Architected for a new era

The future is calling.
Your hardware should rise to the challenge.

Intel® Xeon® 6 processors with Performance-cores (P-cores) offer built-in advantages to provide the right support across the modern data center. With superior performance, TCO and security, they can achieve insight faster, at a better value—while safeguarding your data.

Proven benefits to keep you competitive

Discover how the architectural advantages of Intel® Xeon® 6 processors deliver better support than the competition for critical workloads:

Intel® Xeon® 6 Processors with P-Cores vs. 5th Gen AMD EPYC™ Processors

Intel® AMX
Empower AI everywhere

Speed AI inferencing for INT8 and BF16, with support for FP16 models: Intel AMX offloads computational tasks from the CPU to **significantly improve speed and efficiency** for AI workloads

Up to
2x higher
average AI performance[1]
Intel
AMD

Up to
46% TCO savings
for AI workloads[2]
Intel
AMD

Better memory
Support for the most memory-intensive workloads

Opt for leading-edge MRDIMM technology—**supported only on Intel® Xeon® 6 processors**—at up to 8800 MT/s, or choose **faster DDR5 memory** to boost bandwidth and performance for memory-bound workloads like AI and HPC

Intel:
- **Up to 6400 MT/s DDR5**
- **Up to 8800 MT/s MRDIMM**

AMD:
- **Up to 6000 MT/s DDR5[3]**
- **No MRDIMM**

In certain configurations, desired memory capacity can be met with fewer DIMMs than the competition, which can deliver TCO benefits.

Up to
47% better
HPC performance
with MRDIMM vs. AMD EPYC[4]
Intel
AMD

Up to
37% greater
memory bandwidth
with MRDIMM vs. RRIMMs[5]
Intel
AMD

More PCIe lanes and sockets
Maximize I/O and right-size for greater flexibility

Consolidate your compute footprint with **improved bandwidth** for peripherals and the **freedom to scale** beyond two-socket platforms

Intel:
- **Up to 192 lanes per 2S server**
- **1,2,4 or 8 sockets**

AMD:
- **Up to 160 lanes per 2S server**
- **1 or 2 sockets**

CXL 2.0 with Intel® Flat Memory Mode (FMM)
Faster data access with cost efficiency[6]

Speed data access, minimize CPU resource overhead, and easily configure systems with a single memory tier—no OS intervention required—with **Intel® FMM available only on Intel® Xeon® processors**

Up to
1.52x better performance/$
with comparable performance[7]
Intel with FMM (CXL+DRAM)
Native DRAM only

Leverage both DDR4 and DDR5
more cost-effectively

Better hardware security features
Improved data protection and compliance

Leverage a platform with **fewer firmware vulnerabilities** and a proven track record of detection and remediation:[8] Intel® SGX and Intel® TDX with TDX Connect enhance security and confidentiality for even the most sensitive data

Intel:
94%
of vulerabilities proactively discovered and addressed
Intel
AMD
vs. only 57% from AMD[9]

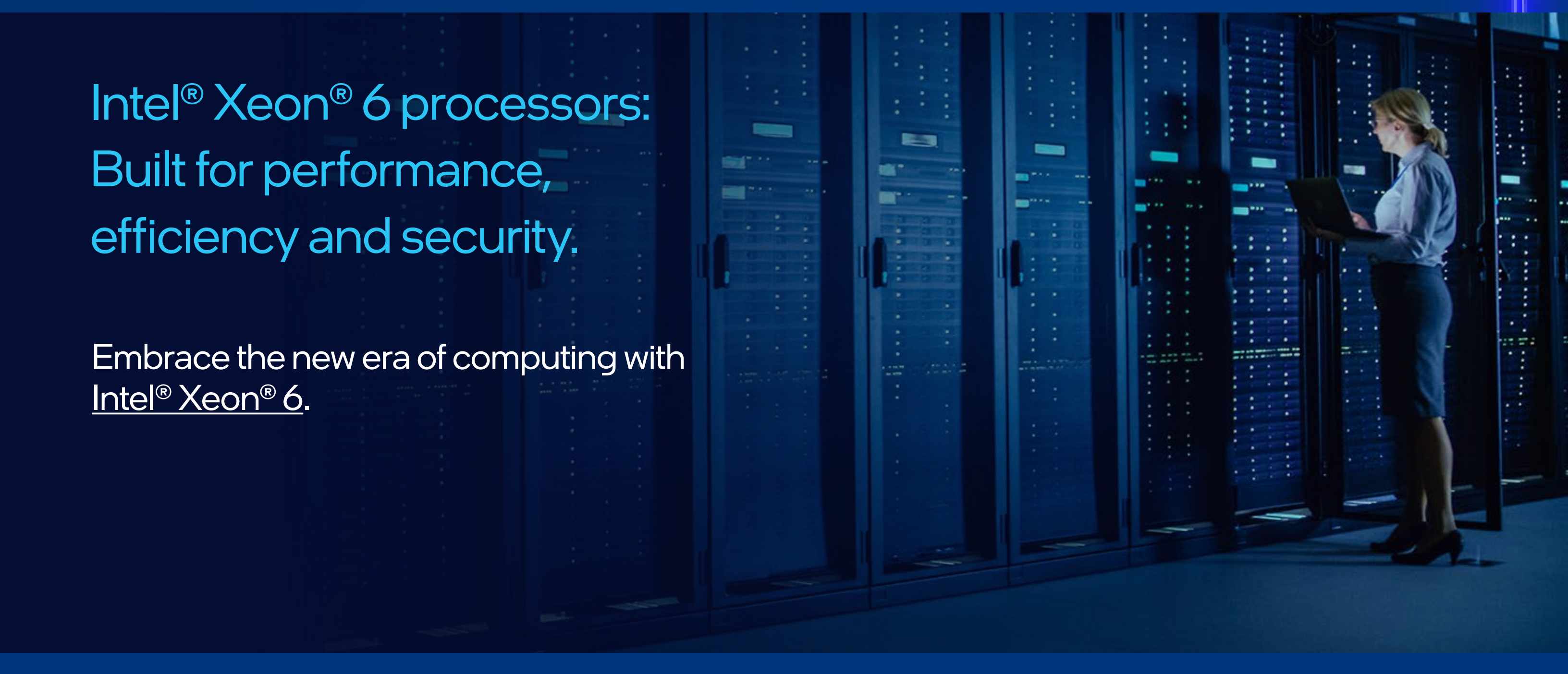
AMD:
4.4x more
firmware vulnerabilities
in hardware root-of-trust vs. Intel[9]
Intel 7
AMD 31

Intel® VROC
Achieve high-performance storage on existing CPUs

Leave behind yesterday's HBAs and their bottlenecks: AMD EPYC runs on legacy RAID with HBA required, while integrated Intel® VMD achieves virtual RAID (Intel® VROC) **without additional hardware**

Up to
49% better
power efficiency
vs. RAID HBA[10]
Intel VROC
Legacy RAID HBA

Up to
45% better performance
(IOPS)
vs. RAID HBA[10]
Intel VROC
Legacy RAID HBA



Intel® Xeon® 6 processors: Built for performance, efficiency and security.

Embrace the new era of computing with Intel® Xeon® 6.

1. See [9A221] at https://www.intel.com/processorclaims: Intel® Xeon® 6. Results may vary.
2. See [9T222] at https://www.intel.com/processorclaims: Intel® Xeon® 6. Results may vary.
3. https://www.amd.com/en/newsroom/press-releases/2024-10-10-amd-launches-5th-gen-amd-epyc-cpus-maintaining-le.html
4. 6980P with MRDIMM: 1-node, 2x Intel® Xeon® 6980P, 128 cores, 500W TDP, HT On, Turbo On, Total Memory 1536GB (24x64GB MRDIMM 8800 MT/s [8800 MT/s]), BIOS BHSDCRB1.IPC.3544.P15.2410232346, microcode 0x1000341, 2x Ethernet Controller X710 for 10GBASE-T, 1x 3.5T SAMSUNG MZWLJ3T8HBLS-00007, Ubuntu 22.04.5 LTS, 6.5.0-21-generic. Test by Intel as of December 2024. 9755: 1-node, 2x AMD EPYC 9755 128-Core Processor, 128 cores, 500W TDP, SMT On, Boost On, Total Memory 1536GB (24x64GB DDR5 6400 MT/s [6000 MT/s]), BIOS 1.1, microcode 0xb002116, 2x Ethernet Controller X710 for 10GBASE-T, 1x 3.5T Micron_7450_MTFDKCB3T8TFR, Ubuntu 24.04.1 LTS, 6.8.0-48-generic. Test by Intel as of January 2025.
5. In comparison to DDR5 6,400 RDIMMs. https://www.intel.com/content/dam/www/central-libraries/us/en/documents/2024-05/intel-xeon-6-product-brief.pdf.
6. https://www.intel.com/content/www/us/en/content-details/817889/orchestrating-memory-disaggregation-with-compute-express-link.html
7. Intel® Xeon® 6 native DRAM-only-configuration: 8TB total memory. 32 x 256GB DDR5 DIMMs. Intel® Xeon® 6 Intel® Flat Memory Mode (CXL + DRAM) configuration: 64 x 128GB DDR5 DIMMs (32 via CXL AICs). This is a performance test and not a support statement from SAP.
8. https://www.intel.com/content/www/us/en/content-details/818858/introduction-to-data-center-security-gold-deck.html
9. https://www.intel.com/securityreport
10. Performance results are based on testing by Intel as of August 23, 2024, and may not reflect all publicly available updates. Results may vary. Platform: AvenueCity CRB; 2x Pre-production Intel® Xeon® 69XX (QDF: SVR GNR AP CPU UCC B1 Q5EH) (72 cores each) (BirchStream - Granite Rapids AP); 768GB RAM (24 x 32GB Micron MTC20F1045S1RC64BDY 6400 MT/s DDR5 Synchronous Registered (Buffered) DIMMs); BIOS Version: BHSDREL1.IPC.3275.D01.2405242326 (Microcode revision: 0x11000240); BKC#104_AVC; BMC version: 24.21-0; CPLD version: 5V0A_V1. Workload not dependent on CPU core count. Similar results expected with a lower core count CPU. BIOS Settings: Fan PWM Offset [100]; Enable LP (Global) [ALL LPs]; CPU P State Control -> SpeedStep (Pstates) [Enable]; CPU P State Control -> Energy Efficient Turbo [Enable]; CPU P State Control -> Turbo Mode [Enable]; Hardware PM State Control -> Hardware P-States [Native Mode]; CPU C State Control -> C1 to C1e Promotion [Disable]; CPU C State Control -> ACPI C6x Enumeration [Disable]; Package C State Control -> Package C State [C0/C1]; CPU - Advanced PM Tuning -> Energy Perf BIAS -> Workload Configuration [I/O sensitive]; PCI Express 4 -> Intel VMD technology -> Intel VMD technology [Enable]; PCI Express 4 -> Ports A, C, E, G -> Intel VMD technology [Enable]; PCI Express 5 -> Intel VMD technology -> Intel VMD technology [Enable]; PCI Express 5 -> Ports A, C, E, G -> Intel VMD technology [Enable]. Storage: VROC: 8 x 3.2TB Kioxia CM7-V PCIe Gen5 U.2 SSDs (Model: KCMYDVUG3T20, Firmware: 1UET7103) connected to backplane which is connected to CPU0 4A-D, 5A-D MCIO PCIe ports (NUMA Node 2, CPU 0); Trimode with Midplane switch: 8 x 3.2TB Kioxia CM7-V PCIe Gen5 U.2 SSDs (Model: KCMYDVUG3T20, Firmware: 1UET7103) connected to backplane which is connected, via a midplane switch to a Broadcom MegaRAID 9670W-16i RAID card to SLOT C (NUMA Node 0, CPU0); OS: On P1600X 58GB Intel NVMe M.2 SSD (Model: SSDPEK1F058GA, Firmware: U40AE022) connected to M.2 LOM slot. RAID Controller:- HBA: Model: MegaRAID 9670W-16i Tri-Mode Storage Adapter; Firmware Version = 8.9.1.0-00000-00002; mpi3mr driver version = 8.9.1.0.0; CLI Version = 008.0009.0000.0010 Apr 02, 2024; Added "scsi_mod.use_blk_mq=y" to grub boot option for maximum throughput on the Broadcom card; "When creating RAID volumes: Read Cache Policy <No Read Ahead>, Write Cache Policy <Write-Back>, Drive Write Cache Policy <Disable>; RAID volume initialized before starting measurements"; "Extra commands set for maximum performance on HBA: echo ""0"" > /sys/block/sda/queue/rotational; echo ""none"" > /sys/block/sda/queue/scheduler; echo ""4065"" > /sys/block/sda/queue/nr_requests; echo ""4065"" > /sys/block/sda/device/queue_depth; echo ""0"" > /sys/block/sda/queue/nomerges; echo ""0"" > /sys/block/sda/queue/add_random; echo ""2"" > /sys/block/sda/queue/rq_affinity"- VROC: Intel(R) VROC PreOS Version: 9.0.0.1244; mdadm version = mdadm-4.3-20240620.intel.14055539.el9.x86_64 (commit hash: 29aa21d94bc7ff10); vmd driver version = inbox; Added "pci=pcie_bus_perf" to grub boot option which sets MaxPayload to the maximum for each of the NVMe devices; Interrupt Coalescing NVMe feature was configured with "0x103" value during measurementOS: Red Hat Enterprise Linux 9.4 GA; Kernel: 6.4.16-upstream.RAID Configurations: 8-Disk RAID0 with 4KB random 70/30 R/W workload using 16 Threads and 64 IODepth with Intel VROC and Broadcom MegaRAID 9670W-16i Tri-Mode. Varying IOPS controlled by changing thread count and IODepth. Benchmark: FIO v3.35.

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