



FortiOS - Zscaler Internet Access and Fortinet SD-WAN Deployment Guide

Version 6.4.1



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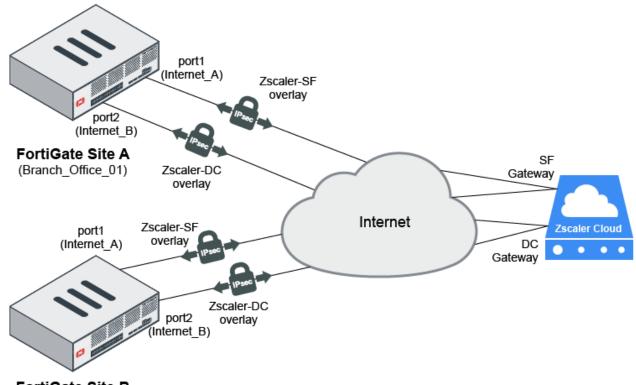
Change Log

Date	Change Description
2020-06-30	Initial release.
2020-07-27	Updated Configuring IPsec or GRE tunnels on FortiOS on page 7, Configuring SD-WAN zones on page 12, Configuring firewall policies on page 15, Configuring Performance SLA test on page 19, and Configuring SD-WAN rules on page 21.
2020-09-08	Updated Configuring IPsec or GRE tunnels on Zscaler Internet Access on page 6 and Configuring IPsec or GRE tunnels on FortiOS on page 7.

Zscaler Internet Access and Fortinet SD-WAN

This document demonstrates the interoperability of Zscaler Internet Access (ZIA) and Fortinet secure SD-WAN. You can use this guide as an example to deploy ZIA and Fortinet secure SD-WAN.

In this example, we have two FortiGate sites, Site A and Site B. Each site has two underlay connections port1 (Internet_A) and port2 (Internet_B) that have two overlay connections <code>Zscaler_SF</code> and <code>Zscaler_DC</code> to Zscaler SF Gateway and Zscaler DC Gateway respectively. Web traffic will be routed to Zscaler where it will be scanned, while non-web traffic passes over the underlays and is scanned by FortiGate.



FortiGate Site B

This section contains the following topics:

- Configuring IPsec or GRE tunnels on Zscaler Internet Access on page 6
- Configuring IPsec or GRE tunnels on FortiOS on page 7
- Configuring SD-WAN zones on page 12
- Configuring firewall policies on page 15
- Configuring Performance SLA test on page 19
- · Configuring SD-WAN rules on page 21
- Verifying configuration with Zscaler test page on page 23
- Results on page 24

Configuring IPsec or GRE tunnels on Zscaler Internet Access

IPsec and GRE are similar in the sense that both provide tunneling across the public Internet. However, IPsec also provides encryption and GRE does not. Also, Zscaler Internet Access supports a greater throughput over GRE tunnels while throughput over an IPsec tunnel is capped.

In this case, you will configure either IPsec tunnels or GRE tunnels, and not both.

To configure IPsec tunnels on ZIA:

- Locate the available data-centers and the hostname/IP address of the VIP to which you will establish a tunnel; go
 to Locating the Hostnames and IP Addresses of Zscaler Enforcement Nodes (ZENs).
- 2. Add the VPN credentials for IPsec tunnel on ZIA; go to Adding VPN Credentials.
- 3. Configure the VPN credentials to a location; go to Configuring Locations.

Repeat the above procedure to configure a second IPsec tunnel to another Zscaler ZEN.



You may configure GRE tunnels, though Fortinet recommends configuring IPsec tunnels.

To configure GRE tunnels on ZIA:

- 1. Locate the available data-centers and the hostname/IP address of the VIP to which you will establish a tunnel; go to Locating the Hostnames and IP Addresses of Zscaler Enforcement Nodes (ZENs).
- 2. Configure the GRE tunnel on ZIA; go to Configuring GRE tunnels.
- 3. Configure a location by choosing a static IP address; go to Configuring Locations.

Repeat the above procedure to configure a second GRE tunnel to another Zscaler ZEN.

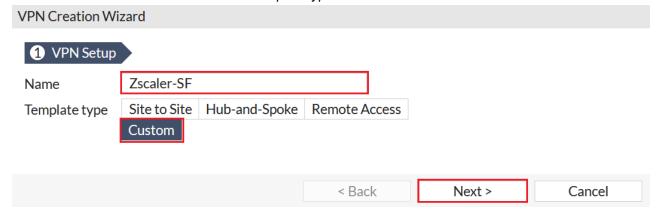
If you have any problems, contact Zscaler by submitting a support ticket at https://help.zscaler.com/submit-ticket.

Configuring IPsec or GRE tunnels on FortiOS

In this case, you will configure either IPsec tunnels or GRE tunnels, and not both.

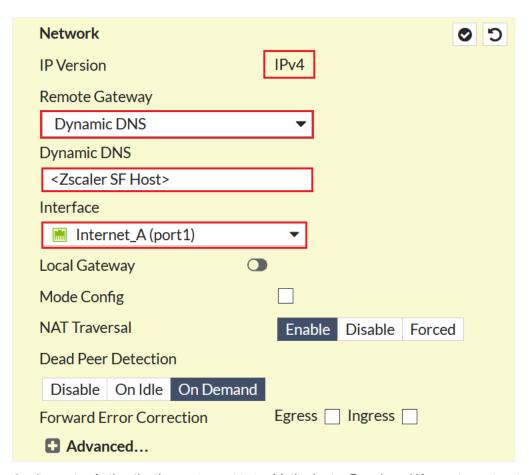
To configure an IPsec tunnel:

- 1. Go to VPN > IPsec Wizard. The VPN Creation Wizard displays.
- 2. Enter a *Name* for the tunnel and select the *Template type* to be *Custom*.

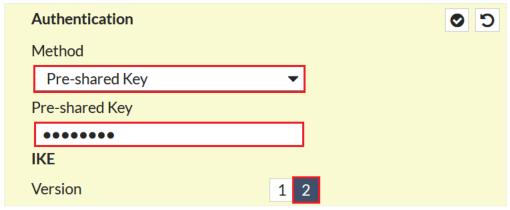


- 3. Click Next. The New VPN Tunnel settings are displayed.
- **4.** Configure the *Network* settings as indicated in the table below. The *Dynamic DNS* field should be the Zscaler ZEN hostname that you will use.

IP Version	IPv4
Remote Gateway	Dynamic DNS
Dynamic DNS	<zscaler host="" sf=""></zscaler>
Interface	<pre>Internet_A(port1)</pre>

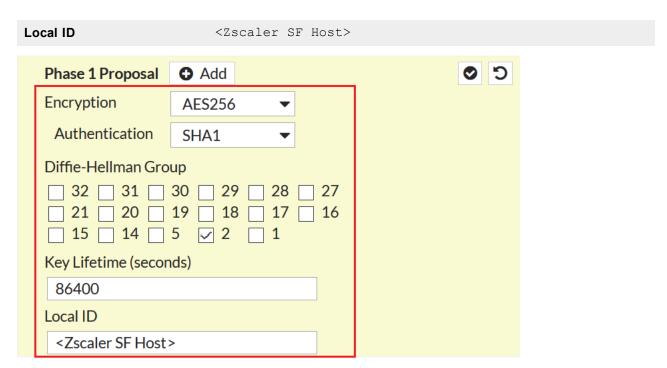


5. Configure the *Authentication* settings with the *Method* to be *Pre-shared Key* and entering the pre-shared key (PSK). The PSK should be unique per site, and the *IKE Version* should be selected to be 2.

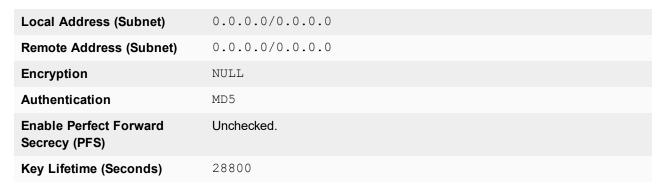


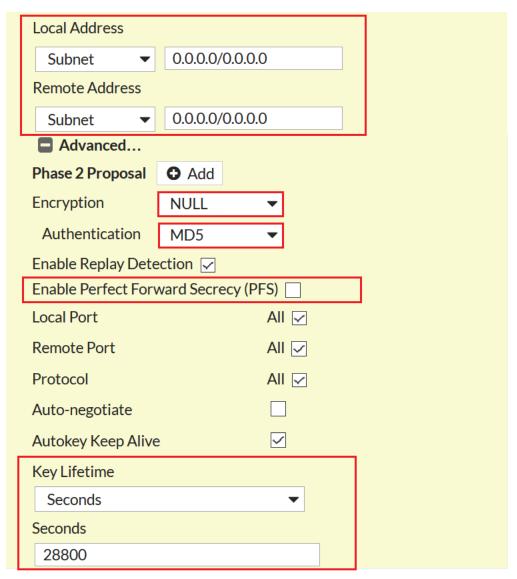
6. Configure the *Phase 1 Proposal* settings as indicated in the table below. The *Local ID* field should be set to the FQDN you configured in the previous steps.

Encryption	AES256
Authentication	SHA1
Diffie-Hellman Group	2
Key Lifetime (seconds)	86400



7. Configure the *Phase 2 Selectors* settings as indicated in table below. Leave all other settings to their default values.

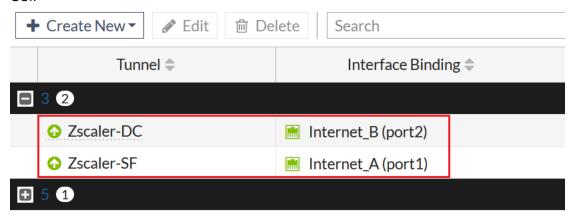




8. Click OK.

Similarly, configure another IPsec tunnel <code>Zscaler-DC</code> over the <code>Internet_B</code> (port2) interface.

Verify your IPsec tunnels by navigating to *VPN > IPsec tunnels* from the tree menu on the left side of the FortiGate GUI.





You may configure GRE tunnels, though Fortinet recommends configuring IPsec tunnels.

To configure a GRE tunnel from the CLI:

1. Create a GRE tunnel and add it as an interface:

```
config system gre-tunnel
  edit "Zscaler-SF"
    set interface "port1"
    set remote-gw <Zscaler SF Host>
    set local-gw <Internet_A>
    next
end
```

2. Configure the GRE tunnel interfaces:

```
config system interface
  edit "Zscaler-SF"
    set ip <ip address in a /30 subnet provided by Zscaler> 255.255.255
    set allowaccess ping
    set type tunnel
    set interface "port1"
    next
end
```

Similarly, configure another GRE tunnel Zscaler-DC over the Internet B (port2) interface.

Configuring SD-WAN zones

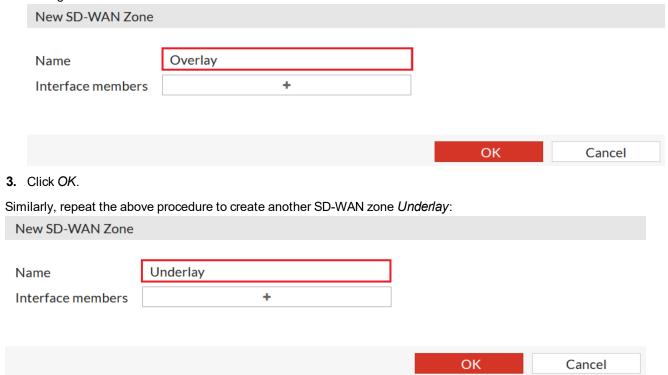
To configure SD-WAN zones, you need to configure the primary and secondary Zscaler ZENs as SD-WAN interface members in an SD-WAN zone.

In this example, the SF ZEN is closer, so we will choose the Lowest Cost (SLA) SD-WAN algorithm to prefer the SF ZEN over the DC ZEN, and configure the Zscaler-SF interface with a lower cost.

We will configure two SD-WAN zones named *Overlay* and *Underlay*, and then configure SD-WAN interface members for those zones.

To configure the Overlay SD-WAN zone:

- 1. Go to Network > SD-WAN Zones, and click Create New > SD-WAN Zone. The New SD-WAN Zone screen displays.
- 2. Configure the *Name* field and leave the *Interface members* field blank.

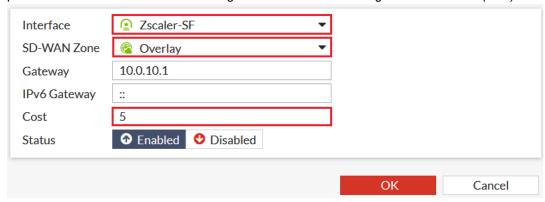


After you create the SD-WAN zones, you need to configure the primary and secondary ZENs as SD-WAN interface members in the *Overlay* SD-WAN zone, and the *Internet_A* and *Internet_B* interfaces in the *Underlay* SD-WAN zone.

To configure the primary ZEN as an SD-WAN interface member in the Overlay SD-WAN zone:

- 1. Go to Network > SD-WAN Zones, and click Create New > SD-WAN Member. The New SD-WAN Member screen displays.
- 2. Configure the *Interface* to be *Zscaler-SF* from the drop-down list.
- 3. Configure the SD-WAN Zone to be Overlay from the drop-down list.

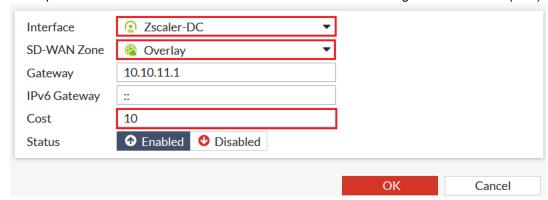
4. Configure the *Cost* to be 5. A lower *Cost* value indicates that this member is the primary interface member, and is preferred more than a member with a higher *Cost* value when using the *Lowest Cost* (*SLA*) strategy.



5. Click OK.

To configure the secondary ZEN as an SD-WAN interface member in the *Overlay* SD-WAN zone:

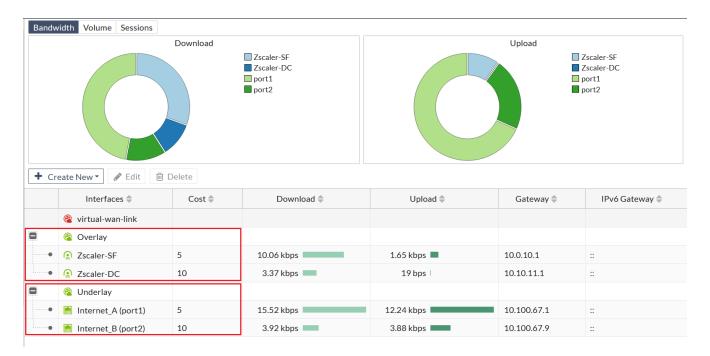
- 1. Go to Network > SD-WAN Zones, and click Create New > SD-WAN Member. The New SD-WAN Member screen displays.
- 2. Configure the *Interface* to be *Zscaler-DC* from the drop-down list.
- 3. Configure the SD-WAN Zone to be Overlay from the drop-down list.
- **4.** Configure the *Cost* to be 10. A higher *Cost* value indicates that this member is the secondary interface member, and is preferred less than a member with a lower *Cost* value when using the *Lowest Cost (SLA)* strategy.



5. Click OK.

Similarly, repeat the above procedure to configure the *Internet_A* and *Internet_B* interfaces in the *Underlay* SD-WAN zone.

After both the *Overlay* and *Underlay* SD-WAN zones are configured, with SD-WAN interface members configured as required in each of the SD-WAN zones, verify the configurations on the *Network* > *SD-WAN Zones* screen.



After configuring SD-WAN zones, we need to configure a static route that points to the SD-WAN interface.

To configure the static route:

- 1. Go to Network > Static Routes, and click Create New > IPv4 Static Route. The New Static Route screen displays.
- 2. Select Subnet for the Destination setting and enter 0.0.0.0.0.0.0 in the associated text input field.
- 3. Select SD-WAN as the Interface from the drop-down list.
- 4. Click OK.



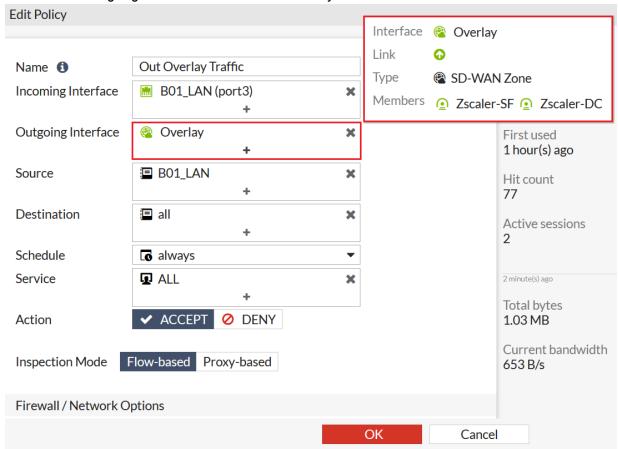
Configuring firewall policies

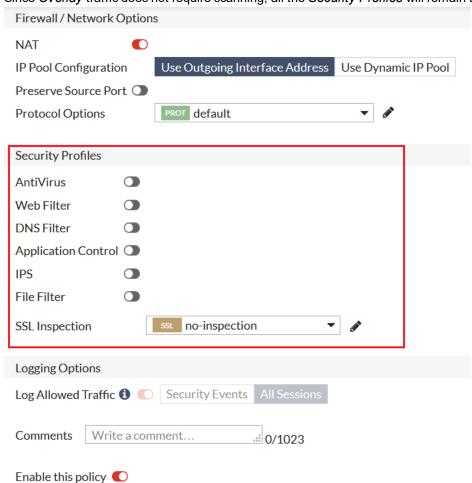
Configure firewall policies for both the Overlay and Underlay traffic as indicated below.

In this example, the *Overlay* traffic does not require scanning, and the *Underlay* traffic requires scanning. The firewall policies are configured accordingly.

To configure a firewall policy for the Overlay traffic:

- 1. Go to Policy & Objects > Firewall Policy, and click Create New . The New Policy screen displays.
- 2. Configure the fields as follows:
 - a. Enter a name in the Name field, like Out Overlay Traffic in this case.
 - **b.** Select the appropriate interface from the *Incoming Interface* field. In this case, it is port3.
 - c. Make sure the Outgoing Interface field is set to the Overlay SD-WAN zone.



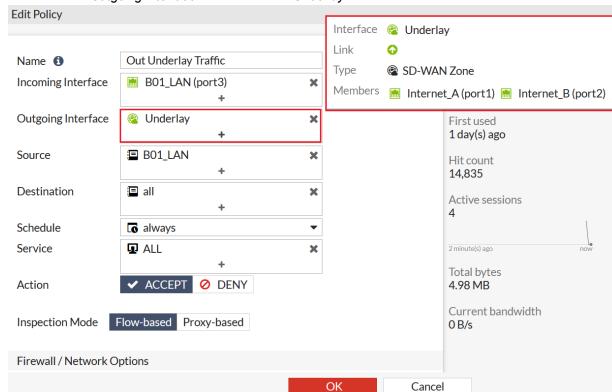


d. Since Overlay traffic does not require scanning, all the Security Profiles will remain turned off.

3. Click OK.

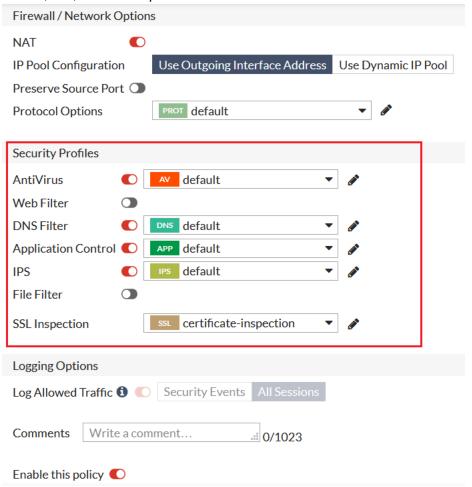
To configure a firewall policy for the *Underlay* traffic:

- 1. Go to Policy & Objects > Firewall Policy, and click Create New . The New Policy screen displays.
- 2. Configure the fields as follows:
 - a. Enter a name in the Name field, like Out Underlay Traffic in this case.
 - **b.** Select the appropriate interface from the *Incoming Interface* field. In this case, it is port3.



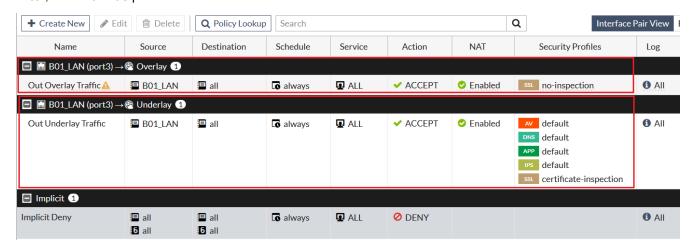
c. Make sure the Outgoing Interface field is set to the Underlay SD-WAN zone.

d. Since *Underlay* traffic requires to be scanned, set the *Security Profiles* of *AntiVirus*, *DNS Filter*, *Application Control*, *IPS*, and *SSL Inspection* as turned on to scan the traffic.



3. Click OK.

Once created, verify the firewall policies by navigating to *Policy & Objects > Firewall Policy*. The *Security Profiles* column indicates that the *Out Overlay Traffic* firewall policy for the *Overlay* traffic is set up to not scan any traffic, while the *Out Underlay Traffic* firewall policy is set to scan all traffic as *SSL Inspection*, *IPS*, *Application Control*, *DNS Filter*, and *AntiVirus* profiles are all active.

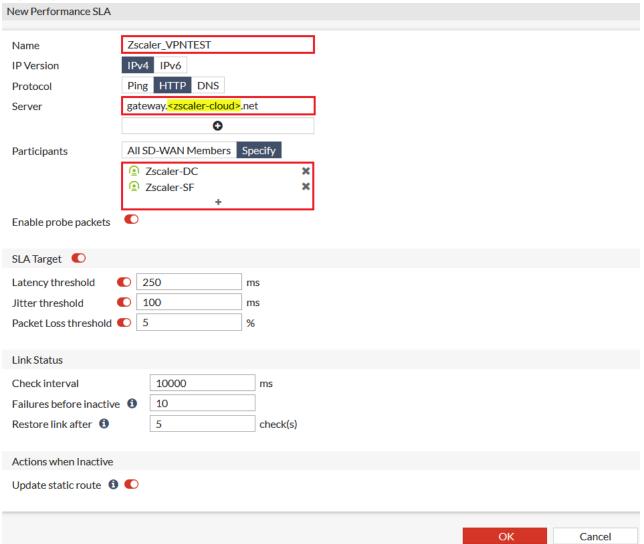


Configuring Performance SLA test

Configure a performance SLA test that will be tied to the SD-WAN interface members for the Zscaler ZENs.

To configure a Performance SLA test:

- 1. Go to Network > Performance SLA, and click Create New . The New Persormance SLA screen displays.
- 2. Enter a name for the Name field like <code>Zscaler VPNTEST</code> in this case.
- 3. Select IPv4 from the IP Version field.
- **4.** Select the *Protocol* to be *HTTP*.
- **5.** The Server field is set to the URL http://gateway.<zscaler-cloud>.net/vpntest test page, where <zscaler-cloud> is to be replaced with your Zscaler cloud name.
- **6.** Select *Specify* for the *Participants* fields and add <code>Zscaler-DC</code> and <code>Zscaler-SF</code> SD-WAN interface members as participants.



7. Click *OK*.



When configuring the Performance SLA test using the GUI, you cannot configure the HTTP GET request. The *Server* field only accepts a valid FQDN. Use the CLI to configure the HTTP GET request.

To configure a Performance SLA test using the CLI:

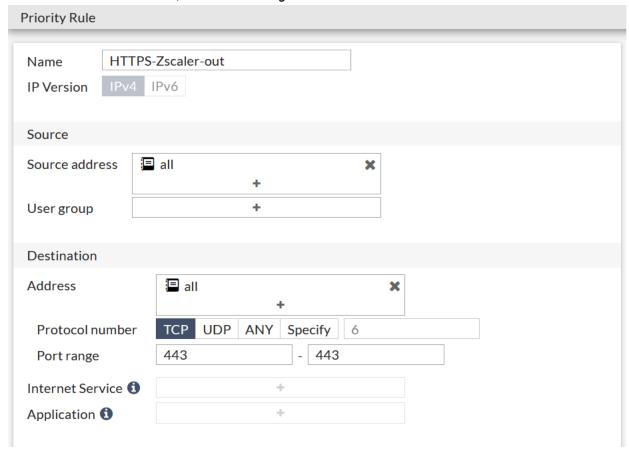
```
config system virtual-wan-link
  config health-check
     edit "Zscaler_VPNTEST"
        set server "gateway. <zscaler-cloud>.net"
        set protocol http
        set http-get "/vpntest"
        set interval 10000
        set failtime 10
        set members 2 3
        config sla
           edit 1
              set latency-threshold 250
              set jitter-threshold 100
              set packetloss-threshold 5
           next
        end
     next
  end
end
```

Configuring SD-WAN rules

Configure SD-WAN rules that will tie the Performance SLA probe (<code>Zscaler_VPNTEST</code>) to each of the SD-WAN members with the *Lowest Cost (SLA)* strategy selected to determine which ZEN will be the active-primary and which one will be the standby-secondary.

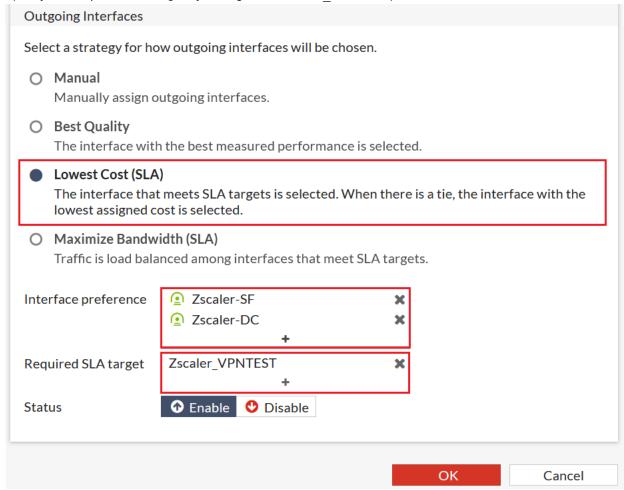
To configure an SD-WAN rule:

- 1. Go to Network > SD-WAN Rules, and click Create New . The Priority Rule screen displays.
- 2. Enter a name in the *Name* field, like HTTPS-Zscaler-out in this case.
- 3. Select the IP Version to be IPv4.
- 4. Select the Source and Destination addresses to be all.
- **5.** Select the *Protocol* to be *TCP*, and the *Port Range* to be 443–443.



- **6.** Select the *Lowest Cost (SLA)* strategy for the outgoing interfaces. It determines which ZEN will be the active-primary and which one will be the standby-secondary.
- **7.** Specify the preference for the outgoing interfaces in the *Interface preference* field by adding <code>Zscaler-SF</code> and <code>Zscaler-DC</code> in the preferred order.

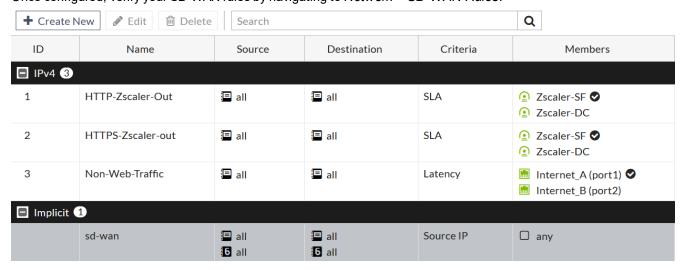
8. Specify the Required SLA target by adding the Zscaler VPNTEST performance SLA test we created earlier.



9. Click OK.

Configure similar SD-WAN rules for HTTP, and non-web traffic. In our example, the non-web traffic is steered to the underlays using the *Best Quality* strategy.

Once configured, verify your SD-WAN rules by navigating to Network > SD-WAN Rules:



Verifying configuration with Zscaler test page

To verify your configuration with Zscaler, request a verification page via the URL https://ip.zscaler.com.

If you are routing traffic via a Zscaler proxy service, the URL https://ip.zscaler.com will respond with a message confirming it.

You are accessing this host via a Zscaler proxy hosted at Los Angeles in the zscalertwo.net cloud.

Your request is arriving at this server from the IP address 104.129.198.69

The Zscaler proxy virtual IP is 104.129.198.34.

The Zscaler hostname for this proxy appears to be zs2-qla1a1.

If not, it will respond with an appropriate message.

The request received from you did not have an XFF header, so you are quite likely not going through the Zscaler proxy service.

Your request is arriving at this server from the IP address 209.37.255.2

Your Gateway IP Address is most likely 209.37.255.2

Results

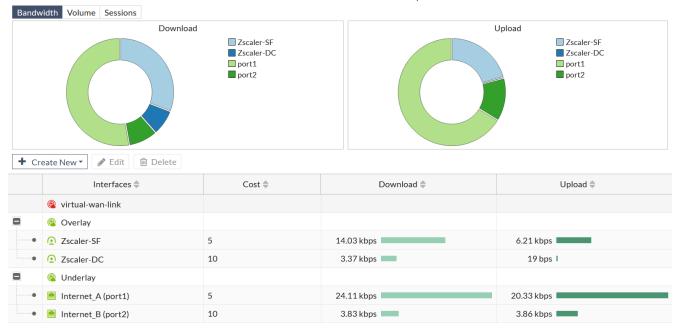
The following GUI pages show the function of the Fortinet secure SD-WAN deployed with Zscaler Internet Access (ZIA) and can be used to confirm that it is setup and running correctly:

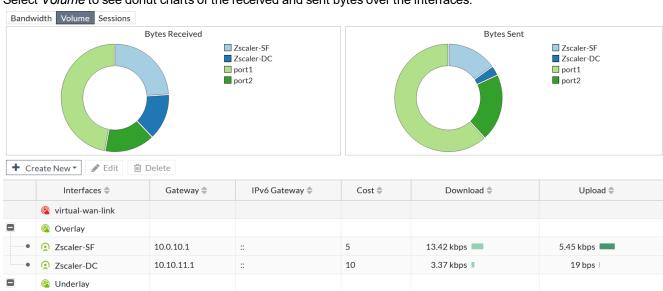
- Interface usage on page 24
- IPsec status on page 25
- Performance SLA on page 26
- Routing table on page 28
- Firewall policy on page 28
- Top sources on page 29

Interface usage

Go to Network > SD-WAN Zones to review the SD-WAN interface usage.

Select Bandwidth to see donut charts of the amount of downloaded and uploaded data for each interface.





5

10

70.51 kbps

3.95 kbps ■

22.66 kbps

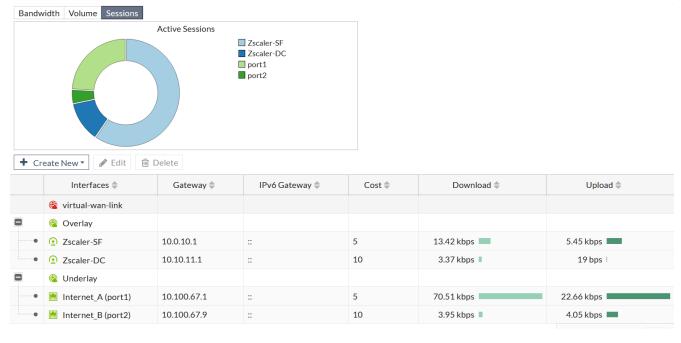
4.05 kbps

Select *Volume* to see donut charts of the received and sent bytes over the interfaces.

Select Sessions to see a donut chart of the number of active sessions on each interface.

10.100.67.1

10.100.67.9

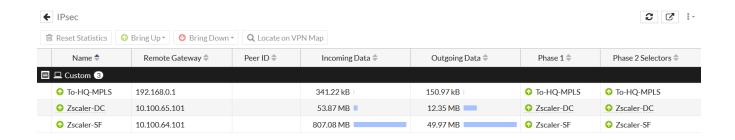


IPsec status

Internet_A (port1)

Internet_B (port2)

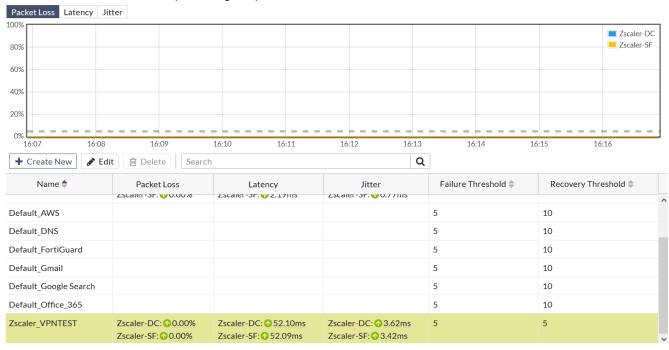
Go to *Dashboard* > *Network* and expand the *IPsec* widget to review all IPsec tunnels.



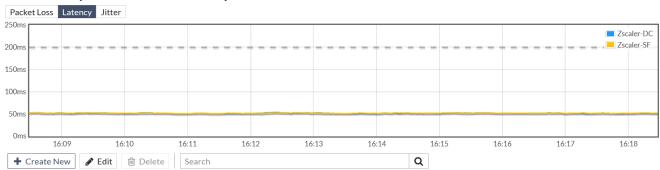
Performance SLA

Go to Network > Performance SLA and select the SLA from the table (Iscaler_VPNTEST in this example) to view the packet loss, latency, and jitter on each SD-WAN member in the health check server.

Select Packet Loss to see the percentage of packets lost for each member.

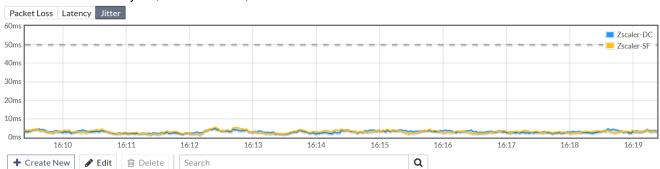


Select *Latency* to see the current latency, in milliseconds, for each member.



Name 🔷	Packet Loss	Latency	Jitter	Failure Threshold \$	Recovery Threshold \$	
	ZSCalet -3F. W 0.00%	ZSCalet - SF. W Z. 171115	ZSCalet-SF. WO.771115			^
Default_AWS				5	10	
Default_DNS				5	10	
Default_FortiGuard				5	10	
Default_Gmail				5	10	
Default_Google Search				5	10	
Default_Office_365				5	10	
Zscaler_VPNTEST	Zscaler-DC: ○ 0.00% Zscaler-SF: ○ 0.00%	Zscaler-DC: 652.10ms Zscaler-SF: 652.09ms	Zscaler-DC: • 3.62ms Zscaler-SF: • 3.42ms	5	5	~

Select *Jitter* to see the jitter, in milliseconds, for each member.



Name 🔷	Packet Loss	Latency	Jitter	Failure Threshold \$	Recovery Threshold 🔷	
	ZSCalet-3F. W 0.00%	ZSCalet-SF. W Z. 171115	ZSCalet-SF. WO.771115			^
Default_AWS				5	10	
Default_DNS				5	10	
Default_FortiGuard				5	10	
Default_Gmail				5	10	
Default_Google Search				5	10	
Default_Office_365				5	10	
Zscaler_VPNTEST	Zscaler-DC: 00.00% Zscaler-SF: 00.00%	Zscaler-DC: 652.10ms Zscaler-SF: 652.09ms	Zscaler-DC: 3.62ms Zscaler-SF: 3.42ms	5	5	Ų

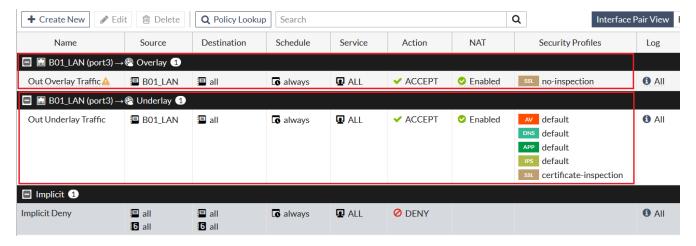
Routing table

Go to *Dashboard > Network* and expand the *Static & Dynamic Routing* widget to review all static and dynamic routes. For more information about the widget, see Static & Dynamic Routing Monitor.



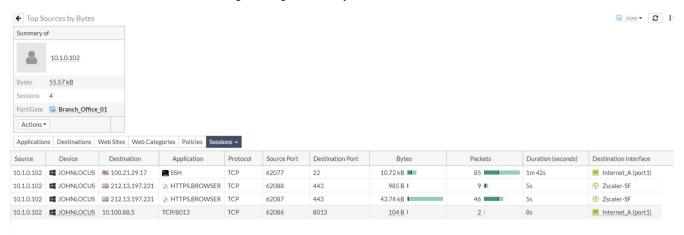
Firewall policy

Go to Policy & Objects > Firewall Policy to review the SD-WAN policy.



Top sources

Go to *Dashboard > Top Sources* to confirm that web traffic (ports 443 and 80) flows through the right overlay interface member, and non-web traffic flows through the right underlay interface member.







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