



Cisco Catalyst SD-WAN Controller Route Filtering by TLOC Color



Note

To achieve simplification and consistency, the Cisco SD-WAN solution has been rebranded as Cisco Catalyst SD-WAN. In addition, from Cisco IOS XE SD-WAN Release 17.12.1a and Cisco Catalyst SD-WAN Release 20.12.1, the following component changes are applicable: **Cisco vManage to Cisco Catalyst SD-WAN Manager**, **Cisco vAnalytics to Cisco Catalyst SD-WAN Analytics**, **Cisco vBond to Cisco Catalyst SD-WAN Validator**, **Cisco vSmart to Cisco Catalyst SD-WAN Controller**, and **Cisco Controllers to Cisco Catalyst SD-WAN Control Components**. See the latest Release Notes for a comprehensive list of all the component brand name changes. While we transition to the new names, some inconsistencies might be present in the documentation set because of a phased approach to the user interface updates of the software product.

Table 1: Feature History

Feature Name	Release Information	Description
Cisco SD-WAN Controller Route Filtering by TLOC Color	Cisco IOS XE Catalyst SD-WAN Release 17.11.1a Cisco Catalyst SD-WAN Control Components Release 20.11.1	Cisco SD-WAN Controllers can reduce the number of routes that they advertise to routers in the network, to exclude routes that are not relevant to a particular device. The filtering to reduce the number of routes is based on the colors of TLOCs on each device. For example, a route to a public TLOC is not relevant to a router that only has private TLOCs. Advertising fewer routes helps to avoid reaching the send path limit for routers in the network.

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Information About Cisco SD-WAN Controller Route Filtering by TLOC Color

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

Using route filtering, Cisco SD-WAN Controllers can reduce the number of routes that they advertise to routers in the network, to exclude routes that are not relevant to a particular device. The filtering is based on the colors of TLOCs on each device: For each individual router, the Cisco SD-WAN Controller advertises only routes that are compatible with one or more of the router's TLOCs.

Benefits

Advertising fewer routes offers the following benefits:

- Avoids reaching the send path limit:

Cisco SD-WAN Controller route filtering by TLOC color helps to avoid reaching the send path limit for routers in the network. For example, the send path limit might be set to 32, but Cisco SD-WAN Controllers might have more than 32 routes for a particular prefix to advertise to a device. Filtering out irrelevant routes helps to avoid reaching the limit.

- Prioritizes relevant routes:

If the send path limit is set to a low value, X, and if there are many routes to advertise, a Cisco SD-WAN Controller might advertise X irrelevant routes to a device, reaching the send path limit before advertising any relevant routes. This could result in a routing failure. Advertising only relevant routes prevents this possible failure.

Default Behavior

Cisco SD-WAN Controller route filtering by TLOC color is disabled by default.

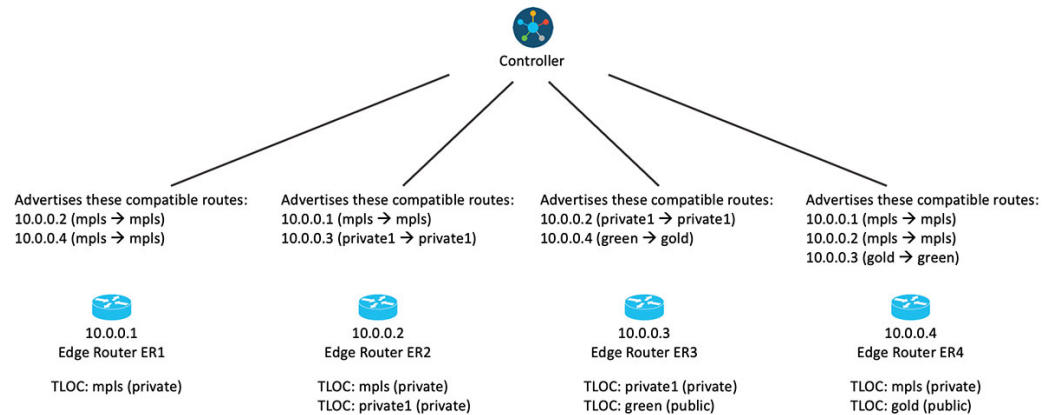
Logic

Cisco SD-WAN Controllers apply the following logic when determining whether routes are compatible:

- A TLOC with a public color can resolve a path to a route for a TLOC with a public color on a peer device.
- A TLOC of a particular color can resolve a path to a route for a TLOC of the same color on a peer device.
- A TLOC with a public color cannot resolve a path with a TLOC in a private color set.

Public colors include default, biz-internet, public-internet, lte, 3g, red, green, blue, gold, silver, bronze, custom1, custom2, and so on. Private colors include mpls, metro-ethernet, private1, private2, and so on. For information about private and public TLOC colors, see [Unicast Overlay Routing](#) in the *Cisco SD-WAN Routing Configuration Guide, Cisco IOS XE Release 17.x*.

For example, if a router has only TLOCs with private colors, Cisco SD-WAN Controllers do not advertise public routes to the device. Similarly, if a router has only TLOCs with public colors, Cisco SD-WAN Controllers do not advertise private routes to the device. The following illustration provides a more detailed example:

Figure 1: Cisco Catalyst SD-WAN Controller Route Filtering by TLOC Color, With the Feature Enabled

If you change the color assignment of a TLOC, the device updates the Cisco SD-WAN Controllers, enabling them to adjust the Cisco SD-WAN Controller route filtering by TLOC color accordingly.

Override

You can override the default logic if necessary and do one of the following:

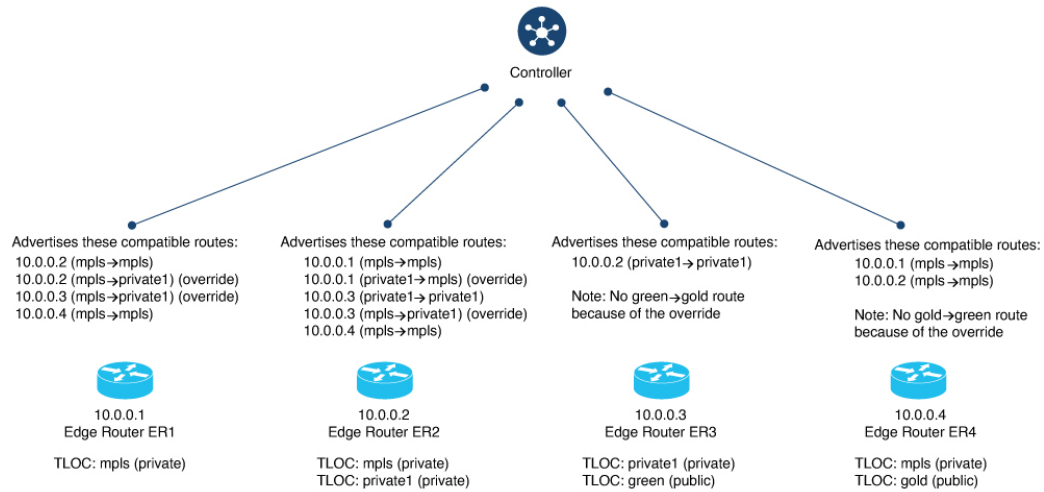
- Configure two TLOC colors to be compatible even if they are incompatible by default.
- Configure two TLOC colors to be incompatible even if they are compatible by default.

This may be helpful in specific unconventional scenarios. See the **tloc-color-compatibility** command in [Override Default TLOC Color Compatibility for Cisco SD-WAN Controller Route Filtering by TLOC Color Using a CLI Template, on page 6](#).

The following illustration shows an example of route filtering by TLOC color, with two overrides:

- Configure green and gold to be incompatible.
- Configure mpls and private1 to be compatible.

Figure 2: Cisco Catalyst SD-WAN Controller Route Filtering by TLOC Color, With the Feature Enabled and Overrides



Updating Cisco SD-WAN Controller of Changes

Routers in the network update Cisco SD-WAN Controllers when the status of their TLOCs changes. This may include reconfiguring a TLOC to a different color.

To account for temporary unavailability of a TLOC due to flapping, there is a dampening interval to delay reporting changes of TLOC status. By default, it is 60 seconds, but it can be configured to a value from 60 to 1200 seconds. For information, see [Configure the Update Interval for Route Filtering by TLOC Color Using a CLI Template, on page 6](#).

Supported Devices for Cisco SD-WAN Controller Route Filtering by TLOC Color

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

Cisco IOS XE Catalyst SD-WAN devices

Prerequisites for Cisco SD-WAN Controller Route Filtering by TLOC Color

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

For Cisco SD-WAN Controllers to determine the compatibility of paths, the colors of TLOCs must be configured according to convention. For example, a TLOC handling an MPLS connection must have the color mpls.

Restrictions for Cisco SD-WAN Controller Route Filtering by TLOC Color

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

When you enable Cisco SD-WAN Controller route filtering by TLOC color in a network, ensure that all you enable it on all Cisco SD-WAN Controllers in the network. We do not support scenarios in which route filtering by TLOC color is enabled on some Cisco SD-WAN Controllers and disabled on others within the same network.

Configure Cisco SD-WAN Controller Route Filtering by TLOC Color Using a CLI Template

The following sections describe how to configure Cisco SD-WAN Controller route filtering by TLOC color.

Enable Route Filtering Using a CLI Template

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

For more information about using CLI templates, see [CLI Add-On Feature Templates](#) and [CLI Templates](#). By default, CLI templates execute commands in global configuration mode.

The following configuration applies to a Cisco SD-WAN Controller.

1. Enter OMP mode.
omp
2. Enter filter-route configuration mode.
filter-route
3. Enable route filtering.
outbound tloc-color

Example

```
omp
 filter-route
  outbound tloc-color
!
```

Configure the Update Interval for Route Filtering by TLOC Color Using a CLI Template

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

For more information about using CLI templates, see [CLI Add-On Feature Templates](#) and [CLI Templates](#). By default, CLI templates execute commands in global configuration mode.

The following configuration applies to a Cisco IOS XE Catalyst SD-WAN device.

1. Enter OMP configuration mode.

```
omp
```

2. Configure the update interval, in seconds, in the range 60 to 1200.

```
timers
tloc-color-cap-update-interval interval
```

Example

```
omp
no shutdown
ecmp-limit      6
graceful-restart
no as-dot-notation
timers
  holdtime              15
  tloc-color-cap-update-interval 120
  graceful-restart-timer 120
exit
address-family ipv4
  advertise ospf external
  advertise connected
  advertise static
!
address-family ipv6
  advertise ospf external
  advertise connected
  advertise static
!
!
```

Override Default TLOC Color Compatibility for Cisco SD-WAN Controller Route Filtering by TLOC Color Using a CLI Template

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

For more information about using CLI templates, see [CLI Add-On Feature Templates](#) and [CLI Templates](#). By default, CLI templates execute commands in global configuration mode.

Before You Begin

You can override the default logic if necessary and do one of the following:

- Configure two TLOC colors to be compatible even if they are incompatible by default.
- Configure two TLOC colors to be incompatible even if they are compatible by default.

This may be helpful in specific unconventional scenarios.

Override Default TLOC Color Compatibility for Cisco SD-WAN Controller Route Filtering

The following configuration applies to a Cisco SD-WAN Controller.

1. Enter system mode.

```
system
```

2. Enter TLOC color compatibility mode.

```
tloc-color-compatibility
```

3. Enter one or more of the following:

- To configure two TLOC colors to be compatible, do the following:

```
compatible first-color second-color
```

- To configure two TLOC colors to be incompatible, do the following:

```
incompatible first-color second-color
```

Example

This example does the following:

- Configures the lte and private1 TLOC colors to be compatible
- Configures the private1 and private2 TLOC colors to be compatible
- Configures the lte and default TLOC colors to be incompatible
- Configures the lte and 3g TLOC colors to be incompatible

```
system
host-name vml
system-ip 10.0.10.1
site-id 100
tloc-color-compatibility
compatible lte private1
!
compatible private1 private2
!
incompatible lte default
!
incompatible lte 3g
!
!
```

Monitor Cisco SD-WAN Controller Route Filtering by TLOC Color

The following sections describe how to monitor Cisco SD-WAN Controller route filtering by TLOC color.

View TLOC Colors for a Device

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

To view the list of the TLOC colors that a device advertises to Cisco SD-WAN Controllers, use the **show support omp peer peer-ip** command on a Cisco SD-WAN Controller. When applying route filtering, the controllers use this TLOC color information to determine which routes are relevant to a device.

The following example shows the TLOC colors that the peer device 10.0.0.15 is advertising—in this case, lte and 3g.

```
vmanage#show support omp peer peer-ip 10.0.0.15 | inc color
ed bitmap: 0xc0, TLOC color supported list: lte 3g
```

Check TLOC Color Compatibility

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.11.1a, Cisco Catalyst SD-WAN Control Components Release 20.11.1

To check the compatibility of TLOC colors, use the **request support omp tloc-color-compat** command.

The following example requests information about whether the 3g and lte colors are compatible. These are both public TLOC colors, so they are compatible:

```
vsmart# request support omp tloc-color-compat 3g lte
Checking compatibility for colors:3g and lte
TLOC colors: 3g and lte are compatible
```

The following examples requests information about whether the 3g and mpls TLOC colors are compatible. They are incompatible:

```
vsmart# request support omp tloc-color-compat 3g mpls
Checking compatibility for colors:3g and mpls
TLOC colors: 3g and mpls are incompatible
```