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Cisco Nexus Hyperfabric — Dynamic Load Balancing

Dynamic Load Balancing

Nexus Hyperfabric provides dynamic load balancing mechanisms to distribute network traffic effectively across a network fabric. These dynamic load balancing capabilities help to:

- optimize traffic distribution across the fabric
- prevent network congestion, and
- support lossless data transmission.

By default, the load balancing option is ECMP (set to **None**) for all switches. In addition to ECMP, you can also select one of these load-balancing options for switch models that support these modes:

- **Adaptive routing for AI applications:** This mode (labeled **Adaptive routing and switching** in the GUI) enables optimized bandwidth utilization for RDMA traffic in AI networks, and is targeted at optimizing lossless traffic. This mode requires server endpoints with NVIDIA® network interface cards (NICs) that support adaptive routing are installed and configured and requires an active Adaptive Routing add-on feature license. For more information, refer to [Subscriptions](#).
- **Flowlet load balancing:** Divides packet bursts into smaller flowlets to route traffic across multiple paths without causing out-of-order packets. This mode works with standard Ethernet or RDMA over Converged Ethernet version 2 (RoCEv2) NICs and does not require an add-on feature license.

Note

You can configure only one load-balancing mode on a switch at a time. Select the mode that matches your server NICs, network architecture, and software subscription.

Table 1: Hardware and license requirements summary

	Adaptive Routing	Flowlet load balancing
Supported switch models	Cisco HF6100-64ED	Cisco HF6100-64ED
Server NIC requirements	Supported NVIDIA SuperNICs (NVIDIA BlueField-3, ConnectX-7, and ConnectX-8)	Standard NICs (operates over standard RoCEv2 and ethernet NICs)
Fabric scope	GPU backend networks	Converged frontend and backend networks
Licensing	Requires an additional Adaptive Routing add-on feature license	Included in standard subscription tiers

Enable adaptive routing

Ensure that your fabric topology has

- switch models that support adaptive routing for AI applications
- NVIDIA® NICs that support adaptive routing are installed and configured on the server, and

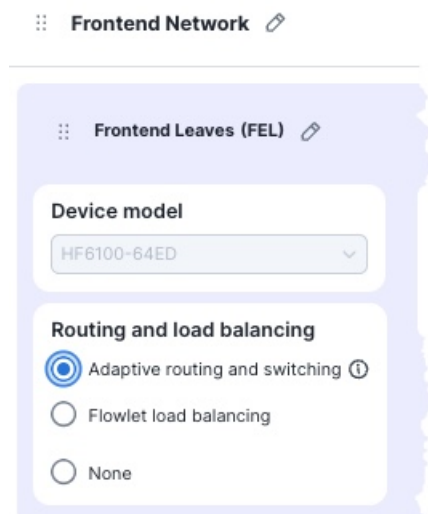
- an Adaptive Routing add-on feature license that is redeemed and available.

 Note

You must enable adaptive routing in all connected switch groups, such as spine and leaf groups, that have active Adaptive Routing add-on feature licenses.

- Step 1** Choose **Fabrics**, then select the fabric where you want to enable Adaptive Routing.
- Step 2** If the fabric is not in edit mode, select **Switch to edit mode**.
- Step 3** In supported switch groups, enable **Adaptive routing and switching** within the **Routing and load balancing** area.

Figure 1: Enable adaptive routing



- Step 4** Select **Save fabric blueprint** to apply the configuration.



Note

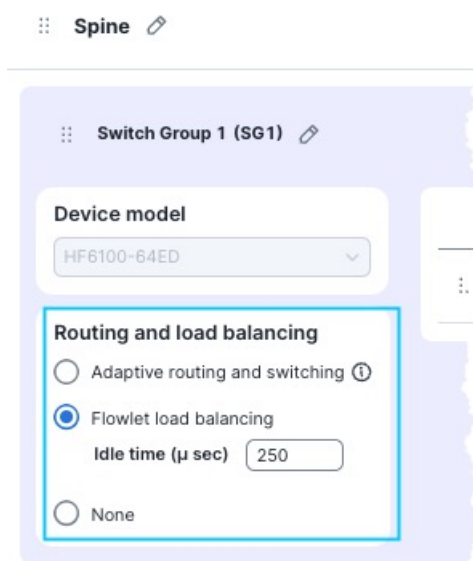
If adaptive routing is not enabled on all applicable switch groups, you will be prompted to enable the appropriate switch group.

Enable flowlet load balancing

Ensure that your fabric topology includes switch models that support flowlet load balancing.

- Step 1** Choose **Fabrics**, then select the fabric where you want to enable flowlet load balancing.
- Step 2** If the fabric is not in the edit mode, select **Switch to edit mode**.
- Step 3** In supported switch groups, enable **Flowlet load balancing** in the **Routing and load balancing** area.
- Step 4** In **Idle time**, enter the minimum duration (in microseconds) of a traffic gap that triggers the switch to identify a new flowlet and reroute it along the best available path.

Figure 2: Enable flowlet load balancing



Step 5 Select **Save fabric blueprint** to apply the configuration to the fabric topology.