Intel

Intel Xeon Gold 5418N Processor (PK8071305121701)

Datasheet

Product Overview

- The Intel Xeon Gold 5418N is a 4th Gen Intel Xeon Scalable processor designed for network, edge, communications, and general-purpose server workloads.
- It provides 24 cores and 48 threads, with a 1.80 GHz base frequency, up to 3.80 GHz Intel Turbo Boost frequency, 45 MB cache, and a 165 W TDP.
- Built on Intel 7 process technology, the processor supports two-socket scalability, eight DDR5 memory channels, and up to 4 TB of memory.
- The processor supports DDR5-4000 memory with ECC and provides 80 PCI Express 5.0 lanes for network adapters, storage, and accelerator connectivity.
- Intel AMX, Intel DL Boost, AVX-512, two AVX-512 FMA units, two default QAT devices, two DLB devices, and one DSA device support AI, data-plane, and analytics workloads.
- Hardware security features include Intel SGX with Intel SPS, Total Memory Encryption, Boot Guard, Control-Flow Enforcement Technology, and Intel virtualization technologies.

Product Highlights

- **24-Core Network-Optimized Compute:** 24 cores and 48 threads provide parallel processing capacity for communications servers, edge nodes, network functions, and general-purpose workloads.
- **1.80 to 3.80 GHz Frequency Range:** The processor combines a 1.80 GHz base frequency with up to 3.80 GHz Intel Turbo Boost frequency for responsive server performance.
- **DDR5 and PCIe 5.0 Expansion:** Eight DDR5-4000 memory channels and 80 PCIe 5.0 lanes support high-throughput memory and I/O designs in two-socket servers.
- **Network and Data Acceleration:** Intel AMX, Intel DL Boost, QAT, DLB, and DSA support selected AI, cryptography, load-balancing, data-movement, and network workloads.

Detailed Features



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Component	Specification
Processor	Intel Xeon Gold 5418N, 24 cores / 48 threads
Ordering Information	PK8071305121701, FC-LGA16A Tray, Spec Code SRMGX
Frequency and Cache	1.80 GHz base, up to 3.80 GHz turbo, 45 MB cache
Memory	Up to 4 TB DDR5-4000, 8 channels, ECC supported
Power and Expansion	165 W TDP, 2S scalability, PCIe 5.0 with 80 lanes, 16 GT/s UPI, 3 UPI links

Network-Optimized Server Compute

The 5418N combines 24 physical cores with 48 threads and a 165 W TDP. Its compute profile suits communications servers, edge nodes, network functions, and general-purpose workloads.

Two-Socket Platform Support

Intel specifies 2S scalability, 16 GT/s UPI, and three UPI links. This supports multi-socket server platforms that need additional compute capacity and inter-socket bandwidth.

Speed Select Performance Profiles

Intel documents three SST-PP configurations: 24 active cores at 1.8 GHz and 165 W, 24 active cores at 1.7 GHz and 165 W, and 24 active cores at 1.9 GHz and 165 W.

PCIe 5.0 Expansion

Eighty PCIe 5.0 lanes provide direct expansion capacity for Ethernet adapters, storage controllers, accelerators, and other high-bandwidth server devices.

High-Capacity ECC Memory

The processor supports up to 4 TB of DDR5-4000 memory across eight channels, with ECC support for server-class reliability. This gives two-socket systems room for virtualized network functions, caches, analytics, and service containers.

PCIe 5.0 I/O for Data-Plane Devices

Eighty PCIe 5.0 lanes provide direct expansion capacity for Ethernet adapters, storage controllers, accelerators, and other high-bandwidth devices. The lane budget helps designers build balanced I/O around a processor socket.

Acceleration for AI and Data Movement

Intel AMX and DL Boost support selected AI and inference workloads, while two default QAT devices, two DLB devices, and one DSA device support cryptography, load balancing, and data movement operations.

Security and Virtualization Foundation

The processor includes Intel SGX with Intel SPS, Total Memory Encryption, Boot Guard, Control-Flow Enforcement Technology, AES instructions, VT-x, VT-d, and Extended Page Tables. These capabilities help protect workloads and support virtualized server platforms.

Technical Specifications

Product Specifications

Feature	Value
User SKU	INTL-5418N
Intel ordering code	PK8071305121701
Intel Spec Code	SRMGX
Processor model	Intel Xeon Gold 5418N Processor
Product collection	4th Gen Intel Xeon Scalable Processors
Code name	Products formerly Sapphire Rapids
Vertical segment	Server
Processor number	5418N
Lithography	Intel 7
Marketing status	Launched
Launch date	Q1 2023
Embedded Options Available	Yes
Total cores	24
Total threads	48

Feature	Value
Processor base frequency	1.80 GHz
Max turbo frequency	3.80 GHz
Cache	45 MB
Intel UPI speed	16 GT/s
Max UPI links	3
TDP	165 W
SST-PP 5418N(0)	24 active cores, 1.8 GHz base, 165 W
SST-PP 5418N(1)	24 active cores, 1.7 GHz base, 165 W
SST-PP 5418N(2)	24 active cores, 1.9 GHz base, 165 W
Scalability	2S
Sockets supported	FCLGA4677
Package carrier	E1B
Package size	77.5 mm x 56.5 mm
DTS max	95 °C
TCASE	84 °C
Max memory size	4 TB
Memory types	Up to DDR5-4000 MT/s 1DPC and 2DPC
Max memory channels	8
ECC memory supported	Yes
PCI Express revision	5
Max PCI Express lanes	80
Intel DL Boost	Yes
Intel QuickAssist Technology	2 default devices
Intel Dynamic Load Balancer	2 default devices
Intel Data Streaming Accelerator	1 default device
Intel Advanced Matrix Extensions	Yes
Intel Speed Select Technology - Core Power	Yes
Intel Speed Select Technology - Turbo Frequency	Yes
Intel Speed Select Technology - Performance Profile	Yes
Intel Speed Select Technology - Base Frequency	Yes

Feature	Value
High Priority Cores	8
High Priority Core Frequency	2.00 GHz
Low Priority Cores	16
Low Priority Core Frequency	1.60 GHz
Intel Resource Director Technology	Yes
Intel Speed Shift Technology	Yes
Intel Turbo Boost Technology	2.0
Intel Hyper-Threading Technology	Yes
Instruction set extensions	Intel AMX, Intel SSE4.2, Intel AVX, Intel AVX2, Intel AVX-512
AVX-512 FMA units	2
Intel SGX	Yes with Intel SPS
Default maximum SGX EPC size	128 GB
Intel Total Memory Encryption	Yes
Intel AES New Instructions	Yes
Intel QuickAssist Software Acceleration	Yes
Intel Control-Flow Enforcement Technology	Yes
Intel Trusted Execution Technology	Yes
Intel Boot Guard	Yes
Intel Platform Firmware Resilience	Yes
Intel Run Sure Technology	Yes
Intel Virtualization Technology	VT-x, VT-d, and VT-x with EPT
Shipping media	Tray
Stepping	S3

Product Comparison

Feature	Intel Xeon Gold 5418N / PK8071305121701	Intel Xeon Gold 5416S / PK8071305122201	Intel Xeon Gold 5412U / PK8071305120401
Processor family	4th Gen Intel Xeon Scalable	4th Gen Intel Xeon Scalable	4th Gen Intel Xeon Scalable
Network or edge positioning	N-series, two-socket processor	Two-socket balanced server processor	Single-socket general-purpose processor
Total cores	24	16	24
Total threads	48	32	48
Processor base frequency	1.80 GHz	2.00 GHz	2.10 GHz
Max turbo frequency	3.80 GHz	4.00 GHz	3.90 GHz
Cache	45 MB	30 MB	45 MB
TDP	165 W	150 W	185 W
Scalability	2S	2S	1S Only
Max memory size	4 TB	4 TB	4 TB
Memory channels	8	8	8
Memory support	DDR5-4000 1DPC and 2DPC	DDR5-4400 1DPC and 2DPC	DDR5-4400 1DPC and 2DPC
ECC memory	Yes	Yes	Yes
PCI Express	5, 80 lanes	5, 80 lanes	5, 80 lanes
Default accelerator devices	QAT: 2; DLB: 2; DSA: 1	QAT: 2; DLB: 2; DSA: 1	DSA: 1
Intel AMX	Yes	Listed in instruction set extensions	Yes
Intel DL Boost	Yes	Yes	Yes
Best-fit role	Two-socket network and edge server	Balanced two-socket enterprise and server compute	Single-socket enterprise, network, and edge server

Accessories

Category	Accessories
Included Accessories	- Intel Xeon Gold 5418N processor - Tray shipping media
Optional Accessories	- FCLGA4677-compatible server board and CPU heatsink solution - DDR5 ECC memory and PCIe 5.0 network or storage adapters

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