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Investor Meeting 2022

Accelerated Computing Systems & Graphics

Raja Koduri

Senior Vice President

General Manager, AXG

The Intel logo, consisting of the word "intel" in a lowercase, sans-serif font, is positioned within a white square. This square is part of a larger graphic element on the left side of the slide, which includes several overlapping squares in various shades of blue and white.

intel



Key Takeaways

Insatiable Compute Demand

Petascale end-points, Exascale Edge and Zettascale Data Centers over next 5 years

Unleashing our Technology Foundation

of Process Nodes, Packaging, Memory, Interconnect, Architecture and Software IP

Energized Execution Engine

with a comprehensive HW+SW roadmap, products launching this year across HPC – AI, media, and gaming supercomputers

Approaching \$10B* Revenue by '26

and Estimated >\$1B Revenue in '22

*AXG revenue includes intersegment graphics royalty that is eliminated in Intel consolidated results. This royalty is approximately \$700M in 2021, growing to approximately \$1B in 2026.

Democratization of Core Computing

PC Era

1B+ Internet Connected Devices

Web 1.0 - Consume



Digitize
Everything

Mobile + Cloud Era

10B+ Cloud Connected Devices

Web 2.0 - Consume + Create



Connect
Everyone

Pervasive Intelligence Era

100B+ Edge Connected Devices

Web 3.0 - Consume + Create + Own

Empower
Everyone

Open Standards

x86

Xe



10²¹

10¹⁸

10¹⁵

10⁹

10⁴

Compute
Tera
Peta
Exa
Zetta

1980

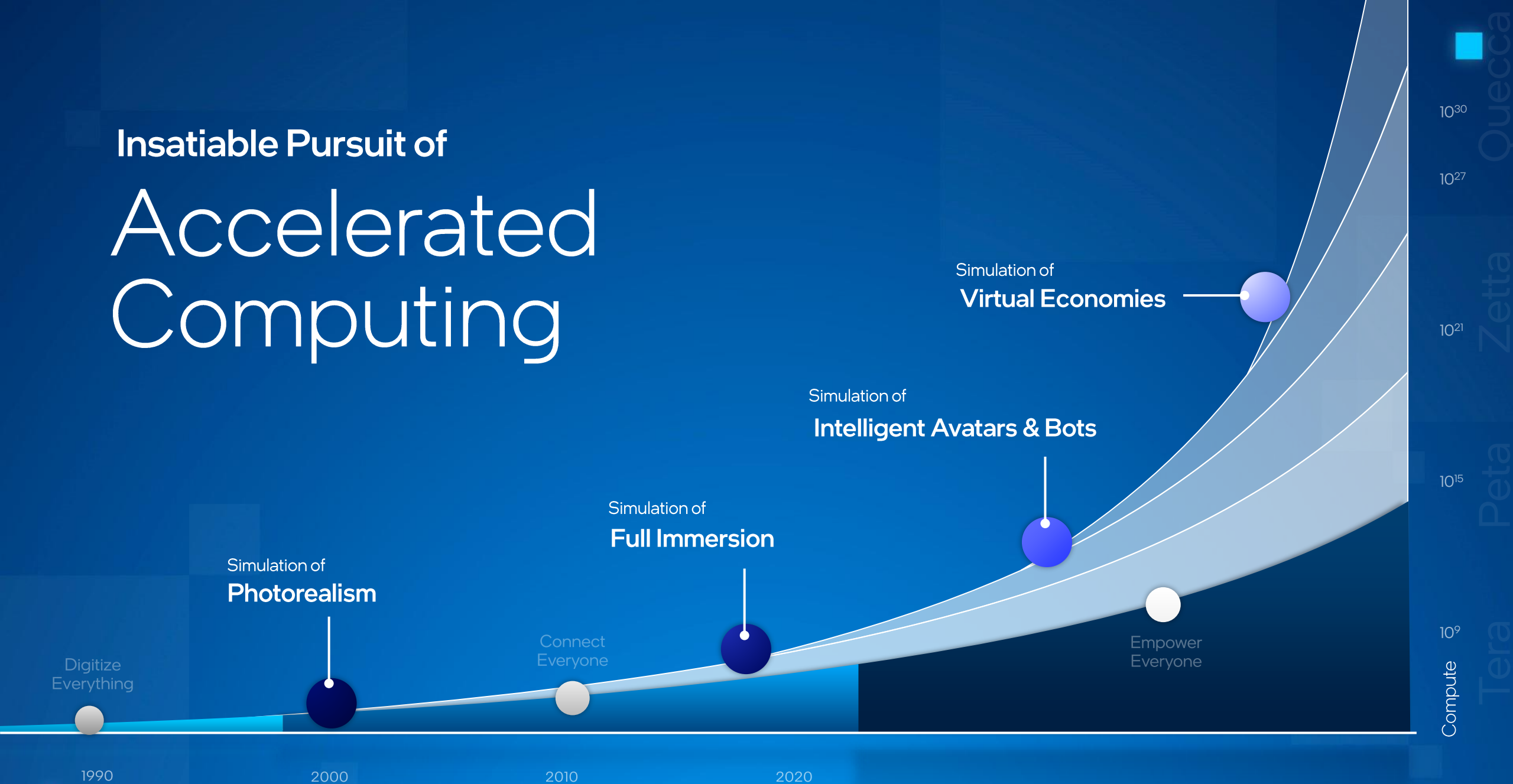
1990

2000

2010

2020

Insatiable Pursuit of Accelerated Computing

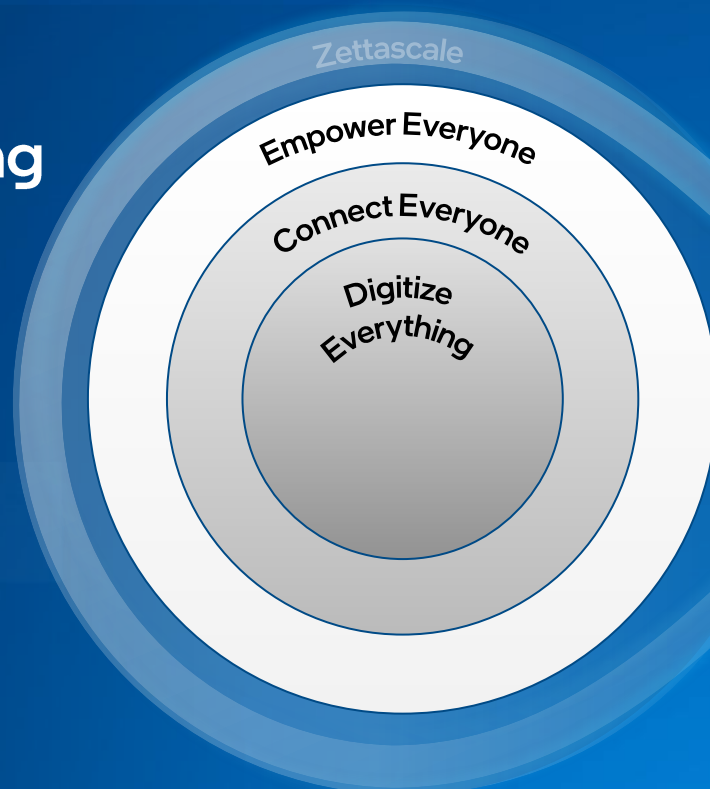


Insatiable Compute Demand

driven by "AI everywhere" and "Persistent immersive web" trending to

Core Computing

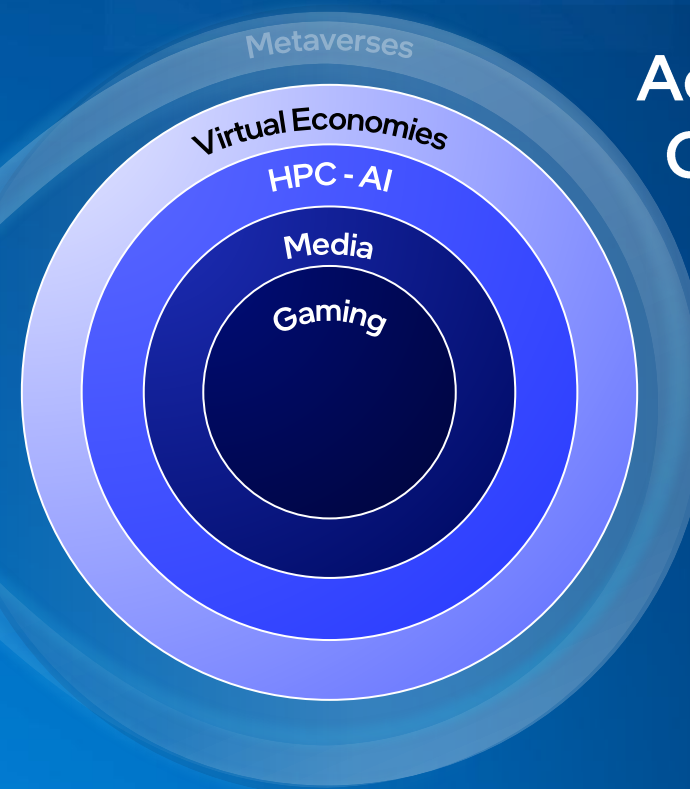
Existential
Needs



AI

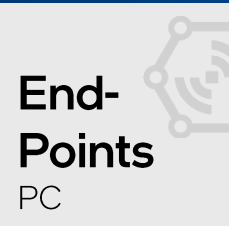
Accelerated Computing

Exploratory
Simulation

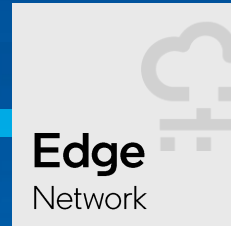


Insatiable Compute Demand

driven by “AI everywhere” and “Persistent immersive web” trending to



10^{15}



10^{18}



10^{21}

Core Computing

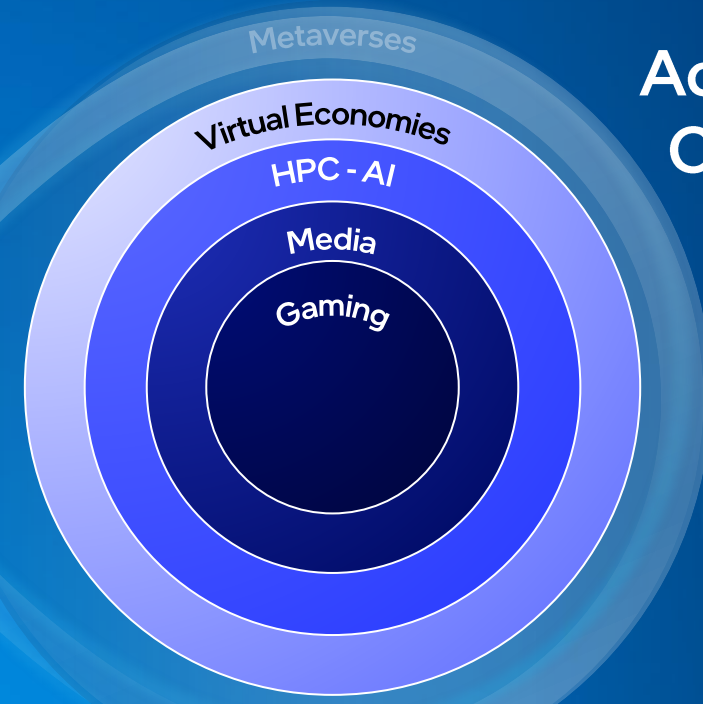
Existential
Needs



AI

Accelerated Computing

Exploratory
Simulation

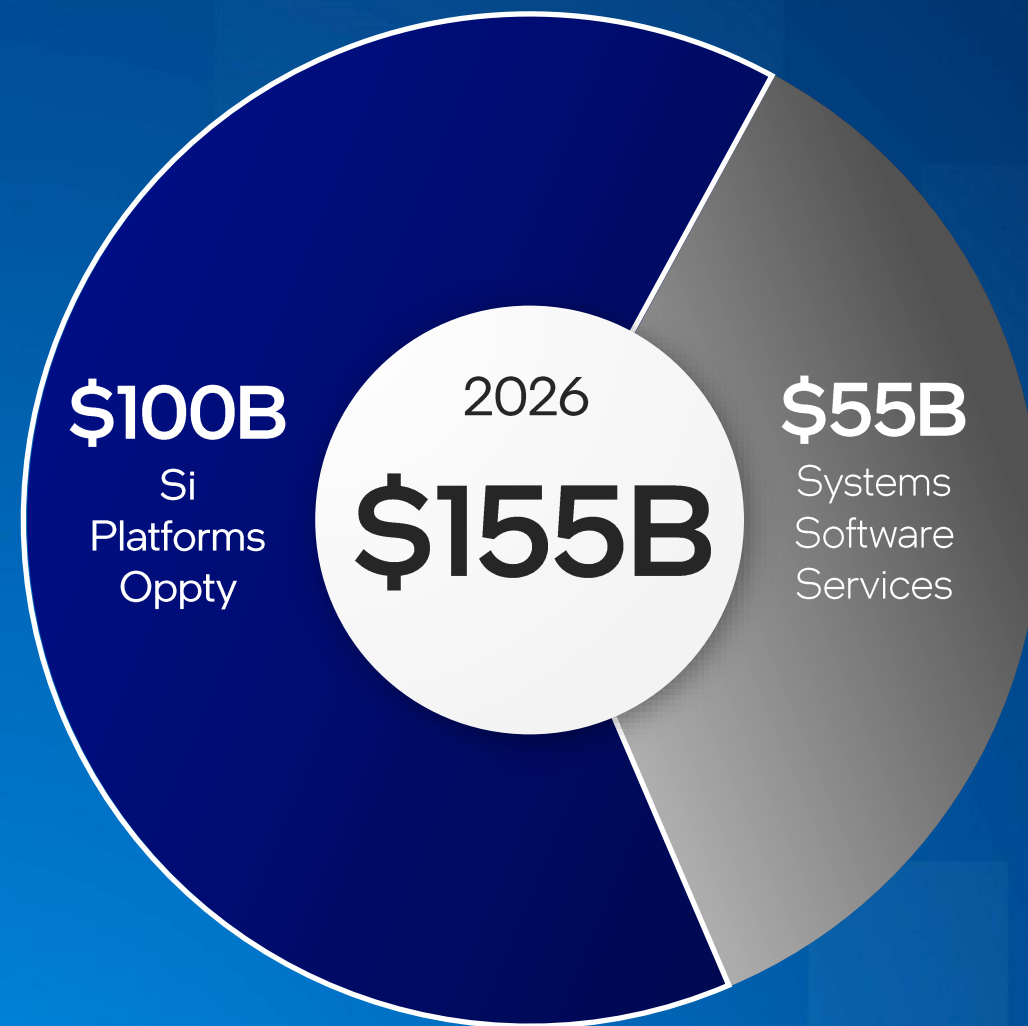


Accelerated Computing Platform TAM



intel.

AXG Focus



intel.

AXG

Segments

Super Compute

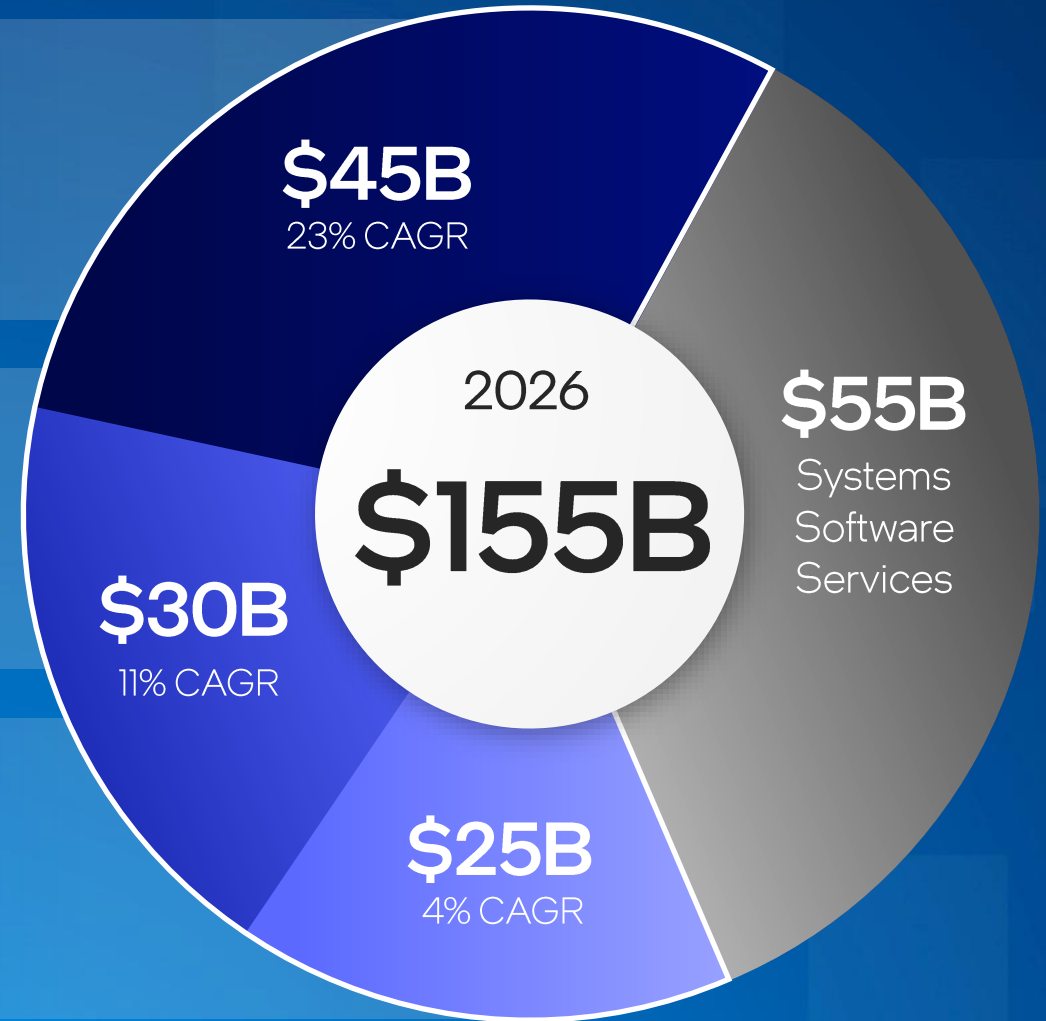
HPC - AI
Media

Custom Compute

Blockchain
Supercomputing at the Edge

Visual Compute

Gaming
Content Creation
Metaverse



intel.

AXG

Growth
Target

Approaching
\$10B*



SW

Arch

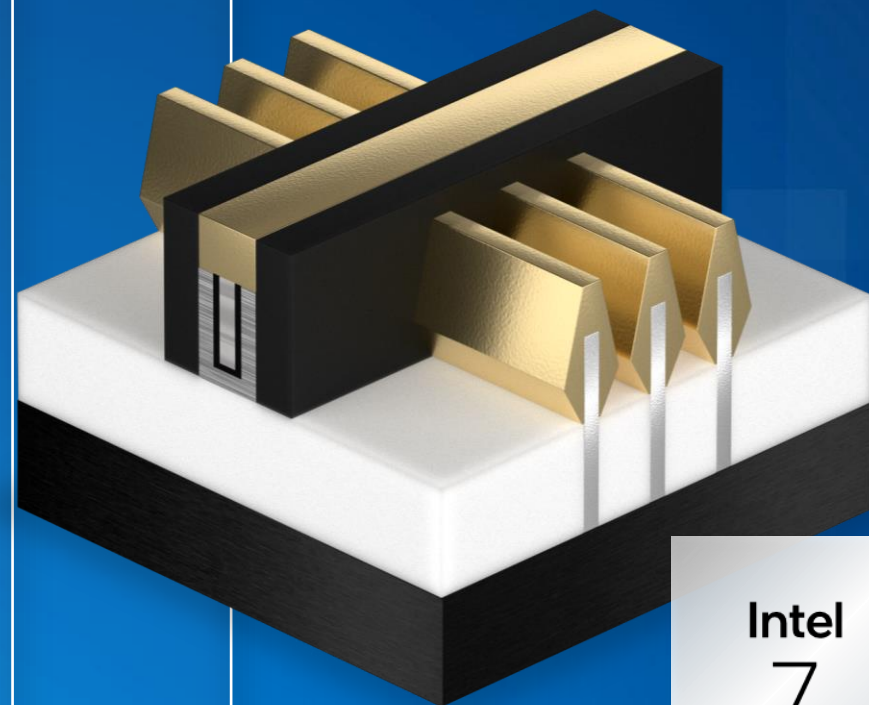
I/O

Memory

Packaging

Process

Unleashing our Technology Foundation



Intel
7

SW

Arch

I/O

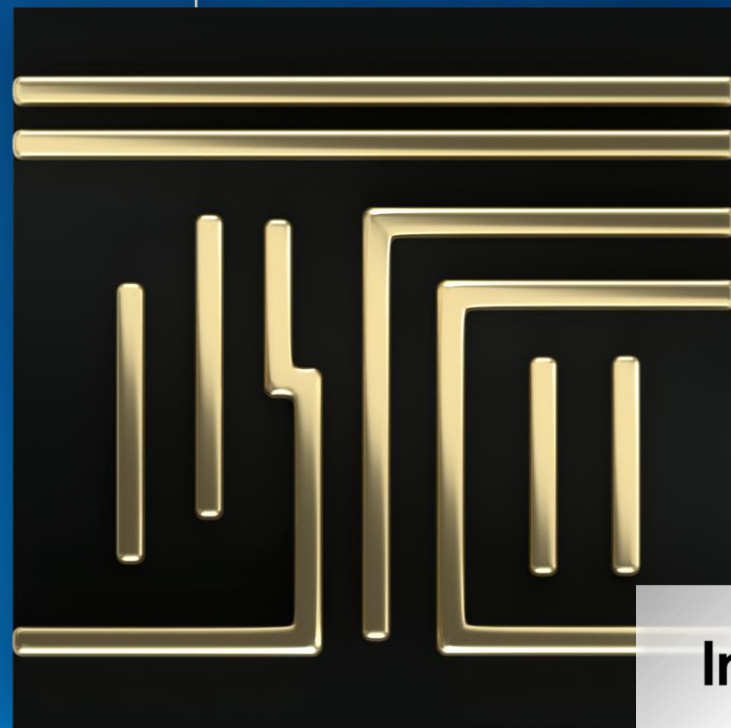
Memory

Packaging

Process

Intel
7

Unleashing our Technology Foundation



Intel
4

SW

Arch

I/O

Memory

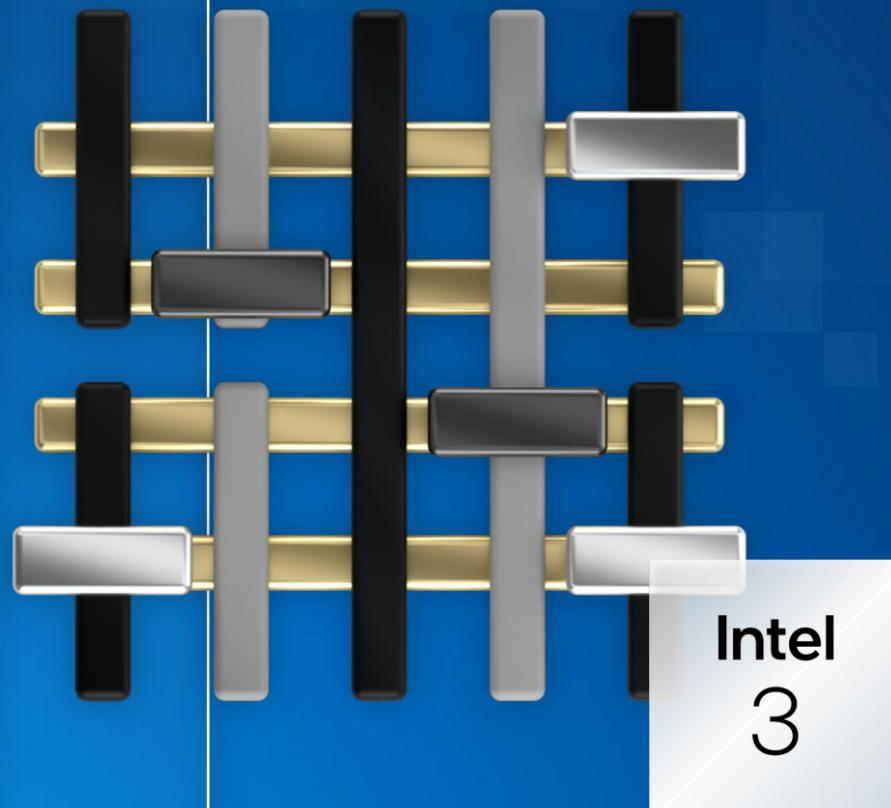
Packaging

Process

Intel
7

Intel
4

Unleashing our Technology Foundation



SW

Arch

I/O

Memory

Packaging

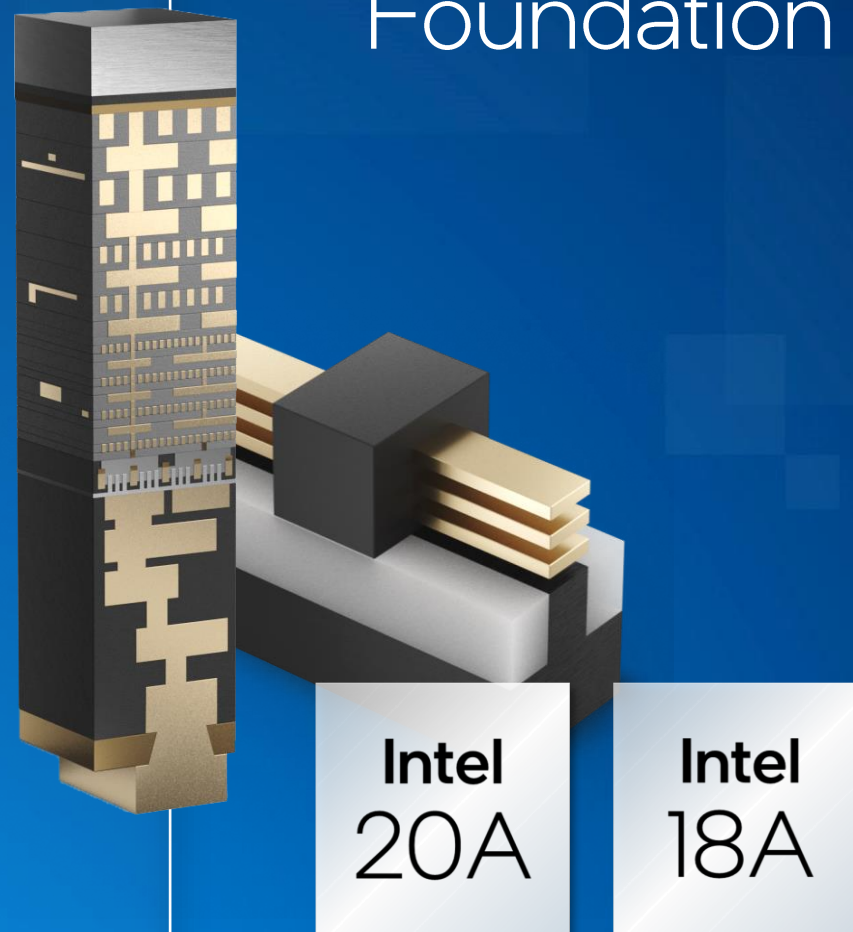
Process

Intel
7

Intel
4

Intel
3

Unleashing our Technology Foundation



SW

Arch

I/O

Memory

Packaging

Process

Intel
7

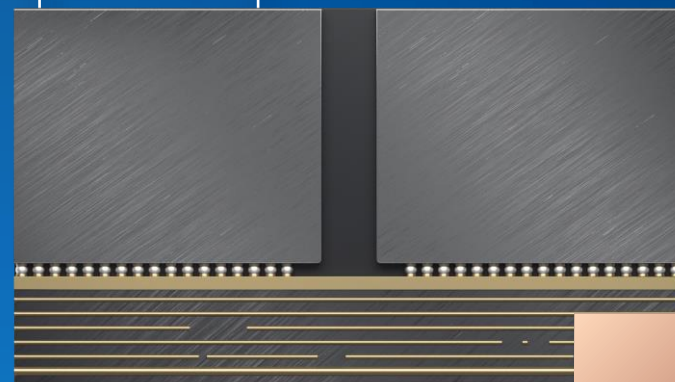
Intel
20A

Intel
4

Intel
18A

Intel
3

Unleashing our Technology Foundation



EMIB

SW

Arch

I/O

Memory

Packaging

Process

Intel
7

Intel
20A

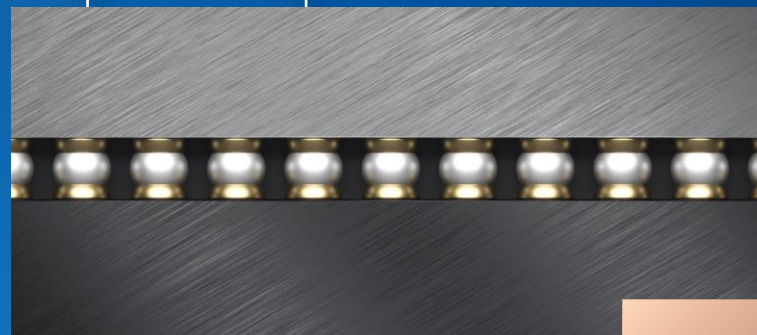
Intel
4

Intel
18A

Intel
3

EMIB

Unleashing our Technology Foundation



Foveros

SW

Arch

I/O

Memory

Packaging

Process

Intel
7

Intel
20A

Intel
4

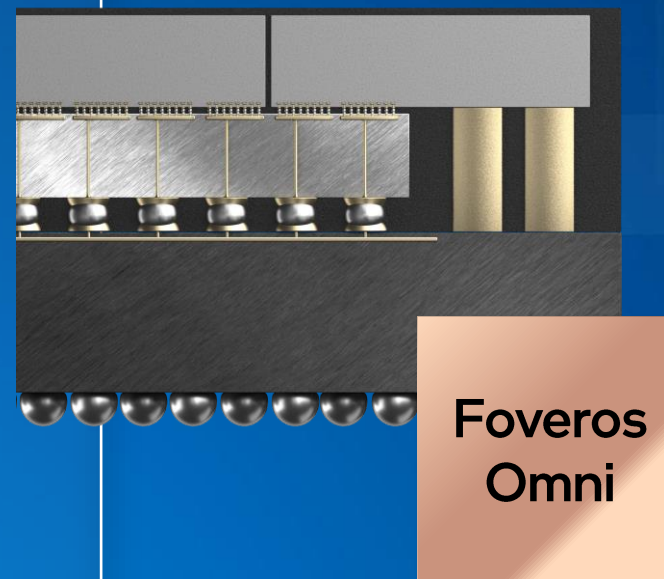
Intel
18A

Intel
3

EMIB

Foveros

Unleashing our Technology Foundation



SW

Arch

I/O

Memory

Packaging

Process

Intel
7

Intel
20A

Intel
4

Intel
18A

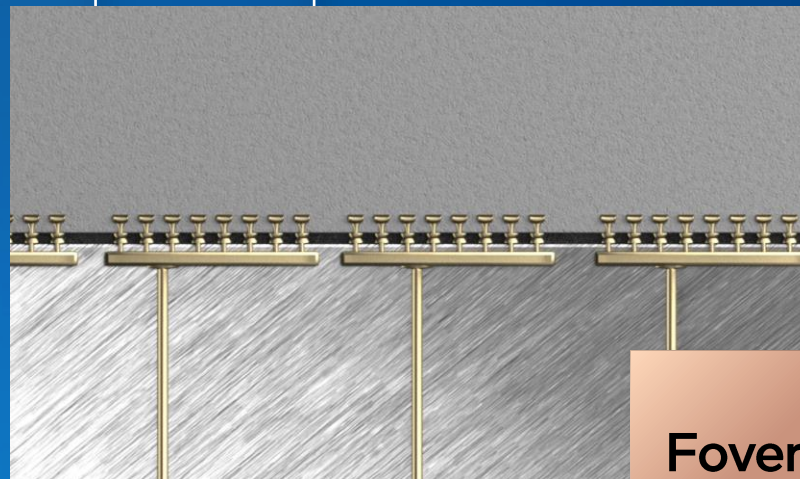
Intel
3

EMIB

Foveros

Foveros
Omni

Unleashing our Technology Foundation



**Foveros
Direct**

SW

Arch

I/O

Memory

Packaging

Process



PyTorch



OpenVINO

XGBoost



vmware



Expansive World-Class IP Portfolio

SW

Arch

I/O

Memory

Packaging

Process



PyTorch



OpenVINO

XGBoost



vmware



SW

Arch

I/O

Memory

Packaging

Process

Intel
7

Intel
20A

Intel
4

Intel
18A

Intel
3

EMIB

Foveros

Foveros
Omni

Foveros
Direct

RAMBO

DDR

HBM

XeLink

CXL

Ethernet

PCIe

Xe
HPC

Xe
HPCG

Xe
LP

X86
p-core

X86
e-core

PyTorch

Apache
Spark

unity

OpenVINO

XGBoost

KVM

vmware



Supercharging our IP Foundation

SW

Arch

I/O

Memory

Packaging

Process

Intel 7

Intel 20A

Intel 4

Intel 18A

Intel 3

EMIB

Foveros

Foveros Omni

Foveros Direct

RAMBO

DDR

HBM

XeLink

CXL

Ethernet

PCIe

Xe HPC

Xe HPG

Xe LP

X86 p-core

X86 e-core

PyTorch



OpenVINO

XGBoost



vmware



IDM 1.0

SW

Arch

I/O

Memory

Packaging

Process

Intel 7

Intel 20A

Intel 4

Intel 18A

Intel 3

EMIB

Foveros

Foveros Omni

Foveros Direct

RAMBO

DDR

HBM

XeLink

CXL

Ethernet

PCIe

Xe HPC

Xe HPG

Xe LP

X86 p-core

X86 e-core

PyTorch

Apache Spark

unity

OpenVINO

XGBoost

KVM

vmware



IDM 2.0

Flexibility
& Agility

SW

Arch

I/O

Memory

Packaging

Design Services

Process

Intel
7

Intel
4

Intel
3

Intel
20A

Intel
18A

TSMC

N7

N6

N5

...

synopsys

EMIB

cādence

Foveros

Rambus

Foveros
Omni

Foveros
Direct

RAMBO

DDR

HBM

XeLink

CXL

Ethernet

PCIe

Xe
HPC

Xe
HPG

Xe
LP

X86
p-core

X86
e-core

PyTorch

spark

unity

OpenVINO

XGBoost

KVM

vmware



SW

Arch

I/O

Memory

Packaging

Design Services

Process

Intel 7 Intel 4 Intel 3 Intel 20A Intel 18A

TSMC

N7

N6

N5

...

No Wafer Left Behind

synopsys

EMIB

DDR

Ethernet

X86 p-core

cadence

Foveros

HBM

PCIe

X86 e-core

Rambus

Foveros Omni

Foveros Direct

Xe HPC

Xe HPG

Xe LP

PyTorch

spark

unity

OpenVINO

XGBoost

KVM

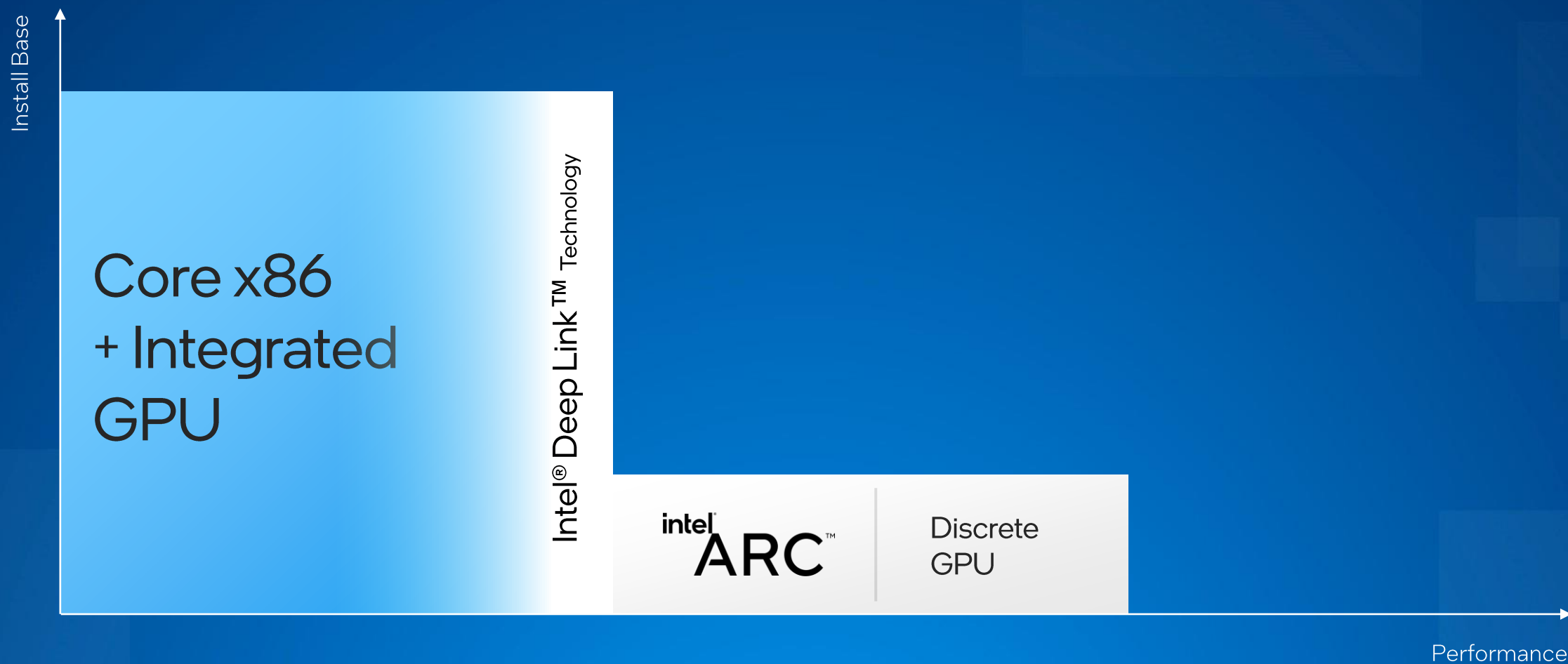
vmware



Visual Compute Product Strategy



Visual Compute Product Strategy



Visual Compute Roadmap

Ultra Enthusiast

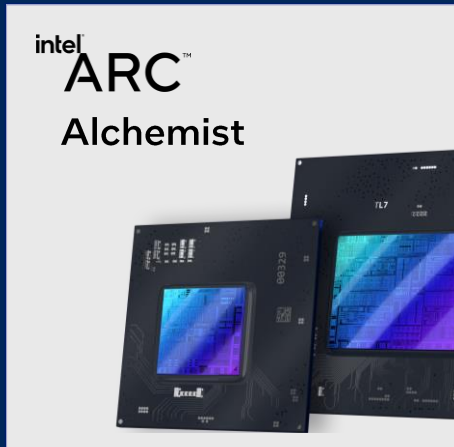
Enthusiast

Performance

Mainstream

Entry

Deep Link



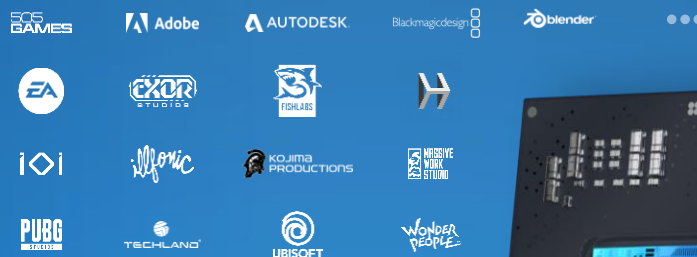
Alder Lake & Raptor Lake

2022

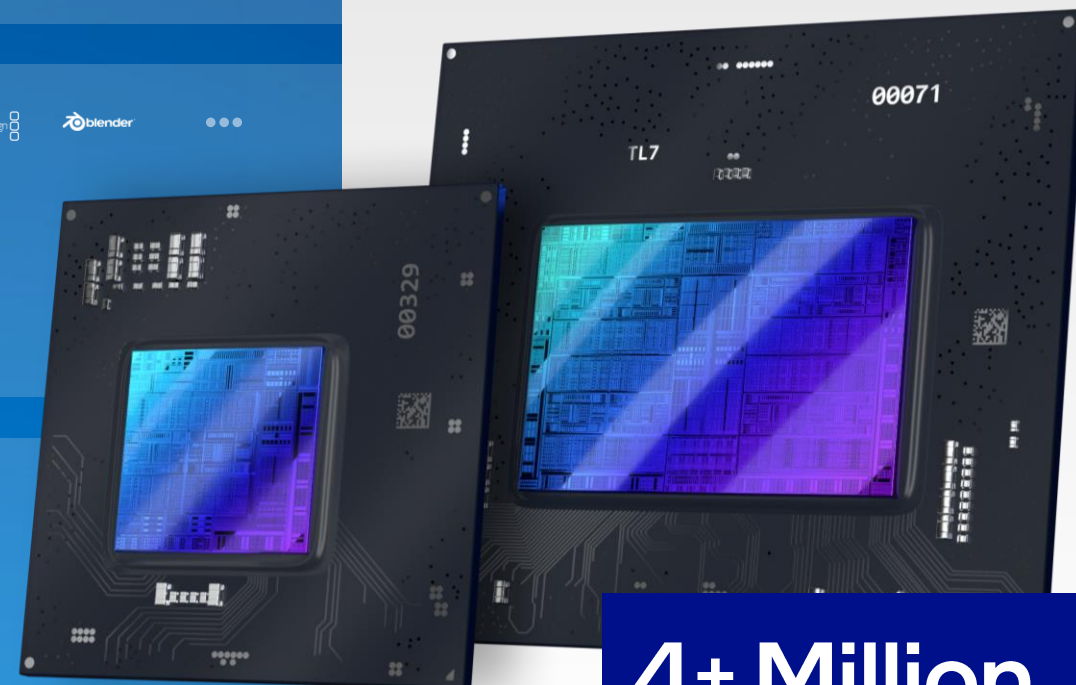
Across Key OEMs and AICs



Xe Super Sampling Ready Games & Deep Link Accelerated Apps



Notebook Q1, Desktop Q2, Workstation Q3



4+ Million
units in 2022

Path to Persistent Immersive Web

Infrastructure
Layer

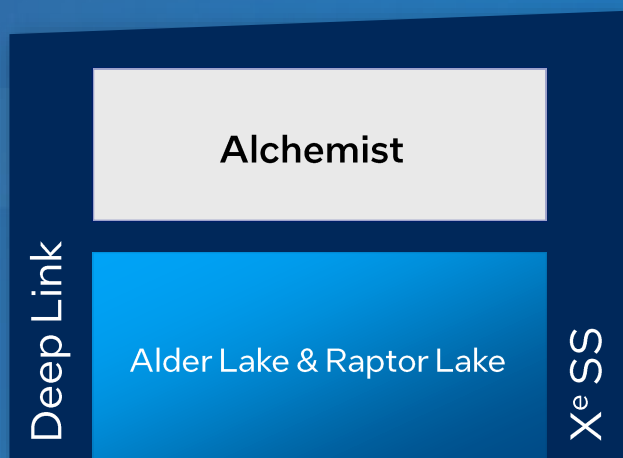
Project

Endgame

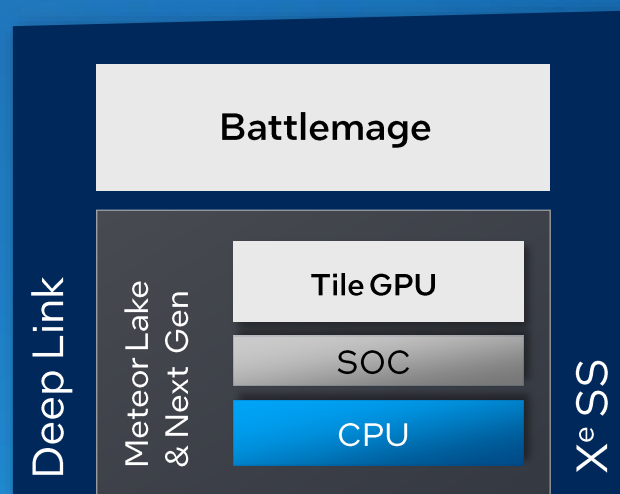
Launch in 2022

Continual XPU Compute as a Service

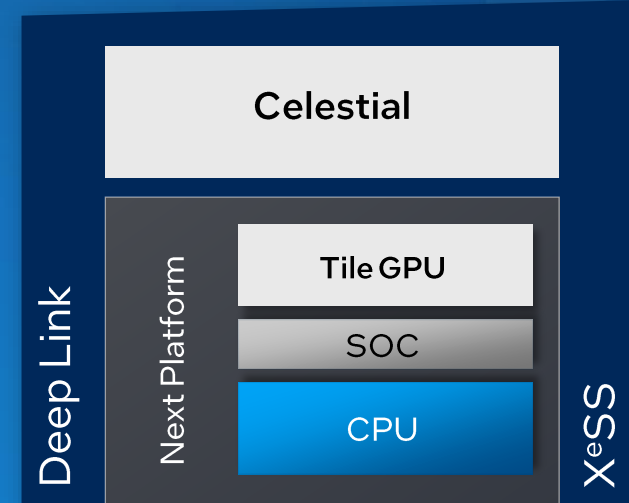
Compute
Layer



2022

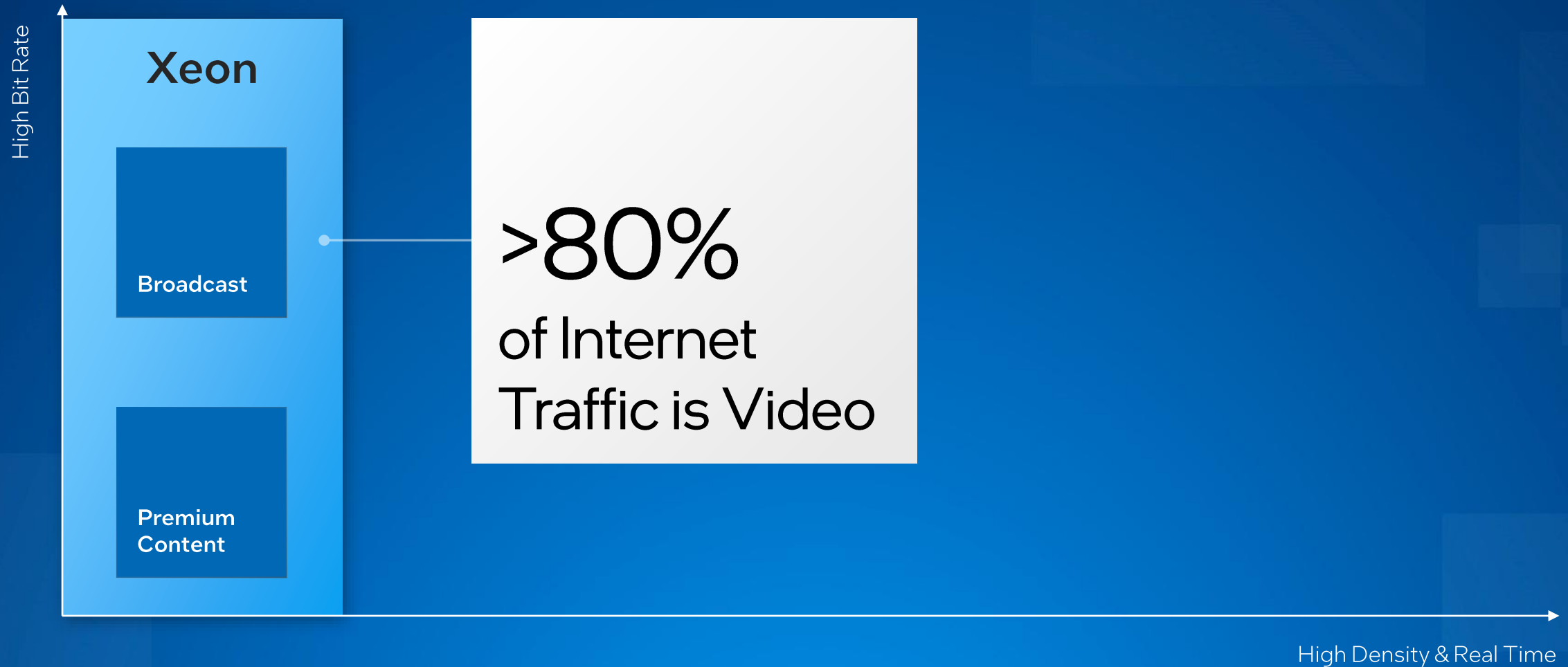


2023-2024

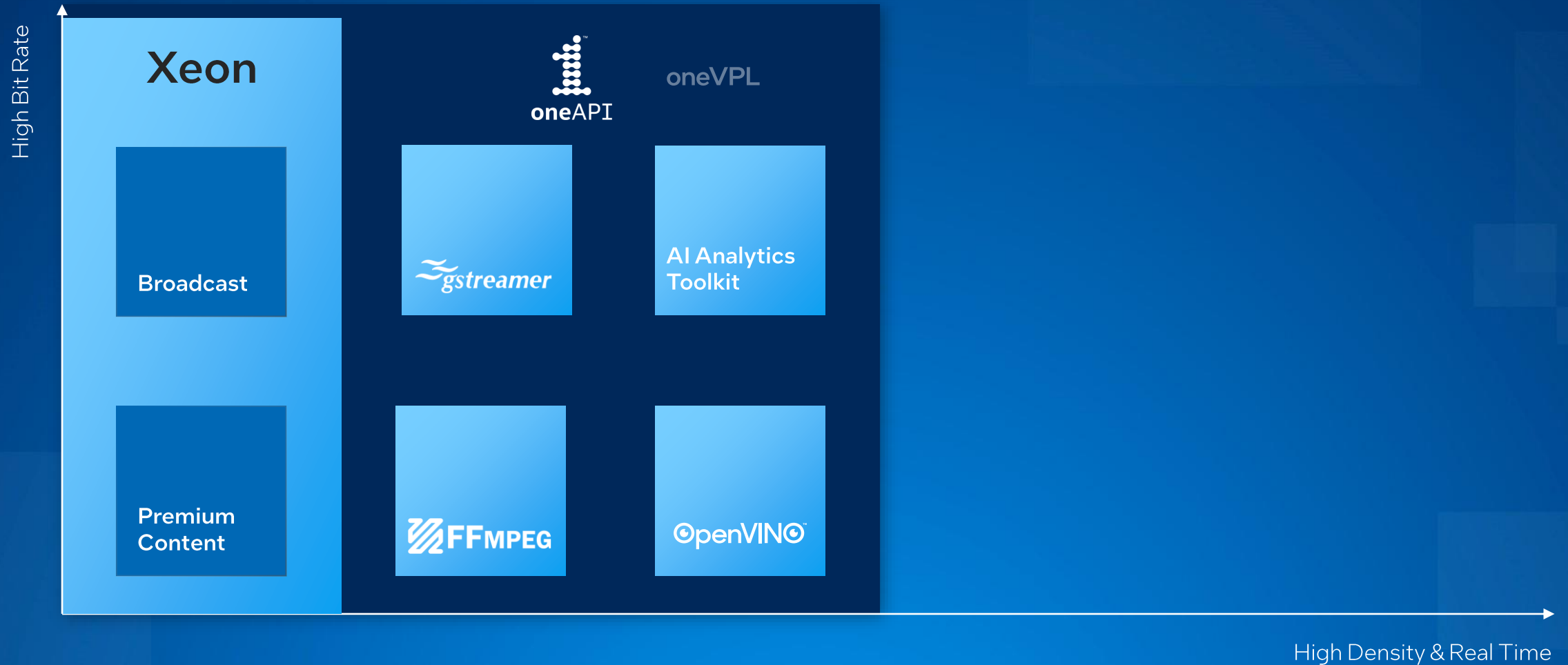


2024+

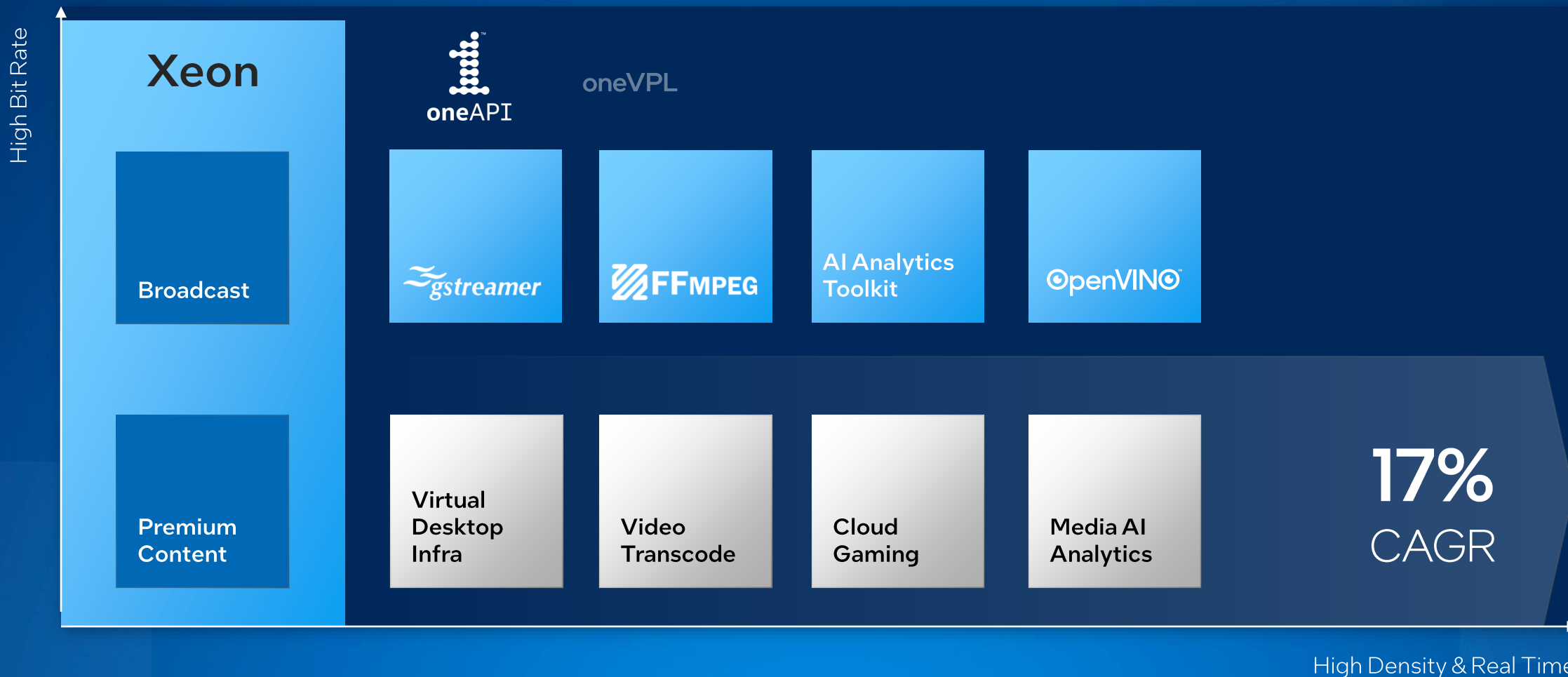
Media Super Compute Strategy



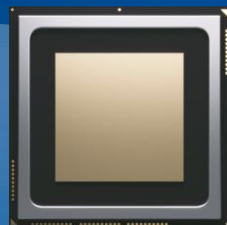
Media Super Compute Strategy



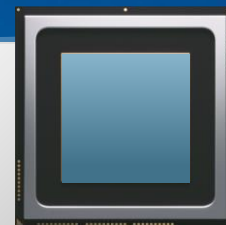
Media Super Compute Strategy



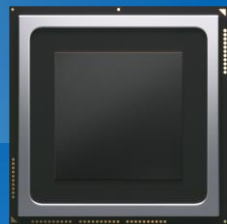
Discrete Solutions Today



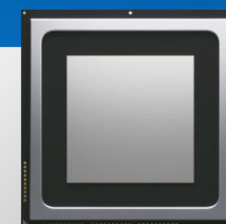
**Video
Transcode**



**Cloud
Gaming**



**Virtual
Desktop
Infra**



**Media AI
Analytics**

Media Supercomputer

Arctic Sound - M

Sampling Today

Shipping Mid 2022



Video Transcode

8

Simultaneous
4K Streams

30+

Simultaneous
1080p Streams

Virtual Desktop Infra

60+

Virtualized Functions

Cloud Gaming

30+

Game Streams¹

Media AI Analytics

150

TOPS²

Industry's Only

Open-Source Media Solution Stack

Industry's First

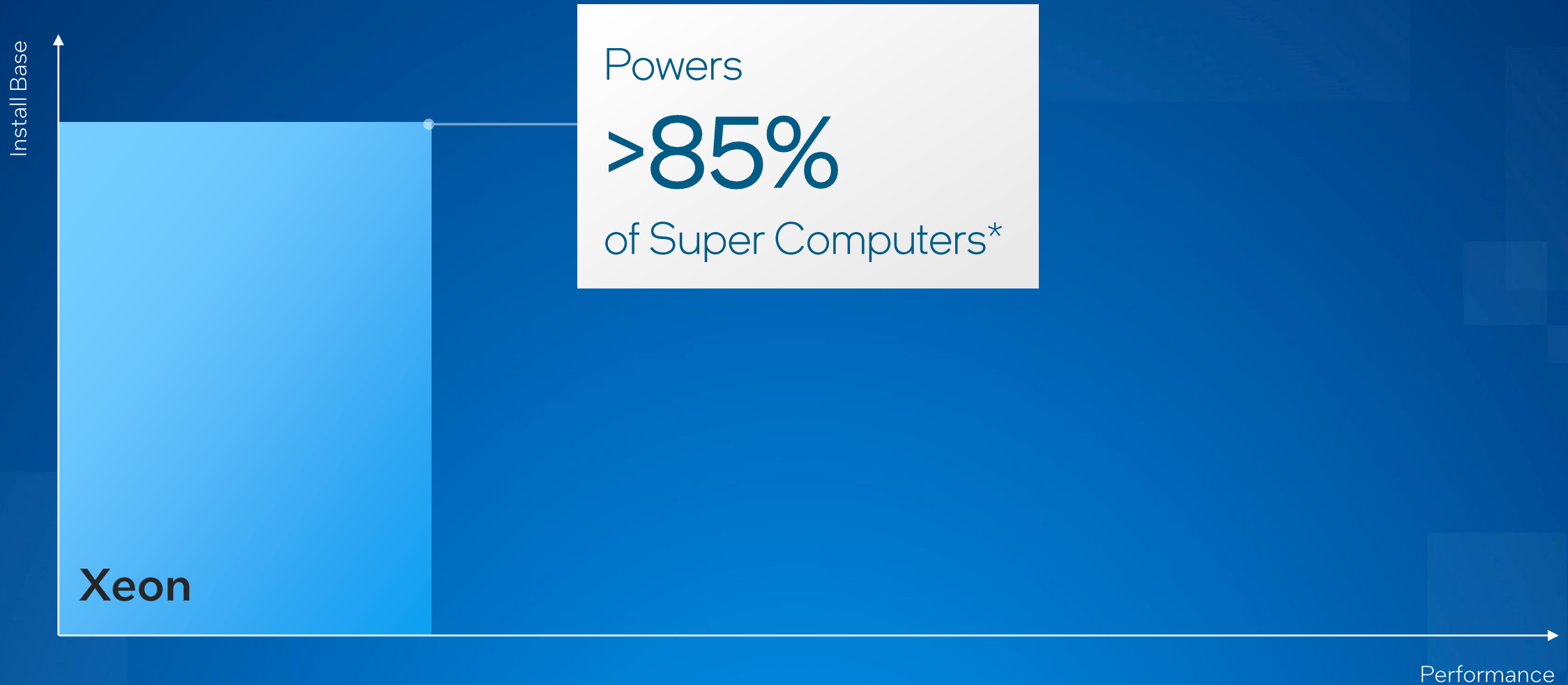
GPU with AV1 Encode

¹720p30 Android Games ²INT 8

HPC - AI Super Compute Strategy

Wave 1

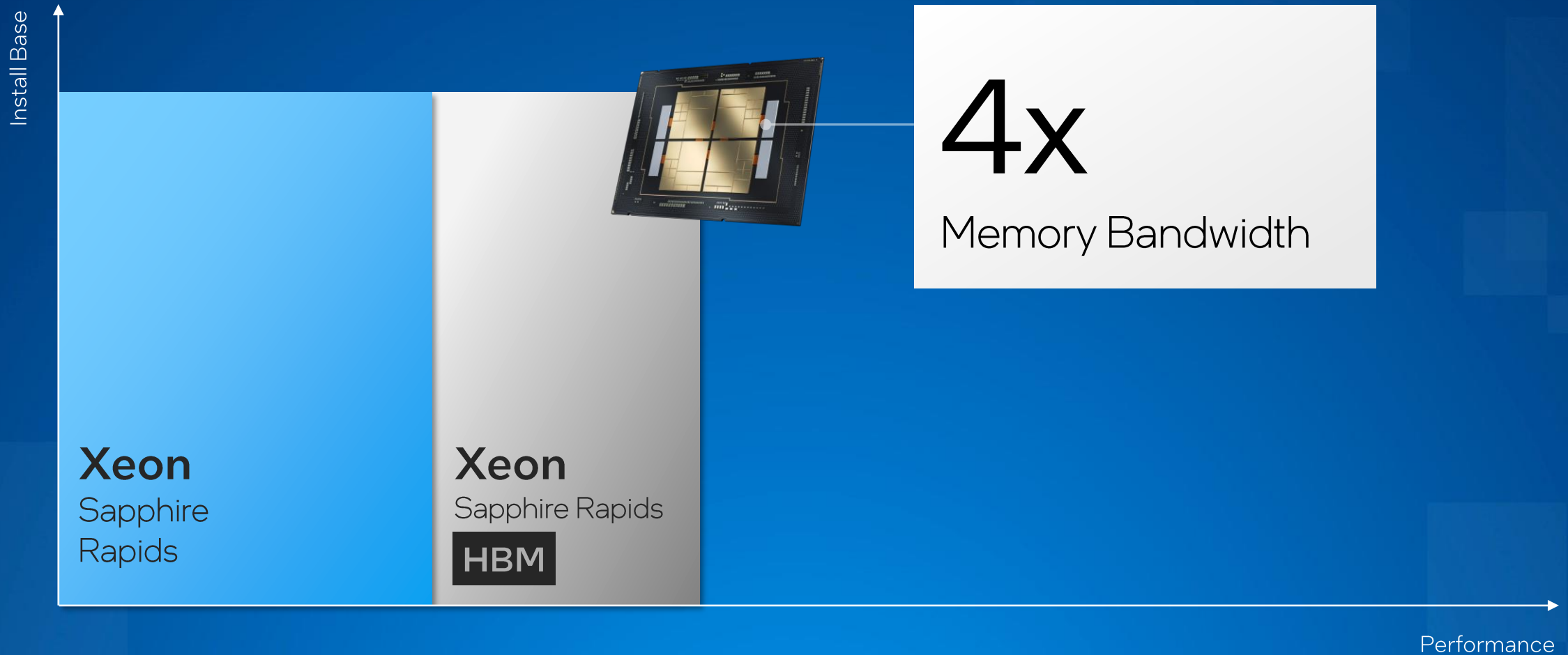
2022



HPC - AI Super Compute Strategy

Wave1

2022



HPC - AI Super Compute Strategy

Wave1 2022



HPC - AI Super Compute Strategy

Wave 1 2022



Super-Charged CPU

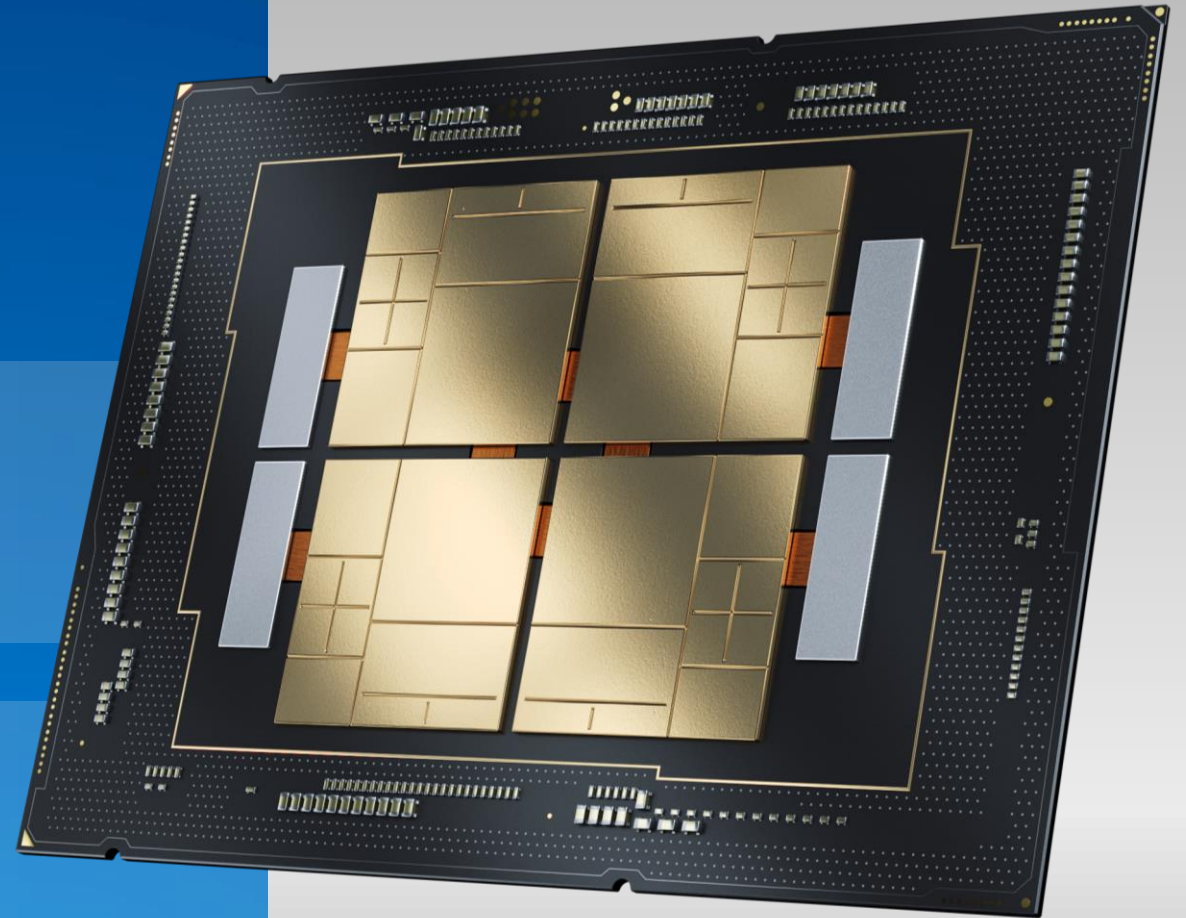
Sapphire Rapids

HBM

Sampling Today
Production 2H '22

Up to 2.8x Perf
over 3rd Gen Xeon¹

¹Based on pre-production measurements.
Learn more at www.intel.com/PerformanceIndex. Results may vary.



Super-Charged CPU

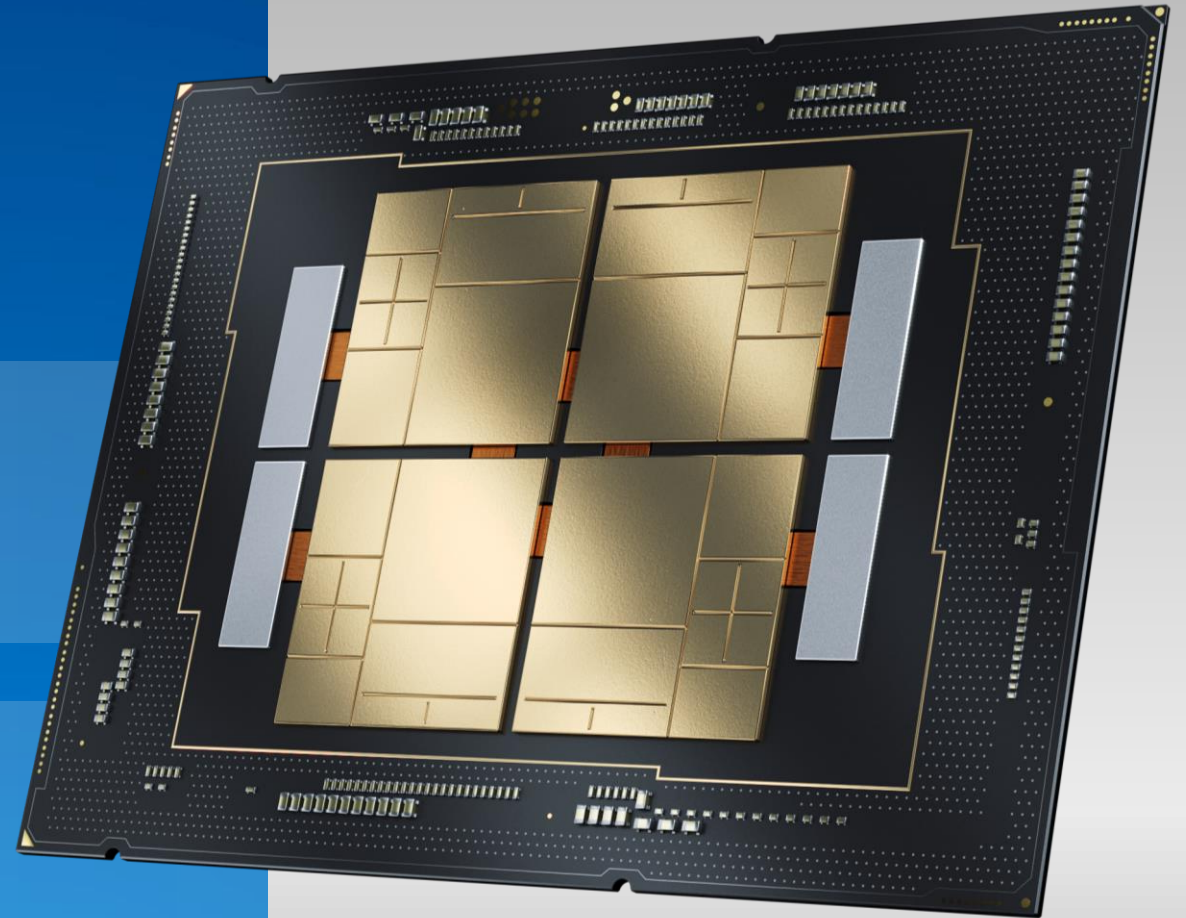
Sapphire Rapids

HBM

Sampling Today
Production 2H '22

Up to 2.8x Perf
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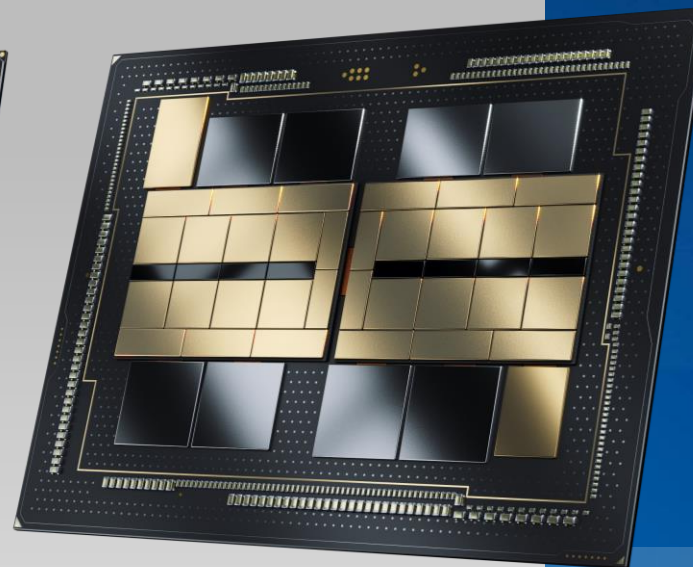
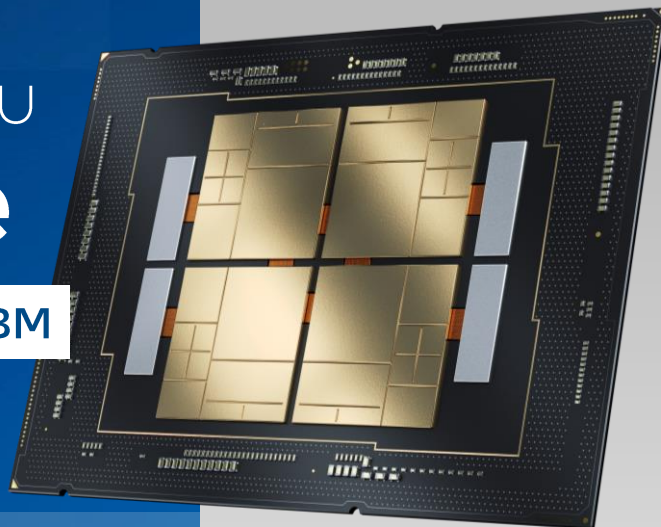
¹Based on pre-production measurements.
Learn more at www.intel.com/PerformanceIndex. Results may vary.



Super-Charged CPU

Sapphire Rapids

HBM



Super-Charged GPU

Ponte Vecchio

Sampling Today
Production 2H '22

Up to 2.8x Perf
over 3rd Gen Xeon¹

¹Based on pre-production measurements.
Learn more at www.intel.com/PerformanceIndex. Results may vary.



oneAPI

Performance Unleashed

35+ HPC-AI Design Wins
100+ Apps Running

On Track
for Aurora >2 Exaflop
Supercomputer²

Up to 2.6x Perf
over best in market today³

²>2 exaflop peak performance
³Based on pre-production measurements.
Learn more at www.intel.com/PerformanceIndex. Results may vary.

HPC - AI Super Compute Strategy

Wave 1

2023



HPC - AI Super Compute Strategy

Wave 2

2024

Install Base

oneAPI

Falcon Shores

XPU

Scalable Architecture for all
Super Computing Workloads



+



Performance

HPC - AI Super Compute Strategy

Wave 2

2024

Install Base

Falcon Shores

XPU

>5x

Performance
/Watt

>5x

Compute density
in x86 socket

>5x

Memory
Capacity & B/W

Flexible
X86/X^e
Core ratio

Simplified
GPU
Programming

Angstrom
Era Process

Next Gen
Advanced
Packaging

Extreme
Bandwidth
Shared Memory

Industry
Leading
I/O

Performance

Technology Pipeline

Aurora
>2 Exaflop
Supercomputer*

**Tech
Foundation**
Today

**Zetta-
Scale**
by 2027

Technology Pipeline

**Tech
Foundation**
Today

Architecture

Power
& Thermals

Process
& Packaging

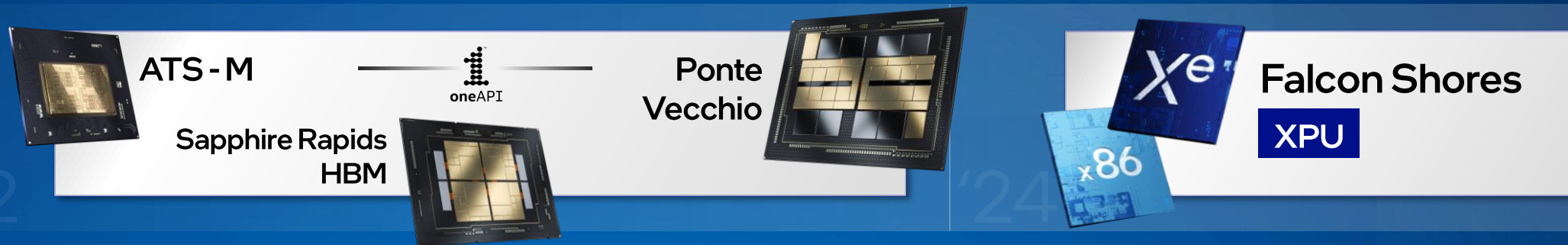
Memory
& I/O

**Zetta-
Scale**
by 2027

Accelerated Computing Systems & Graphics Group

Super Compute

\$45B by '26



Custom Compute

Visual Compute

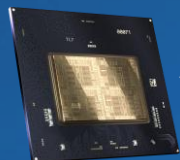
\$25B by '26



Accelerated Computing Systems & Graphics Group

Super
Compute

\$45B by '26

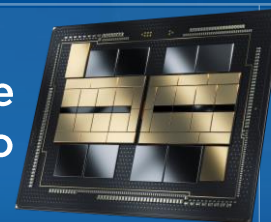


ATS - M

Sapphire Rapids
HBM



Ponte
Vecchio



Falcon Shores
XPU

Custom
Compute

\$30B by '26



Blockchain Accelerator

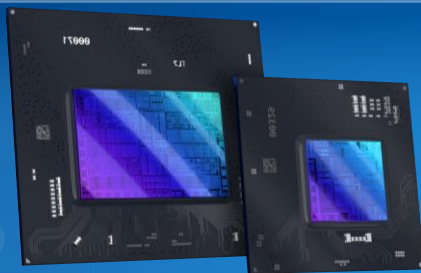
Shipping this Year



Custom Design
Services

Visual
Compute

\$25B by '26



intel
ARC[™]
Alchemist

+

Deep
Link



Celestial
& Tiled GPUs



Key Takeaways

Insatiable Compute Demand

Petascale end-points, Exascale Edge and Zettascale Data Centers over next 5 years

Unleashing our Technology Foundation

of Process Nodes, Packaging, Memory, Interconnect, Architecture and Software IP

Energized Execution Engine

with a comprehensive HW+SW roadmap, products launching this year across HPC – AI, media, and gaming supercomputers

Approaching \$10B* Revenue by '26

and Estimated >\$1B Revenue in '22

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