compression                                            : Enabled
  Primary DNS Address                                    : 0.0.0.0
  Primary WINS Address                                   : 0.0.0.0
  Secondary DNS Address                                  : 0.0.0.0
  Secondary WINS Address                                 : 0.0.0.0
  Allow Clients                                          : ALL
  Allow undefined networks for non-Contivity clients     : Enabled
  Allow Password Storage on Client                       : Disabled
  ESP - AES 256 with SHA1 Integrity                      : Disabled
  ESP - AES 128 with SHA1 Integrity                      : Disabled
  ESP - Triple DES with SHA1 Integrity                   : Disabled
  ESP - Triple DES with MD5 Integrity                    : Disabled
  ESP - 56-bit DES with SHA1 Integrity                   : Disabled
  ESP - 56-bit DES with MD5 Integrity                    : Disabled
  ESP - 40-bit DES with SHA1 Integrity                   : Disabled
  ESP - 40-bit DES with MD5 Integrity                    : Disabled
  ESP - NULL (Authentication Only) with SHA1 Integrity   : Enabled
  ESP - NULL (Authentication Only) with MD5 Integrity    : Enabled
  AH - Authentication Only (HMAC-SHA1)                   : Disabled
  AH - Authentication Only (HMAC-MD5)                    : Disabled
  IKE 56-bit DES with Group 1 (768-bit prime)            : Enabled
  IKE Triple DES with Group 2 (1024-bit prime)           : Disabled
  IKE Triple DES with Group 7 (ECC 163-bit field)        : Disabled
  IKE AES 128 with Group 5 (1536-bit prime)              : Disabled
  IKE AES 128 with Group 8 (ECC 283-bit field)           : Disabled
  ISAKMP Initial Contact Payload Accept                  : Disabled
  Client Failover Tuning                                 : Enabled
  Client Failover Tuning Interval                        : 00:01:00
  Client Failover Tuning Max Number of Retransmissions   : 3
  Client NAT Interval                                    : Disabled
  Client Auto Connect                                    : Disabled
  Client Auto Connect Type                            : Any Network
Traffic
```

```
  Client Auto Connect Networks                          : Not
Configured
  Client Auto Connect Domains                           : Not
Configured
  Client Screen Saver Password Required                 : Disabled
  Client Screen Saver Activation Time                   : 5
  Client Policy                                         : Not
Configured
  Client Policy                                         : Not
Configured
  LDAP Authentication  - User Name and Password         : Enabled
  LDAP Authentication  - RSA Digital Signature          : Enabled
  LDAP Authentication  - Default Server Certificate     : Not
Configured
  External Authentication - AXENT Technologies Defender : Disabled
  External Authentication - User Name and Password      : Disabled
  External Authentication - Security Dynamics SecurID   : Disabled
  External Authentication - Group ID                    : Not
Configured
  External Authentication - Text Password               : Not
Configured
  Nat Traversal                                         : Disabled
  Nortel client requirements Action                     : Not
Configured
  Nortel client requirements Version                    : Not
Configured
  Nortel client requirements Message                    : Not
Configured
  Nortel client requirements Filter                     : deny all
  Transport Mode Connections                            : Enabled
  Mobility                                              : Enabled
  Anti Replay                                           : Enabled
  Maximum Roaming Time                                  : 210
  Persistence                                           : Enabled
  Persistent Time                                       : 1000
  Split Tunneling                                       : Not
Configured
  Split Tunneling Networks                              : Not
Configured
  Inverse Split Tunneling Networks                      : Not
Configured
  ! Radius Server does not exist for this group or its ancestors
CES(config)#
```

```
To exit configuration mode:
CES(config)#exit
CES#
```

Appendix A
Branch office quick start template

The branch office quick start template provides a list of values that the local Contivity 1010/1050/1100 users will need to enter on the BOQS screen. You can enter the appropriate values in the right-hand column and then fax, send, or E-mail the template to the local user along with any other information that they may need, such as who to contact for further information or questions.

Central office tunnel configuration	**Your value**
Central office tunnel name	
Central office tunnel password	
Central office public IP address	
Central office DNS server IP address	
Central office WINS sever IP address	
Private network IP address	
Private network mask	
Network Operation Center tunnel configuration	**Your value**
Network operation center tunnel name	
Network operation center tunnel password	
Network operations center public IP address	
Network operations center private network IP address	
Network operations center private net mask	
Branch office switch management IP address	

Glossary

acknowledgement (ACK)

A type of message sent to indicate that a block of data arrived at its destination without error.

address masks

IP addresses used to represent a series or range of IP addresses.

authentication

A security procedure where a user verifies his identity before accessing networks protected by a firewall.

bandwidth

The difference between the highest and lowest frequencies of a transmission channel; amount of data that can be sent through a given communications circuit.

certification authority (CA)

An authority that issues digital certificates and manages the life cycle of certificates.

Challenge Handshake Authentication Protocol (CHAP)

A peer entity authentication method for PPP, using a randomly-generated challenge and requiring a matching response that depends on a cryptographic hash of the challenge and a secret key.

client

A system or process that requests a service of another system or process.

default route

A route that is used when the switch receives traffic for which no matching route is in the routing table.

Diffie-Helman

A key agreement algorithm that does key establishment, not encryption. However, the key it produces may be used for encryption, for further key management, or any other cryptography.

digital certificate

A certificate document in the form of a digital data object to which is appended a computed digital signature value that depends on the data object.

distinguished name (DN)

An identifier that uniquely represents an object in the X.500 Directory Information Tree. An X.509 public-key certificate or CRL contains a DN that identifies its issuer, and attribute certificate identifies its subject.

Domain Name System (DNS)

A general purpose distributed, replicated, data query service used to look up host IP addresses based on host names. DNS applications can perform name-to-address and address-to-name translations.

dynamic routes

Routes that are learned via the switch's RIP support, and are used for branch office connections and the private interface.

encryption

The manipulation of a packet’s data to prevent any but the intended recipient from reading the data.

encryption certificate

A public-key certificate that contains a public key that is intended to be used for encrypting data, rather than for verifying digital signatures or performing other cryptographic functions.

Federal Information Processing Standards (FIPS)

Technical guidelines for U.S. Government procurements of information processing system equipment and services.

File Transfer Protocol (FTP)

A TCP-based application layer Internet Standard protocol that transfers files to and from a remote host.

firewall

A collection of hardware and software components that controls communication between two networks, such as a private network and the Internet. All information passed between the two networks must pass through the firewall. The firewall allows only authorized traffic to pass between the networks.

gateway

A communications device or program that passes data between networks having similar functions but dissimilar implementations.

interface

The connection between a router and one of its attached networks. An interface to a network has a single IP address and mask associated with it.

Internet

The single, interconnected, worldwide system of commercial, government, educational, and other computer networks that share a set of protocols.

Internet Protocol (IP)

The transport layer protocol used by the Internet Protocol family for transporting information among computers.

Internet Security Association and Key Management Protocol (ISAKMP)

Defines how encryption keys for sessions are initiated and updated.

intranet

A computer network, especially one based on Internet technology, that an organization uses for its own internal, and usually private, purposes and that is closed to outsiders.

IP address

The identifiers used by the protocols that govern Internet information exchange. The Internet Network Information Center assigns these numbers to uniquely identify different machines on the Internet.

IPsec

A tunneling protocol that offers a strong level of encryption, integrity protection. It uses digital certificates, password-based keys, and tokens for authentication.

IPsec Key Exchange (IKE)

An Internet IPsec key-establishment protocol that puts in place authenticated keying information for use with ISAKMP and for other security associations.

key agreement

A method for negotiating a key value without transferring the key, even in an encrypted form, such as Diffie-Helman.

Layer2 Tunneling Protocol (L2TP)

Tunneling protocol that enables secure remote access to enterprise networks across the Internet.

Lightweight Directory Access Protocol (LDAP)

Protocol based on directory entries that provide access for management and browser applications that provide read/write interactive access to the X.500 directory.

local area network (LAN)

A data network intended to serve an area of only a small area to optimize data transfer rates.

management information base (MIB)

The set of parameters an SNMP management station can query or set in the SNMP agent of a network device, such as a router.

management IP address

The IP address that is used to manage all system services from a Web browser, such as HTTP, FTP, and SNMP. This address must be accessible from one of the switch's private physical interfaces. To be accessible, the Management IP Address must map to the same network as one of the private interfaces.

medial access control (MAC) address

The hardware address of a device connected to a shared media.

Network Address Translation (NAT)

A mechanism that converts an internal network’s private addressing scheme to an acceptable Internet address, thereby enabling the internal systems to communicate on the Internet.

Network Time Protocol (NTP)

Synchronizes the clocks of various devices across networks.

Open Shortest Path First (OSPF)

OSPF is a link-state routing protocol that maintains a database from which a routing table is constructed from the shortest path, using a minimum of routing protocol traffic.

packet

The unit of data sent across a network. Typically, it refers to application data units.

PING

A program used to test reachability of destinations by sending an ICMP echo request and waiting for a reply.

Point-to-Point Protocol (PPP)

A protocol that provides a method for transmitting packets over serial point-to-point links.

Point-to-Point Tunneling Protocol (PPTP)

A tunneling protocol that is used as a security tool.

port

A transport layer demultiplexing value. Each application has a unique port number associated with it.

private default route

The default routes that are used for traffic that comes into the switch via a public interface, through a tunnel, or from the switch's public interface address.

protocol

A formal description of message formats and the rules two computers must follow to exchange those messages. A protocol can describe low-level details of machine-to-machine interfaces or high-level exchanges between allocation programs.

public default route

The default routes that are used for traffic that comes into the switch via a private interface or from the switch's private interface address.

Resource Reservation Protocol (RSVP)

A protocol used to signal QoS requests and confirmations.

route

The path that network traffic takes from its source to its destination.

router

A device that forwards traffic between networks. The forwarding decision is based on network layer information and routing tables.

routing

The process of selecting the correct interface and next hop for a packet being forwarded.

Routing Information Protocol (RIP)

A distance vector, as opposed to link state, routing protocol.

RSA digital signature

A public-key encryptographic system that may be used for encryption and authentication.

server

A provider of resources, such as file servers and name servers.

Simple Network Management Protocol (SNMP)

The Internet standard protocol developed to manage nodes on an IP network.

split horizon

A method that RIP uses to avoid routing problems caused by including routes in updates sent back to the gateway from which they were learned. The simple split horizon scheme omits routes learned from one neighbor in updates sent back to that neighbor. An extension to this method is called split horizon with poisoned reverse. It includes the learned routes, but assigns them a cost of infinity, which causes an update.

static routes

Routes that are manually configured in the switch's routing table.

stub network

A network that only carries packets to and from local hosts. Even if it has paths to more than one other network, it does not carry traffic for other networks.

subnet

A portion of a network, which may be a physically independent network segment, that shares a network address with other portions of the network and is distinguished by a subnet number.

Telnet

A command protocol used to establish login sessions on a remote host.

triggered update

A method used by RIP in which a new routing table is sent almost immediately after a routing change has been made. This is in contrast to the poison reverse method, in which routes are updated after a cost of infinity is reached, a process that can take much time.

User Datagram Protocol (UDP)

An Internet standard transport layer protocol. It is a connectionless protocol that adds a level of reliability to an multiplexing to IP.

Uniform Resource Locator (URL)

A standard for identifying objects on the Internet accessible through the Web.

Virtual Router Redundancy Protocol (VRRP)

A protocol that handles private interface failures. VRRP targets hosts that are configured with static next-hop routing addresses or default gateways. It provides a means of rerouting traffic in the event of a system/interface failure.

Wide Area Network (WAN)

A network, usually constructed with serial lines, that covers a large geographic area.

Index