

Specifications

Technical specifications for Xeon 6 P-cores and E-cores

Lenovo

P-core and E-core specification comparison

INTEL® XEON® 6 PROCESSORS Performance Core		INTEL® XEON® 6 PROCESSORS Efficient Core	
up to 128 cores	Cores	up to 288 cores	
1S, 2S, 4S, 8S	Sockets	1S, 2S	
Up to 500W	Max TDP	Up to 500W	
up to 12 channels DDR5 MRDIMM	Memory	up to 12 channels DDR5	
6400 (1 DPC) 5200 (2 DPC) 8800 MCR (1 DPC)	Max Memory Speed	6400 (1 DPC) 5200 (2 DPC)	
up to 6 UPI 2.0 up to 24 GT/s	Intel® UPI	up to 4 UPI 2.0 up to 24 GT/s	
up to 96 lanes PCIe 5.0 (x16, x8, x4, x2) RIS: up to 136 lanes PCIe 5.0	PCI Express	up to 96 lanes PCIe 5.0 (x16, x8, x4, x2)	
up to 64 lanes CXL 2.0	Compute Express Link	up to 64 lanes CXL 2.0	
52/57	Physical/Virtual Address Bits	52/48	
Intel Advanced Matrix Extensions (INT8, BF16, FP16) Intel Advanced Vector Extensions 512 (VNNI/INT8)	AI Acceleration Intel® Deep Learning Boost	Intel Advanced Vector Extensions 2 (VNNI/INT8)	
Intel Software Guard Extensions, Intel Trusted Domain Extensions	Security	Intel Software Guard Extensions, Intel Trusted Domain Extensions	
Vector AES, SHA2-256 extensions, VPMADD52	Crypto	Vector AES, SHA2-256 extensions, VPMADD52	
Intel QuickAssist Technology, Intel Dynamic Load Balancer, Intel Data Streaming Accelerator, Intel In-memory Analytics Accelerator	Integrated Accelerators	Intel QuickAssist Technology, Intel Dynamic Load Balancer, Intel Data Streaming Accelerator, Intel In-memory Analytics Accelerator	

Features and specifications table

	WHITLEY	EAGLE STREAM		Xeon 6		
Platform / Processor Specification	3 rd Gen Intel Xeon Scalable Processors (Ice Lake)	4 th Gen Intel Xeon Scalable Processors (Sapphire Rapids)	5 th Gen Intel Xeon Scalable Processors (Emerald Rapids)	Xeon 6700E/6900E-series processors	Xeon 6500P-series & 6700P/6900P-series processors	Future Xeon CPU (codenamed Clearwater Forest-SP/AP)
Core Count / CPU Socket	40 cores	60 cores	64 cores	64 to 144 cores (E)/ 192 to 288 cores (E)	8 to 86 cores (P)/ 72 to 128 cores (P)	Up to 192 cores (E)/ 288 cores (E)
Socket Scalability (per node)	1S, 2S	1S, 2S, 4S, 8S	1S, 2S	1S, 2S	1S, R1S, 2S, 4S, 8S/1S, 2S	1S, 2S
Min TDP / Max TDP	270W	350W	350W	205 to 330W/~350 to ~500W	150-165 to 350W/400 to 500W	Up to 350W/Up to 500W
Node controller support	No	Yes	Yes	No	Yes/No	No
Physical/Virtual Address Bits	52/57	52/57	52/57	AP & SP: 52 Physical address bits/ 48 virtual address bits	AP & SP: 52 Physical address bits/ 57 virtual address bits	AP & SP: 52 Physical address bits/ 48 virtual address bits
Memory support (DDR4/DDR5)	DDR4	DDR5	DDR5	DDR5	DDR5, MRDIMM	DDR5, MRDIMM
# Memory channels	8	8	8	8/12	8/12	8/12
Memory max. speeds	3200 (2 DPC)	4800 (1 DPC) & 4400 (2 DPC)	5600 (1 DPC) & 4400 (2 DPC)	SP: 6400/5200 (1/2 DPC) AP: 6400 (1 DPC)	SP: 6400/5200 (1/2 DPC), 8000 (1DPC MCR) AP: 6400 (1 DPC), 8800 (1DPC MCR)	SP: 6400/5200 (1/2 DPC) 8000 (1DPC MCR)/ AP: 7200 (1 DPC) 8800 (1DPC MCR)
High Bandwidth Memory (HBM)	No	Yes, 1TB/s BW, 64GB HBM2e per socket	No	No		
# Intel® UPI links	UPI 1.0 (2, 3)	UPI 2.0 (up to 4)	UPI 2.0 (up to 4)	UPI 2.0 (up to 4)/UPI 2.0 (up to 6)	UPI 2.0 (up to 4)/UPI 2.0 (up to 6)	UPI 2.0 (up to 4)/UPI 2.0 (up to 6)
Intel® UPI speeds	Up to 11.2 GT/s	Up to 16 GT/s	Up to 20 GT/s	Up to 24 GT/s		
PCIe Generation (I/O)	PCIe 4.0, 64 lanes (x16, x8, x4)	80 lanes, PCIe 5.0 (x16, x8, x4), PCIe 4.0 (x2)	80 lanes, PCIe 5.0 (x16, x8, x4), PCIe 4.0 (x2)	88 lanes, PCIe 5.0 (x16, x8, x4, x2)/ 96 lanes, PCIe 5.0 (x16, x8, x4, x2)	SP: 88 lanes, PCIe 5.0 (x16, x8, x4, x2) SP: R1S SKUs: 136 PCIe 5.0/ AP: 96 lanes, PCIe 5.0 (x16, x8, x4, x2)	88 lanes, PCIe 5.0 (x16, x8, x4, x2)/96 lanes, PCIe 5.0 (x16, x8, x4, x2)
Intel® Deep Learning Boost (AI Inference / Training)	AVX-512 (VNNI/INT8)	AMX/TMUL (INT8 & BFloat16) & AVX-512 (VNNI/INT8)	AMX/TMUL (INT8 & BFloat16) & AVX-512 (VNNI/INT8)	AVX2 (VNNI/INT8, BF16/FP16 Fast up/down convert) (2x128)	AMX/TMUL (INT8 & BFloat16, FP16) & AVX-512 (VNNI/INT8)	AVX2 (VNNI/INT8, BF16/FP16 Fast up/down convert) (4x128)
Security – Intel® SGX & TDX	SGX Only	SGX Enhanced	SGX, TDX	SGX, TDX, LASS, LAM	SGX, TDX	SGX, TDX, LASS, LAM
Crypto Instructions	Vector AES, SHA extensions, VPMADD52	Vector AES, SHA extensions, VPMADD52	Vector AES, SHA extensions, VPMADD52	Vector AES, SHA2-256 extensions, VPMADD52		Vector AES, SHA2-512, VPMADD52, SM3, SM4
Intel Optane memory support	Intel Optane Persistent Memory 200 Series (Barlow Pass)	None	None	None		
Compute Express Link (CXL)	No	Yes; spec 1.1, 4 x16 devices	Yes; spec 1.1, 4 x16 devices	CXL 2.0, 64 lanes		
Integrated Accelerators	QAT in PCH	QAT G4, DLB 2.0, DSA 1.0, IAA 1.0	QAT G4, DLB 2.0, DSA 1.0, IAA 1.0	QAT G4, DLB 2.5, DSA 2.0, IAA 2.0		

Xeon 6 platform diagram

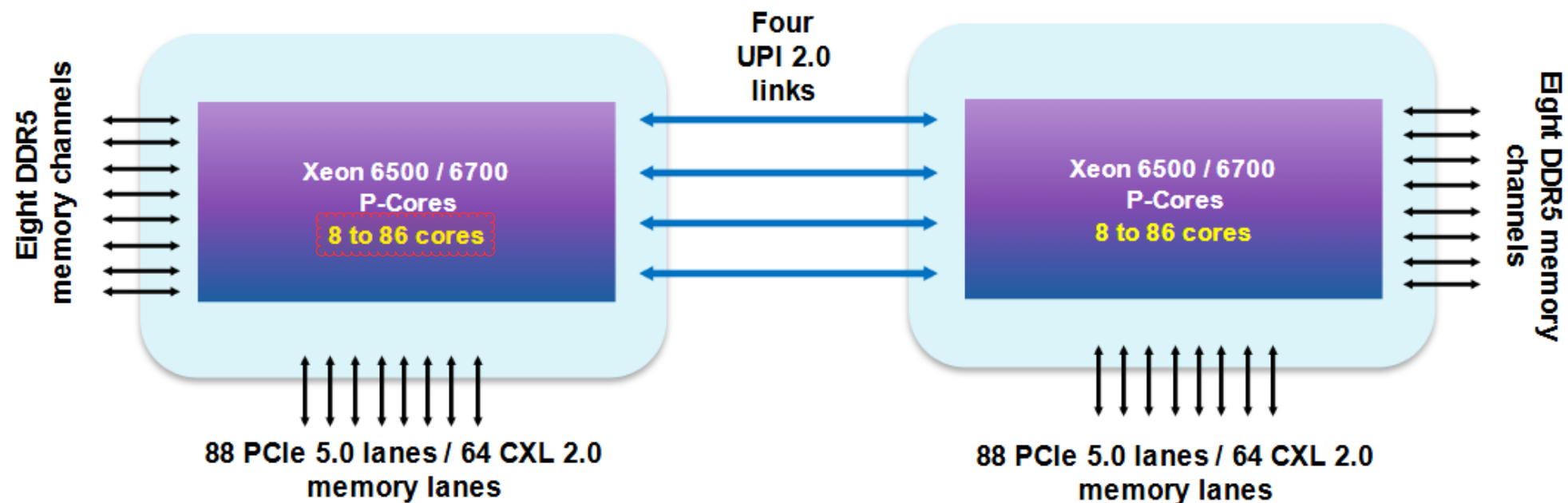
Click the following links to see a Xeon 6 platform diagram for each processor type.

- [6500 / 6700 P-Cores diagram](#)
- [6700 E-Cores diagram](#)
- [6900 P-Cores diagram](#)
- [6900 E-Cores diagram](#)



Specifications 6500 / 6700 P-Cores diagram

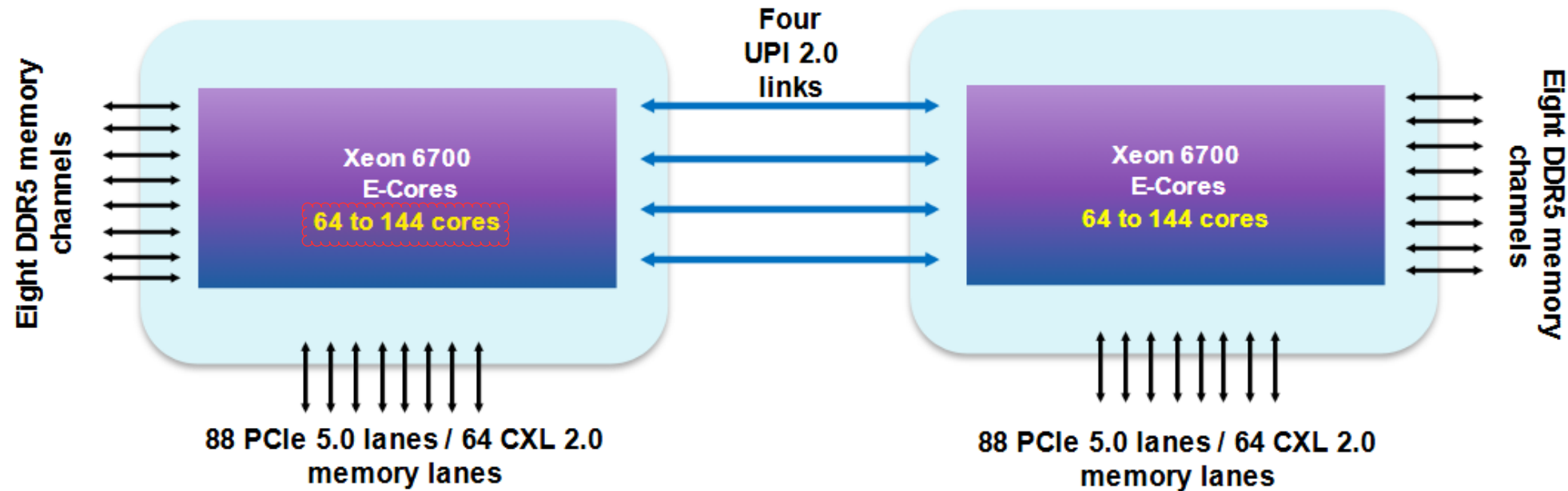
Xeon 6 platform diagram



- Scalability: one-socket, two-socket, **four-socket, eight-socket**
- TDP: **150 W** to **350 W**
- Socket pins: 4710 pins

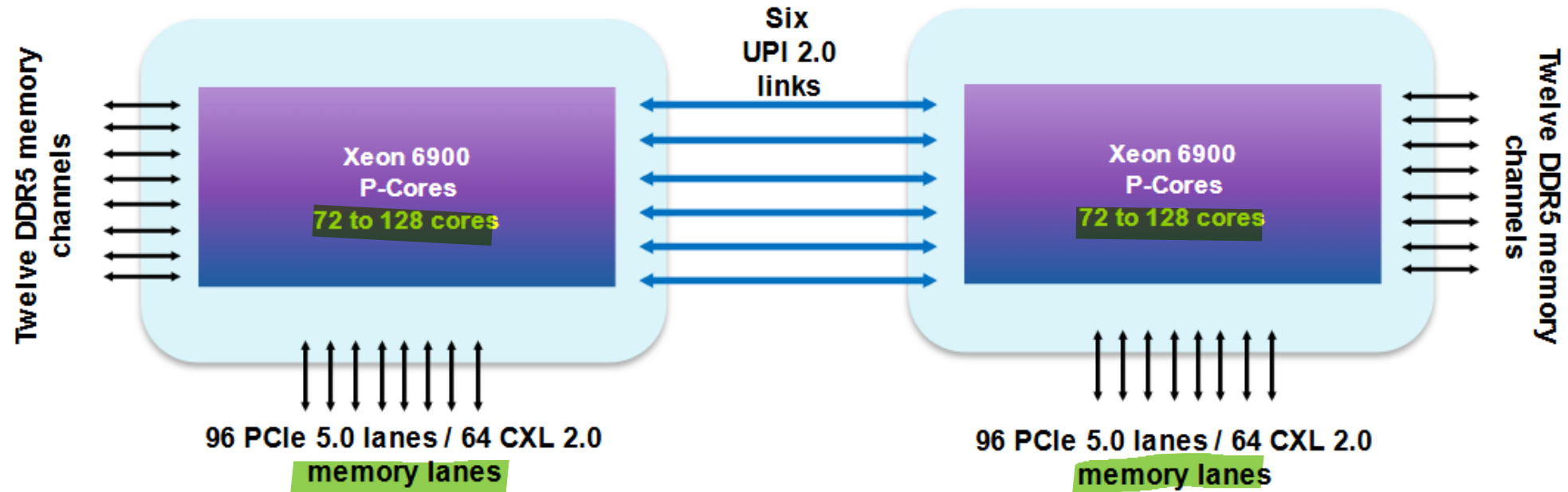
Specifications 6700 E-Cores diagram

Xeon 6 platform diagram



- Scalability: one-socket, two-socket
- TDP: 205 W to 330 W
- Socket pins: 4710 pins

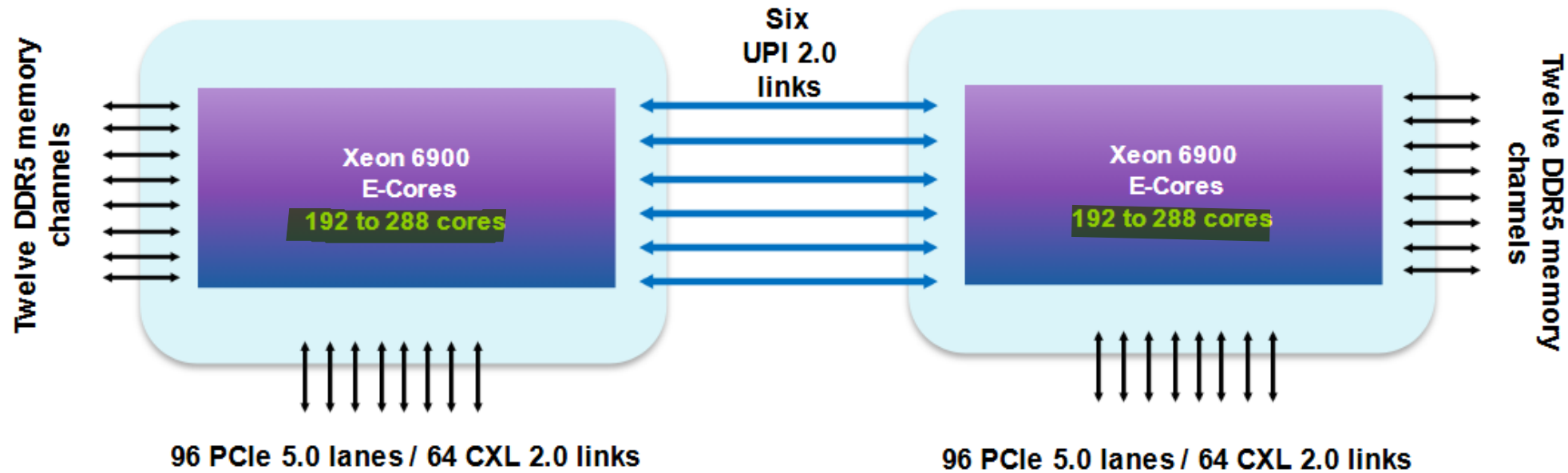
Xeon 6 platform diagram



- Scalability: one-socket, two-socket
- TDP: 400 W to 500 W
- Socket pins: 7529 pins

Specifications 6900 E-Cores diagram

Xeon 6 platform diagram



- Scalability: one-socket, two-socket
- TDP: 350 W to 500 W
- Socket pins: 7529 pins

Processor comparison

For a specification comparison of the latest Intel Xeon 6 processors, refer to the following Intel web page:

<https://www.intel.com/content/www/us/en/products/details/processors/xeon.html>

Browse Intel® Xeon® 6 Processors

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	Product Name	Total Cores	Max Turbo Frequency	Processor Base Frequency	Cache
☒	Intel® Xeon® 6740E Processor (96M Cache, 2.40 GHz)	96	3.2 GHz	2.4 GHz	96 MB
☒	Intel® Xeon® 6756E Processor (96M Cache, 1.80 GHz)	128	2.6 GHz	1.8 GHz	96 MB
☒	Intel® Xeon® 6780E Processor (108M Cache, 2.20 GHz)	144	3 GHz	2.2 GHz	108 MB
☒	Intel® Xeon® 6710E Processor (96M Cache, 2.40 GHz)	64	3.2 GHz	2.4 GHz	96 MB
☒	Intel® Xeon® 6766E Processor (108M Cache, 1.90 GHz)	144	2.7 GHz	1.9 GHz	108 MB
☒	Intel® Xeon® 6731E Processor (96M Cache, 2.20 GHz)	96	3.1 GHz	2.2 GHz	96 MB
☒	Intel® Xeon® 6746E Processor (96M Cache, 2.00 GHz)	112	2.7 GHz	2 GHz	96 MB

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