Deploying the Barracuda Link Balancer with Cisco ASA VPN Tunnels

https://campus.barracuda.com/doc/12194176/

This article provides a reference for deploying a Barracuda Link Balancer under the following conditions:

1. In transparent (firewall-disabled) mode in front of a Cisco ASA firewall that is an endpoint for a site-to-site VPN tunnel.
2. In firewall-enabled mode as a remote VPN endpoint with the Cisco ASA on the other end.

Related Article

- Site-to-Site VPN Overview
- How to Create a Site-to-Site VPN Tunnel

This example combines both scenarios. That is, assume a corporate headquarters with an existing Cisco ASA device and a branch office in Michigan. To improve the network uptime and resilience, the company installs a Barracuda Link Balancer at both sites. At headquarters it is deployed in transparent (firewall-disabled) mode upstream of the Cisco ASA device. In Michigan, it is deployed in firewall-enabled mode.

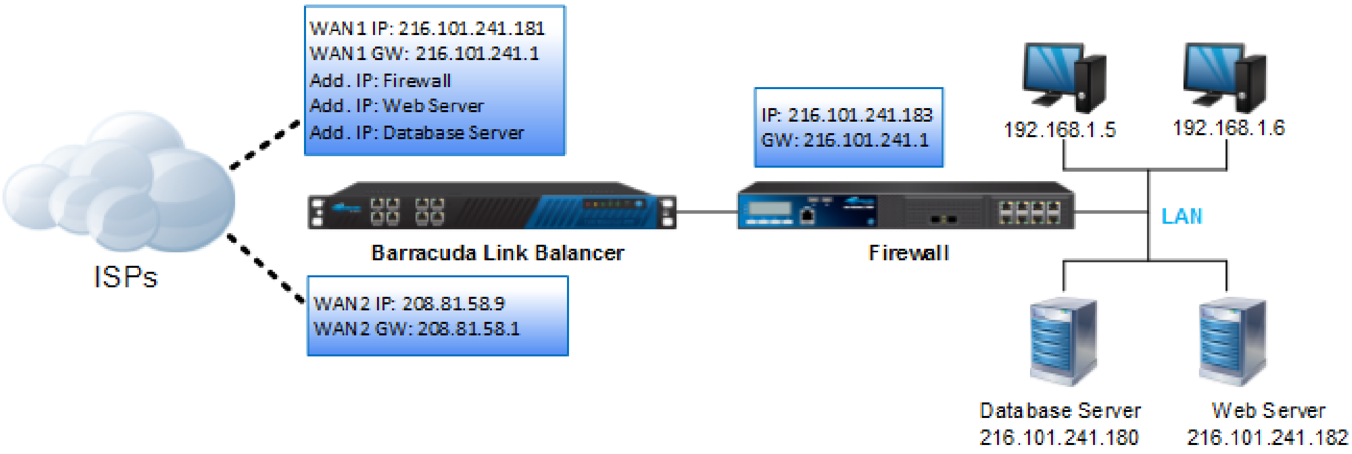
Both the Barracuda and the Cisco devices must have static WAN IP addresses in order to set up a VPN tunnel between them.

Barracuda Labs has tested and validated the settings described in this document. All settings and screenshots contained in this document are taken from a Barracuda Link Balancer version 2.4.1, and a Cisco device running *Cisco Adaptive Security Appliance Software* version 8.2 and *Cisco Device Manager* version 6.2.

Before You Begin

Barracuda Networks recommends using release version 2.4.1 or newer on the Barracuda Link Balancer. To update your Barracuda Link Balancer units, you can install the newest firmware from the **ADVANCED > Firmware Updates** page. For more information, see How to Update the Firmware.

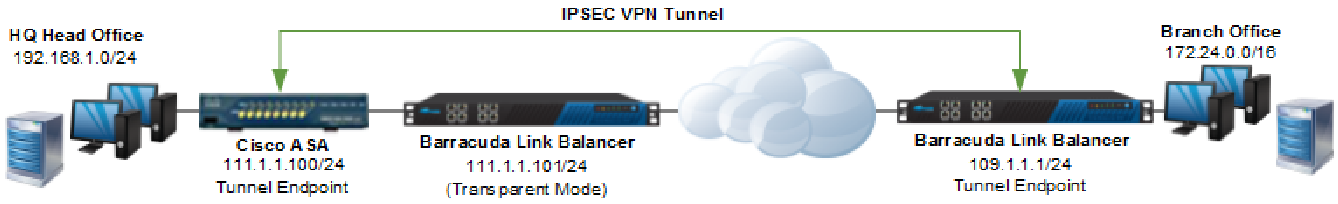
Before proceeding, please collect all information in the table below that is valid for your setup. The example values in the table are used in this article.



Corporate Headquarters (uses Cisco ASA)		
1	Unused Public IP from ISP *	111.1.1.100/24
2	Local network behind Cisco ASA	192.168.1.0/24
3	Management IP of the Cisco ASA	10.11.23.33
4	Outside interface for VPN endpoint on Cisco ASA	111.1.1.100/24
5	Mgmt IP of Barracuda Link Balancer at Headquarters	10.11.23.157
6	Mgmt IP of Cisco ASA	10.11.23.33
Remote Site – Michigan		
7	Mgmt IP of Barracuda Link Balancer (Michigan branch)	10.11.23.165
8	Remote network	172.24.0.0/16
9	WAN IP for Barracuda Link Balancer for tunnel endpoint	109.1.1.1/24

* To avoid changing the existing configuration on the Cisco ASA, provision an additional public IP address from your ISP on the WAN port of the Barracuda Link Balancer and retain the WAN IP address on the Cisco ASA. If necessary, contact your ISP in order to obtain a new IP address.

The network diagram below shows the headquarters on the left and the Michigan branch office on the right. The headquarters has an existing Cisco ASA firewall which forms an IPsec tunnel with a Barracuda Link Balancer at the branch office. A Barracuda Link Balancer is deployed at the headquarters in front of the Cisco ASA in transparent mode. In this mode, it does not terminate the VPN but just passes the VPN traffic through to the Cisco ASA.



Configuring Cisco ASA

To configure an IPsec VPN on the Cisco device requires the following configuration steps:

1. Configure Interfaces and ACL for the Tunnel
2. Configure Phase 1
3. Configure Phase 2

Step 1. Configure Interfaces and ACL for the Tunnel

```
interface Ethernet0/0                         # this will be the tunnel endpoint
description WAN Interface
nameif Outside
security-level 0
ip address 111.1.1.100 255.255.255.0
interface Ethernet0/1
description LAN Interface
nameif Inside
security-level 0
ip address 192.168.1.254 255.255.255.0
```

This access list (MI_Tunnel) is used with the crypto map (MI_Map) to determine which traffic needs to be encrypted and sent across the tunnel:

```
access-list MI_Tunnel extended permit ip 192.168.1.0 255.255.255.0 172.24.0.0
255.255.0.0
```

Step 2. Configure Phase 1

The following configuration commands define the Phase 1 policy parameters to be used. A policy is created with *priority=1* used to negotiate the IKE SA.

```
crypto isakmp policy 1                         # Priority = 1
authentication pre-share                       # Use pre-shared keys
encryption 3des                                # 3des is more secure for encryption
than des
hash md5                                       # use sha-1 for max protection
(though less throughput)
group 2                                        # group 2 provides adequate
security; avoid group 1
lifetime 86400
```

Now, enable ISAKMP on the interface that terminates the VPN tunnel:

```
crypto isakmp enable outside
```

Step 3. Configure Phase 2

1. Define the transformation set for Phase 2. It will be used in the crypto map entry.
   `crypto ipsec transform-set ESP-3DES-MD5 esp-3des esp-md5-hmac`
2. Define a crypto map and specify which traffic should be sent to the IPsec peer with the access list defined above.
   `crypto map MI_Map 1 match address MI_Tunnel`
3. Set the IPsec peer (remote endpoint) to the appropriate WAN port on the Barracuda Link Balancer:
   `crypto map MI_Map 1 set peer 109.1.1.1`
4. Configure the IPsec transform set *ESP-3DES-MD5* to be used with the crypto map entry:
   `crypto map MI_Map 1 set transform-set ESP-3DES-MD5`
5. Specify the interface to be used with the settings defined in this configuration:
   `crypto map MI_Map interface Outside`
6. Disable NAT-T and set the Phase 2 lifetime:
   ```
   crypto map MI_Map 1 set nat-t-disable
   crypto map MI_Map 1 set security-association lifetime seconds 3600
   ```
7. Create the tunnel group and assign the preshared key for authentication:
   ```
   tunnel-group 109.1.1.1 type ipsec-l2l
   tunnel-group 109.1.1.1 ipsec-attributes
   pre-shared-key my_secret_key            # must be identical to the key
   on the remote peer
   ```

ICMP must be enabled on the IP address of the Cisco device to allow the Barracuda Link Balancer at headquarters to perform health checks for the remote VPN endpoint.

Configuring the Barracuda Link Balancer (at Corporate Headquarters) for VPN Passthrough

To configure the Barracuda Link Balancer at headquarters, complete the following major steps:

1. Add Missing Applications
2. Configure the IP / Application Routing
3. Define Actions to be Taken

To allow the VPN traffic to pass through, outbound routing rules for the following applications must be configured:

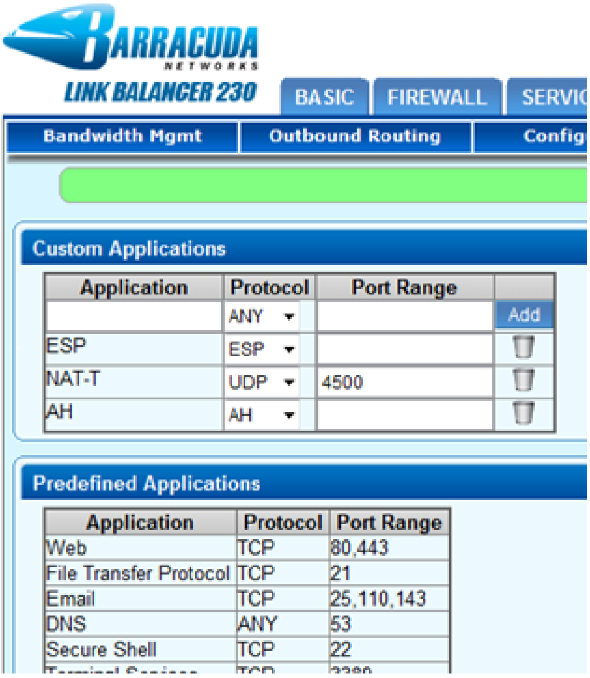
- ESP
- IKE
- NAT-T
- GRE
- PPTP
- AH

> GRE, PPTP, AH and NAT-T are not really required in this deployment. However, they are mentioned here for completeness, and are useful when you want to allow other tunnels to pass through the Barracuda Link Balancer.

Step 1. Add Missing Applications

IKE, GRE, and PPTP are included in the **Predefined Applications** by default. Navigate to **POLICY > Applications > Custom Applications** and create custom applications for ESP, AH, and NAT-T with the following settings:

Application	Settings
ESP	• **Application Name**: *ESP* • **Protocol Type**: *ESP*
AH	• **Application Name**: *AH* • **Protocol Type**: *AH*
NAT-T	• **Application Name**: *NAT-T* • **Protocol Type**: *UDP* • **Port Number**: *4500*



Custom Applications

Application	Protocol	Port Range	
	ANY		Add
ESP	ESP		
NAT-T	UDP	4500	
AH	AH		

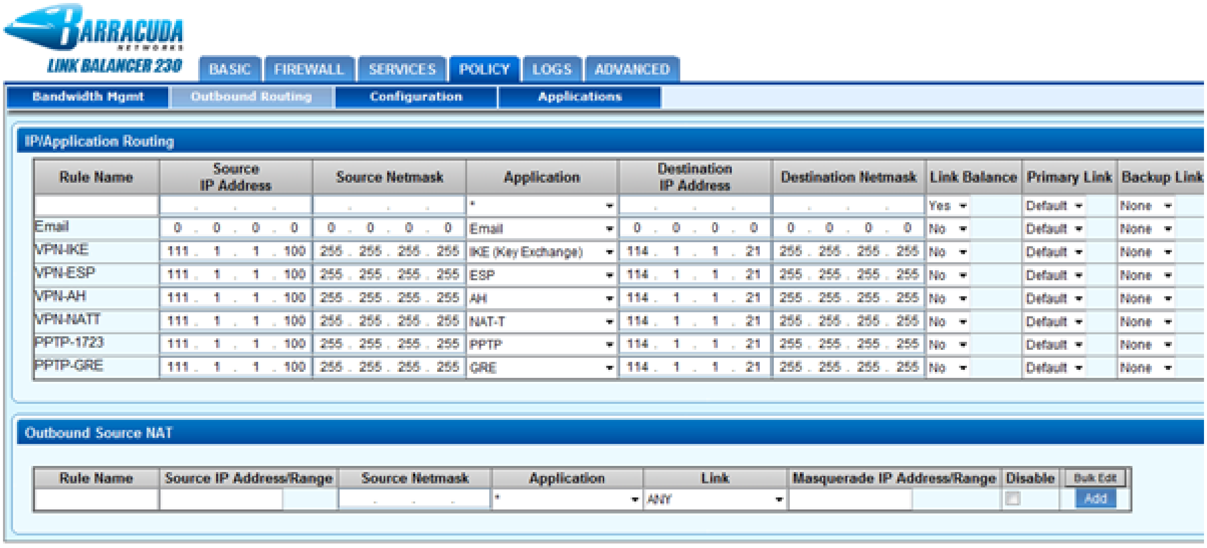
Predefined Applications

Application	Protocol	Port Range
Web	TCP	80,443
File Transfer Protocol	TCP	21
Email	TCP	25,110,143
DNS	ANY	53
Secure Shell	TCP	22

Step 2. Create a New IP / Application Routing Rule

Navigate to **POLICY > Outbound Routing > IP/Application Routing** and add a new rule with a unique **Rule Name**. Configure the following condition fields:

Setting	Description
Source IP Address	The IP address (e.g. *111.1.1.100*) being NAT'd on the Cisco ASA
Source Netmask	The netmask (e.g. *255.255.255.255* if it is a single host, or, if it is a set of IP addresses, the subnet mask must reflect that accordingly).
Application	Create rules here for each protocol.
Destination IP Address	The IP address of the VPN remote gateway (e.g. *114.1.1.21*).
Destination Netmask	The netmask (e.g. *255.255.255.255* if it is a single host, or, if it is a set of IP addresses, the subnet mask must reflect that accordingly).
Link Balance	Select *No* and then select a **Primary** and a **Backup** link: • ◦ **Primary Link —** Select *Default* to direct the outgoing traffic to the WAN link on the same subnet. Alternatively, select a specific link from the list to bind traffic to that link. ◦ **Backup Link** — Select *None* to drop traffic if the primary link is not available. Or, select a specific link from the list to bind traffic to that link.
NAT	To maintain the original source IP address if there is no backup link, clear this check box. If there is a backup link, select the **NAT** check box and add **Source Network Translation** rules to retain the original source IP address(the NAT'd IP address on the firewall behind the Barracuda Link Balancer) for the five applications.



IP/Application Routing

Rule Name	Source IP Address	Source Netmask	Application	Destination IP Address	Destination Netmask	Link Balance	Primary Link	Backup Link
	. . .	. . .	*	. . .	. . .	Yes	Default	None
Email	0 . 0 . 0 . 0	0 . 0 . 0 . 0	Email	0 . 0 . 0 . 0	0 . 0 . 0 . 0	No	Default	None
VPN-IKE	111 . 1 . 1 . 100	255 . 255 . 255 . 255	IKE (Key Exchange)	114 . 1 . 1 . 21	255 . 255 . 255 . 255	No	Default	None
VPN-ESP	111 . 1 . 1 . 100	255 . 255 . 255 . 255	ESP	114 . 1 . 1 . 21	255 . 255 . 255 . 255	No	Default	None
VPN-AH	111 . 1 . 1 . 100	255 . 255 . 255 . 255	AH	114 . 1 . 1 . 21	255 . 255 . 255 . 255	No	Default	None
VPN-NATT	111 . 1 . 1 . 100	255 . 255 . 255 . 255	NAT-T	114 . 1 . 1 . 21	255 . 255 . 255 . 255	No	Default	None
PPTP-1723	111 . 1 . 1 . 100	255 . 255 . 255 . 255	PPTP	114 . 1 . 1 . 21	255 . 255 . 255 . 255	No	Default	None
PPTP-GRE	111 . 1 . 1 . 100	255 . 255 . 255 . 255	GRE	114 . 1 . 1 . 21	255 . 255 . 255 . 255	No	Default	None

Outbound Source NAT

Rule Name	Source IP Address/Range	Source Netmask	Application	Link	Masquerade IP Address/Range	Disable	Bulk Edit
		. . .	*	ANY		□	Add

The rules in the **IP/Application Routing** table are processed from top to bottom, in the order listed in the table. Only the first matching rule is executed. New rules are added to the bottom of the table. To change the order of rules, use the arrows on the right side of the table. Also, if you have a large number of tunnels with varying peer addresses, it might be more convenient to relax the **Source** and **Destination** fields and use only the **Application** field for rules.

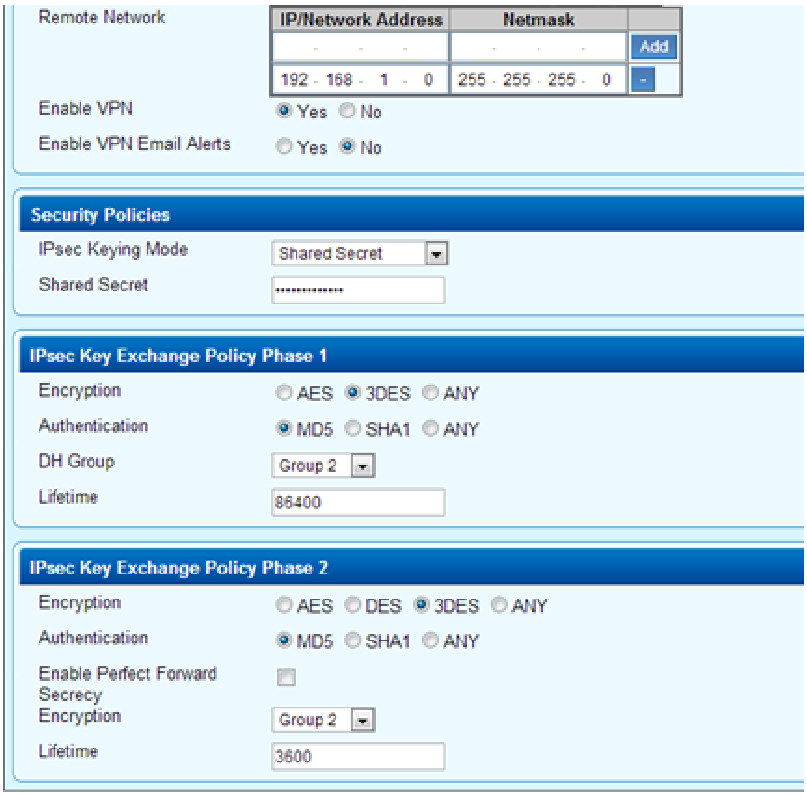
Configuring the Remote Barracuda Link Balancer (at Michigan)

Create a new tunnel at the remote Barracuda Link Balancer (running in firewall-enabled mode) to connect with the Cisco ASA. Make sure that the **Security Policies > Phase 1** and **Phase 2** settings are identical to the Cisco settings.

The following table provides the reference settings for adding the new VPN tunnel:

Section	Settings
Edit VPN Tunnel	• **Enable NAT-Traversal**: *No* • **Remote NAT-T IP**: *No*
Security Policies	• **IPsec Keying Mode:** *Shared Secret* • **Shared Secret:** *my_secret_key*
IPsec Key Exchange Policy Phase 1	• **Encryption:** *3DES* • **Authentication**: *MD5* • **DH Group**: *Group 2* • **Lifetime**: *86400*

IPsec Key Exchange Policy Phase 2	• **Encryption:** *3DES* • **Authentication:** *MD5* • **Enable Perfect Forward Secrecy**: *No* • **DH Group**: *Group 2* • **Lifetime:** *3600*



Remote Network

IP/Network Address	Netmask	
. . .	. . .	Add
192 . 168 . 1 . 0	255 . 255 . 255 . 0	-

Enable VPN ● Yes ○ No

Enable VPN Email Alerts ○ Yes ● No

Security Policies

IPsec Keying Mode: Shared Secret

Shared Secret: ••••••••••••••

IPsec Key Exchange Policy Phase 1

Encryption ○ AES ● 3DES ○ ANY

Authentication ● MD5 ○ SHA1 ○ ANY

DH Group: Group 2

Lifetime: 86400

IPsec Key Exchange Policy Phase 2

Encryption ○ AES ○ DES ● 3DES ○ ANY

Authentication ● MD5 ○ SHA1 ○ ANY

Enable Perfect Forward Secrecy □

Encryption: Group 2

Lifetime: 3600

Verify Whether the Tunnel Works

After the tunnel has been established successfully, a **green check mark** displays next to it on the **VPN** page on the Barracuda Link Balancer at both corporate headquarters and Michigan. Both private IP addresses should now be accessible using the *ping* command.

Troubleshooting

A **yellow triangle** next to the VPN tunnel on the **VPN** page of the Barracuda Link Balancer indicates that something does not work as intended.

To troubleshoot:

- Check the **LOGS > VPN Log** page on the Barracuda Link Balancer.
- You can also refer to the logs generated by the Cisco ASDM web interface.
- Make sure that routing is correctly configured on the client networks and on the Cisco device. Cisco ASDM provides network logs.
- You may also use the **TCP Dump** command on the **ADVANCED > Troubleshooting** page on the Barracuda Link Balancer.

Figures