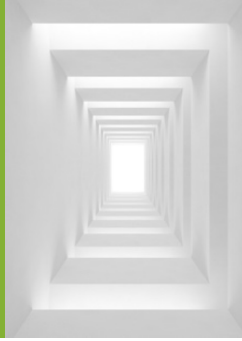


Juniper® Validated Design

JVD Test Report Brief: AI Data Center GPU Backend Fabric with Juniper® RDMA-aware LB and BGP-DPF



test-report-brief-JVD-AICLUSTERDC-UEFQPP-01-01

Introduction

This JVD test report describes the methodology and results to validate the features and components of the AI cluster GPU Backend Fabric solution using Juniper RDMA-Aware Load Balancing (RLB) and Juniper BGP Deterministic Path Forwarding (BGP-DPF) in the GPU Backend Fabric. This fabric is built based on AI-optimized Juniper Data Center QFX5240 series switches running 23.4X100-D41.1-EVO and Nvidia H100 DGX GPU servers.

Test Topology

Figure 1. Leaf to Spine Nodes connectivity with coloring.

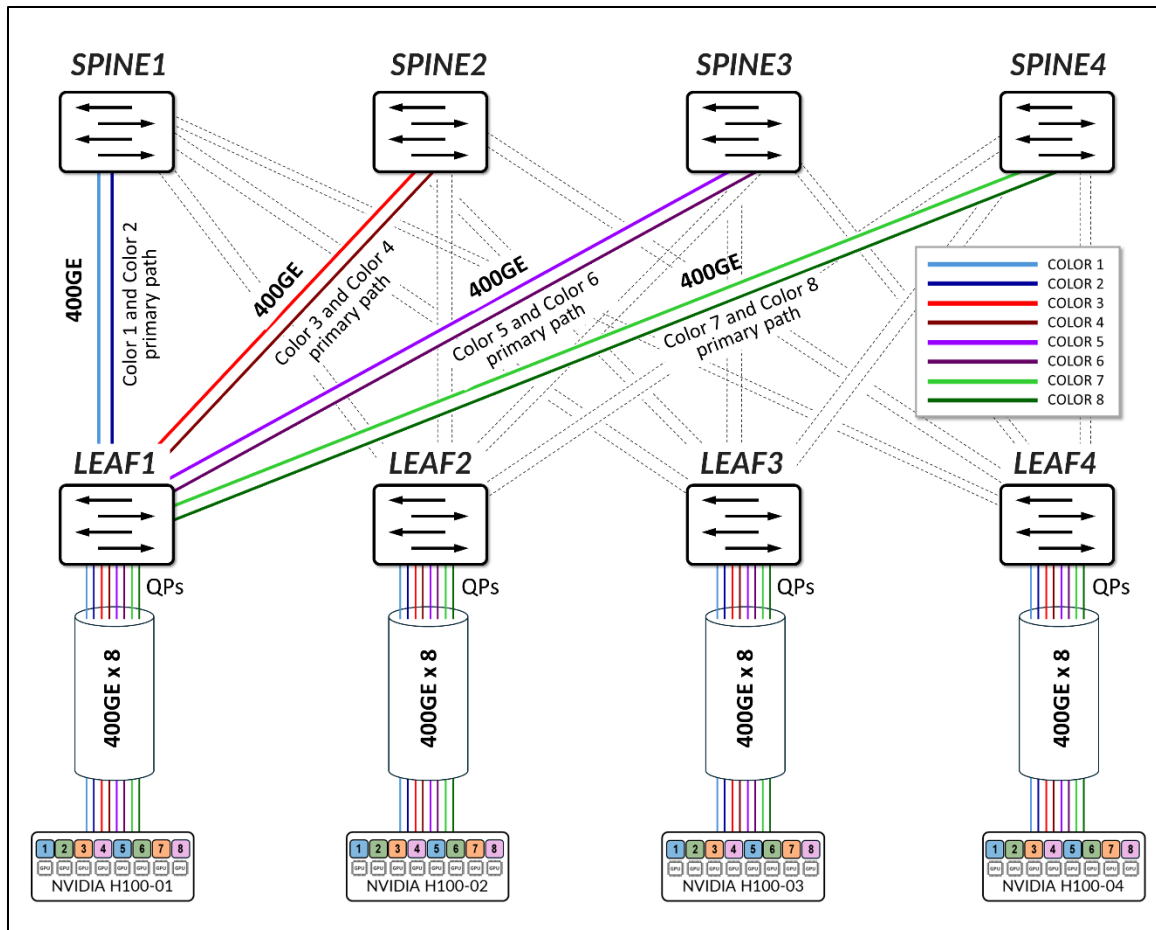
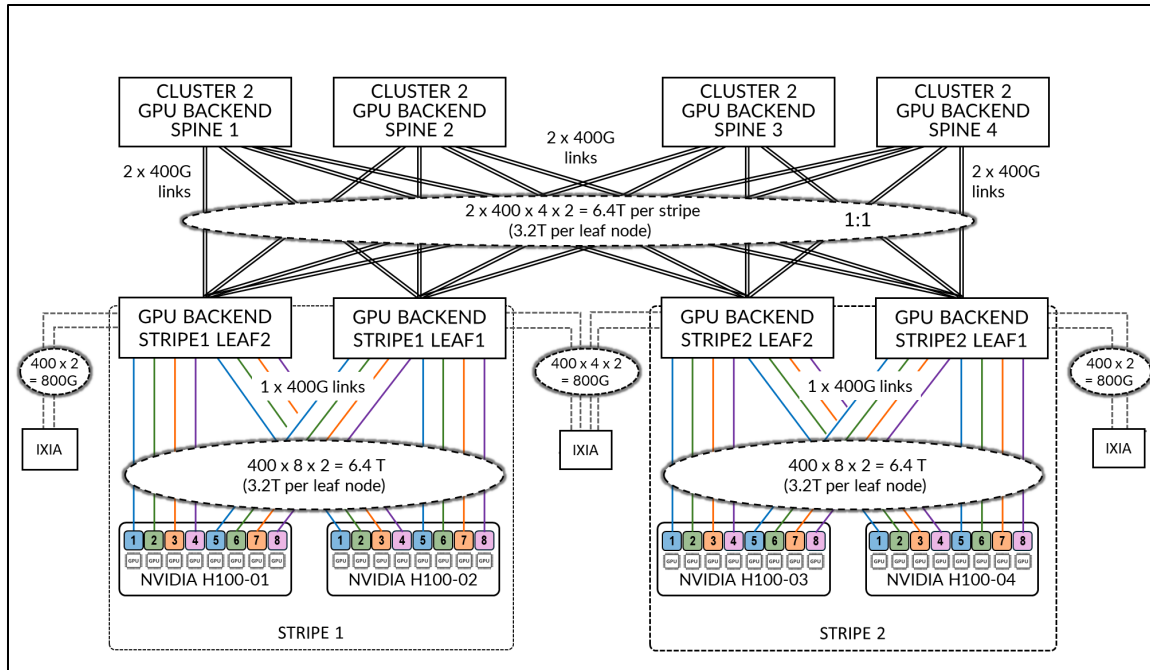


Figure 2: GPU to Leaf node rail optimized connectivity.



Platforms Tested

Table 1 lists the platforms tested for this JVD. For more details on all supported platforms and OS versions, see the Validated Platforms and Software section in the JVD document.

Table 1:

Tag	Role	Model	OS	Linecard	RE	Fabric	VC	Helper/DUT
R0	Spine1	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R1	Spine2	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R2	Spine3	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R3	Spine4	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R4	Leaf1	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R5	Leaf2	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R6	Leaf3	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
R7	Leaf4	qfx5240-64qd	23.4X100-D41.1-EVO	NA	NA	NA	NA	DUT
S0	Server1	Nvidia H100	nccl-2.26.5-1	NA	NA	NA	NA	DUT
S1	Server2	Nvidia H100	nccl-2.26.5-1	NA	NA	NA	NA	DUT
S3	Server3	Nvidia H100	nccl-2.26.5-1	NA	NA	NA	NA	DUT
S4	Server4	Nvidia H100	nccl-2.26.5-1	NA	NA	NA	NA	DUT
RT0	Tgen	Ixia	IxiaOS	NA	NA	NA	NA	Helper

High Level Features

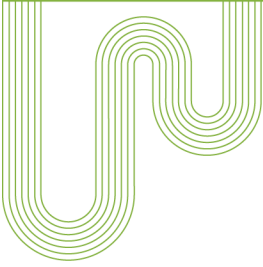
The following table shows the high level features that were tested with this JVD.

Table 2: Features Tested

Category	Details
Release	23.4X100-D41.1-EVO
Platform	QFX5240
Feature Coverage	Baseline Features
	BGP Deterministic Path Forwarding (DPF)
	BGP Unnumbered auto-discovery
	IPv6 Neighbor Discovery
	RDMA-aware Load Balancing (RLB)
	IPv6 Stateless Address Autoconfiguration (SLAAC)
	HW Assisted Bidirectional Forwarding Detection (BFD)
	Load Balancing
	DSB (Dynamic Load Balancing)
	Global Load Balancing Multilink Support
	Congestion Control
	- Drop Congestion Notification
	- DCQCN
	- PFC Watchdog
	- XON
	Telemetry
	- Dynamic packet capture support
	- Per-interface ingress shared buffer pool allocation support
	- Support optics pre-fetch BER rate in QFX5 EVO
	- FEC Histogram and stats and BER
	- ECN Accounting
	- PFC Accounting

Version Qualification History

This JVD was initially qualified on Junos Evolved OS Release 23.4X100-D41. For more details on all supported platforms and OS versions, see the Validated Platforms and Software section in the JVD document.

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