Link Level Flow Control

Link-level Flow Control (LLFC) is a congestion management technique that temporarily pauses data transmission to prevent system overload.

Table 1: Feature History Table

Feature Name	Release Information	Feature Description
LLFC	Release 7.5.1	Link-Level Flow Control (LLFC) helps prevent data loss by managing congestion on network links. By temporarily pausing data transmission when a receiving device becomes congested, LLFC ensures that the network can handle high traffic volumes without dropping packets, maintaining data integrity and performance.

LLFC in network congestion

When a receiving device experiences congestion, it sends a pause frame to the transmitter. Upon receiving this frame, the transmitter temporarily halts data transmission. The LLFC feature affects all traffic on the link and allows separate configuration for transmission and reception. By default, LLFC is disabled in both directions.

Guidelines and limitations for link level flow control

LLFC includes specific configuration guidelines and limitations:

- Ethernet interfaces do not auto detect the LLFC capability. LLFC must be configured explicitly.
- Enabling LLFC requires a part of the buffer to be reserved. This reservation reduces the available shared buffer space.

- Configuration time quanta of the pause frames is not supported.
- On each Ethernet interface, the switch can enable either Priority Flow Control (PFC) or LLFC, but not both. For more information , see PFC.

Note When both PFC and LLFC are enabled, LLFC is selected.

Configure LLFC egress

Follow these steps to configure LLFC egress on an interface.

Procedure

Step 1 Enable the privileged EXEC mode.

```
Device> enable
```

Enter your password if prompted.

Step 2 Enter the global configuration mode.

```
Device# configure terminal
```

Step 3 Enter the **interface** <*Gigabit Ethernet interface*> command to configure an interface type and enter interface configuration mode.

```
Device(config)#interface tenGigE 0/4/0/0
```

Step 4 Enter the **flow-control egress** command to enable the interface to receive and process pause frames.

```
Device(config-if)# flow-control egress
```

- Configuring LLFC on an interface causes the interface to flap which results in a momentary traffic loss.
- The **flow-control** keywords and their expected behaviour:
  - **egress:** Enables the receiving of flow control pause frames.
  - **ingress:** Enables the sending of flow control pause frames (unsupported).
  - **bidirectional:** Enables the receiving of flow control pause frames, but does not allow sending, as ingress flow control is not supported.

Step 5 Enter the **exit** command to exit the interface configuration mode.

```
Device(config-if)# exit
```

Step 6 Verify the **flow-control** configuration with the **show interfaces** <*interface-id*> **flow-control** command.

```
Device# show interfaces tenGigE 0/4/0/0 flow-control
Flow-control Send: off
Flow-control Receive: on
```

Mismatched LLFC configurations

The transmit and receive directions can be configured separately, and each device on the network can have a different LLFC configuration. The table demonstrates the interaction between devices with configurations that do not match.

Switch A	Switch B	Description
LLFC configured to receive and transmit PAUSE frames.	LLFC configured to receive PAUSE frames.	Switch A can transmit 802.3x PAUSE frames and honor 802.3x PAUSE frames. Switch B can only receive 802.3x PAUSE frames.
LLFC configured to receive and transmit PAUSE frames.	LLFC configured to transmit PAUSE frames.	Switch A can transmit 802.3x PAUSE frames and honor 802.3x PAUSE frames. Switch B can transmit 802.3x PAUSE frames but will drop all received PAUSE frames.