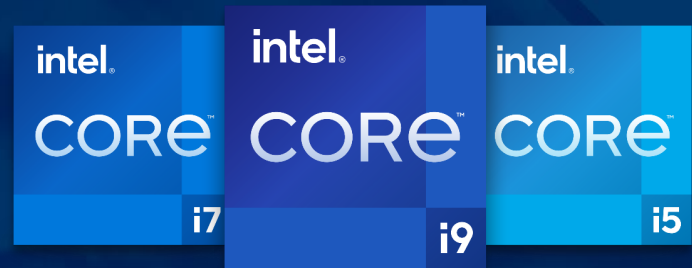


# New Intel® Xeon® W & 13<sup>th</sup> Gen Intel® Core™ Processors for Workstations

Intel Partner Alliance Webinar | Q1 2023



# Agenda

- Review: Key dates and workstation offerings
- 13<sup>th</sup> Gen Intel® Core™ Processors
  - Workstations configuration recommendation
  - General transition guidance
- Intel® Xeon® W Processors
  - New & Key Features
  - New Branding
  - Box, Tray, and Carrier Information
- Closing
  - Sales Enablement Resources
  - Q&A

# A Brand-New Workstation Stack

February 15<sup>th</sup>

Launch of Intel® Xeon® W-3400 & Intel® Xeon® W-2400 Processors

Product Introduction:  
1-Socket WS: Intel Xeon W-2400, Intel Xeon W-3400  
2-Socket WS: 4<sup>th</sup> Gen Xeon Scalable

Begin Pre-orders



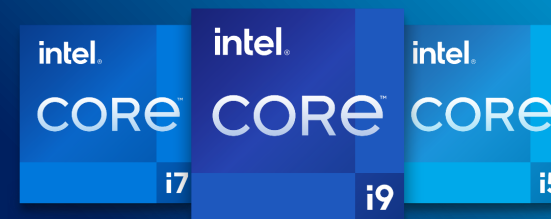
Sales Embargo:  
Intel Xeon W-2400 & 4<sup>th</sup> Gen Intel Xeon Scalable  
March 8, 2023, at 6:00am PT

Intel Xeon W-3400  
April 19, 2023, at 6:00am PT

March 23<sup>rd</sup>

Launch of 13<sup>th</sup> Gen Intel® Core™ processor-based Workstations

Product Introduction:  
13<sup>th</sup> Gen Intel Core Processors  
(S/HX/H/P/U-series) Commercial, Mobile  
& Stationary Workstation



Please refer to the Intel Launch Update (ILU) for the latest and most up to date information on Intel product launch information.

# Workstation Verticals & Definitions

Workstations are client computers specifically designed and configured to meet power users' technical computing requirements, such as high performance, data integrity, ISV certifications, and manageability.



## Expert WS

4<sup>th</sup> Gen Intel® Xeon® Scalable Processors  
Intel® Xeon® W-3400 Processors

Highest level of workstation performance and scalability for complex designs, simulations, 8K video editing, and running AI workloads in expandable tower form factors.



## Mainstream WS

Intel® Xeon® W-2400 Processors

Optimal workstation performance for VFX, 3D rendering, complex 3D CAD, and AI development & edge deployments in configurable tower form factors.



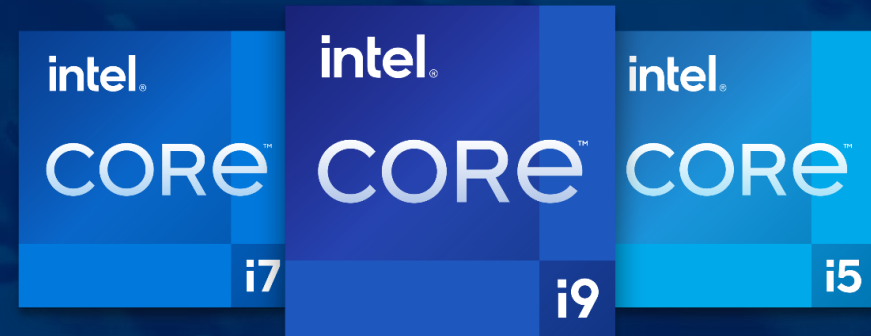
## Entry & Mobile WS

Intel vPro® Eligible  
13<sup>th</sup> Gen Intel® Core™ Processors

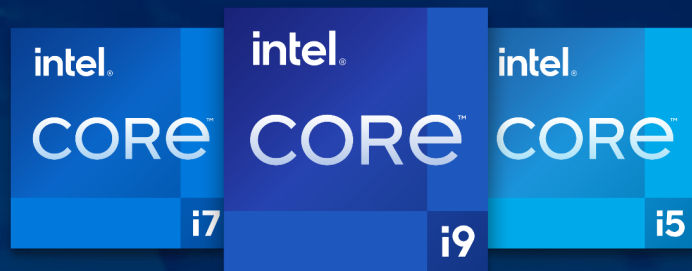
Professional workstation performance for 2D/3D CAD, BIM, ECC memory, and VR content development in tower, AIO, or small form-factor designs.<sup>14</sup>

<sup>14</sup> See notices & disclaimers for details.

# 13<sup>th</sup> Gen Intel<sup>®</sup> Core<sup>™</sup> Processors for Workstations



# 13th Gen Intel® Core™ Processors



The Next Generation  
of Breakthrough Core Performance  
for Workstation Users

## NEXT-LEVEL PERFORMANCE

- **INCREASED** Processor core count – up to 24 (8P+16E) processor cores with up to 32 threads
- **IMPROVED** P-core performance
- **INCREASED** Intel® Smart Cache (L3) and L2 cache on Intel® Core™ i5 Desktop processors and above
- **EXTENDED** Performance hybrid architecture<sup>1</sup> to all Intel® Core™ i5 desktop processors and above
- Intel® Thread Director<sup>2</sup>, Intel® Thermal Velocity Boost, Intel® Turbo Boost Max Technology 3.0

## POWERFUL PLATFORM FEATURES

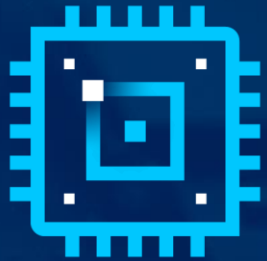
- **INDUSTRY LEADING** support for CPU PCIe 5.0, up to 16 lanes
- **LATEST** DDR5 memory support with Error Correction Code (ECC) memory for workstation. Continued DDR4 memory support.
- Discrete Intel® Thunderbolt 4 technology<sup>3</sup> support
- Compatible with Intel® 600 and 700 series chipset-based motherboards
  - Note: Entry Workstation will continue to use the Intel® W680 Chipset

## IMMERSIVE SYSTEM EXPERIENCES

- Integrated Wi-Fi 6E<sup>4</sup> supporting Intel® Double Connect Technology
- Intel® UHD Graphics driven by Xe<sup>e</sup> architecture<sup>5</sup> supporting up to 4 simultaneous displays configured as DisplayPort 1.4a or HDMI 2.1

For numbered references, see [notices and disclaimers](#) for details.  
See source and performance disclaimers and appendix for workloads and configurations. Results may vary.  
Not available on certain 13th Gen Intel® Core™ processors.  
Performance hybrid architecture on select SKUs only; requires OS enablement.

# 13<sup>th</sup> Gen Intel<sup>®</sup> Core<sup>™</sup> Processors for Workstations



Intel vPro<sup>®</sup> Eligible 13th Gen Intel<sup>®</sup> Core<sup>™</sup> Processor<sup>1</sup>

13th Gen Intel<sup>®</sup> Core<sup>™</sup> i9 Processor

13th Gen Intel<sup>®</sup> Core<sup>™</sup> i7 Processor

13th Gen Intel<sup>®</sup> Core<sup>™</sup> i5 Processor

Intel<sup>®</sup> W680 Chipset Based Motherboard

Supports ECC Memory & Intel vPro<sup>®</sup> Technologies

▪ DDR5 ECC Memory<sup>2</sup>

Entry workstations provide professional-grade performance, data integrity, ISV certifications, security, and manageability for demanding workloads and applications.

1. OEMs must enable Intel vPro<sup>®</sup> platform and be Intel vPro<sup>®</sup> platform certified. Not all Intel<sup>®</sup> Core<sup>™</sup> processor-based systems are Intel vPro<sup>®</sup> platform certified.
2. Available on select CPU SKUs when paired with the W680 PCH. ECC routing supported in 4L for all DDR4 and DDR5 configurations.

## Previous Gen to Latest Gen Guidance

# 13<sup>th</sup> Gen Intel® Core™ Processors for Workstations



N-2	Previous generation	Latest generation
 <b>W-1390P</b> <b>W-1390</b> Up to 8 cores 16 MB cache 125W and 80W	 <b>i9-12900K</b> Up to 16 (8+8) cores 30 MB Intel® Smart Cache 125W	 <b>i9-13900K</b> Up to 24 (8+16) cores 36 MB Intel® Smart Cache 125W
 <b>W-1370P</b> <b>W-1370</b> Up to 8 cores 16 MB cache 125W and 80W	 <b>i7-12700K</b> Up to 12 (8+4) cores 25 MB Intel® Smart Cache 125W	 <b>i7-13700K</b> Up to 16 (8+8) cores 30 MB Intel® Smart Cache 125W
 <b>W-1350P</b> <b>W-1350</b> Up to 6 cores 12 MB cache 125W and 80W	 <b>i5-12500K</b> Up to 10 (6+4) cores 18 MB Intel® Smart Cache 125W	 <b>i5-13500K</b> Up to 14 (6+8) cores 24 MB Intel® Smart Cache 125W

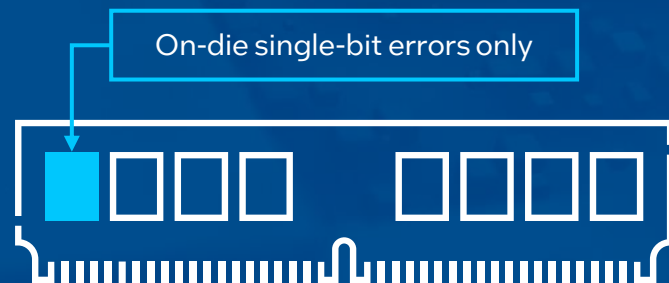


# On-Die Data Checking Versus Traditional ECC

## On-Die Data Checking

On-die single-bit error detection & correction is not a substitute for a full-system data integrity protections.

### DDR5 UDIMM Memory

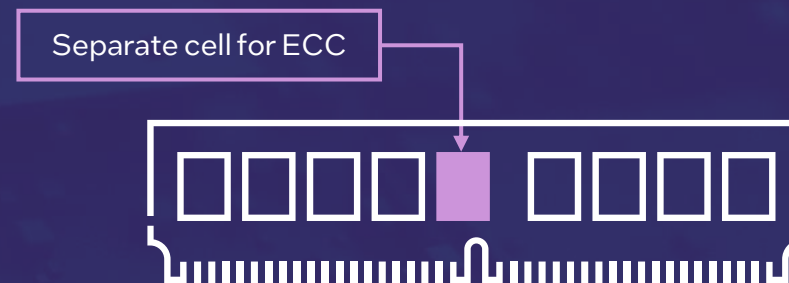


Intel Recommends DDR5 ECC Memory for Workstations

## Traditional ECC

A separate DRAM cell for double-bit error detection & correction, enabling out-of-band system-level (CPU, Memory control, DIMM) data integrity. (SECDED)

### DDR5 ECC UDIMM Memory



# 13<sup>th</sup> Gen Intel® Core™ Processors That Support ECC Memory

Processor Number	Processor Cores (P+E) <sup>1</sup>	Processor Threads <sup>2</sup>	Intel® Smart Cache (L3)	Total L2 Cache	Processor Turbo Frequency				Processor Base Frequency		Unlocked <sup>4</sup>	Processor Graphics	CPU PCIe Lanes	Maximum Memory Speed (MT/s) <sup>5</sup>	Memory Channels	Maximum Memory Capacity <sup>5</sup>	Processor Base Power (W)	Maximum Turbo Power (W)	Reliability, Availability & Serviceability <sup>6</sup>	Intel® SIPP <sup>7</sup>	Intel Technologies	
					Intel® Thermal Velocity Boost Frequency (GHz) <sup>2</sup>	Intel® Turbo Boost Max Technology 3.0 Frequency (GHz) <sup>2</sup>	P-core Max Turbo Frequency (GHz) <sup>3</sup>	E-core Max Turbo Frequency (GHz) <sup>3</sup>	P-core Base Frequency (GHz) <sup>3</sup>	E-core Base Frequency (GHz) <sup>3</sup>											Intel vPro <sup>®6,8</sup>	Intel® ISM <sup>6</sup>
Socket LGA1700 – Performance																						
i9-13900K	24 (8+16)	32	36MB	32MB	Up to 5.8	Up to 5.7	Up to 5.4	Up to 4.3	3.0	2.2	√	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	2	128GB	125	253	ECC	√	√	√
i7-13700K	16 (8+8)	24	30MB	24MB	n/a	Up to 5.4	Up to 5.3	Up to 4.2	3.4	2.5	√	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	2	128GB	125	253	ECC	√	√	√
i5-13600K	14 (6+8)	20	24MB	20MB	n/a	n/a	Up to 5.1	Up to 3.9	3.5	2.6	√	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	2	128GB	125	181	ECC	√	√	√

Intel® processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. All processors are lead-free (per EU RoHS directive July 2006) and halogen free (residual amounts of halogens are below November 2007 proposed IPC/JEDEC J-STD-709 standards). All processors support Intel® Virtualization Technology (Intel® VT-x).

1. Processor cores listed first are the total number of cores in the processor. The number of Performance-cores and the number of Efficient-cores are listed in parentheses (P+E).
2. Intel® Hyper-Threading Technology, Intel® Turbo Boost Max Technology 3.0, and Intel® Thermal Velocity Boost are only available on Performance-cores.
3. Efficient-core frequencies are lower to optimize power usage. The frequency of cores and core types varies by workload, power consumption, and other factors. Visit [www.intel.com/technology/turboboost](http://www.intel.com/technology/turboboost) for more information.
4. Unlocked features for overclocking are present when paired with the eligible Intel® 600/700 Series chipset SKU. See altering clock frequency or voltage disclaimer on slide 2.
5. Maximum memory speeds are associated with 1 DIMM per Channel (1DPC) configurations. Additional DIMM loading on any channel may impact maximum memory speed. Up to DDR5-5600 MT/s 1DPC UDIMM 1Rx8, 1Rx16 and DDR5-5200 1Rx8, 1Rx16, 2Rx8 on select SKUs. Maximum memory capacity is achievable with 2DPC configurations. For additional 2DPC configuration details, refer to the Raptor Lake Processor External Design Specification (EDS), [Doc ID 640555](#).
6. When paired with the eligible Intel® 600 Series chipset SKU (an eligible Intel® 700 Series chipset SKU will not be available), a motherboard with supporting hardware and software, and potential service activation.
7. Eligible for Intel® Stable IT Platform Program (Intel® SIPP) starting with Raptor Lake-S Commercial platform availability.
8. Intel vPro® Enterprise with Intel® Active Management Technology (Intel® AMT) or Intel vPro® Essentials with Intel® Standard Manageability (Intel® ISM).

# 13<sup>th</sup> Gen Intel® Core™ Processors That Support ECC Memory

Processor Number	Processor Cores (P+E) <sup>1</sup>	Processor Threads <sup>2</sup>	Intel® Smart Cache (L3)	Total L2 Cache	Processor Turbo Frequency				Processor Base Frequency		Unlocked <sup>4</sup>	Processor Graphics	CPU PCIe Lanes	Maximum Memory Speed (MT/s) <sup>5</sup>	Memory Channels	Maximum Memory Capacity <sup>5</sup>	Processor Base Power (W)	Maximum Turbo Power (W)	Reliability, Availability & Serviceability <sup>6</sup>	Intel® SIPP <sup>7</sup>	Intel Technologies	
					Intel® Thermal Velocity Boost Frequency (GHz) <sup>2</sup>	Intel® Turbo Boost Max Technology 3.0 Frequency (GHz) <sup>2</sup>	P-core Max Turbo Frequency (GHz) <sup>3</sup>	E-core Max Turbo Frequency (GHz) <sup>3</sup>	P-core Base Frequency (GHz) <sup>3</sup>	E-core Base Frequency (GHz) <sup>3</sup>											Intel® vPro <sup>®6,8</sup>	Intel® ISM <sup>6</sup>
Socket LGA1700 – Mainstream																						
i9-13900	24 (8+16)	32	36MB	32MB	Up to 5.6	Up to 5.5	Up to 5.2	Up to 4.2	2.0	1.5		Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	2	128GB	65	219	ECC	√	√	√
i7-13700	16 (8+8)	24	30MB	24MB	n/a	Up to 5.2	Up to 5.1	Up to 4.1	2.1	1.5		Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	2	128GB	65	219	ECC	√	√	√
i5-13600	14 (6+8)	20	24MB	11.5 MB	n/a	n/a	Up to 5.0	Up to 3.7	2.7	2.0		Intel® UHD Graphics 770	20	DDR5 4800 DDR4 3200	2	128GB	65	154	ECC	√	√	√
i5-13500	14 (6+8)	20	24MB	11.5 MB	n/a	n/a	Up to 4.8	Up to 3.5	2.5	1.8		Intel® UHD Graphics 770	20	DDR5 4800 DDR4 3200	2	128GB	65	154	ECC	√	√	√

Intel® processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. All processors are lead-free (per EU RoHS directive July 2006) and halogen free (residual amounts of halogens are below November 2007 proposed IPC/JEDEC J-STD-709 standards). All processors support Intel® Virtualization Technology (Intel® VT-x).

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- When paired with the eligible Intel® 600 Series chipset SKU (an eligible Intel® 700 Series chipset SKU will not be available), a motherboard with supporting hardware and software, and potential service activation.
- Eligible for Intel® Stable IT Platform Program (Intel® SIPP) starting with Raptor Lake-S Commercial platform availability.
- Intel vPro® Enterprise with Intel® Active Management Technology (Intel® AMT) or Intel vPro® Essentials with Intel® Standard Manageability (Intel® ISM).

# Intel® Xeon® W Processors for Workstations



# Intel® Xeon® W-3400 and Xeon® W-2400 processors



Intel® Xeon® W-3400 processors



Intel® Xeon® W-2400 processors

## **THE ULTIMATE WORKSTATION PLATFORM** for professionals

Built for professional creators, the Intel® Xeon® W-3400 and Xeon® W-2400 platform delivers a giant leap in performance and expanded platform capabilities for Media and Entertainment, Engineering, and Data Science professionals in desk-side tower form factors

# Intel® Xeon® W-3400 Processors

## New and Featured Technologies

### Architecture Improvements

NEW	Intel® 7 Process Technology
NEW	Processor core architecture, up to 46% higher performance over previous generation <sup>1</sup>
NEW	Up to 56 (56 P-core + 0 E-core) processor cores in a <b>single socket</b>
INCREASED	L2 Cache and L3 Shared Intel® Smart Cache
NEW	3 <sup>rd</sup> Gen Intel® Deep Learning Boost

### Platform Improvements

NEW	Eight-Channel DDR5 ECC RDIMM (up to 4800MT/s) for <b>up to 4TB</b> of memory support <sup>2</sup>
NEW	CPU PCIe* 5.0 up to 112 lanes
NEW	X8 DMI 4.0 lanes to Platform Controller Hub (PCH)
NEW	PCH PCIe* 4.0 up to 16 lanes
NEW	Integrated Intel® Wi-Fi 6E support

### Featured Tech

CPU PCIe\* 4.0, up to x16 lanes from PCH (Intel® W790)

Intel® Turbo Boost Max Technology 3.0

ECC Memory Support

Core frequency tuning<sup>3</sup>

Intel vPro® Enterprise technologies<sup>4</sup>

\*Other names and brands may be claimed as the property of others.

1. Configuration: Estimated SPECrate 2017\_int\_base based on Intel internal analysis for Sapphire Rapids 28c vs Cascade Lake 28c and is subject to confirmation based on testing of final product.

2. Maximum memory speeds are associated with 1 DIMM per Channel (1DPC) configurations. Additional DIMM loading on any channel may impact maximum memory speed. Maximum memory capacity is achievable with 2DPC configurations.

3. Only on Select SKUs, Altering clock frequency or voltage may void any product warranties and reduce stability, security, performance, and life of the processor and other components.

4. For a full list of Intel vPro platform technologies by product line visit <https://www.intel.com/content/www/us/en/products/details/processors/vpro.html>

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

No product or component can be absolutely secure. Your costs and results may vary.

# Intel® Xeon® W-2400 Processors

## New and Featured Technologies

### Architecture Improvements

NEW	Intel® 7 Process Technology
NEW	Processor core architecture, up to 46% higher performance over previous generation <sup>1</sup>
NEW	Up to 24 (24 P-core + 0 E-core) processor cores in a <b>single socket</b>
INCREASED	L2 Cache and L3 Shared Intel® Smart Cache
NEW	3 <sup>rd</sup> Gen Intel® Deep Learning Boost

### Platform Improvements

NEW	Quad-Channel DDR5 ECC RDIMM (up to 4800MT/s) for <b>up to 2TB</b> of memory support <sup>2</sup>
NEW	CPU PCIe* 5.0 up to 64 lanes
NEW	X8 DMI 4.0 lanes to Platform Controller Hub (PCH)
NEW	PCH PCIe* 4.0 up to 16 lanes
NEW	Integrated Intel® Wi-Fi 6E support

### Featured Tech

CPU PCIe* 4.0, up to x16 lanes from PCH (Intel® W790)
Intel® Turbo Boost Max Technology 3.0
ECC Memory Support
Core frequency tuning <sup>3</sup>
Intel vPro® Enterprise technologies <sup>4</sup>

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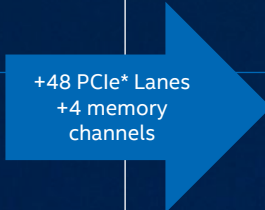
Intel technologies may require enabled hardware, software or service activation.

No product or component can be absolutely secure. Your costs and results may vary.

# Intel® Xeon® w9, w7, w5, w3 – Brand Levels

Introducing Intel® Xeon® brand levels for workstation, to distinguish between features and core counts

Brand Level		Intel® Xeon® W-2400 Processors <i>Mainstream WS - 64L CPU PCIe* Lanes</i>	Intel® Xeon® W-3400 Processors <i>Expert WS – 112L CPU PCIe* Lanes</i>
	Intel® Xeon® w9 processors	N/A	Up to 56 cores
	Intel® Xeon® w7 processors	Up to 24 cores	Up to 28 cores
	Intel® Xeon® w5 processors	Up to 16 cores Unlocked <sup>1</sup> Up to DDR5 RDIMM-4800 MT/s	Up to 16 cores Up to DDR5- 4800 MT/s Eight-Channel Memory
	Intel® Xeon® w3 processors	Up to 8 cores Up to DDR5 RDIMM- 4400 MT/s, Four-Channel Memory	N/A



\*Other names and brands may be claimed as the property of others.

1. On select SKUs.



# Boxed Processor Information

The following unlocked SKUs will be boxed:

## Intel® Xeon® W-3400 Processors:

- Intel® Xeon® w9-3475X Processor
- Intel® Xeon® w7-3465X Processor
- Intel® Xeon® w5-3435X Processor

## Intel® Xeon® W-2400 Processors:

- Intel® Xeon® w7-2495X Processor
- Intel® Xeon® w7-2475X Processor
- Intel® Xeon® w5-2465X Processor
- Intel® Xeon® w5-2455X Processor



NEW: 3-year warranty for tray and box!

# CPU Carrier Information

## Intel® Xeon® W-3400 and Xeon® W-2400 Processors

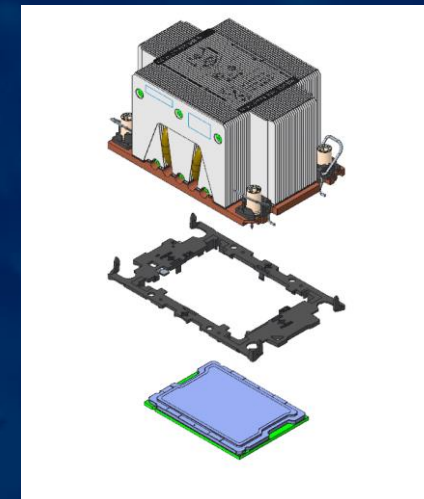
### What is a Carrier?

Carriers are required to properly align and install the CPU onto the motherboard. Intel Xeon W-3400 and Xeon W-2400 processor families each have their own required carriers. (see table)

### Carrier Features

- Visual Indicators: Carriers and CPUs are marked with carrier codes (E1A, E1B) to indicate which should be used.
- Keying Features: Carriers are keyed, mitigating the mixing of carriers with CPU or installing in the wrong orientation.
- Integrated Shims: E1B carriers for Intel Xeon W-2400 processors have integrated shims that ensure proper CPU to socket loading is provided by the bolster plate

Carrier Types		
CPU	Intel Xeon W-3400 Processors	Intel Xeon W-2400 Processors
Carrier Code	E1A	E1B
Shim	No	Yes
Integrated TIM Break Lever	Yes	Yes



# Information on Obtaining Carriers

## Intel® Xeon® W-3400 and Xeon® W-2400 Processors

*Boxed processors: The correct carrier will be included in the box.*

*Tray processors: Please confirm with your motherboard or thermal vendor if the correct carrier is included with their solution. If not, carriers can be purchased directly from one of the suppliers listed below.*

Suppliers	Part Number (E1A)	Part Number (E1B)	Where to Buy
Foxconn Interconnect Technology*	WNMEC00-0NNK1-EH	WNMEC00-0NNK2-EH	<a href="#">AVNET</a> <a href="#">TIME SPEED ELECTRONIC</a>
LOTES co Ltd.*	AZIF0204-P006C01	AZIF0204-P003C01	<a href="#">Contact Cathy Yang</a> <a href="#">LOTES Website</a>
TE Connectivity*	1-2351052-5	1-2351052-2	<a href="#">TE Connectivity Website</a>

# Resources to Help You Sell

## Available Now:

- Platform Briefs
- Selling Guides
- Intel® Xeon® W Tech Bytes Video Series (4)
- Quick Reference Guides
- How to Sell Guides
- Intel Xeon W Sales Cards
- Distri/Retailer Set-up Guide (Available)

NOTE: To-customer content will be translated into the following languages:

- EMEA: PL, FR, DE, RU
- APJ: Trad. CH, Simp. CH, KO, JP, VT, TH, ID
- LA: ES, PT

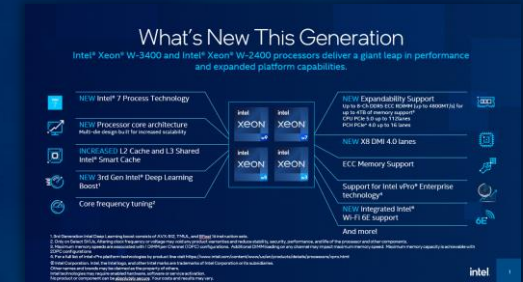


Intel® Xeon® W-3400 & Intel® Xeon® W-2400 Processors and the Intel® W790 Chipset for Workstations

Intel® Xeon® W-3400 and Xeon® W-2400 processors deliver the ultimate workstation platform to power the next generation of compute-intensive professional workloads. Paired with the Intel® W790 Chipset, professionals can experience high performance compute and reliability, in addition to expanded peripherals—high-speed network cards, graphics accelerators, and large volume storage arrays—for increased productivity and configuration flexibility. The multi-die architecture brings a revolutionary increase in core counts to accelerate high-thread computing for workstation tasks like 3D rendering, product visualization and simulation, and scientific computing. Innovative platform capabilities, including up to 112 lanes of PCIe Gen 5.0 connectivity, up to 4TB of DDR5 RDIMM memory support, and up to 5x USB 3.2 Gen 2x2 ports provide the configuration flexibility for professionals to meet intricate compute demands with ease.



Intel Tech Bytes



### What's New This Generation

Intel® Xeon® W-3400 and Intel® Xeon® W-2400 processors delivers a giant leap in performance and expanded platform capabilities.

- NEW Intel® 7 Process Technology
- NEW Processor core architecture. Multi-die design for increased scalability
- INCREASED L2 Cache and L3 Shared Intel® Smart Cache
- NEW 3rd Gen Intel® Deep Learning Boost<sup>1</sup>
- Core frequency tuning<sup>2</sup>
- NEW Expansibility Support. Up to 2x expansion slots to increase the number of memory support. PCIe Gen 5.0 up to 112 lanes. PCIe Gen 4.0 up to 14 lanes
- NEW XE DMI 4.0 lanes
- ECC Memory Support
- Support for Intel® vPro® Enterprise technology<sup>3</sup>
- NEW Integrated Intel® Wi-Fi 6E support
- And more!



### 13<sup>th</sup> Gen Intel® Core™ Processors for Workstation

The 13<sup>th</sup> Gen Intel® Core™ processors for workstation employ an innovative performance hybrid architecture to accelerate your productivity and help you tackle your most demanding workloads. With a full suite of platform technologies like Gaussian & Neural Accelerator 3.0 (GNA), Intel® Wi-Fi 6E (Gig+) and support for PCIe Gen 5.0, you can stay focused on the task at hand while having the peace of mind that your data is secure with DDR5 Error Correcting Code (ECC) memory support.<sup>1</sup> Together, the 13<sup>th</sup> Gen Intel® Core workstations combine high performance and unmatched productivity with game-changing data integrity for professionals who expect the most out of their system.

# Notices and Disclaimers

Performance varies by use, configuration and other factors. Learn more at [www.intel.com/PerformanceIndex](http://www.intel.com/PerformanceIndex).

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

All versions of the Intel vPro® platform require an eligible Intel® Core™ processor, a supported operating system, Intel LAN and/or WLAN silicon, firmware enhancements, and other hardware and software necessary to deliver the manageability use cases, security features, system performance and stability that define the platform. See [www.intel.com/Performance-vPro](http://www.intel.com/Performance-vPro) for details.

Your costs and results may vary.

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

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1. Performance hybrid architecture combines two new core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die. Select 13th Gen Intel® Core™ processors (certain 13th Gen Intel Core i3 processors and lower) do not have performance hybrid architecture, only P-cores.
2. Built into the hardware, Intel® Thread Director is provided only in performance hybrid architecture configurations of 12th and 13th Gen Intel® Core™ processors; OS enablement is required. Available features and functionality vary by OS.
3. Discrete Intel® Thunderbolt™ 4 (Maple Ridge) is only validated and supported from Intel® 600 and 700 Series Chipset PCIe lanes.
4. 'Best in Class wired and wireless connectivity with Wi-Fi 6': Intel® Wi-Fi 6 (Gig+) products support optional 160 MHz channels, enabling the fastest possible theoretical maximum speeds (2402 Mbps) for typical 2x2 802.11ax PC Wi-Fi products. Premium Intel® Wi-Fi 6 (Gig+) products enable 2-4X faster maximum theoretical speeds compared standard 2x2 (1201 Mbps) or 1x1 (600 Mbps) 802.11ax PC Wi-Fi products, which only support the mandatory requirement of 80 MHz channels. Gigabit Wi-Fi Requirements: To achieve speed of over 1 Gbps requires Gig internet service, router/gateway with either Wi-Fi 6 or 12ac with 160 MHz channel support, and PC with Intel® Wireless 9260/9560 or Intel® Wi-Fi 6 (Gig+) AX200/AX201.
5. Available only on 12th and 13th Gen Intel® Core™ processors featuring integrated graphics

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