



# Virtual Tunnel Interface

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This chapter describes how to configure a VTI tunnel.

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## About Virtual Tunnel Interfaces

The ASA supports a logical interface called Virtual Tunnel Interface (VTI). As an alternative to policy based VPN, a VPN tunnel can be created between peers with Virtual Tunnel Interfaces configured. This supports route based VPN with IPsec profiles attached to the end of each tunnel. This allows dynamic or static routes to be used. Egressing traffic from the VTI is encrypted and sent to the peer, and the associated SA decrypts the ingress traffic to the VTI.

Using VTI does away with the requirement of configuring static crypto map access lists and mapping them to interfaces. You no longer have to track all remote subnets and include them in the crypto map access list. Deployments become easier, and having static VTI which supports route based VPN with dynamic routing protocol also satisfies many requirements of a virtual private cloud.

## Guidelines for Virtual Tunnel Interfaces

### General Configuration Guidelines

- VTIs are only configurable in IPsec mode. To terminate GRE tunnels on an ASA is unsupported.
- You can use dynamic or static routes for traffic using the tunnel interface.
- The MTU for VTIs is automatically set, according to the underlying physical interface. However, if you change the physical interface MTU after the VTI is enabled, you must disable and reenable the VTI to use the new MTU setting.
- If Network Address Translation has to be applied, the IKE and ESP packets will be encapsulated in the UDP header.
- IKE and IPsec security associations will be re-keyed continuously regardless of data traffic in the tunnel. This ensures that VTI tunnels are always up.

- Tunnel group name must match what the peer will send as its IKEv1 or IKEv2 identity.
- For IKEv1 in LAN-to-LAN tunnel groups, you can use names which are not IP addresses, if the tunnel authentication method is digital certificates and/or the peer is configured to use aggressive mode.
- VTI and crypto map configurations can co-exist on the same physical interface, provided the peer address configured in the crypto map and the tunnel destination for the VTI are different.
- By default, all traffic through VTI is encrypted.
- By default, the security level for VTI interfaces is 0.
- Access list can be applied on a VTI interface to control traffic through VTI.
- Only BGP is supported over VTI.
- If ASA is terminating IOS IKEv2 VTI clients, disable the config-exchange request on IOS, because ASA cannot retrieve the mode-CFG attributes for this L2L session initiated by an IOS VTI client.

### IPv6 Support

IPv6 is not supported.

### Context Mode

Supported in single mode only.

### Firewall Mode

Supported in routed mode only.

## Create a VTI Tunnel

To configure a VTI tunnel, create an IPsec proposal (transform set). You will need to create an IPsec profile that references the IPsec proposal, followed by a VTI interface with the IPsec profile. Configure the remote peer with identical IPsec proposal and IPsec profile parameters. SA negotiation will start when all tunnel parameters are configured.



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**Note** For the ASA which is a part of both the VPN VTI domains, and has BGP adjacency on the physical interface: When a state change is triggered due to the interface health check, the routes in the physical interface will be deleted until BGP adjacency is re-established with the new active peer. This behavior does not apply to logical VTI interfaces.

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Access control lists can be applied on a VTI interface to control traffic through VTI. To permit any packets that come from an IPsec tunnel without checking ACLs for the source and destination interfaces, enter the `sysopt connection permit-vpn` command in global configuration mode.

You can use the following command to enable IPsec traffic through the ASA without checking ACLs:

```
hostname(config)# sysopt connection permit-vpn
```

When an outside interface and VTI interface have the security level of 0, if you have ACL applied on VTI interface, it will not be hit if you do not have same-security-traffic configured.

To configure this feature, use the **same-security-traffic** command in global configuration mode with its **intra-interface** argument.

For more information, see [Permitting Intra-Interface Traffic \(Hairpinning\)](#).

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- Step 1** Add an IPsec Proposal (Transform Sets).
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  - Step 3** Add a VTI Tunnel.
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## Add an IPsec Proposal (Transform Sets)

A transform set is required to secure traffic in a VTI tunnel. Used as a part of the IPsec profile, it is a set of security protocols and algorithms that protects the traffic in the VPN.

### Before you begin

- You can use either pre-shared key or certificates for authenticating the IKE session associated with a VTI. IKEv2 allows asymmetric authentication methods and keys. For both IKEv1 and IKEv2, you must configure the pre-shared key under the tunnel group used for the VTI.
- For certificate based authentication using IKEv1, you must specify the trustpoint to be used at the initiator. For the responder, you must configure the trustpoint in the tunnel-group command. For IKEv2, you must configure the trustpoint to be used for authentication under the tunnel group command for both initiator and responder.

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Add an IKEv1 transform set, or an IKEv2 IPsec proposal to establish the security association.

Add an IKEv1 transform set:

**crypto ipsec ikev1 transform-set** {*transform-set-name* | *encryption* | *authentication*}

#### Example:

```
ciscoasa(config)#crypto ipsec ikev1 transform-set SET1 esp-aes esp-sha-hmac
```

*Encryption* specifies which encryption method protects IPsec data flows:

- esp-aes—Uses AES with a 128-bit key.
- esp-aes-192—Uses AES with a 192-bit key.
- esp-aes-256—Uses AES with a 256-bit key.
- esp-null—No encryption.

*Authentication* specifies which encryption method to protect IPsec data flows:

- `esp-md5-hmac`—Uses the MD5/HMAC-128 as the hash algorithm.
- `esp-sha-hmac`—Uses the SHA/HMAC-160 as the hash algorithm.
- `esp-none`—No HMAC authentication.

Add an IKEv2 IPsec proposal.

**Note** For the IOS platform, use the **no config-exchange request** command in the IKEv2 profile configuration mode to disable configuration exchange options. See <http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/security/a1/sec-a1-cr-book/sec-cr-c2.html#wp3456426280> for more information.

- Specify a name for the IPsec proposal:

```
crypto ipsec ikev2 ipsec-proposal IPsec proposal name
```

**Example:**

```
ciscoasa(config)#crypto ipsec ikev2 ipsec-proposal SET1
```

- Specify the security parameters in the crypto IPsec ikev2 ipsec-proposal configuration mode:

```
protocol esp {encryption {aes | aes-192 | aes-256 | aes-gcm | aes-gcm-192 | aes-gcm-256 | null} | integrity {sha-1 | sha-256 | sha-384 | sha-512 | null}}
```

**Example:**

```
ciscoasa(config-ipsec-proposal)#protocol esp encryption aes aes-192
```

## Add an IPsec Profile

An IPsec profile contains the required security protocols and algorithms in the IPsec proposal or transform set that it references. This ensures a secure, logical communication path between two site-to-site VTI VPN peers.

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**Step 1** Set a name for the profile:

```
crypto ipsec profile name
```

**Example:**

```
ciscoasa(config)#crypto ipsec profile PROFILE1
```

**Step 2** Set the IKEv1 or IKEv2 proposal. You can choose either an IKEv1 transform set or an IKEv2 IPsec proposal.

a) Set the IKEv1 transform set.

- To set the IKEv1 proposal, enter the following command in the crypto ipsec profile command sub-mode:

```
set ikev1 transform set set_name
```

In this example, SET1 is the IKEv1 proposal set created previously.

```
ciscoasa(config-ipsec-profile)#set ikev1 transform-set SET1
```

b) Set the IKEv2 proposal.

- To set the IKEv2 proposal, enter the following command in the crypto ipsec profile command sub-mode:

```
set ikev2 ipsec-proposal IPsec_proposal_name
```

In this example, SET1 is the IKEv2 IPsec proposal created previously.

```
ciscoasa(config-ipsec-profile)#set ikev2 ipsec-proposal SET1
```

**Step 3** (Optional) Specify the duration of the security association:

```
set security-association lifetime {seconds number | kilobytes {number | unlimited}}
```

**Example:**

```
ciscoasa(config-ipsec-profile)#set security-association lifetime
seconds 120 kilobytes 10000
```

**Step 4** (Optional) Configure the end of the VTI tunnel to act only as a responder:

**responder-only**

- You can configure one end of the VTI tunnel to perform only as a responder. The responder-only end will not initiate the tunnel or rekeying.
- If you are using IKEv2, set the duration of the security association lifetime, greater than the lifetime value in the IPsec profile in the initiator end. This is to facilitate successful rekeying by the initiator end and ensure that the tunnels remain up.
- If you are using IKEv1, IOS should always be in responder-only mode since IOS doesn't support continuous channel mode. The ASA becomes the initiator and session and rekeys.
- If the rekey configuration in the initiator end is unknown, remove the responder-only mode to make the SA establishment bi-directional, or configure an infinite IPsec lifetime value in the responder-only end to prevent expiry.

**Step 5** (Optional) Specify the PFS group. Perfect Forward Secrecy (PFS) generates a unique session key for each encrypted exchange. This unique session key protects the exchange from subsequent decryption. To configure PFS, you have to select the Diffie-Hellman key derivation algorithm to use when generating the PFS session key. The key derivation algorithms generate IPsec security association (SA) keys. Each group has a different size modulus. A larger modulus provides higher security, but requires more processing time. You must have matching Diffie-Hellman groups on both peers.

```
set pfs { group14 }
```

**Example:**

```
ciscoasa(config-ipsec-profile)# set pfs group14
```

**Step 6** (Optional) Specify a trustpoint that defines the certificate to be used while initiating a VTI tunnel connection.

```
set trustpoint name
```

**Example:**

```
ciscoasa(config-ipsec-profile)#set trustpoint TPVTI
```

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## Add a VTI Interface

To create a new VTI interface and establish a VTI tunnel, perform the following steps:



**Note** Implement IP SLA to ensure that the tunnel remains up when a router in the active tunnel is unavailable. See Configure Static Route Tracking in the ASA General Operations Configuration Guide in <http://www.cisco.com/go/asa-config>.

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### Procedure

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**Step 1** Create a new tunnel interface:

```
interface tunnel tunnel_interface_number
```

**Example:**

```
ciscoasa(config)#interface tunnel 100
```

Specify a tunnel ID, from a range of 0 to 100. Up to 100 VTI interfaces are supported.

**Note** If you will be migrating configurations from other devices to ASA 5506 devices, use the tunnel ID range of 1 - 100. This is to ensure compatibility of the tunnel range of 1 - 100 available in ASA 5506 devices.

**Step 2** Enter the name of the VTI interface.

Enter the following command in the **interface tunnel** command submode:

```
nameif interface name
```

**Example:**

```
ciscoasa(config-if)#nameif vti
```

**Step 3** Enter the IP address of the VTI interface.

```
ip address IP addressmask
```

**Example:**

```
ciscoasa(config-if)#ip address 192.168.1.10 255.255.255.254
```

**Step 4** Specify the tunnel source interface.

```
tunnel source interface interface name
```

**Example:**

```
ciscoasa(config-if)#tunnel source interface outside
```

**Step 5** Specify the tunnel destination IP address.

```
tunnel destination IP address
```

**Example:**

```
ciscoasa(config-if)#tunnel destination 10.1.1.1
```

**Step 6** Configure the tunnel with tunnel mode IPsec IPv4.

```
tunnel mode ipsec ipv4
```

**Example:**

```
ciscoasa(config-if)#tunnel mode ipsec ipv4
```

**Step 7** Assign the IPsec profile to tunnel.

```
tunnel protection ipsec IPsec profile
```

**Example:**

```
ciscoasa(config-if)#tunnel protection ipsec Profile1
```

This new VTI can be used to create an IPsec site-to-site VPN.

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