Forward Error Correction

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**, and **Cisco vSmart** to **Cisco Catalyst SD-WAN Controller**. 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
Forward Error Correction	Cisco SD-WAN Release 19.1.x	Feature introduced. FEC is a mechanism to recover lost packets on a link by sending extra "parity" packets for every group of 4 packets.

Forward Error Correction (FEC) is a mechanism to recover lost packets on a link by sending extra "parity" packets for every group of 4 packets. As long as the receiver receives a subset of packets in the group (at-least N-1) and the parity packet, up to a single lost packet in the group can be recovered. FEC is supported on Cisco vEdge 1000, 2000, and 5000 routers.

Supported Devices for Forward Error Correction

The following are the supported devices for forward error correction:

- ASR10002-HX

- ENCS 5408

Configure Forward Error Correction for a Policy

Step 1 From the Cisco SD-WAN Manager menu, choose **Configuration** > **Policies**.

Step 2 Click **Centralized Policy** and then click **Add Policy**.

Step 3 Click **Next**.

Step 4 Click **Next** again and then click **Configure Traffic Rules**.

Step 5 Click **Traffic Data**, and from the **Add Policy** drop-down list, choose **Create New**.

Step 6 Click **Sequence Type**.

Step 7 From the **Add Data Policy** pop-up menu, choose **QoS**.

Step 8 Click **Sequence Rule**.

Step 9 In the **Applications/Application Family List**, choose one or more applications or lists.

Step 10 Click **Accept**.

Step 11 Click **Actions** and click **Loss Correction**.

Step 12 In the **Actions** area, choose one of the following:

- **FEC Adaptive**: Only send FEC information when the loss detected by the system exceeds the packet loss threshold.

- **FEC Always**: Always send FEC information with every transmission.

- **Packet Duplication** check box: Duplicates packets through secondary links to reduce packet loss if one link goes down.

Step 13 Click **Save Match and Actions**.

Step 14 Click **Save Data Policy**.

Step 15 Click **Next** and take these actions to create a centralized policy:

a) Enter a **Name** and a **Description**.
b) Select **Traffic Data Policy**.
c) Choose VPNs and a site list for the policy.
d) Save the policy.

Monitor Forward Error Correction Tunnel Information

Step 1 From the Cisco SD-WAN Manager menu, choose **Monitor** > **Devices**.

Cisco vManage Release 20.6.x and earlier: From the Cisco SD-WAN Manager menu, choose **Monitor** > **Network**.

Step 2 Choose a device group.

Step 3 In the left panel, click **Tunnel**, which displays under WAN.

The WAN tunnel information includes the following:

- A graph that shows the total tunnel loss for the selected tunnels.

- A table that provides the following information for each tunnel endpoint:

    - Name of the tunnel endpoint

    - Communications protocol that the endpoint uses

    - State of the endpoint

    - Jitter, in ms, on the endpoint

    - Packet loss percentage for the endpoint

    - Latency, in ms, on the endpoint

    - Total bytes transmitted from the endpoint

    - Total bytes received by the endpoint

    - Application usage link

Monitor Forward Error Application Family Information

Step 1   From the Cisco SD-WAN Manager menu, choose **Monitor** > **Devices**.

Cisco Catalyst SD-WAN Control Components Release 20.6.1 and earlier: From the Cisco SD-WAN Manager menu, choose **Monitor** > **Network**.

Step 2   Choose a device group.

Step 3   In the left panel, click **SAIE Applications**, which displays under **Applications**.

Note   In Cisco Catalyst SD-WAN Control Components Release 20.7.1 and earlier releases, **SAIE Applications** is called **DPI Applications**.

The FEC Recovery Rate application information includes the following:

- A graph for which you can choose the following perspective:

    - Application Usage—Usage of various types of traffic for the selected application families, in KB.

- A table that provides the following for each application family:

    - Name of the application family.

    - Packet Delivery Performance for the application family.

      Note   If you need to see the packet delivery performance for the selected application family, ensure that packet duplication is enabled. Packet delivery performance is calculated based on the formula as displayed in the Cisco SD-WAN Manager tooltip for the **Packet Delivery Performance** column.

- Traffic usage, in KB, MB, or GB for the selected application family.

Monitor Forward Error Correction Status Using the CLI

Use the **show sdwan tunnel statistics fec** command to verify the FEC status on a Cisco IOS XE Catalyst SD-WAN device:

```
Device# show sdwan tunnel statistics fec
tunnel stats ipsec 80.80.10.19 80.80.10.25 12346 12366
fec-rx-data-pkts     0
fec-rx-parity-pkts   0
fec-tx-data-pkts     0
fec-tx-parity-pkts   0
fec-reconstruct-pkts 0
fec-capable          true
fec-dynamic          false
tunnel stats ipsec 80.80.10.19 80.80.10.50 12346 12346
fec-rx-data-pkts     122314
fec-rx-parity-pkts   30578
fec-tx-data-pkts     125868
fec-tx-parity-pkts   31467
fec-reconstruct-pkts 3
fec-capable          true
fec-dynamic          false
```

The following table describes the FEC counters related to the output shown in the **show sdwan tunnel statistics fec** command:

Name of Counter	Description
fec-rx-data-pkts	Displays the number of data packets received by the device.
fec-rx-parity-pkts	Displays the number of parity packets received by the device.
fec-tx-data-pkts	Displays the number of data packets sent by the device.
fec-tx-parity-pkts	Displays the number of parity packets sent by the device.
fec-reconstruct-pkts	Displays the number of received packets reconstructed by the device.