

This quick start guide walks through setting up VPN connections using the Ubicom VPN Router. Four common technologies are used for VPN today: L2TP, PPTP, IPsec, and SSL. The Ubicom VPN router supports all of the above types of VPNs. This application note explains only few of the above VPN connection types.

You should already be familiar with building and loading Ubicom firmware for a Router-Gateway platform.

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## 1 Building VPN Firmware (optional)

If you do not already have the VPN firmware, use the following steps to build the firmware:

1. `cd ubicom-distro`
2. `make menuconfig`
  - a. Select or choose
    - i. "Run distro menuconfig"
    - ii. board type
    - iii. regenerate ultra configs
  - b. Exit and save
3. On the OpenWrt `menuconfig`,
  - c. Select VPNGateway as the "Target Profile"
  - d. Exit and save
4. `make v=99`

This should build the VPN image.

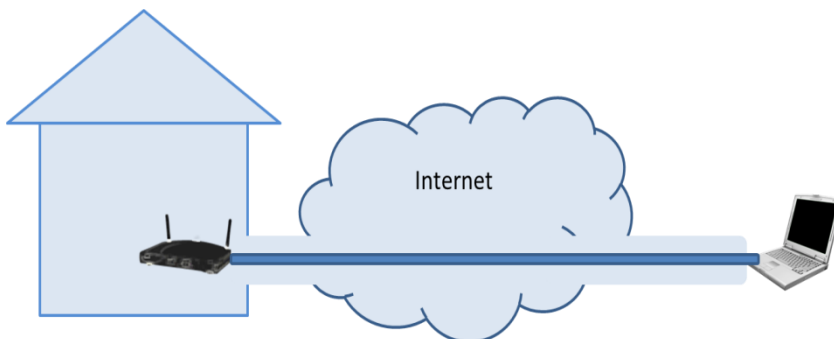
5. `export UBICOM_DONGLE=DONGLE_IP:5010`
6. `make install_all`

The firmware is loaded onto the RGW eval board and is ready for evaluation.

## 2 IPsec – Remote Access

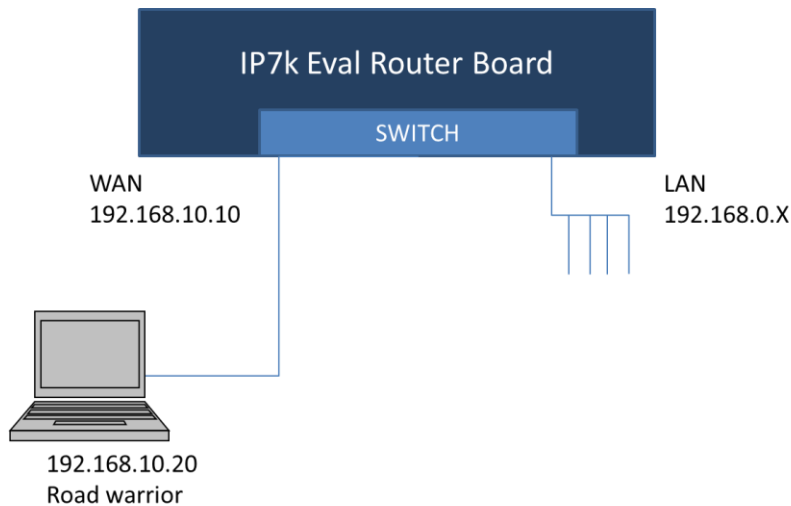
Remote access is a common method for a remote laptop or cell phone to connect back to the corporate network, commonly used for working remotely such as from home or hotel. Typically, the remote access PC has VPN client software to connect to gateway.

### 2.1.1 Real-World Use-Case:



**Figure 1: IPsec real world use case.**

## 2.1.2 Evaluation Setup:



**Figure 2: IPsec remote access -- evaluation setup**

## 2.2 Equipment

The following equipment and software is needed for this setup:

- Ubicom IP7k Evaluation board with VPN profile.
- Windows XP PC with TheGreenBow VPN client.
- Ubicom programming dongle and a PC to configure the Eval board. Please see the *Programming Dongle* application note.

## 2.3 Setup Router

### 2.3.1 Set up WAN Connection

Set up the WAN connection by accessing the router UI pages at <http://192.168.0.1>:

Connection type: static

IP address: 192.168.10.10

Network mask: 255.255.255.0

### 2.3.2 Start the Script

Access the router shell by establishing telnet connection using the dongle as follows.

```
telnet <dongle_ip> 50
```

After establishing the connection, set up the VPN configuration in the router through the following commands.

```
# cd /etc/ipsec/evaluation-scripts
#./start_ipsec_remote_psk <password/psk>
```

The router is ready for accepting an IPsec VPN remote access connection.

## 2.4 Set Up PC

### 2.4.1 Install VPN client.

TheGreenBow VPN client is at [http://www.thegreenbow.com/vpn\\_down.html](http://www.thegreenbow.com/vpn_down.html).

The Shrew Soft VPN client is also supported: <http://www.shrew.net/software>.

### 2.4.2 Set up IP Address on PC

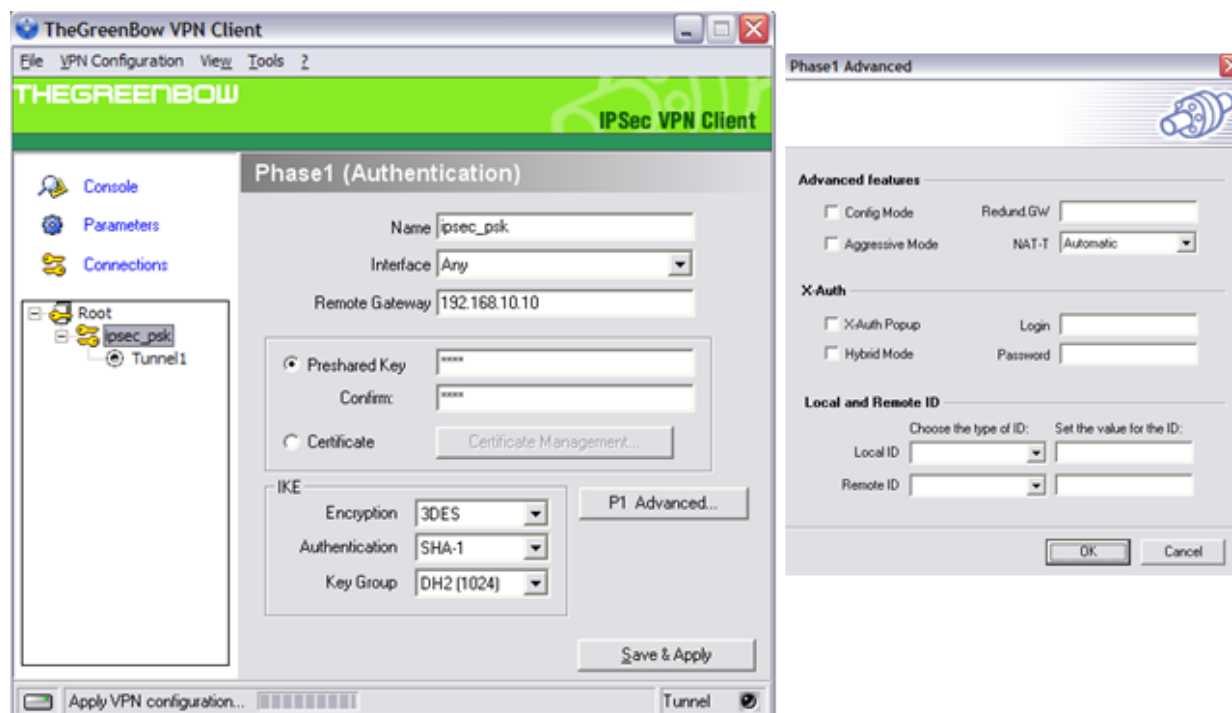
Configure the Ethernet interface on the PC with following address.

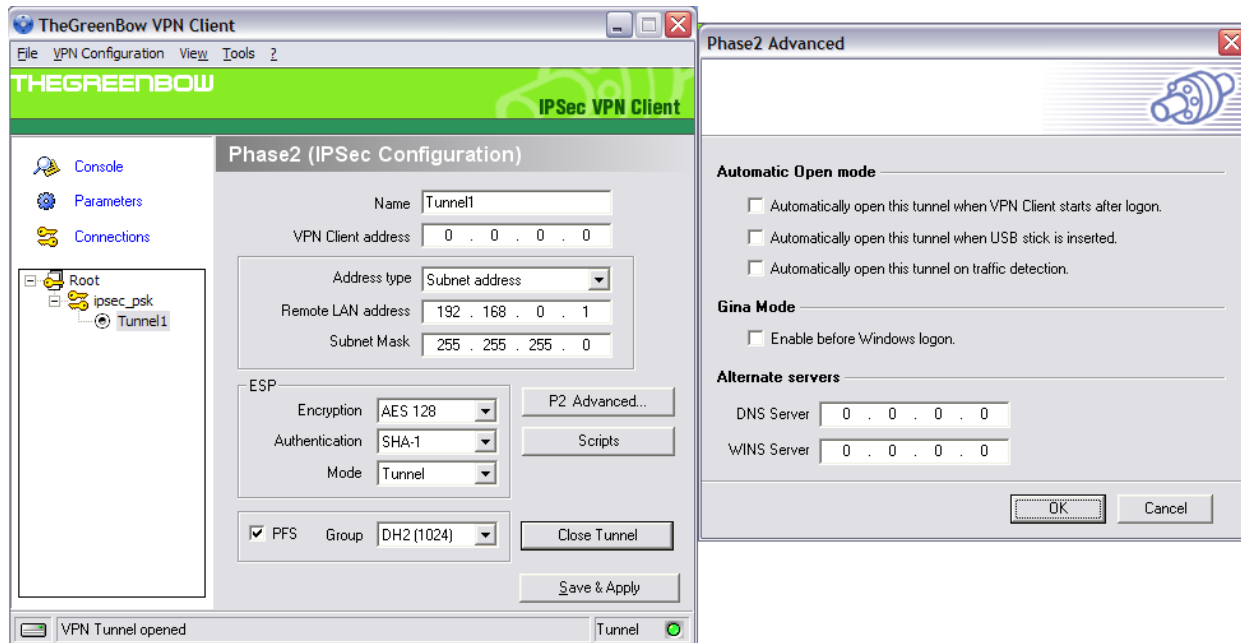
IP address: 192.168.10.20

Mask: 255.255.255.0

Gateway: 192.168.10.10

### 2.4.3 Configure the VPN Client





## Configure TheGreenBow Phase 1:

1. Enter the WAN IP of the VPN router as "Remote Gateway"
2. Select Preshared Key and enter the same preshared key you entered above for VPN router.
3. Select IKE encryption, authentication and key group as you like. The Ubicom VPN router supports all of them.
4. Do not change any settings in "P1 Advanced" page.

## Configure Greenbow Phase 2:

1. Select address type as "Subnet address"
2. Enter the VPN router's LAN IP (default value is **192.168.0.1**, if you have not changed it) as the "Remote LAN address"
3. Leave the subnet mask as "255.255.255.0"
4. Select ESP encryption, authentication, and PFS group as you like. The Ubicom VPN router supports all of them.
  - Do not change any settings on "P2 Advanced" or "Scripts" pages.

## 2.5 Establishing Connection

On starting the connection, you will see the following:



On success, the color of the icon changes from blue to green.

## 2.6 Performance

To test the WPN performance, connect a LAN computer and run throughput tests using client software such as **iperf** or **Ixia chariot** between the VPN client PC and the LAN PC.

## 2.7 Miscellaneous

### 2.7.1 “VPN Scripts Not Found on Router”

This happens when the firmware on the router is changed by programming through the dongle. The dongle does not erase old router configuration settings.

In the router shell do the following:

```
#rm -rf /flash/*  
#reboot
```

### 2.7.2 Verifying IPsec

Use a sniffer such as Wireshark in the path of the tunnel to check whether the IP header has the IPsec header name; i.e, **ESP**.

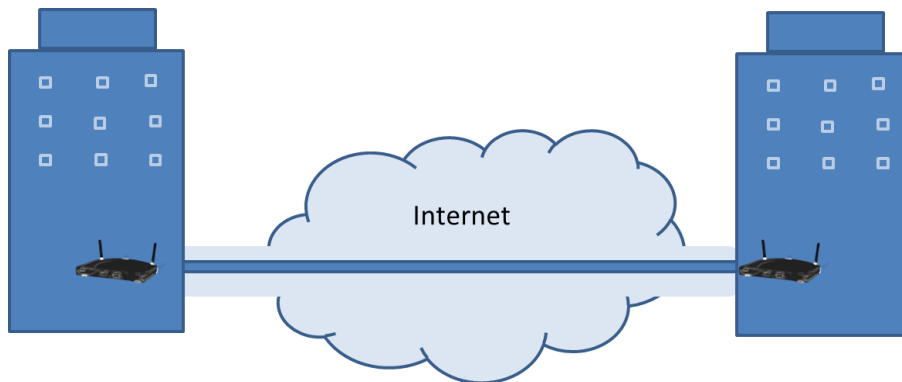
### 2.7.3 Security Parameters

The Ubicom router supports all hash algorithms and encryption standards such as AES128, Aes256, 3DES, MD5, SHA1.

## 3 IPsec – Site-to-Site

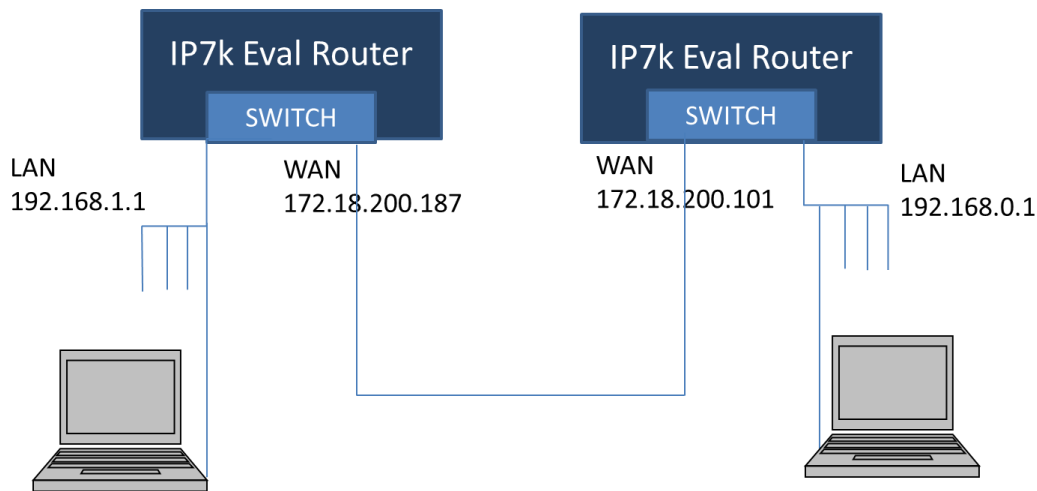
**Site-to-Site** is commonly used to connect remote offices with Corporate HQ, with a VPN gateway residing at each location. All computers at each site are fully visible to each other as if they were on the same local network.

## 3.1.1 Real-World Use Case:



**Figure 3: Site-to-Site Real world use case**

## 3.1.2 Evaluation Setup:



**Figure 4: Site-to-Site evaluation setup**

## 3.2 Equipment

The following equipment is needed for this setup.

- Two Ubicom IP7K Evaluation boards with VPN software.
- Two Windows XP PCs
- Two Ubicom dongles and a PC to configure the boards. Please see the *Programming Dongle app note*.

## 3.3 Set Up Router

### 3.3.1 Left Side and Right Side

Set up the LAN and WAN connections as shown in the figure by accessing router UI pages at <http://192.168.0.1> (default address)

## 3.4 Set Up Connection

Run start\_site\_to\_site\_psk script on both left and right boards using router shell.

### 3.4.1 Left Router

```
#cd /etc/ipsec/evaluation-scripts
# ./start_site_to_site_psk 172.18.200.101 192.168.0.1 192.168.0.0/24
```

### 3.4.2 Right Router

```
#cd /etc/ipsec/evaluation-scripts
# ./start_site_to_site_psk 172.18.200.187 192.168.1.1 192.168.1.0/24
```

## 3.5 Verifying Connection

You should see the following message on the shell on both sides:

```
004 "site-to-site-psk" #4: STATE_QUICK_I2: sent QI2, IPsec SA established
    tunnel mode {ESP=>0xf94dfbd4 <0x51a741d4 xf rm=AES_128-HMAC_SHA1 NATOA=none
    NATD=none DPD=enabled}
```

Also, you can check the VPN status on VPN router side by running

```
# vpn_manager status
```

## 4 Other VPN Connection Types

Use the scripts present in the router and SDK in directory `/etc/ipsec/evaluation-scripts`. The following scripts are provided along with text document **evaluation\_readme**

- start\_ipsec\_remote\_cert
- start\_ipsec\_remote\_psk
- start\_l2tp\_ipsec\_psk
- start\_pptp\_vpn
- start\_site\_to\_site\_psk
- start\_site\_to\_site\_cert

## 5 For More Information

- *VPN Profile Configuration* Application Note
- *VPN Middleware CLI* Application Note
- Evaluation scripts in SDK and in router at `/etc/ipsec/evaluation_scripts`
- <http://developer.ubicom.com/>





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