# Forward-Looking Statements

Statements in this presentation that refer to future plans or expectations are forward-looking statements. These statements are based on current expectations and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. For more information on the factors that could cause actual results to differ materially, see our most recent earnings release and SEC filings at www.intc.com.

# Building the AI-Ready PC Ecosystem

Robert Hallock, Senior Director, Client Computing Group, Client Performance Marketing

# Agenda

- Our AI View and Vision
- AI for Everyone with Intel® Core™ Ultra Processors
- Introducing Intel® AI Boost
- Building a 10X AI Ecosystem With Intel
- An AI Roadmap You Can Count On

# Agenda

- **Our AI View and Vision**
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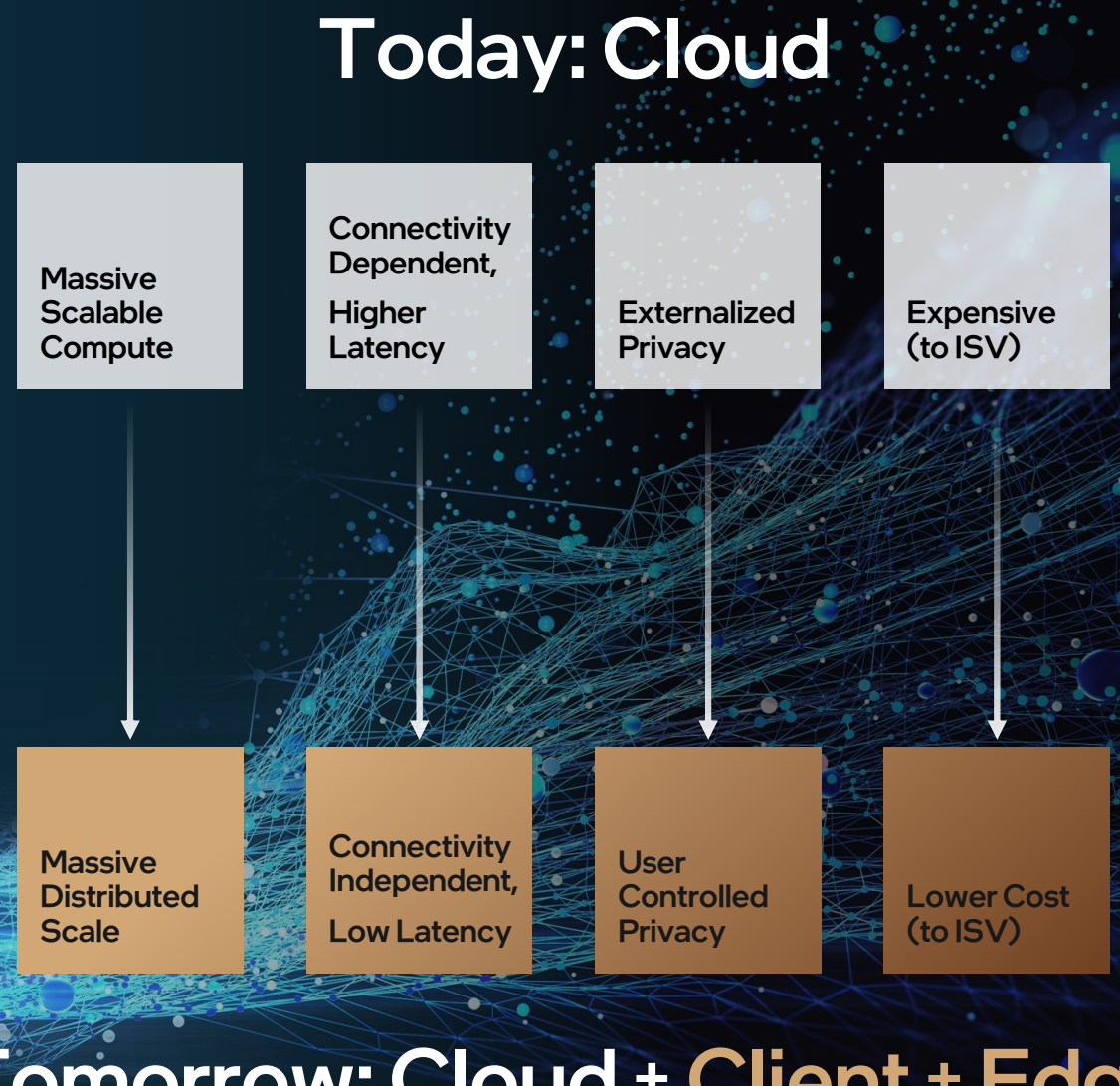
# AI

## is Everywhere

# AI
## is Everywhere



# AI on the PC

Enhanced audio effects

Elevated video collaboration & streaming

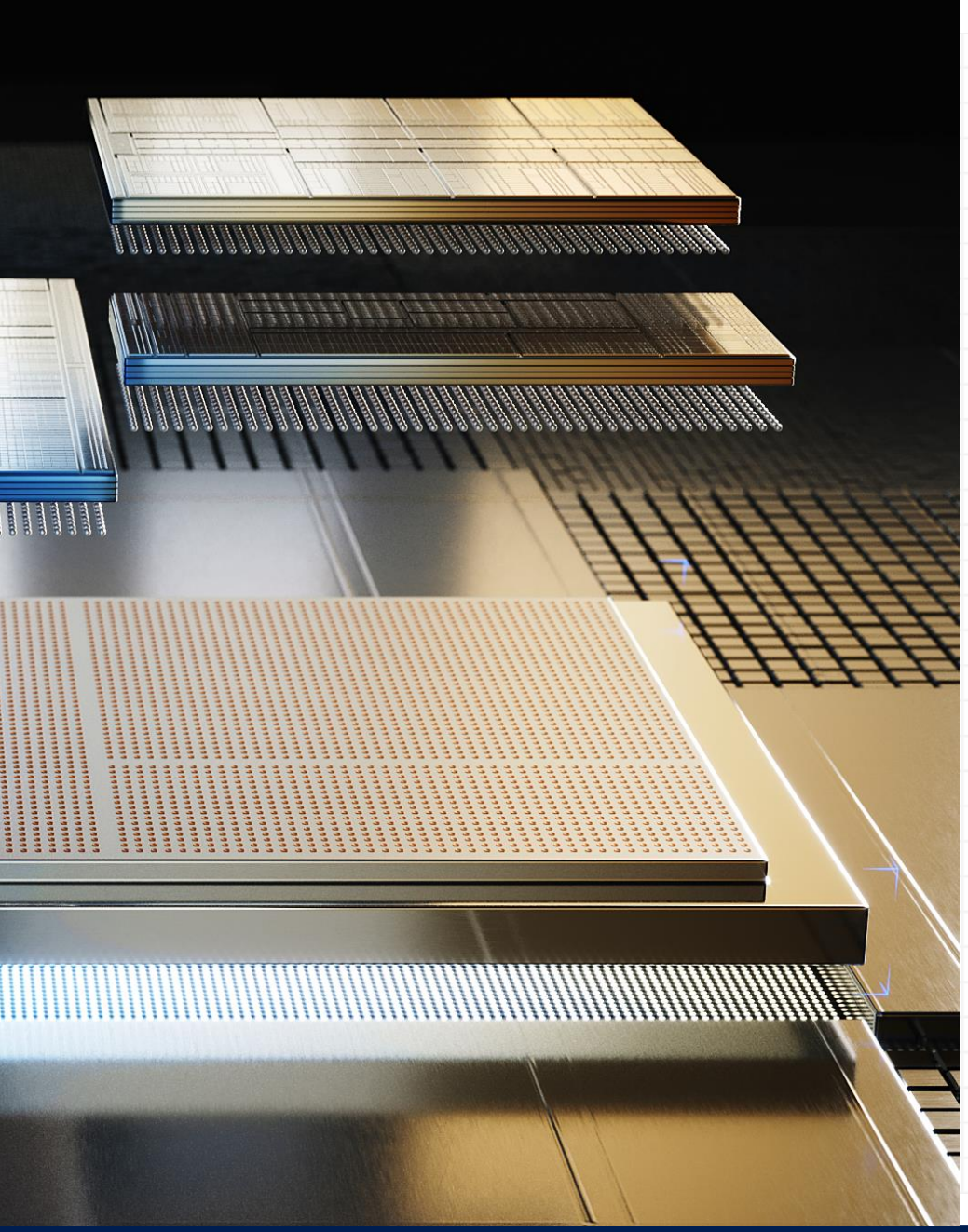
Creator and gaming effects

AI Assistants know your daily context

More creative, productive, & collaborative

Across everything you do

**Today –** Enhancements → **Tomorrow –** Workflows



## Our Vision for the AI-Ready Computer

An AI-ready PC must offer a wealth of experiences. We will use our scale, history, and relationships to drive the trust and compatibility users need in this new era of AI software.

# How Intel plans to lead the AI PC transformation

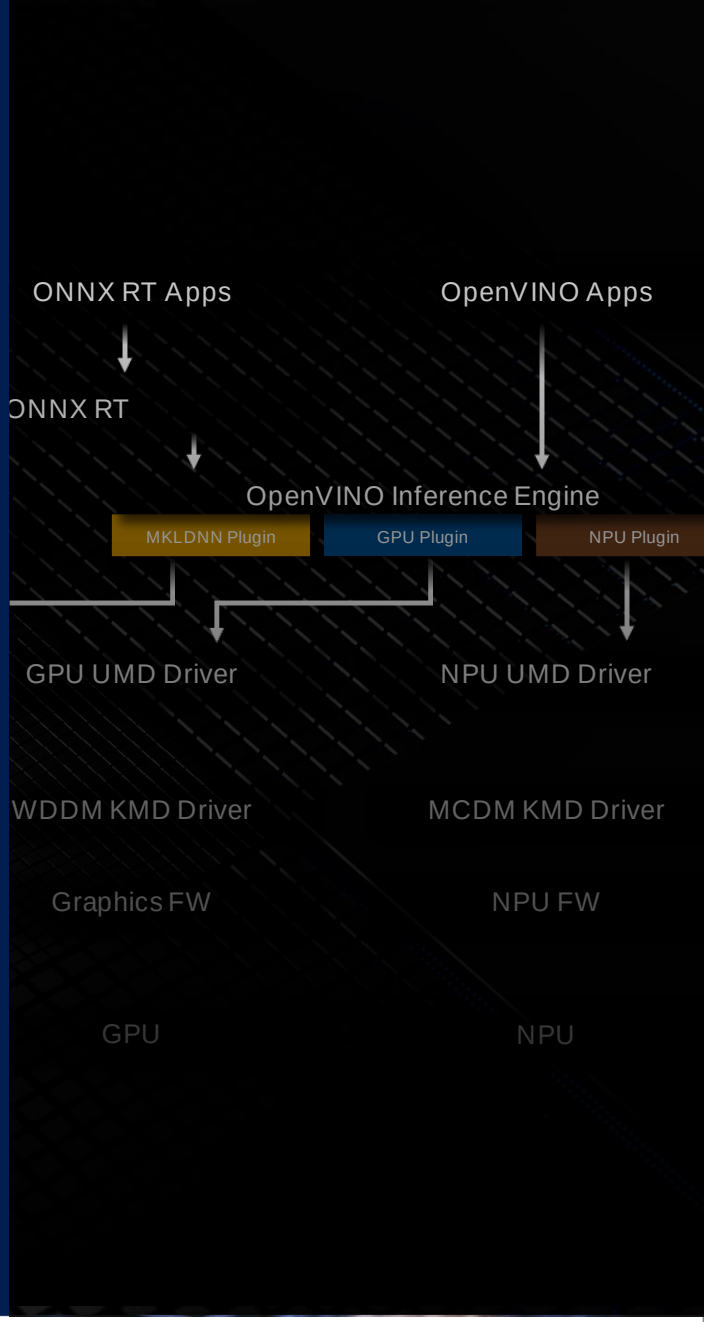
**DEVICES**
Ship the largest install base of AI-ready PCs with Intel® Core™ Ultra

# How Intel plans to lead the AI PC transformation

**DEVICES**
Ship the largest install base of AI-ready PCs with Intel® Core™ Ultra

**SOFTWARE**
Enable a library of AI-accelerated apps that's already ~3X other vendors*

* Based on public AI software roadmap releases and/or commitments from AMD, Qualcomm, and Intel as of 09 September, 2023.



# How Intel plans to lead the AI PC transformation

**DEVICES**
Ship the largest install base of AI-ready PCs with Intel® Core™ Ultra

**SOFTWARE**
Enable a library of AI-accelerated apps that's already ~3X other vendors*

**SIMPLICITY**
Give users a frictionless AI experience with great compatibility

* Based on public AI software roadmap releases and/or commitments from AMD, Qualcomm, and Intel as of 09 September, 2023.

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# Design Goals

# Intel® Core™ Ultra Processors

Reimagined **Efficiency**
Our most power efficient client processor in history

Launch **Intel 4** Process
New P- and E-Cores with landmark chip packaging

~2X **Graphics** Performance*
With increased power efficiency

Lead **AI at Scale**
Enable more users and ISV experiences than other vendors

* See backup for workloads and configurations. Results may vary.

# Relentless **Efficiency**

## Intel Thread Director

Power management through leadership OS scheduling

**Runtime Instruction Mix Monitoring**
nanosecond precision

**Runtime Feedback to OS**
for optimal scheduling

**Dynamic intelligent guidance**
without user input

## System Power

Exhaustive platform-level power technologies

**Reconstructing Power Management**

**Low Power Island**

**Rest of SOC and Platform Technologies**

## 3D Performance Hybrid

Our most efficient client SOC ever

**NEW**
**P-Cores**
For high-Performance

**NEW**
**E-Cores**
Efficient MT performance

**Low Power**
**E-Cores**
Low power, maximum efficiency

# Intel® Arc™ Graphics

**DP4A Engine**
Sustained AI Accelerator

**New X$^{e}$ LPG Graphics Cores**
~2X GPU Performance vs. Previous Gen*

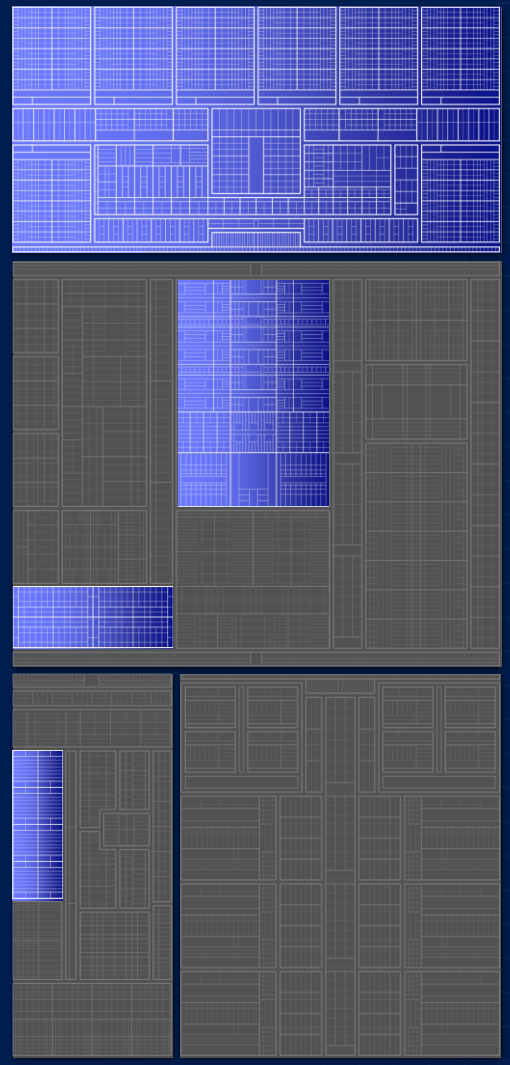
**New Display Engine**
4x Displays, HDMI® 2.1, DP™ 2.1 20G, eDP 1.4b

**New Media Engine**
AV1, H.265, H.264, VP9 Encode up to 8K 10b HDR

**Efficiency**
~2x Performance/W vs. Previous Gen*

**X$^{e}$ Super Sampling (XeSS)**
AI-Based Game Upscaling

* See backup for workloads and configurations. Results may vary. Intel® Arc™ graphics only available on select Intel® Core™ Ultra H-series processor-powered systems with dual-channel memory. OEM enablement required; check with OEM or retailer for system configuration details.

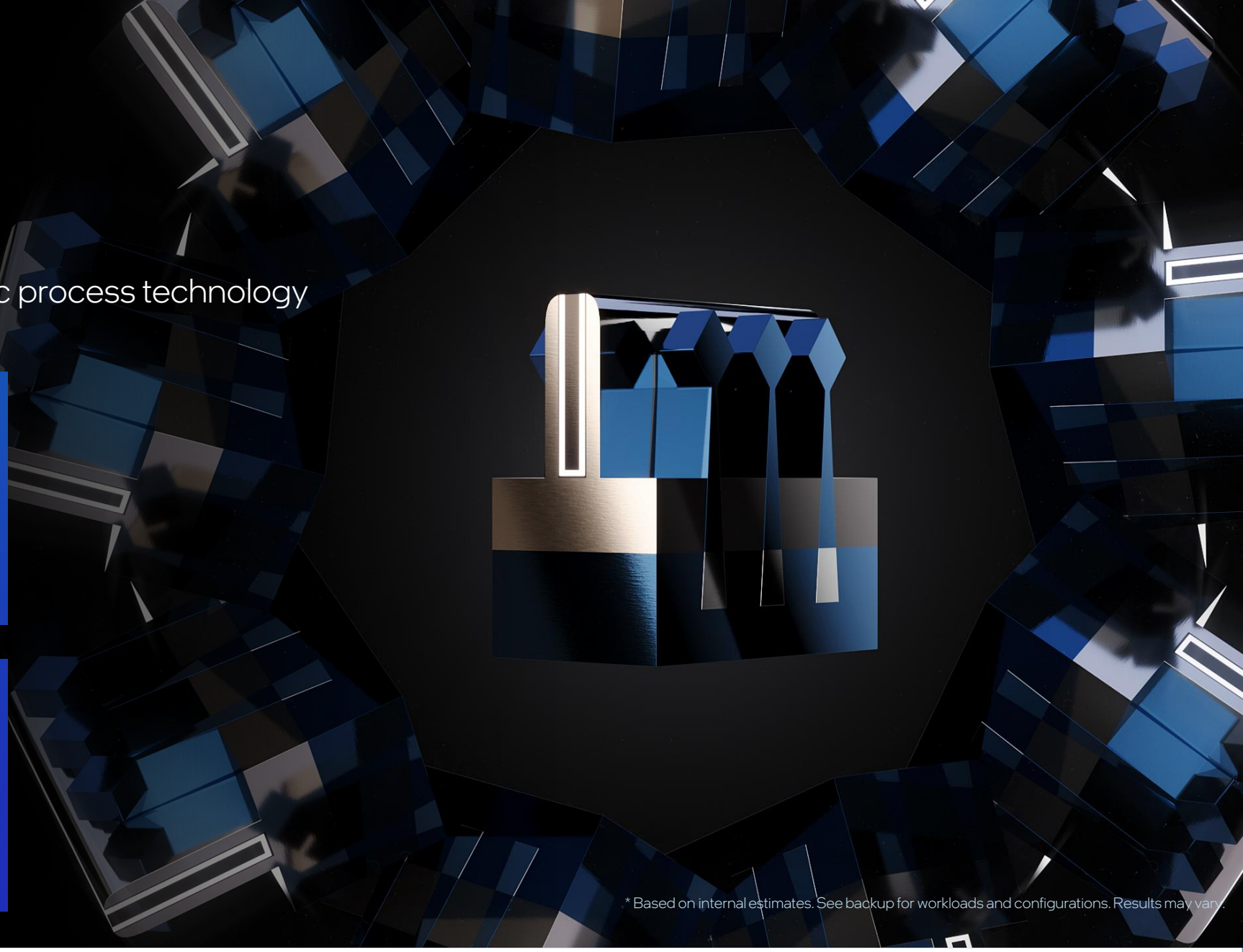


intel ARC™

Introducing

# Intel 4

Logic process technology



**2x**
**area scaling**
for High Perf Logic library vs Intel 7*

**EUV**
lithography for process simplification

**>20%**
power efficiency*

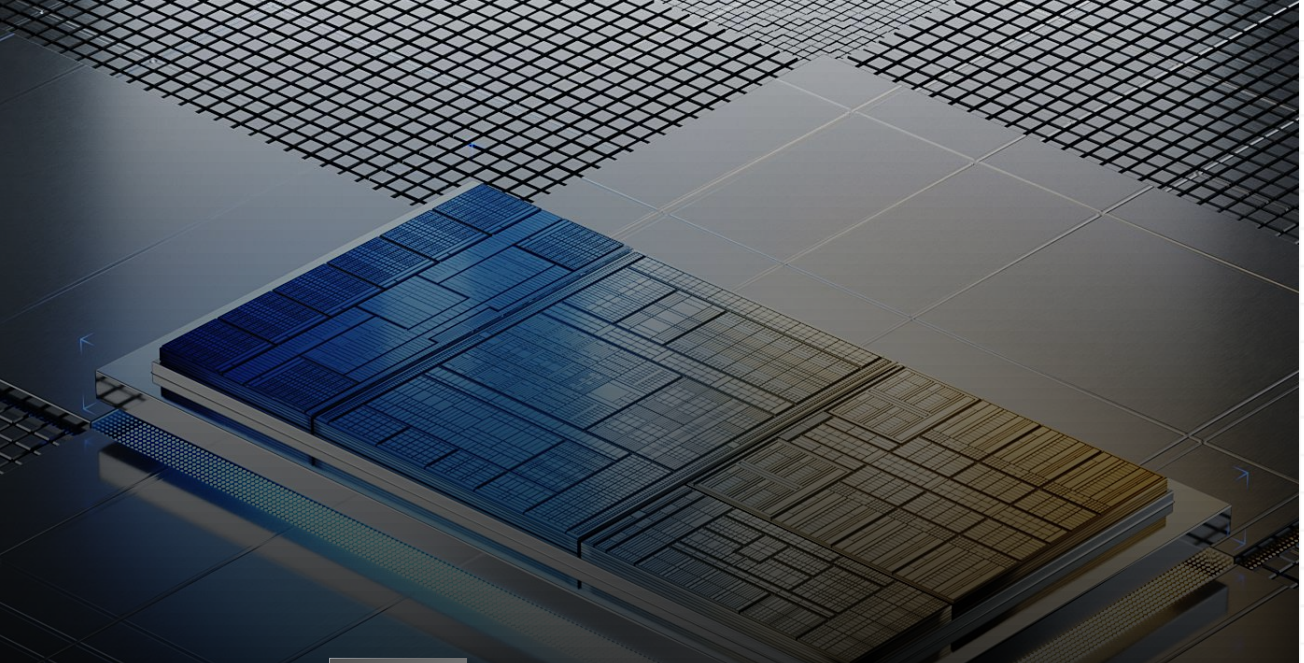
Compatible with
**3D Foveros**
Advanced Packaging

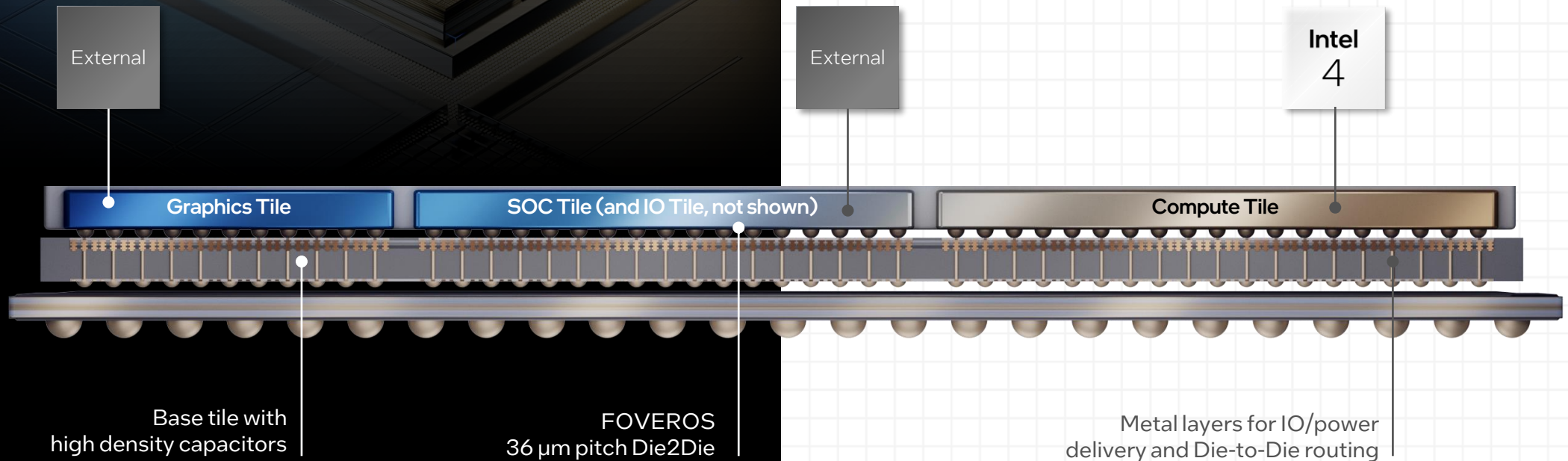
* Based on internal estimates. See backup for workloads and configurations. Results may vary.

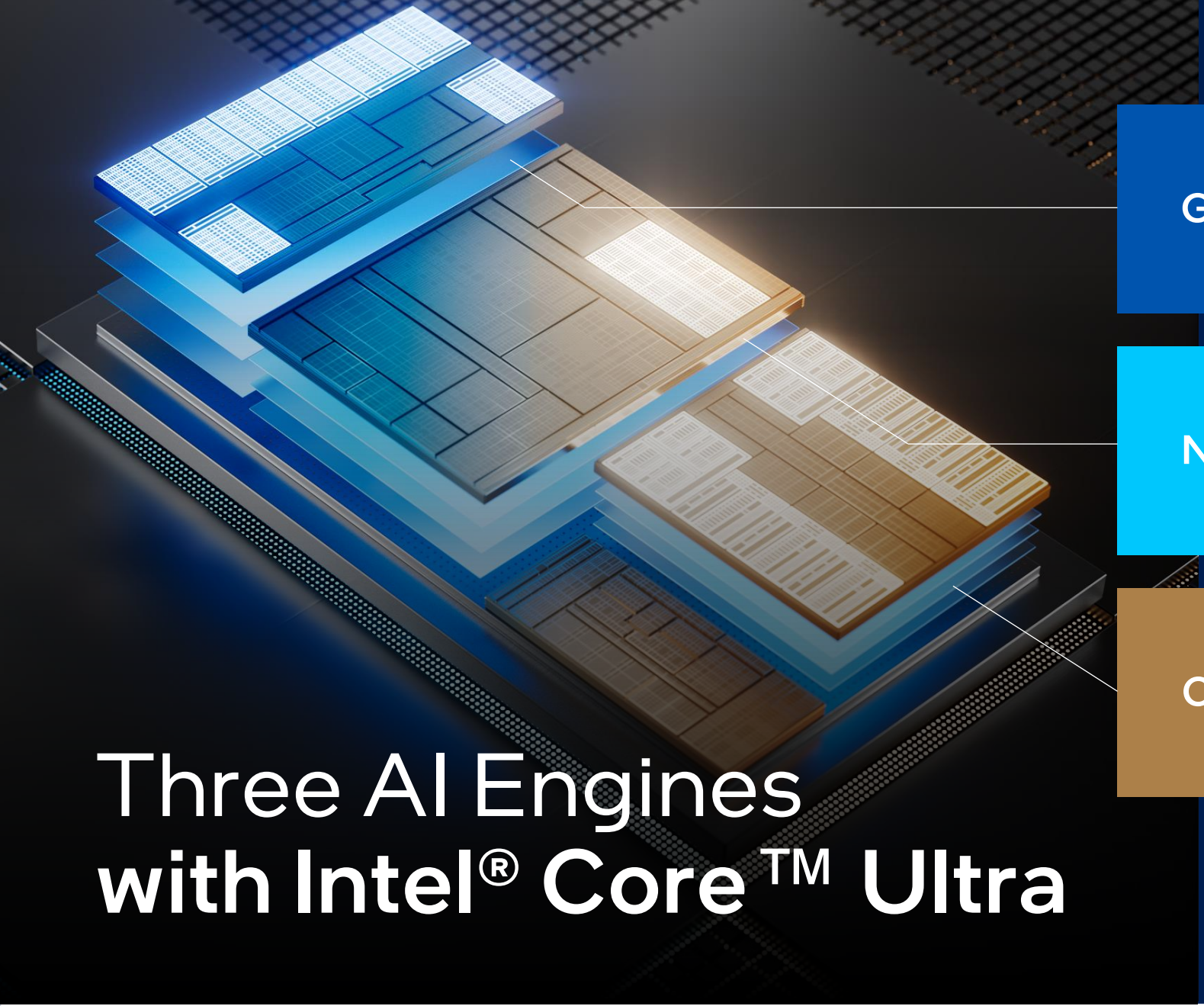
# Advancing Moore's Law
# 5 NODES IN 4 YEARS

# Intel® Core™ Ultra
# 3D Construction with Foveros

Scalability – Flexibility - Efficiency







# Three AI Engines with Intel® Core™ Ultra

**GPU**

**High Throughput**
Ideal for AI-accelerated digital content creation

**NPU**

**Low Power**
Ideal for sustained AI workloads and AI offload for battery life

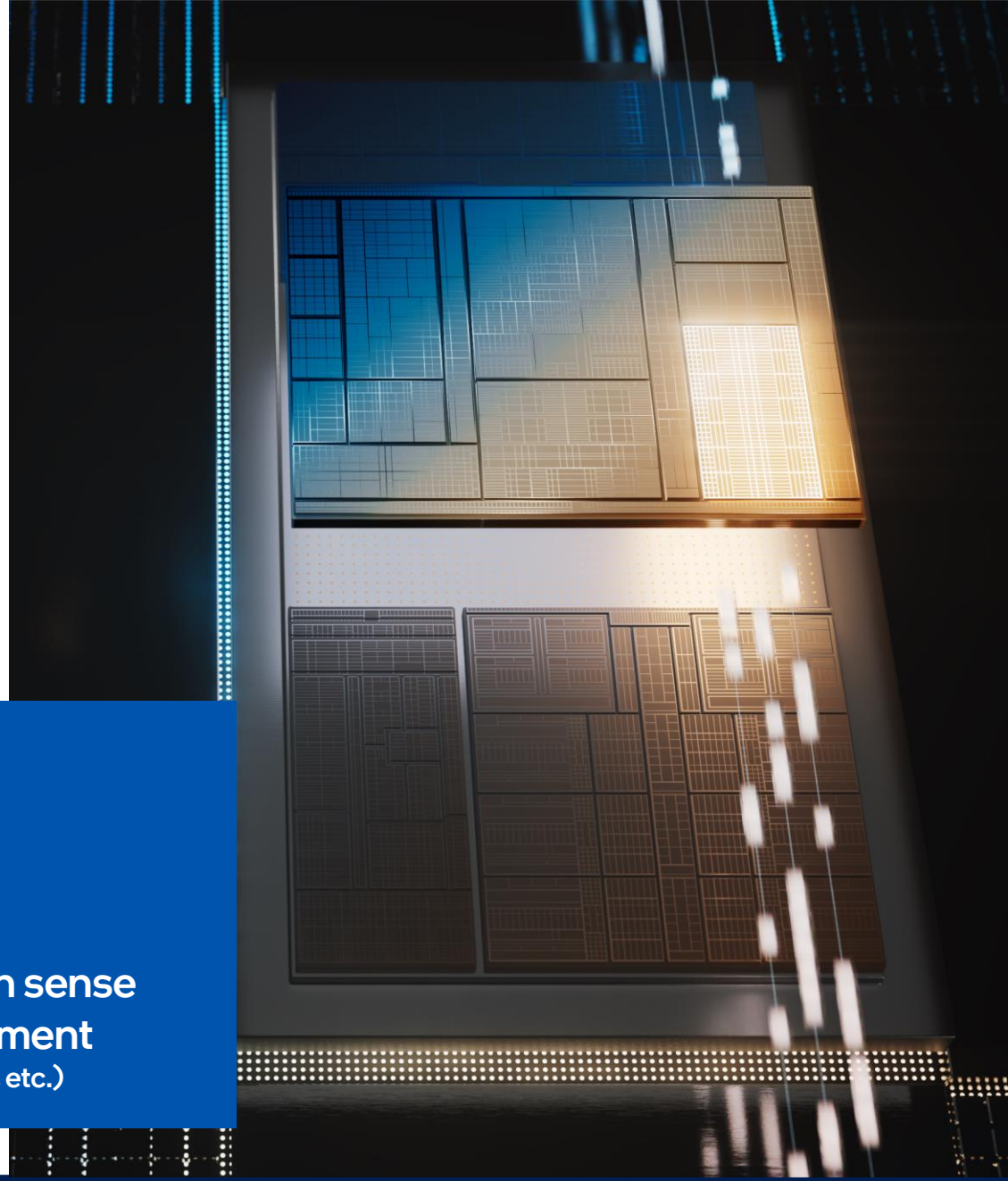
**CPU**

**Fast Response**
Ideal for low-latency AI workloads

INTRODUCING

# Intel's First Integrated NPU

Dedicated Engine for Low Power AI

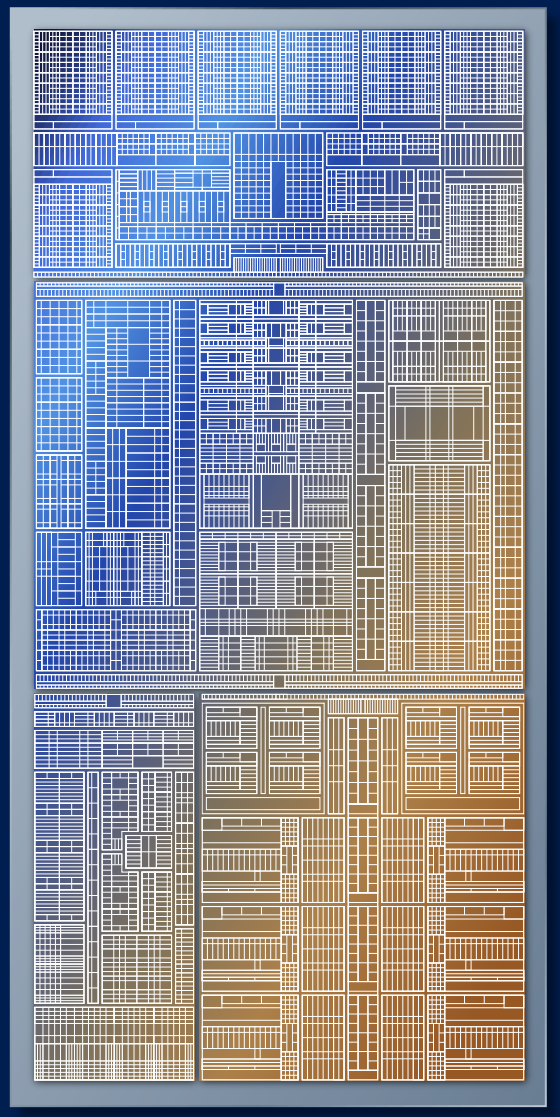


**Purpose built for efficient client AI**

**Ideal for sustained AI and AI offload**

**Common sense development** (OpenVINO, etc.)

See backup for AI workloads, software, and feature enablement.



INTEL® AI BOOST with Integrated NPU

# Uniquely Capable

All-new low power AI architecture

Easy for developers to adopt and utilize

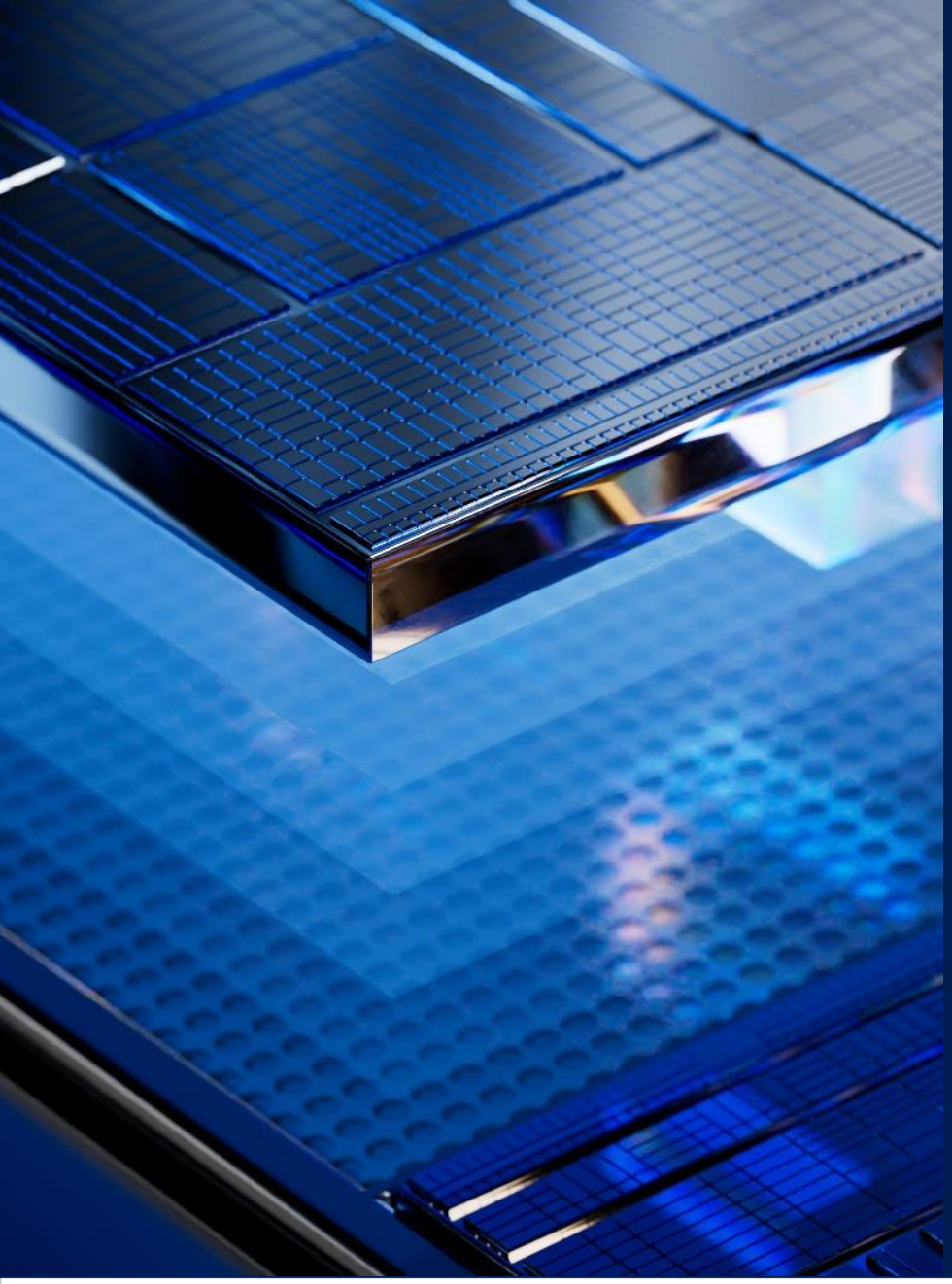
High parallelism for efficient AI compute

Flexible engines for strong performance

“Architectural sparsity” for efficient battery usage in Client

Deep “instruction set” for broad AI software compatibility

See backup for AI workloads, software, and feature enablement.



Intel® Core™ Ultra NPU

# Uniquely Versatile

FP32

FP16

Int8

Mixed Precision Support

No Int8 Quantization Requirement

See backup for AI workloads, software, and feature enablement.

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# Intel AI Leadership
# END-TO-END INVESTMENT

| | |
|---|---|
| Tools | Top AI developer toolchains enabled **NOW** |
| ISV | Roadmap of **100+ AI-accelerated ISV features** |
| CPU | >100 million processors with AI accelerators **by 2025** |
| OEM | Systems from **Acer, Asus, Dell, HP, Lenovo, LG, Samsung** |

# Join developers already building AI workloads for Intel® Core™ Ultra

OpenVINO · ONNX

WindowsML
DirectML

W3C®
WebAssembly
WebNN
WebGPU

## Adobe Creative Cloud
Adobe Premiere Elements
Adobe Photoshop
Adobe Photoshop Lightroom
Adobe Premiere Pro
Adobe After Effects

## Audacity
Noise Suppression
Speech to Text
Auto Track Splitting
Vocal Remover
Remixing

## Bytedance JianYing
Video Effects Offload

## CyberLink
**Photo & PowerDirector**
Sky Replacement
Anime Selfies

## GIMP†
Stable Diffusion
Inpainting
Image Segmentation
Upscaling
Image Style Transfer

## iQIYI (爱奇艺)
Gesture Recognition
Video Upscaling

## MAGIX VEGAS Pro
Upscaling
Colorization
Image Style Transfer
Masking
Z-Depth

## OBS Studio†
AI Greenscreening
Face Detection
Smart Scene Framing
Noise Suppression

## Skylum | Luminar Neo
Image Enhancement
Noise Reduction
Super Sharpening
Scene & Object Relight
*+more*

## VideoCom Presenter
AI Greenscreening

## XSplit VCam
Smart Scene Framing
AI Greenscreening

## Windows Studio Effects
Automatic Framing
Eye Contact
Background Blur

† Functionality provided by free application plugin ported by Intel® to enable Core Ultra Processor compatibility.

# Watch what they do, not what they say

Competing vendors fall short of Intel's depth and breadth of AI tools and workloads

## Qualcomm PC[1]

- TensorFlow
- PyTorch
- ONNX
- Caffe/Caffe2

- Windows Studio Effects
- Stable Diffusion

- UL Procyon

## AMD PC[2]

- TensorFlow
- PyTorch
- ONNX

- Windows Studio Effects
- Stable Diffusion

1. Based on QCOM Neural SDK frameworks (www.tiny.cc/kkzavz) and Microsoft Build disclosures (www.tiny.cc/qkzavz) as of 09 September, 2023.

2. Based on Ryzen AI frameworks (www.tiny.cc/bkzavz) and Ryzen AI applications (www.tiny.cc/ckzavz) as of 09 September, 2023.

# The “killer app” is choice

Only Intel’s deep relationships pave the way for widespread AI accessibility.

With a roadmap of over 100 ISVs & features, **AI compatibility starts with Intel.**

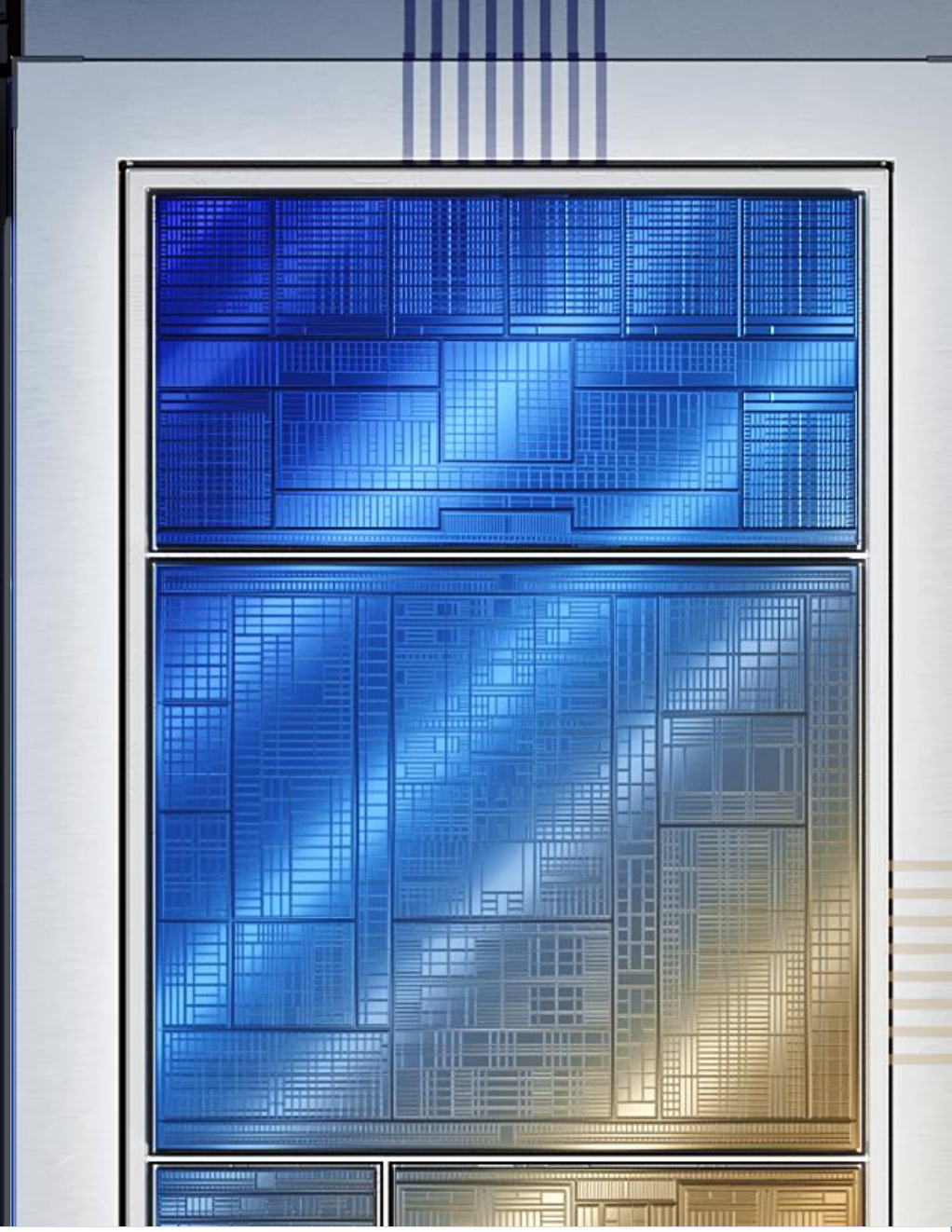
Intel technologies may require enabled hardware, software or service activation.

# Announcing

## PyTorch backend for Intel® Core™ Ultra Processors

Preview available in OpenVINO 2023.1

OpenVINO PyTorch



intel.innovation

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# AGGRESSIVE CLIENT ROADMAP

Our path to an install base of >100 million AI accelerators by 2025.

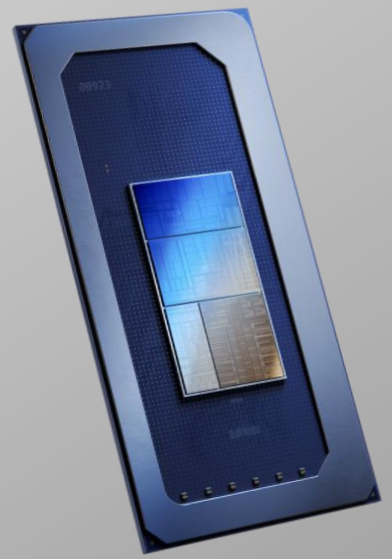
2023

## Meteor Lake

First Integrated NPU

Energy Efficiency

~2X Faster Graphics



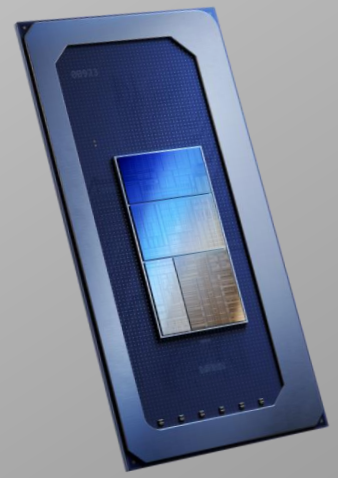
2024

## Arrow Lake

Next Gen CPU Cores

Enhanced GPU & AI

Optimized for Enthusiast

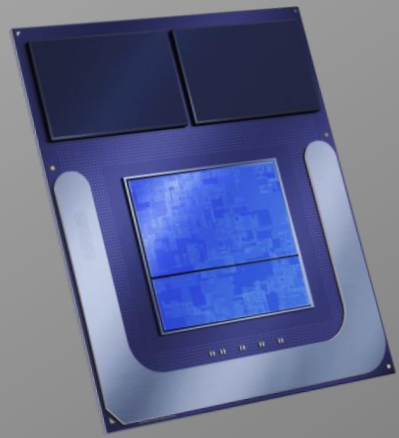


## Lunar Lake

Next Gen NPU

Ultra Low Power Mobility

Breakthrough Perf/W



*All product plans and roadmaps subject to change.

# Intel Will Bring AI to the PC at Scale

**Transforming** the PC User Experience

## The Scale Provider for AI-Ready PCs

Over 100 Million Intel®-based PCs with AI Accelerators in Market by 2025

## Leadership AI Compatibility for PC

Massive x86 Ecosystem

100+ Apps and Frameworks

Intel technologies may require enabled hardware, software or service activation.

# Go Deeper on AI Development

# Intel® Innovation 2023

**NGS003:** Flexible AI Acceleration with oneAPI

**NGS006:** Easy Ethernet-Based Distributed Nodes for AI

**NGS007:** Revolutionizing Datacenter with IPUs

**AI001:** Neural Network Frameworks & Deployment on the Client

**AI007:** Developing Web-Based AI Apps for the Client

Thank You!

# Notices and Disclaimers

AI features may require software purchase, subscription or enablement by a software or platform provider, or may have specific configuration or compatibility requirements. Details at www.intel.com/PerformanceIndex. Results may vary.

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