

The Nokia logo is displayed in white, uppercase letters against a dark blue background. The letters are spaced out and have a clean, sans-serif font.

Building out Modern and Scalable DC Fabric

Alperen Akpinar

May '26 - CHNUG



Data Center Network Evolution

Speed, Tech, Ops

10/100/1000M

10/25G

100G

400G

800G+

1.6T+

STP

VLANs

VPLS

VXLAN

BGP/EVPN

UET/uSIDs/DCQCN



Legacy Ops

SNMP / CLI

Manual configs
Box-by-box management



Simple Automation

Config templates

Scripts
Basic monitoring



Intent-Based Automation

Programmable NOS

gNMI, YANG APIs
Event-driven workflows



AI-Driven Operations

Telemetry at scale
Closed-loop automation
AIOps integration



2010s

2020s

2030s

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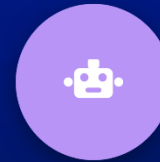
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Coming soon >>>

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AI & Cloud Data Centers Are Getting Bigger!

2013

Then...largest DC in Europe



Meta's Lulea Data Center

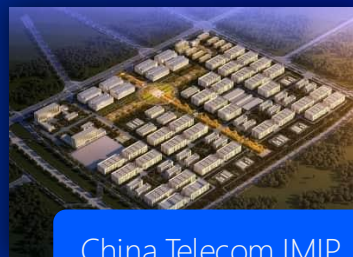
30 MW*

84,000 m²

Source: [Baxtel](#)

2025

Largest DC in the World



China Telecom IMIP

150 MW

1,000,000m²

AI is resetting the expectation of what a "large Data Center" is

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Meta's Altoona DC

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465,000 m²

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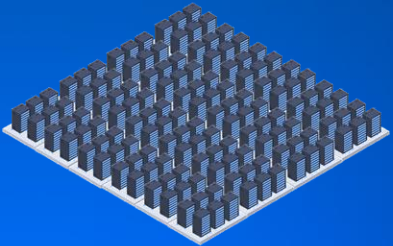
2026

Largest DCs



GigaWatts

NOKIA



AI is resetting the expectation of what a "large Data Center" is

Networking for the AI era



Builds on and leverages
kubernetes



Event-Driven-Automation

Intent-Based Network management, automation and orchestration



DDoS Protection

DDoS Detection, Mitigation and scrubbing



AI for network operations



Edge Cloud



WAN



Internet



Public cloud

IP connectivity

Optical connectivity



Data center fabric

Reliable data center switching with predictable and simplified operations for your data center environments



Data center gateway

High performance DC to DC, DC to internet, DC to WAN and DC to clouds interconnect and DDoS mitigation

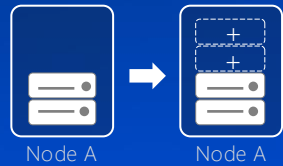


Optical DCI

Dedicated optical networking enables high bandwidth, very low latency and highly secure data transmission for business-critical applications

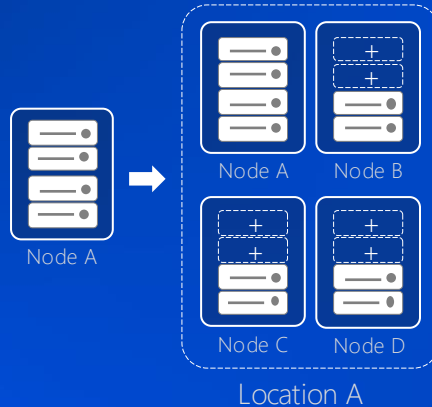
Scaling the number of GPUs

Scale-Up



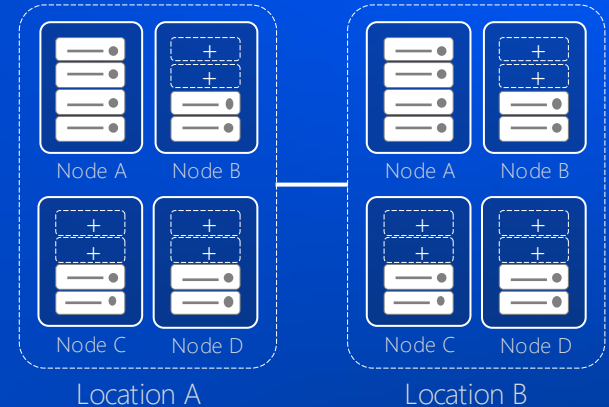
AMD UAlink
Broadcom SUE
Nvidia NVSwitch
PCIe Gen5 / Gen6
OCP ESUN

Scale-Out



InfiniBand
ROCEv2
UEC

Scale-Across

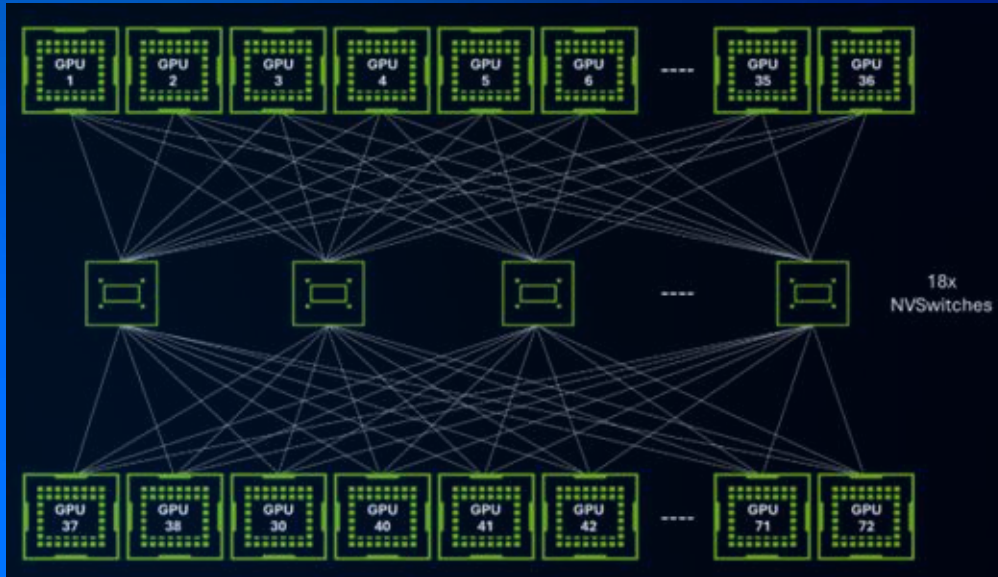
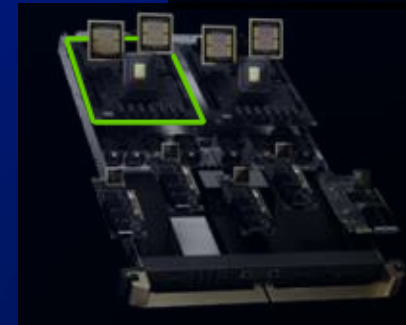
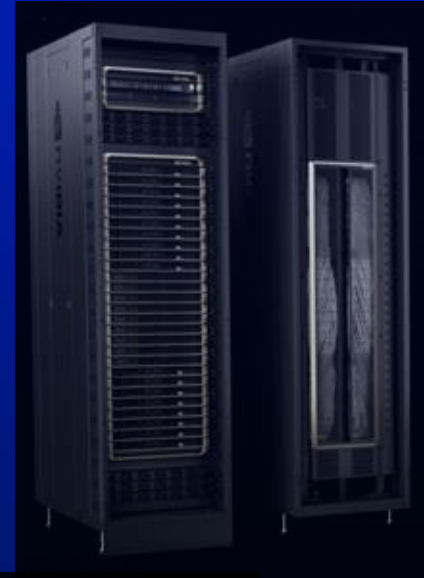


DCI (Data Center Interconnect) with optical or IP solution
RDMA over WAN
Encryption

GB200 NVL72 Intra-Rack Connectivity

Nvidia's scale-up network:

- 9 NVLink switch (18 chip) each with 144 ports at 100GB/s in a NVL72 rack
- Every GPU is connected to NVLink switch with 18x 100GB/s = 1.8TB/s via NVLink Spine
- NVLink Spine: a copper fabric in the rack that connects compute trays (GPUs) to NVLink switches

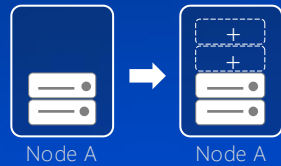


NVLink Spine

Compute Tray (2x GB200)

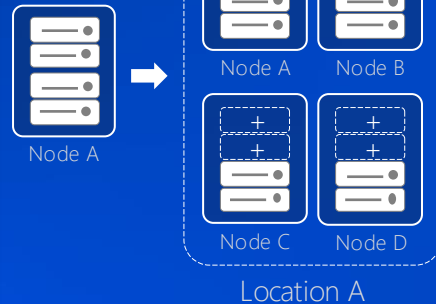
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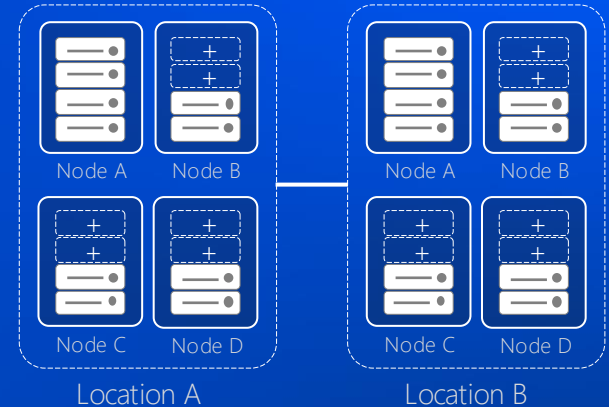
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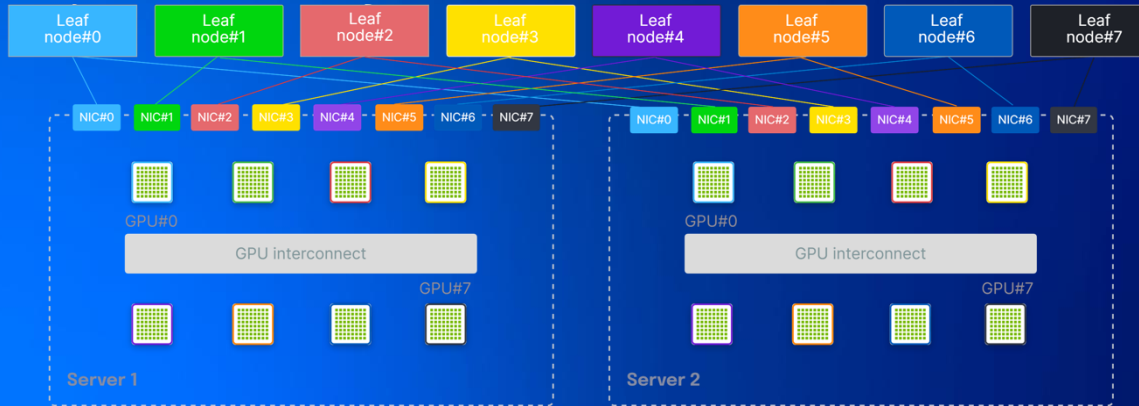
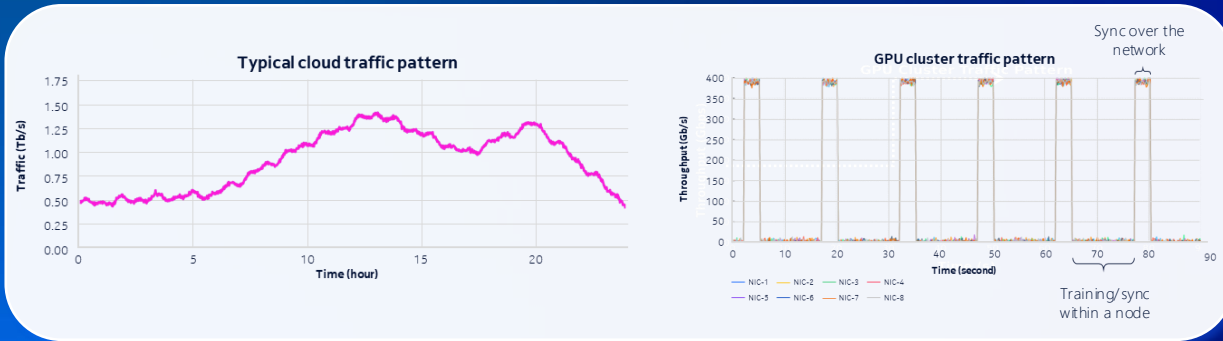
InfiniBand
ROCEv2
UEC

Scale-Across



DCI (Data Center Interconnect) with optical or IP solution
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Encryption

Scale-out: AI traffic is different from traditional apps



High-speed GPU interconnect: NVLink, InfinityFabric etc.

Job Completion Time (JCT): total time taken for data to be transferred across that network during the training process

Balanced GPU flows



Imbalanced GPU flows

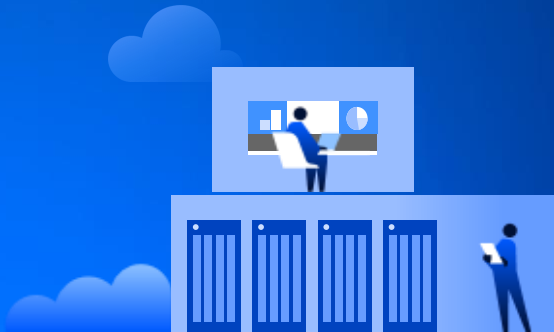


Directly affects training step times; slow GPUs delay all others!

AI-ready networks

Between data centers

Inside data centers



Data center

AI-ready networks

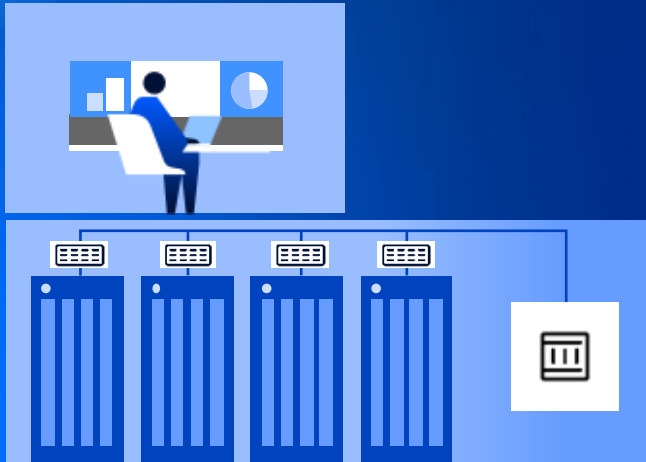
Between data centers

Inside data centers

Scalable

Lossless

Automated



800G / 1.6T AI backend fabrics

- AI features on 7220 IXR-H5/H6 and 7250 IXR Gen3+

AI-ready networks

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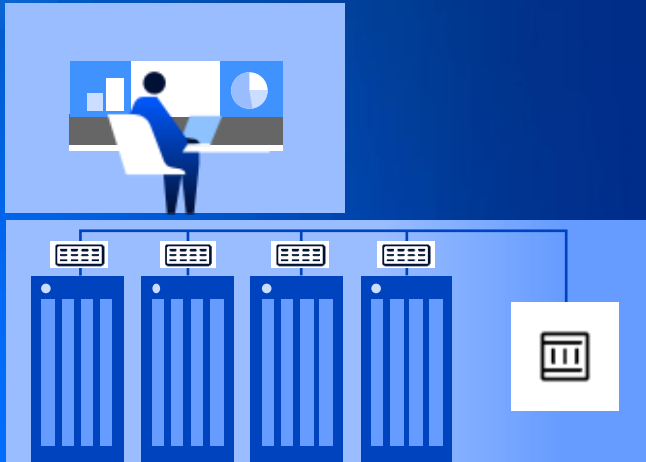
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Load balancing and QoS

- DLB and RDMA aware (Q-pair) hashing
- DCQCN (PFC/ECN), MRC...

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Advanced AI telemetry

- Congestion indicators
- Real time insight

AI-ready networks

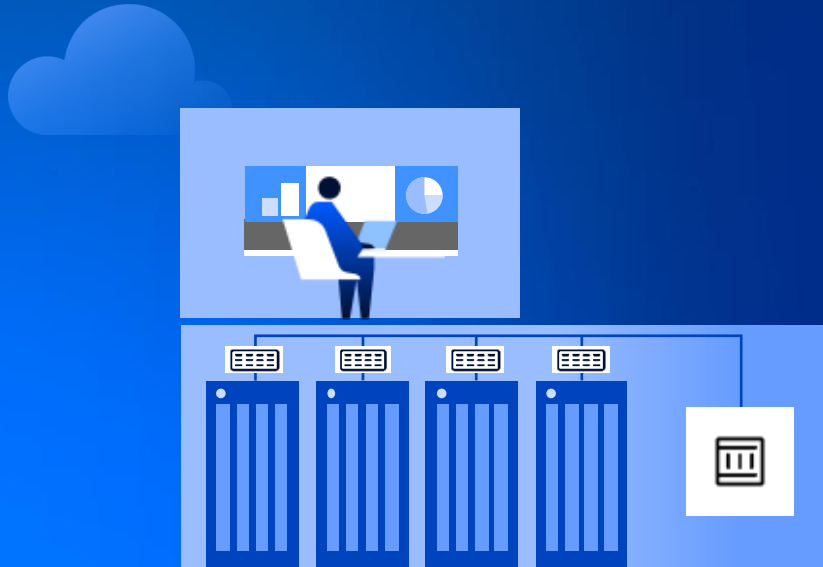
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Backend multi-tenancy

- Lightweight and secure segmentation

AI-ready networks

Between data centers

Inside data centers

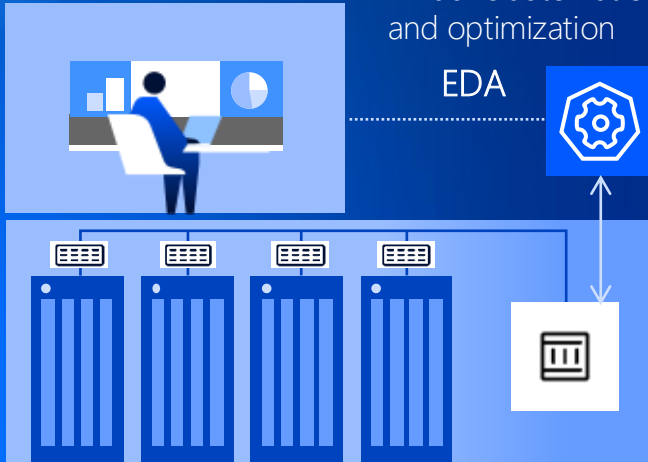
Scalable

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AI fabric automation
and optimization

EDA



800G / 1.6T AI backend fabrics

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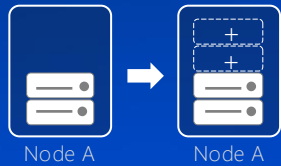


Backend multi-tenancy

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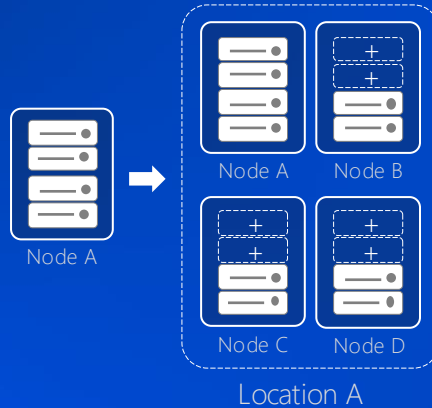
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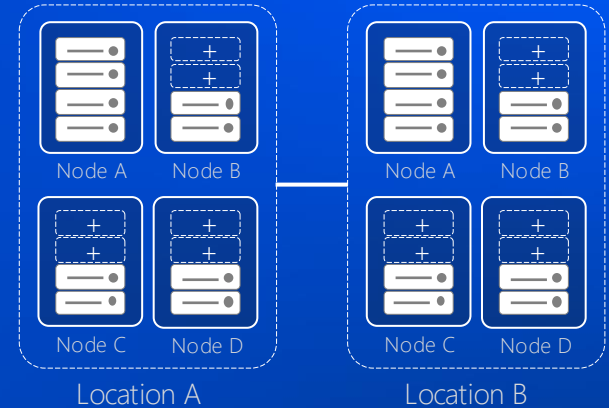
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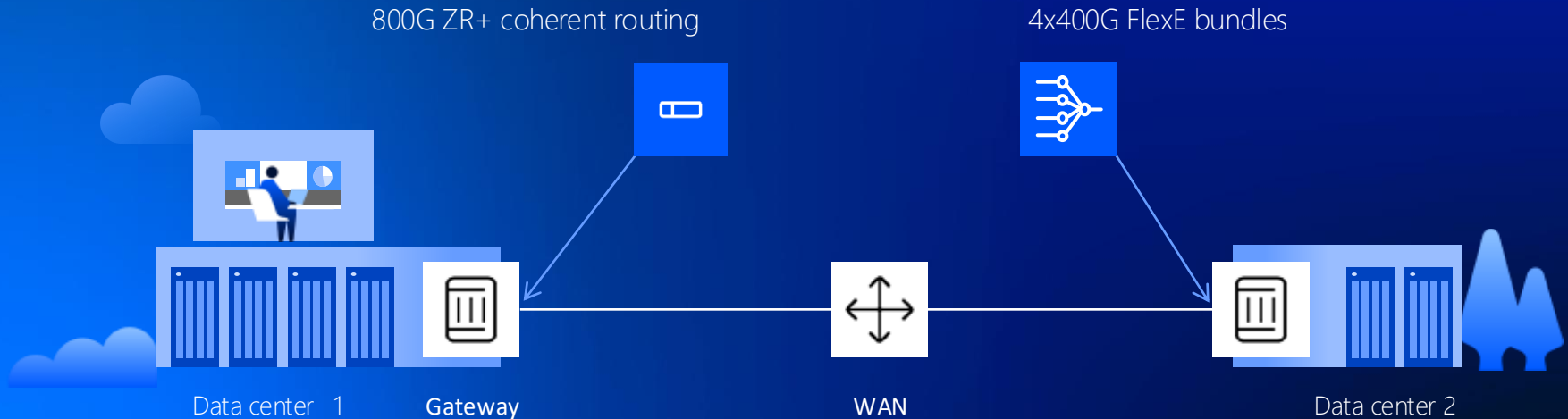


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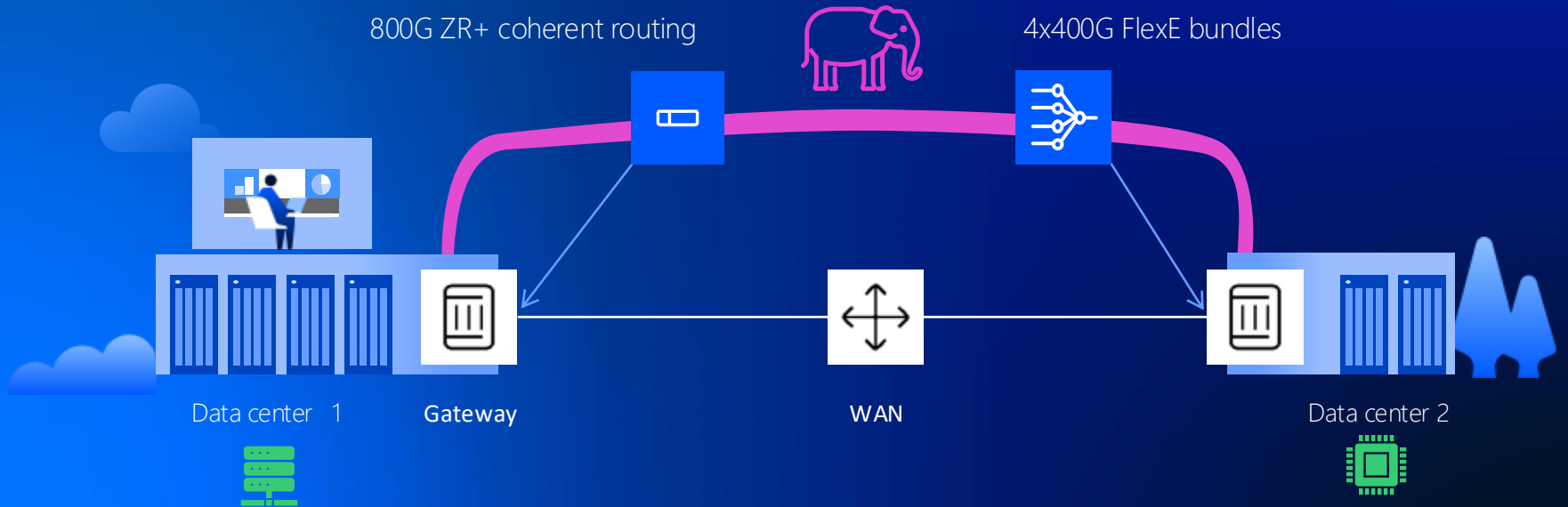
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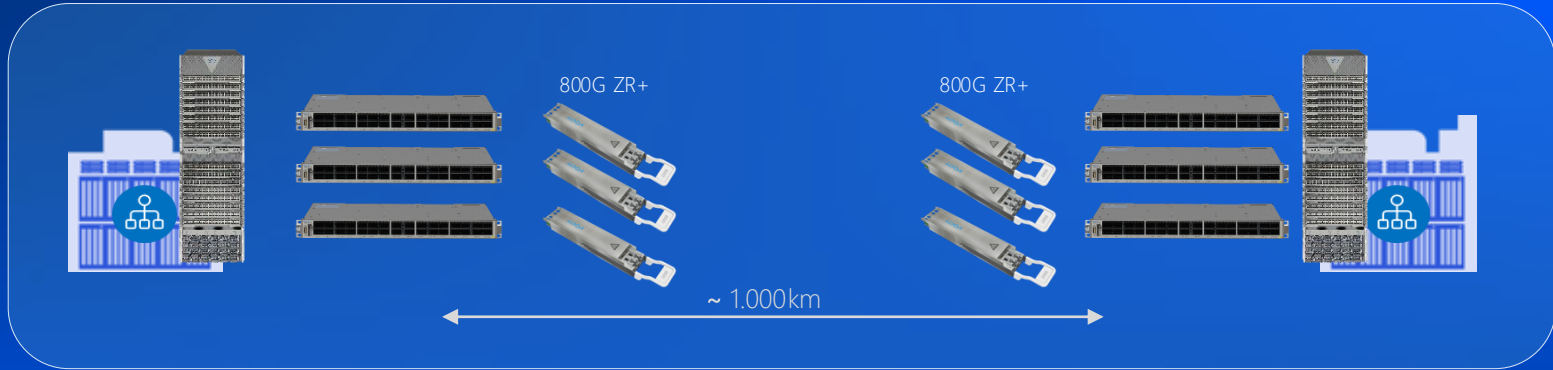
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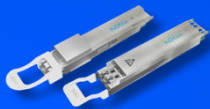
Scale across: Network requirements are similar to DCI



High-Density Scale-Across Router

Abstraction of internal DC network for scale
Managing WAN-realities with many paths

- Dynamic provisioning and steering of traffic
- High-frequency reporting of telemetry/congestion data
- Shared underlying



800G ZR/ZR+ (C band and L band)

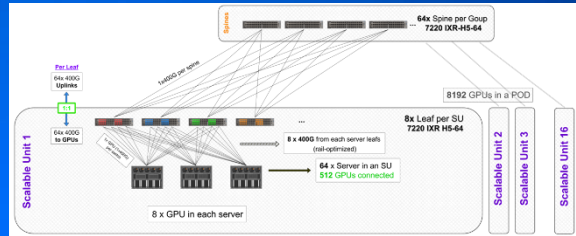
Maximum capacity
Single RU Router @ 25T
Rack systems @ ,576 PB

NOKIA

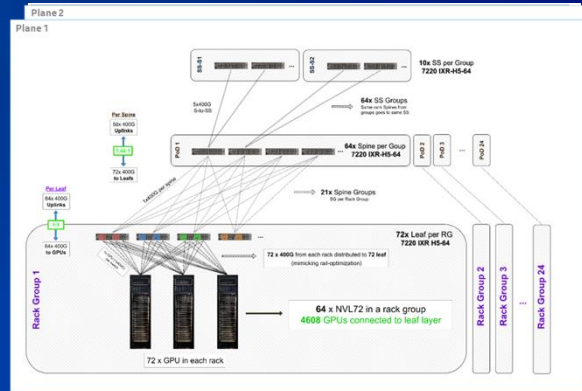
Nokia AI Deployment Examples

Based on Ethernet, open and future-safe networking

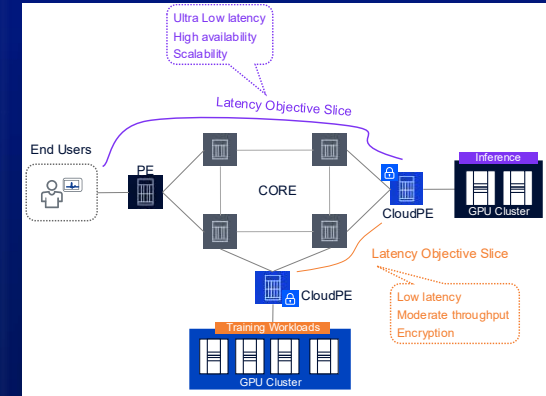
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 - Two-tier topologies



- “Giga” AI Factories @100K+ to 1M GPUs
 - Multi-plane topologies
 - Advanced routing, QoS, and load balancing



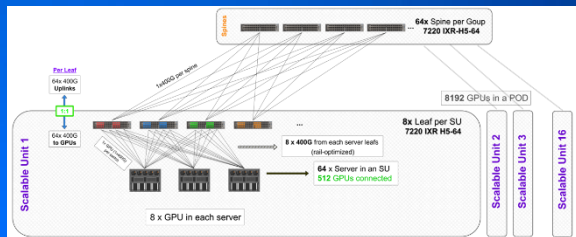
- Inference Edge Clusters
 - Optimized for size and consolidation
 - Integrated WAN interconnect



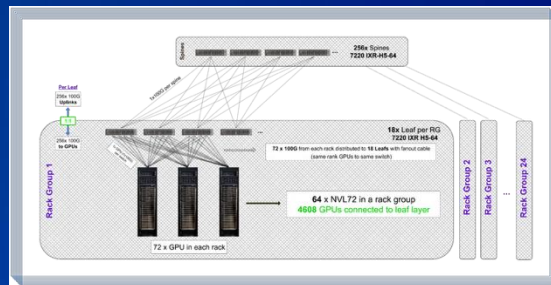
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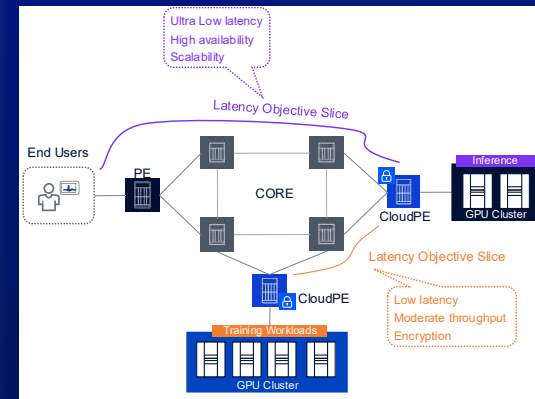
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Building for open

Consistently raising the bar



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