Blueprint Series

11th Gen Intel® Core™ Processor

Blueprint Series:
11th Gen Intel® Core™ Processor

Chris Walker
Intel Corporate Vice President
General Manager of Mobile Client Platforms

11th Gen Intel® Core™ Processor

with Intel® Iris® Xᵉ Graphics for Thin and Light Laptops

New CPU architecture

New Intel® Iris® Xᵉ Graphics

New AI capabilities

New Media and Display Engine

New Hardware-hardened security

New Integrated Thunderbolt™ 4

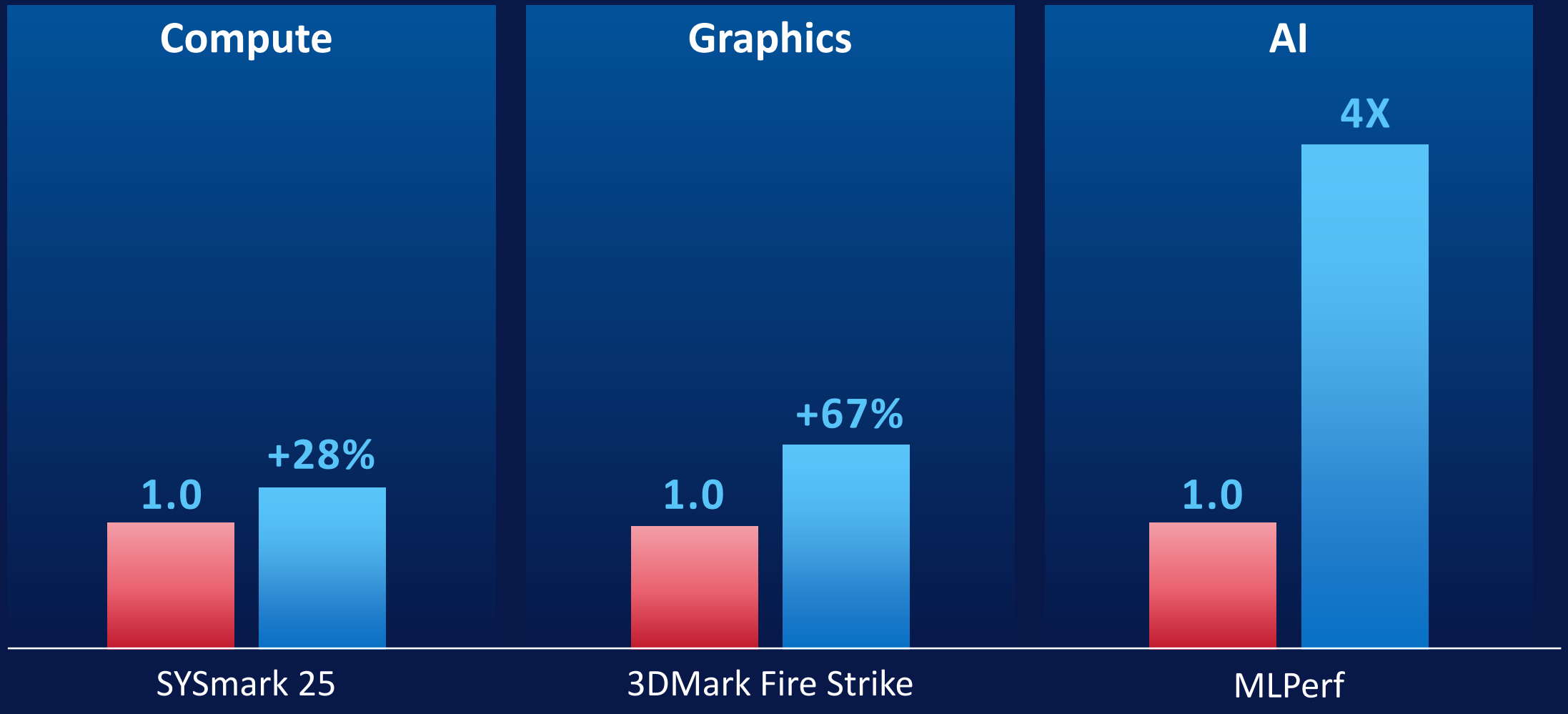
New PCIe Gen 4 interface

Best-in-class Intel® Wi-Fi 6 (Gig+)

Scalable Performance : 7W-28W

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

Leadership Benchmark Performance

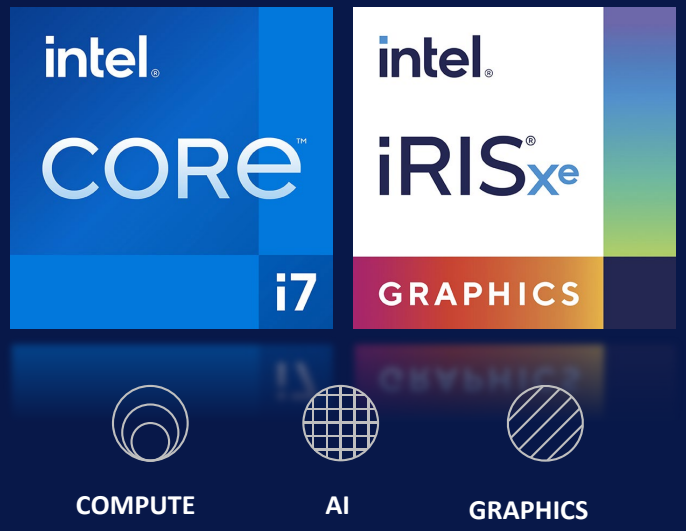


For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

Leadership Real World Performance

11th Gen Intel® Core™

Code Name Tiger Lake



Work	Chart export: **1.3X** FASTER	Convert to PDF: **1.38X** FASTER	Convert to PDF: **1.34X** FASTER
Create	Subject select: **1.4X** FASTER	Auto reframe: **2.7X** FASTER	Photo upscale: **4.4X** FASTER
Play	GRID, Medium setting: **1.82X** BETTER	GEARS TACTICS, Medium setting: **1.76X** BETTER	CS GO, Medium setting: **1.49X** BETTER
Connect	Web browsing: **1.15X** FASTER	Download 10G media: **~3X** FASTER	Transfer large file: **4X** FASTER

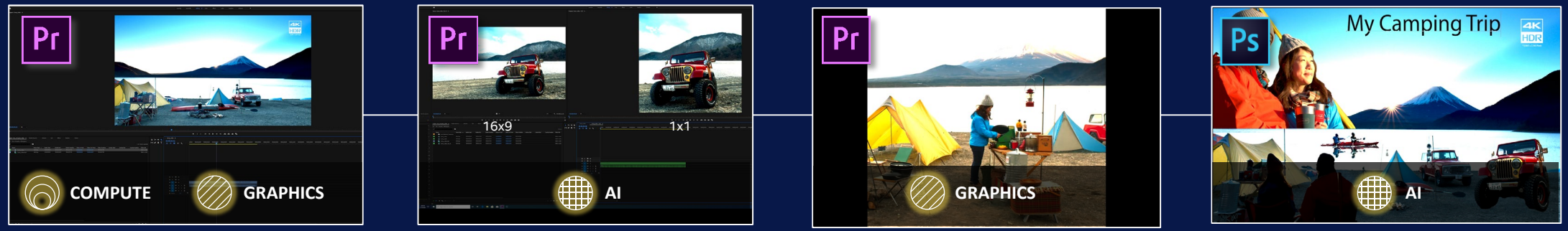
Intel® Core™ i7-1185G7 vs. AMD Ryzen 7 4800U

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

intel

Video Editing Workflow

Import → Edit → Post Social



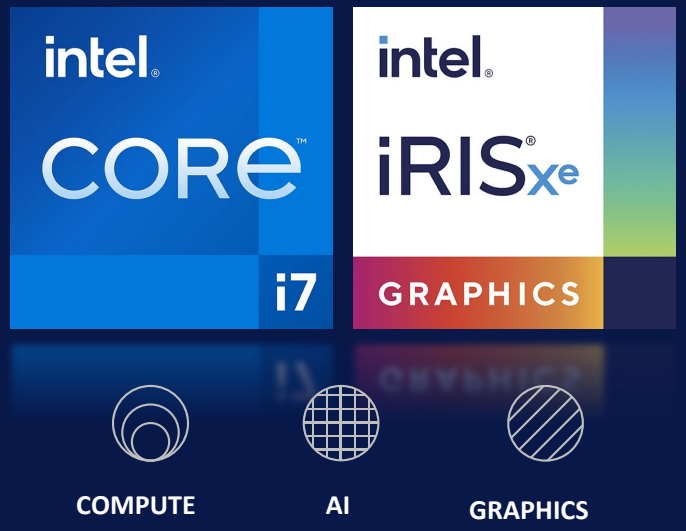
4K Video Playback | Auto Reframe | Export | Create Thumbnail

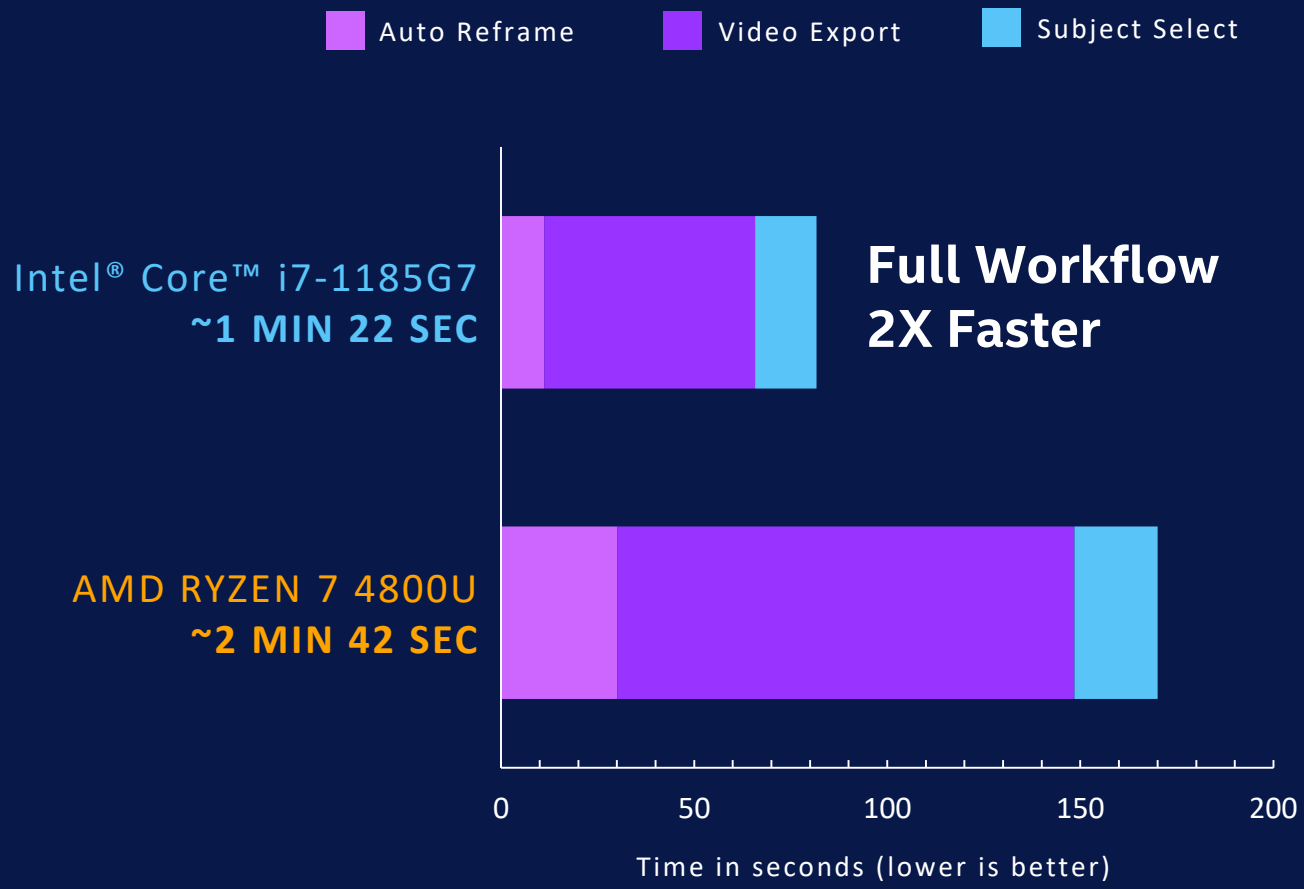
Video Editing Workflow Demo

Video Editing Workflow

11th Gen Intel® Core™

Code Name Tiger Lake



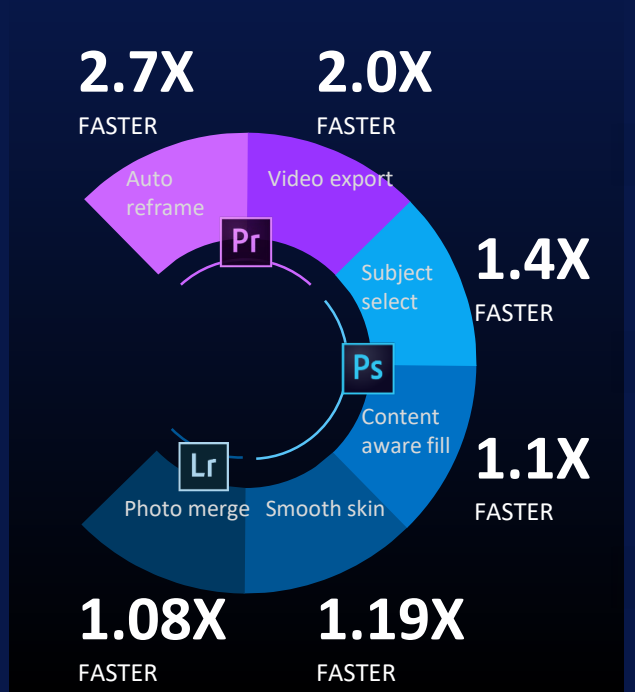


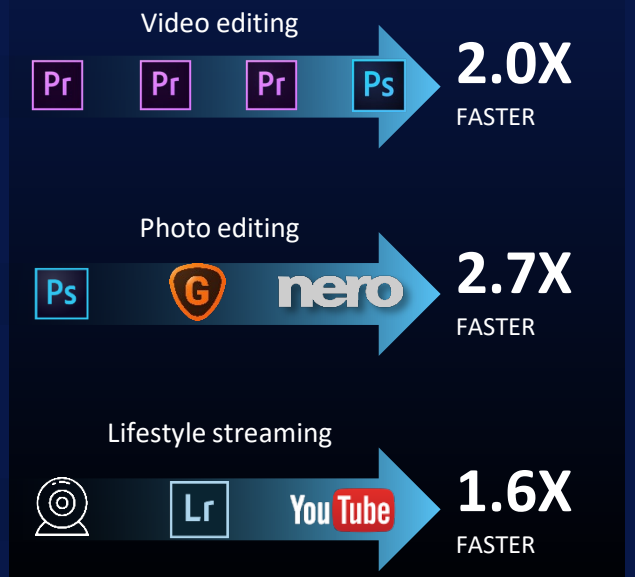
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

Best for Creation

11th Gen Intel® Core™ i7 Processor with Iris® Xᵉ Graphics Wins

SYSMARK 25 (Creativity sub score) **1.35X** HIGHER





Intel® DL Boost: DP4a
Topaz Gigapixel AI
Photo Upscaling
4.4X FASTER

Intel® DL Boost: VNNI
Nero AI Photo Tagger
Photo tagging
1.9X FASTER

Intel® Wi-Fi 6 (Gig+)
Download large media wirelessly
~3X FASTER

INDUSTRY BENCHMARK + LEADING APPLICATION TASKS + COMPELLING USER WORKFLOWS + UNIQUE FEATURES

Intel® Core™ i7-1185G7 vs. AMD Ryzen 7 4800U

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

intel

World’s Best Processor

Breaking the Boundaries of Performance

Best for Productivity	Best for Creation	Best for Gaming	Best for Entertainment		Best for Collaboration	
Make Your Best Contribution Anywhere	Take Your Imagination Further	More Gaming In More Places	The World Is Your Living Room		The Ultimate Device For Connecting & Collaborating	
1.2B Users	**12M** Users	**1.2B** PC Gamers	**105M** Users	**2B** Users	**100M** Devices	**75M** Daily Users
Office	Ai Ae Lr Pr Ps	GRID, CS GO, GEARS TACTICS, PLAYERUNKNOWN'S BATTLEGROUNDS	iQIYI	YouTube	alexa	Teams

As measured by

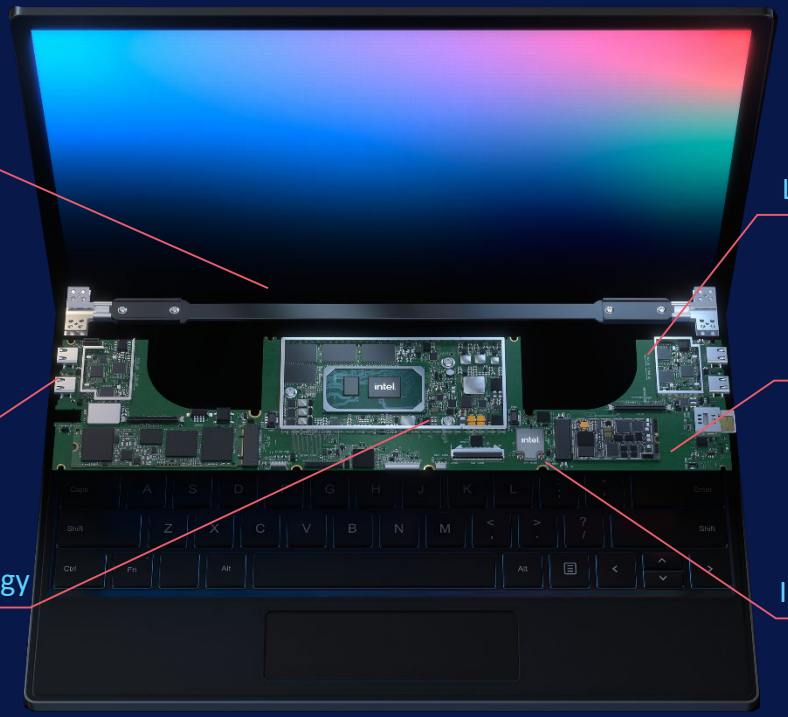
INDUSTRY BENCHMARKS + LEADING APPLICATION TASKS + COMPELLING USER WORKFLOWS + UNIQUE FEATURES

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

intel

Project Athena

An Innovation Program Inspired by Human Understanding



- Ready Before You Are
- Performance and Responsiveness
- Artificial Intelligence
- Worry Free Day of Battery Life
- Always Fast Reliable Connectivity
- Formfactor & Interaction

Intel® Evo™ Platform

The Best Thin and Light Laptops for Getting Things Done

Powered by the
11th Gen Intel® Core™ with Intel® Iris® Xᵉ Graphics

Each design verified for:

- **Responsiveness from Anywhere**
- **Longer battery life** (>9 hrs on FHD)
- **Instant wake** (<1 sec)
- **Fast charging** (4hrs usage ≤30 min on FHD)
- **Best-in-class connectivity with Intel® Wi-Fi 6 (Gig+) & Thunderbolt™ 4**

As measured by industry benchmark and Representative Usage Guides testing and unique features of 11th Gen Intel® Core™ processors. Intel's comprehensive laptop innovation program, Project Athena, ensures designs are tested, measured and verified against a premium specification and key experience indicators. For more complete information about performance and benchmark results, visit www.intel.com/Evo.

intel

Blueprint Series Session 1: Tiger Lake Speakers

Roger Chandler
Vice President
Intel Architecture, Graphics & Software
General Manager Client XPU Products and Solutions

Nathan Smith
Senior Director
Client Computing Group
General Manager of Client AI

Boyd Phelps
Vice President
Design Engineering Group

Tom Petersen
Intel Fellow

Ryan Shrout
Intel Chief Performance Strategist
Senior Director of Client Technical Marketing

New 11th Gen Intel® Core® Processor and Intel® Evo™ Platform

Blueprint Series:
11th Gen Intel® Core™ Processor

Roger Chandler
Vice President, Intel Architecture, Graphics & Software
General Manager, Client XPU Products and Solutions

Nathan Smith
Senior Director, Client Computing Group
General Manager, Client AI

12M+ Developers & 1000s of ISVs Worldwide

Productivity

Creation

Gaming

Entertainment

Collaboration

Google

Adobe

CyberLink

CODEMASTERS

iQIY

Dolby

THE COALITION

amazon alexa

TOPAZ LABS

nero

XSplit

SEGA

EPIC GAMES

YouTube

Microsoft

intel

Intel’s Software Enabling Engine

1

World Class Tools, SDK’s Dev Resources

2

Deep Engineering & Marketing Collaboration

3

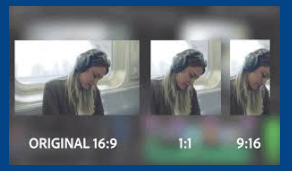
Architectural Innovation

intel

Client AI: Simplifying the Complex

AI Is Becoming Ubiquitous

Creativity



Video Reframe
(Adobe Pr)


AI Subject Select
(Adobe Ps)


Colorize Photo
(Adobe Ps Elements)


De-Blur
(Cyberlink)


AI Style Transfer
(Cyberlink)

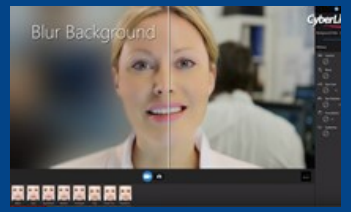

Photo Upscaling
(Topaz Labs)


Mask AI
(Topaz Labs)


Raytracing De-Noise
(Blender/Intel)

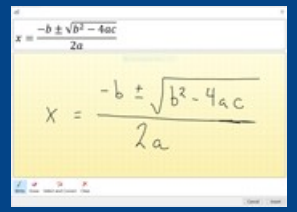
Productivity


AI Noise Removal
(BabbleLabs/Elevoc)



Background Blur
(Cyberlink)

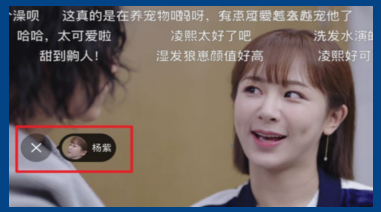

Real time facial AR
(Face Unity)

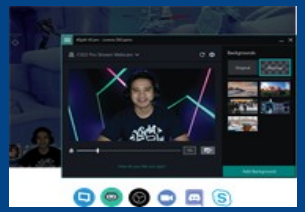

Ink to Text
(Microsoft Office)

Eye Contact Correction
(Intel)

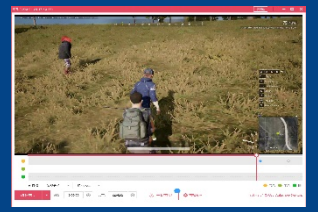

Semantic Search
(Excire/QuikFynd)

Entertainment


Celebrity Recognition
(IQIYI)


AI Green Screen
(XSplit)


Civilization VI
(Firaxis Games, 2K Games)


Game Highlights
(Xiaohulu)


Animated Dances
(Dasong Editor)


AI Photo Tagger
(Nero)

Client AI

Low Latency
& Network Overhead

Always Available

Trust & Privacy

Cost of Operation

Neural Networks Are Compute Intensive

Creativity


Detail Enhance
(Adobe Lr)


AI Subject Select
(Adobe Ps)


Colorize Photo
(Adobe Ps Elements)


De-Blur
(Cyberlink)


AI Style Transfer
(Cyberlink)

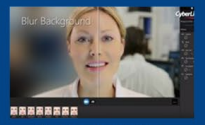

Photo Upscaling
(Topaz Labs)


AI Adjust
(Topaz Labs)

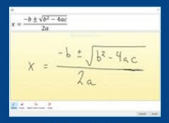

Raytracing De-Noise
(Blender/Intel)

Productivity


AI Noise Removal
(BabbleLabs/Elevoc)


Background Blur
(Cyberlink)


Cosmetic Effects
(Cyberlink)


Ink to Text
(Microsoft Office)


Eye Contact Correction
(Intel)


Semantic Search
(Excire/QuikFynd)

Video Super Resolution
(ORBO)


AI Green Screen
(XSplit)


Civilization VI
(Firaxis Games, 2K Games)

Total War: Three Kingdoms
(Sega)

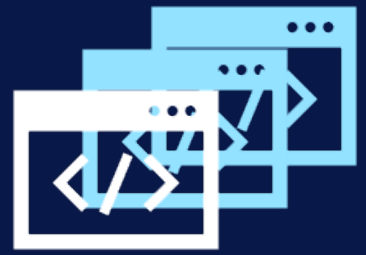

AI Photo Tagger
(Nero)

Challenge:
3.8+ Billion multiplications per image

Impact:


Performance


Battery Life


Responsiveness

Accelerating AI Workloads

Windows ML

Intel® OpenVINO™

Chrome Cross ML

Intel® DL Boost: VNNI
CPU Instructions

Intel® DL Boost: DP4a
GPU Instructions

Intel® Gaussian &
Neural Accelerator (GNA)

Creator Photo Workflow

Colorize → **Upscale** → **Catalog**

Colorize

Photo Upscale

Photo Tagging

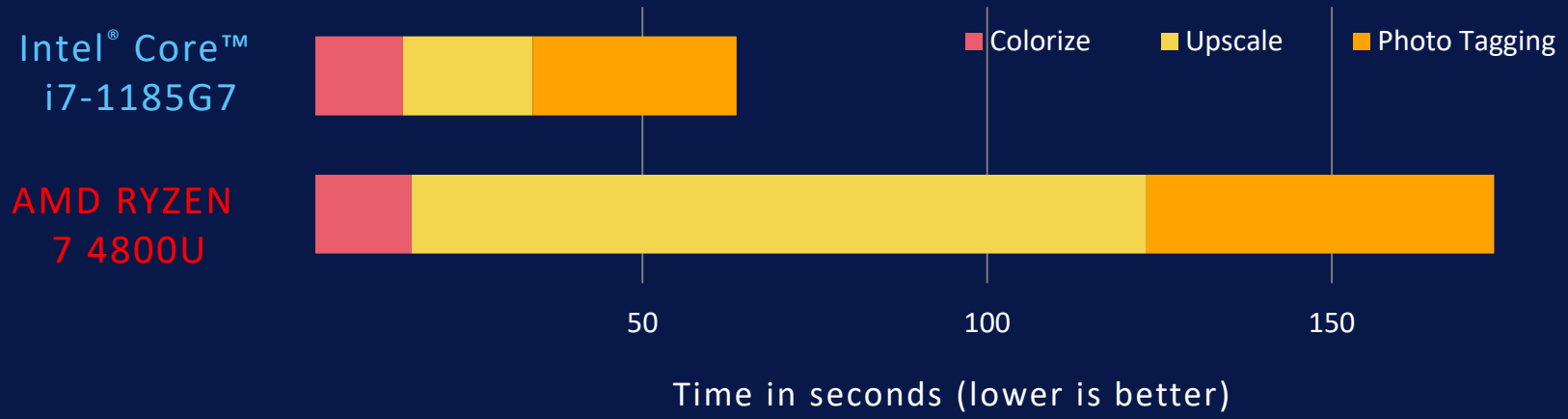
AI-based Photo Workflow

Topaz Labs Gigapixel AI Photo Upscale

Up To **5.6x** Faster

AI Photo Tagger

Up To **1.7x** Faster



Full Workflow 2.7X Faster

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 2).

Not All Inference Workloads Behave the Same

CPU

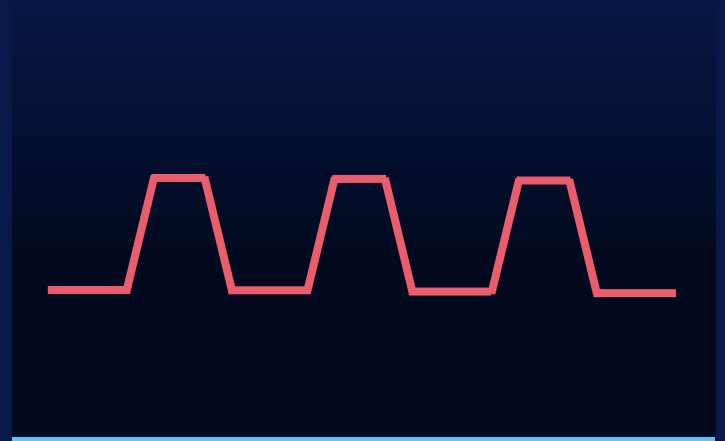
Burst

Intel® DL Boost: VNNI

GPU

Sustained

Intel® DL Boost: DP4a

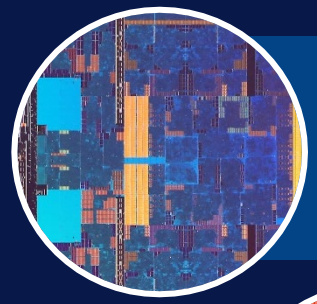


ACC

Periodic

Intel® GNA 2.0

The ENGINES to Tackle the WORKLOADS



4x

Intel® DL Boost: DP4a

GPU Based Acceleration for Sustained Workloads vs. Competition (MLPerf)

1.7x

Intel® DL Boost: VNNI

CPU Based Acceleration for Burst Workloads vs. Competition (MLPerf)

V2.0

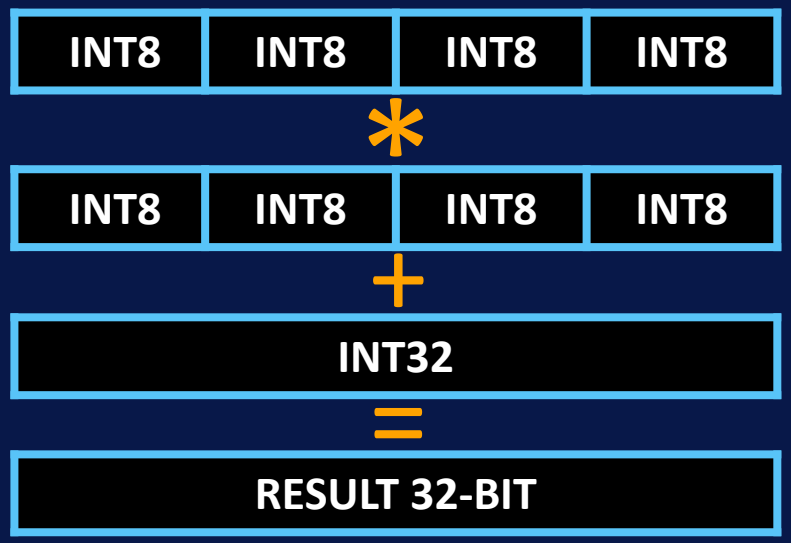
GNA 2.0: Low Power AI Accelerator

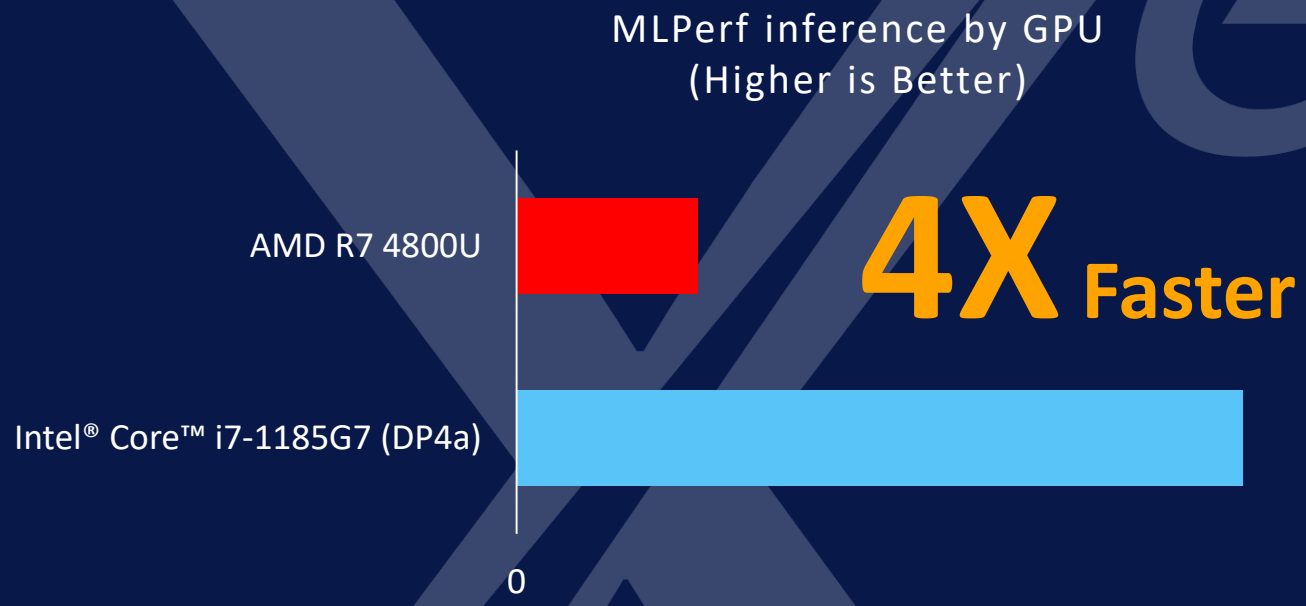
Reduced power vs. same workload running on CPU

11th Gen Intel® Core™ Exponential AI Leadership

Intel® Core™ i7-1185G7 vs AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 2).

Intel® DL Boost: DP4a

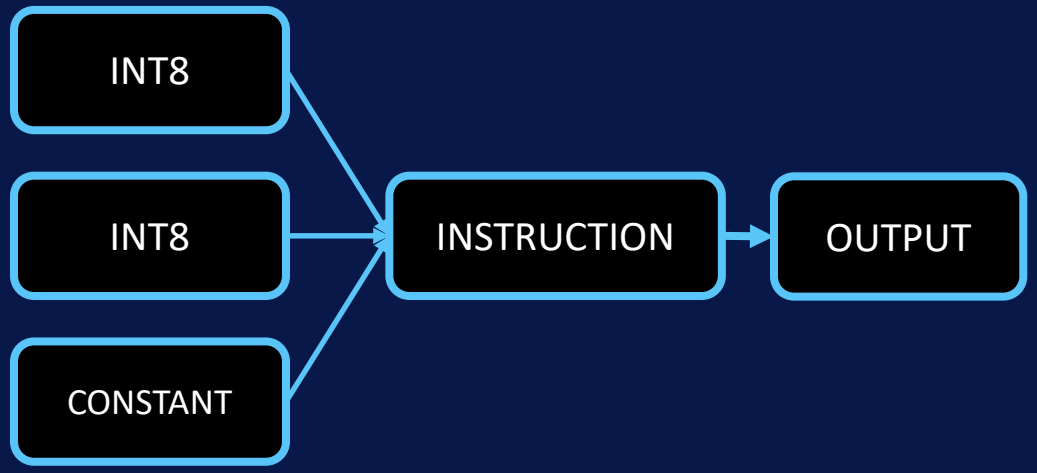


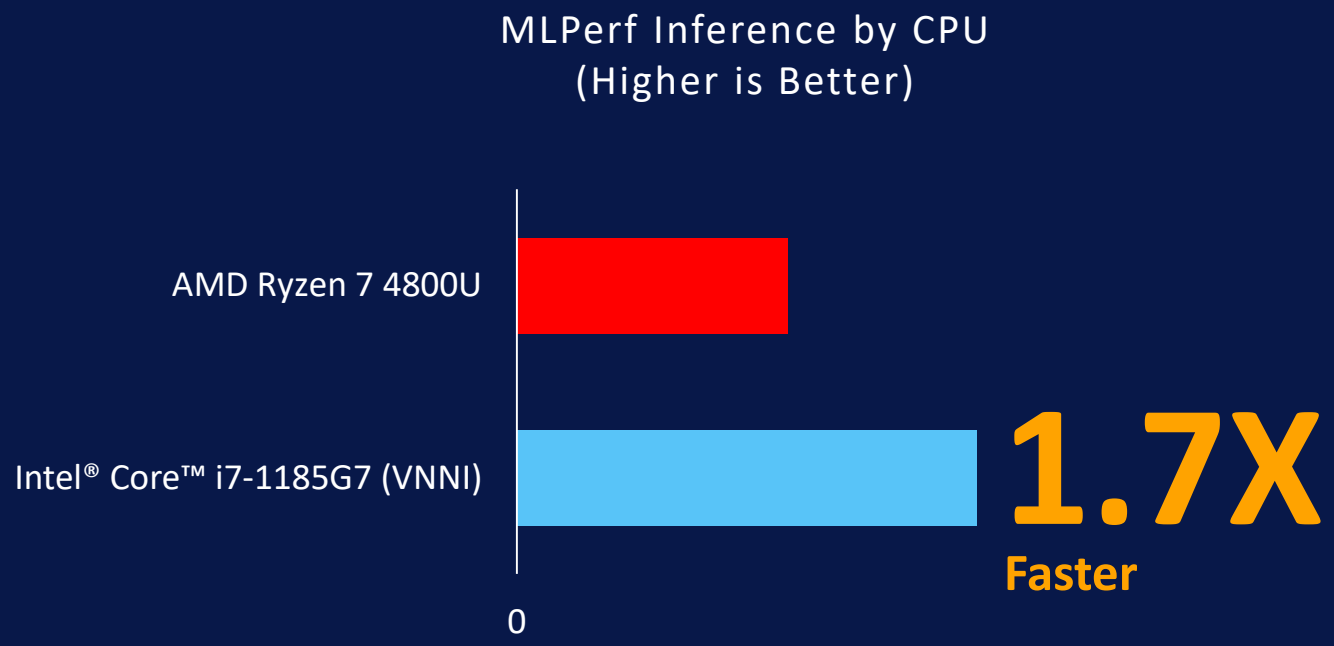


- Introducing 8-bit INT acceleration on Intel® Iris® Xᵉ graphics
- Optimized with Intel® OpenVINO™ Toolkit & OneAPI
- 4X faster than competition (ML Perf)

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 2).

Intel® DL Boost: VNNI

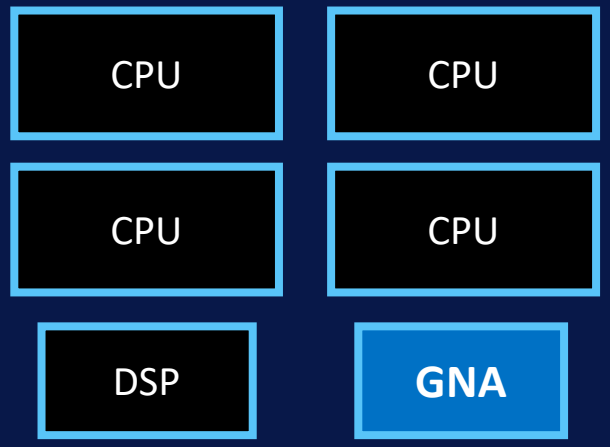


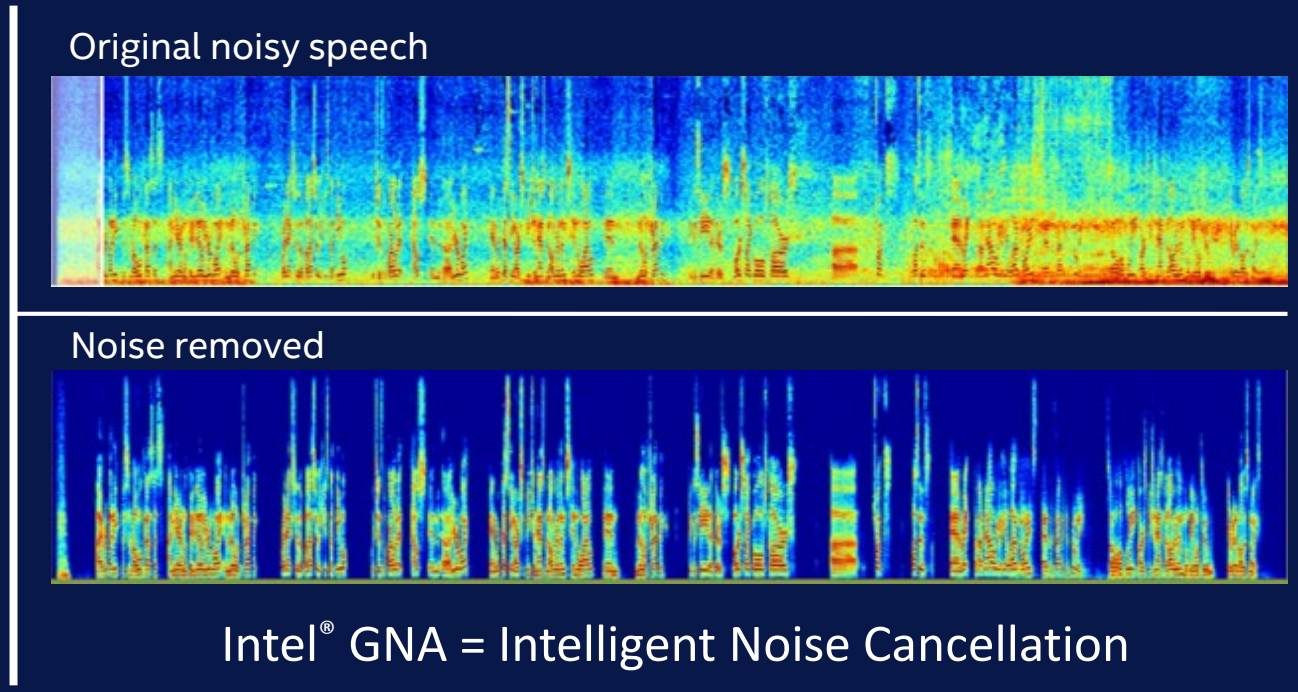


- VNNI (INT8 instruction) to support low precision instructions
- Accessible through industry standard frameworks and libraries
- 1.7X faster than competition (ML Perf)

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 2).

Intel® GNA – Gaussian & Neural Accelerator

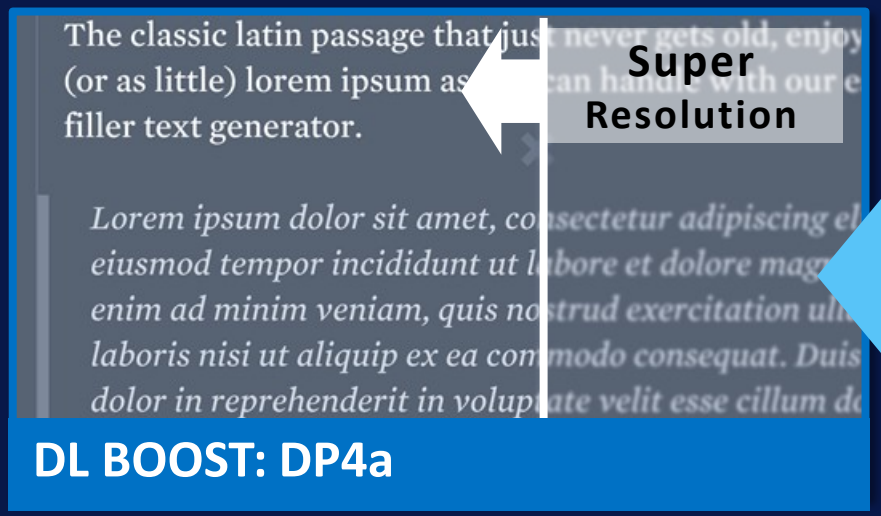




Intel® GNA = Intelligent Noise Cancellation

- Separate IP Block: Intel's lowest power AI Accelerator
- Can operate while the SOC is in lower power states
- Offloads CPU: Reduces power and enables CPU headroom

A Better Collaboration Experience



Collaboration Usage Video

Best for Collaboration

11th Gen Intel® Core™ i7 Processor with Iris® Xᵉ Graphics Wins

Better in Industry Benchmark

SYSMARK25 OVERALL **1.28X**

WEBXPRT3 **1.15X**

Faster with Industry Leading Apps

1.38X Convert to pdf

1.30X Chart Export

1.34X Convert to pdf

1.16X File Archive

Better in Compelling User Workflow

1.24X FASTER

BEST PRODUCTIVITY

Intel Wi-Fi 6 (Gig+)

Best Wi-Fi technology for video conferencing

Thunderbolt™ 4

Truly universal cable connectivity

BEST CONNECTIVITY

Modern Standby

AV1

Maintain 1080 in lower bandwidth environments

Quad-Core Audio DSP

Low power wake-on-voice and A4PC

AVX2/ Intel® DL Boost

Low power Background Blur

GNA 2.0

Low power neural noise suppression

IPU 6.0

Higher quality integrated camera capability

Video Super Resolution

Intel exclusive with Amazon Smoother images and shaper text

UNIQUE FEATURES

Intel® Core™ i7-1185G7 vs. AMD Ryzen 7 4800U

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 2).

Blueprint Series:
11th Gen Intel® Core™ Processor

Boyd Phelps
Vice President, Design Engineering Group

Introducing 11th Gen Intel® Core™ Processor

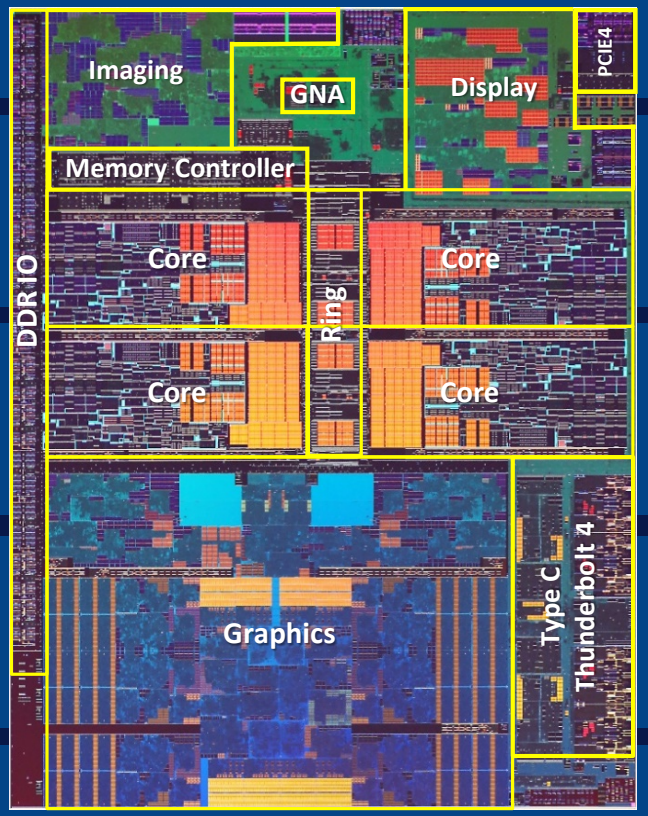
New Willow Cove Cores
Up to 4 Cores / 8 Threads
Up to 4.8GHz

New Converged Chassis Fabric
High Bandwidth / Low Latency
IP and Core Scalable

New Memory Controller
LP4/x-4266 4x32b up to 32GB
DDR4-3200 2x64b up to 64GB

1st Integrated Thunderbolt™ 4
Full 4x DP/USB/PCIe mux on-die
Up to 40Gbps bi-directional per port

1st Integrated PCIe Gen 4 (CPU)
Low Latency, High Bandwidth
SSD or Discrete Graphics Direct CPU Attach



New Iris® Xe Graphics
Up to 96EU – Up to 2x Higher Performance
Intel® Deep learning Boost: DP4A for AI

New 2x MEDIA Encoders
Up to 4K60 10b 4:4:4
Up to 8K30 10b 4:2:0

New 4 x Display Pipes
Up to 1 x 8K60 or 4 x 4K60
DP1.4 HBR3, BT.2020

New Image Processing Unit (IPU6)
Video up to 4K90 resolutions (initially 4K30)
Still image up to 42 megapixels (initially 27MP)

New GNA 2.0
Enhanced Power Management
Autonomous DVFS

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

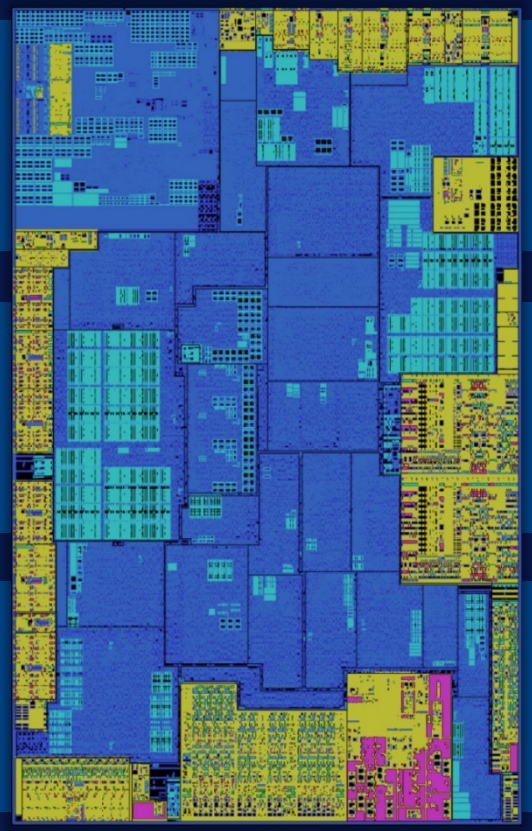
intel

11th Gen Intel® Core™ PCH Processor

Integrated Wi-Fi 6 (Gig+)
Integrated 802.11ax MAC (CNVi 2)
Discrete RF (Intel® AX201)

Integrated Power Delivery
Fully Integrated Voltage Regulators
CPU and PCH

4th Gen CSME
Improved Crypto, Side Channel Resiliency
Power and EM monitoring



Audio DSP
Programmable Quad Core DSP
Low Power Wake-on-Voice
USB and BT Audio Offload

I/O
x4 USB3 (x10 USB2)
x12 Gen3 PCIe
x2 SATA 6 Gbps
OPIO x8 Gen3.0

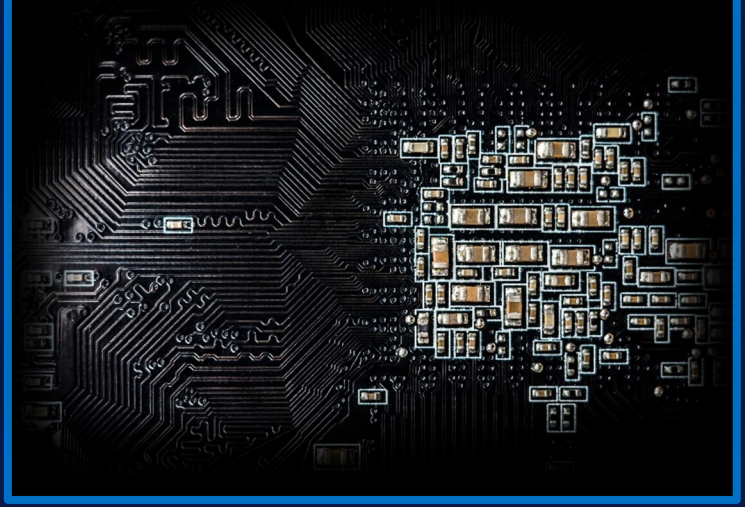
Touch Host Controller (THC)
Lower Power, More Responsive
Simultaneous Pen + Touch

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

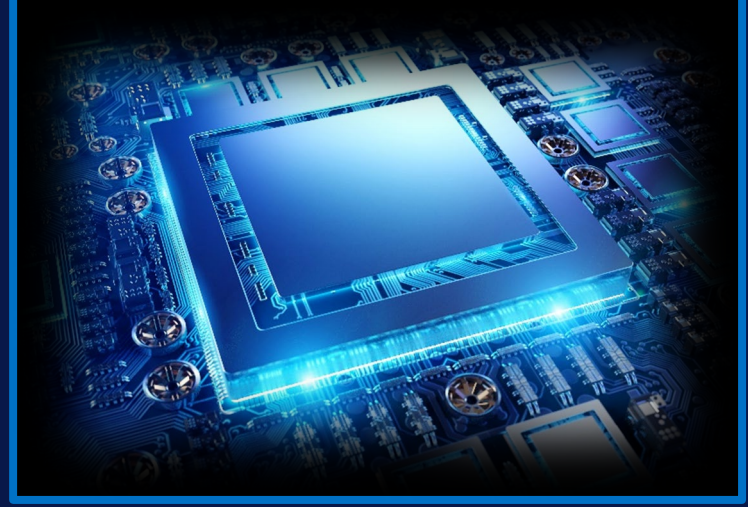
intel.

11th Gen Intel® Core™ Processor Design Approach

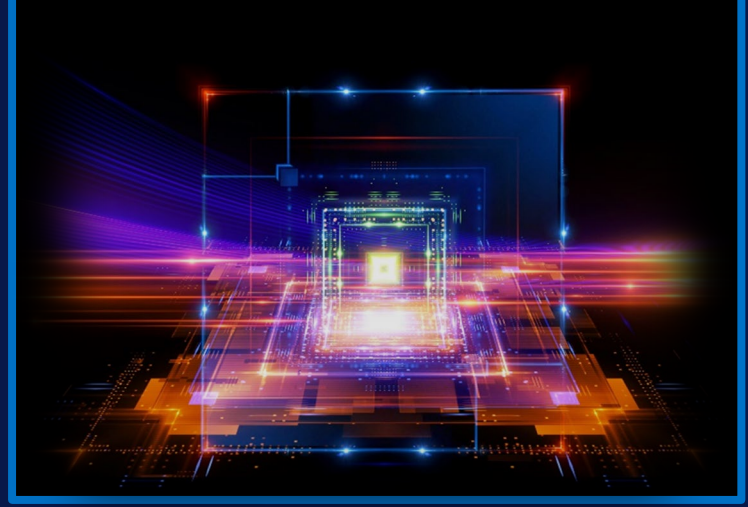
New SuperFin Technology



New Core and Graphics



New Platform Integration

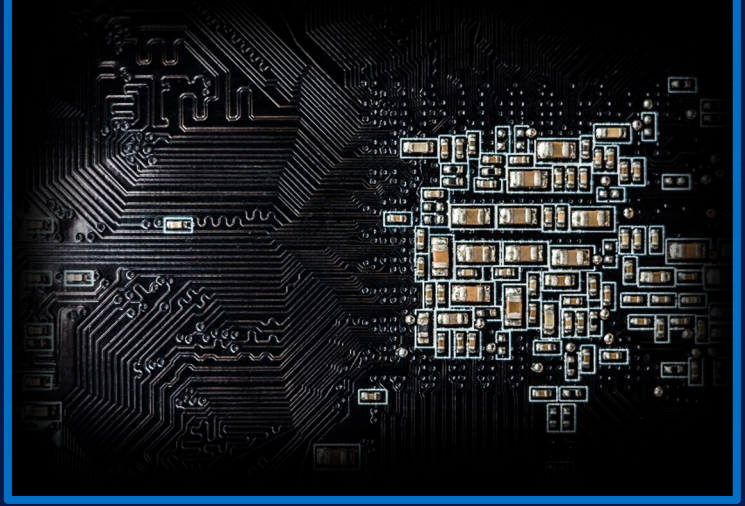


All-new Platform For World's Most Advanced Laptops

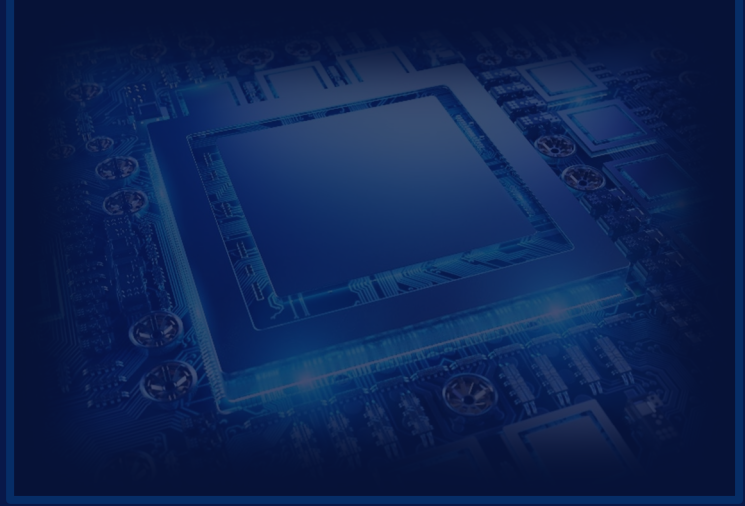
In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

intel.

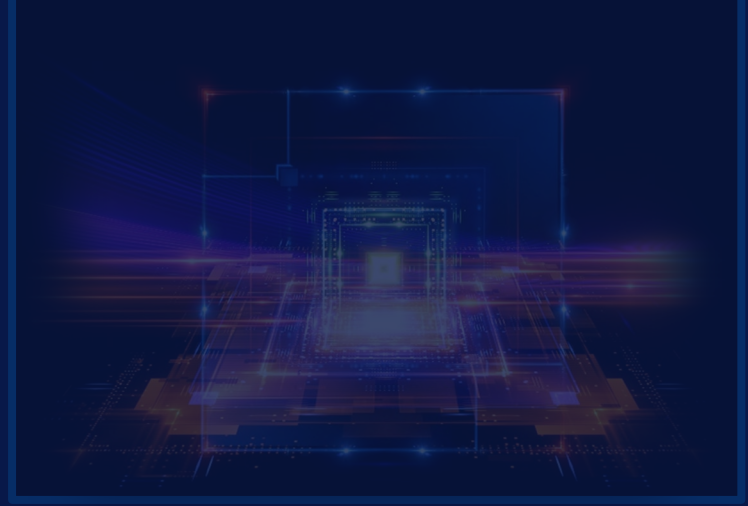
New SuperFin Technology



New Core and Graphics



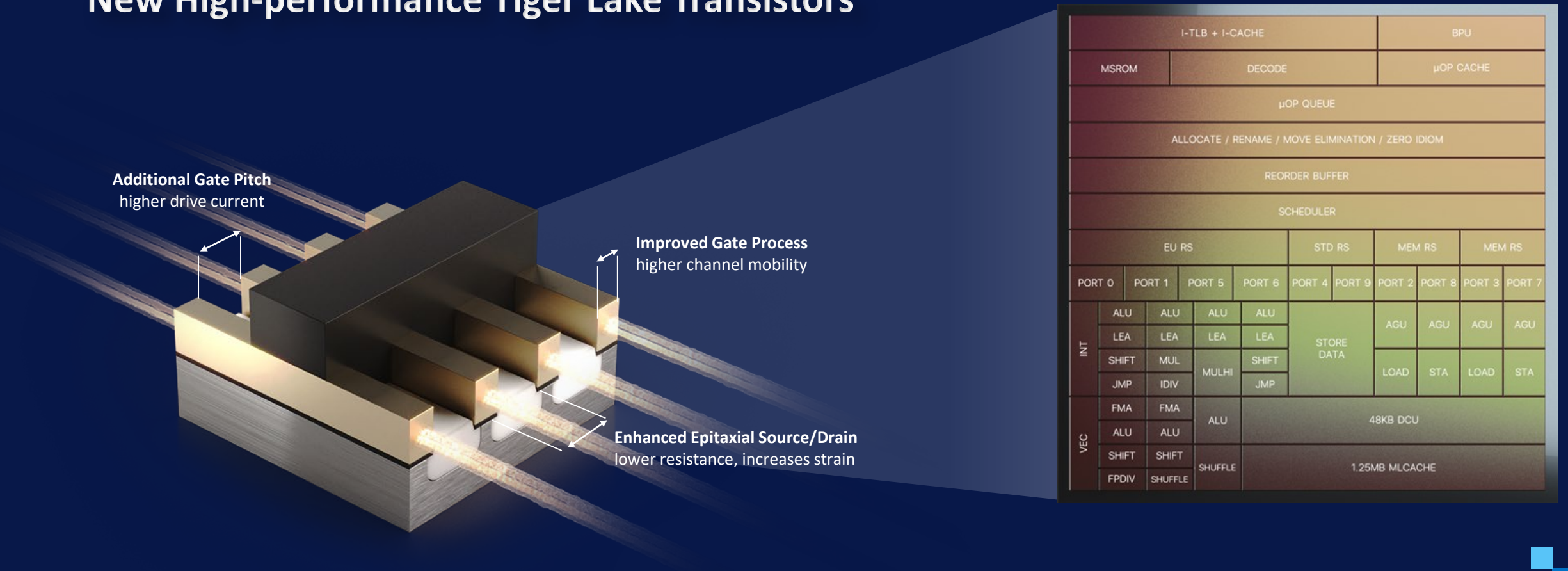
New Platform Integration



New High Performance XTOR

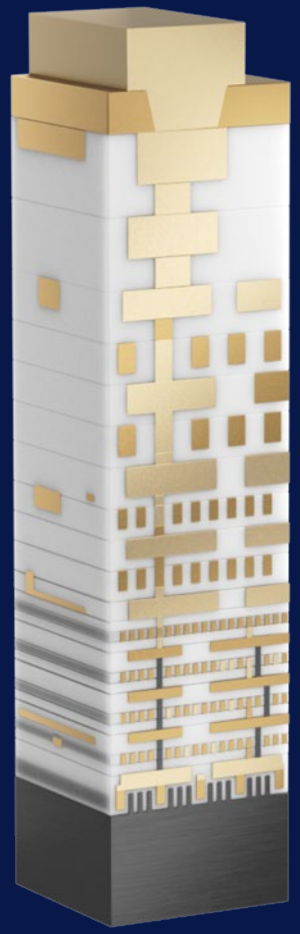
Innovation Across the Entire Process Stack, From Channel to Interconnects

New High-performance Tiger Lake Transistors



Improved Metal Stack

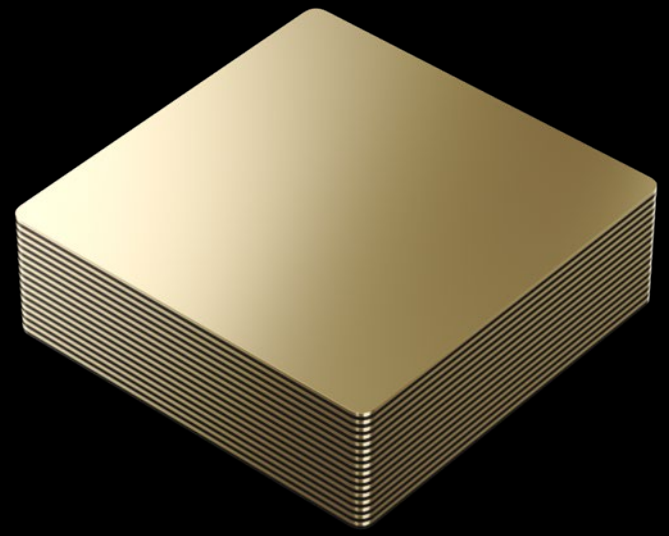
Innovation Across the Entire Process Stack, From Channel to Interconnects



Super MIM Capacitor
>4x increase in MIM capacitance

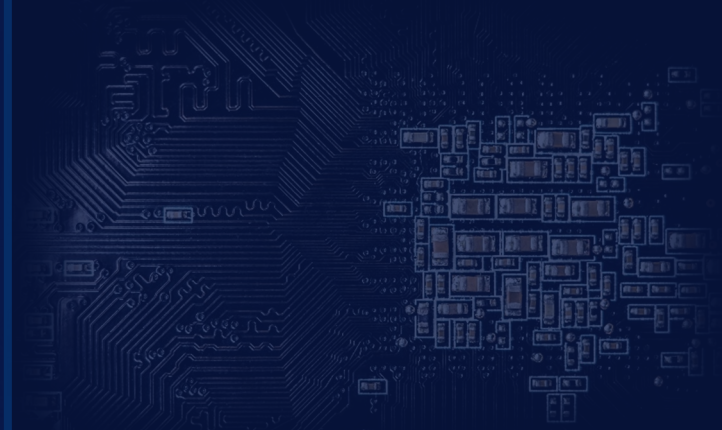
Novel Thin Barrier
reduces via resistance by 30%

Thin layers of different Hi-K materials, each just a few Angstroms thick, stacked in a repeating “superlattice.”

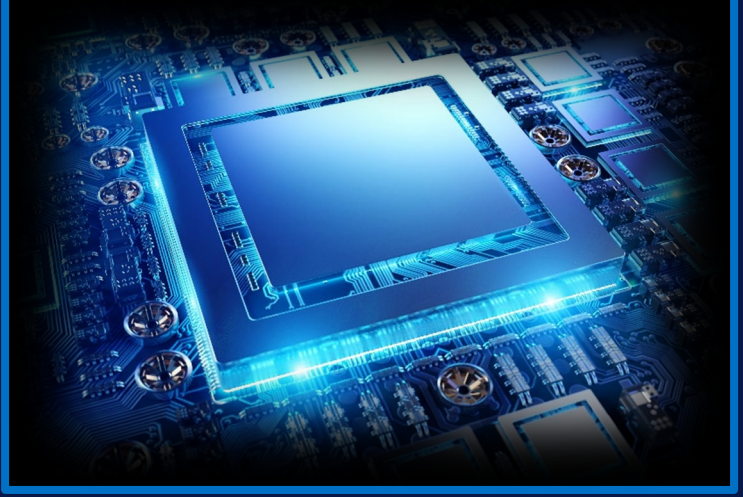


For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

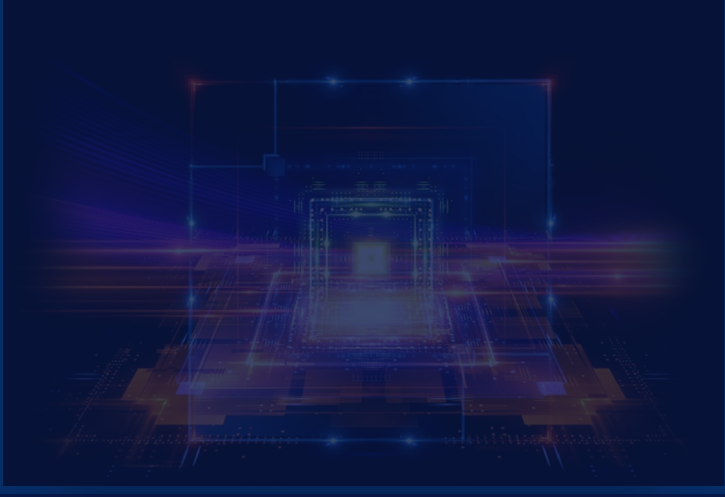
New SuperFin Technology



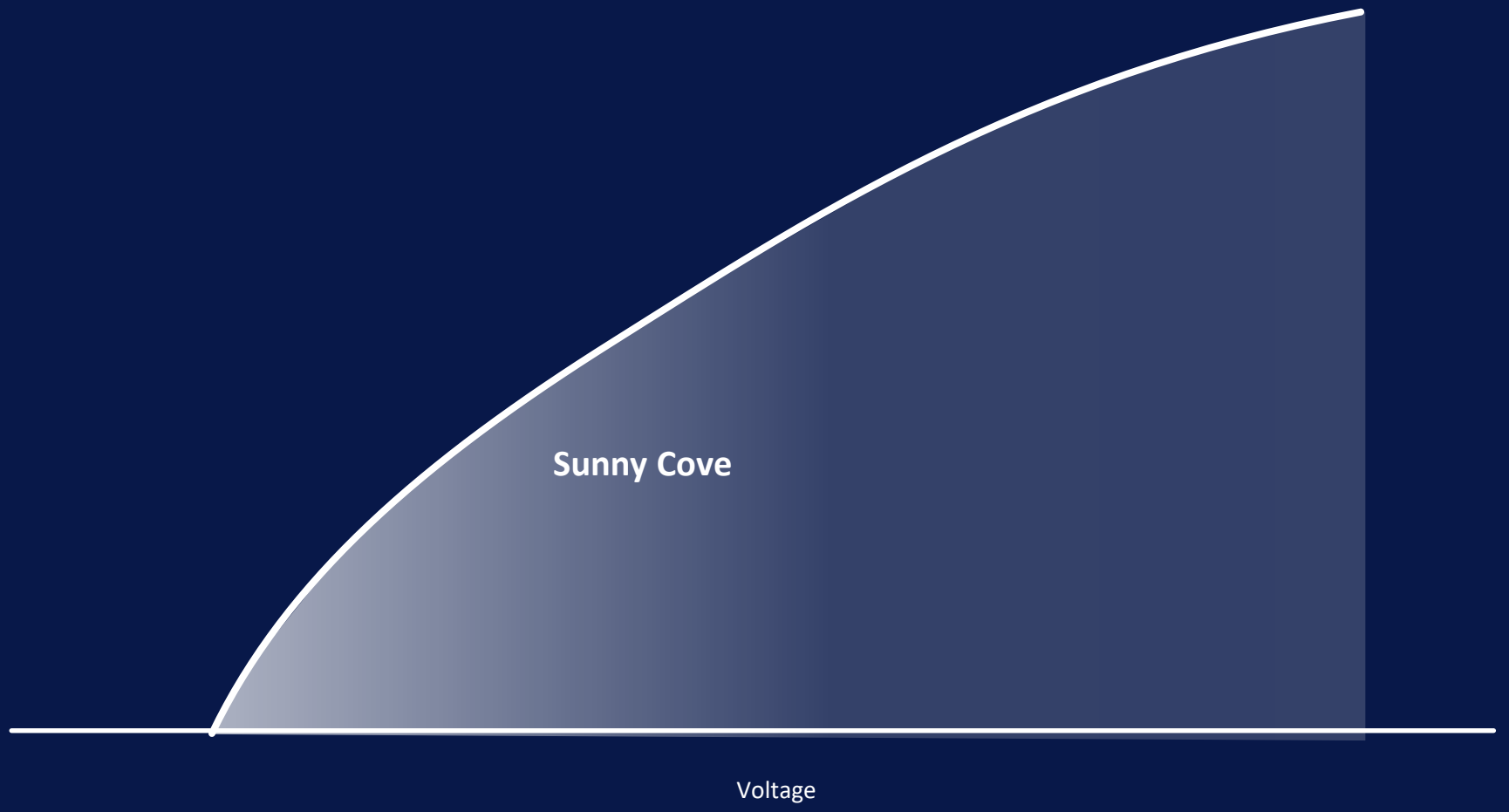
New Core and Graphics



New Platform Integration

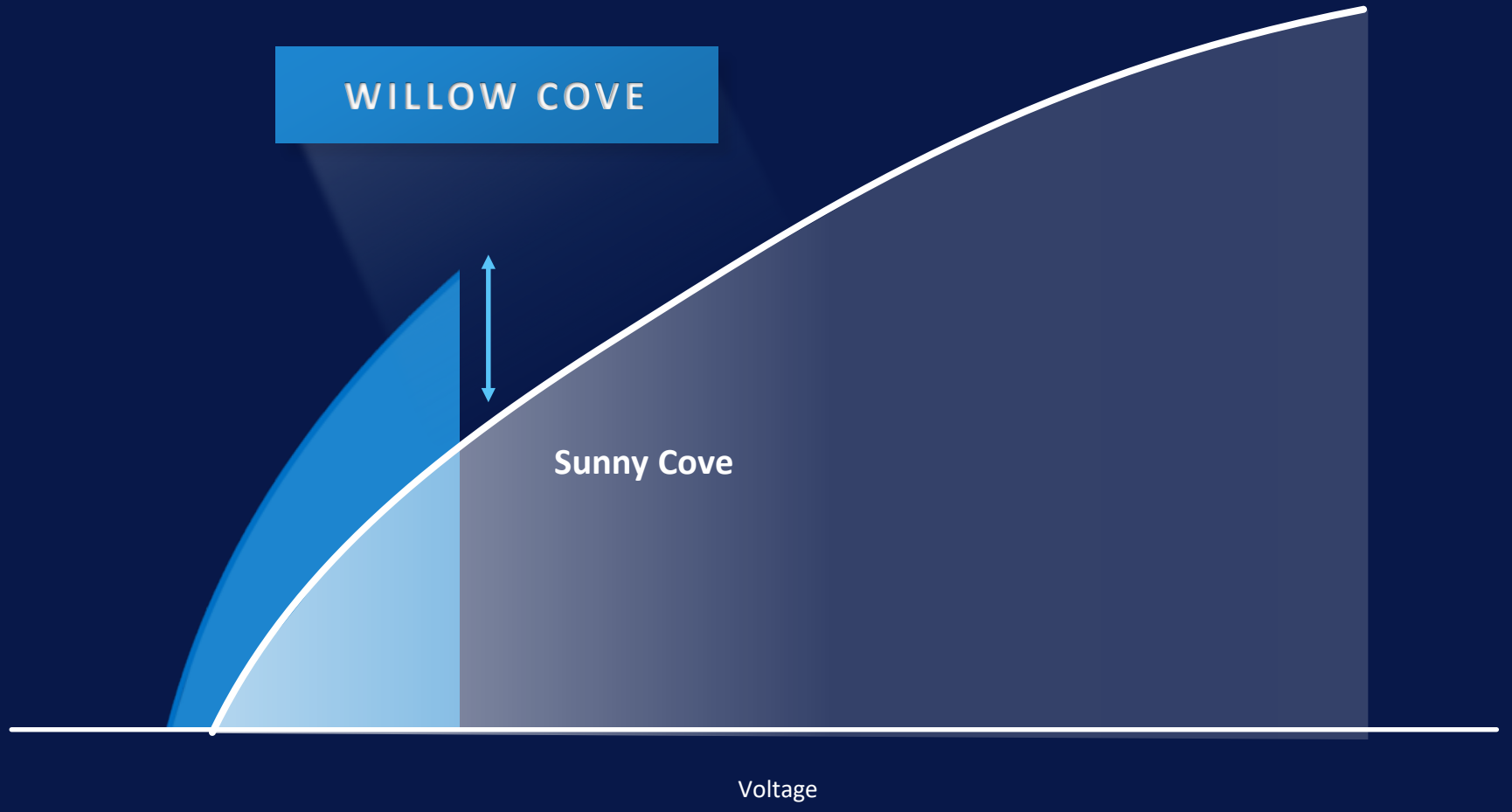


The Result

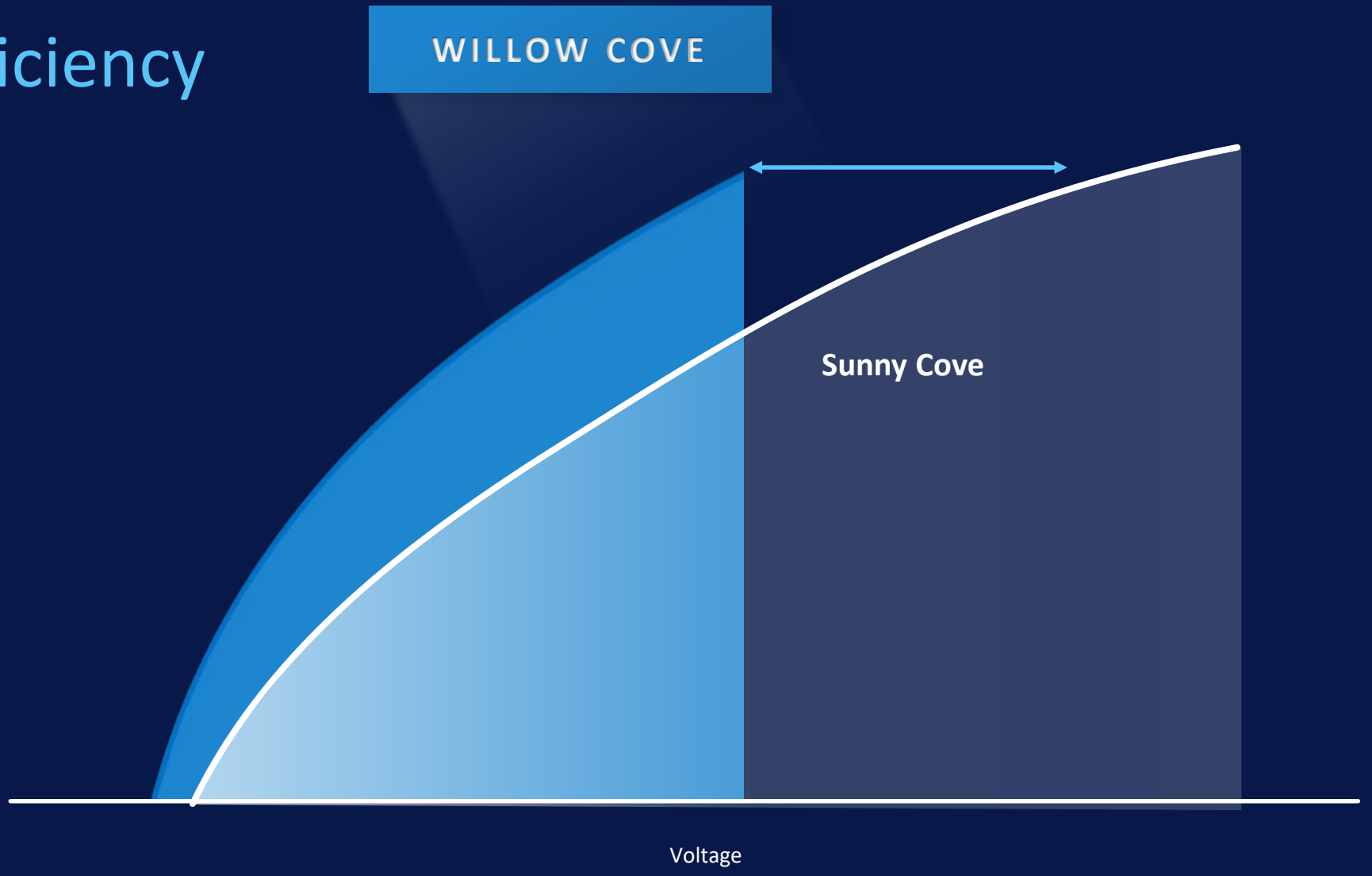


The Result

Large Frequency Gains



The Result
Increased Efficiency



The Result

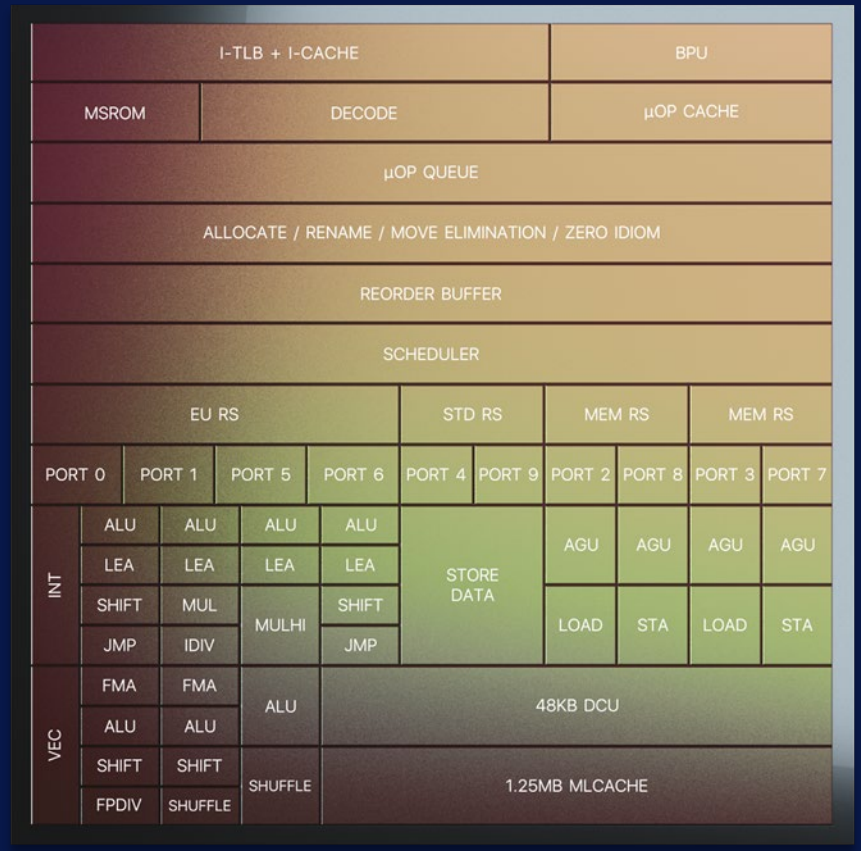
Greater Dynamic Range

intel

Willow Cove Core

CPU Core Goals

- Build on the Sunny Cove architectural foundation
- Redesigned caching architecture to larger non-inclusive, 1.25MB MLC
- Control Flow Enforcement technology to help protect against return / jump oriented attacks
- All at a 900 MHz frequency increase over our prior generation!



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

Intel® Xe Graphics

- Large improvements in performance per watt efficiency
- Up to 96EUs with increased capabilities
- 3.8MB L3 cache
- Feeding the beast: Increased Memory & Fabric efficiency for high bandwidth

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

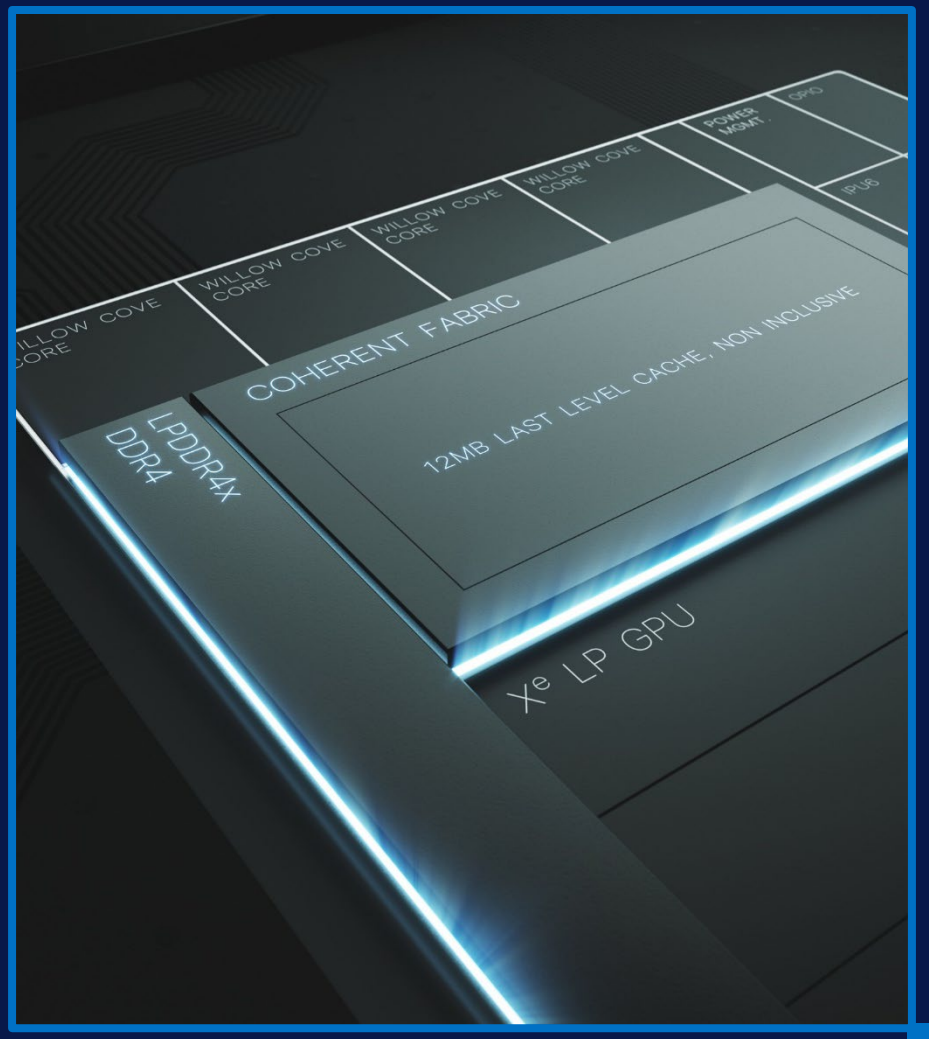
Fabrics and Memory

Coherent Fabric

- 2x increase in coherent fabric bandwidth
  - Dual ring microarchitecture
- 50% LLC size increase to non-inclusive
- IO caching

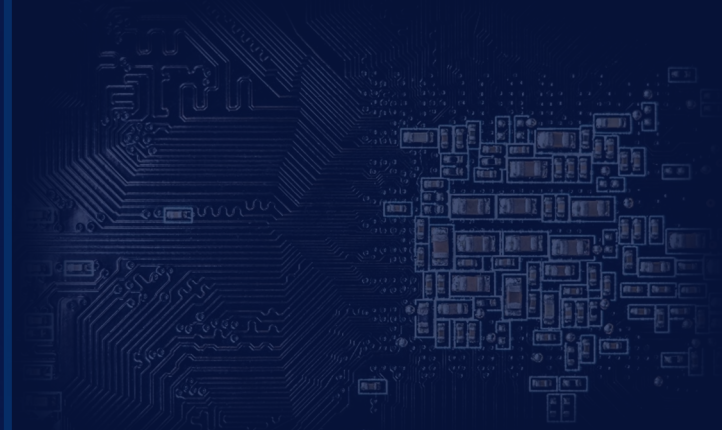
Memory

- More efficient memory bandwidth for graphics & cores
  - Support for up to ~86GB/s of memory bandwidth
  - Deeper, narrower dual memory controller; higher efficiency
- Architectural support for LP4x-4267 and DDR4-3200 (initial) and up to LP5-5400
- Intel® Total Memory Encryption
- In-band ECC protection
- Dedicated Display Ishoc Port for Quality of Service

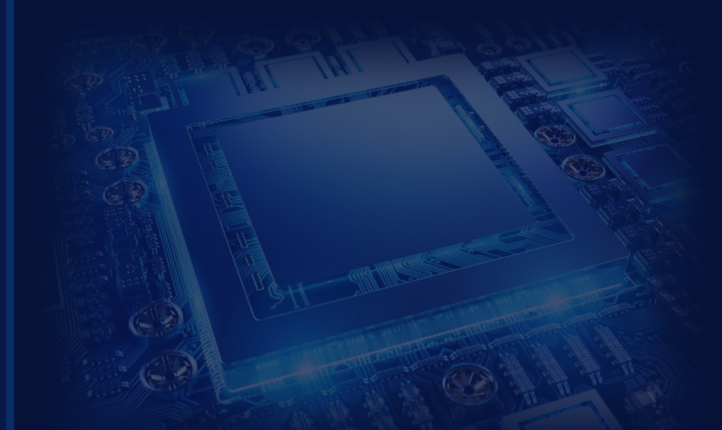


For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

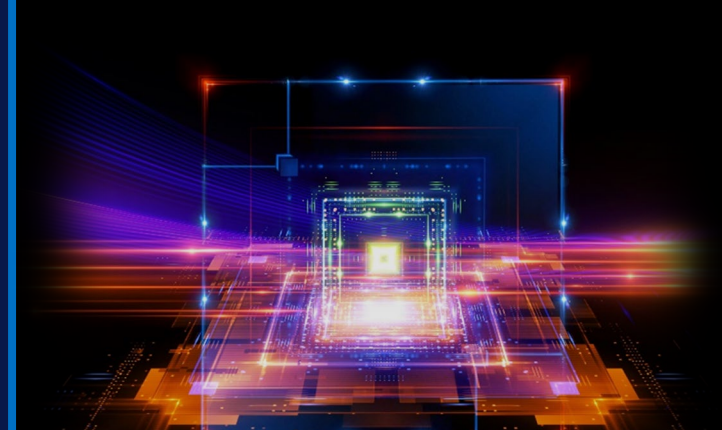
New SuperFin Technology



New Core and Graphics



New Platform Integration



Display, Imaging, GNA 2.0

Display

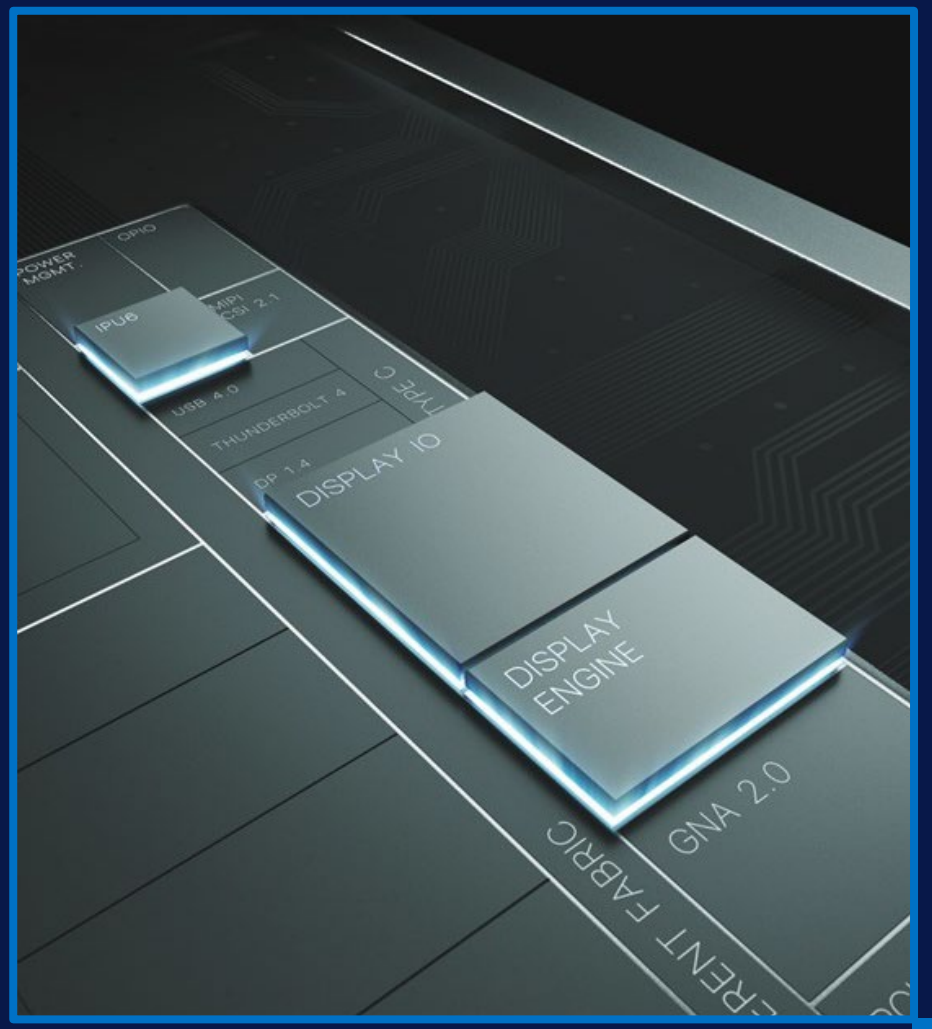
- Increased both # of displays supported and higher resolutions & quality for future displays
- Dedicated fabric path to memory to maintain QoS
- Up to 64GB/s of isochronous bandwidth to memory for multiple high-resolution displays

Intel® IPU 6.0

- Imaging pipeline fully implemented in hardware
- Up to 6 sensors with architectural capabilities for:
  - Video up to 4K90 resolutions (initial 4K30)
  - Still image up to 42 megapixels (initial 27MP)

Intel® GNA 2.0

- Dedicated IP for off-loaded, low power neural inferencing
- 1GOP/mW



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

IO

Integrated Thunderbolt™ 4 and USB4 support

- Up to 40Gb/s bandwidth on each port

Integrated Display output via Type-C Subsystem

- DP alternate Mode
- DP tunnelling over Thunderbolt™
- DP-in ports for discrete graphics card display output to mux over type-C port

4 x PCIe Gen4 on CPU for low latency, high bandwidth device access to memory

- Full 8GB/s bandwidth to memory
- ~100ns less latency when attached to CPU vs PCH

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

Power Management

Targeted power optimizations

- Deeper package C state turning off all clocks in CPU
- Increased FIVR efficiency at low loads
- Moved always-on logic in fabric, PCIe, Type-C and thermal sensors blocks to gated domains
- Hardware-based save and restore logic

Autonomous DVFS in coherent fabric and memory subsystem to scale frequency and voltage based on bandwidth

PM - DVFS

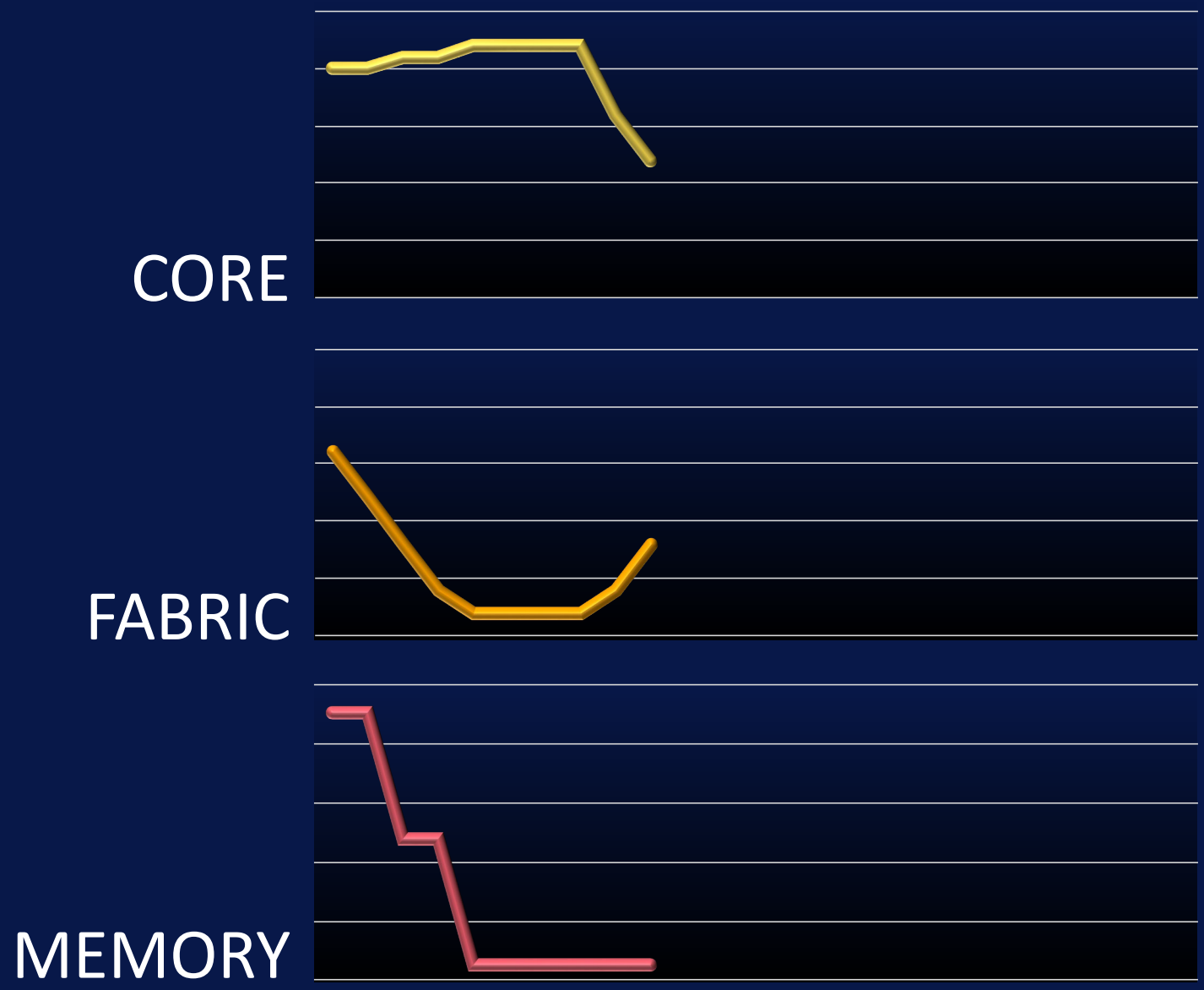
- Goal is to adapt frequencies (and voltages) to required performance level

PM - DVFS

- Workload is in a core centric phase with few requests
- Core increases frequency to match required performance
- Fabric and memory reduce frequency to match low number of requests

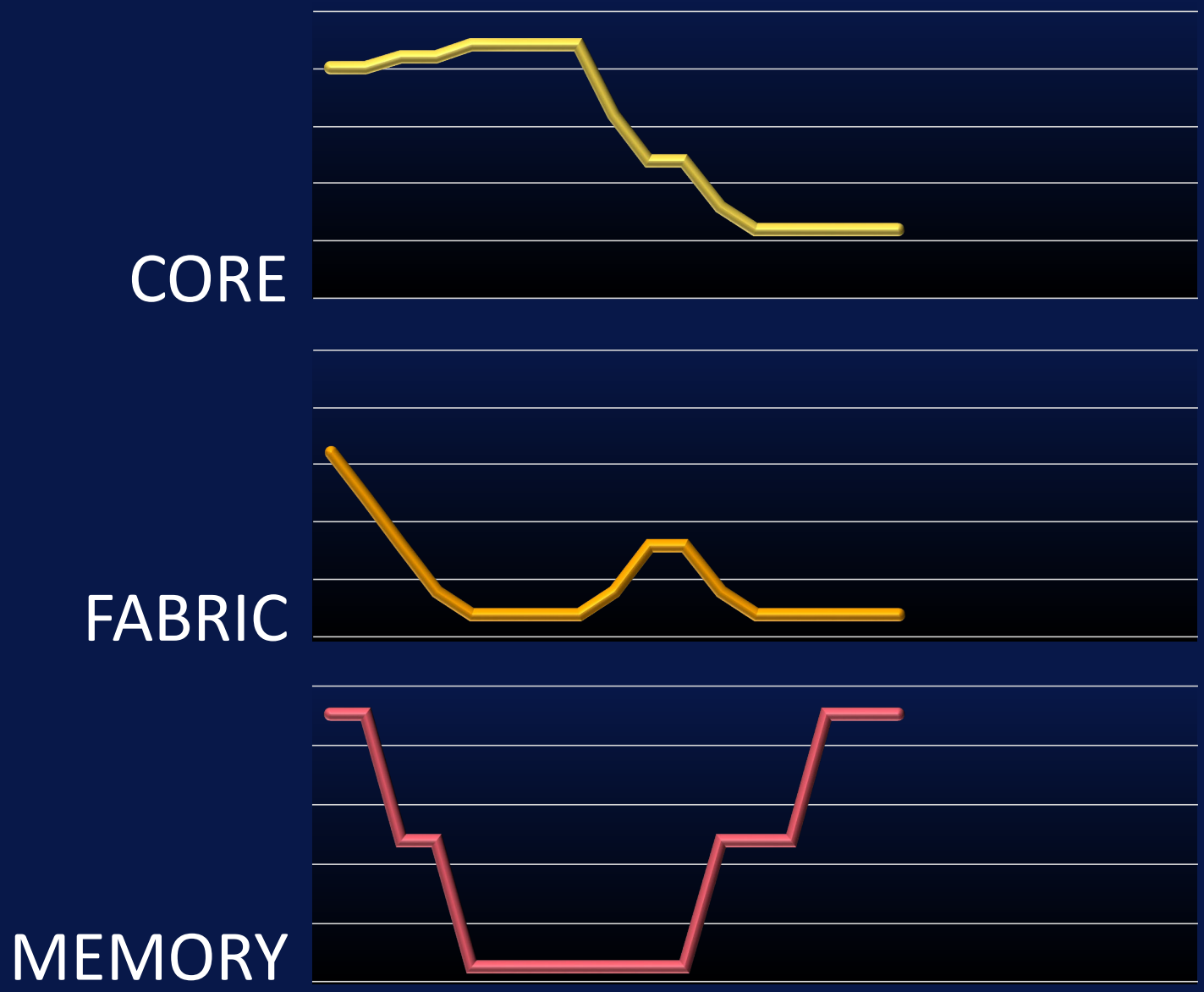
PM - DVFS

- Workload enters a phase where requests go out to fabric and hit the large LLC
- Core reduces the frequency, while fabric increases it to match the increasing number of requests
- Memory stays at low frequency since requests are served from cache



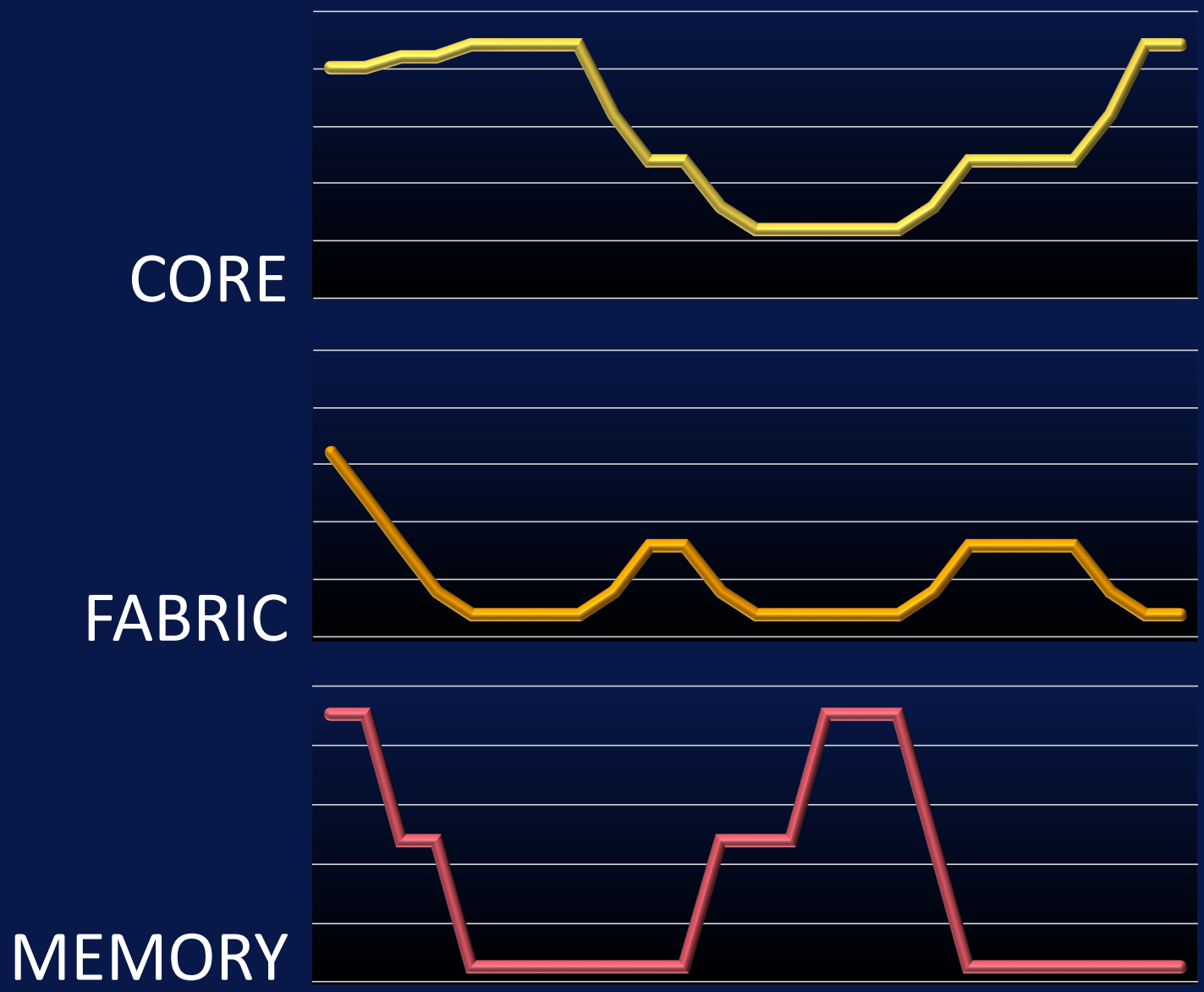
PM - DVFS

- Workload enters a phase where data requests miss in the LLC and go to memory
- Core keeps reducing frequency
- Memory increases frequency to match the increasing demand
- Fabric can reduce frequency



PM - DVFS

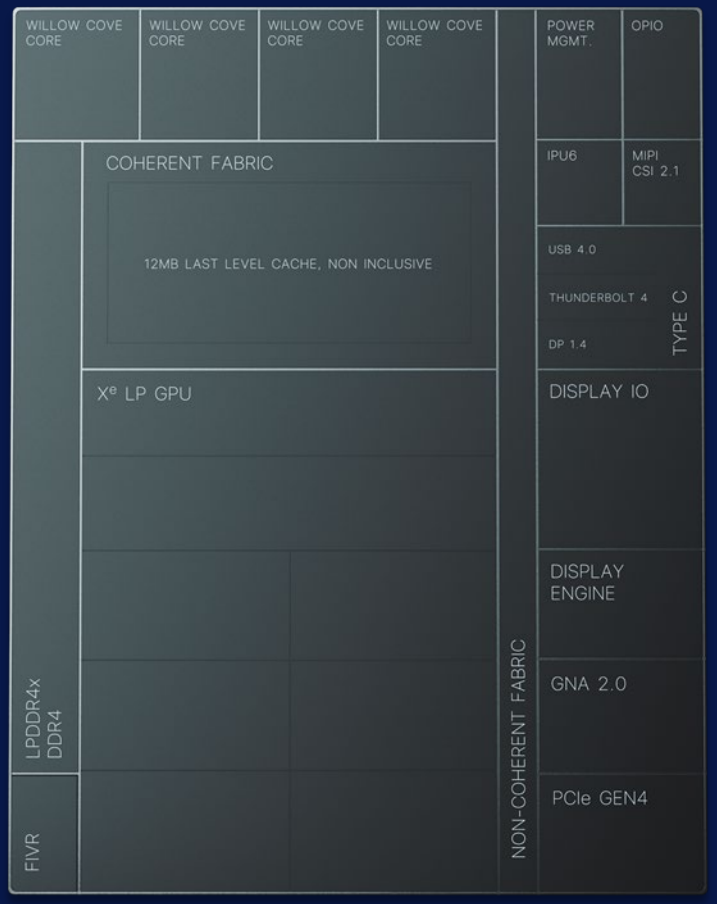
- Working set is within the core caches, core raises the frequency to deliver max frequency, while fabric and memory stay at the minimum frequency to deliver the few requests



Tiger Lake SoC Architecture

Leveraging Process Tech Improvements, Tiger Lake SoC Architecture delivers significant advancements across a wide set of SoC IPs, with:

- More than a generational increase in CPU performance in Willow Cove CPU core:
  - Up to 24% Higher vs Ice Lake
- Massive improvements in graphics power efficiency and performance in Intel® Xᵉ-LP graphics IP
  - Up to 2X Higher Game fps vs Ice Lake
- Improved fabric and memory to deliver more bandwidth *efficiently*
- Rich I/O… and much more!



For more complete information about performance and benchmark results, visit visit www.intel.com/11thgen (configuration details in section 3).

Best for Productivity

11th Gen Intel® Core™ i7 Processor with Iris® Xᵉ Graphics Wins

SYSmark 25 (Overall score) **1.28X** HIGHER

WebXPRT 3 **1.15X** FASTER

1.30X FASTER CHART EXPORT

1.38X FASTER DOCUMENT TO PDF

1.34X FASTER DOCUMENT TO PDF

1.16X FASTER FILE ARCHIVE

Office Productivity

1.24X FASTER

Only Processor with Integrated

Wi-Fi 6 (Gig+) Thunderbolt™ 4

BEST –IN-CLASS WIRELESS & WIRED CONNECTIVITY

INDUSTRY BENCHMARK + LEADING APPLICATION TASKS + COMPELLING USER WORKFLOWS + UNIQUE FEATURES

Intel® Core™ i7-1185G7 vs. AMD Ryzen 7 4800U

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 3).

intel

Blueprint Series:
11th Gen Intel® Core™ Processor

Tom Petersen
Intel Fellow

Another Big Year-over-Year Advancement

Intel® Iris® Xᵉ Graphics

2.01X

1.52X

1.66X

1.70X

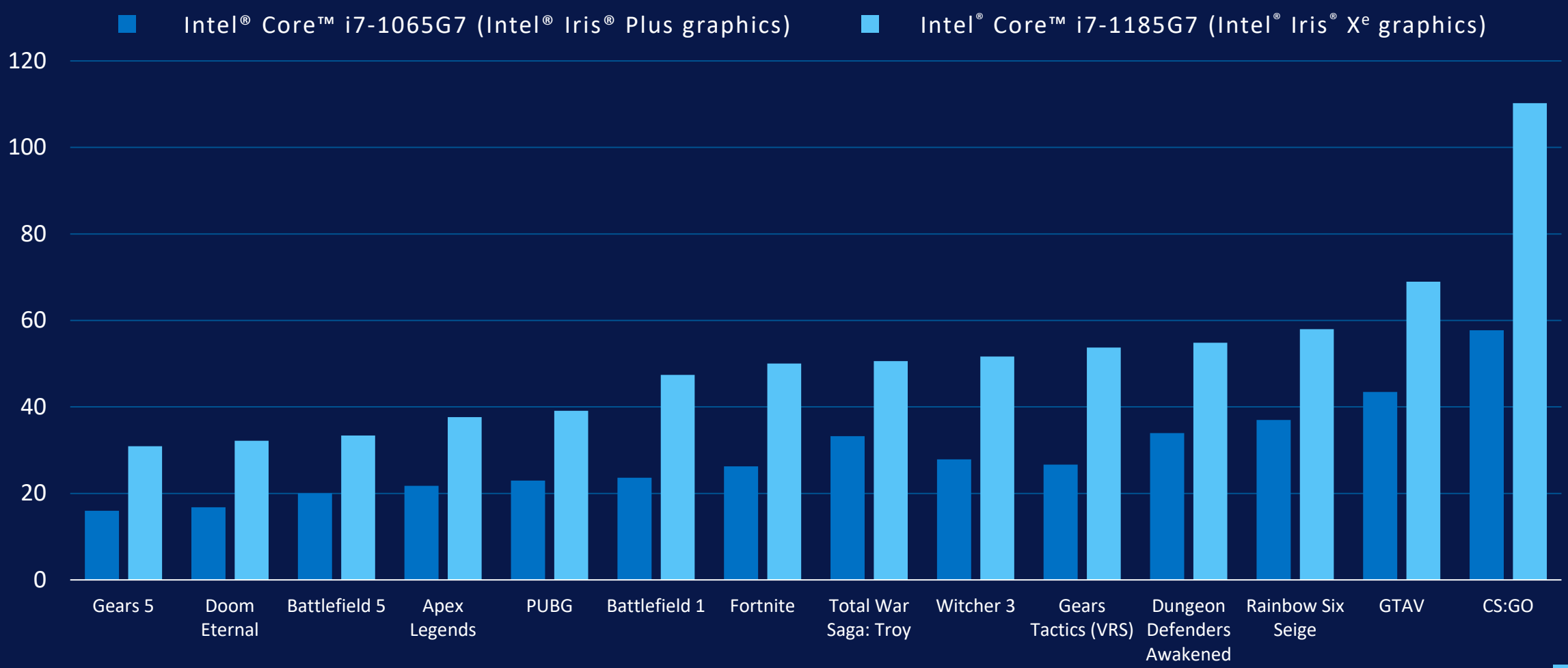
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

intel

Gen-Over-Gen Gaming

Up to 2X Gen-over-Gen Performance… Again

Intel® Iris® Xe Graphics



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

Low Power, High Performance

Intel® Iris® Xᵉ Graphics

New Xᵉ-LP microarchitecture
Up to 96 EUs
Up to 1.35 GHz

New high-efficiency thread control with software score boarding

New 8-wide vector units with support for Intel® DL Boost: DP4a

New L1 data cache
Up to 3.8 MB L3

2X bandwidth to the memory fabric

Up to 48 texels/clock
Up to 24 pixels/clock

End-to-End Compression

Variable Rate Shading

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

Generational Leap in Capacity

Intel® Iris® Xe Graphics

	Intel® Iris® Plus Graphics (ICL Gen11)	Intel® Iris® Xe Graphics (TGL Xe-LP)	Improvement
EUs	64	96	1.5X
Frequency (GHz)	1.10	1.35	1.23X
FP32 (TFLOPs)	1.13	2.07	1.84X
FP16 (TFLOPs)	2.25	4.15	1.84X
INT8 (TOPs)	-	8.29	3.68X*
Pixels (Gpixels/s)	17.6	32.4	1.84X
Geometry (Gprimitives/s)	1.10	2.7	2.45X
L3 Cache (KB)	3072	3840	1.25X

* Compared to Intel® Iris® Plus graphics FP16

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

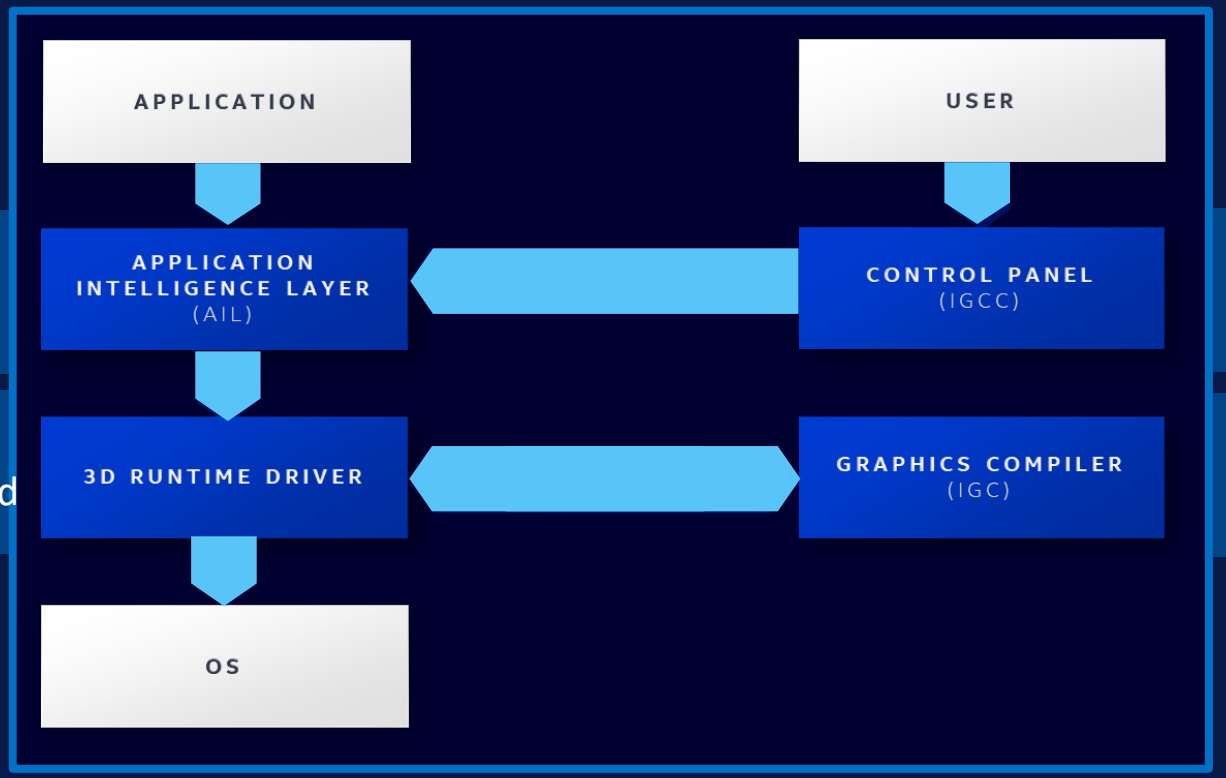
Extra Performance Boost with VRS

Extra Performance Boost with VRS

Intel® Iris® Xe Graphics Software Stack

New Instant Game Tuning
Fast and seamless delivery of game optimizations

New DirectX 11 driver
Built from scratch for low overhead

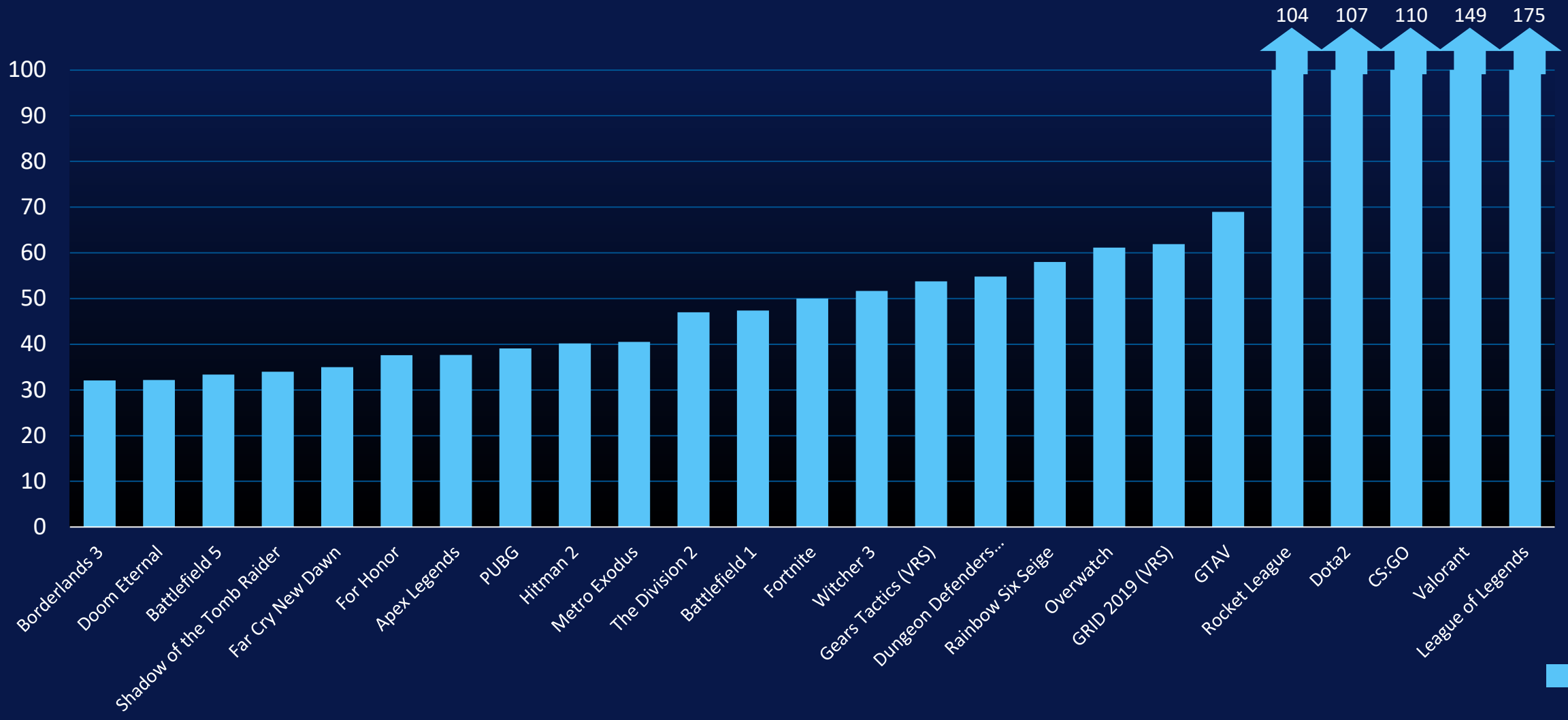


New Game Sharpening
Perceptual adaptive sharpening filter

New GPU Profile-Guided Optimizations

Playable Titles at 1080p!

Intel® Iris® Xe Graphics



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

Up Level Gaming vs. Competition

Intel® Iris® Xe Graphics

1.76X

1.52X

1.49X

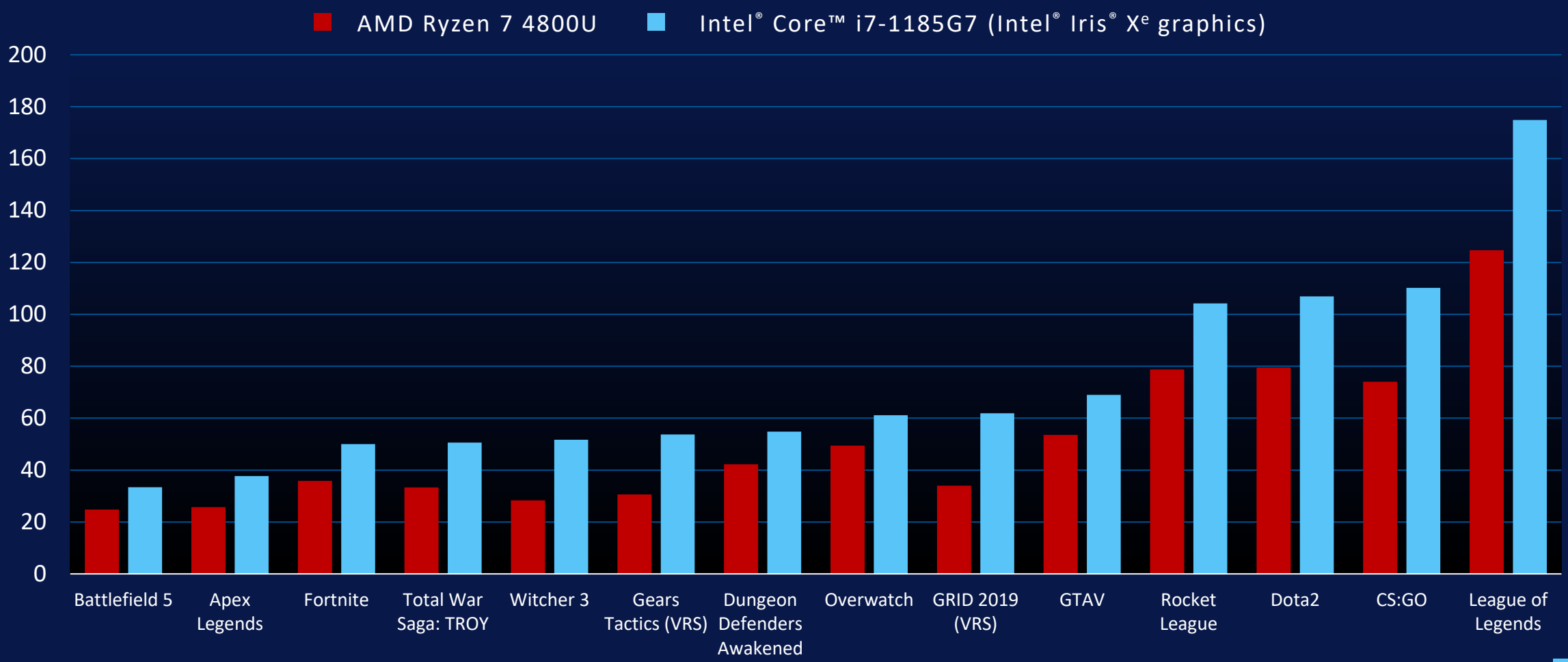
1.82X

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

Gaming vs. Competition

Up to 1.8x Performance Benefit vs Competition

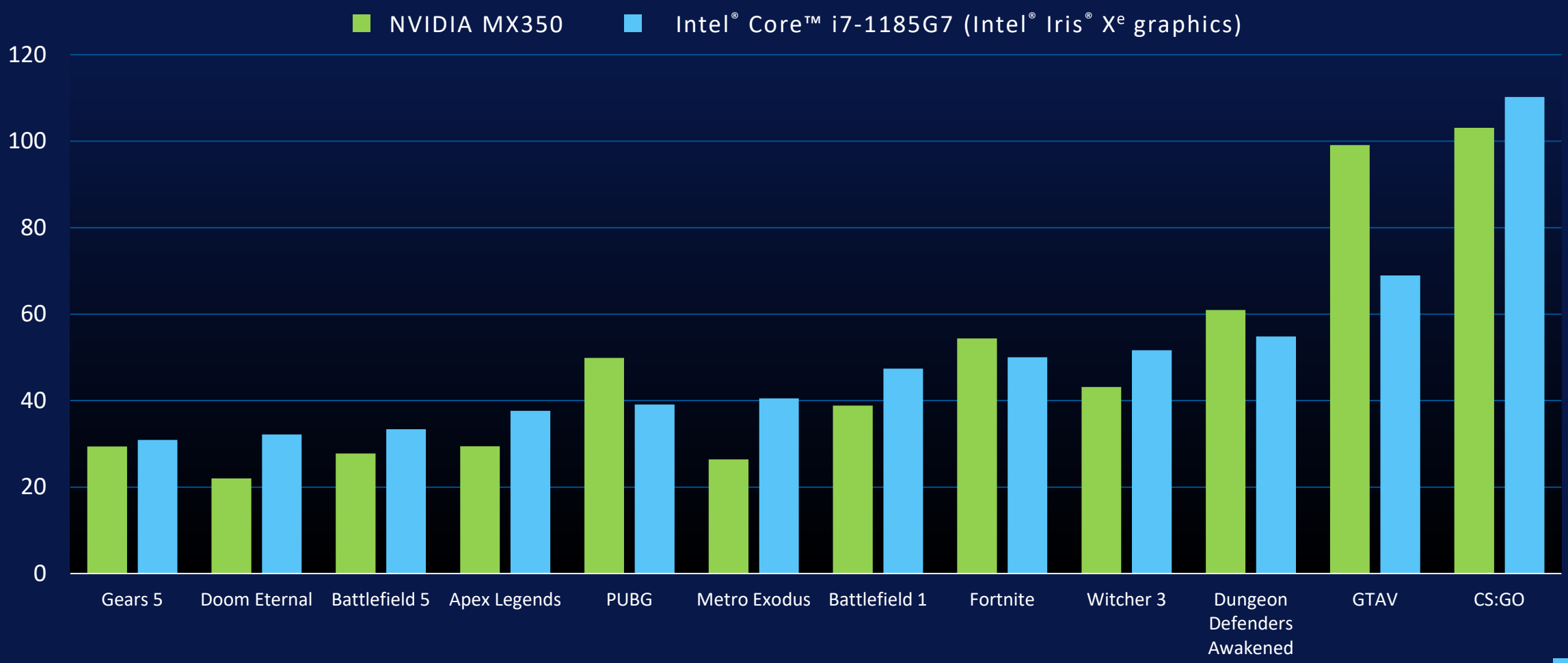
Intel® Iris® Xe Graphics



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

Trading Blows with Discrete Graphics

Intel® Iris® Xe Graphics



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

Delivering Billions of Brilliant Colors

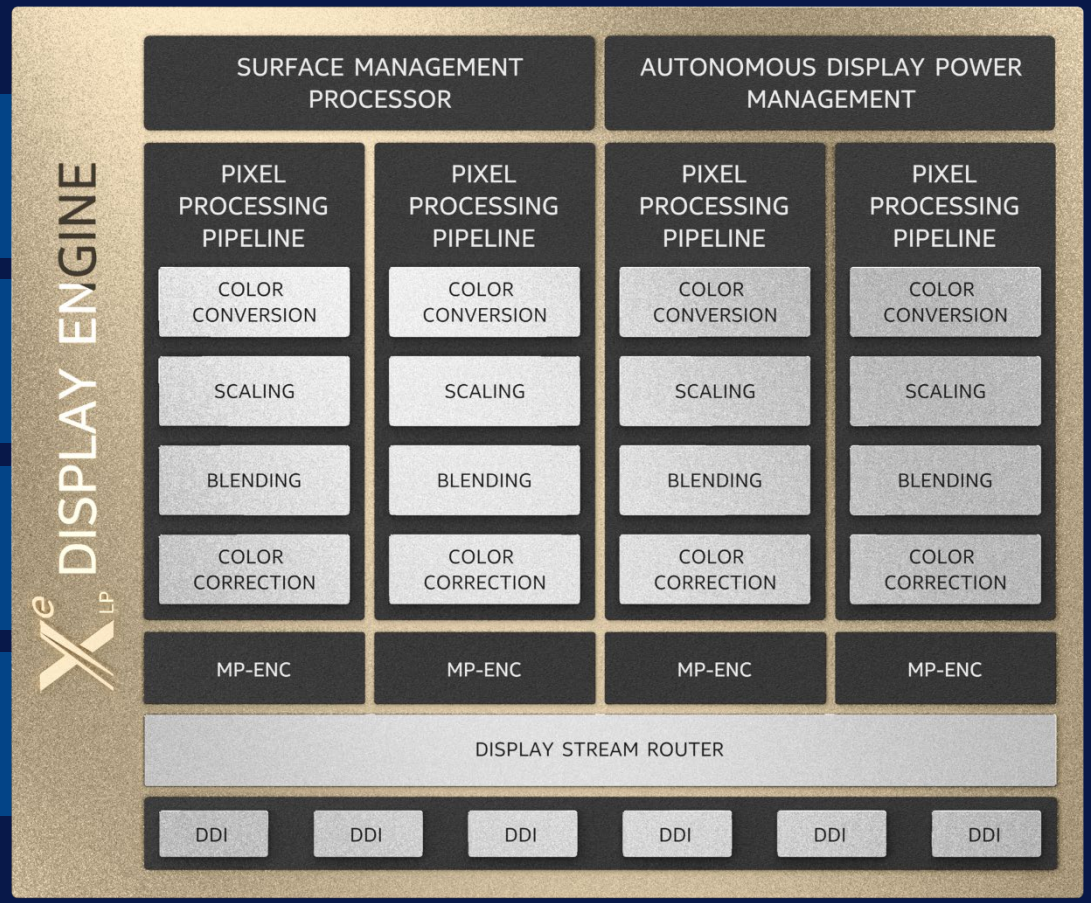
Intel® Iris® Xe Display Engine

Up to 4 Displays

DP1.4, HDMI2.0, TBT4, USB4 Type-C

HDR10/Dolby Vison

Up to 360Hz and Adaptive Sync



For more complete information about performance and benchmark results, visit www.intel.com/11thgen.

intel

High Quality, Blazing Fast Encode & Decode

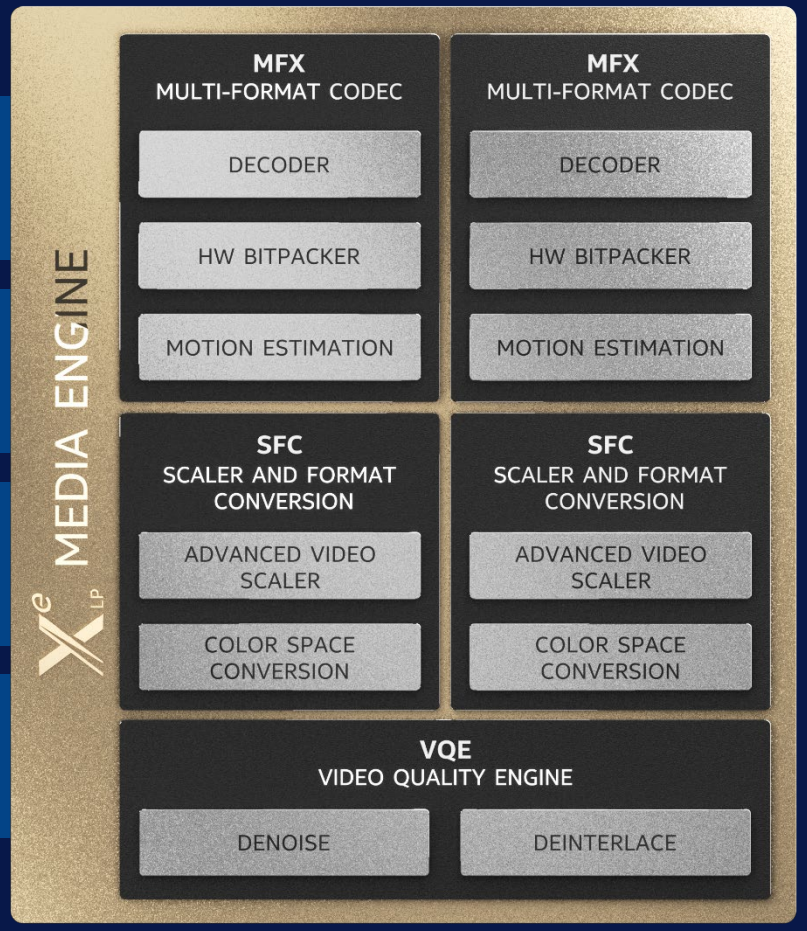
Intel® Iris® Xᵉ Media Engine

Low power 4K HDR10 and Dolby Vision playback

Dedicated AV1 decode hardware

12-bit end-to-end video pipeline

Broad codec support AVC, VP9, HEVC, and AV1



YouTube

"At YouTube we're always looking for new technologies to give our users the best experience. This is a great win for our users because it can mean faster video load times, less network usage, and better-looking video."

Ritz Campbell, Product Manager at YouTube

Delivering 2x Encode Performance Over Competition

Intel® Core™ i7-1185G7 vs AMD Ryzen 7 4800U. For more complete information about performance and benchmark results, visit www.intel.com/11thgen.

intel

Horsepower to Game and Stream

Intel® Iris® Xe Graphics

Counter-Strike: Global Offensive (Streaming)

AMD Ryzen 7 4800U

Intel® Core™ i7-1185G7

For more complete information about performance and benchmark results, visit www.intel.com/11thgen.

Game + Stream

Best for Gaming

11th Gen Intel® Core™ i7 Processors with Iris® Xᵉ Graphics Wins

INDUSTRY BENCHMARK

3DMark Fire Strike (Graphics score) **1.67X** HIGHER

LEADING APPLICATION TASKS

Witcher 3 Medium setting	**1.82X** BETTER
Gears Tactics Medium setting	**1.76X** BETTER
Apex Legends High setting	**1.46X** BETTER
League of Legends Medium setting	**1.40X** BETTER

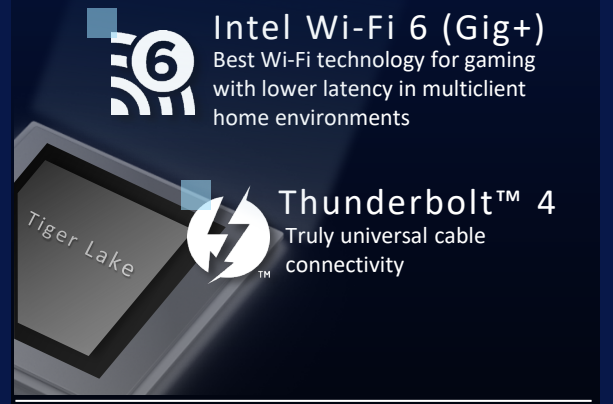
COMPELLING USER WORKFLOWS

Game Streaming **>2X** Higher FPS

Game & stream at 1080p

UNIQUE FEATURES

Variable Rate Shading **1.3X** Higher FPS



Intel Wi-Fi 6 (Gig+)
Best Wi-Fi technology for gaming with lower latency in multiclient home environments

Thunderbolt™ 4
Truly universal cable connectivity

Delivering the Best Gaming Performance on the Most Played Games for Thin & Light

Intel® Core™ i7-1185G7 vs. AMD Ryzen 7 4800U

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

intel

Best for Entertainment

11th Gen Intel® Core™ i7 Processors with Iris® Xᵉ Graphics Wins

Modern Standby

AV1
Maintain 1080p in lower bandwidth environments

Dolby Vision
1st integration for PC with HW acceleration

Thunderbolt™ 4

Intel Wi-Fi 6 (Gig+)

YouTube

iQIYI 爱奇艺

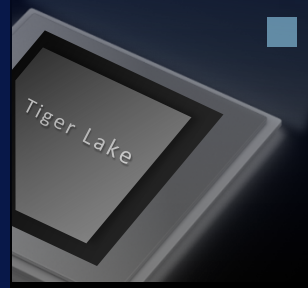
alexa

Wake-on-voice & interact with PC

Rich audio and immersive visuals

Longer battery life, longer viewing time

Best-in-class wireless and wired connectivity



UNIQUE FEATURES + INDUSTRY LEADING APPLICATIONS + COMPELLING USER BENEFITS

Intel® Core™ i7-1185G7 vs. AMD Ryzen 7 4800U

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 4).

intel

Blueprint Series:
11th Gen Intel® Core™ Processor

Ryan Shrout
Intel Chief Performance Strategist
Senior Director of Client Technical Marketing

11th Gen Intel® Core™ Processors

PROCESSOR NUMBER	CORES/ THREADS	GRAPHICS (EUs)	CACHE (MB)	OPERATING RANGE (W)	BASE CLOCK SPEED (GHZ)	MAXIMUM SINGLE CORE TURBO FREQ (GHZ)	MAXIMUM ALL CORE TURBO FREQ (GHZ)	GRAPHICS MAX FREQ (GHZ)	MEMORY SUPPORT
i7-1185G7	4C/8T	96	12	12-28	3.0	4.8	4.3	1.35	DDR4-3200 LPDDR4x-4266
i7-1165G7	4C/8T	96	12	12-28	2.8	4.7	4.1	1.3	"
i5-1135G7	4C/8T	80	8	12-28	2.4	4.2	3.8	1.3	"
i3-1125G4*	4C/8T	48	8	12-28	2.0	3.7	3.3	1.25	DDR4-3200 LPDDR4x-3733
i3-1115G4	2C/4T	48	6	12-28	3.0	4.1	4.1	1.25	DDR4-3200 LPDDR4x-3733
i7-1160G7	4C/8T	96	12	7-15	1.2	4.4	3.6	1.1	LPDDR4x-4266
i5-1130G7	4C/8T	80	8	7-15	1.1	4.0	3.4	1.1	"
i3-1120G4*	4C/8T	48	8	7-15	1.1	3.5	3.0	1.1	"
i3-1110G4	2C/4T	48	6	7-15	1.8	3.9	3.9	1.1	"

* Available 2021

intel

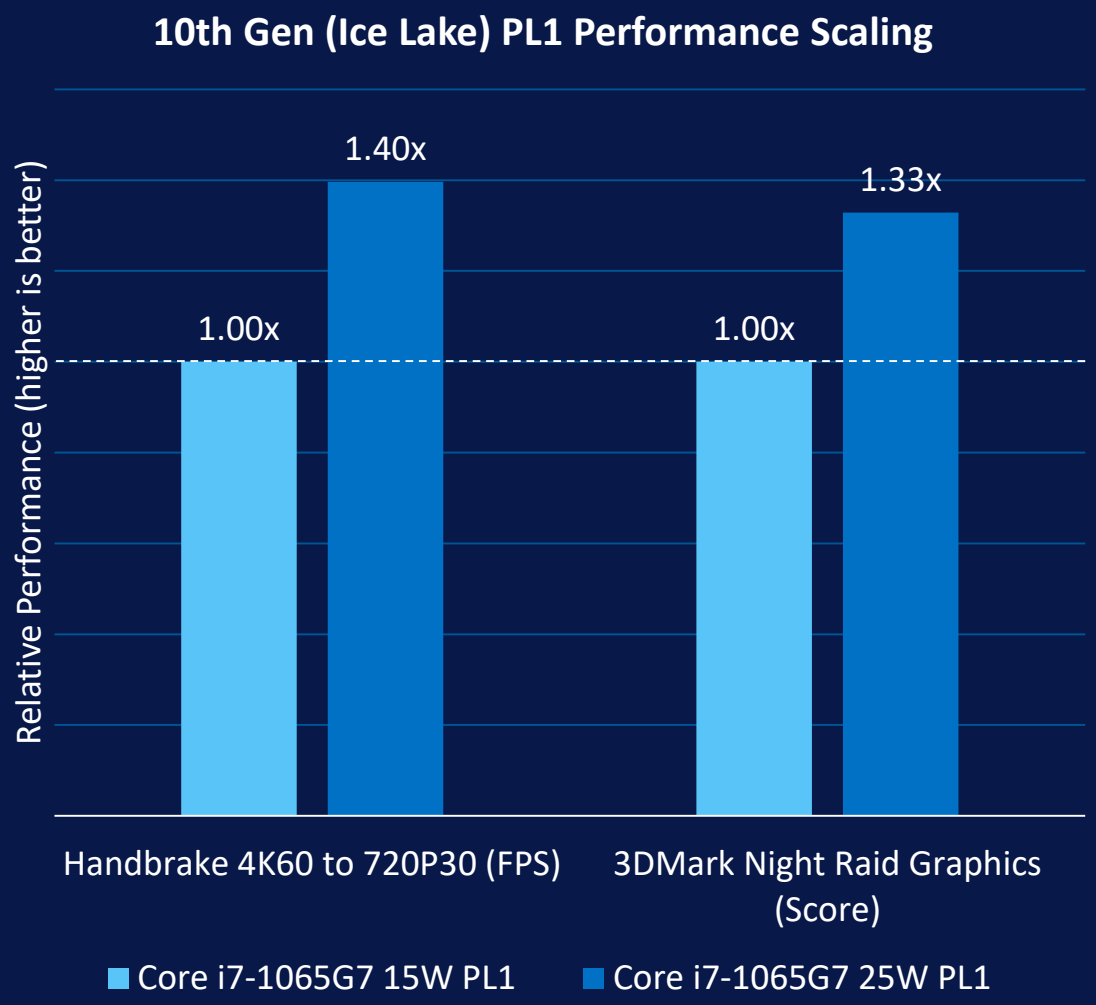
11th Gen Intel® Core™ Processors

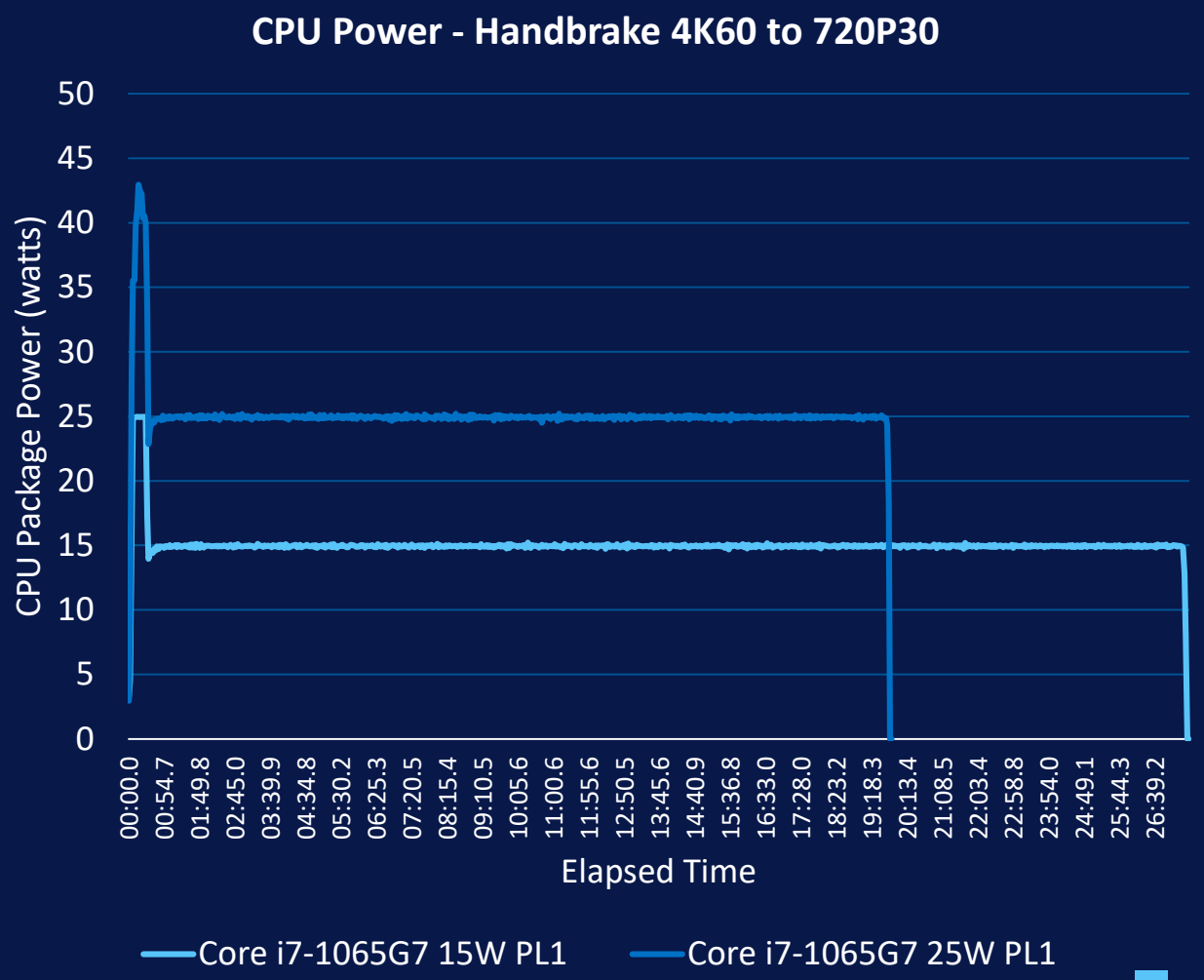
PROCESSOR NUMBER	CORES/ THREADS	GRAPHICS (EUs)	CACHE (MB)	OPERATING RANGE (W)	BASE CLOCK SPEED (GHZ)	MAXIMUM SINGLE CORE TURBO FREQ (GHZ)	MAXIMUM ALL CORE TURBO FREQ (GHZ)	GRAPHICS MAX FREQ (GHZ)	MEMORY SUPPORT
i7-1185G7	4C/8T	96	12	12-28	3.0	4.8	4.3	1.35	DDR4-3200 LPDDR4x-4266
i7-1165G7	4C/8T	96	12	12-28	2.8	4.7	4.1	1.3	"
i5-1135G7	4C/8T	80	8	12-28	2.4	4.2	3.8	1.3	"
i3-1125G4*	4C/8T	48	8	12-28	2.0	3.7	3.3	1.25	DDR4-3200 LPDDR4x-3733
i3-1115G4	2C/4T	48	6	12-28	3.0	4.1	4.1	1.25	DDR4-3200 LPDDR4x-3733
i7-1160G7	4C/8T	96	12	7-15	1.2	4.4	3.6	1.1	LPDDR4x-4266
i5-1130G7	4C/8T	80	8	7-15	1.1	4.0	3.4	1.1	"
i3-1120G4*	4C/8T	48	8	7-15	1.1	3.5	3.0	1.1	"
i3-1110G4	2C/4T	48	6	7-15	1.8	3.9	3.9	1.1	"

* Available 2021

intel

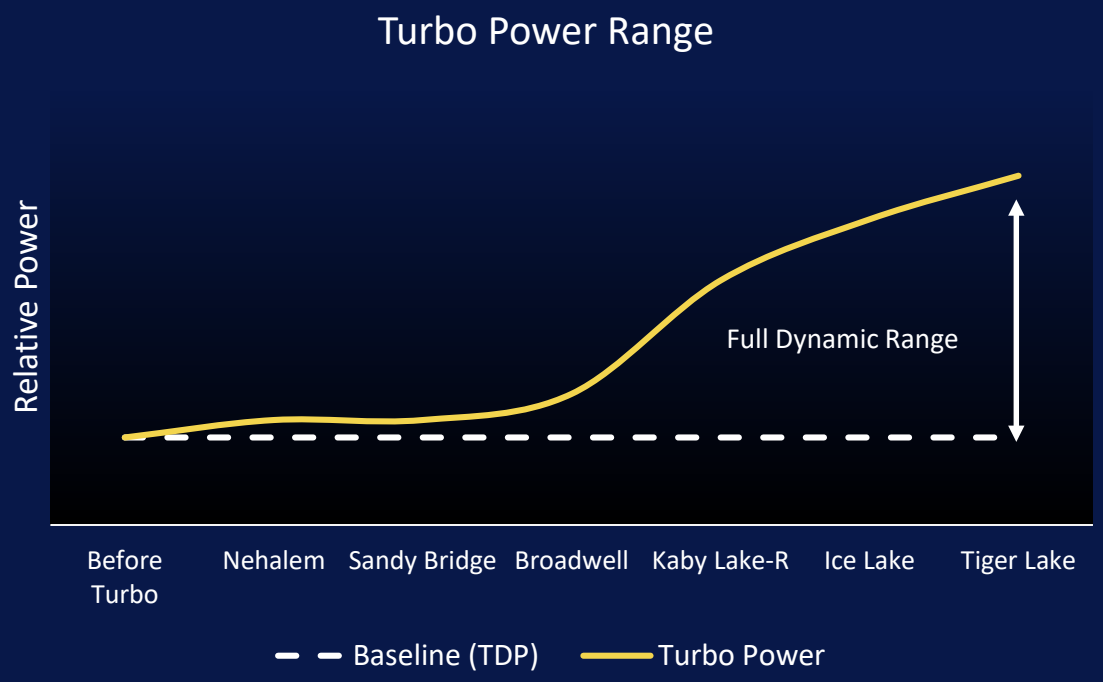
Scalability – 10th Gen Intel® Core™ Processor





For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

Intel Turbo Technology and System Design

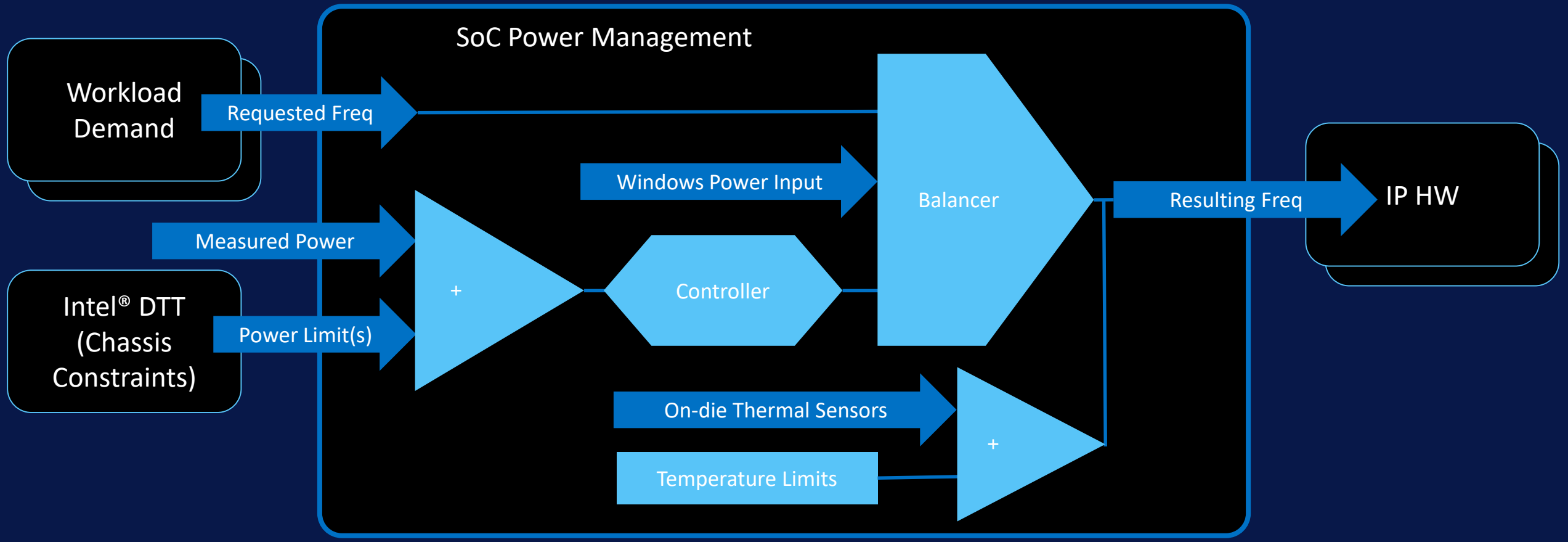


- Intel® Turbo Boost Technology capability has greatly expanded since its introduction
- Systems are no longer designed to a static power level
- The SoC operates dynamically anywhere within the full range

Systems Maximize Performance by Tuning the SoC Power Controls to the Physical Characteristics of the System Design

What Determines System Performance?

Hint: It's not TDP



Intelligent Performance That Scales

A Performance Leap for 12” Ultra-Thin Fanless to 15” Thin Gaming & Creation

Relative Performance

Premium, Ultra-thin, Incl. Fanless, 12-13”

Amazing fanless productivity

Premium, Fanned, Ultra-thin 14-15”

Premium, fanned, thin & light designs. Segment served by UP4 and UP3, which have similar performance at ISO PL1

Thin Gaming, Thin Creator 14-15”

Unleash full performance of 11th Gen & Iris® Xe Graphics for creation & 1080p gaming usages in thin laptops

UP3: Type 3 Package, 12-28W

UP4: Type 4 (SFF) Package, 7-15W

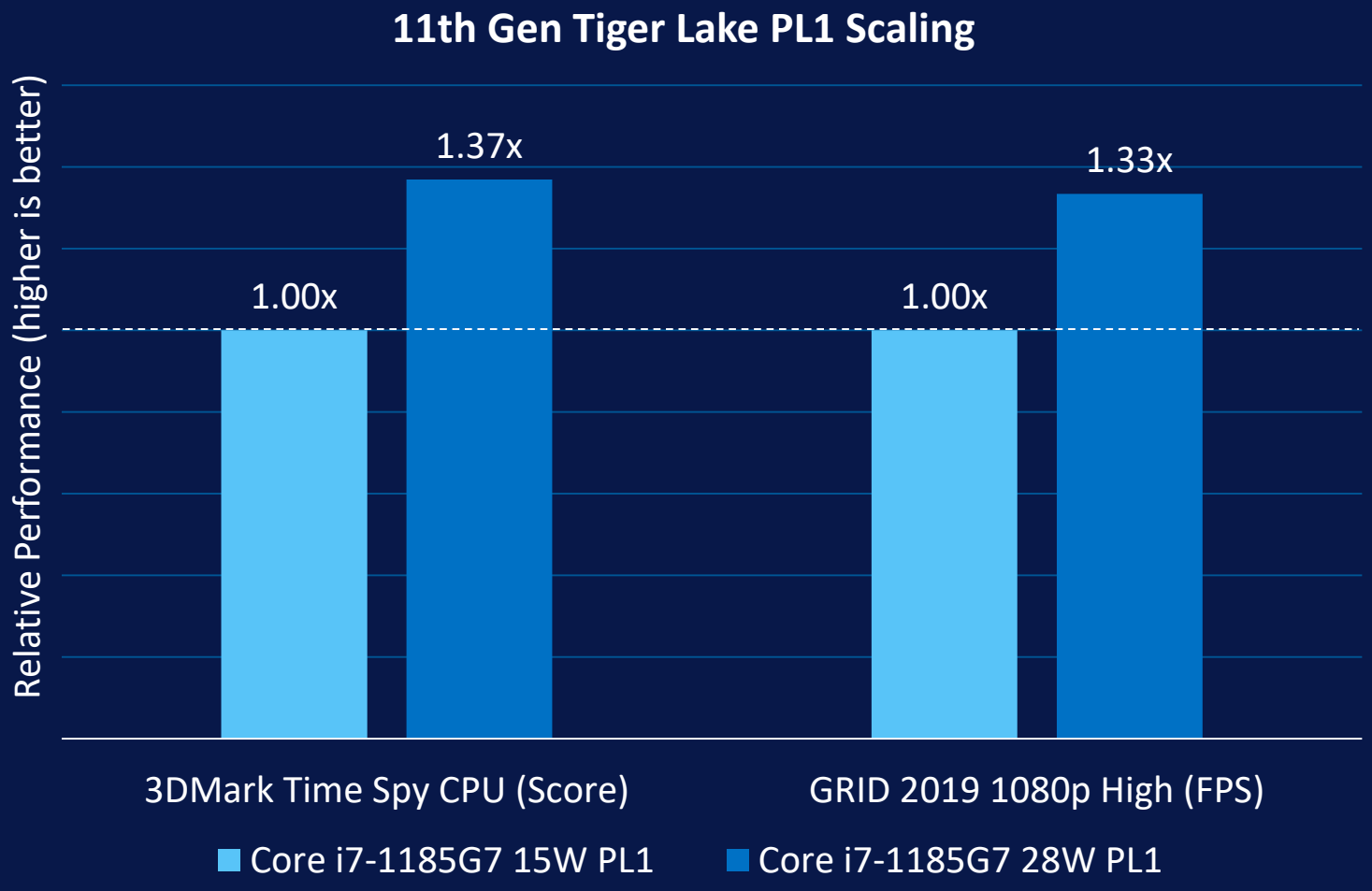
5 7 10 15 20 25 28

Operating Range/cTDP (Watts)

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

intel

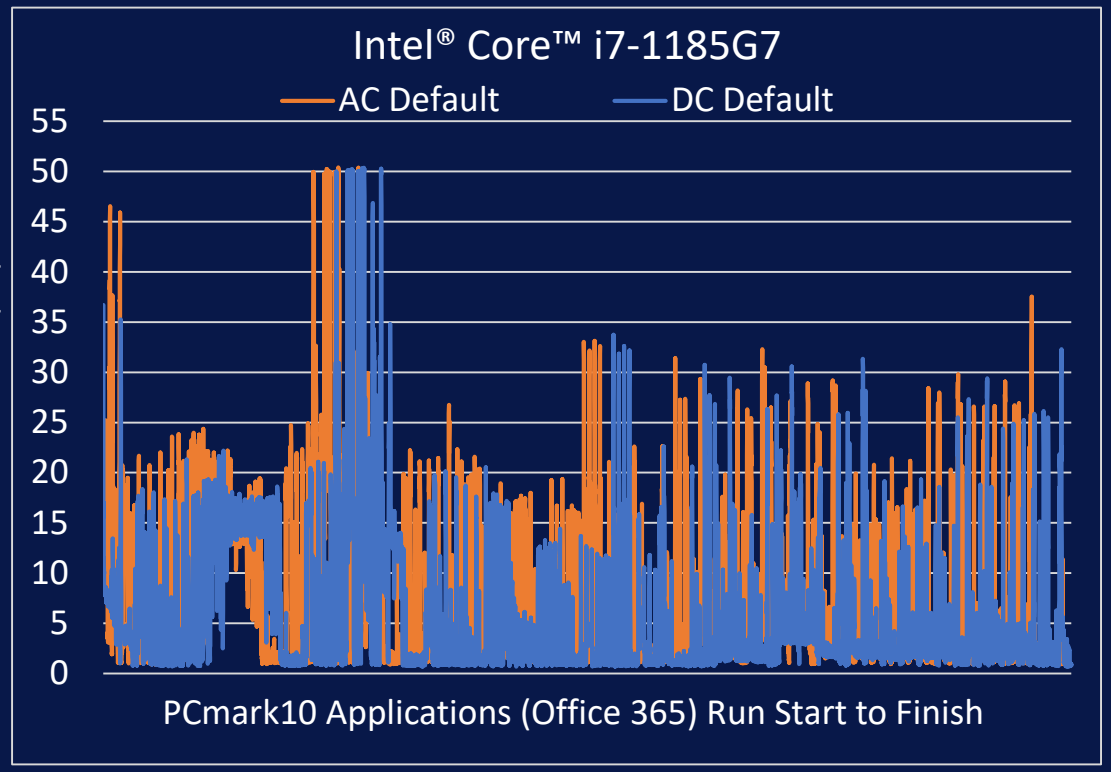
Scalability – 11th Gen Intel® Core™ Processor



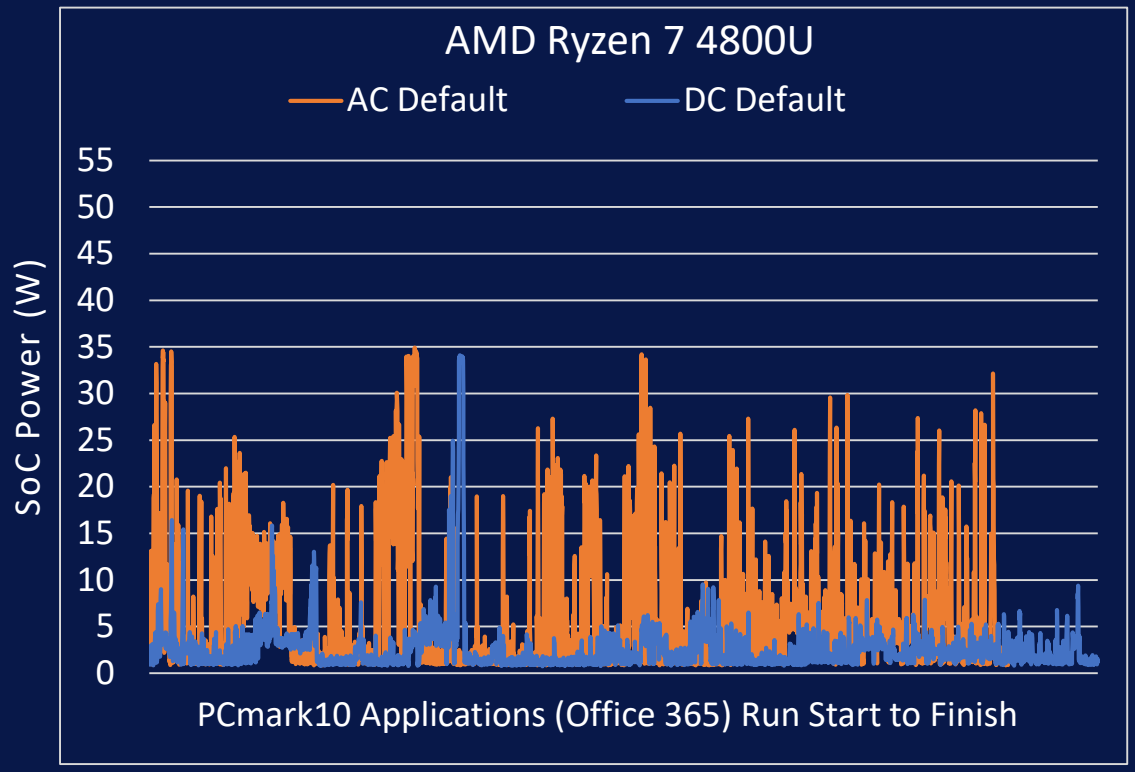
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

Performance on AC and DC

~5% Performance delta on AC vs DC



~38% Performance delta on AC vs DC



Mobile PC Customers Expect
Responsiveness and Performance on Battery

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

Intelligent Performance On Windows

Representative Benchmarks

	vs ICL	vs AMD
SYSmark 25	1.24x	1.28x
3DMark Fire Strike	1.87x	1.67x
MLPerf	5x	4x

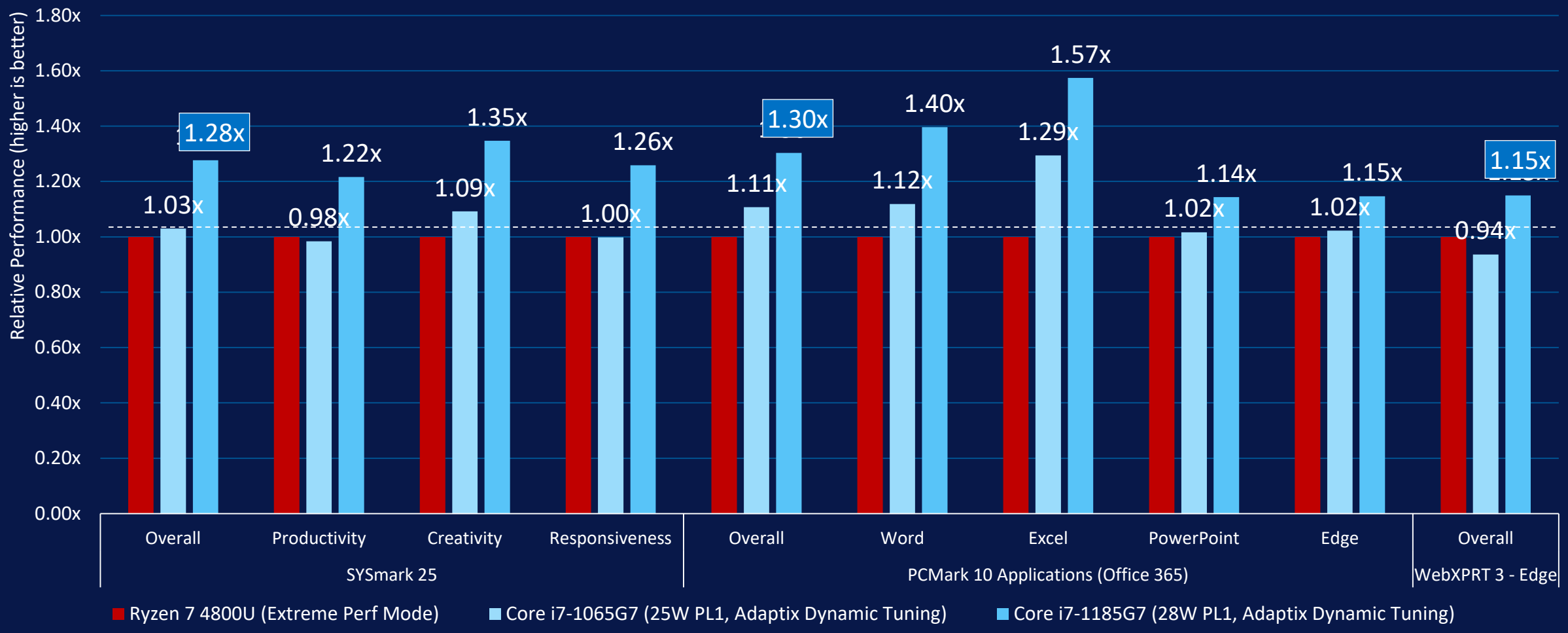
Representative Usage Guides

Real-world Performance, Accelerated by AI

Intel® Core™ i7-1185G7 vs Intel® Core™ i7-1065G7 and AMD Ryzen 7 4800U. In thin & light devices, as measured by industry benchmarks and Representative Usage Guides testing.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

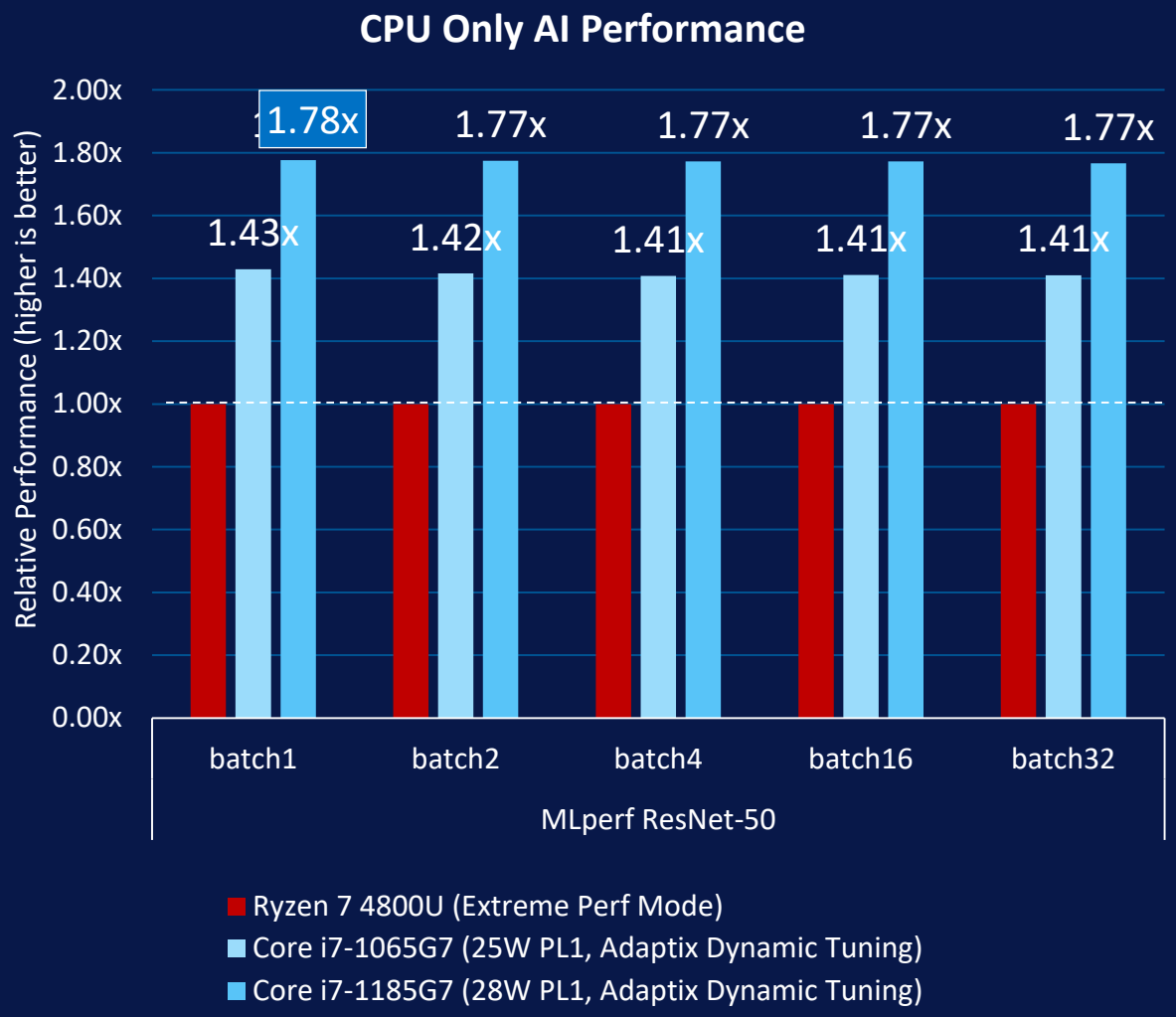
intel

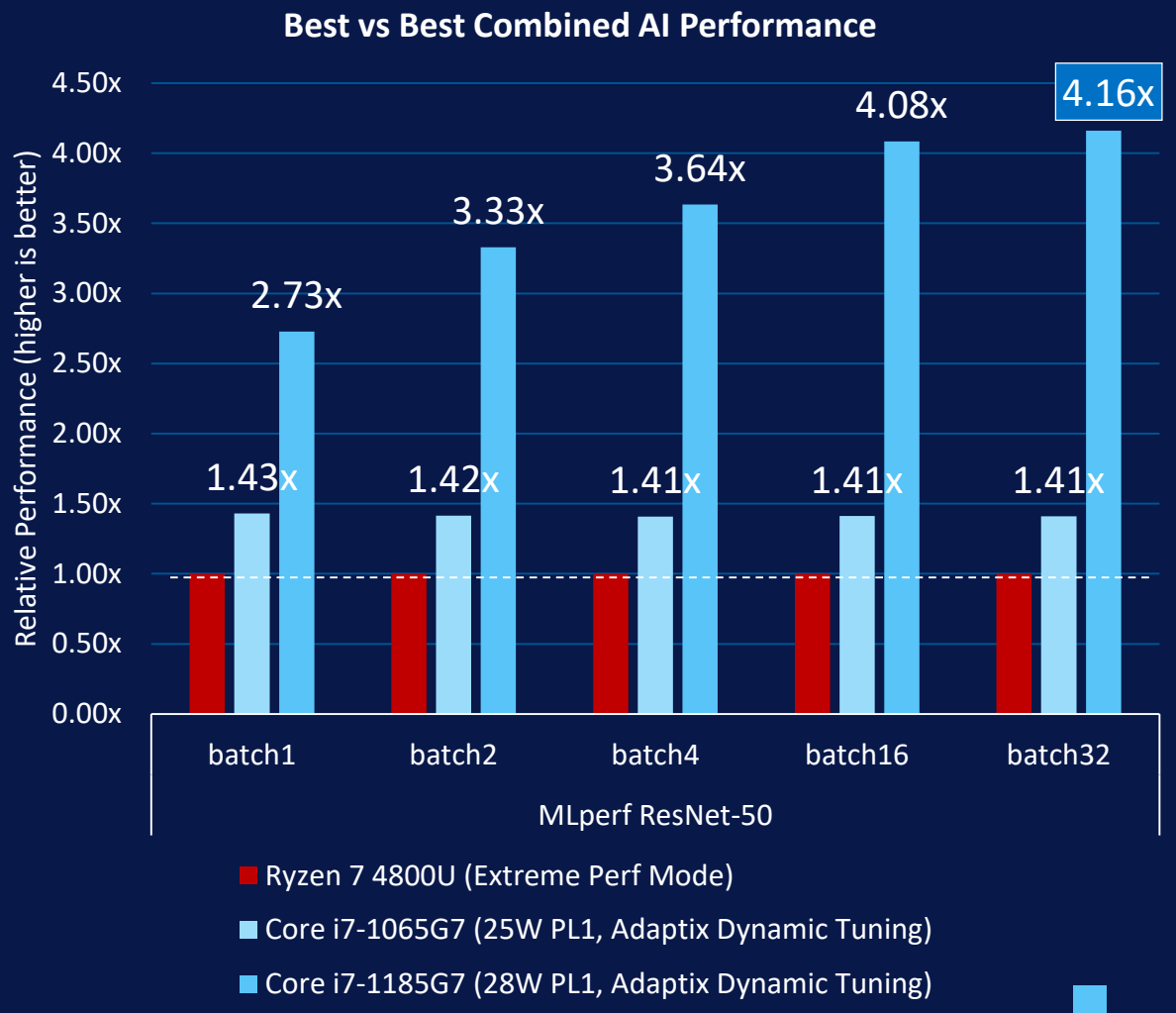
Benchmarks: Productivity Performance



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

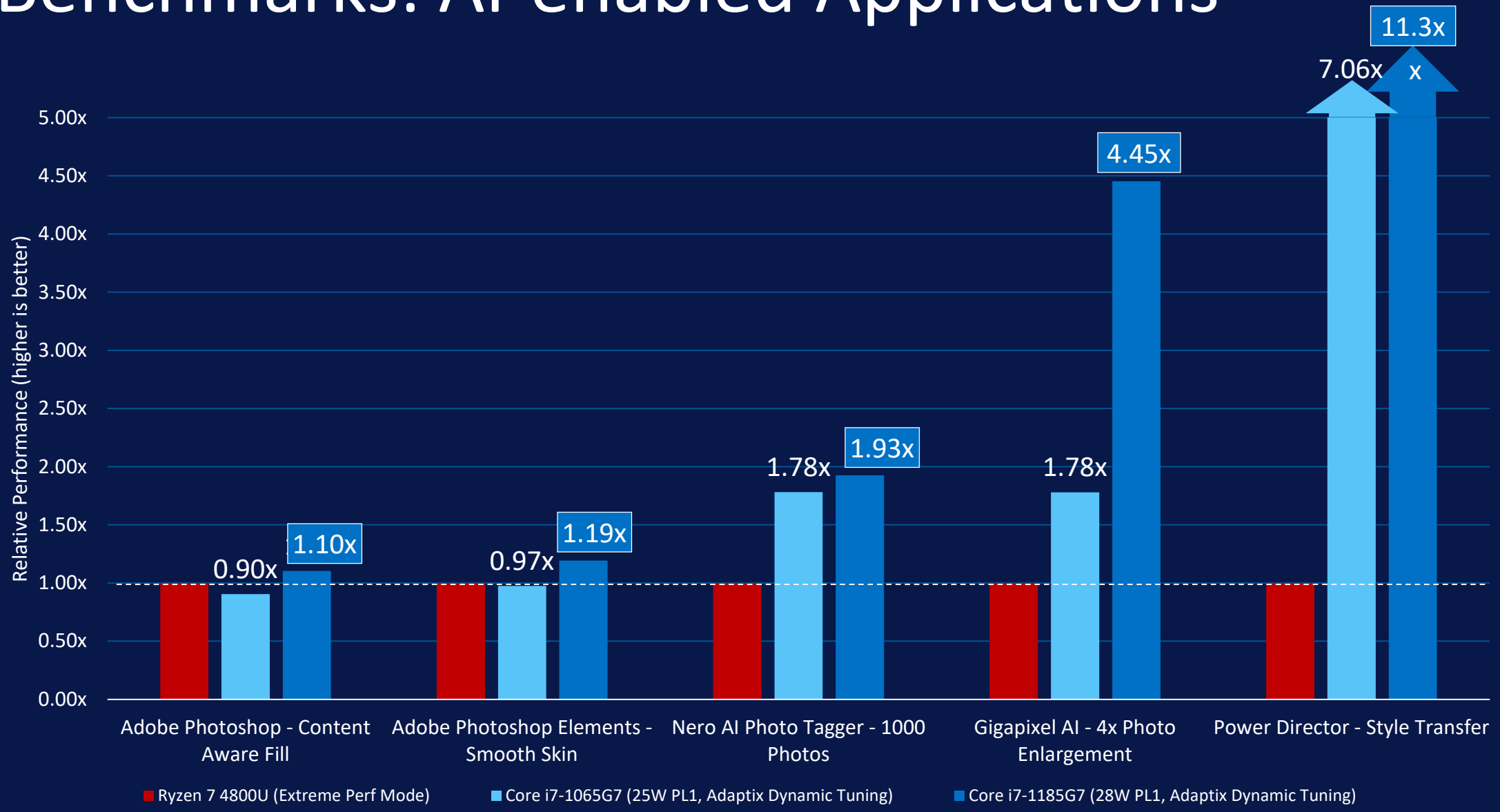
Benchmarks: AI Performance





For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

Benchmarks: AI-enabled Applications



For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

Real World Performance History

Real World... Not Really

Desktop users in the segment do...

Office applications

Games (Steam + CS, LoL, OW, GTA V)

Media consumption (VLC)

Light content creation (Photoshop, Illustrator, Premiere, After Effects)

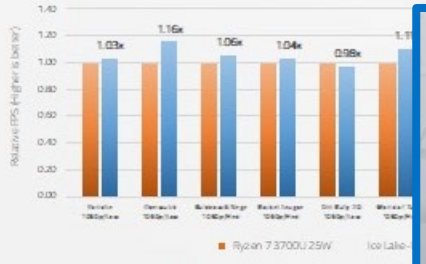
Game streaming (OBS)

Intel is offering help to OEMs and press

Rank	Application	Popularity
4	Chrome	63.005%
15	Word	40.512%
17	Steam	37.971%
18	WinRAR	37.169%
21	Excel	33.391%
33	Powerpoint	21.775%

Source: Intel Product Improvement Program Q2 2019: 1,852,283 systems

Ryzen 7 3700U (25W) vs Ice Lake-U (25W) Graphics Comparison



WHAT IS REAL WORLD PERFORMANCE?

Performance Where it Matter

Investments in Performance

Computing Without Compro

DEMO TIME!

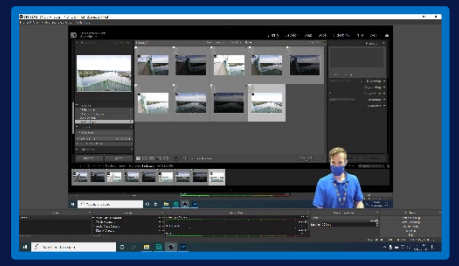
Gaming
WoT RT

AI Workloads
Topaz

Content Creation
Premiere HEVC Timeline

Lifestyle Streaming

Intelligent Performance: Lifestyle Streaming

Stream	Content	Post Social
Record/Background Removal	HDR Panoramic Merge	Content Aware fill
		
1.79X	1.09X	1.42X

1.62X
Faster While Streaming

vs AMD 4800U

Compute Engines	OBS - Xᵉ/ QSV VCam - CPU / VNNI (INT8)	CPU / AVX2	CPU / AVX2

OBS 4K/60fps Streaming
Optimized for Quick Sync Video and VDenc on Iris® Xᵉ Graphics & provides a smooth experience for both streamer and viewer

Lightroom Preview
AVX2 Acceleration on 11th Gen Intel® Core™ processor

Panoramic Merge
One click pano merge made faster with AVX2 acceleration

Content Aware Fill
Optimized with Adobe Sensei and accelerated with AVX2

For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

Intelligent Performance On Windows

Representative Benchmarks

+

Representative Usage Guides

	vs ICL	vs AMD
Productivity	1.32x	1.24x
Game/Stream	1.77x	2.46x
Lifestyle Streaming	1.48x	1.62x
Photo Creation	1.59x	2.73x
Video Creation	1.49x	2x

Real-world Performance, Accelerated by AI

Intel® Core™ i7-1185G7 vs Intel® Core™ i7-1065G7 and AMD Ryzen 7 4800U. In thin & light devices, as measured by industry benchmarks and Representative Usage Guides testing.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

intel

Intelligent Performance On Windows

Representative Benchmarks

	vs ICL	vs AMD
SYSmark 25	1.24x	1.28x
3DMark Fire Strike	1.87x	1.67x
MLPerf	5x	4x

Representative Usage Guides

	vs ICL	vs AMD
Productivity	1.32x	1.24x
Game/Stream	1.77x	2.46x
Lifestyle Streaming	1.48x	1.62x
Photo Creation	1.59x	2.73x
Video Creation	1.49x	2x

Real-world Performance, Accelerated by AI

Intel® Core™ i7-1185G7 vs Intel® Core™ i7-1065G7 and AMD Ryzen 7 4800U. In thin & light devices, as measured by industry benchmarks and Representative Usage Guides testing.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 5).

11th Gen Intel® Core™ Processor
with Intel® Iris® Xe Graphics

- New CPU architecture
- New Intel® Iris® Xe graphics
- New AI capabilities
- New Media and Display Engine
- New HW-hardened security
- New Integrated Thunderbolt™ 4
- New PCIe Gen 4 Interface
- Integrated Intel® Wi-Fi 6 (Gig+)
- Scalable Performance: 7W-28W

- 1st Windows-enabled HW support for AV1
- 1st Support 1 8K 12b HDR / 4 4K HDR displays
- 1st AI Instructions for integrated graphics (DP4a)
- 1st Native support for INT8 AI data type
- 1st Mainstream CPU-attached PCIe Gen 4
- 1st SoC with CET HW-hardened security
- 1st GNA 2.0 for Neural Noise Cancellation
- 1st HW-accelerated Dolby Vision
- 1st USB and BT Audio off-load

intel

World's Best Processor

Breaking the Boundaries of Performance

Best for Productivity	Best for Creation	Best for Gaming	Best for Entertainment		Best for Collaboration	
Make Your Best Contribution Anywhere	Take Your Imagination Further	More Gaming In More Places	The World Is Your Living Room		The Ultimate Device For Connecting & Collaborating	
1.2B Users	**12M** Users	**1.2B** PC Gamers	**105M** Users	**2B** Users	**100M** Devices	**75M** Daily Users
Office	Ai Ae Lr Pr Ps	GRID, CS GO, FORTNITE, GEARS TACTICS, PLAYERUNKNOWN'S BATTLEGROUNDS	iQIYI	YouTube	alexa	Teams

As measured by

INDUSTRY BENCHMARKS + LEADING APPLICATION TASKS + COMPELLING USER WORKFLOWS + UNIQUE FEATURES

In thin & light devices, as measured by industry benchmarks, Representative Usage Guide testing, and unique features, including in comparison to AMD Ryzen 7 4800U.
For more complete information about performance and benchmark results, visit www.intel.com/11thgen (configuration details in section 1).

intel

New 11th Gen Intel® Core™ Processors and Intel® Evo™ Platform

Coming Next

- Intel® Pentium™ and Celeron™ Processors
- Intel® DG1 discrete graphics
- 11th Gen Intel® Core™ vPro™ Platform

For more information visit:

newsroom.intel.com/11thGenLaunch

intel.com/11thgen

Notices & Disclaimers

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors.

Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit www.intel.com/benchmarks.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. For testing details and system configurations, please contact your intel representative or visit www. Intel.com/11thgen.

Results that are based on pre-production systems and components as well as results that have been estimated or simulated using an Intel Reference Platform (an internal example new system), internal Intel analysis or architecture simulation or modeling are provided to you for informational purposes only. Results may vary based on future changes to any systems, components, specifications or configurations.

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice.

Intel contributes to the development of benchmarks by participating in, sponsoring, and/or contributing technical support to various benchmarking groups, including the BenchmarkXPRT Development Community administered by Principled Technologies.

All product plans and roadmaps are subject to change without notice.

Statements in this document 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.

No product or component can be absolutely secure. Intel technologies may require enabled hardware, software or service activation. Your costs and results may vary.

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.


intel