

# Intel Gaudi Interconnect Architecture

Feature	Gaudi 2	Gaudi 3
Ethernet Ports	24 × 100 Gbps	24 × 200 Gbps
Intra-node Links	21 ports (all-to-all within 8-card server)	21 ports (all-to-all within 8-card server)
Scale-out Links	3 ports (external cluster connectivity)	3 ports (external cluster connectivity)
Intra-node Bandwidth	2.1 Tbps (262.5 GB/s)	4.2 Tbps (525 GB/s)
Scale-out Bandwidth	300 Gbps (37.5 GB/s)	600 Gbps (75 GB/s)
Network Protocol	RoCE v2 over Ethernet	RoCE v2 over Ethernet
Topology	Fully connected mesh (within node)	Fully connected mesh (within node)

## Topology and Connectivity

Each Gaudi accelerator integrates Ethernet ports divided between intra-node and scale-out connectivity. Intra-node uses direct links among accelerators; scale-out connects to Ethernet switches for multi-node training.

## Implications for System Design

Schedulers can optimize for bandwidth; workloads can use hierarchical collectives; and Ethernet-based design reduces cost and simplifies integration.

## Software Stack and Integration

SynapseAI SDK, RoCE v2 drivers, and standard frameworks support topology-aware distributed training.

## Key Design Advantages

Scalable Ethernet Fabric, Low-Latency RDMA, Topology-Aware Communication, Simplified Operations.

## Summary

Intel Gaudi interconnect prioritizes openness, scalability, and cost efficiency using Ethernet and RoCE for large-scale AI training workloads.