Avaya Solution & Interoperability Test Lab

Application Notes for Configuring an VPN Tunnel using IPsec between Fortinet FortiGate Network Security Platforms and Appliances and Avaya 9600 Series IP Phones - Issue 1.1

Abstract

These Application Notes describe the procedures for configuring a Virtual Private Network (VPN) tunnel using Internet Protocol Security (IPsec) between Fortinet FortiGate Network Security Platforms and Appliances and Avaya 9600 Series IP (H.323) Phones.

Fortinet offers security platform models to satisfy various deployment requirements from the FortiGate-20 series for small offices to the FortiGate-5000 series for very large enterprises, service providers and carriers. Each FortiGate includes a wide range of security and networking functions. These Application Notes focus on the FortiGate 60C VPN functionality using IPsec. Both the FortiGate 60C and 300C were compliance tested.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe the procedures for configuring a Virtual Private Network (VPN) tunnel using Internet Protocol Security (IPsec) between Fortinet FortiGate Network Security Platforms and Appliances and Avaya 9600 Series IP (H.323) Phones.

Fortinet offers security platform models to satisfy various deployment requirements from the FortiGate-20 series for small offices to the FortiGate-5000 series for very large enterprises, service providers and carriers. Each FortiGate includes a wide range of security and networking functions, including:

- Firewall, VPN, and Traffic Shaping
- Intrusion Prevention System (IPS)
- Antivirus/Antispyware/Antimalware
- Integrated Wireless Controller
- Application Control
- Data Loss Prevention (DLP)
- Vulnerability Management
- IPv6 Support
- Web Filtering
- Anti-spam
- VoIP Support
- Layer 2/3 Routing
- WAN Optimization & Web Caching

These Application Notes focus on the FortiGate 60C VPN functionality using IPsec. Both the FortiGate 60C and 300C were compliance tested.

2. General Test Approach and Test Results

This section details the general approach to the testing, what was covered, and results of the testing.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

2.1. Interoperability Compliance Testing

The objective of the compliance testing was to verify interoperability between the Avaya 9600 Series IP phones with VPN mode enabled and the Fortinet FortiGate 60C. The testing focused on establishment of the VPN tunnel using IPsec and basic call functionality (voice paths, hold, resume, mute, transfer, conference, etc.) after the tunnel was established.

2.2. Test Results

All compliance test cases passed successfully with the following exception/observation:

- If the FortiGate is rebooted after a VPN tunnel is already established from a VPN phone, the phone will be out of service until the VPN phone is restarted. Note, the phone's display will indicate that the tunnel was lost and the phone will automatically attempt to reestablish the VPN tunnel; however since the phone is still using port 4500 for the current (lost) tunnel, and the FortiGate is only expecting new tunnels on port 500 after it is rebooted, the tunnel isn't reestablished until the phone restarts and then uses port 500 again. It is during the Internet Key Exchange (IKE) exchange that the VPN phone and FortiGate change from port 500 to 4500. Fortinet expects to have a fix for this issue by the time this document is published.

Fortinet has supplied the following statement with regards to the test results:

"This statement relates to the interoperability and compliance testing conducted in May 2012 at Avaya facilities in Colorado, USA, using the FortiGate 60C and 300C models running FortiOS v4.3.7 (4.0-MR3-patch7) firmware.

Fortinet, Inc confirms that the VPN and stateful firewall functionality demonstrated in the compliance testing with the Avaya Aura® Communication Manager 6.0.1 and Avaya 9600 Series IP (H.323) Deskphones is consistent across all FortiGate and FortiWIFI models which run FortiOS v4.3.7. Therefore, Fortinet believes the compliance testing results from the FortiGate 60C and 300C testing is representative of the results expected for any other FortiGate or FortiWIFI model."

2.3. Support

For Fortinet FortiGate technical support and information, contact Fortinet at:

- **Phone**: 1-866-648-4638
- **Web**: http://www.fortinet.com/support/contact_support.html

3. Reference Configuration

The figure below shows the sample configuration used during compliance testing. A corporate office environment was created consisting of Avaya Aura® Communication Manager, various Avaya 9600 Series IP Phones, and a Fortinet FortiGate 60C. Additionally, two home office environments were created. Each home office had a home router with NAT enabled and two Avaya 9600 Series IP (H.323) phones. The phones, at the home offices, are used DHCP to obtain their IP address. Initially, the phones are assigned with IP address on the 192.168.1.0/24 network by their local router. When the phones are establish with a VPN tunnel, they are assigned with IP address on the 10.64.28.0/24 network.

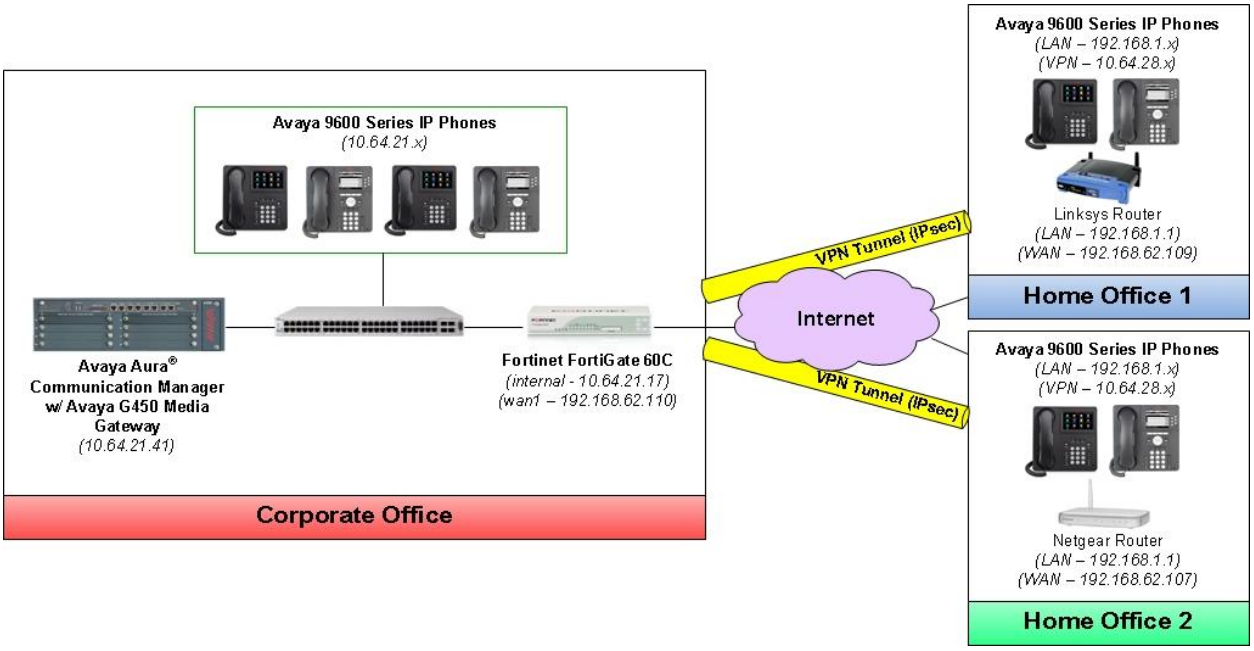


Figure 1: Fortinet FortiGate VPN Configuration

4. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment/Software	Release/Version
Avaya Aura® Communication Manager running on Avaya S8300D Server with G450 Gateway	Avaya Aura® Communication Manager 6.0.1 (R016x.00.1.510.1) with Patch 19528
Avaya 9600 Series IP Phones (H.323) • 96x0 • 96x1	 • 96xx-IPT-H323-R3_1_4-031612 • 96x1-IPT-H323-R6_2_0_09_02812
Fortinet FortiGate 60C	v4.0,build0535,120511 (MR3 Patch 7)

5. Configure Avaya 9600 Series IP Phones

This section describes the steps required to configure the VPN settings on Avaya 9600 Series IP Phones. Note that VPN-enabled firmware must be installed on the phone prior to the phone being deployed at a remote location.

The Avaya 96xx Series IP Phone configuration can be administered centrally from an HTTP server through the 46xxsettings.txt file or locally on the phone. The parameters that were configured during compliance testing are shown below. The default values were used for all other VPN parameters. For security purposes, actual public IP addresses used during compliance testing were changed to 192.168.x.x in this section.

SET NVVPNMODE = 1 enables the VPN client
SET VPNPROC = 2 enables VPN procedure View & Modify privileges

SET NVSGIP = 192.168.62.110 sets the IP address used to access the Fortinet FortiGate
SET NVMCIPADD = 10.64.21.41 sets the IP address used to access Communication Manager

SET NVVPNUSERTYPE = 1 sets user type to "Any"
SET NVVPNUSER = test sets VPN user name
SET NVNVPNPSWD = test sets VPN user's password
SET NVPNPSWDTYPE = 1 saves VPN user's password in flash

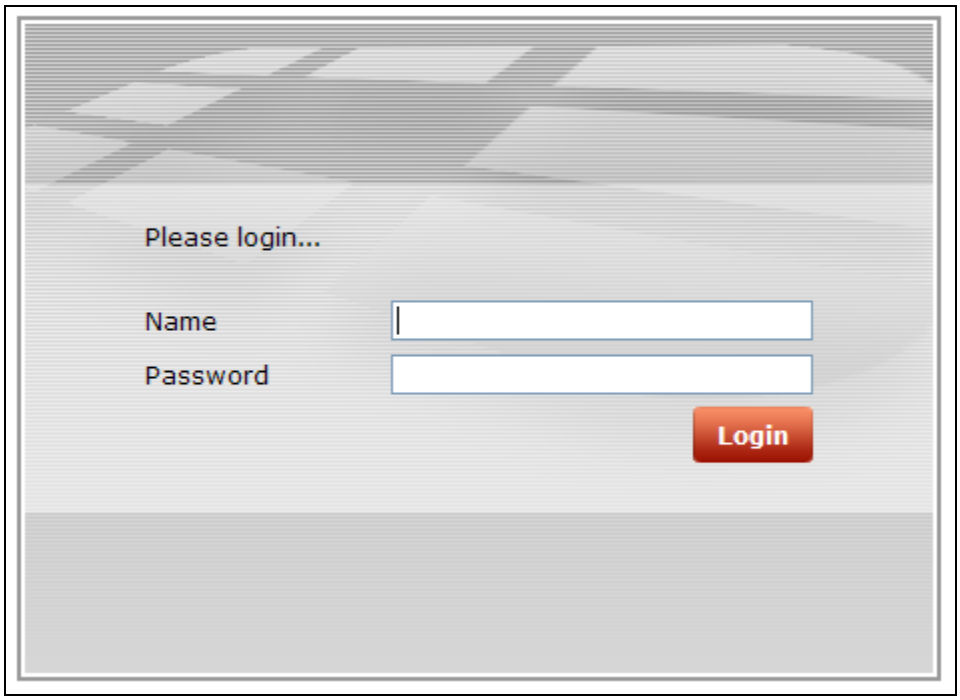
SET NVIKECONFIGMODE = 1 enables IKE configuration mode
SET NVIKEEXCHGMODE = 1 sets the exchange method to Aggressive for IKE Phase 1
SET NVIKEIDTYPE = 11 sets the IKE Identifier type for the IKE-ID
SET NVIKEID = ipsecvpn sets the IKE-ID used during Phase 1 negotiation
SET NVIKEAUTHTYPE = 4 sets authentication method to PSK with XAUTH
SET NVVPNSVENDER = 4 sets the security gateway Vendor to "other"
SET NVIKEPSK = interop123 sets the PSK (note in actual deployments, it is recommended that user enter his/her Preshared Key using phone's dial pad rather than storing the value in the phone)
SET NVIKEDHGRP = 5 sets the value of the DH group used during Phase 1 negotiation
SET NVPFSDHGRP = 5 sets the value of the DH group used during Phase 2 negotiation

6. Configure Fortinet FortiGate 60C

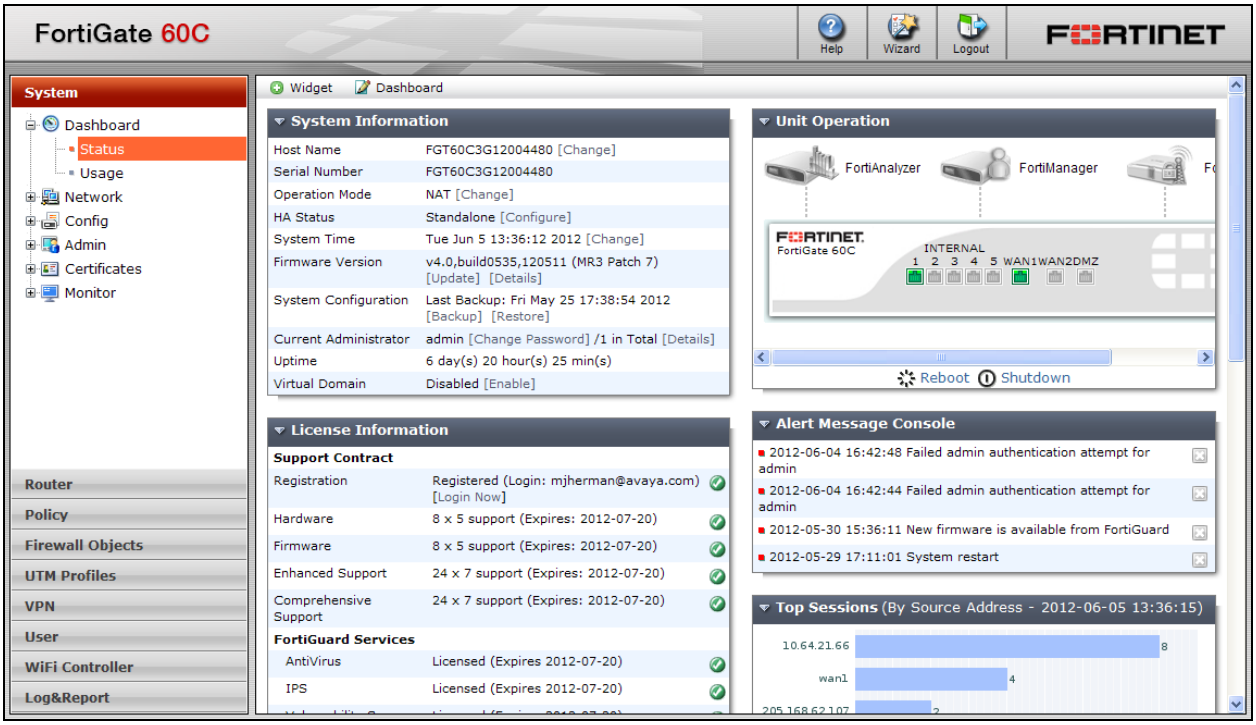
This section describes the steps required to configure the Fortinet FortiGate 60C VPN functionality. It is assumed that the basic installation and configuration of the FortiGate has already been completed. For security purposes, actual public IP addresses used during compliance testing were changed to 192.168.x.x in this section.

6.1. Web-based Manager

Using HTTP or a secure HTTPS connection from any management computer running a web browser, connect to the FortiGate web-based manager to configure and manage the FortiGate unit. Enter the IP address of the FortiGate 60C in a web browser. Log in using appropriate credentials.

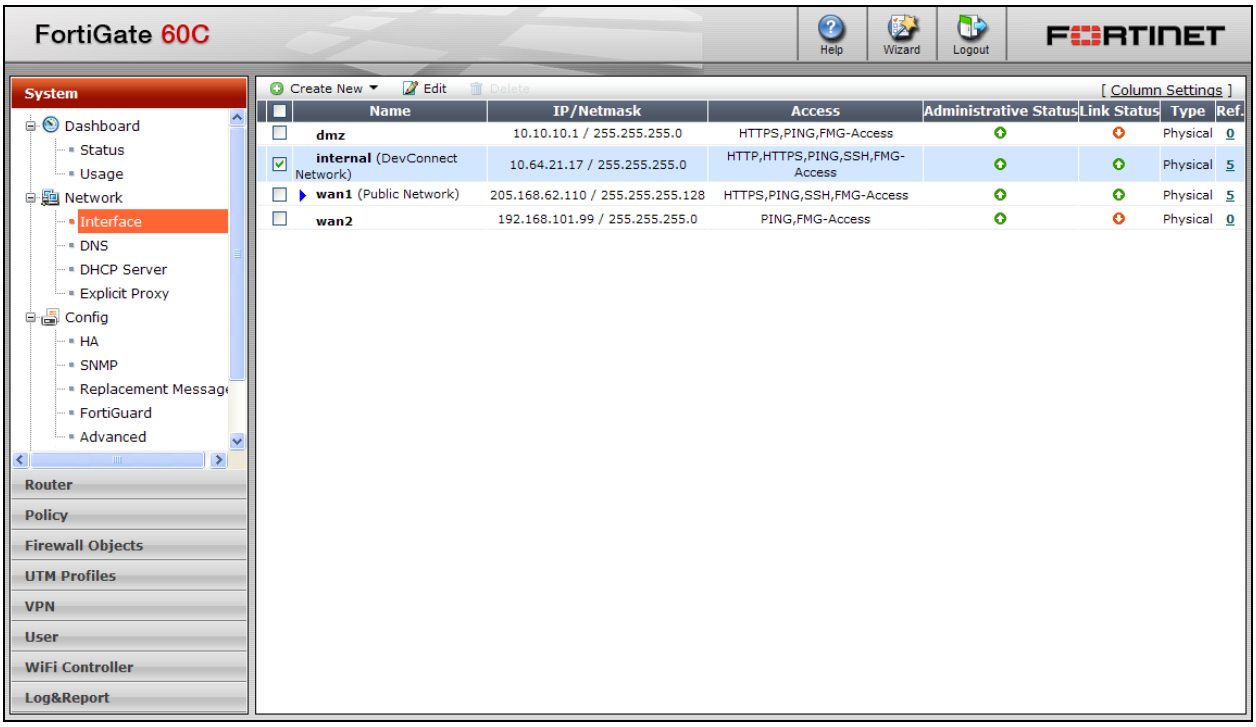


The **System→Dashboard→Status** screen is displayed after logging in.



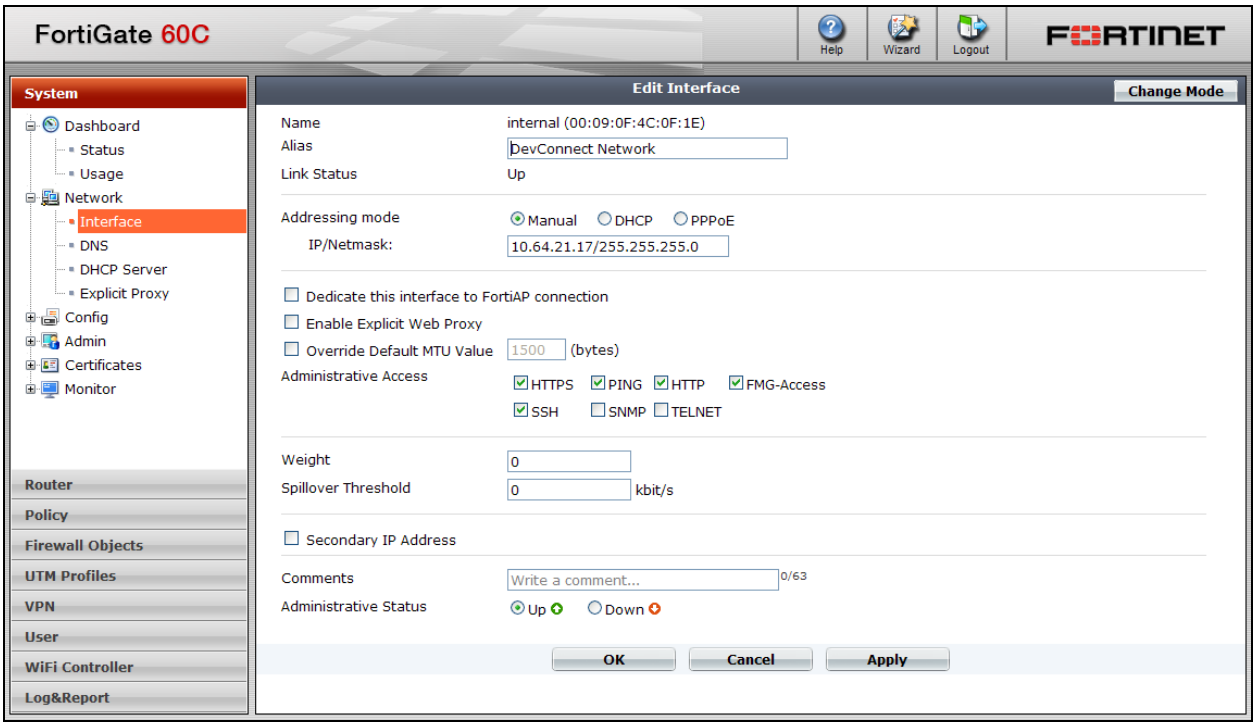
6.2. Configure Network

Navigate to **System→Network→Interface**. Configure the **internal** (private) and **wan1** (public) network interfaces.

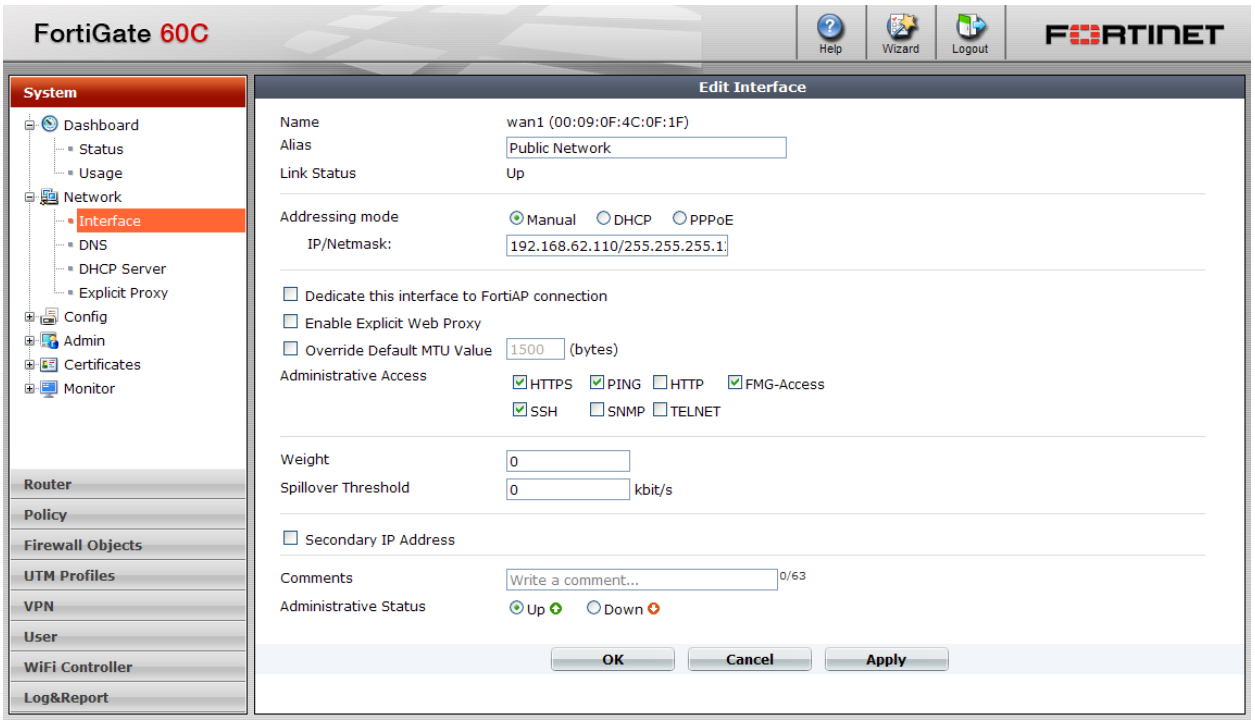


To modify an existing interface, check the checkbox next to the interface and then click **Edit**.

The **Edit Interface** screen is displayed. Enter an **Alias** (optional) and the **IP/Netmask** for the interface. The **internal** interface used during compliance testing is shown below.

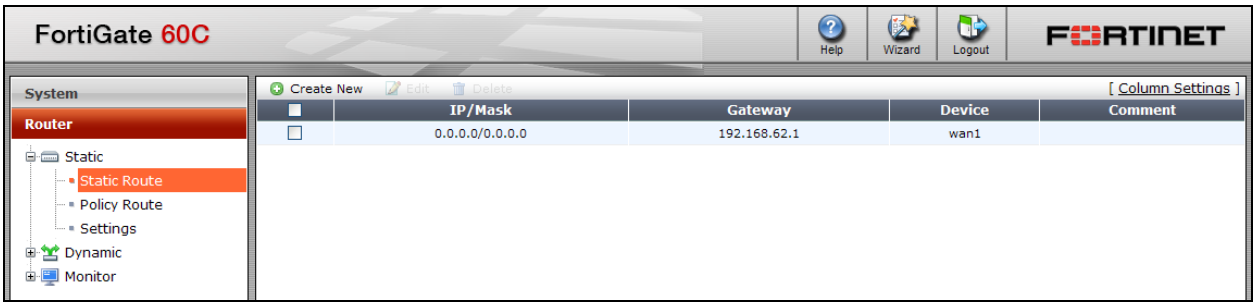


The **wan1** interface configuration used during compliance testing is shown below.

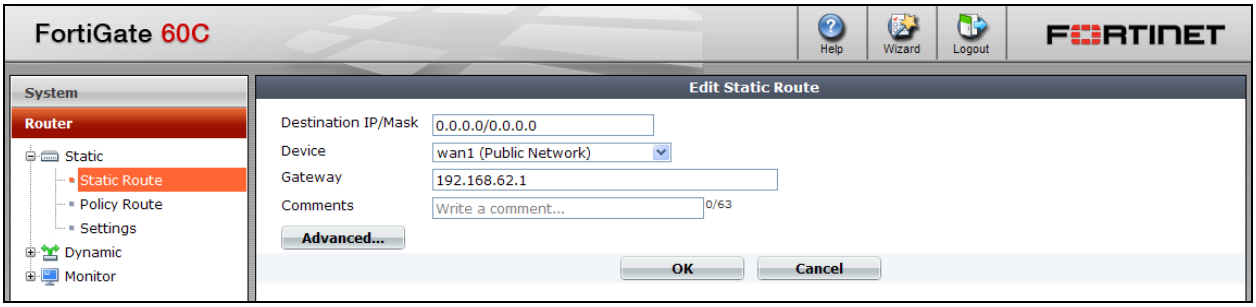


6.3. Configure Router

Navigate to **Router→Static Route**. Only one default static route to the public interface was created for compliance testing.

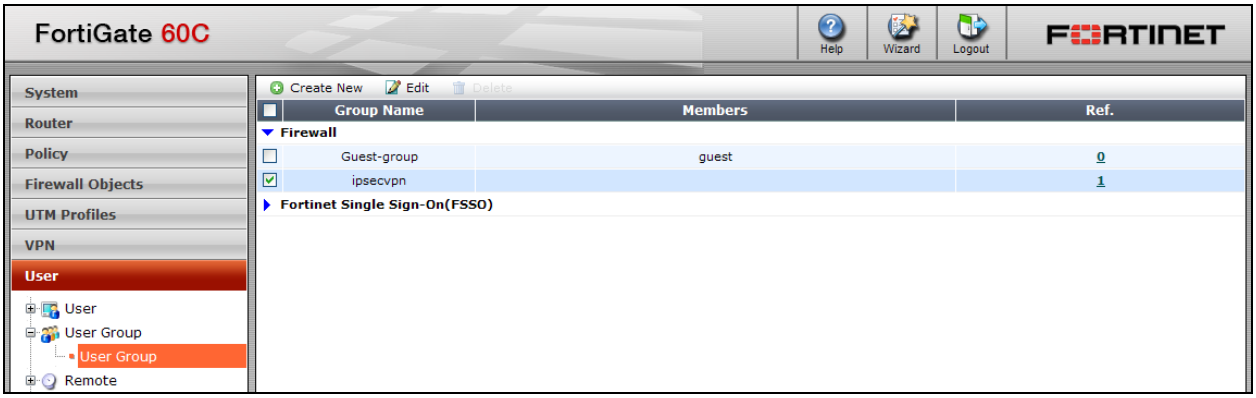


The configuration of the static route is shown below.



6.4. Configure User Group

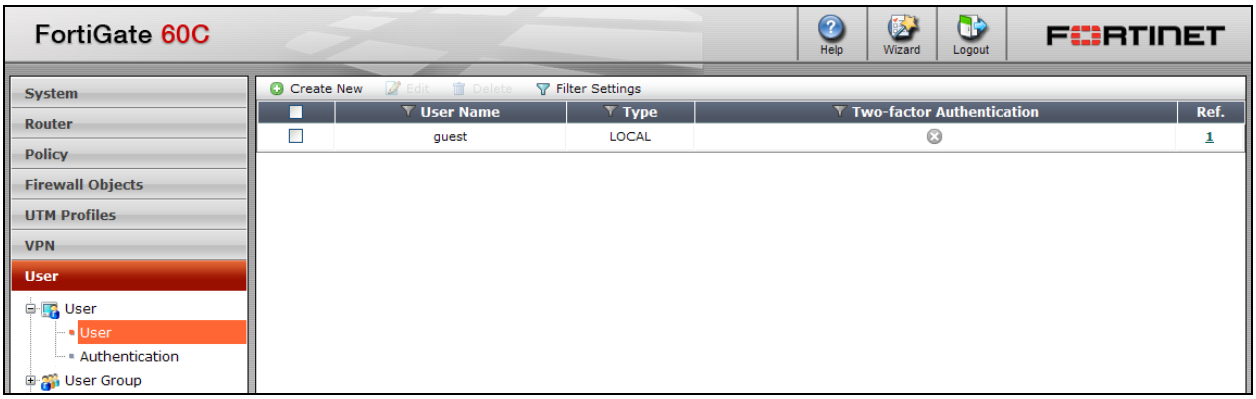
Navigate to **User→User Group**. Create or Modify an existing group. The user group **ipsecvpn** was used for compliance testing. To view/modify an existing group, check the appropriate checkbox and click **Edit**.



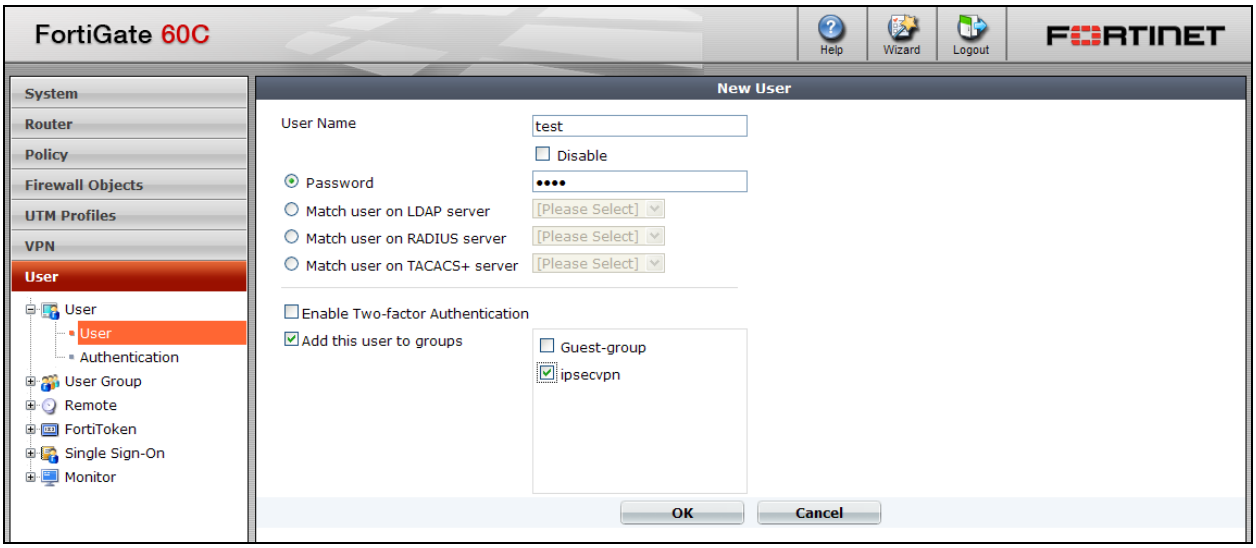
The **Edit User Group** screen is displayed. The screen below shows the values used for the **ipsecvpn** user group.

6.5. Configure User

Navigate to **User→User→User**. Click **Create New** to add a new user.

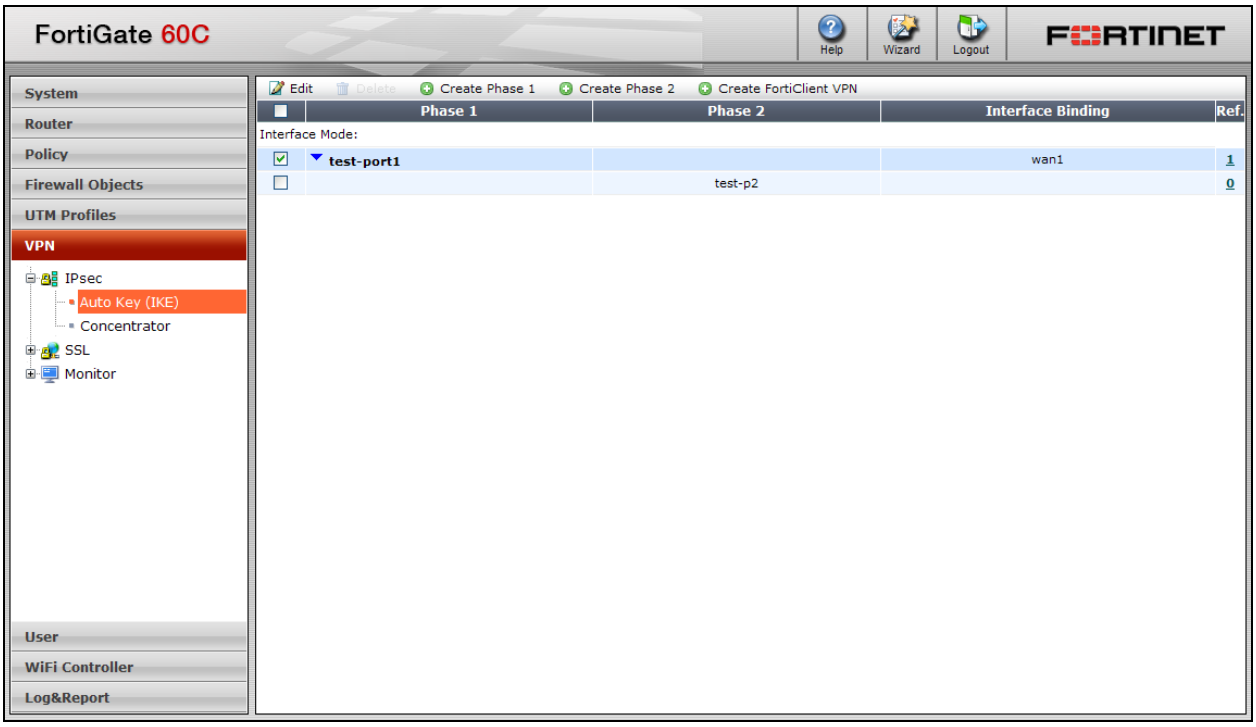


The **New User** screen is displayed. Enter a **User Name** and **Password**. Check the box for **Add this user to groups** and check the user group created in **Section 6.4**.

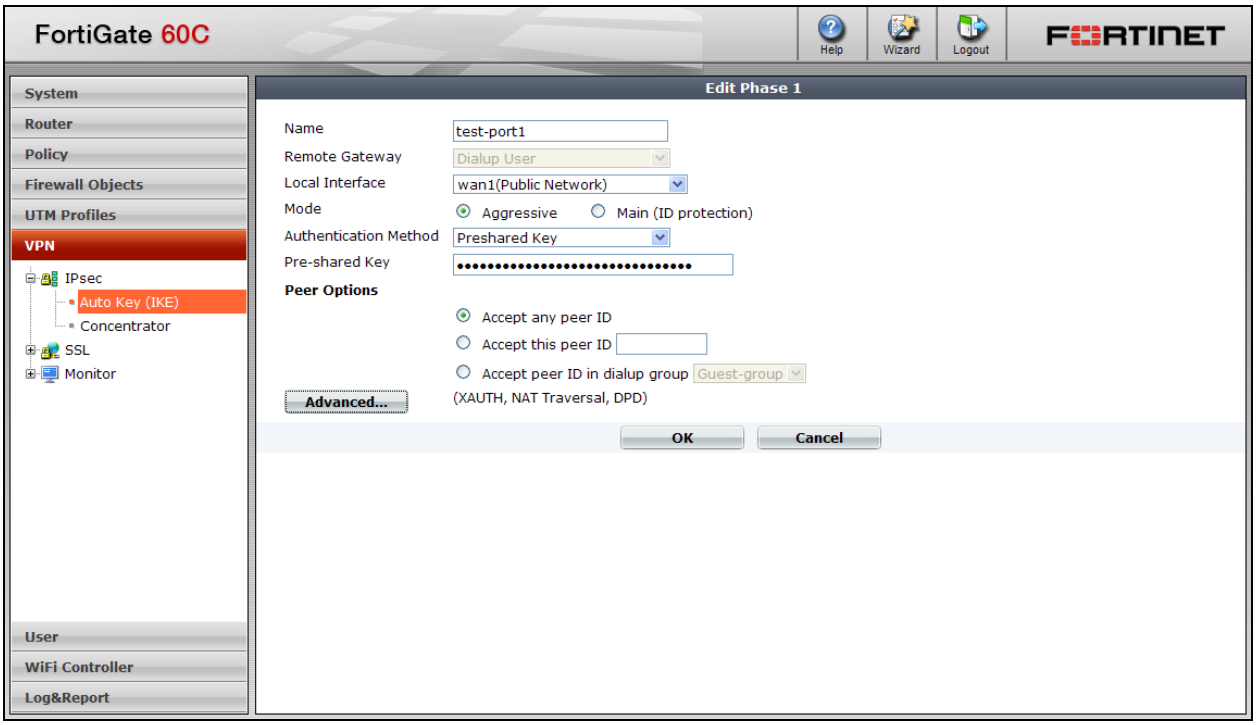


6.6. Configure VPN

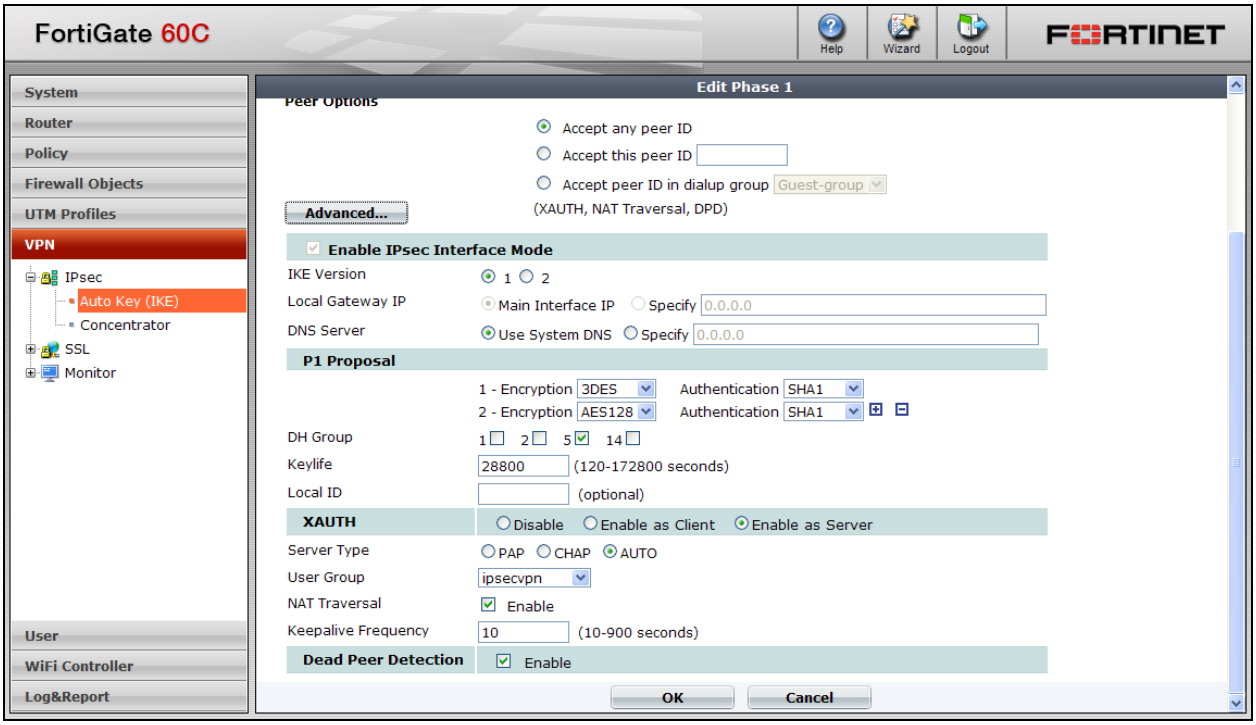
With the web-based manager, navigate to **VPN→IPsec→Auto Key (IKE)**. As shown below, **test-port1** for Phase 1and **test-p2** for Phase 2 were created for compliance testing. To view or modify Phase1 check the appropriate checkbox and click **Edit**.



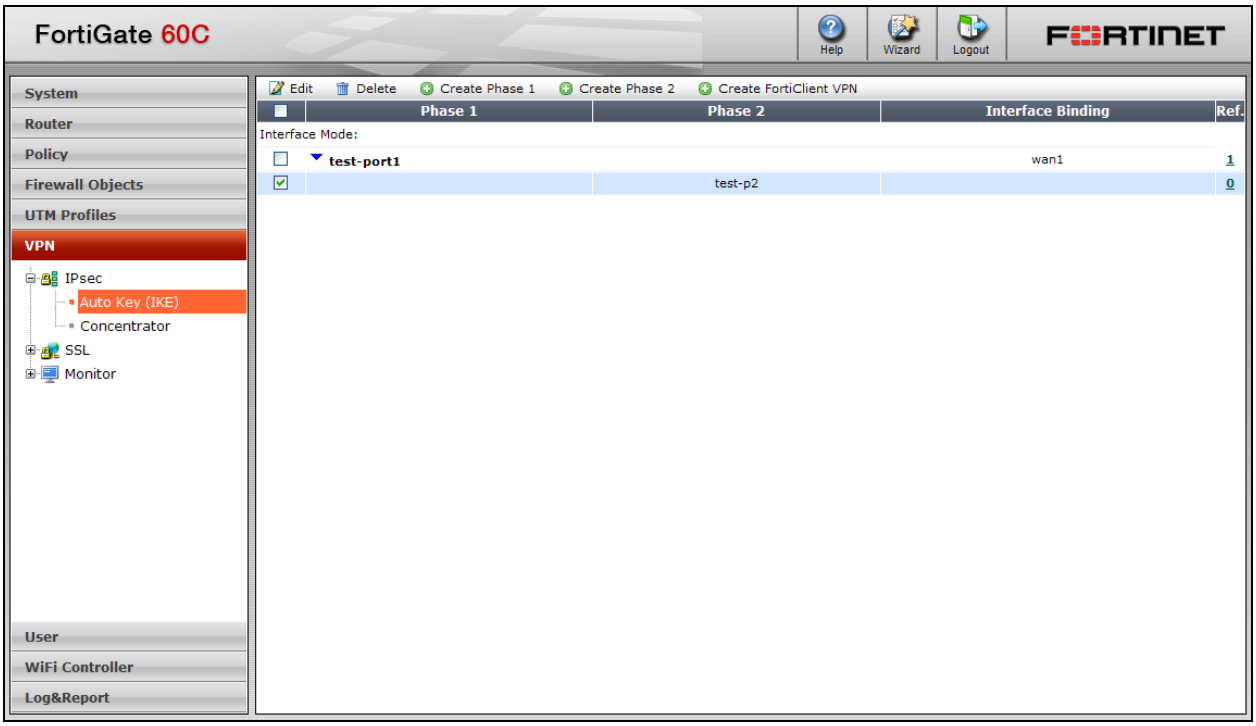
The **Edit Phase 1** screen is shown below with the configuration used during testing. Select **Dialup User** for the **Remote Gateway** and set the **Mode** to **Aggressive**. This allows the FortiGate to dynamically add tunnel routes as IPSec connections are made from the VPN phones.



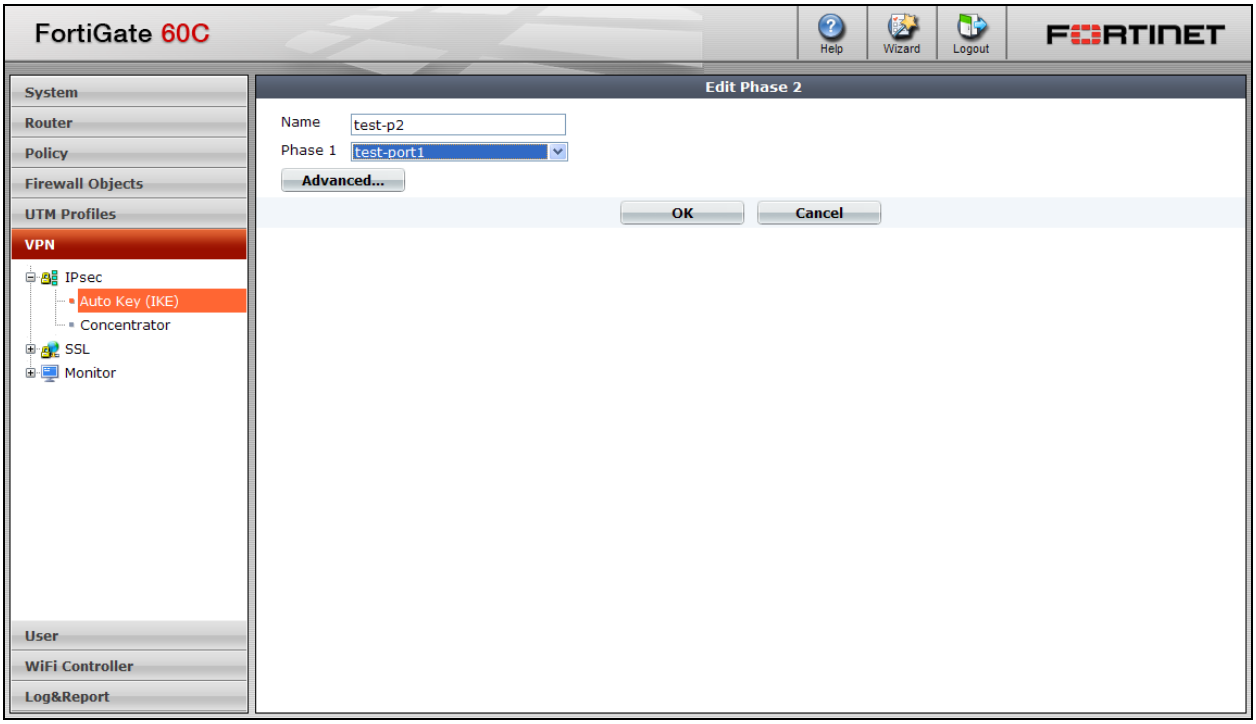
Click the **Advanced…** button to view more details. Note, the **Enable IPsec Interface Mode** checkbox was checked, and **XAUTH** was set to **Enable as Server** with the **User Group** created earlier (i.e. **ipsecvpn**) selected.



Navigate back to **VPN→IPsec→Auto Key (IKE)**. To view or modify Phase 2 check the appropriate checkbox and click **Edit**.



The **Edit Phase 2** screen is shown below with the configuration used during testing.



Confirm the IKE Configuration Method is enabled, which can only be done through the FortiGate command line interface. Use a secure shell client to access the FortiGate. After logging in, use the **config**, **edit**, and **set** commands shown in bold below to set the **type** and **mode-cfg** values. The **type** keyword determines whether the administrator is creating a server or a client. Setting **type** to dynamic creates a server configuration, otherwise the configuration is a client. The **mode-cfg** keyword enables the IKE Configuration Method.

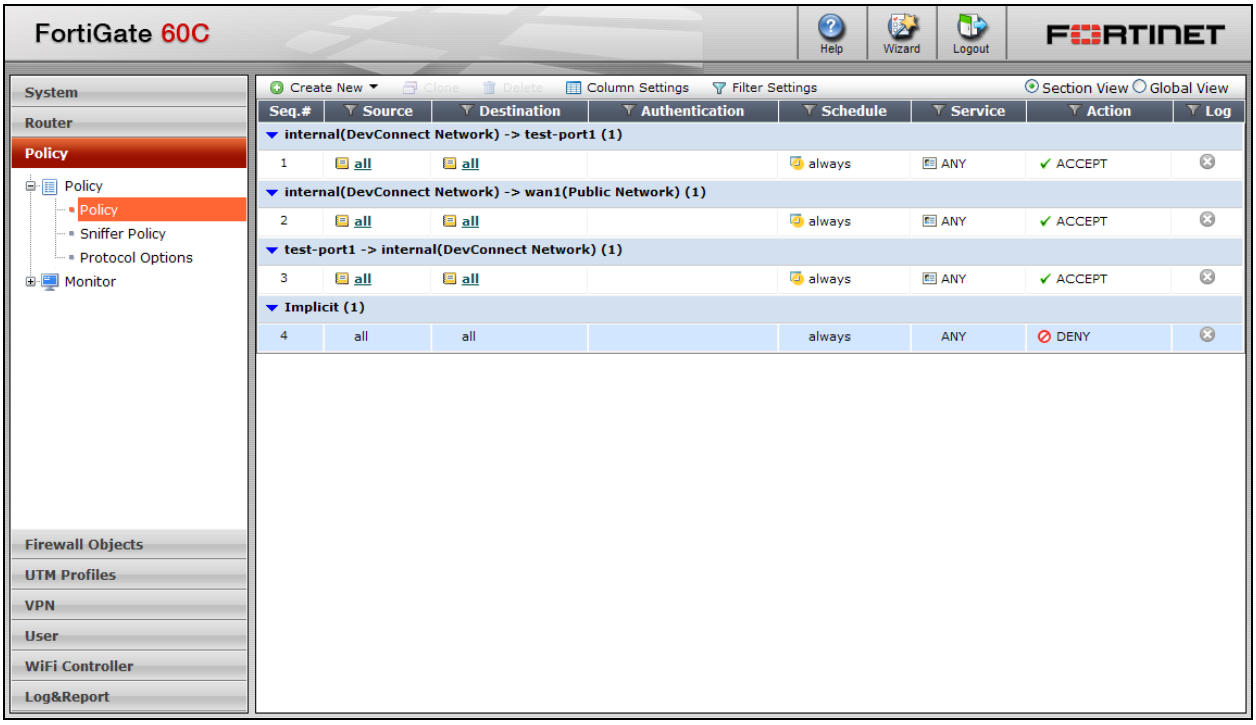
```
config vpn ipsec phase1-interface
    edit "test-port1"
        set type dynamic
        set interface "wan1"
        set xauthtype auto
        set mode aggressive
        set mode-cfg enable
        set proposal 3des-sha1 aes128-sha1
        set authusrgrp "ipsecvpn"
        set ipv4-start-ip 10.64.28.164
        set ipv4-end-ip 10.64.28.173
        set ipv4-netmask 255.255.255.0
        set dns-mode auto
        set unity-support disable
        set psksecret ENC
Cw/KXthp0PQlKB+ZxCYrUYLqfYDOKr9+/Zu6fUnA13RBdgn0yXCNxbx+M7IHUMDAm4G6pZlr6XL4XedB/SHThA
l7W/2a2YWowLSZz7JuCIMGTNVk
    next
end
```

Note, the PSK is encrypted in the configuration and can be copied verbatim between FortiGate units. For reference, the Phase 2 configuration is also shown below.

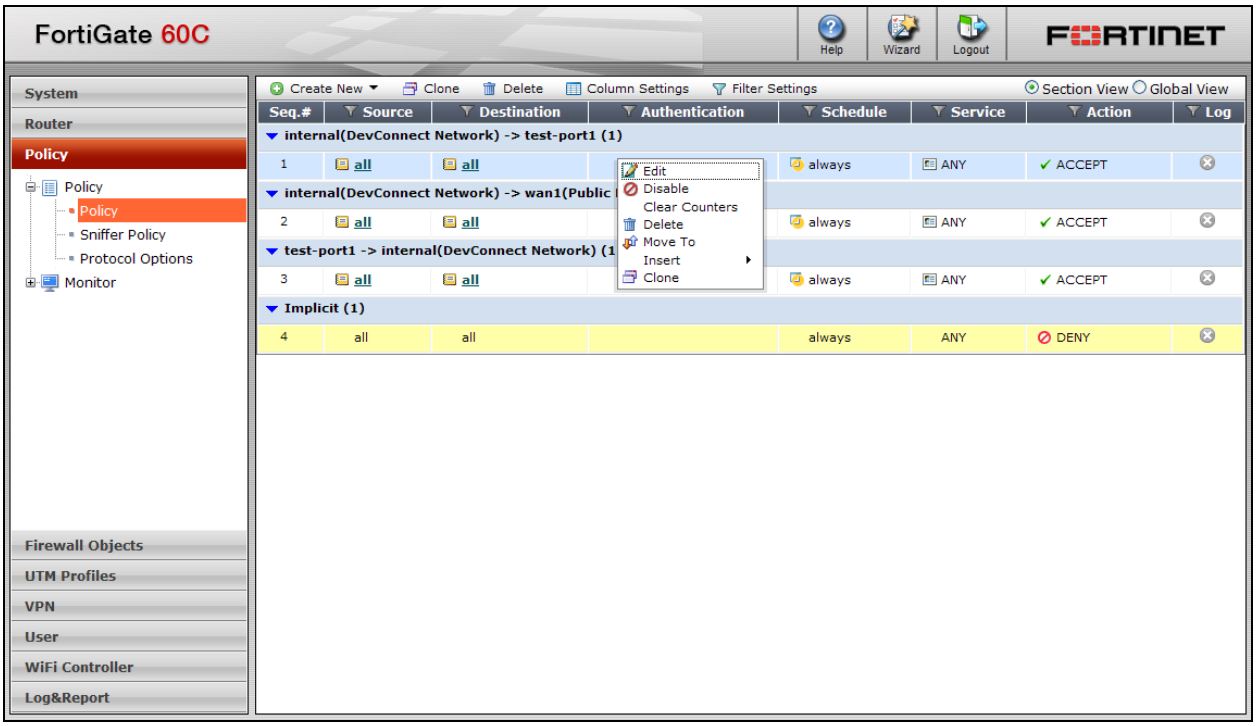
```
config vpn ipsec phase2-interface
    edit "test-p2"
        set keepalive enable
        set phase1name "test-port1"
        set proposal 3des-sha1 aes128-sha1
    next
end
```

6.7. Policy

Navigate to **Policy→Policy→Policy**. The screen below shows the policies defined during compliance testing. The policy for "test-port1" references the IPsec tunnel configuration made earlier.

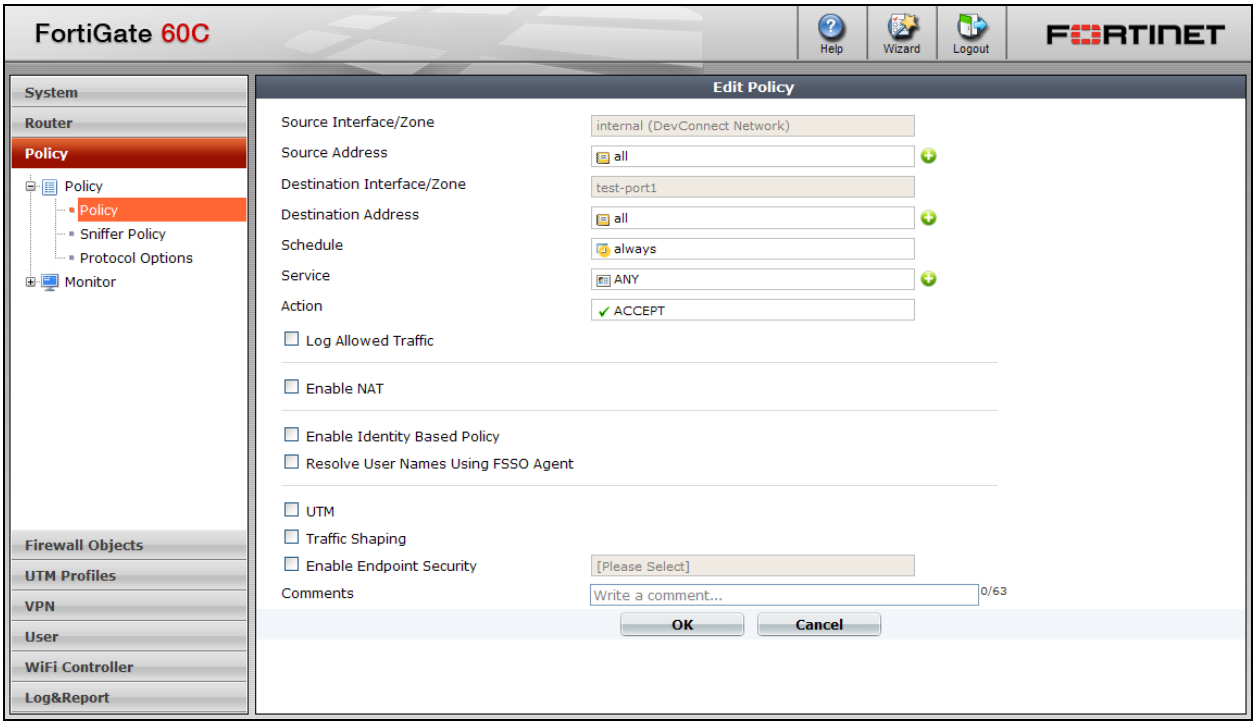


To view or modify an existing policy, click on the policy row to high-light it, right-click and then select **Edit**.



The screen below shows the configuration of the **internal (DevConnect Network) → test-port1** policy. Note that during compliance testing, this tunnel for the IPSec tunnel interface does not require a NAT configuration since it joins the two trusted subnets on either end of the IPSec tunnel.

The other policies shown above were configured similarly.



6.8. Configure VPN Phone DHCP IP Address Pool

The VPN phones were assigned IP address for a pool of IP address on the 10.64.28.0/24 network by the FortiGate 60C. To set the IP address pool range, use a secure shell client to access the FortiGate. After logging in, use the **config**, **edit**, and **set** commands shown in bold below to set the **ipv4-start-ip**, **ipv4-end-ip**, and **ipv4-netmask** values.

```
config vpn ipsec phase1-interface
    edit "test-port1"
        set type dynamic
        set interface "wan1"
        set xauthtype auto
        set mode aggressive
        set mode-cfg enable
        set proposal 3des-sha1 aes128-sha1
        set authusrgrp "ipsecvpn"
        set ipv4-start-ip 10.64.28.164
        set ipv4-end-ip 10.64.28.173
        set ipv4-netmask 255.255.255.0
        set dns-mode auto
        set unity-support disable
        set psksecret ENC
Cw/KXthp0PQlKB+ZxCYrUYLqfYDOKr9+/Zu6fUnA13RBdgn0yXCNxbx+M7IHUMDAm4G6pZlr6XL4XedB/SHThA
l7W/2a2YWowLSZz7JuCIMGTNVk
    next
end
```

7. Verification Steps

The following steps can be used to verify the configuration:

- Verify VPN connections are successfully established from the VPN phones.
- Verify calls placed between all VPN users and corporate users are successful.
- Verify messages can be left for the VPN phones and that the message waiting indicator on each phone functions correctly.

8. Conclusion

These Application Notes describe the procedures for configuring a Virtual Private Network (VPN) tunnel using Internet Protocol Security (IPsec) between Fortinet FortiGate Security Platforms and Appliances and Avaya 9600 Series IP (H.323) Phones. All compliance test cases passed successfully with the one exception/observation noted in **Section 2.2**.

9. Additional References

This section references the product documentation relevant to these Application Notes.
Avaya product documentation is available at http://support.avaya.com.
Fortinet product documentation is available at http://docs.fortinet.com/fgt.html.

[1] *Administering Avaya Aura® Communication Manager*, March 2012
[2] *ForiGate Desktop Install Guide*, March 2009
[3] *FortiOS™ Handbook v3*, March 2012
[4] *FortiOS™ CLI Reference*, February 2012

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya DevConnect Program at devconnect@avaya.com.