



Overview and Guidelines

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Forwarding Scale Profiles Overview

Cisco ACI and APIC allow you to configure different Forwarding Scale Profiles to suit your topology and deployment use cases. This section describes all Forwarding Scale Profiles and their purpose. Keep in mind, specific profiles may be unavailable in earlier releases or restricted to specific hardware platforms. For detailed information on hardware support and scalability numbers of each profile, see the release-specific chapters.

- **Dual Stack**—The default profile for all new supported switches that allows both IPv4 and IPv6 configurations.
- **High Dual Stack**—Provides increased IPv4, IPv6, and policy scale numbers compared to the default Dual Stack profile. This profile supports different scalability limits based on the specific switch platforms.
- **High LPM**—Provides scalability similar to the Dual Stack profile, but for deployments that require higher scale for longest prefix match (LPM) and lower policy scale.
- **High Policy**—This profile is similar to the Dual Stack profile but with higher policy scale. This profile has specific hardware requirements.
- **IPv4 Scale**—This profile is designed for IPv4-only deployments and allows you to configure higher IPv4 scale where no IPv6 configurations are needed.
- **High IPv4 EP Scale**—This profile is recommended to be used only for the ACI border leaf (BL) switches in Multi-Domain (ACI-SDA) Integration. It provides enhanced IPv4 EP and LPM scales specifically for these BLs and has specific hardware requirements.
- **Multicast Heavy**—This profiles provides an enhanced multicast scale and has specific hardware requirements.

Switch Behavior When Changing Forwarding Scale Profiles

Each ACI switch has a managed object (MO) called `topoctrlFwdScaleProf` which describes the existing and configured forward scale profiles on the switch using the following attributes:

- `currentProfile`, available starting with Release 4.1(1), indicates the forwarding scale profile that is currently running on the switch.
- `profType` indicates the forwarding scale profile that you configured for the switch.

The following table summarizes the expected behavior when changing the forwarding scale profile on a switch.

Action	Effect
Configured a supported FSP on the switch	<p>The switch accepts the new forwarding scale profile.</p> <p>The following specific events occur:</p> <ul style="list-style-type: none"> • The <code>profType</code> field changes to the newly configured profile • APIC prompts you to reload the switch for the change to take effect • After you reload the switch, the <code>currentProfile</code> field is updated to the new profile and the new profile takes effect
Configured an unsupported FSP on the switch	<p>The switch does not accept the unsupported FSP and retains its original existing FSP.</p> <p>The following specific events occur:</p> <ul style="list-style-type: none"> • The <code>profType</code> field changes to the newly configured profile • The <code>currentProfile</code> field and the currently enabled forwarding scale profile remain unchanged • APIC does not show the notification to reload that switch • Whether you reload the switch or not, it will continue to use its existing profile without change. • Whether you reload the switch or not, the <code>profType</code> field will continue to display the profile you attempted to configure until you manually change it again.

Guidelines and Limitations

- When downgrading to a release that does not support one or more switches in your current fabric, keep the following in mind:
 - If you downgrade your fabric to a release where one or more of your current switches are not supported, those switches will become inactive in the fabric.

- If you later upgrade the fabric to a release where the switch is supported again, the APIC will not regain complete details about the switch. In this case, you will need to explicitly remove the switch from the APIC and then re-add it to the fabric.
- When downgrading to a release that does not support one or more of your current forwarding scale profiles, the default forwarding scale profile will be configured on the switch. You must reduce the configurations on the switch to fit the default profile before the upgrade.
- Because the IPv4 Scale forwarding scale profile does not support IPv6 configurations, you must remove all IPv6 configurations from the switches that need to be configured with the IPv4 Scale profile.
- Before switching between forwarding scale profiles, the configurations on the switch must be reduced appropriately and thoroughly verified so that scale parameters of the target profile are not exceeded.
For example, for switch models with EX at the end of the switch name, because the High Dual Stack profile has reduced scale support for contract policies, you must reduce the contracts scale accordingly before deploying that profile.
- Before migrating to minimal tenant multicast scale leaf profiles, such as High Dual Stack, we recommend that you first disable Layer 2 IGMP snooping, Layer 3 IGMP, and PIM-related configurations to prevent having a stale multicast state in your hardware.
- Applying a forwarding scale profile to a node requires a manual reload of that node. Any unsupported switches are ignored.
- We recommend using switch models of same capacity in a VPC pair when enabling scale profiles.
Otherwise, the maximum scale will be defined by the member with lower capacity.
- Members of a VPC must be configured with the same scale profile, however the reload required to enable the configured scale profile can be performed for each member one at a time to avoid traffic loss.
- With the default deny model in Cisco ACI, the configured tenant or VRFs have implicit rules that consume several TCAM entries for each VRF. With an increase in the number of VRFs configured on a single switch, these TCAM entries that are used per VRF also count toward the overall policy TCAM usage.
- Reporting of contract rule statistics is subject to the following limitations, depending on the configured scale profile:
 - Contract rule statistics are not reported by switches configured with High Policy scale profiles.
 - Beginning with Release 4.1(1), contract rule statistics are not reported by switches configured with High Dual Stack scale profiles.
 - For all other scale profiles, the maximum number of rules for which statistics are reported is 25,000
- If you need to clear the configurations on the switch, we recommend using the `setup-clean-config.sh -k` command. The command will clear all configurations on the switch, except the forwarding scale profile and port profile configurations.

Switch Operations and Their Effect on Forwarding Scale Profiles

This section lists various operations on the switch and their effect on the forward scale profile configuration in releases 4.1(1) and later. We recommend that the following operations are performed during a maintenance window.

Operation	Is Forwarding Scale Profile (FSP) Preserved	Additional Details
Upgrade or Downgrade	Yes, if the particular FSP is supported in target version	<p>The switch will retain its forwarding scale profile if the switch model and the deployed forwarding scale profile are supported on both the current and target image versions except in Release 3.2(4d). In Release 3.2(4d), where the scale profile is not preserved with the upgrade, you will need to reload the switch for the original scale profile to take effect.</p> <p>If the forwarding scale profile is not supported on the target release, the switch reverts to the default Dual Stack profile.</p> <p>If the switch itself is not supported on the target release, the switch will become inactive in the fabric.</p>
Reload the switch	Yes	The switch will retain its forwarding scale profile
Clean reboot with <code>-k</code> option	Yes	The switch will retain its forwarding scale profile and port profile configurations, but erase all other configurations.
Enable maintenance mode	Yes	The switch will retain its forwarding scale profile
Commission the switch from maintenance mode	Yes, from Release 4.1(1) and later	<p>For release 4.1(1) and later, the switch will reload with the original forwarding scale profile</p> <p>For releases prior to Release 4.1(1), the switch will join the switch fabric with default Dual Stack forwarding scale profile. You can then reload the switch for any previously configured forwarding scale profile to take effect</p>

Operation	Is Forwarding Scale Profile (FSP) Preserved	Additional Details
Decommission the switch	No	<p>The switch will erase all configuration, including the forwarding scale profile, and will show up with factory default configuration.</p> <p>The node serial number and other configurations will still be available on the APIC.</p>
Commission a decommissioned switch	No	<p>The switch will join the switch fabric with default Dual Stack forwarding scale profile. You can reload the switch for any previously configured forwarding scale profile to take effect.</p>
Remove the switch from APIC	No	<p>All configurations are erased on the switch. The switch serial number and all other details are also removed from the APIC</p>

