

Device Registration Using Device Templates

You can add devices to the Firewall Management Center using device templates.

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Device registration using device templates

Device templates enable deployment of multiple branch devices with pre-provisioned initial device configurations. You can use device templates to perform bulk zero-touch provisioning of multiple devices, apply day 2 configuration changes to multiple devices with different interface configurations, and clone configuration parameters from existing devices. You can also register more than one device at a time with the Firewall Management Center using serial numbers.

Configuration capabilities

Device templates let you pre-configure settings and apply them at the time of registration. When you register a device using basic initial configuration, you can apply limited configurations such as the access control policy and licenses. You must then configure other device settings such as interfaces, routing, and site-to-site VPN configurations individually after device registration. Values that need to be unique per device, such as IP addresses, can be defined using variables and network object overrides that you define at registration.

You can also configure site-to-site VPN connections in a device template. These configurations define the site-to-site VPN topologies that a device should be a part of. The VPN configurations along with the other device template policies and configurations enable easy deployment of the branch device to your network. Device templates support the configuration of a device only as a spoke. A device can be part of multiple hub and spoke site-to-site VPN topologies.

After the configured device template is applied to a device, the variables are resolved, the protected network overrides are configured, and the device is added as a spoke in the specified VPN topology.

Methods to register devices using templates

Use any of these methods to register your device on Firewall Management Center and set up day 0 configuration through device templates.

- Registration Key - You can register a single device by specifying the registration key and defining variables in the Firewall Management Center, and
- Serial Number - You can use zero-touch provisioning to register one or more devices by serial number. For serial number registration, define all variables and overrides in a CSV file that you upload.

Variables and network object overrides

You can parameterize template configurations using variables and network object overrides.

Variables

A variable is an object type that is supported for template configurations. A variable in a template defines specific configuration values for a device. You can define values for these variables during device registration and during application of the template on the device. You can see the variable icon (x) for the fields that use a variable. The variables are displayed with a $ prefix to distinguish these values from the other values.

For information on supported variable types and creating variables, see Supported Variables and Add a Variable.

Network object overrides

Network object overrides are similar to variables. But, these are used to provide override values for a network object. You can declare a list of network objects in the template and create network object overrides for these objects. You can then provide values for these network object overrides during the application of the template on the device. For example, if you define a host network object in a template, you can add a network object override before the application of the template on the device and then provide a relevant value during the application of the template on the device.

For more information on supported network objects and adding a network object override, see Supported Network Object Overrides and Add a Network Object Override.

Model mapping

Model mapping lets you map template-defined interfaces to the interfaces of the Firewall Threat Defense model you require.

Model mapping requirements

Create model mappings in the template before applying the template to the device. During template application, the variables in the interface configurations are replaced with the values that you provide, then the resulting configurations are copied to the mapped interfaces on the device.

Interface configurations differ for each device model, so you must copy interface configurations from the template to the device's target interfaces.

During template application, the variables in the interface configurations are replaced with the values that you provide, then the resulting configurations are copied to the mapped interfaces on the device.

For more information on setting up model mapping, see Add Model Mapping.

Templates and high availability

You can apply device templates on Firewall Threat Defense high availability devices after device registration. High availability-specific configurations are not supported in device templates. Any high availability configurations and monitored interfaces that are already part of the target high availability device pair configurations are not modified. You cannot map any template interfaces to failover interfaces.

You can generate a device template from a high-availability device pair. Template operations such as application of the template on a device, template generation, importing, and exporting of a template, can be performed only on the active unit. You cannot perform these operations on the standby unit.

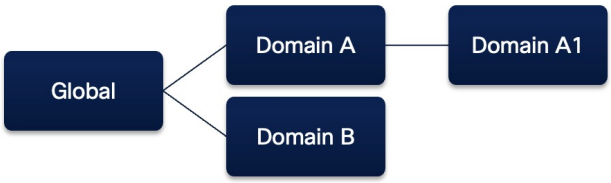
Templates and domains

Device templates can exist in any domain. If you are in the child domain, you have read-only access to the templates in the higher-level domains in the domain hierarchy. You can apply a template to a device from its domain or its parent domains. You can generate a template from a device and apply that template to a device in any domain in the domain hierarchy.

Template and domain hierarchy scenarios

A domain hierarchy sample is given below along with a table displaying the supported device template application and generation scenarios.

Consider this scenario:



- Domain A and B are child domains of the Global domain.
- Domain A1 is the child domain of Domain A.

Template Domain	Device Domain	Device Template Application/Generation Supported
Global	A1	Yes
Global	B	Yes
A	A1	Yes
A	B	No
B	A1	No
B	B	Yes

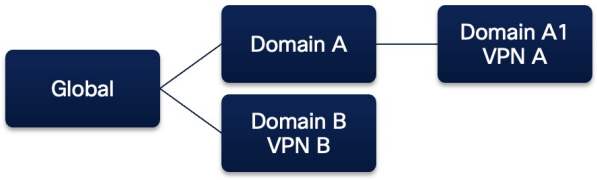
Template Domain	Device Domain	Device Template Application/Generation Supported
A1	A1	Yes
A1	B	No

Domains and VPN Connections

- You can define a template in a global or child/leaf domain. However, you can define a VPN topology only in a leaf domain.
- You can configure VPN connections in a template for all domains. During template application, VPN connections are applied to the device only if the device is in the same domain as the VPN topology.

A domain hierarchy sample is given below along with a table displaying the supported device template application and generation scenarios.

Consider this scenario:



- Domain A and B are child domains of the Global domain.
- Domain A1 is the child domain of Domain A.
- VPN A is part of Domain A1.
- VPN B is part of Domain B.

Template Domain	VPN Topology in the Template	Device Domain	Device Template Application/Generation Supported
Global	VPN A VPN B	A1	No
Global	VPN B	B	Yes
A	VPN A	A1	Yes
B	VPN B	A1	No
B	VPN B	B	Yes
A1	VPN A	A1	Yes

Validating template configurations before and after application on devices

Summary

The key components involved in the template configuration validation process are:

- System validator: Performs automated checks to ensure device compatibility and configuration integrity
- Target device: The network device receiving the template configuration
- Template configuration: The configuration settings being applied to the device
- Rollback mechanism: System capability to restore original device state if validation fails

Workflow

These stages describe how template configuration validation works:

1. The system performs pre-application validation checks before deploying the template on the target device.
   - Ensure that the target device model and version are supported.
   - Cluster and container checks -The device must not be part of a cluster or multi-instance.
   - Model mapping validation - Model mapping for the target device model exists and is valid.
   - Sanity check of template parameter values. For example, two variables used as IP addresses of interfaces must not have the same value.
2. The system applies the template configuration to the target device after successful pre-application validation.
3. The system performs post-application validation checks to ensure the applied configurations are valid.
   - Interface configuration validation. For example, variables used for the IP address fields of two or more interfaces must not have the same IP address values.
   - Routing policy validation. For example, the IPv4 address in BGP neighbor configurations must not overlap with the IP address of any interface.

   If the validation checks that are done at the end of the task to apply the template on the device fail, any applied configurations are rolled back and the device is restored to it's original state.

Prerequisites for device registration using device templates

This reference provides the prerequisites for device registration using device templates, including supported models and VPN configuration requirements.

Model support

Device templates are supported on On-Prem Firewall Management Center, Cloud-Delivered Firewall Management Center(cdFMC), with these models running Secure Firewall version 7.4.1 and later versions:

- Firepower 1010
- Firepower 1100

- Secure Firewall 1200
- Secure Firewall 3100

Prerequisites for VPN connections in device templates

- Configure site-to-site VPN topologies that must be used in the device template.
- Ensure that you have configured all hub and VPN topology-related configurations such as authentication methods, IKE and IPsec policies.
- Supported types of VPN hub and spoke topologies are:
  - Policy-based
  - Route-based
  - SD-WAN
- Assign appropriate logical names and IP addresses to the interfaces of the Firewall Threat Defense devices. For example, use *inside* for the interface connected to the LAN, and *outside* for the interface connected to the internet or WAN.
- Spoke devices must be version 7.4.1 and later.

Licenses for device registration using device templates

This reference provides license requirements and conditions for device registration using device templates, including Smart Licensing account requirements and Secure Client license behavior during template application.

- Device templates do not have any specific license requirements.
- License entitlements for the target device must be present in the Smart Licensing account.
- To configure VPN connections in the template, the Essentials license must allow export-controlled functionality. Choose **System** (⚙) > **Licenses** > **Smart Licenses** to verify this functionality in the Firewall Management Center.
- When you apply a template on a device, note these conditions for Secure Client licensing:

Device with Secure Client License	Template with Secure Client License	Secure Client License after Device Template Application
Yes	Yes	Template License
Yes	No	Device License
No	Yes	Template License

Guidelines for device registration using device templates

General guidelines

Follow these general guidelines when using device templates for device registration and configuration management.

- All device configurations other than VNI and VTEP are supported.
- You can attach shared policies and S2S VPN policies to a template. These policies are assigned during template application.
- Templates can be applied on HA devices. However, application of device templates during HA device pair registration is not supported. You also cannot manage HA-related configurations such as failover links, standby IP addresses, and so on. For more information, see Device Template Operations on Threat Defense HA Devices.
- Device template operations are supported only on the active Firewall Management Center. The standby peer does not support device template operations.
- Ensure that the template names and device display names are not the same.
- Ensure that you do not create or delete a template during device backup or restore operations.
- After application of the template on the device, if the manager access is changed from management to data interface or vice-versa, you must re-establish the management connection with the device. Note that you cannot change the manager access interface during template application.
- You can add a maximum of 250 device templates to the Firewall Management Center.
- Templates that are created and configured for devices that are managed through the data interface cannot be used to register and apply to devices that are managed through the management interface.
- Device registration and application of template does not come under the Change Management workflow. Only approved data, such as access policies, templates, template variables, network overrides declared in template, and template configurations used in the template application operation are used.
- Device registration with serial number and access control policy is supported for only one device at a time.
- Devices with IPv6 DHCP discoverability are not supported when you add devices using serial numbers.
- When you apply a template to a device that is already registered, the configuration in the template is only copied to the target device. You can then choose to manually deploy the configuration on the device or let the copied configuration stay on the device and deploy later. However, if you apply the template during device onboarding, the configuration in the template is copied to the target device and, as per existing behavior, automatically deployed on the device after device registration.
- Any change in model mapping causes the device to be marked as 'Out of Sync'. Consider reapplying the template to the devices if you have made changes to the interface mapping in the corresponding model mapping or if you have made any configuration changes after the previous application of the template.
- Device templates are only supported on merged management and diagnostic interfaces. For more information, see Merge the Management and Diagnostic Interfaces.

- Template configuration updates are supported by change management. Creation and application of device templates is not supported by change management.
- You cannot sync configuration changes from a device to the template. A few sample scenarios during which you may want to make changes to the device configuration using a template along with recommended solutions are given below:
  - If you want to test the new configuration changes on one device before propagating the changes to multiple devices, we recommend that you make the changes in the template and apply the template to one device. Validate the changes on that device and then apply the template to the other devices.
  - If you want to make a large number of changes resulting in a signification deviation from the current configuration on a device, and then propagate those changes to other devices, you may choose one of these options:
    - Export the current template to get a copy of the template. You can then make the required changes in the template and apply to a single device. Validate the changes on that device and then apply the template to the other devices.
    - You can also make the required changes on the device and create a template from that device. You can then apply and validate the changes on the other devices. However, we do not recommend this as template parameters such as variables and network object overrides will not be present in the created template.
  - If the configuration on a particular device starts to differ significantly from the configuration in the template, you may also choose to not use the template for this device and delete the device-template association from the **Associated Devices** window.

Guidelines for VPN connections

Follow these guidelines when configuring VPN connections in device templates.

- Supported interfaces for VPN topologies are:

Topology Type	Interface Type

Policy-Based and SD-WAN	• Physical interfaces
	  • Non-management
	  • Interface Mode must be either Routed or None
	• Subinterfaces
	• Redundant interfaces
	• Etherchannel interfaces
	• VLAN interfaces

Route-Based	Static Virtual Tunnel Interfaces

- When you apply a template on a device that is part of a VPN topology, you must ensure that the template includes interface configurations for all interfaces used in the topology.

- When you apply a template with VPN connections to multiple devices, note that a template is applied to multiple devices in the order in which you have selected the devices. If the template has VPN connections, the corresponding VPN topology is locked.
- For SD-WAN topology VPN connections: Ensure that IP address subnet of the interface does not conflict with the subnet of the IP address pool of the SD-WAN hub.
- Domain:
  - You can define a template in a global or leaf domain. However, you can define a VPN topology only in a leaf domain.
  - You can configure VPN connections in a template for all domains. During template application, VPN connections are applied to the device only if the device is in the same domain as the VPN topology.

  For more information, see Templates and domains, on page 3.
- Change management: Before you apply a device template to a device, ensure that the VPN topology is not locked by a Change management ticket.

Unsupported configurations

The following features and configurations are not supported using device templates.

- Multi-instance mode
- Clustering
- Non-converged management interface
- Transparent mode
- HA failover configurations
- Chassis configurations
- Logical devices
- Variables for nested objects
- Override support for network groups and other object types

Limitations for VPN connections

Be aware of these limitations when working with VPN connections in device templates.

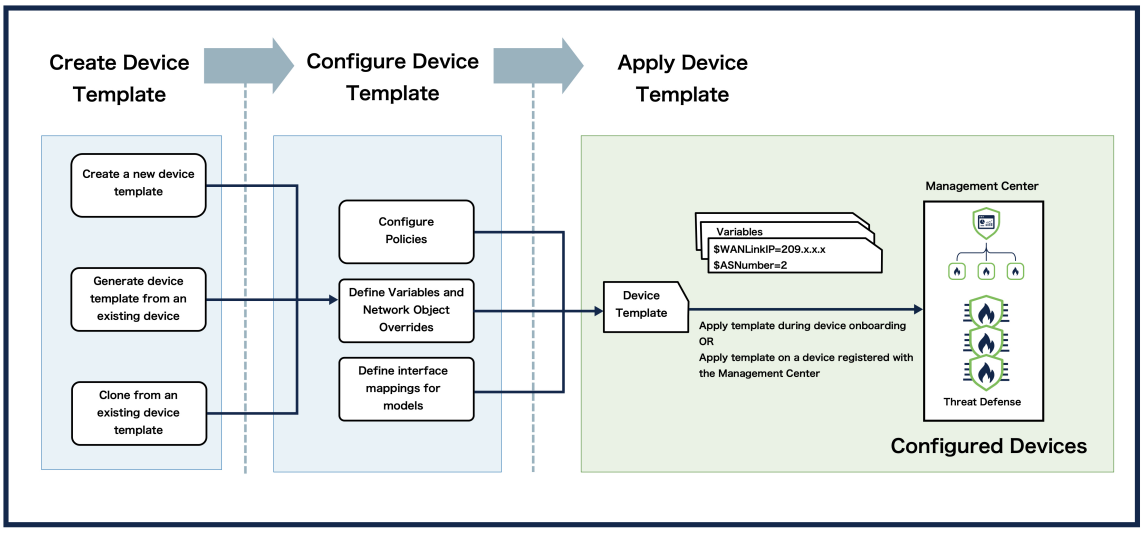
- When you create a template from a device that is part of a VPN topology (**Devices** > **Device Management** **More** (⋮) **> Generate Template from Device**), VPN configurations are not part of the template. You must reconfigure the VPN configurations on the template.
- When you export a device template with one or more VPN connections (**Template Settings > General** > **General** pane > **Export**), the VPN connections are not exported. You must reconfigure the VPN connections on the imported template.
- Certificate-based authentication:
  - Device templates do not support automatic certificate enrolment of a device.

- When you onboard a device using a template with VPN configurations, if the VPN topology uses certificate-based authentication, the first deployment to the device will fail. Ensure that you manually enroll the device certificate after the device registration and deploy the configurations on the device again.

Workflow for device management using device templates

This workflow diagram illustrates the process for managing devices using device templates, showing the sequential steps and decision points in the device management workflow.

Figure 1: Device management workflow using device templates



Configure device templates

Add a template and then configure settings in the template.

Add a device template

You can add a new device template with the required configuration or generate a device template from an existing device.

Create a new device template

Create a device template to establish standardized configurations that can be applied to multiple devices, ensuring consistent security policies and routing modes across your network.

You can specify the device template name, description, access control policy, and routing mode. You can add more configurations after the template has been created.

Follow these steps to create a device template:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click **Add Device Template**.

Step 3 In the **Add Device Template** window, enter a **Name** for the template.

Step 4 (Optional) Enter a **Description** for the template.

Step 5 Choose an **Access Control Policy** from the drop-down list.

Step 6 Choose a **Mode** from the drop-down list.

Step 7 Click **OK**.

Generate a new device template from an existing device

The new template has the same configuration as the device from which it is generated. You can generate a new device template from standalone and HA devices. However, if you generate a template from HA devices, the new template will not contain the failover configurations.

You can generate a new device template from a device that is registered with the Firewall Management Center.

Follow these steps to generate a new device template from an existing device:

Procedure

Step 1 Choose **Devices** > **Device Management**.

Step 2 Click the **More** (⋮) icon, and click **Generate Template from Device**.

In the new device management view, select the device, and then select **Generate template from device** in the **Device actions** pane.

Step 3 In the **Generate template from device** window, enter a **Name** for the template.

Step 4 (Optional) Enter a **Description** for the template.

Step 5 Choose an **Access Control Policy** from the drop-down list.

Note This policy is assigned to the generated template. Any other shared policies that are associated with the device from which the template is generated are assigned to the generated template only if these policies are visible in the domain in which the template is being generated.

Step 6 Click **OK**. To view the status of template creation, go to **Notifications**, and then click the **Tasks**tab.

Step 7 Choose **Devices** > **Template Management** to view the newly created template.

Import a device template

The device template import feature allows you to transfer templates between different Firewall Management Center systems or domains for replication, modification, and deployment purposes.

You can import a template into the Firewall Management Center or export a template to your local system. This feature is useful in the following scenarios:

- Generate a copy of the template from a device, export it, and import that template into another Firewall Management Center or Cloud-Delivered Firewall Management Center.
- Generate a copy of the template, export it, modify as required to create a variation of the existing template, and import the template into the Firewall Management Center.
- Generate a copy of the template, export it, and import that template into another domain in which the source template is not visible.

When you import a template into a domain, any objects that are part of the configuration are either newly created or reused if the objects with the same name are visible in the domain into which the template is imported. Any object with matching names that is not visible, due to domain hierarchy, is imported as a new object with the name suffixed with a _x.

If there is a mismatch in the variable names when you want to onboard devices in a domain using the cloned template from another domain, you must specify the new variable names in the .csv file to onboard the devices.

Follow these steps to import a device template into the Firewall Management Center from your local system:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **More** (⋮) icon for the template that you want to replace with an imported template.

Step 3 Click **Import** and click **Import** again.

If you want to export a template, click **Export** and click **OK**.

Step 4 To view the status of the import task, click **Notifications**, and then click the **Tasks** tab.

Step 5 Choose the template SFO file on your local system and click **Open**. This template SFO file that you import can be newly created, generated from a device, or cloned from an existing template.

Step 6 To view the status of the import task, click **Notifications**, and then click the **Tasks** tab. You will see a notification informing you that the import or export task is successfully completed. If you are exporting a template, click **Notifications** and click the **Tasks**tab. In the tab page, click **Download Export Package** to download the template configuration as an SFO file.

Note Alternatively, you can also go to the **Template Management** window and click the **Edit** (✎) icon of the template. Then, go to **Template Settings**, and click **General**. Click **Import** or **Export** in the **General** tile to import or export the template.

Configure device settings in the template

After creating the template, you can set up device configurations and adjust the settings by editing the template.

Add a physical interface

A physical interface allows you to expand network connectivity in a device template beyond the default interfaces provided.

By default, a device template will enable the device to come up with the following physical interfaces:

- Management interface
- Inside interface
- Outside interface

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** ( ) icon of the template in which you want to add the physical interface.

Step 3 In the **Interfaces** tab, click **Add Physical Interface**.

Step 4 Choose a **Slot** and **Port Index** number from the drop-down list.

Step 5 Click **Create Interface**.

Add a logical interface

Create a logical interface in a template to define network connectivity and traffic handling for your firewall deployment.

You can create a logical interface in the same way as you do on the Firewall Management Center without using the template. Perform the procedure given below to create a logical interface.

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** ( ) icon of the template in which you want to add the logical interface.

Step 3 In the **Interfaces** tab, click **Add Interface**, and choose the type of interface that you want to create from the drop-down list. You can create the following types of interfaces:

- Sub-interface
- Ether channel interface
- Bridge group interface
- VLAN interface

- Virtual tunnel interface
- Loopback interface

For more information, see Interface overview and Regular Firewall Interfaces.

Edit an interface

Edit interface configurations on Firepower 1000,Secure Firewall 1200, Firepower 2100, and Secure Firewall 3100 Firewall Threat Defense devices using device templates.

You can edit an interface in the same way as you do on the Firewall Management Center without using the template. Use template variables to set up the IPv4 and IPv6 addresses. The device template supports the configurations that are supported on Firepower 1000,Secure Firewall 1200, Firepower 2100, and Secure Firewall 3100 Firewall Threat Defense devices.

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** (✎) icon of the template in which you want to edit the physical interface.

Step 3 In the **Interfaces** tab, click the **Edit** icon for the interface that you want to edit.

Step 4 In the **Edit Physical Interface** window, you can edit any of the following settings:

- General
- PoE
- IPv4
- IPv6
- Path Monitoring
- Hardware Configuration
- Manager Access
- Advanced

Note Use variables to configure IPv4 and IPv6 addresses. For more information on templatizing variables, see Configure Template Parameters.

For more information on editing the settings mentioned above, see Interface overview and Regular Firewall Interfaces.

Configure other device settings

Configure additional device settings within templates to maintain consistent configuration across multiple devices.

Configure the other device settings in the same way as you do on the Firewall Management Center without using the template.

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** (✎) icon for the template in which you want to configure the settings.

Step 3 Click the tabs at the top of the window to configure any of these settings:

- Inline Sets
- Routing
- DHCP
- VPN
- Template Settings

Template settings

When you apply a template to a device, the template-specific settings are copied to the device.

Available template settings

you can configure these template settings in the **Template Settings** window.

- General
  - General
  - License
  - Applied Policies
  - Advanced Settings
  - Deployment Settings
- Template Parameters
  - Variables
  - Network object overrides
- Model Mapping

Edit general settings

Edit the name of the device template and enable or disable packet transfer to customize the device configuration according to your requirements.

In the **General** tile, you see the following fields:

- **Template Name** – The name of the template.
- **Transfer Packets** – Displays whether or not the managed device sends packet data with the events to the management center.
- **Mode** – Displays the mode of the management interface for the device: routed.
- **Configuration** – Click **Export** to export the template configurations as an SFO file. Click **Import** to import an SFO file that has the template configurations that you require.
- **Manage device by Data Interface** – Toggle the button to enable or disable management of the device using the data interface.

Follow these steps to edit the name of the device and to enable or disable packet transfer:

Procedure

Step 1 Click the **Edit** ( ) icon in the **General** tile.

Step 2 Change the **Template Name** as per your requirement.

Step 3 Check the **Transfer Packets** checkbox to allow packet data to be stored with events on the Firewall Management Center.

Step 4 Click **Save**.

Edit licenses

Edit license types to match your requirements for template configurations.

In the **License** tile, you can see the **License types** that are required based on the configurations used in the template. Choosing a license here does not consume that license on the device. The license is consumed only when you apply the template to a device.

Procedure

Step 1 Click the **Edit** ( ) icon in the **License** tile.

Step 2 Check or clear the check box next to the license you want to enable or disable for the managed device.

Step 3 Click **Save**.

Edit applied policies

Edit applied policies to modify the access control policy assignments for a template according to your requirements.

In the **Applied Policies** tile, you can see the access control policies that are associated with the template.

For policies with links, you can click the link to view the policy.

Procedure

Step 1 Click the **Edit** ( ) icon in the **Applied Policies** tile.

Step 2 For each policy type, choose a policy from the drop-down list. Only existing policies are listed.

Step 3 Click **Save**.

Edit advanced settings

Edit advanced configuration settings to optimize device performance and memory usage according to your network requirements.

The **Advanced Settings** tile displays the advanced configuration settings, as described below. You can edit any of these settings.

Table 1: Advanced section table fields

Field	Description
Application Bypass	The state of Automatic Application Bypass on the device.
Bypass Threshold	The Automatic Application Bypass threshold, in milliseconds.
Object Group Search	The state of object group search on the device. While operating, the Firewall Threat Defense device expands access control rules into multiple access control list entries based on the contents of any network or interface objects used in the access rule. You can reduce the memory required to search access control rules by enabling object group search. With object group search enabled, the system does not expand network or interface objects, but instead searches access rules for matches based on those group definitions. Object group search does not impact how your access rules are defined or how they appear in the Firewall Management Center. It impacts only how the device interprets and processes them while matching connections to access control rules. **Note** By default, the **Object Group Search** is enabled when you add Firewall Threat Defense for the first time in the Firewall Management Center.

Field	Description
Interface Object Optimization	The state of interface object optimization on the device. During deployment, interface groups and security zones used in the access control and prefilter policies generate separate rules for each source/destination interface pair. If you enable interface object optimization, the system will instead deploy a single rule per access control/prefilter rule, which can simplify the device configuration and improve deployment performance. If you select this option, also select the **Object Group Search** option to reduce memory usage on the device.

Procedure

Step 1 Click the **Edit** ( ) icon in the **Advanced Settings** tile.

Step 2 Change the settings as per your requirement.

- Configure Automatic Application Bypass
- Configure Object Group Search
- Configure Interface Object Optimization

Step 3 Click **Save**.

Edit deployment settings

Edit deployment settings to configure auto rollback functionality when management connection fails due to misconfiguration and to set the time interval for connectivity monitoring.

The **Deployment Settings** tile displays the information described in the table below.

Table 2: Deployment settings

Field	Description
Auto Rollback Deployment if Connectivity Fails	Enabled or Disabled. You can enable auto rollback if the management connection fails as a result of the deployment; specifically if you use data for Firewall Management Center access, and then you misconfigure the data interface.
Connectivity Monitor Interval (in Minutes)	Shows the amount of time to wait before rolling back the configuration.

Deployment settings include enabling auto rollback of the deployment if the management connection fails as a result of the deployment; specifically if you use data for Firewall Management Center access, and then you misconfigure the data interface. Alternatively, manually roll back the configuration using the **configure policy rollback** command.

Procedure

Step 1 Click the **Edit** icon in the **Deployment Settings** tile.

Step 2 Set the **Connectivity Monitor Interval (in Minutes)** to set the amount of time to wait before rolling back the configuration. The default is 20 minutes.

Step 3 If a rollback occurs, see the following for next steps.

- If the auto rollback was successful, you see a success message instructing you to do a full deployment.
- You can also click **Deploy** and then go to the **Advanced Deploy** screen and click the **Preview** icon to view the parts of the configuration that were rolled back (see Deploy Configuration Changes). Click **Show Rollback Changes** to view the changes, and **Hide Rollback Changes** to hide the changes.
- In the Deployment History Preview, you can view the rollback changes.

Step 4 Check that the management connection was reestablished.

In Firewall Management Center, check the management connection status on the Connection Status page. Navigate to **Devices** > **Device Management** page and then navigate to **Management** area under the **Device** tab. Then in the **FMC Access Details** screen, click **Connection Status**.

At the Firewall Threat Defense CLI, enter the **sftunnel-status-brief** command to view the management connection status.

If it takes more than 10 minutes to reestablish the connection, you should troubleshoot the connection. See Troubleshoot Management Connectivity on a Data Interface.

Configure template parameters

You can templatize configurations using template parameters such as variables and network object overrides.

Supported variables

The variable types are supported in device templates.

Variable Name	Description	Type
AS Number	Defines the unique Autonomous System (AS) number.	Integer Example: 2
FQDN	Defines a single Fully Qualified Domain Name (FQDN).	String Example: abc.example.com
IPv4 Host	Defines the IPv4 address of the host.	String Example: 209.165.201.8
IPv4 Network	Defines the IPv4 network address block.	String Example: 209.165.200.224/27

Variable Name	Description	Type
IPv4 Range	Defines the range of IPv4 addresses.	String Example: 209.165.200.225-209.165.200.250
IPv6 Host	Defines the IPv6 address of the host.	String Example: 2001:DB8::1
IPv6 Network	Defines the IPv6 network address block.	String Example: 2001:DB8:0:CD30::/60
Password	Defines a password string.	String Example: E28@2OiUrhx!
Router ID	Defines an identifier for the router.	Integer Example: 21
String	Defines a custom string.	String Example: testvalue2

Add a variable

Add variables to create reusable configuration elements that can be applied across multiple device templates, enabling consistent and efficient policy management.

Variables provide a way to standardize configuration elements across your deployment. You can create variables for network objects, ports, or other configurable elements that need to be consistent across multiple devices or policies.

Follow these steps to add a variable:

Procedure

Step 1 Choose **Objects** > **Object Management**.

Step 2 Choose **Variable** from the list of object types.

Step 3 Click **Add Variable**.

Step 4 Enter a **Name**.

In a multi-domain deployment, object names must be unique within the domain hierarchy. The system may identify a conflict with the name of an object you cannot view in your current domain.

Step 5 Choose a **Variable Type** from the drop-down list.

Step 6 (Optional) Enter a **Description**.

Step 7 Click **Save**.

Supported network object overrides

This reference provides information about the network objects that are supported for override configurations, including their descriptions and data types with examples.

Network Object Name	Description	Type
Network	An address block, also known as a subnet.	String Example: IPv4 - 209.165.200.224/27 IPv6 - 2001:DB8::/48
Host	The IP address of the host.	String Example: IPv4 - 209.165.200.225 IPv6 - 2001:DB8:1::1
Range	A range of IP addresses.	String Example: IPv4 - 209.165.200.225-209.165.200.250 IPv6 - 2001:DB8::1 - 2001:DB8:FFFF:FFFF:FFFF:FFFE:FFFF:FFFF
FQDN	A single fully-qualified domain name (FQDN).	String Example: abc.example.com

Add a network object override

Network object overrides allow you to customize network objects within templates for specific deployments without modifying the base template.

Use this procedure to add network object overrides to a template when you need to customize network objects for specific deployment scenarios.

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** (✎) icon of the template in which you want to add the network object override.

Step 3 Choose **Template Settings** > **Template Parameters**.

Step 4 In the **Network Object Overrides** section, click **Add or Remove Network Object Overrides**.

Step 5 In the **Add or Remove Network Object Overrides** window, choose the network objects for which you want to create network object overrides from the **Available Networks** window and click the > button.

Step 6 Click **Save**.

Add model mapping

Model mapping allows you to map a template to one or more models as long as the interface configurations are valid for all mapped models.

For each model, you can specify which template interface corresponds with which model interface. For example, if the template includes switch ports and VLAN interfaces, then that template can only be applied to a Firepower 1010 or Secure Firewall 1210/1220.

Follow these steps to add model mapping:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click **Add Model Mapping** for the template in which you want to create the model mapping. Alternatively, you can click the **Edit** (✎) icon of the template and choose **Template Settings > Model Mapping**.

Step 3 Click **Add Model Mapping**.

Step 4 Choose the **Device Model** from the drop-down list.

Step 5 Map the template interfaces to the device model interfaces by choosing the interface from the **Model Interface** drop-down list.

Note You can click **Clear Mapping** to remove the defined model mapping. Click **Reset Mappings** for default interface mapping in which the mapping is done based on the slot and port index order of the interface names.

Step 6 Click **Save**. The interface mappings are listed along with the device model and mapping status on the **Model Mapping** window.

Note Some configurations in the template may not be supported on all device models. Unsupported configurations, if any, are not applied to the device. The device Template Apply Report provides details about such configurations.

Invalid model mappings

Some configurations in the template may not be supported on all device models. Unsupported configurations, if any, are not applied to the device. Valid model mappings can become invalid when you modify template configurations. For example, if you add a new interface on the template and assign a name to it, you must map the new interface to the appropriate device model interface.

Causes of invalid model mappings

Model mapping can be invalidated due to any of these reasons:

- Number of configured VRF instances exceeds the limit for a specific model.
- Interfaces mapped to incompatible models, versions, or interfaces. See Requirements and Prerequisites for more information.
- Number of interfaces exceeds the model limit.
- Deleted an interface that was mapped.
- Newly added physical interfaces are not mapped to a compatible model interface.
- Model mapping is not done for a named interface.
- Model mapping is not done for an interface related to other logical interfaces, such as sub-interfaces, PC interfaces, and so on.
- Policy or configuration changes that are unsupported on some device models, such as enabling switch port configuration on interfaces.

You can also save a template with invalid model mappings. However, you must review and fix the model mapping before initiating application of the template on the device.

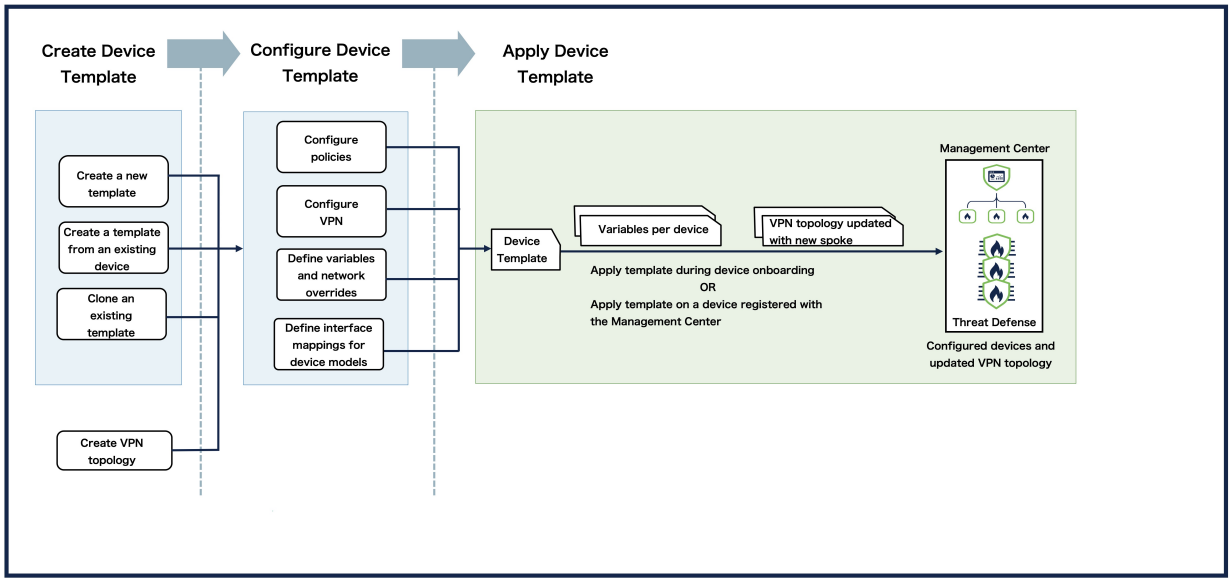
You can hover over **Invalid** under **Mapping Status** to view the errors that caused the invalid mapping status. Fix the errors before initiating application of the template on the device.

Configure Site-to-Site VPN connections in a device template

This reference provides the configuration parameters and settings required to establish Site-to-Site VPN connections using device templates.

Device template with site-to-site VPN connections workflow

This workflow diagram illustrates the process for implementing device templates with site-to-site VPN connections in your network infrastructure.



Configure an SD-WAN VPN connection

This task allows you to add spokes to SD-WAN topologies by configuring an SD-WAN VPN connection through the device template.

You can configure an SD-WAN VPN connection to add spokes to SD-WAN topologies using the device template.

Before you begin

- Configure a minimum of one SD-WAN topology (**Devices** > **VPN** > **Site to Site**).
- Review Prerequisites for Configuring Device Templates and Guidelines and Limitations for Device Templates.

Follow these steps to configure an SD-WAN VPN connection:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the edit icon adjacent to the device template that you want to edit.

Step 3 Click the **VPN** tab.

Step 4 Click **Add VPN Connection**.

Step 5 Choose an SD-WAN topology from the **VPN Topology** drop-down list.

The **Add VPN Connection** dialog box expands and you can configure the following parameters:

a) From the **VPN Interface** drop-down list, choose a WAN-facing or internet-facing physical interface to establish a VPN connection with the hub.

This list contains all the interfaces configured on the device template.

b) **Use IP Address from the VPN Interface**—This drop-down list is auto populated with the IP address variable. For IPv6 addresses, choose an IPv6 address from the drop-down list.
c) Check the **Local Tunnel (IKE) Identity** check box to enable a unique and configurable identity for the VPN tunnel from the spoke to a remote peer.
d) **Identity Type**—Key ID is the only supported identity type. Choose a key ID variable from the drop-down list or click (+) to create a new key ID variable.
e) Click **OK**.

You can view the VPN connection in the **Site-to-Site VPN Connections** table.

Step 6 Click **Save**.

What to do next

1. Configure the routing policy for the spoke in the device template.
2. Map the device interfaces to the template interfaces (Model Mapping).
3. Apply the template to a device.

Configure a route-based Site-to-Site VPN connection

This task allows you to add spokes to existing route-based site-to-site VPN topologies by configuring VPN connections through the device template interface.

You can configure a route-based site-to-site VPN connection to add spokes to route-based site-to-site VPN topologies using the device template.

Before you begin

- Configure a minimum of one route-based site-to-site VPN topology (**Devices** > **VPN** > **Site to Site**).
- Review Prerequisites for Configuring Device Templates and Guidelines and Limitations for Device Templates.

Follow these steps to configure a route-based site-to-site VPN connection:

Procedure

Step 1 Choose **Devices** > **Template Management**.
Step 2 Click the edit icon adjacent to the device template that you want to edit.
Step 3 Click the **VPN** tab.
Step 4 Click **Add VPN Connection**.
Step 5 Choose a route-based site-to-site VPN topology from the **VPN Topology** drop-down list.

The **Add VPN Connection** dialog box expands and you can configure the following parameters:

a) From the **Virtual Tunnel Interface (VTI)** drop-down list, choose a VTI interface or click (+) to create a new VTI.

VTI is a virtual interface used to establish a route-based VPN tunnel. You must configure routing policies for a VTI to set up a VPN tunnel. This list contains all the VTIs configured on the device template. For more information on creating a VTI, see Add a VTI interface.

b) Check the **Use Public IP Address** check box to override the tunnel source IP address and configure a public IP address variable for the VTI. Click (+) to create a new public IP address variable.

This IP address is the source IP address for the VPN tunnel. By default, this is the IP address of the VPN interface. However, if the device is behind NAT, the VPN interface has a private address, but the post-NAT public IP address should be configured.

c) Check the **Local Tunnel (IKE) Identity** check box to enable a unique and configurable identity for the VPN tunnel from the spoke to a remote peer.

d) **Identity Type**: Key ID is the only supported identity type. Choose a key ID variable from the drop-down list or click (+) to create a new key ID variable.

e) (Optional) Check the **Enable Secondary VPN Tunnel** check box to configure the parameters for the secondary VPN tunnel.

f) Click **OK**.

You can view the VPN connection in the **Site-to-Site VPN Connections** table.

Step 6 Click **Save**.

What to do next

1. Configure the routing policy for the spoke in the device template.
2. Map the device interfaces to the template interfaces (Model Mapping).
3. Apply the template to a device.

Configure a policy-based Site-to-Site VPN connection

This task enables you to add spokes to policy-based site-to-site VPN topologies using the device template.

You can configure a policy-based site-to-site VPN connection to add spokes to policy-based site-to-site VPN topologies using the device template.

Before you begin

- Configure a minimum of one policy-based site-to-site VPN (**Devices** > **VPN** > **Site to Site**).
- Review Prerequisites for Configuring Device Templates and Guidelines and Limitations for Device Templates.

Follow these steps to configure a policy-based site-to-site VPN connection:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the edit icon adjacent to the device template that you want to edit.

Step 3 Click the **VPN** tab.

Step 4 Click **Add VPN Connection**.

Step 5 Choose a policy-based site-to-site VPN topology from the **VPN Topology** drop-down list.

The **Add VPN Connection** dialog box expands and you can configure these parameters:

a) From the **VPN Interface** drop-down list, choose a WAN-facing or internet-facing physical interface to establish a VPN connection with the hub.

This list contains all the interfaces configured on the device template.

Do one of these to configure the IP address of the VPN interface:

- Click the **Use IP Address from the VPN Interface** radio button to use the IP address of the VPN interface.

  This IP address is auto populated. For IPv6 addresses, choose an IPv6 address from the drop-down list.

- Click the **Use Public IP Address** radio button to configure a public IP address for the VPN interface.

  Choose an IP address variable from the drop-down list or click (+) to add an IP address variable.

b) Check the **Local Tunnel (IKE) Identity** check box to enable a unique and configurable identity for the VPN tunnel from the spoke to a remote peer.

c) **Identity Type**: Key ID is the only supported identity type. Choose a key ID variable from the drop-down list or click (+) to add a new key ID variable.

d) **Protected Networks**: Click (+) to configure a protected network for the VPN connection.

Do one of these:

- Choose a protected network and click **OK**.
- Click **Add** to configure a network object and click **Save**.

  When you create a protected network object, note this:

  - Click either the **Host** or the **Network** radio button.
  - Check the **Allow Overrides** check box.

e) Click **OK**.

You can view the VPN connection in the **Site-to-Site VPN Connections** table.

Step 6 Click **Save**.

What to do next

1. Before you apply a template to a device, to configure device-specific values for the protected networks, add these objects in **Template Settings** > **Template Parameters** > **Add Network Objects Overrides**.
2. Map the device interfaces to the template interfaces (model mapping).
3. Apply the template to a device.

Register a device using device template and add it to a Route-Based VPN topology

This task enables you to register a device using device template and add it to a route-based VPN topology.

Use this procedure when you need to integrate a new device into an existing route-based VPN topology using a standardized device template approach.

Before you begin

Ensure that you have a route-based VPN topology.

Follow these steps to register a device using device template and add it to a route-based VPN topology:

Procedure

Step 1 Create a device template.

Navigate to **Devices** > **Template Management**, and click **Add Device Template**.

For detailed instructions, see Create a new device template, on page 10.

Step 2 Configure interfaces in the template.

Navigate to **Devices** > **Template Management**, and click **Interfaces**.

For detailed instructions, see Edit an interface, on page 14.

Step 3 Configure a route-based VPN connection in the template.

Navigate to **Devices** > **Template Management**, and click **VPN > Add VPN Connection**.

For detailed instructions, see Configure a route-based Site-to-Site VPN connection, on page 25.

Step 4 Configure routing policies in the template.

Navigate to **Devices** > **Template Management**, and click **Routing**.

Step 5 Add a model mapping for the device model in the template.

Navigate to **Devices** > **Template Management**, and click **Template Settings > Model Mapping**.

For detailed instructions, see Add model mapping, on page 22.

Step 6 Register the device using a device template.

Navigate to **Devices** > **Device Management**, and click **Add > Device (Wizard)**.

For detailed instructions, see Add a Device Using a Registration Key—Device Template.

Step 7 Deploy configurations on the hub of the VPN topology.

Click **Deploy**.

Add a device to an SD-WAN topology in a dual ISP deployment

This task enables you to add a device to an SD-WAN topology in a dual ISP deployment using a device template.

Use this procedure to integrate a device into an existing SD-WAN topology that utilizes dual ISP connections for redundancy and load balancing.

Before you begin

Ensure that you have two SD-WAN VPN topologies with the same hub. For more information about configuring SD-WAN topologies, see Configure an SD-WAN topology using the SD-WAN wizard.

Follow these steps to add a device to an SD-WAN topology in a dual ISP deployment:

Procedure

Step 1 Create a device template.

Navigate to **Devices** > **Template Management**.

For detailed instructions, see Create a new device template, on page 10.

Step 2 Add a physical interface in the template.

By default, a template has only one outside interface. Rename the outside interfaces, for example, ISP1, ISP2.

Navigate to **Devices** > **Template Management**, and click **Interfaces > Add Physical Interface** .

For detailed instructions, see Add a physical interface, on page 13.

Step 3 Configure an SD-WAN VPN connection using ISP1 interface.

Navigate to **Devices** > **Template Management**, and click **VPN > Add VPN Connection**.

For detailed instructions, see Configure an SD-WAN VPN connection, on page 24.

Step 4 Configure an SD-WAN VPN connection using ISP2 interface.

Navigate to **Devices** > **Template Management**, and click **VPN > Add VPN Connection**.

For detailed instructions, see Configure an SD-WAN VPN connection, on page 24.

Step 5 Add static routes from ISP1 and ISP2 interfaces to the SD-WAN hub network.

Navigate to **Devices** > **Template Management**, and click **Routing > Static Route**.

Step 6 Add the ISP1 and ISP2 interfaces to an ECMP zone.

Navigate to **Devices** > **Template Management**, and click **Routing > ECMP**.

Step 7 Configure the network object overrides.

Navigate to **Devices** > **Template Management**, and click **Template Settings > Template Parameters > Add Network Objects Overrides**.

For detailed instructions, see Add a network object override, on page 21.

Step 8 Map the template interfaces to the device model interfaces (Model Mapping).

Navigate to **Devices** > **Template Management**, and click **Template Settings > Model Mapping**.

For detailed instructions, see Add model mapping, on page 22.

Step 9 Apply template to the device.

Navigate to **Devices** > **Template Management**.

For detailed instructions, see Apply a template, on page 32.

The device is successfully added to the SD-WAN topology in a dual ISP deployment. For more information about dual ISP deployment using the SD-WAN wizard, see Sample configurations for dual-ISP deployment using SD-WAN wizard.

What to do next

Click **Deploy** deploy the configurations on the device and the hubs of the SD-WAN topologies.

Configure a Template for Firewall Threat Defense Devices Managed Using the Data Interface

This task configures a template for Firewall Threat Defense devices that are managed using a data interface, ensuring proper connectivity parameters match between the device and template to maintain Firewall Management Center connectivity after template deployment.

To configure a template for a Firewall Threat Defense device that is managed using a data interface for Firewall Management Center connectivity, ensure that the connectivity parameters of the device match the template. This ensures that the Threat Defense device does not lose connectivity with the Firewall Management Center after application of the template. A template that you configure for Firewall Threat Defense devices managed using the data interface cannot be applied on devices that are not managed by the data interface.

These are the connectivity parameters:

- Data interface used to the manage the Firewall Threat Defense device. For example, **Ethernet1/1**.
- Name of the interface. For example, **outside**.
- IP address configured on the data interface. For example, DHCP or static IP.
- Route configured for the data interface. This can be a default or specific route defined on the data interface used for connectivity between the Firewall Threat Defense device and the Firewall Management Center.
- DDNS hostname configuration on the data interface.

If the template connectivity parameters do not match those on the device, validation fails and the template is not applied on the device. Validation does not require an exact match for some parameters, such as IP address or DDNS hostname. However, configure these parameters appropriately to maintain connectivity between the Firewall Threat Defense device and the Firewall Management Center after deployment.

These template validation checks are done to ensure sanity of configurations that are required to manage the Firewall Threat Defense device using the data interface:

- You cannot apply a template in which manager access to the device is configured with the management interface to a device in which manager access to the device is configured with the data interface.
- You cannot apply a template in which manager access to the device is configured with the data interface to a device in which manager access to the device is configured with the management interface.

- You cannot apply a template in which manager access to the device is configured with the single WAN data interface to a device in which manager access to the device is configured with the dual WAN data interface.
- If any of the connectivity parameters do not match, you cannot apply a template in which manager access to the device is configured with the data interface to a device in which manager access to the device is configured with the data interface.

Before you begin

Follow these steps to configure a template for Firewall Threat Defense devices managed using the data interface:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** (✎) icon of the template that you want to configure to manage Firewall Threat Defense devices using the data interface.

Step 3 Click the **Template Settings** tab.

a) In the **General** tile, toggle the **Manage device by Data Interface** button.
b) You will see a popup asking you to pick a data interface for manager access. Click **OK**.

Step 4 Click the **Interfaces** tab.

a) Click the **Edit** icon of the data interface that you want to use for manager access. The first data interface – Ethernet1/1 (outside interface), is the data interface that is most commonly used for manager access.
b) In the **Edit Physical Interface** window, click the **Manager Access** tab.
c) Check the **Enable management access** checkbox.
d) Click **OK**. You will see that the interface that you selected for manager access has been marked with **Manager Access**.

Step 5 Click the **DHCP** tab.

Step 6 Click the **DDNS Update Methods** tab.

a) Click **+Add** to add a DDNS update method.
b) In the **Add DDNS Update Method** window, enter a **Method Name** and choose **FMC only**.
c) Set the **Update Interval** as per your requirement.
d) Click **OK**. You will see the method that you created in the **DDNS Update Methods** table.

Step 7 Click the **DDNS Interface Settings** tab.

a) Click **+Add** to add dynamic DNS configuration.
b) In the **Add Dynamic DNS** configuration window, choose values for these fields:
   - **Interface** – Choose the interface enabled for manager access
   - **Method Name** – Choose the method that you created.
   - **Host Name** – Choose a variable for the hostname.

   Do not edit the rest of the fields in this window.
c) Click **OK**. The **DDNS Interface Settings** table is populated with the entry that you created.

Step 8 To configure the model mapping to ensure that the data interface set for manager access in the template matches the data interface selected for manager access on the device, click the **Template Settings** tab and click **Model Mapping**.

a) Click **Add Model Mapping**.
b) Choose the **Device Model** from the drop-down list.
c) Map the date interface that is set for manager access in the template to the appropriate data interface on the device by choosing the interface from the **Model Interface** drop-down list.
d) Click **Save**. The interface mappings are listed along with the device model and mapping status on the **Model Mapping** window. You can now apply the template on a device that is managed using the data interface.

Use templates with devices

You can apply templates in these scenarios:

- During device registration: Choose a compatible template for the initial configuration when registering a device with the Firewall Management Center.
- After device registration: Apply templates to devices that are already registered with the Firewall Management Center.

Adding Devices to Management Center using device template

You can add a device to the Firewall Management Center using a device template with these options:

- Add a Device Using a Registration Key—Device Template
- Add Devices Using Serial Numbers (Zero-Touch Provisioning)—Device Template

Note Approve any change management tickets related to template configurations so that the template application workflow incorporates the corresponding changes. During template application, the system uses only approved template configurations.

Apply templates to existing devices

You can apply or reapply a template to existing devices.

Apply a template

Template application clears existing configurations and applies configurations from the template to devices already registered with the Firewall Management Center.

You can apply a template to devices that are already registered with the Firewall Management Center. Application of a template on a device clears existing configurations and applies configurations from the template. However, the Firewall Threat Defense HA failover configurations are not cleared.

Application of a template changes device configurations only on the Firewall Management Center. You must explicitly deploy these device configuration changes to the Firewall Threat Defense device. You cannot roll back the applied configuration changes. However, you can apply another template with the required configurations.

Note Any change management tickets related to template configurations must be approved for the corresponding changes to be incorporated into the template application workflow. Only approved template configurations are used during template application.

Follow these steps to apply a template to existing devices:

Procedure

Step 1 To apply the template from the **Template Management** window, choose **Devices** > **Template Management**.

a) Click the **More** (⋮) icon next to the template that you want to apply, and click **Apply**.
b) From the **Device** dropdown list, choose the **Device** on which you want to apply the template.
c) Click **Confirm** to initiate application of template on the device.

Step 2 (Optional) To apply the template from the **Associated Devices** window, choose **Devices > Template Management**.

a) Click the **Edit** (✎) icon of the template that you want to apply to a device.
b) Click **Associated Devices**.
c) In the **Associated Devices** window, click **Apply Template**.
d) From the **Device** drop-down list, choose the **Device** on which you want to apply the template.
e) Enter values for the **Variables** and **Network object overrides** fields.
f) Click **Apply** to initiate application of template on the device.

Reapply a template

Reapply a template to synchronize the device configuration with the template configuration when changes result in an out-of-sync state.

If you make any changes to the device or template that results in the configuration being out-of-sync, you can reapply the template to make the configuration in sync with the template.

Follow these steps to reapply a template on a device:

Procedure

Step 1 Choose **Devices** > **Template Management**.

Step 2 Click the **Edit** (✎) icon of the template that you want to reapply to a device.

Step 3 Click **Associated Devices**.

Step 4 In the **Associated Devices** window, click **Reapply Template** for the device on which you want to reapply the template.

Note If you want to reapply the template on all the associated devices in the template, click **Bulk Reapply** and click **Confirm**.

Step 5 On the **Reapply template** window, you can reuse the autopopulated **Variables** and **Network object overrides** values or enter new values.

Step 6 Click **Confirm** to initiate reapplication of the template on the device.

Monitor device templates

You can monitor and verify the application of templates by viewing the devices listed in the **Associated Devices** window and by viewing the **Template Apply Report**.

View associated devices

The devices that are associated with the templates are listed in the **Associated Devices** window. Each device row displays the **Device Name, Sync Status, Template Application Status**, and **Applied Date**. You can also click **Reapply template** to reapply the template. Click the **Variable Summary** icon to display a summary of the variables in the template and the **Report** ( ) icon to download the Device Template Apply report.

Click the **Delete** ( ) icon to remove the template from the device.

Click **Apply Template** if you want to apply a template on a device from the **Associated Devices** window. If you want to reapply the template on all the associated devices in the template, click **Bulk Reapply** and click **Confirm**.

The **Sync Status** can be either **Sync** or **Out-of-Sync**. **Sync** indicates that the template and device configurations are the identical. **Out-of-Sync** indicates that the configuration has changed on either the device or the template since the template was last applied.

These conditions do not affect the association of the device with the template:

- Pending configuration changes on the device—The **Sync Status** does not change if there are pending configuration changes that have to applied on the device.
- Deployment of pending configuration changes on the device—The **Sync Status** does not change after deployment of pending configuration changes on the device.

This table shows the **Sync** and **Out-of-Sync** scenarios that may occur.

Device Configurations Modified After Application of Template on Device	Template Configurations Modified After Application of Template on Device	Association Status
No	No	In Sync
Yes	No	Out of Sync

Device Configurations Modified After Application of Template on Device	Template Configurations Modified After Application of Template on Device	Association Status
No	Yes	Out of Sync
Yes	Yes	Out of Sync

Template Apply reports

A **Template Apply Report** PDF is generated after the task to apply the template is completed. This report is generated on both successful and unsuccessful application of the template on the device. To access the link to this report, click **Notifications**, and then click the **Tasks** tab.

Template apply report details

The **Template Apply Report** contains these details:

- Template name
- Device model name
- Domain from which the template was applied
- Start and end time
- Status of the application of the template on the device
- Interface mapping information
- Variable values

Some configurations on the template may not be applied to the device if the device model or version is incompatible. The report includes details about these configurations and any errors encountered when the application of the template fails. Application of a template on a device may fail due to any of these reasons:

- Model mapping does not exist for the device model that is used.
- Values used for variables and network object overrides do not conform to routing policy or interface configuration rules. For example, the same IPv4 address has been used for two IPv4 address interface variables.
- The device or template is locked because another task, such as applying or modifying the template, is in progress.

Audit logs

View logs related to application of device templates, configuration updates, device template creation, and deletion activities that are recorded under audit logs.

Logs related to application of the device template, configuration updates, device template creation, and deletion, are logged under audit logs. The device template audit logs are added to the log both at the start and at the end of the task to apply the template on the device.

An audit diff file is also generated. This file contains the configuration changes that have been done during application of the template on the device.

Procedure

Step 1 Choose **System** (⚙) > **Monitoring** > **Audit**.

Step 2 The device template logs are logged under the subsystem **Devices** > **Template Management**. Click the **diff** icon to open a new window that displays the configuration changes that have been done during the application of the template on the device.

Troubleshoot device templates

This reference provides comprehensive troubleshooting information for device templates. For initial troubleshooting, we recommend looking at the information in the Template Apply Report and notifications that come up on the Firewall Management Center UI when you run into an error. The Firewall Management Center log files also contain detailed debugging and troubleshooting info.

Initial troubleshooting

Follow this procedure for initial troubleshooting.

1. Check the errors mentioned in the **Template Apply Report**. For more information, see Template Apply Report.
2. Review variable values and check for overlaps and incompatibilities.
3. Check model mappings to ensure if the correct model mappings exist. Delete or add mappings accordingly.
4. See the Firewall Management Center audit logs to find any other issues and resolve them.

Consider this error scenario. In a device template, the inside interface is configured with a static IPv4 variable - *$insideIPv4*.

The BGP IPv4 address is configured with an IPv4 BGP neighbor.

An overlapping IPv4 address is configured for the BGP neighbor and an interface.

Due to these issues, the application of the device template fails and an error is displayed.

To troubleshoot this error, identify the error from the notification displayed on the UI.

```
IP Address 192.168.10.1 same as ip address of interface - 'inside'(Ethernet1/1)
```

Check the **Template Apply Report** for more information.

Enter correct values for the variables and apply the template again to ensure successful application of the template on the device.

Troubleshoot device registration

- Issue: Admin Password is incorrect or not provided during registration

Scenario: If the admin password is not set on the device and if you have not provided the admin password during registration, the Firewall Threat Defense device provisioning will fail. In such a scenario, a *Provision Error* along with an **Enter Password** link is displayed.

Workaround: Click **Enter Password** to enter a new password and click **Save**. Click **Confirm and Proceed** to trigger the onboarding again.

- If the admin password is already set on the device and you provide another admin password during registration, device provisioning will fail.
- Issue: Device registration in Firewall Management Center fails

  Workaround: Follow existing device registration troubleshooting steps. For more information, see Configure, Verify, and Troubleshoot Firepower Device Registration.
- Issue: Bulk Registration Request Fails in Firewall Management Center

  Scenario: The bulk registration request can fail due to a few scenarios:

  - You do not have the required permissions to perform template-related operations
  - Template is not visible from the request domain
  - Invalid CSV file provided

  Workaround: You can see logs for these errors in the VMS Shared and USM Shared log files. Fix the errors and initiate registration again.
- Issue: Device provisioning fails in Security Cloud Control due to some generic errors, such as communication with the device fails

  Workaround: Click Retry in the Provision Error to trigger the onboarding in Security Cloud Control again. You can also see the Security Cloud Control workflows for more information on the error and troubleshooting information.

Troubleshoot Cisco Security Cloud integration

Issue: Cisco Security cloud integration not successful

Workaround: Follow Cisco Security Cloud integration troubleshooting steps. For more information, see Cisco Security Cloud Integration.

Troubleshoot device template configuration issues

Issue: Device template misconfigurations causing deployment failures after registration

Workaround: Follow these steps for initial troubleshooting.

1. Check the errors mentioned in the Template Apply Report.
2. Review variable values and check for overlaps and incompatibilities.
3. Check model mappings to ensure if the correct model mappings exist. Delete or add mappings accordingly.
4. See the Firewall Management Center audit logs to find any other issues and resolve them.

Troubleshoot Security Cloud Control Issues

- Issue: Device with serial number already claimed

  Workaround: Verify serial number and reinitiate onboarding.

- Issue: Security Cloud Control fails to claim devices

  Workaround: Select the device in the Security Cloud Control **Security Devices** window for more details on the error. You can see logs related to device claim issues in the VMS Shared and USM Shared log files. Click **Retry** to initiate registration again.

- Issue: Communication failures between Firewall Management Center and Security Cloud Control

  Scenario: Communication failures between Firewall Management Center and Security Cloud Control can cause failures during the Zero-Touch Provisioning (ZTP) device registration request.

  Workaround: Refresh the ZTP device status, retry ZTP registration, and delete the ZTP device. You can see logs regarding communication failure between the Firewall Management Center and Security Cloud Control in the Auth Daemon logs. For operational failures related to ZTP, you can see the logs in the VMS Shared and USM Shared log files.

History for device management using device templates

This reference provides the version history and implementation details for device management using device templates across different product versions.

Feature	Minimum Firewall Management Center	Minimum Firewall Threat Defense	Details
Device management using device templates	7.6.0	7.4.1	Device templates enable deployment of multiple branch devices with pre-provisioned initial device configurations. You can use device templates to perform bulk zero-touch provisioning of multiple devices, apply day 2 configuration changes to multiple devices with different interface configurations, and clone configuration parameters from existing devices. New/modified screens: • **Devices** > **Device Management** > **Add** > **Device (Wizard)** • **Devices** > **Template Management** > **Add Device Template** • **Devices** > **Template Management** > **Add Model Mapping** • **Devices** > **Template Management** > **Edit a template** > **Template Settings** • **Integration** > **Cisco Security Cloud**