Industry's 1st 1.6T AEC DSP for Accelerated Infrastructure Copper Connections

June 2024

Forward-looking statements

Except for statements of historical fact, this presentation contains forward-looking statements (within the meaning of the federal securities laws) including statements related to future revenue, future earnings, and the success of our product releases that involve risks and uncertainties. Words such as "anticipates," "expects," "intends," "plans," "projects," "believes," "seeks," "estimates," "can," "may," "will," "would" and similar expressions identify such forward-looking statements. These statements are not guarantees of results and should not be considered as an indication of future activity or future performance. Actual events or results may differ materially from those described in this presentation due to a number of risks and uncertainties.

Forward-looking statements are only predictions and are subject to risks, uncertainties and assumptions that are difficult to predict, including those described in the "Risk Factors" section of our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and other documents filed by us from time to time with the SEC. Forward-looking statements speak only as of the date they are made. You are cautioned not to put undue reliance on forward-looking statements, and no person assumes any obligation to update or revise any such forward-looking statements, whether as a result of new information, future events or otherwise.

Overview

Company founded **1995**	FY24 revenue **$5.5B**
Employees **6,800+**	Patents worldwide **10,000+**

Global fabless semiconductor supplier

Industry-leading data infrastructure products

Storage
HDD, SSD and
Fibre Channel controllers

Electro-optics
PAM4 DSPs, linear TIAs, drivers and
coherent DSPs

Processors
4G/5G baseband and
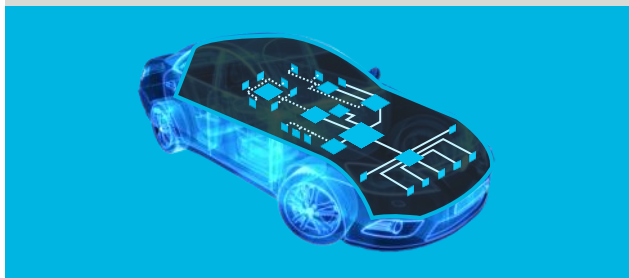data processor units (DPUs)

Networking
Ethernet switches and PHYs

Automotive Ethernet
Switches, multi-gig PHYs and bridges

Security
Processors and cloud hardware
security modules (HSM)

Marvell accelerated infrastructure portfolio

Compute —— MARVELL
Custom compute

Connectivity —— MARVELL
Ethernet switch

MARVELL
Interconnect

Storage —— MARVELL
Controllers

Key data center trends driven by AI

Higher compute performance	**Higher bandwidth connectivity**
Faster interconnects	**Shift to active interconnects**
Larger AI server clusters	**More interconnects**

Accelerated infrastructure network tiers

Data center interconnect (DCI)

Between data centers

Inside data centers

Frontend network

Compute fabric

AI server

AI server

AI server

CPU server

General purpose servers and storage

Backend network
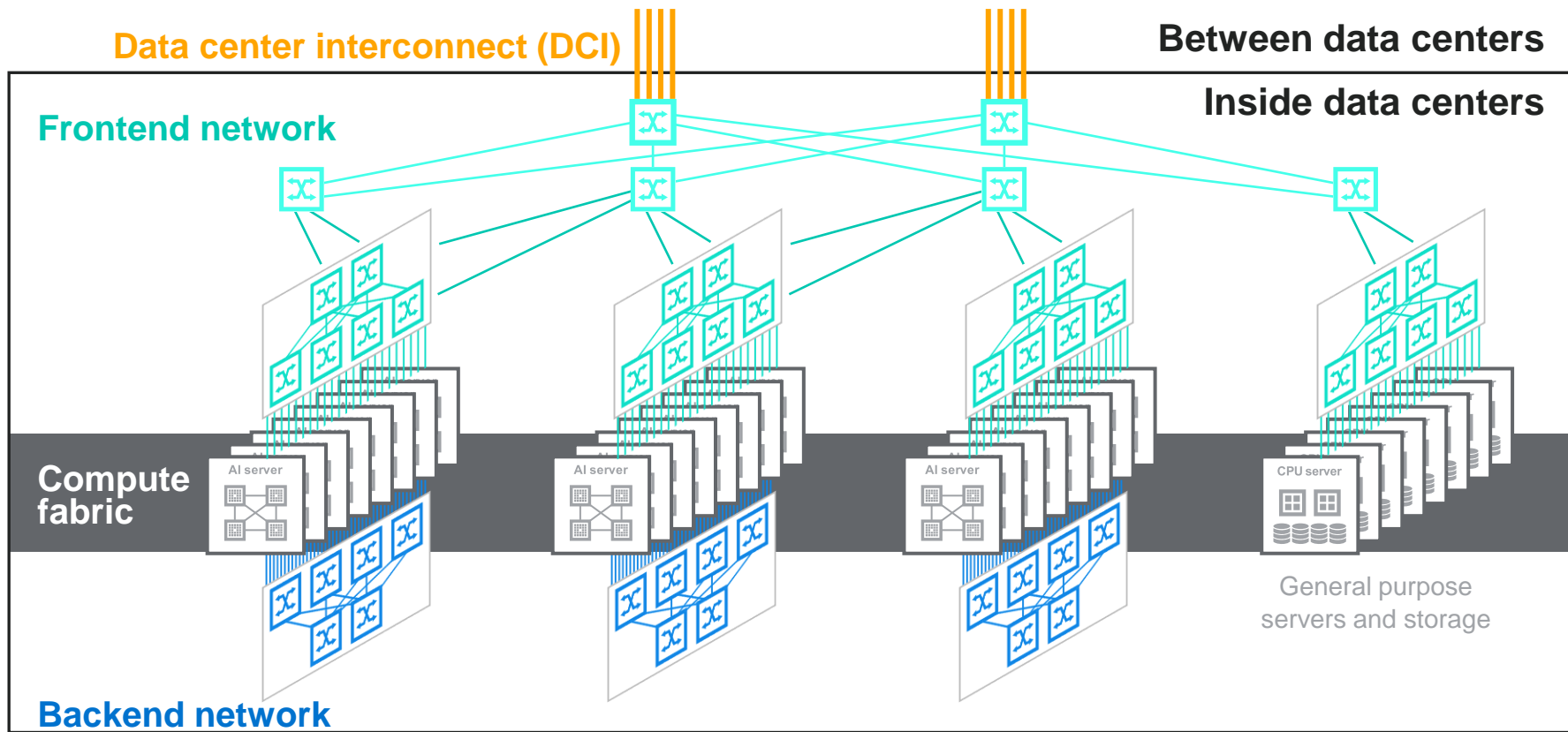
Accelerated infrastructure network protocols

Inside Data Centers

Frontend network
Ethernet

1

2

Backend network
InfiniBand or Ethernet

Inside AI Servers

Frontend network

NIC/DPUs

CPUs

◀ **XPUs**

NIC/DPUs

Backend network

3

Compute fabrics
PCIe / CXL, NVLink, UALink, Infinity and proprietary

AI server

CPU server
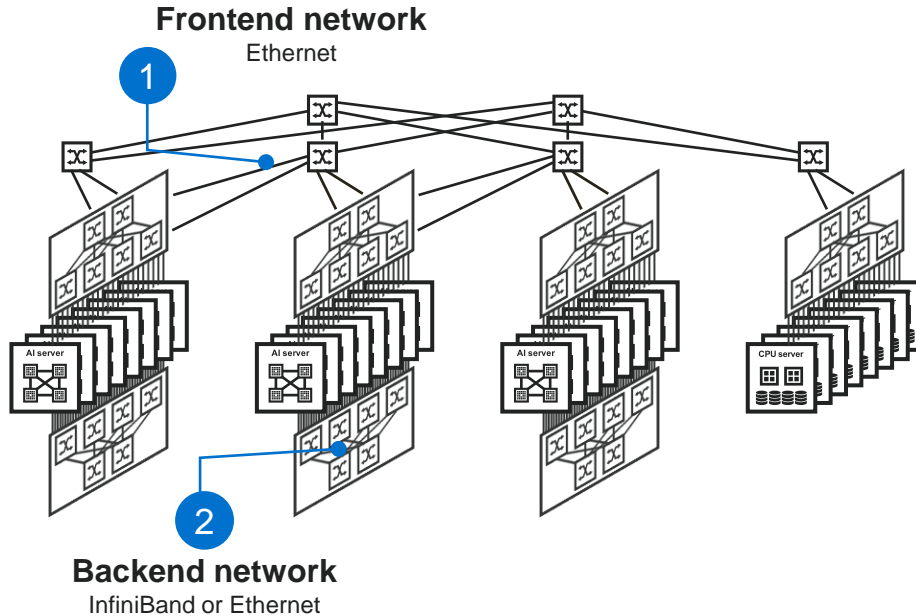
A combination of optical and copper interconnects

Core switches

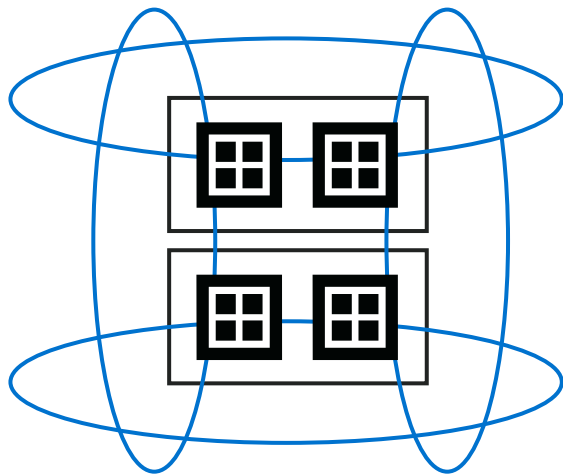Spine switches

Rack switches

AI servers

Optical

Long (>5m)

Core switch to spine switch
Spine switch to rack switch
AI clusters

Copper

Short (<5m)

AI compute fabrics
AI accelerators to rack switches
NICs to rack switches
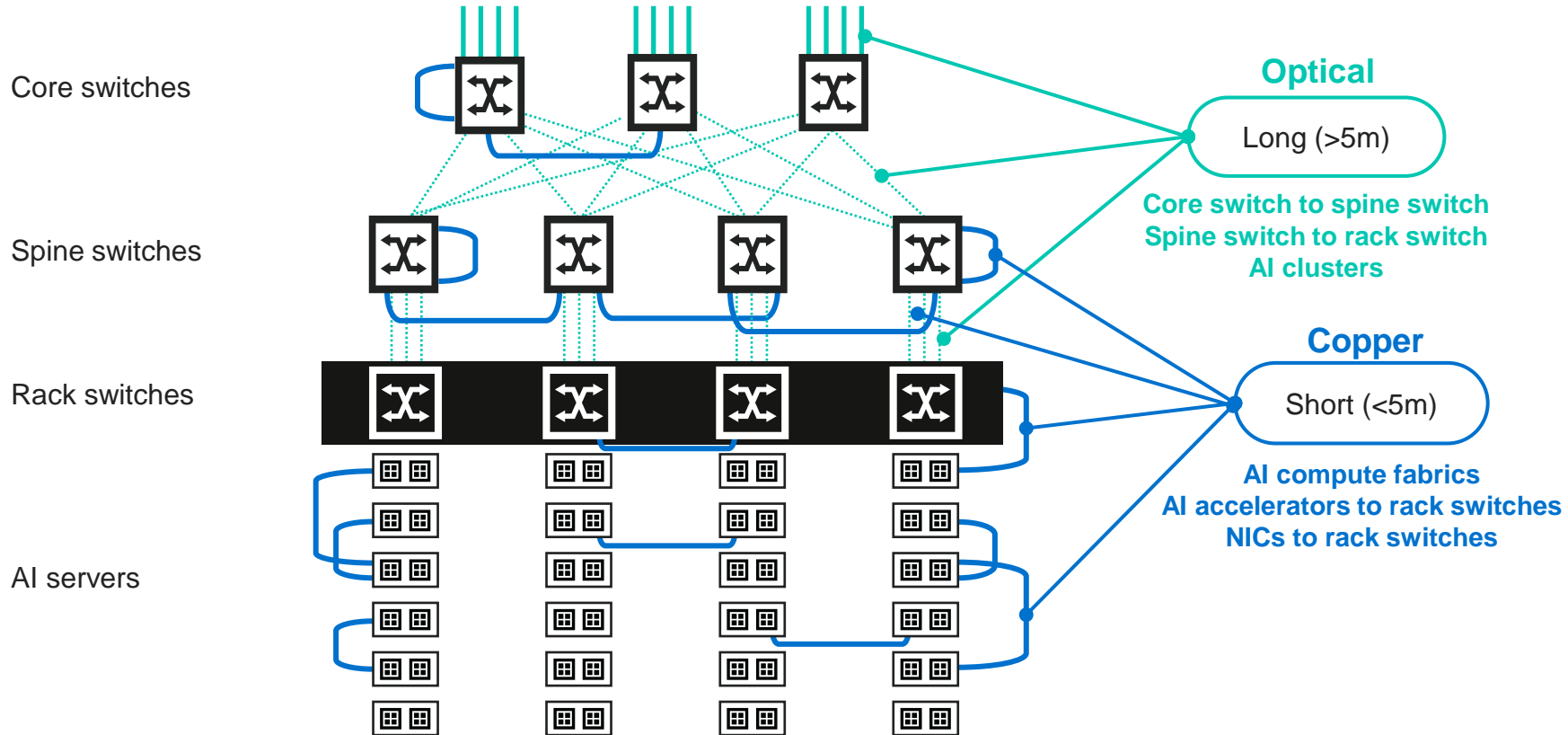
Where are copper interconnects used?

Server to rack switch

Top of Rack Switches

Servers

AI servers

NIC DPUs

CPUs

XPUs

Compute Fabric

NIC DPUs

10
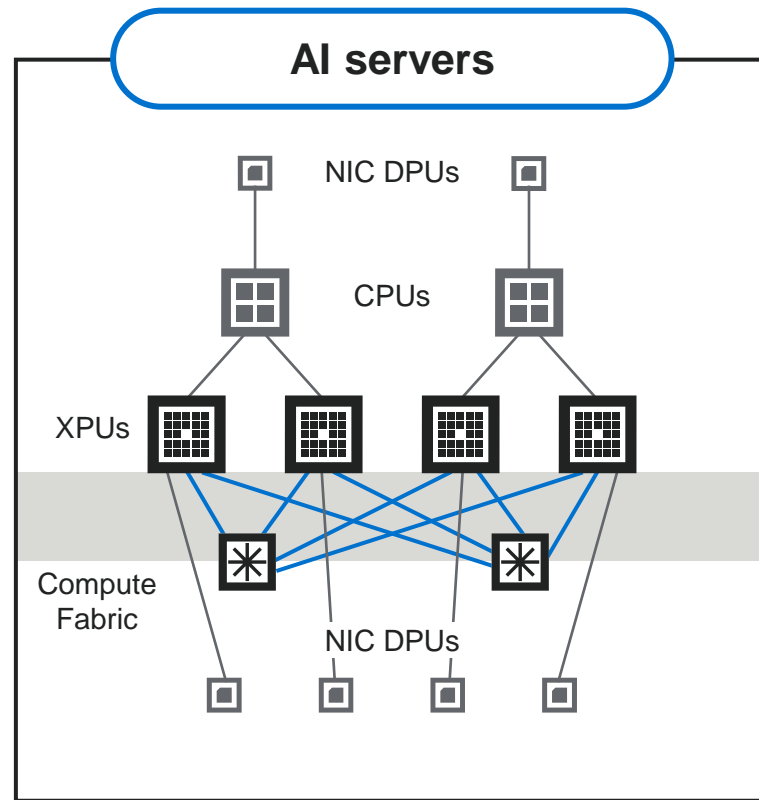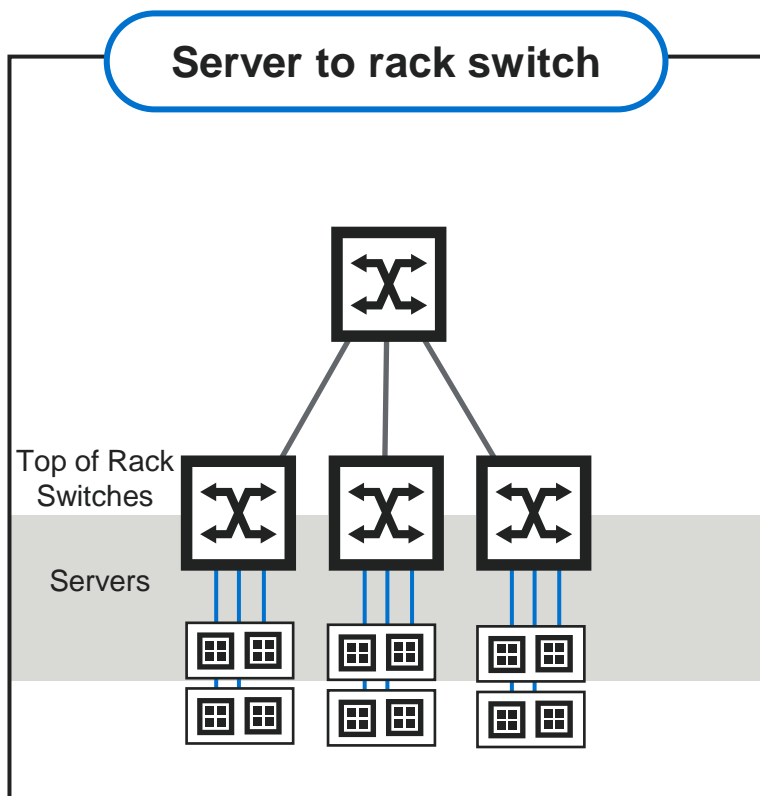
AI accelerators are leading the move to serial 200G

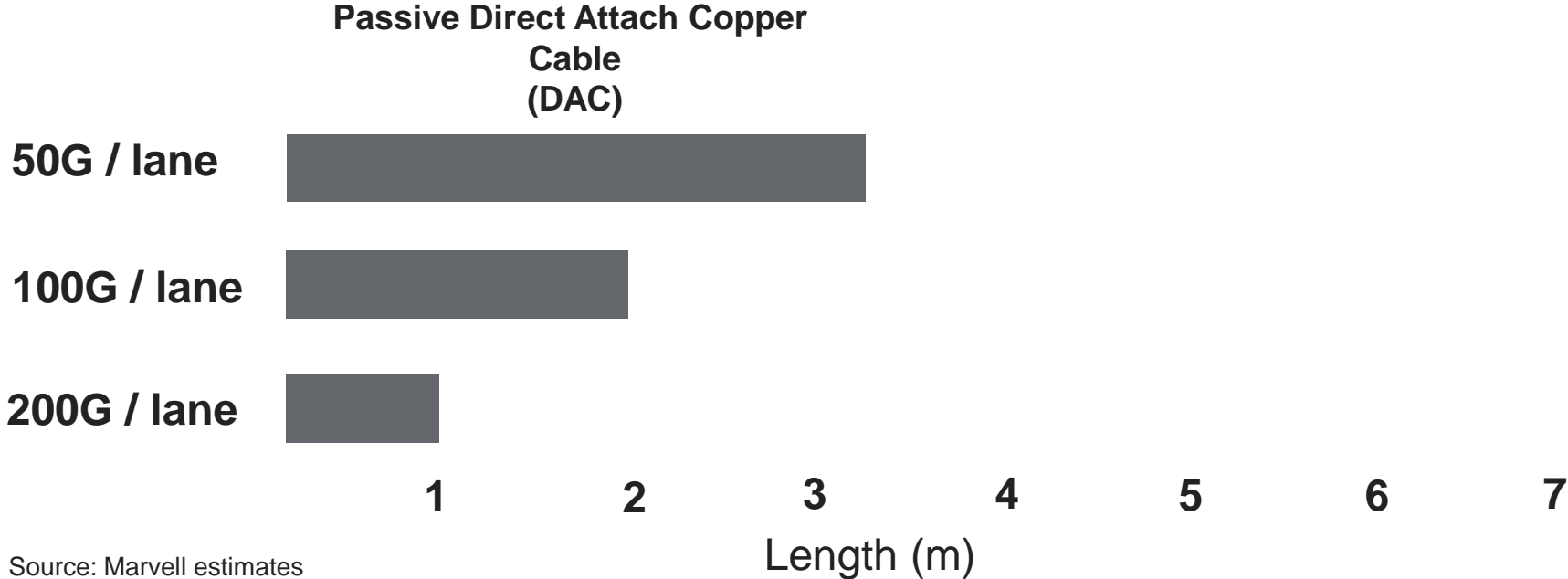AI accelerator to AI accelerator

AI accelerator to rack switch
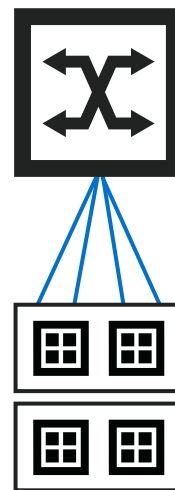
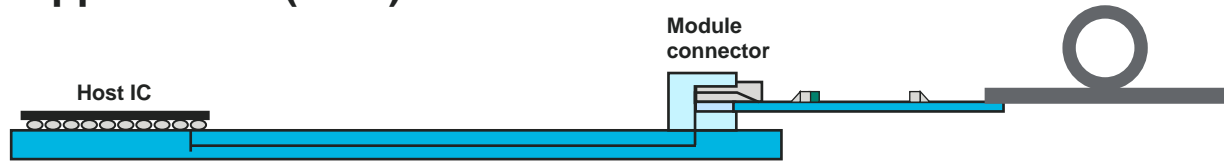**Higher accelerated compute driving higher bandwidth connectivity**

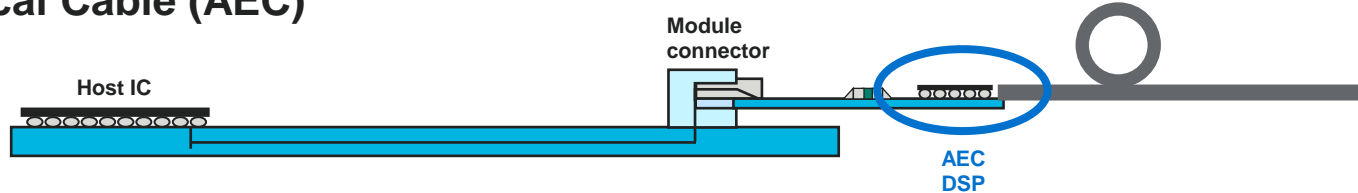# 200G serial limits copper connections distance

Passive Direct Attach Copper Cable (DAC)

	Length (m)
50G / lane	~3.3
100G / lane	~2
200G / lane	~1

Axis: 1 2 3 4 5 6 7 — Length (m)

Source: Marvell estimates

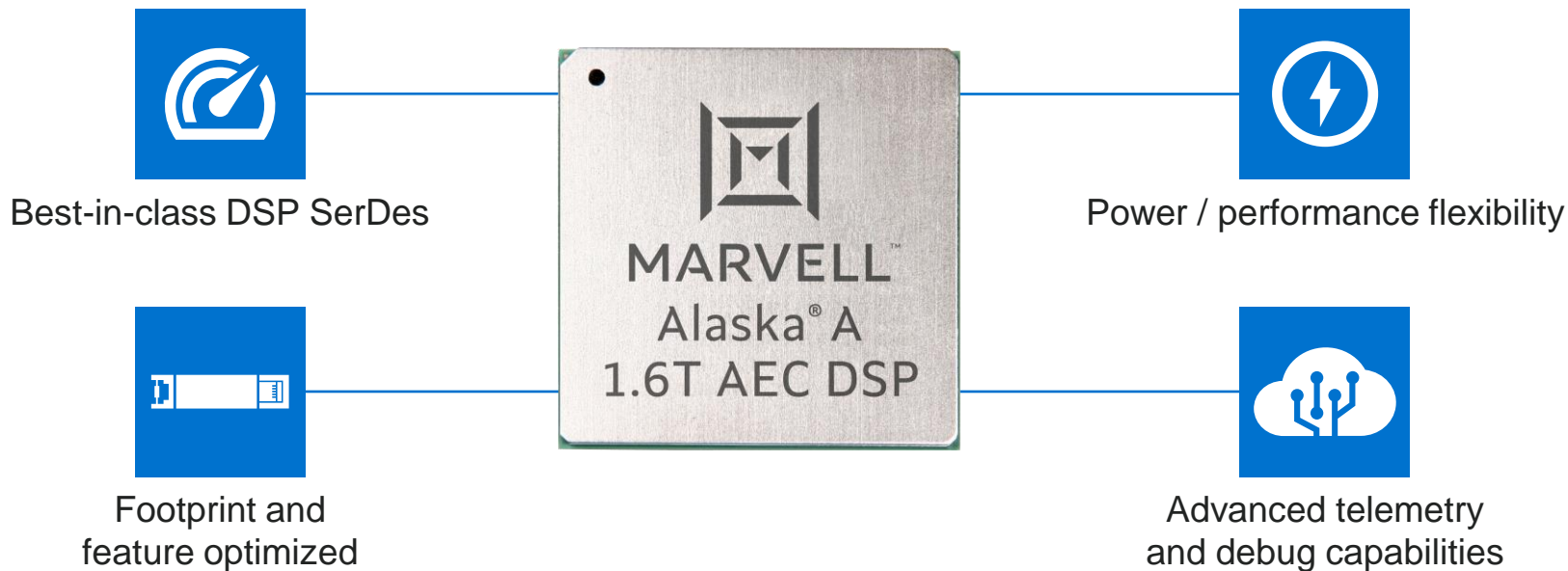**DACs cannot meet reach and cable thickness requirements**

The solution: Active Electrical Cable (AEC)

AEC enables longer reach over thinner cables

Industry's 1st 1.6T AEC DSP for copper interconnects

Best-in-class DSP SerDes

Power / performance flexibility

MARVELL™
Alaska® A
1.6T AEC DSP

Footprint and
feature optimized

Advanced telemetry
and debug capabilities

Enables cloud-optimized short-reach copper connectivity

Alaska A 1.6T DSP extends copper reach to >3 meters

Passive Direct Attach Copper Cable (DAC)

Active Electrical Cable (AEC)

50G / lane

100G / lane

200G / lane

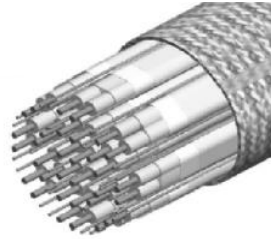1   2   3   4   5   6   7

Length (m)
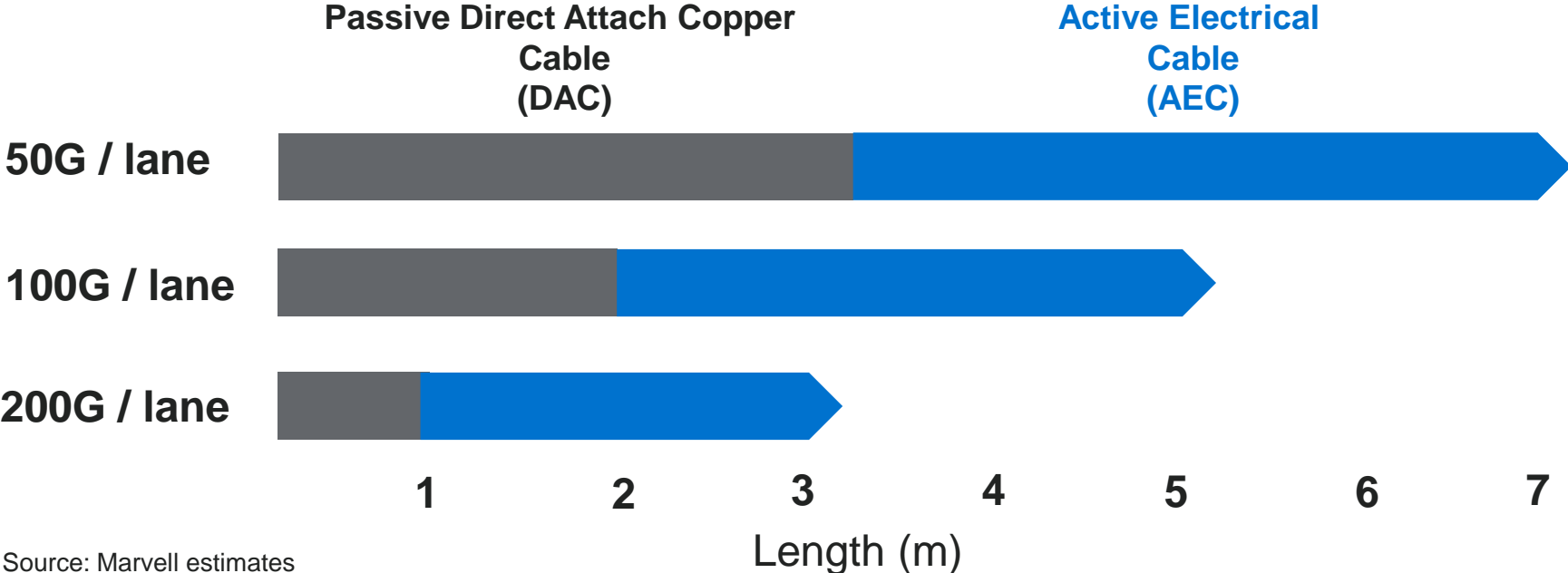
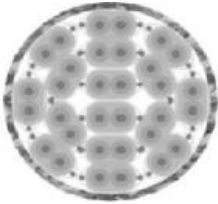Source: Marvell estimates

Addresses cable reach and thickness requirements
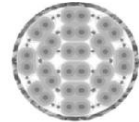
AECs solve cable routing and air flow

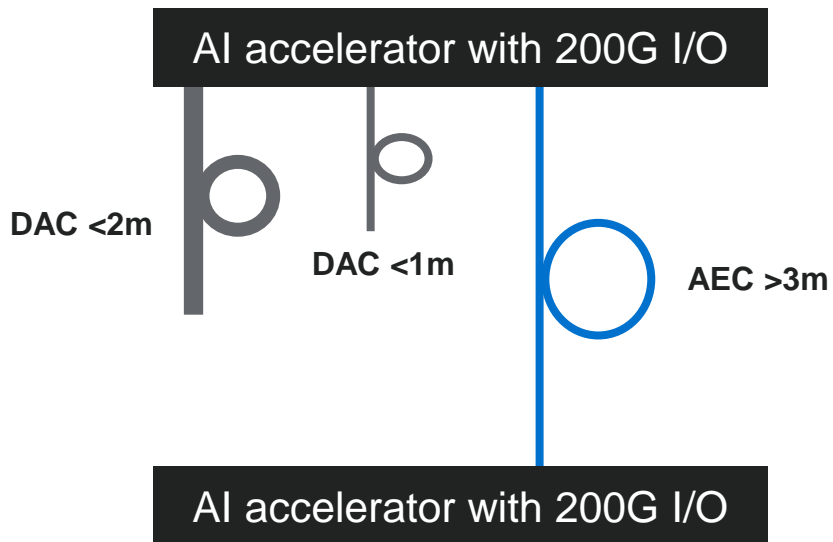1.6T (8x200G) cable: 16 cable pairs

26 AWG passive DAC

32 AWG AEC

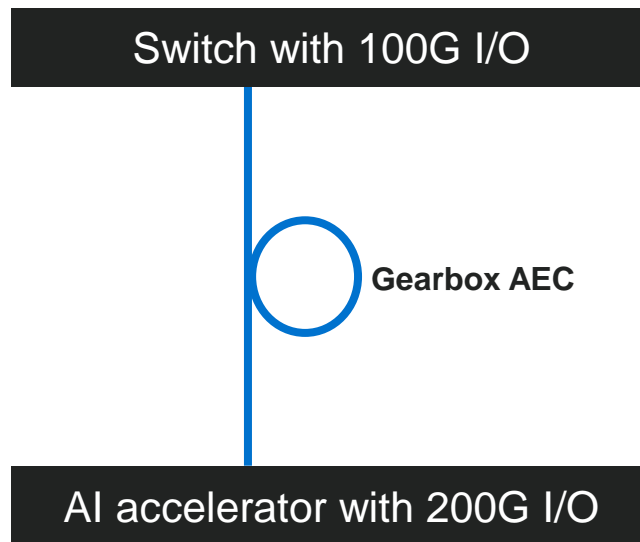**AECs are 50% thinner than equivalent DACs**

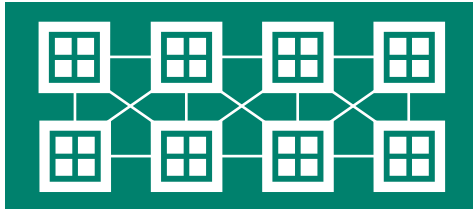# Key Alaska A 1.6T AEC DSP use cases

AI accelerator to AI accelerator

AI accelerator with 200G I/O

DAC <2m

DAC <1m

AEC >3m

AI accelerator with 200G I/O

AI accelerator to switch

Switch with 100G I/O

Gearbox AEC

AI accelerator with 200G I/O

Enabling essential accelerated infrastructure connections

Emerging use case of distributed AI server

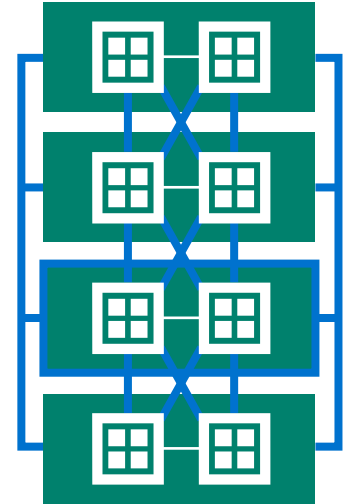| Today	Emerging	Future

Single board with N XPUs
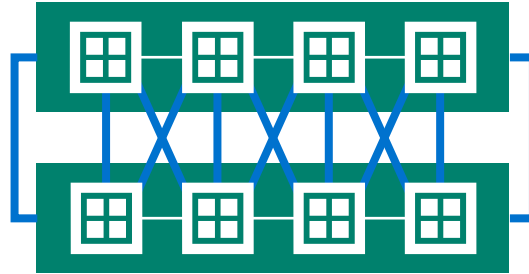
Two boards with N XPUs

Four boards with N XPUs

AECs to cluster AI accelerators within rack

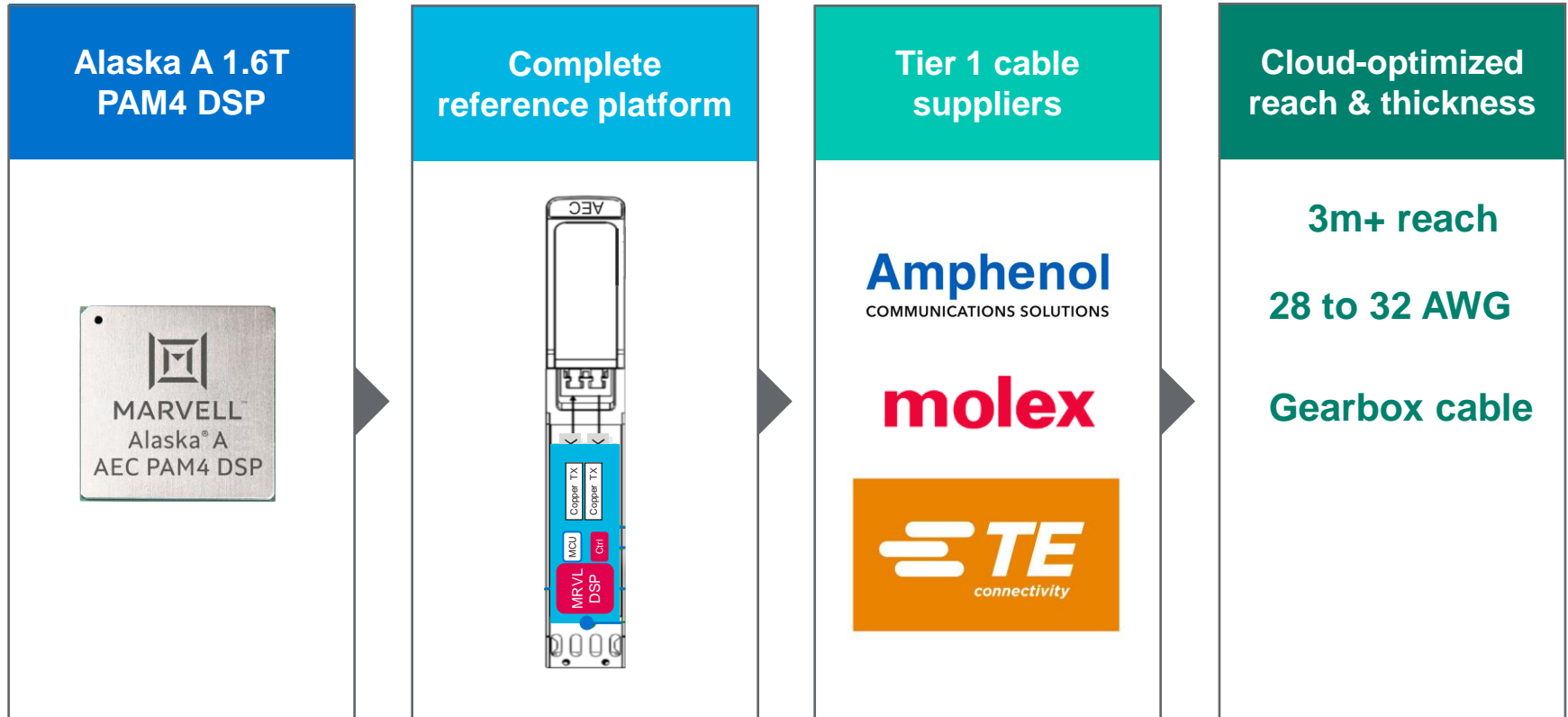# Enabling broad ecosystem of tier 1 cable vendors

Collaborating with leading vendors to deliver cloud-optimized solutions

Uniquely delivering cloud-optimized AECs

Alaska A 1.6T PAM4 DSP	Complete reference platform	Tier 1 cable suppliers	Cloud-optimized reach & thickness
			3m+ reach **28 to 32 AWG** **Gearbox cable**

Alaska® A 1.6T AEC DSP extends copper connectivity

- **Industry's 1st 1.6T AEC DSP**
- 224G / 112G / 50G PAM4 support
- Retimer and gearbox modes supported
- Comprehensive diagnostics and debug capabilities
- Built on industry-leading Marvell 5nm in-house PAM4 IP
  - SerDes supporting >40dB insertion loss compensation
  - Field-proven: shipping in multiple Marvell 5nm high-volume products
- **Enables copper connectivity > 3 meters**
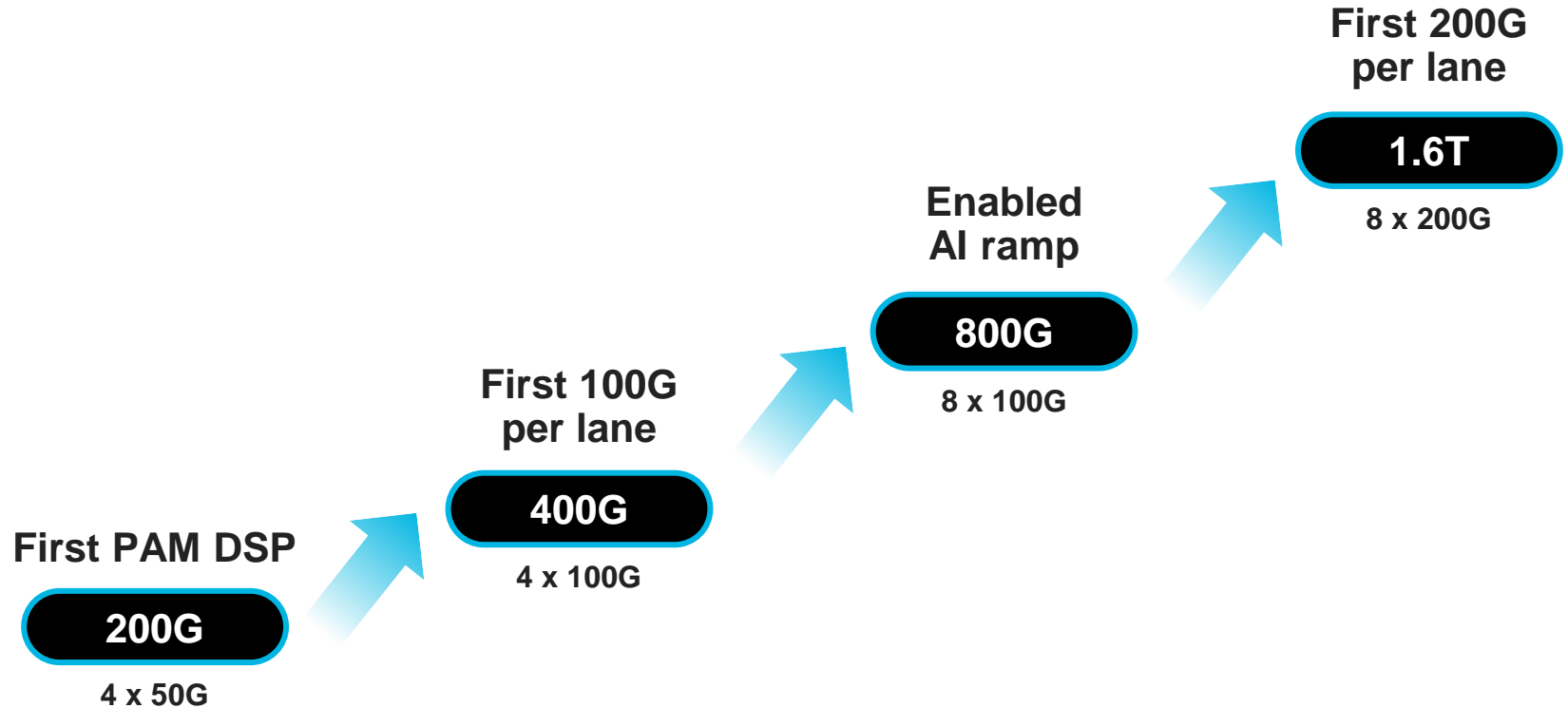- Package size: 12mm x 14mm

Complete reference platform for customers to leverage

Industry-leading 5nm PAM4 SerDes

High-performance equalizer

>40dB insertion loss

Low-power

Field-proven

Multiple Marvell 5nm products shipping in high volume

Leveraging PAM4 leadership to enable AECs

First PAM DSP

200G

4 x 50G

First 100G per lane

400G

4 x 100G

Enabled AI ramp

800G

8 x 100G

First 200G per lane

1.6T

8 x 200G

Marvell PAM4 technology deployed in all the leading cloud data centers

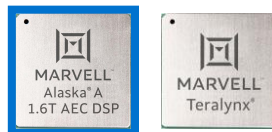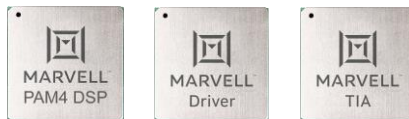# Comprehensive data center connectivity portfolio

Between data centers

Data center interconnect (DCI) networks

Inside data centers

Frontend and backend networks

Inside servers

Compute fabrics

Alaska A 1.6T AEC DSP extends Marvell interconnect leadership

Key takeaways

1   AI accelerators are leading the move to higher bandwidth 200G/lane interconnects.

2   Copper interconnects migrating from DAC to AEC to meet bandwidth and reach needs.

3   Marvell introduces industry's 1st 1.6T AEC DSP for short-reach AI accelerator connections.

4   Partnering with Tier 1 cable vendors to deliver cloud-optimized interconnect solutions.

5   Alaska A 1.6T AEC DSP extends Marvell data center interconnect leadership.

MARVELL™

Essential technology, done right™