

# INVESTOR DAY 2021

October 6 · Virtual Event



# Introduction

**Ashish Saran**Vice President, Investor Relations
October 6, 2021





Topic	Presenter	
Accelerating the cloud disruption	Matt Murphy President and CEO	
Delivering cloud-optimized silicon	Raghib Hussain President, Products & Technologies	
Leading the electro-optics revolution	Loi Nguyen EVP, Optical & Copper Connectivity	
Marvell's storage transformation	Dan Christman EVP, Storage Business Group	
Gaining share in networking	Nariman Yousefi EVP, Automotive, Coherent DSP & Switching	
Driving compute disruption	Raghib Hussain President, Products & Technologies	
Driving sustainable growth at scale	Jean Hu Chief Financial Officer	
Q&A session	All	

# Forward-looking statements

- Except for statements of historical fact, this presentation contains forward-looking statements (within the meaning of the federal securities laws) including, but not limited to, statements related to market trends and to the company's business and operations, business opportunities, growth strategy and expectations, and financial targets and plans, 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.
- For factors that could cause Marvell's results to vary from expectations, please see the risk factors identified in Marvell's Quarterly Report on Form 10-Q for the fiscal quarter ended July 31, 2021 as filed with the SEC on August 27, 2021 and other factors detailed from time to time in Marvell's filings with the SEC. The forward-looking statements in this presentation speak only as of the date of this presentation and Marvell undertakes no obligation to revise or update publicly any forward-looking statements.

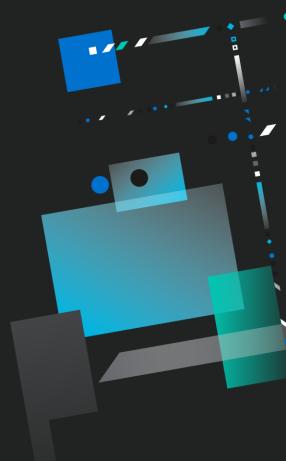
#### Non-GAAP financial measures

- During this presentation, we may refer to certain financial measures on a U.S. non-GAAP basis.
- We believe that the presentation of non-GAAP financial measures provides important supplemental information to management and investors regarding financial and business trends relating to our financial condition and results of operations.
- While we use non-GAAP financial measures as a tool to enhance our understanding of certain aspects
  of our financial performance, we do not consider these measures to be a substitute for, or superior to,
  the information provided by GAAP financial measures.
- A reconciliation in accordance with SEC Regulation G for the non-GAAP financial measures used in these slides is available in the financial statements section of this presentation and/or in the Investor Relations section of our website at https://www.marvell.com.

## Basis of presentation

#### Fiscal Year vs Calendar Year

- Financial measures in this presentation correspond to Marvell's fiscal calendar
- Marvell's fiscal year is the 52- or 53-week period ending on the Saturday closest to January 31
- As an example, FY2021 refers to the period February 2, 2020, through January 30, 2021
- We will be referring to calendar years in presenting external market data





# Accelerating the cloud disruption

**Matt Murphy** 

President & Chief Executive Officer

October 6, 2021

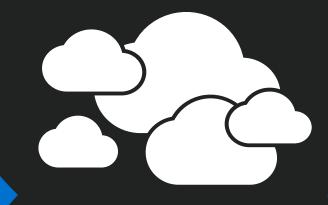




# Cloud-optimized silicon







Enterprise networking



Data center



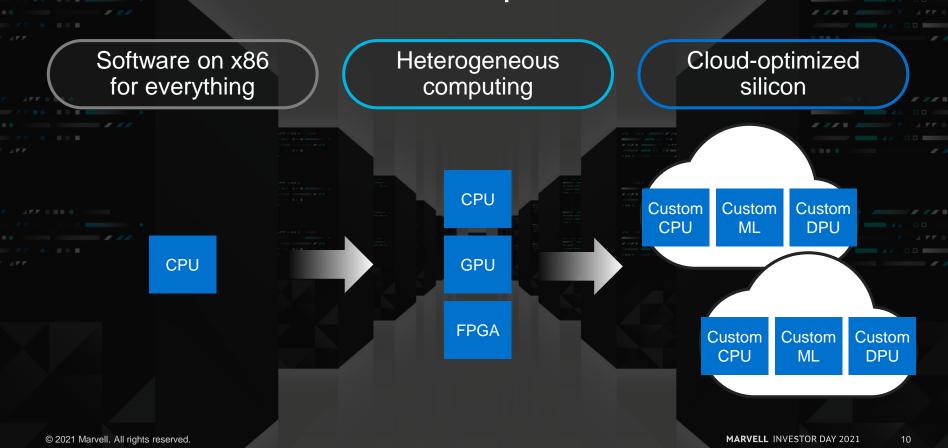
Carrier infrastructure



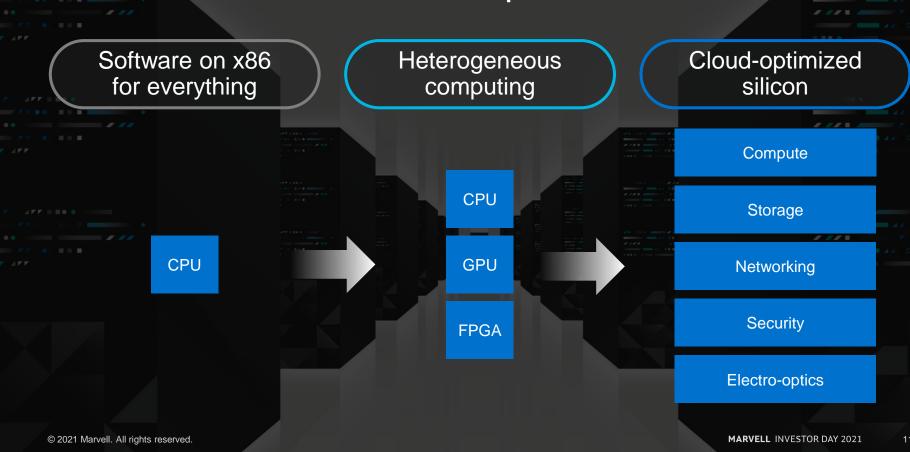
Automotive / industrial



# The era of cloud-optimized silicon



# The era of cloud-optimized silicon





Search

eCommerce

Enterprise applications

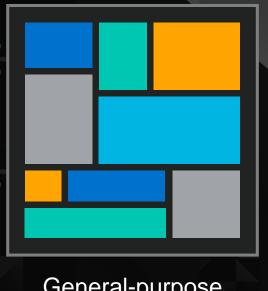
IaaS

Social media

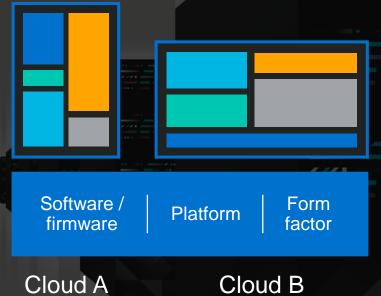
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# What is cloud-optimized silicon?



General-purpose



Cloud-optimized silicon goes mainstream

Facebook is developing in-house AI chips for video transcoding, recommendations

techradar pro it insights for Business

Google has designed a new chip to help load YouTube videos faster

Bloomberg Microsoft Designing Its Own Chips for Servers, Surface PCs

REUTERS

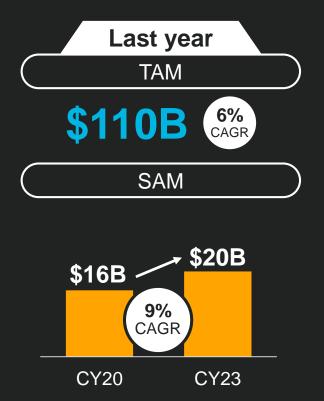
Amazon's cloud unit taps own chips for new supercomputing offering

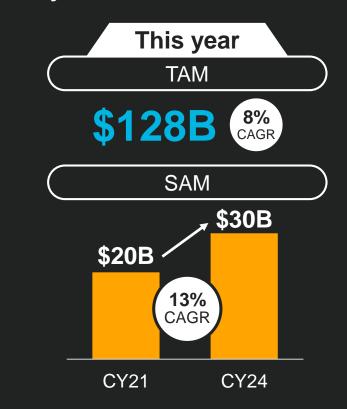
Baidu creates Kunlun silicon for Al

What Google's AI-designed chip tells us about the nature of intelligence

We are the essential silicon partner to the cloud

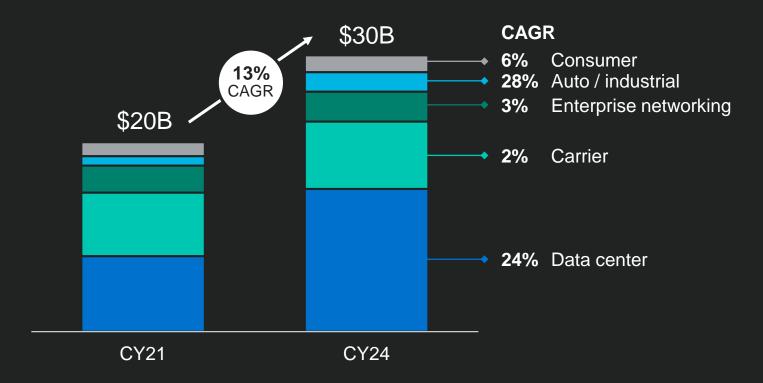
## Expanding our market opportunity





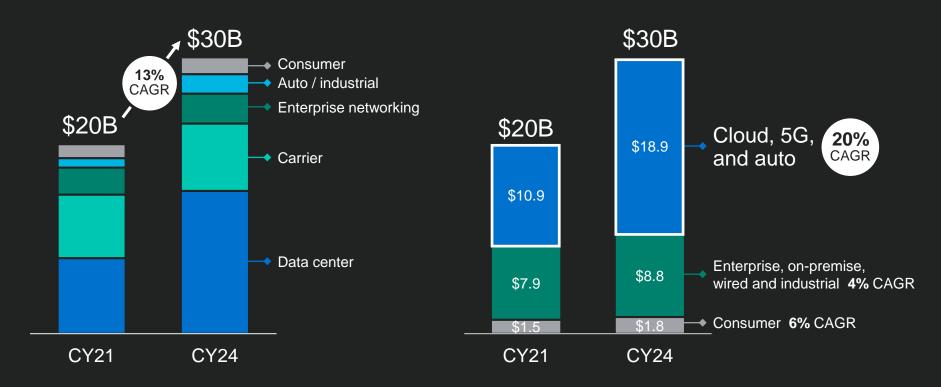
Source: 650 Group, Cignal AI, Crehan, Dell'Oro, Forward Insights, Gartner, LightCounting, Linley Group, Omdia, Strategy Analytics, Trend Focus and Marvell estimates

# Our opportunity by end market



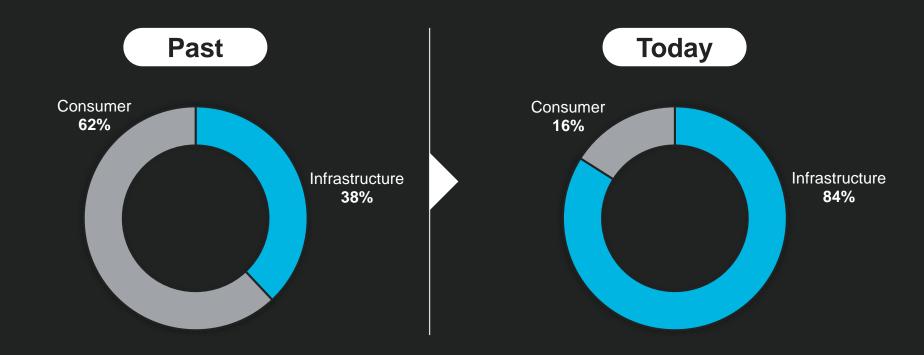
Source: 650 Group, Cignal AI, Crehan, Dell'Oro, Forward Insights, Gartner, LightCounting, Linley Group, Omdia, Strategy Analytics, Trend Focus and Marvell estimates

# Our opportunity by end market

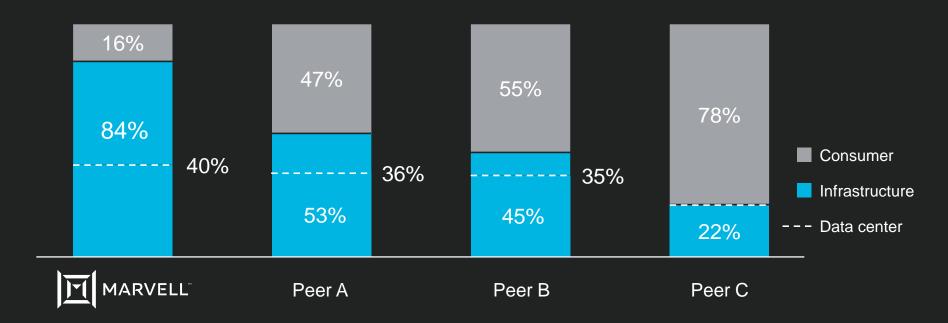


Source: 650 Group, Cignal AI, Crehan, Dell'Oro, Forward Insights, Gartner, LightCounting, Linley Group, Omdia, Strategy Analytics, Trend Focus and Marvell estimates

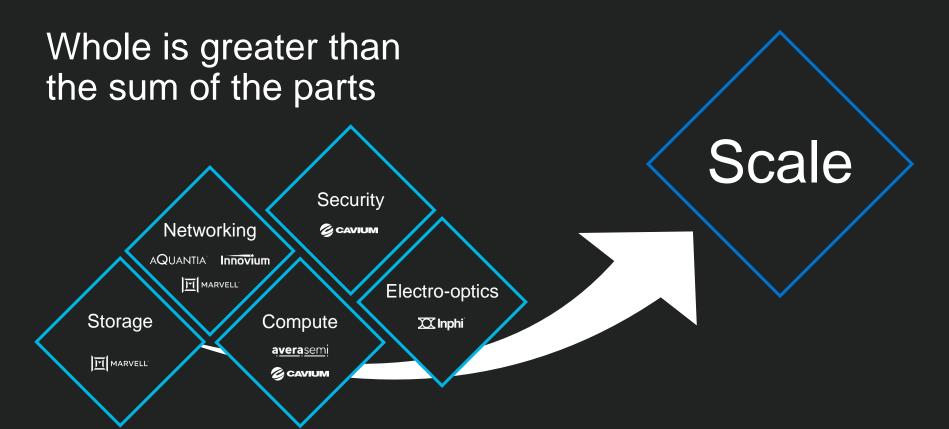
### Revenue transformation to data infrastructure



# Revenue mix relative to peers



#### Marvell is industry's pure play infrastructure company



### Complete platform – we have all the pieces

# Scaling for growth



Products and technology



Customer-centric approach

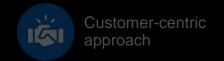


Operational scale



People and culture









# Market leadership

Market Execution

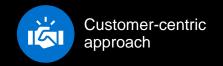
# Products

Architecture | Definition

### Technology

5nm → 3nm process node | Innovative IP









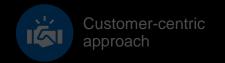
# Partnering with leading customers

\$100M+
customers growing  $13 \rightarrow 17 \rightarrow 19$ 

Partnering and Co-investing with customers

**Extension of our customers' engineering teams** 



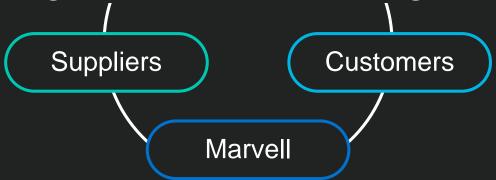






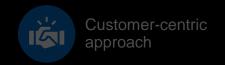
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# Scaling operations to support our growth over the long-term



### Securing capacity for growth





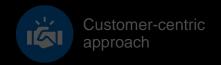




### Destination for diverse talent













Marvell Wins
GSA's Most
Respected Public
Semiconductor
Company Award





SILICON VALLEY BUSINESS JOURNAL



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Marvell places in four categories in the 2021 All-America Executive Team Rankings

MARVELL"

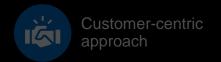
Institutional Investor Marvell recognized for generosity and giving

Marvell named San Francisco Business Times' Top 100 Bay Area Corporate Philanthropists

MARVELL"

sential technology,









# Supporting our environment

- Net zero emissions
- Science-based target of 1.5°C
- Increased public reporting

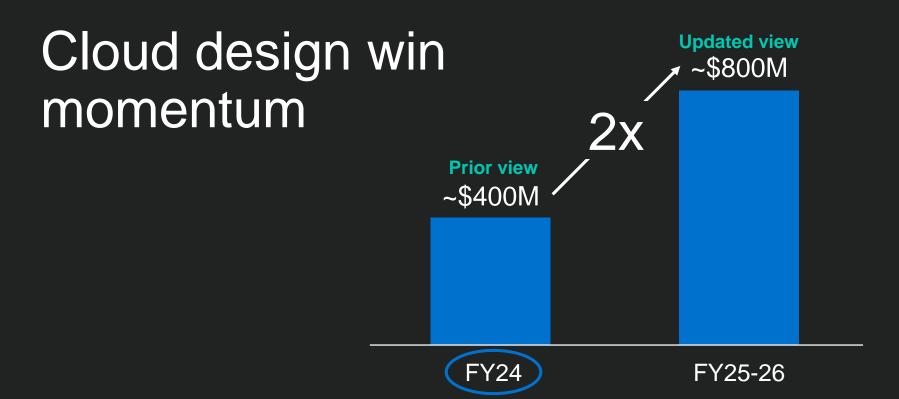
Poised to

capitalize
on cloud-optimized
silicon disruption

We have all the pieces

Scaling to best opportunity in semiconductors

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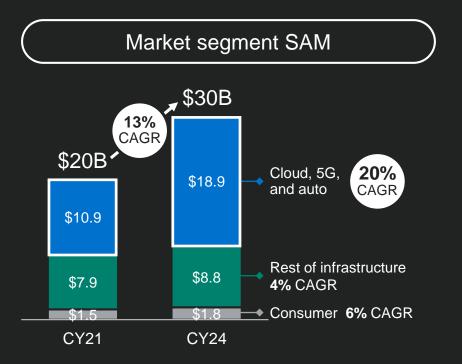
Incremental revenue significantly larger ... and sooner

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# Delivering accelerated revenue growth



End-market	Revenue <sup>*</sup>	Growth expectations
Cloud, 5G and auto	~ \$1.5B	2x of market
Rest of infrastructure	~ \$2.2B	Above market
Consumer	~ \$0.6B	Below market
Long-term target 15-20%		

\*Annualized revenue based on Q2-FY22 for Marvell including Inphi

Source: 650 Group, Cignal AI, Crehan, Dell'Oro, Forward Insights, Gartner, LightCounting, Linley Group, Omdia, Strategy Analytics, Trend Focus and Marvell estimates



# Delivering cloud-optimized silicon

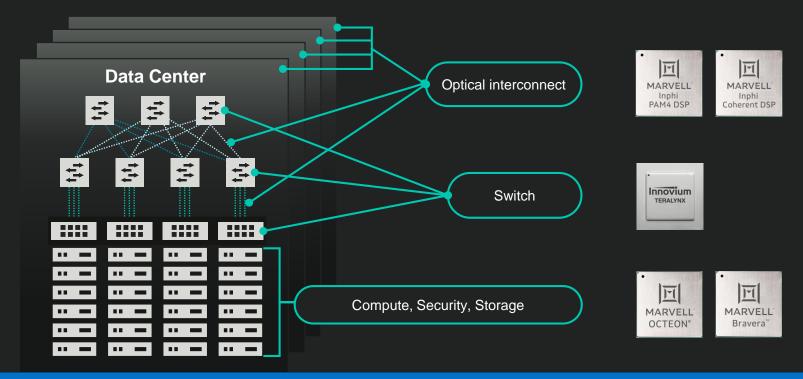
Raghib Hussain

President, Products and Technologies

October 6, 2021



#### Cloud architectures



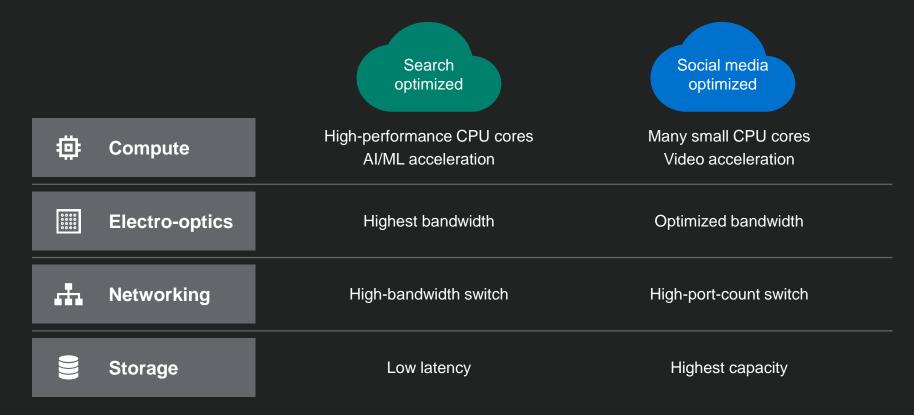
#### Marvell has all the essential products from top to bottom

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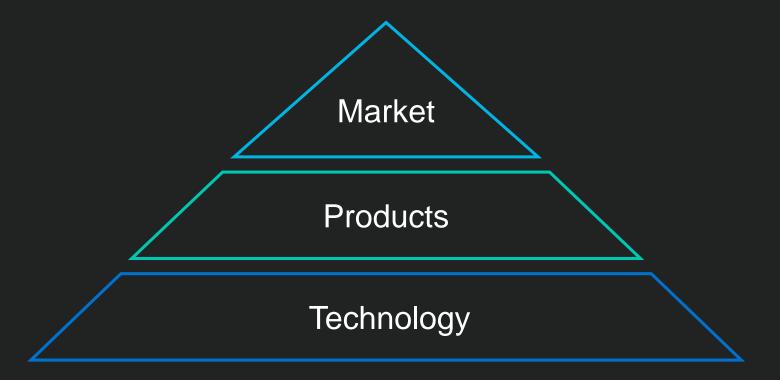
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# Unique cloud requirements



# Cloud-optimized silicon leadership

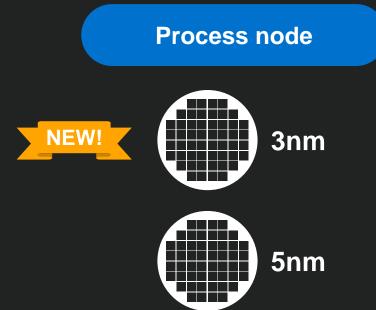


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# Technology leadership



#### **Advanced SerDes**



**224 Gbps** 

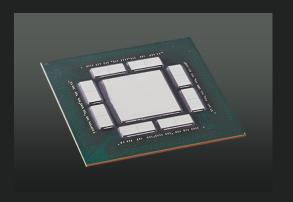




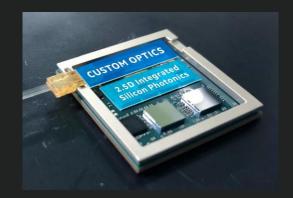
**112 Gbps** 

# Advanced packaging

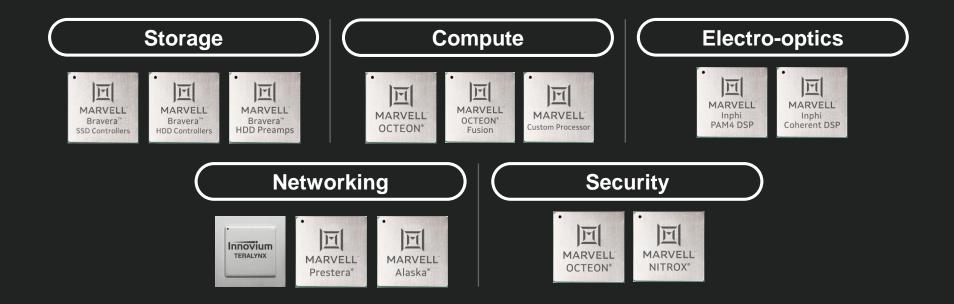
#### **Multi-die**



#### **Co-packaged optics**



# Leading products

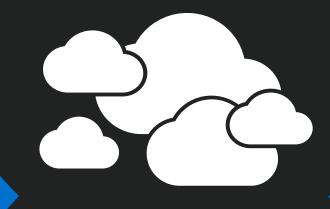


#### Co-designing and innovating with customers

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Enterprise networking



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Data center



Carrier infrastructure



Automotive / industrial





# Leading Electro-Optics Revolution

#### Loi Nguyen

Executive Vice President, Optical and Copper Connectivity October 6, 2021



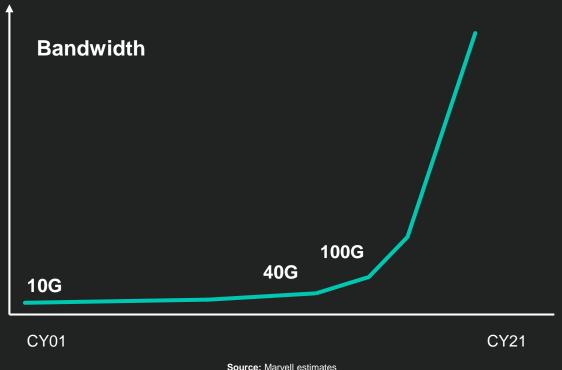
# Electro-optics enables cloud data centers



- High bandwidth
- Long reach
- Low power

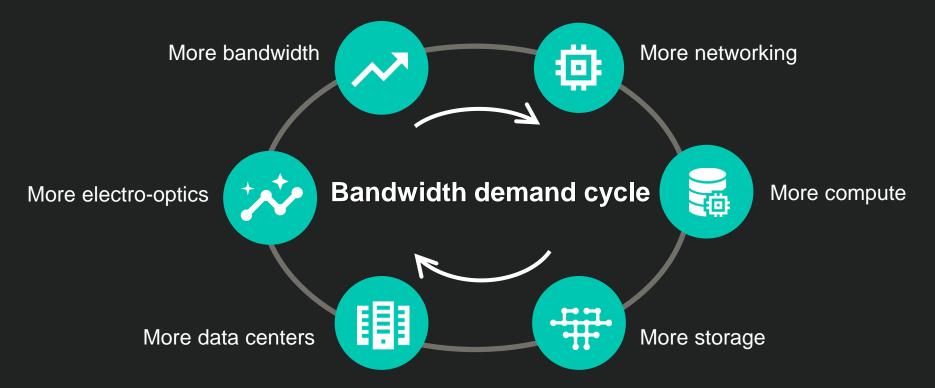
All links > 5m inside cloud data centers are electro-optics

### Cloud data center bandwidth demand

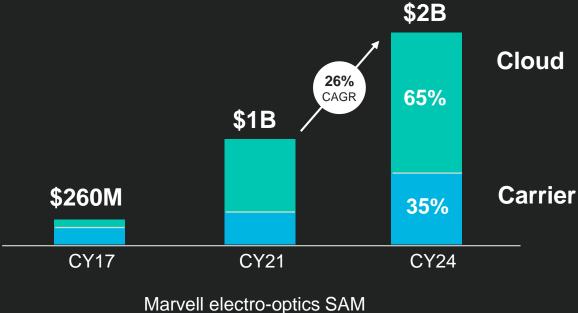


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# More bandwidth drives more of everything



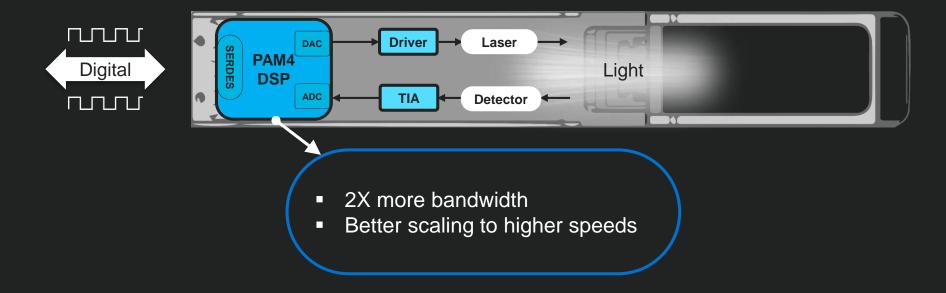
# Electro-optics growing SAM



Source: 650 Group, Cignal AI, Dell'Oro, LightCounting & Marvell estimates

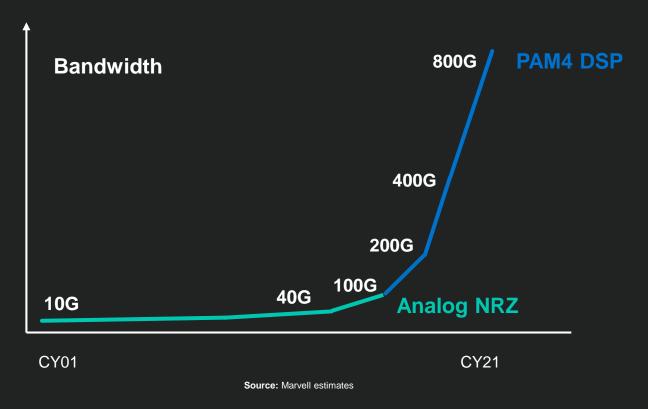
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# Anatomy of electro-optics module



#### PAM4 DSP accelerates bandwidth growth

# PAM4 DSP scales bandwidth to new heights

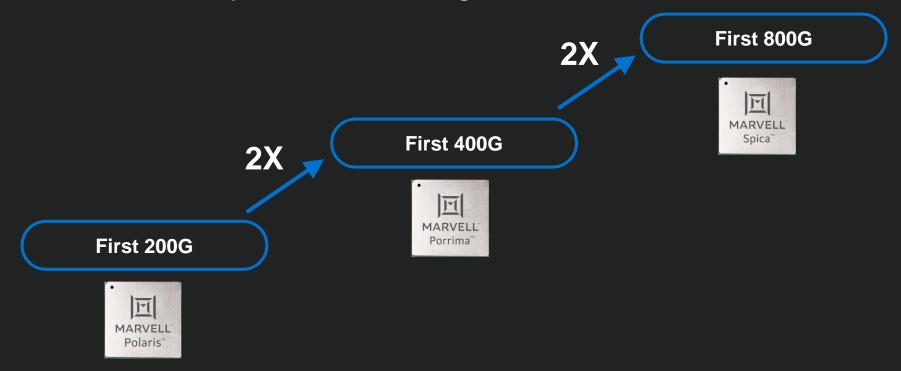


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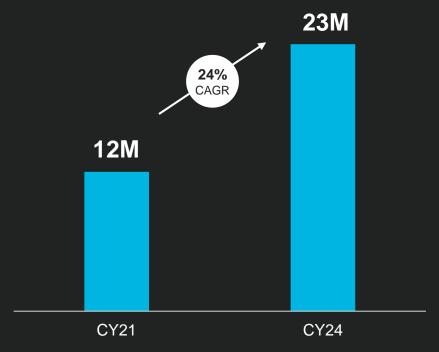
45

# First for every PAM4 DSP generation



#### Leadership in technology, product, market position

# PAM4 DSP port forecast

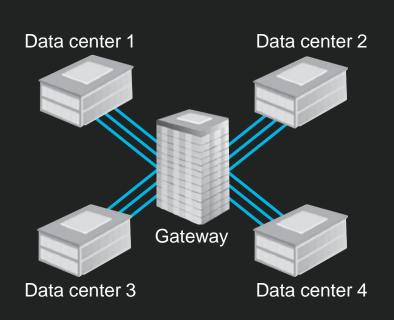


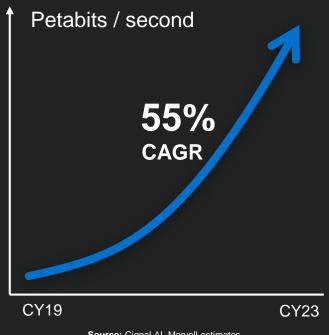
Source: 650 Group, Dell'oro, Marvell estimates

- Marvell leads market
- 2 tier-one clouds in deployment
- Rest will follow
- Massive growth opportunity ahead

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# New trend: regional data centers





Source: Cignal AI, Marvell estimates

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#### New architecture drives bandwidth growth for "ZR optics"

# Lead disruptive transition to ZR optics







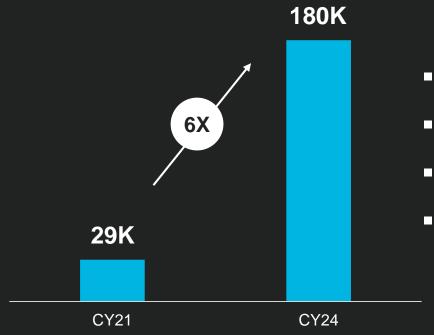




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Leadership in technology, product, market position

# 400ZR port forecast



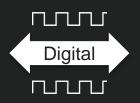
- Only one cloud deployed COLORZ
- Broader customer adoption for 400ZR
- Marvell first to production with 400ZR

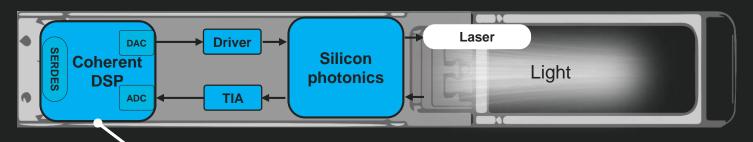
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Massive growth opportunity ahead

Source: Cignal AI, Marvell estimates

# Anatomy of 400ZR optics module





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- Higher performance, longer reach
- 4X more bandwidth / module
- 6X more bandwidth / fiber

#### Coherent DSP enables wide adoption of ZR optics

# Support eco-system partners with coherent DSP

#### First 400G



- Cloud optimized silicon for ZR
- Extended reach for metro / long haul

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Largest ecosystem partners

#### Leading market share merchant coherent DSP

# Silicon photonics heterogenous integration

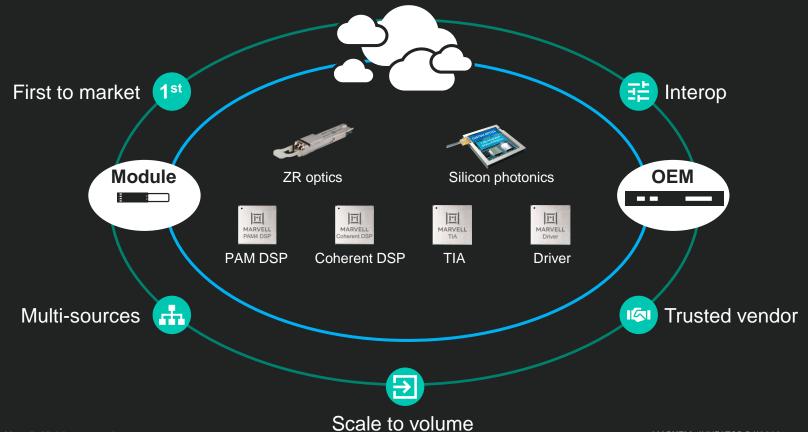


- Higher density
- Lower power
- Better signal integrity

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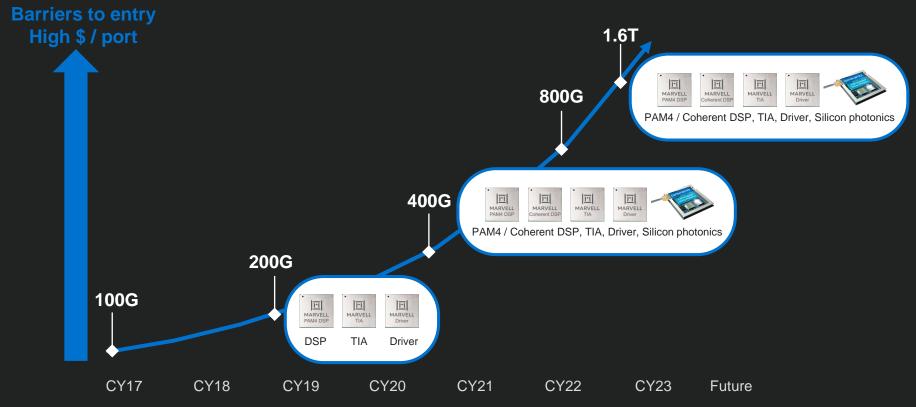
#### Leadership in silicon photonics integrated optics

# Unique platforms create largest ecosystem



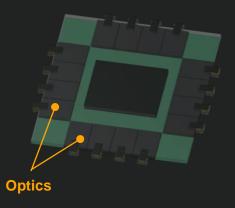
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# Unique platforms create high barriers to entry

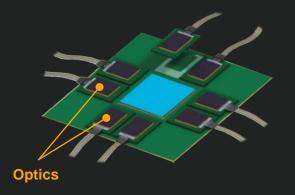


# Looking ahead: electro-optics to everything

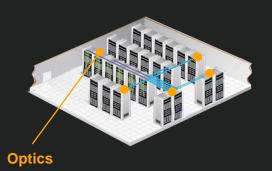
**Optics to switch** 



**Cloud optimized silicon** 



**Optics to compute** 



Co-packaged optics reduce system power up to 30%

# Leading electro-optics revolution

1 Huge bandwidth demand inside and between cloud data centers

2 Leadership in technology, product, market share

3 Massive opportunities ahead for PAM4 DSP and ZR optics

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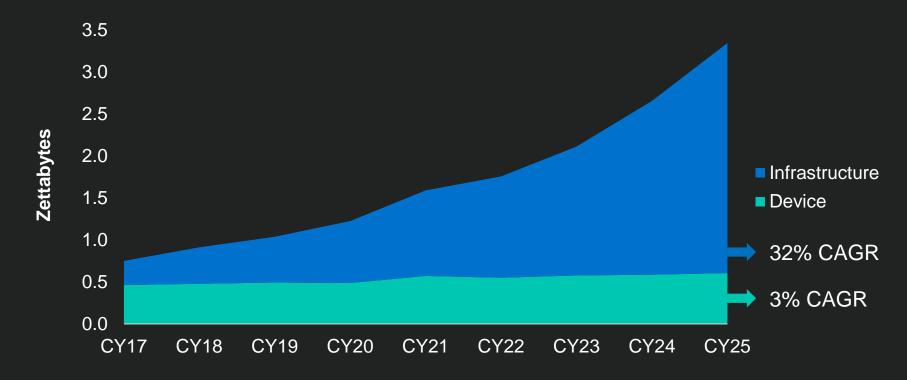
# Marvell's storage transformation

#### **Dan Christman**

Executive Vice President, Storage Products Group October 6, 2021



### Data center is the most important storage market



# Multiple data center trends driving value creation

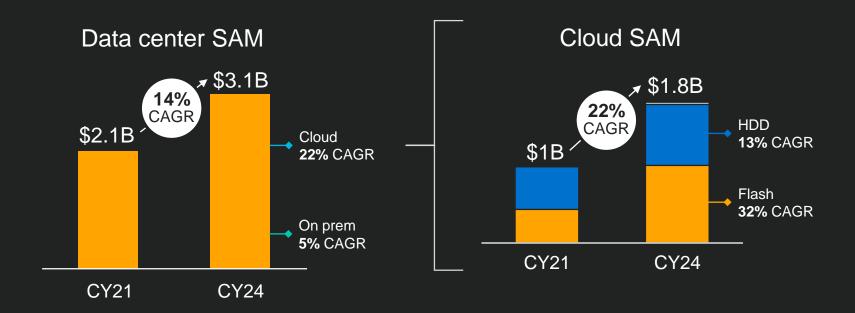




Trend	HDD	SSD
Capacity ↑	More platters, Energy assist	More NAND channels
Performance ↑	Dual actuator	Throughput → PCIe Gen5/6
Cloud optimization	Transition to NVMe	SLA, Virtualization, Security

#### **Generational ASP uplifts**

# Data center opportunity



#### Flash and HDD driving strong growth

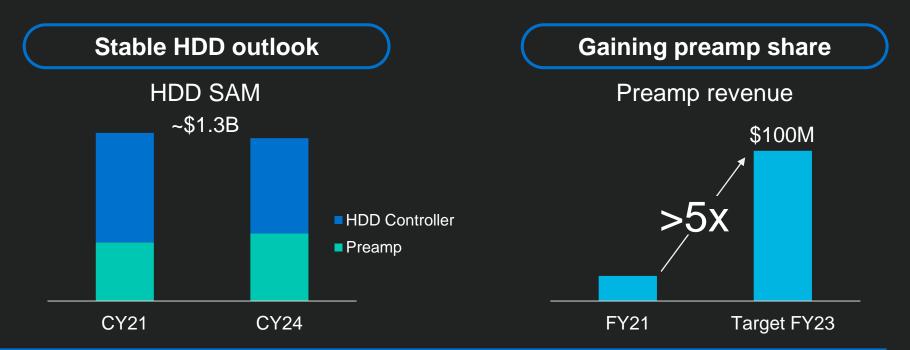
Source: 650 Group, Dell'Oro, Forward Insights, Gartner, Trendfocus, and Marvell estimates

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#### Time to rethink HDD

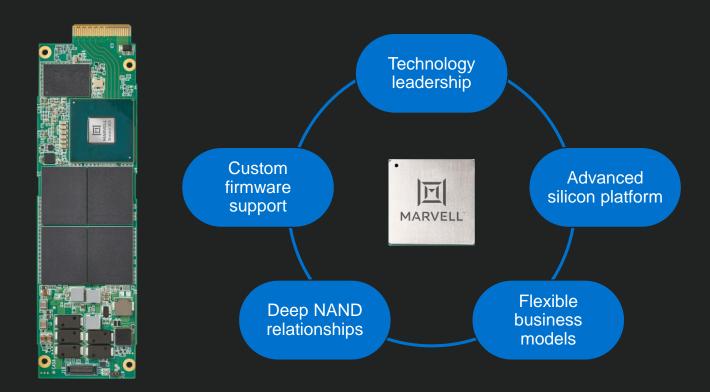


#### Marvell HDD revenue is growing again

62

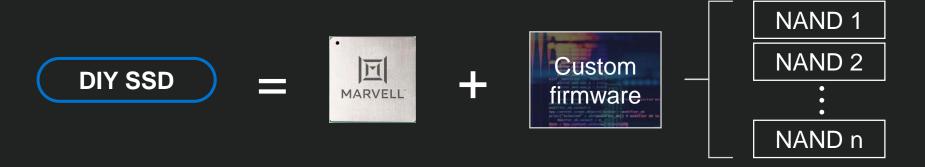
Source: Gartner, Trendfocus, and Marvell estimates

# Uniquely positioned in cloud SSD



#### Pioneered DIY SSD business model

Now in high volume production in gaming and cloud



DIY business is sticky and multi-generational

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# Cloud SSD leadership



#### PCIe Gen5

- 1<sup>st</sup> to market Bravera SC5
- Cloud optimized design
- 2 NAND vendor design wins

NEW!

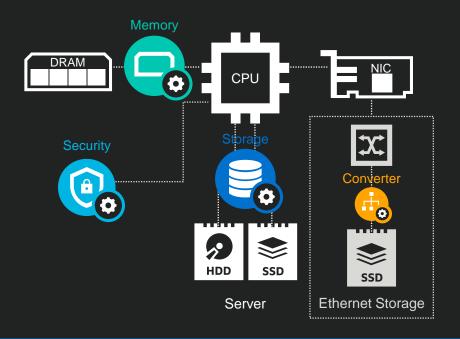
#### PCle Gen6

- Custom 5nm design win
- Merchant 5nm Bravera SC6



#### Outgrow cloud SSD SAM by >2x

# Next opportunity for growth in storage



#### **Cloud storage accelerators**

- First custom design win
- NEW!

More to come

#### Cloud storage accelerators: next \$500M+ storage market

# Storage business outlook

>60%

Data center revenue\*

>14%

Data center growth

**6-8%** 

Sustainable growth





Cloud accelerators



#### Storage business back to growth



# Gaining share in networking

#### Nariman Yousefi

Executive Vice President, Automotive, Coherent DSP & Switch October 6, 2021



#### Markets we serve



#### **Data center**

Highest bandwidth
Low latency
Fastest optical connection



#### **Automotive**

Auto grade switch / PHY
High reliability
Low defect density

**Next \$1B market** 



#### **Enterprise**

High-medium bandwidth
Feature-rich
Flexible



#### **Carrier**

High bandwidth
Programmable
Long distance optics

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# Industry-leading networking portfolio

#### **High-speed electro-optics**



PAM4 DSP



Coherent DSP





PHY

#### **Automotive Ethernet**





**Auto Switch** 

Auto PHY





TIA





#### **Optimized compute**

**Switch and copper PHY** 



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Prestera"

Switch

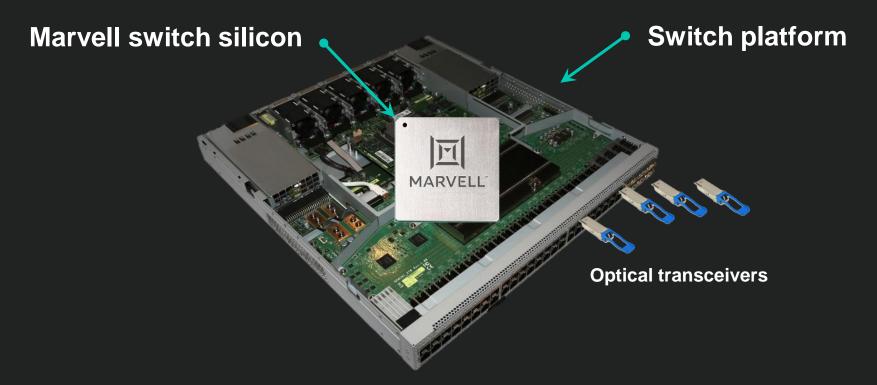


DPU

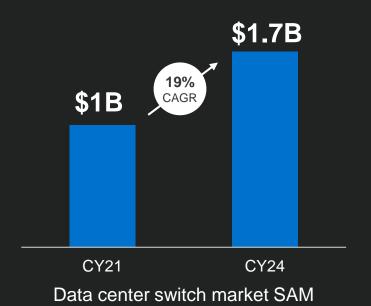
Custom

#### End to end networking portfolio

# Switch and physical layer: the core technologies



# Data center switch: fastest growing segment



<u>Innovium</u>™

- High bandwidth
- Cloud optimized
- Low latency
- Proven track record

Source: 650 Group, Dell'Oro, and Marvell estimates

## Complete cloud data center networking portfolio

Innovium

Inphi

Widely established

High bandwidth switch

**Optical DSP** 

Copper PHY

Feature rich switch





















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#### **Game changing portfolio boost**

#### Data center focus

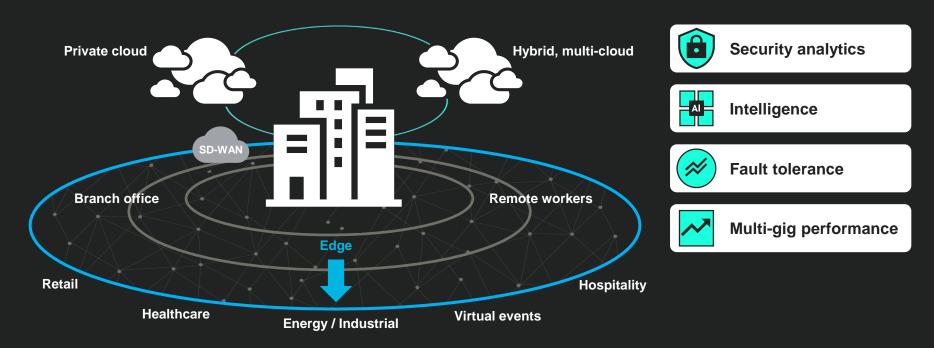


- Expand in data center switches
- Innovate at switch / PHY level platform
- Increase the velocity of product refresh cycle



## Revenue growing in enterprise

## Borderless enterprise

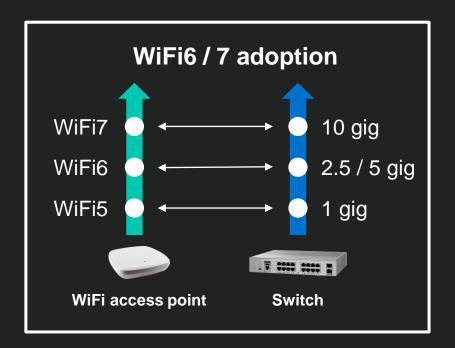


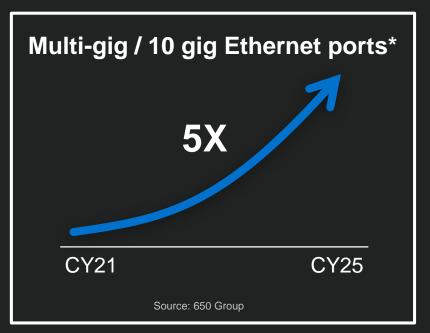
#### Increasing \$ per port

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## Catalyst for enterprise market growth

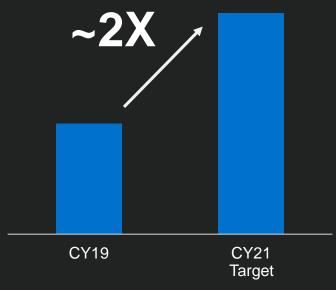




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#### Multi-gig PHYs: higher value per port

## Marvell gaining enterprise market share



Marvell enterprise switch ports

Source: Marvell

## Enterprise recap

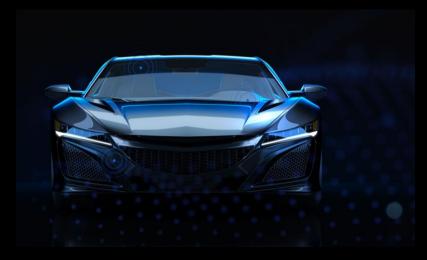
1 Gaining market share

2 Increasing content per port

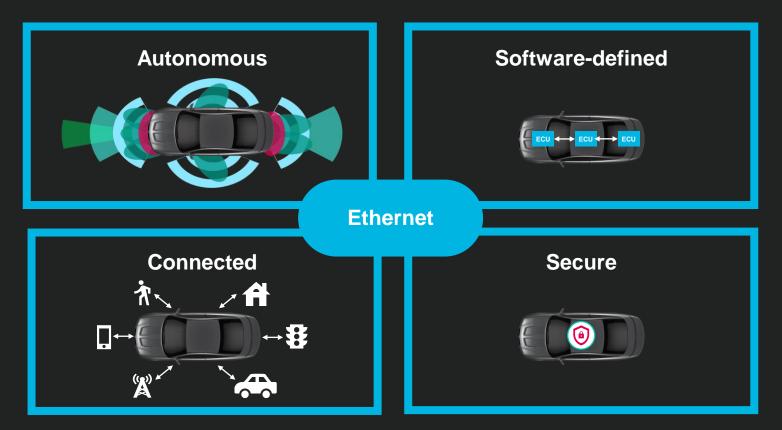
3 Improving YoY revenue

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## The next \$1B Ethernet market



## Automotive megatrends



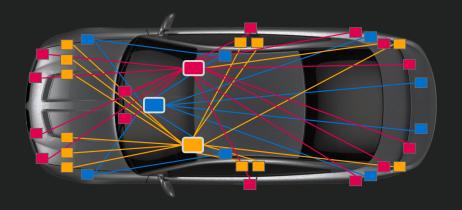
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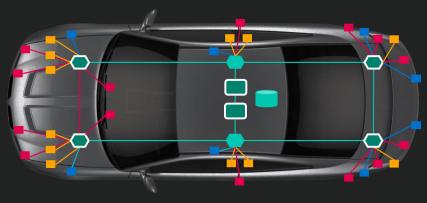
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#### The network of a smart car

Point to point, rigid, expensive

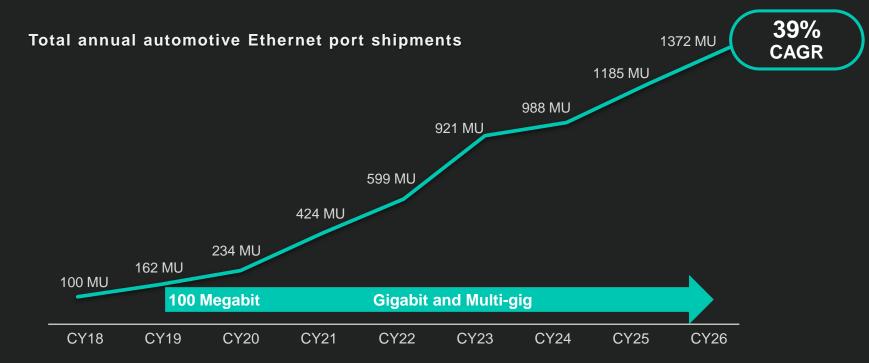
Networked, secure, scalable, intelligent





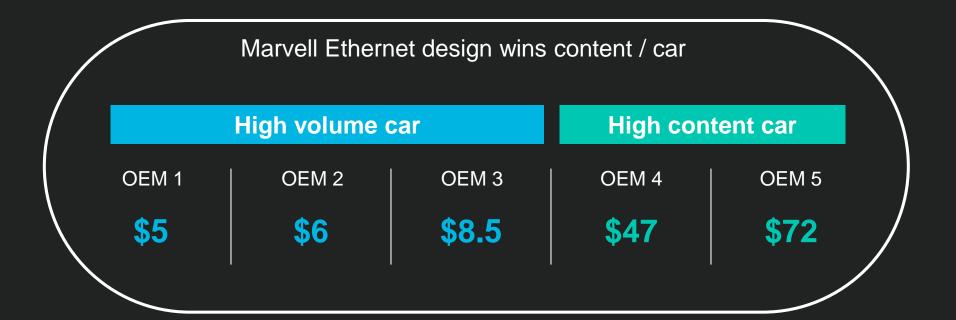
#### **Ethernet is the future**

## Automotive Ethernet ports



#### Multi-gig higher \$ value per port

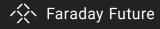
## Ethernet content per car accelerating



Source: Marvell

## Automotive Ethernet adoption





















HONDA

















STELLANTIS











NIO









GEELY







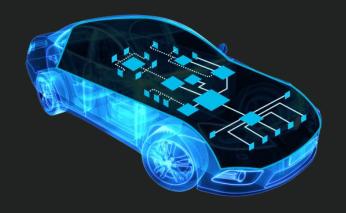








## Marvell: fastest growing automotive Ethernet company

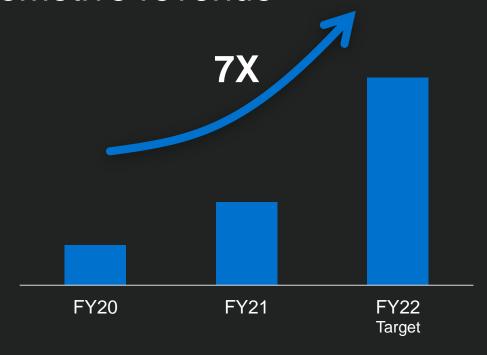


#### First in market

- 1st with automotive secured switch
- 1st with 1 gigabit Ethernet PHY
- 1st with 10 gigabit Ethernet PHY

Design wins at 28 OEMs: 7 out of top 10

#### Marvell automotive revenue



#### Increasing market share target from >33% to >50%

## Positioned for growth

1 Winning in data center with Innovium

2 Gaining market share in enterprise networking

Growing automotive revenue into a \$1B market



# Driving compute disruption

Raghib Hussain

President, Products and Technology

October 6, 2021



## Our compute journey

#### **Enterprise**



**5G** 



Cloud



90

## Our compute journey

#### **Enterprise**



**5G** 



Cloud



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## Enterprise disruption

Prior solution Optimized solution **DPU** Multi-core **CPU** Security offload **OCTEON®** Integrated networking General purpose

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## Enterprise security and networking leadership



#### Shipping in 9 of top 10 firewalls | growing 5nm wins

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## Our compute journey

**Enterprise** 



**5G** 



Cloud



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## 5G RAN disruption

Prior solution Optimized solution **RAN-optimized ASIC** Multi-core **Baseband DSP** MARVELL OCTEON° **FPGA** Fusion Security RAN accelerators

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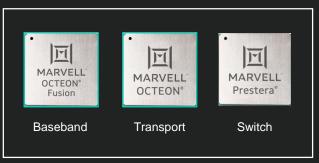
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## Complete 5G digital platform

#### **Distributed Unit (DU)**









Optical fronthaul

#### Radio Unit (RU)



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#### Industry's only provider of optimized 5G RAN silicon

## Leading 5G RAN market

**Tier one customers** 



NOKIA

SAMSUNG

ZTE中兴

**Regional OEM customers** 



Snibb



Sampling



Sampling

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#### Diverse and growing customer base

## 5G global deployment status

Smartphone share

Networks upgraded

Service availability

43%

27%

11%

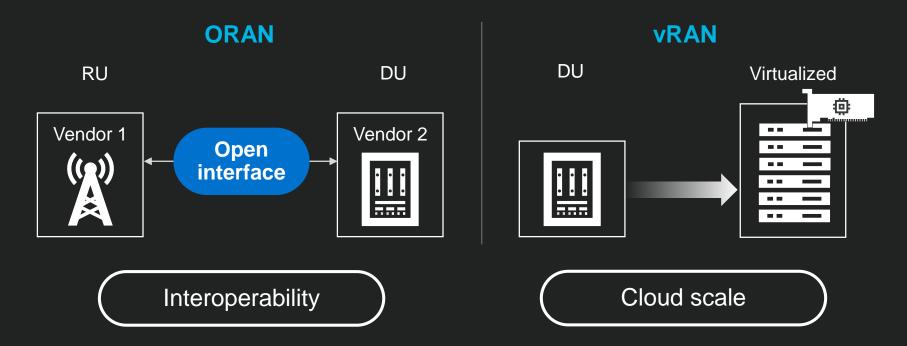
Source: Statista, June 2021 5G share of global smartphone unit shipments

Source: 5*G* Americas, September 2021 Share of 4G networks that have been upgraded to 5G Source: OpenSignal testing, September 2021
Share of time connected to 5G in 106 5G networks

98

#### Majority of 5G growth is in front of us

## Next 5G opportunity



#### All 5G RAN architectures require optimized silicon

99

#### Marvell's 5G vRAN solution NEW!





#### **OCTEON Fusion vRAN**

- Proven baseband
- Superior performance
- Production software

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Full turnkey



5 design wins | card solution | higher ASP

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## Our compute journey

**Enterprise** 



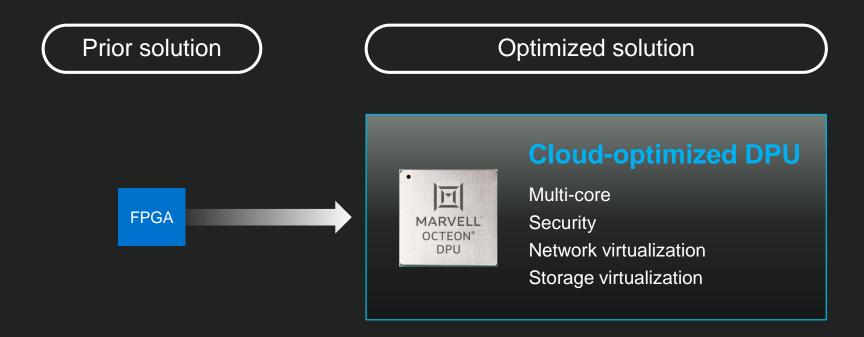
**5G** 



Cloud



## Accelerated computing offload



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### Success in DPU

**SmartNIC** 



Security



vRAN



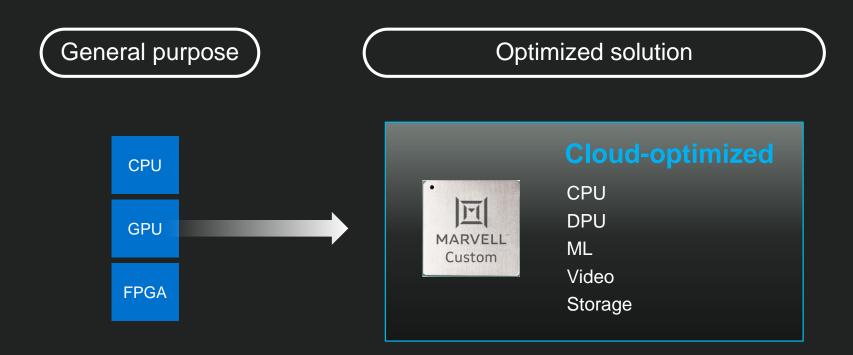
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Shipping to 4 tier one clouds

## The era of cloud-optimized compute



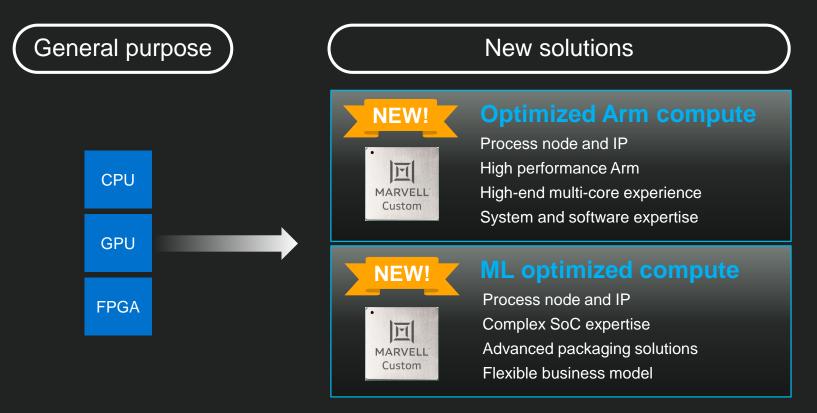
## Transition to cloud-optimized compute



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## Cloud compute design wins



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## Our compute journey

Enterprise



**5G** 



Cloud

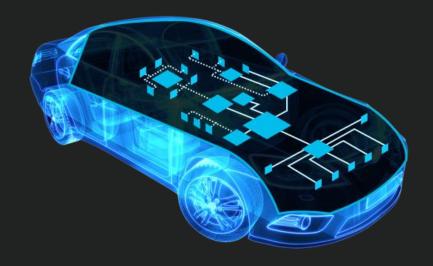


**Automotive** 



#### The next big disruption

## Shift to autonomous driving



#### Compute is the new engine

#### Automotive compute disruption

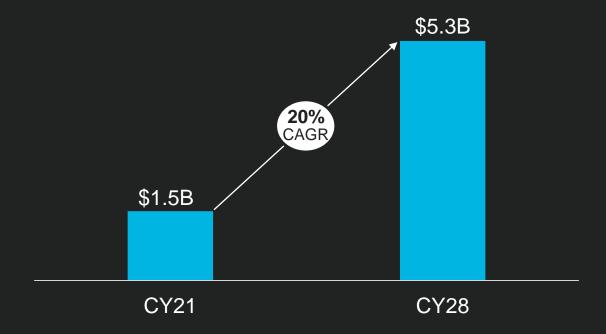


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#### Announcing 5nm automotive compute design win

#### Auto compute opportunity



#### **Incremental multi \$B opportunity for Marvell**

#### Key takeaways

Increasing strength in enterprise business

2 Ramping 5G and expanding into vRAN

3 Capitalizing on cloud compute disruption

4 Investing in optimized compute platform for automotive



# Driving sustainable growth at scale

Jean Hu
Chief Financial Officer
October 6, 2021



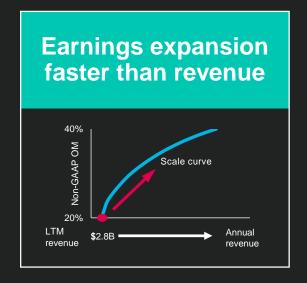
#### Our financial roadmap from last investor day

#### Accelerating revenue growth

LT growth target

Revenue CAGR = 10-15%

Revenue CAGR post Inphi = 12-16%



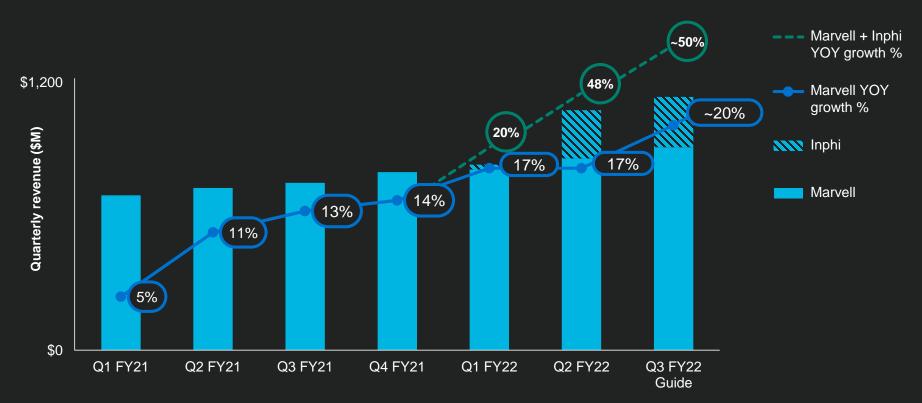
#### Disciplined capital allocation

Organic investment

M&A

Shareholder returns

#### Successful execution of revenue growth plan



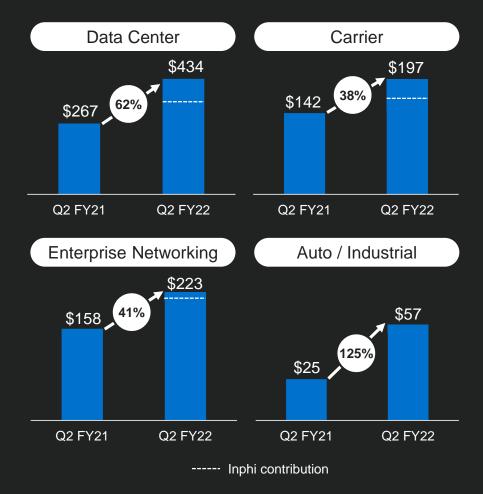
<sup>\*</sup> Q3 FY22 midpoint revenue guidance

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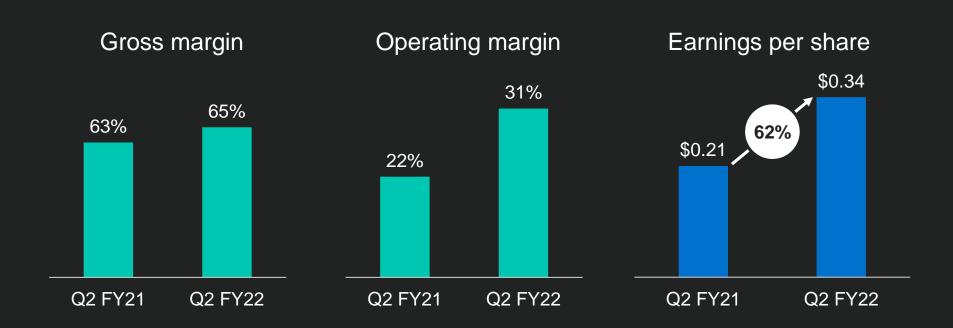
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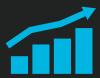
## Revenue growth engine fueled by multiple drivers



#### Earnings expansion faster than revenue



#### Financial roadmap going forward



Sustainable revenue growth at scale



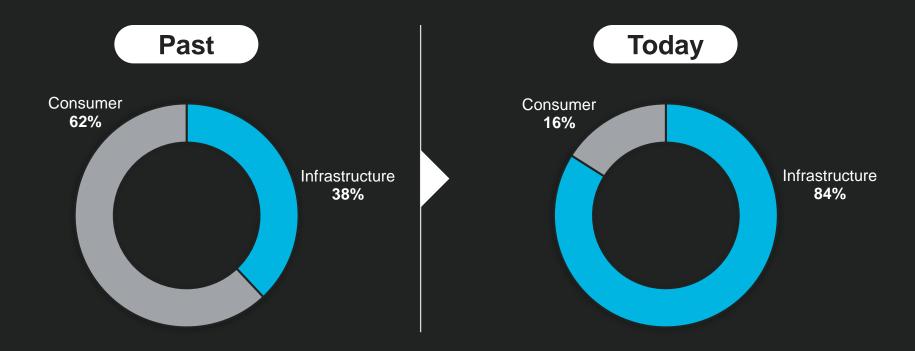
Scaling business model to expand earnings



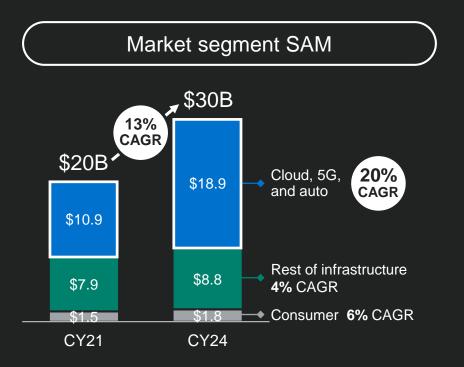
Disciplined capital allocation

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#### Revenue transformation to data infrastructure



#### Delivering accelerated revenue growth

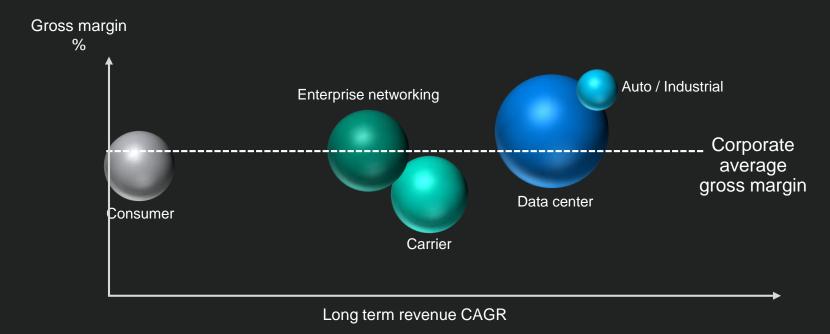


End-market	Revenue <sup>*</sup>	Growth expectations		
Cloud, 5G and auto	~ \$1.5B	2x of market		
Rest of infrastructure	~ \$2.2B	Above market		
Consumer	~ \$0.6B	Below market		
Long-term target 15-20%				

\*Annualized revenue based on Q2 FY22 for Marvell including Inphi

Source: 650 Group, Cignal AI, Crehan, Dell'Oro, Forward Insights, Gartner, LightCounting, Linley Group, Omdia, Strategy Analytics, Trend Focus and Marvell estimates

#### Maintain strong gross margin



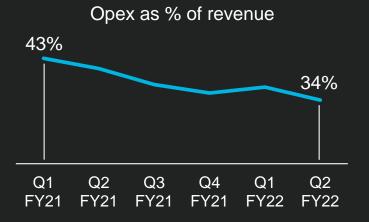
#### **Target Non-GAAP Gross Margin = 64-66% of sales**

Note: Q2 FY22 non-GAAP gross margin as corporate average gross margin. Size of bubble represents Q2 FY22 revenue. Chart is for illustration of gross margin by end market and not to scale

#### Focus on operating leverage and investment

Scale operating model...

...While investing in R&D



>\$1.2B

Annualized R&D\*

~95%

Cloud, Carrier, Enterprise & Auto

\*Annualized Non-GAAP R&D based on Q2 FY22 for Marvell including Inphi

#### Target Non-GAAP opex = 26-28% of sales

#### Long-term Non-GAAP financial model

	2020 investor day	2021 investor day		
Revenue growth	10-15% CAGR	15-20% CAGR		
Gross margin	63-65%	64-66%		
Operating expenses	28-30%	26-28%		
Operating margin %	>35%	38-40%		
FCF%	>30%	>32%		

Note: For our non-GAAP long term target model, we have not provided a reconciliation to the corresponding GAAP measures because certain items that impact these measures are uncertain or out of our control or cannot be reasonably predicted. Accordingly, a reconciliation of these non-GAAP financial measures to the corresponding GAAP measures is not available without unreasonable effort.

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#### Capital allocation priorities

Investment in organic growth

Investment through acquisitions

Returns to shareholders (>50% of FCF)

Talent / people

3/5nm technology and IP

Supporting infrastructure

XX Inphi



Prioritize share repurchase

Maintain current dividend

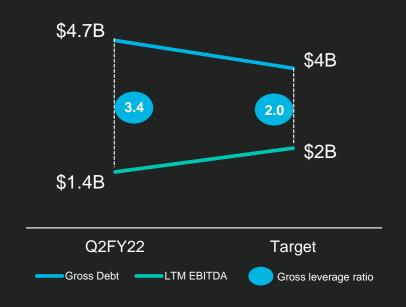
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Strong balance sheet, investment grade rating and ample financial flexibility

#### Capital return priorities

EBITDA tailwind drives rapid deleveraging

Share repurchase since Q3FY17



\$1.2B repurchased

\$18
Average price per share

**36%**Compounded annual return

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#### Key takeaways

1 Driving sustainable revenue growth

2 Scaling financial model while investing to lead

3 Disciplined capital allocation funds growth and shareholder returns



## Thank you





Essential technology, done right™



### Appendix

#### GAAP to non-GAAP reconciliation for slide 116

	Q2FY21	Q2FY22
GAAP operating margin	-20.8%	-24.8%
Other cost of goods sold	1.6%	14.5%
Share-based compensation	8.6%	10.6%
Restructuring related charges	16.6%	1.1%
Amortization of acquired intangible assets	15.3%	25.7%
Other operating expenses	1.1%	3.7%
Non-GAAP operating margin	22.4%	30.8%

	Q2FY21	Q2FY22
GAAP gross margin	49.4%	34.6%
Special items:		
Share-based compensation	0.6%	0.2%
Amortization of acquired intangible assets	11.7%	15.5%
Other cost of goods sold	1.6%	14.5%
Total special items	13.9%	30.3%
Non-GAAP gross margin	63.3%	64.8%

#### GAAP to non-GAAP reconciliation for slide 121

\$K	Q1 FY21	Q2 FY21	Q3 FY21	Q4 FY21	Q1 FY22	Q2 FY22
GAAP Operating Expense	\$422,898	\$510,523	\$390,450	\$422,868	\$500,452	\$638,498
Share-based compensation	56,149	58,504	55,352	55,214	99,790	111,440
Amortization of acquired intangible assets	26,355	26,354	26,355	26,355	34,827	109,419
Integration and deal costs	-	-	-	-	-	-
Restructuring related charges	21,287	120,590	19,312	9,570	12,886	12,294
Legal settlement and related charges	-	-	-	36,000	-	-
Other operating expenses	19,403	8,125	9,490	12,480	46,684	38,948
Total Recon Items	123,194	213,573	110,509	139,619	194,187	272,101
Non-GAAP Operating Expense	\$299,704	\$296,950	\$279,941	\$283,249	\$306,265	\$366,397
Net Revenue	\$693,641	\$727,297	\$750,143	\$797,819	\$832,279	\$1,075,881
Non-GAAP Opex as % of revenue	43.2%	40.8%	37.3%	35.5%	36.8%	34.1%