



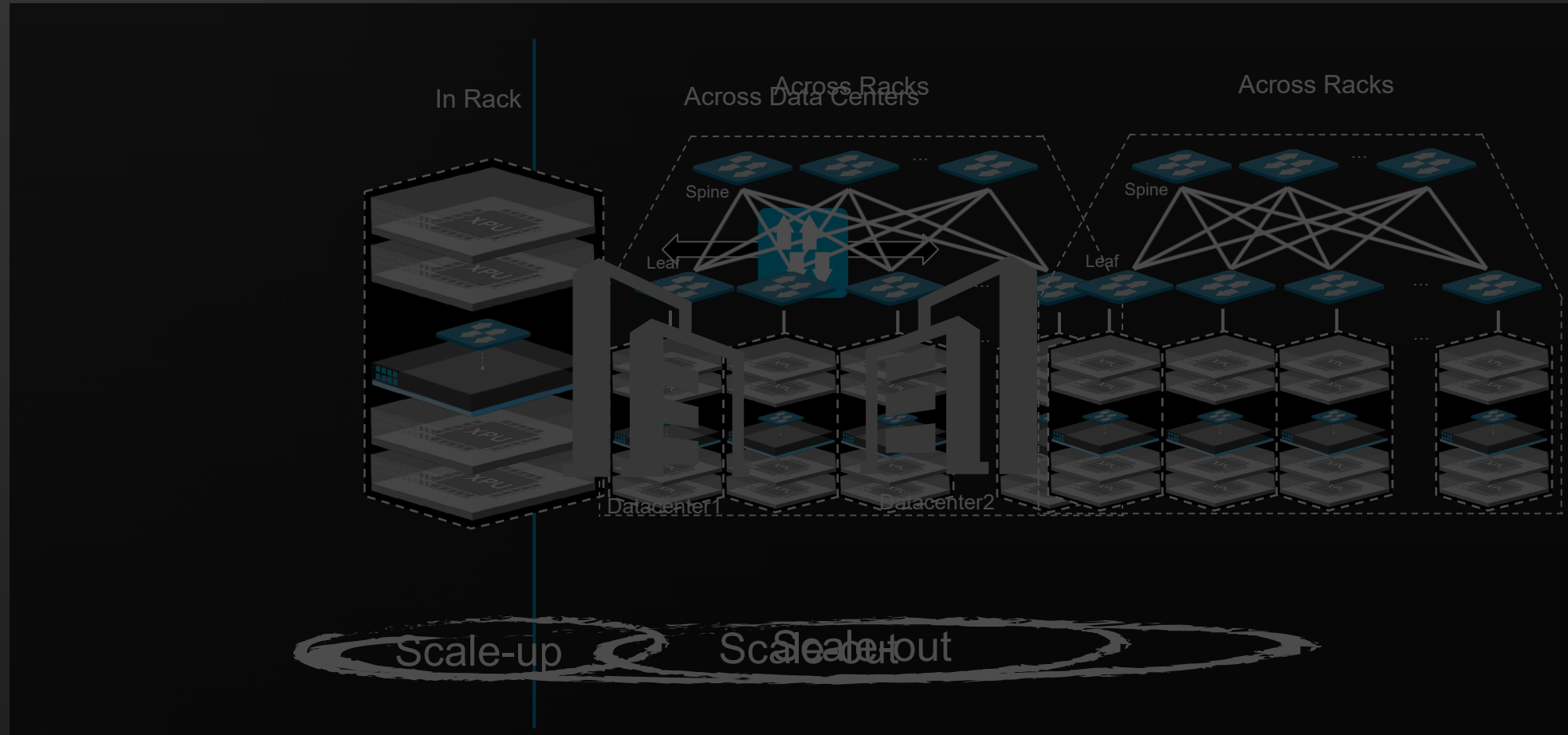
# Scaling to Super Intelligence

Ram Velaga, SVP/GM, Broadcom

Aug 5, 2025

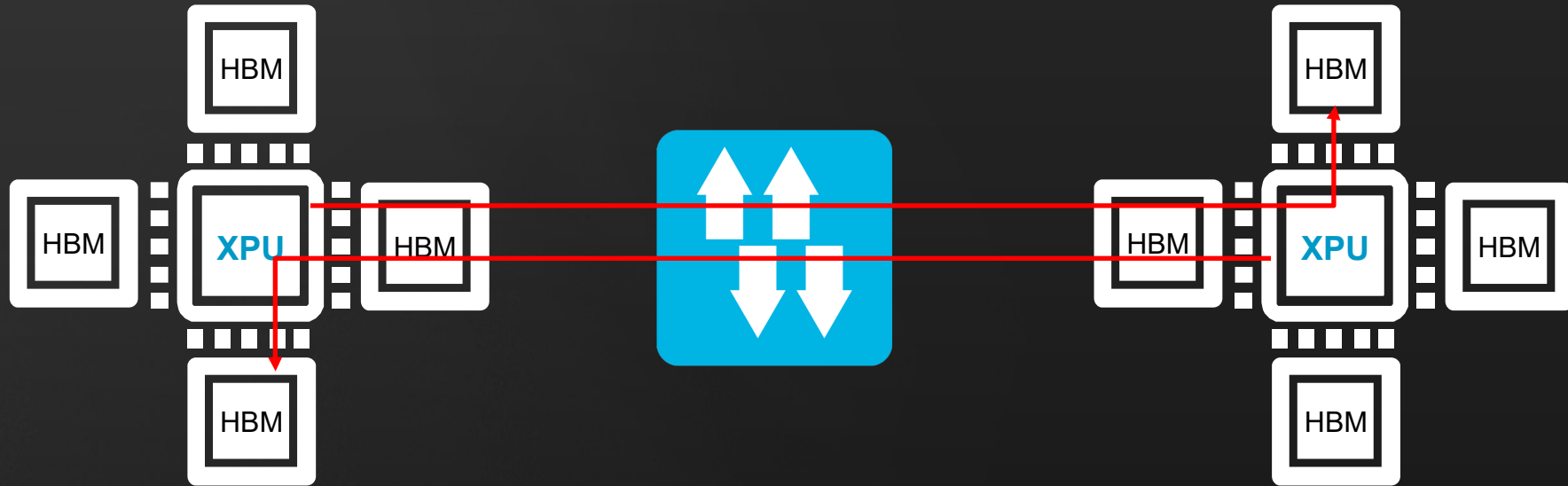
Embargoed till Aug 5<sup>th</sup>, 2025, 11:15 am Taiwan Time

# AI Scale-up and Scale-out Networking



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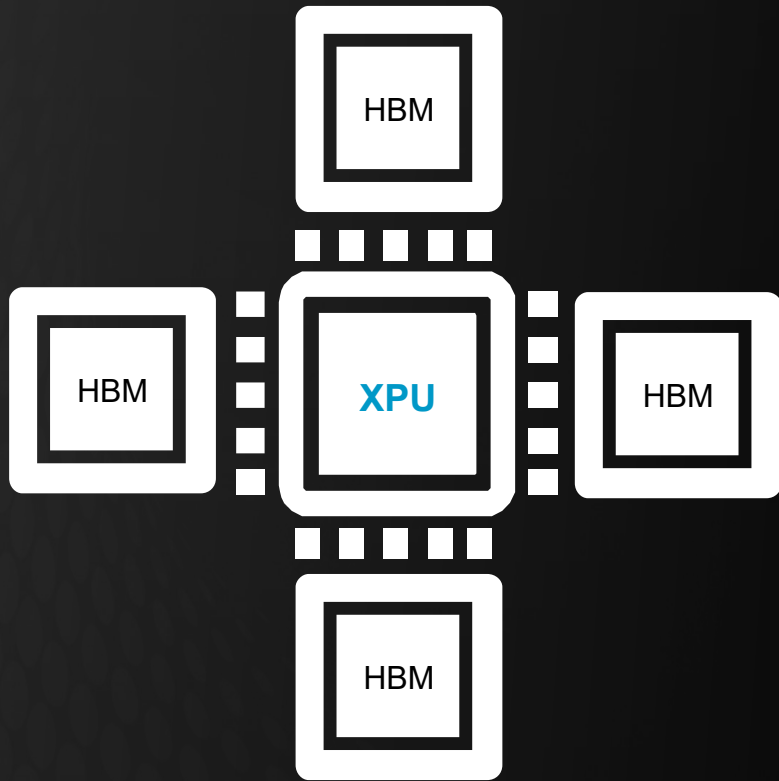
# XPU Scale-up: High Bandwidth Memory Sharing Across XPUs



4 x HBM3E (9.6Tbps) → 38.4Tbps  
8 x HBM4 (12.8Tbps) → 102.4Tbps

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# XPU Scale-up Requirements



- 1 High bandwidth
- 2 Efficient data transfer
- 3 Reliable connectivity

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# Addressing Scale-up Networking...



Very high bandwidth per XPU

High bandwidth Ethernet switches:  
• 50Tbps → 100Tbps → 200Tbps

Increasing SerDes lane speeds :  
• 100G → 200G → 400G



Directly connecting 512+ XPU



Not constrained to one rack

Copper, CPC, lower power pluggables & CPO



Reliable and power efficient interconnect (copper or fiber)

Advanced semiconductor manufacturing  
• 5nm → 3nm → 2nm+

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# Scale-up Networking



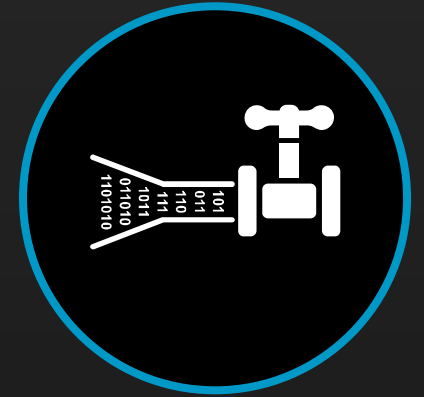
Low-latency



Optimized  
headers



Link level retry



PFC or credit-  
based  
flow control

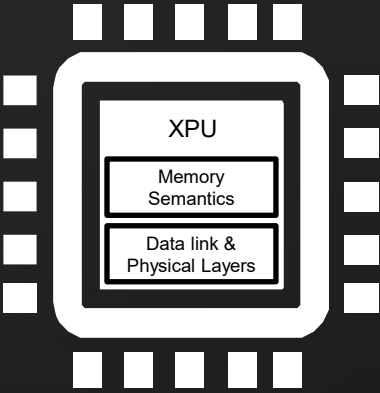
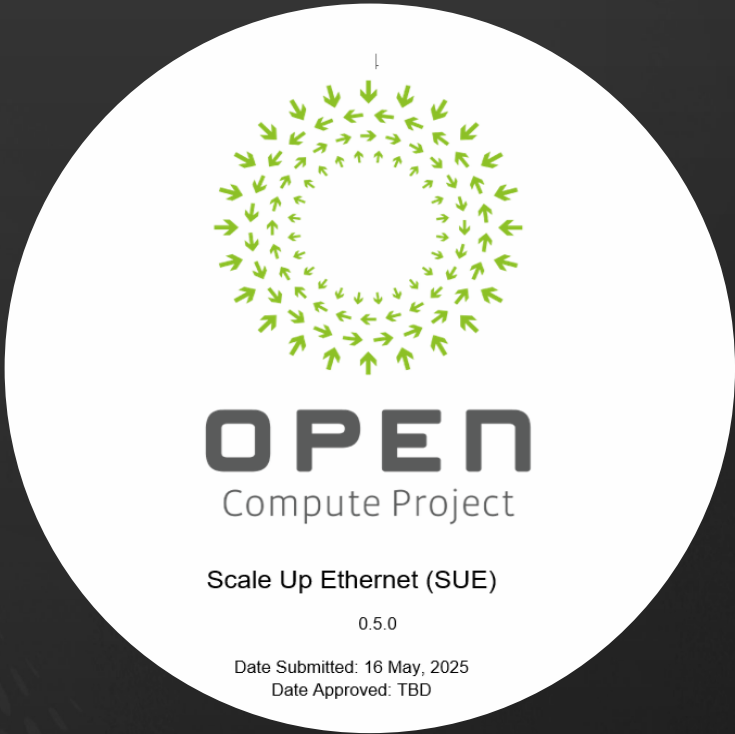
Efficiency

Reliability

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# OCP Scale-up Ethernet Contribution

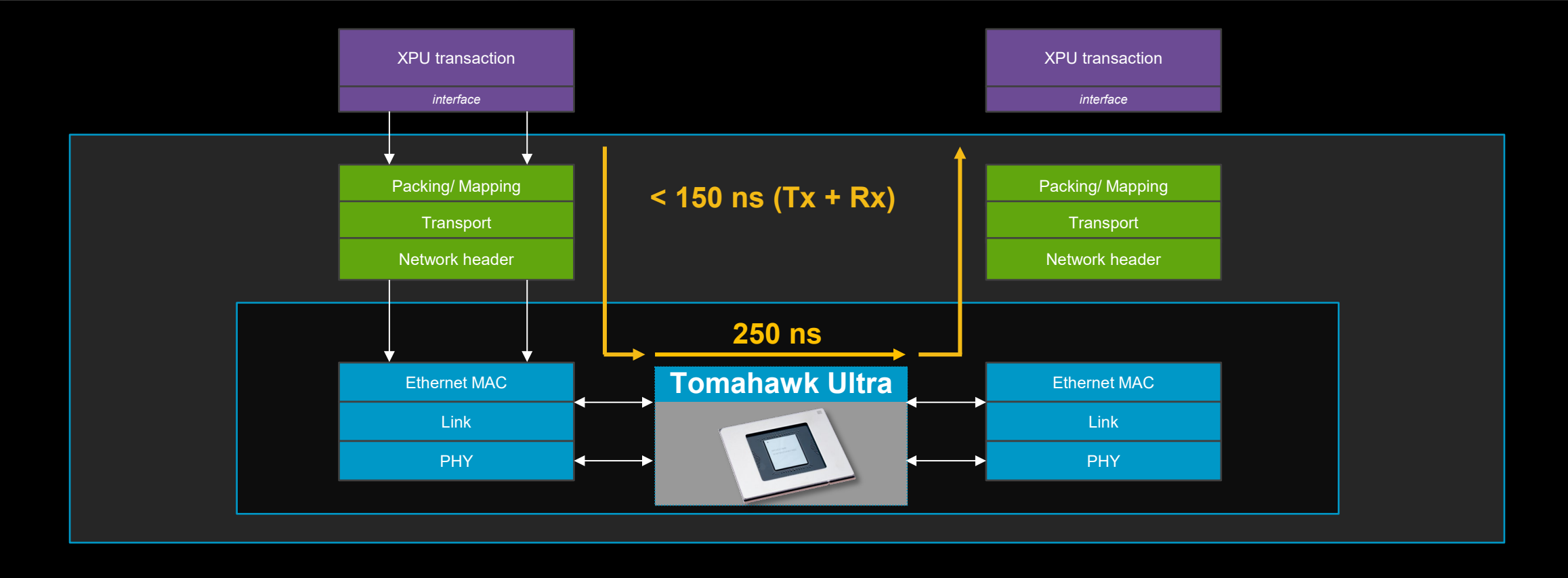


Scale-up Ethernet Specification

Drive a broad ecosystem to build high performance, efficient and reliable scale-up systems

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# Scale-Up Ethernet (SUE): End-to-end ultra-low latency < 400 ns

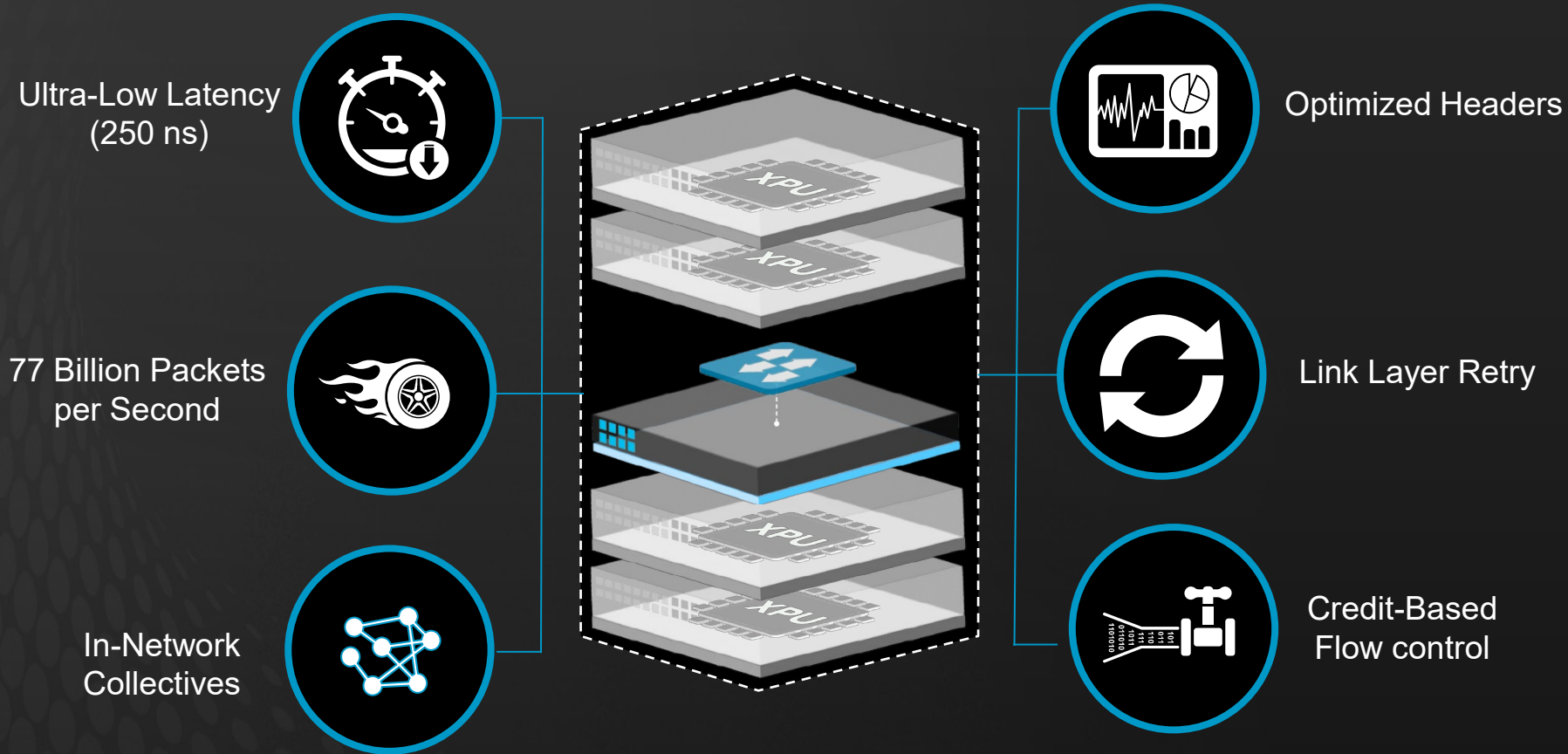


## Tomahawk Ultra: Ultra-low Latency, High-performance and Reliable Ethernet

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# Tomahawk Ultra: Ethernet Switching Reimagined



**NOW SHIPPING**

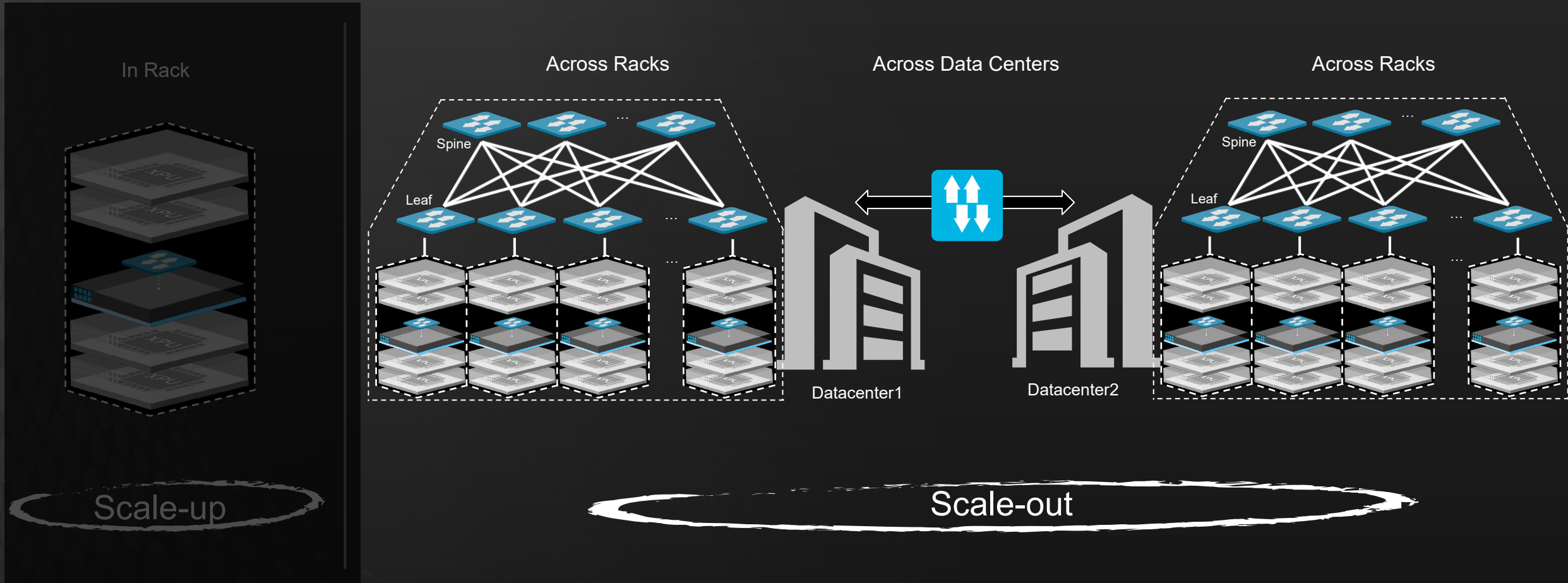


**Tomahawk Ultra**  
512 x 100G-PAM4

Shipping Now

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# AI Scale-up and Scale-out Networking

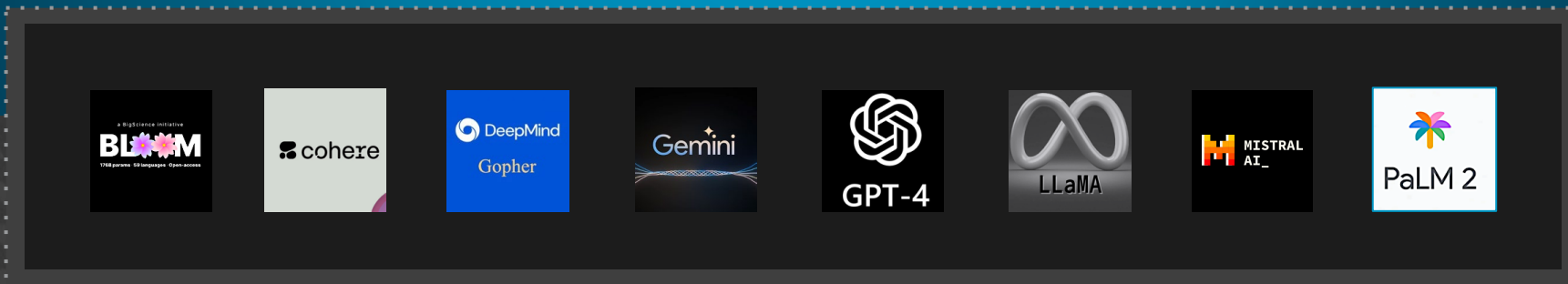


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New AI Models → 100X+ Scale → Distributed Computing

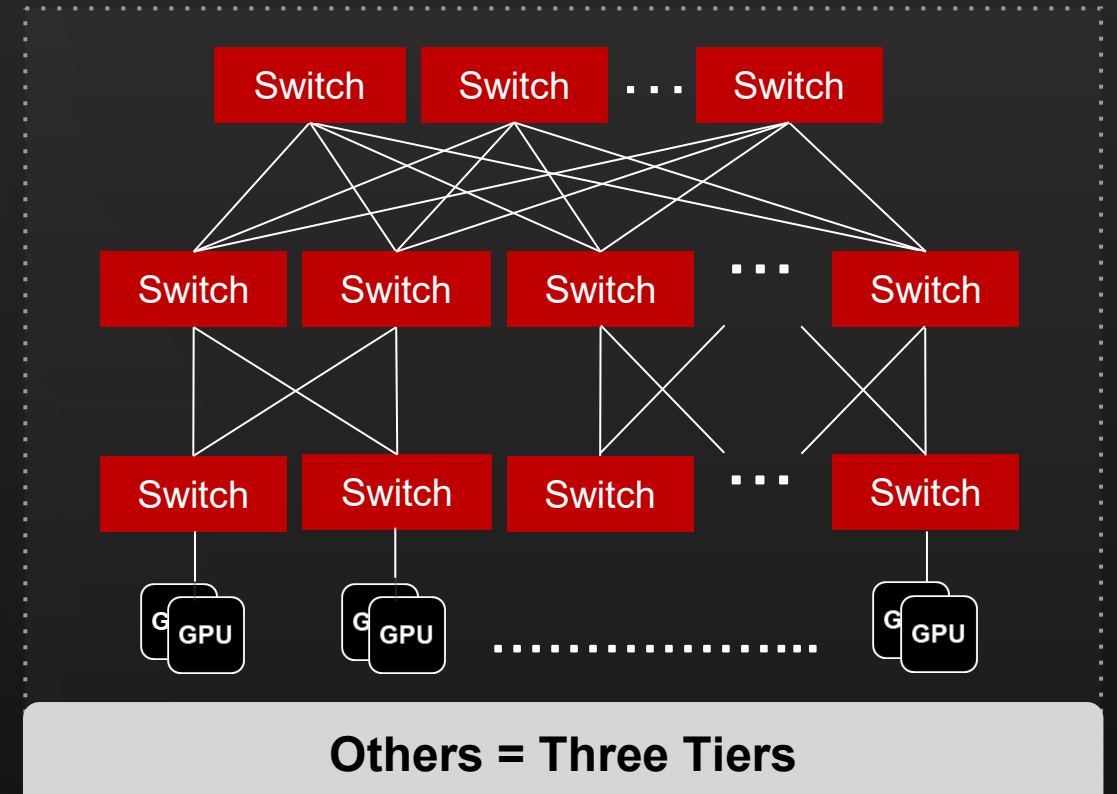
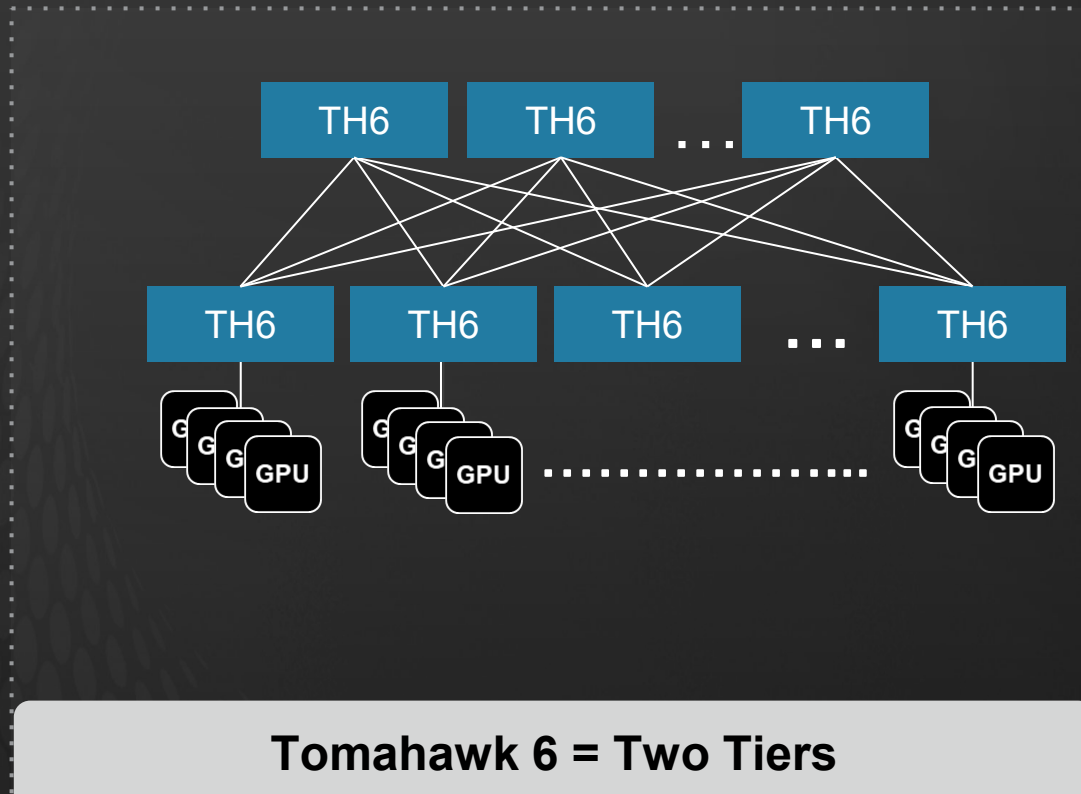
# 1 Million

## AI Accelerators



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# Tomahawk 6: Large Two-Tier Scale-Out



N = # rails

## 128K-GPU Cluster at 200Gb

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# Benefits of Two-Tier vs. Three-Tier Networks

Two-Tier
Fewer optics
Lower latency
Higher reliability
Higher performance
Lower power

Three-Tier
67% more optics
67% higher latency (5 vs. 3 hops)
>3x number of switches & 67% more optics
Difficult load balancing and congestion control, more link flaps
2x power for the network

# Jericho4: 1M+ Accelerators Across the Data Centers



**Jericho4 Delivers Scale-Out Network Interconnect**

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# Broadcom Offers Complete Coverage of HPC and AI

HPC



**Tomahawk Ultra**

51.2 Tbps

AI Scale-Up



**Tomahawk 6**

102.4 Tbps

AI Scale-Out



**Jericho4**

51.2 Tbps

Region Scale-Out

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# Call to Action



*Join the newly forming  
SUE Workstream at OCP*

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Thank You