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Power Your AI Transformation: 5 Reasons Why Intel® Xeon® 6 Processors with P-Cores Excel at AI

Efficiently take on growing AI needs alongside your existing general-purpose workloads by deploying systems with Intel Xeon 6 processors.

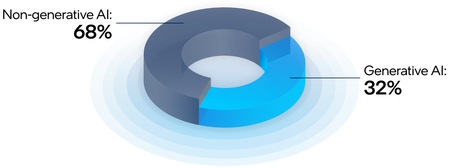
Costly, dedicated systems with GPUs aren't always needed in the data center.

With exceptional performance and efficiency, Intel Xeon 6 processors can help you reduce total cost of ownership (TCO) by consolidating servers and reducing power consumption in the data center.

But Intel Xeon 6 processors with Performance-cores (P-cores) also excel at running the majority of AI workloads used in the enterprise today.

It's no secret that AI development and spending are growing rapidly.

By 2028, non-generative AI workloads will make up more than 2/3 of all AI workloads.[1]



You don't need a dedicated GPU for all AI workloads because the right CPU can efficiently handle most non-generative AI tasks. That's where Intel Xeon 6 processors with P-cores come in.

With support for any precision type, Intel Xeon 6 processors with P-cores excel at ...

- General-purpose AI
- Analytics
- Classical machine learning (ML)
- Small model deep learning and inferencing
- BERT, Deep Learning Recommendation Model (DLRM), ResNet-50, and many other models
- Computer vision
- Training/fine tuning DL models during unused off-peak hours
- Generative AI workloads with fewer than 20B parameters

Why choose Intel Xeon 6 processors with P-cores?

Here are five reasons to choose Intel Xeon 6 processors with P-cores as the right CPUs to support your AI workloads.

1 More cores, memory bandwidth, and cache

Higher CPU core counts and greater memory bandwidth translate to better AI performance, directly from your Intel Xeon processor.

Innovative Multiplexed Rank DIMMs (MRDIMMs) deliver improved memory bandwidth and up to 504 MB low-latency last-level cache (LLC), which significantly boosts performance for memory-bound AI and high-performance computing (HPC) workloads.

Up to **128 cores per CPU** deliver 2x more cores per socket than 5th Gen Intel Xeon processors

Up to **30% better AI performance** compared to DDR5-6400 DIMMs[2]

Up to **2.3x higher AI performance** with MRDIMM compared to 5th Gen Intel Xeon processors[3]

2 Integrated AI acceleration

Intel Xeon 6 processors with P-cores include Intel® Advanced Matrix Extensions (Intel® AMX) and Intel® Advanced Vector Extensions 512 (Intel® AVX-512) acceleration in every core to boost AI and HPC workloads.

Intel AMX includes support for INT8, BF16, and now FP16 data types. Optimizations are also integrated into the mainstream distributions of popular frameworks like TensorFlow, PyTorch, Llama CPP, vLLM, and others.

Integrated acceleration helps **eliminate costs and data bottlenecks** inherent when using discrete accelerators

Up to **42% better performance with Intel AMX** compared to the prior generation[4]

3 Scaled power efficiency and server consolidation

Address growing power usage and space constraints by refreshing aging infrastructure. Intel Xeon 6 processors with P-cores bring improved energy efficiency that scales with utilization.

Consolidating servers powered by Intel Xeon 6 processors reduces server space requirements and energy consumption for a lower TCO while maintaining exceptional performance for AI workloads.

Up to **1.9x better performance per watt** at typical 40% utilization compared to 5th Gen Intel Xeon processors[5]

Up to **44% lower TCO** running a BERT-large LLM workload compared to running on an AMD EPYC processor[6]

4 Exceptional AI performance

Intel Xeon 6 processors with P-cores deliver exceptional compute power to support a wide variety of workloads, including small to medium LLMs and generative AI models for inferencing, fine-tuning, and retrieval-augmented generation (RAG) use cases.

Up to **2x better AI inference performance** compared to AMD EPYC processors[7]

Up to **1.5x better AI performance with 33% fewer cores** compared to AMD EPYC processors[8]

5 Open software ecosystem

Intel has teamed with industry partners and the open source community to provide a rich ecosystem of validated technologies and seamless integration with common operating systems, compilers, libraries, and frameworks. With this shared software stack and a global ecosystem of hardware and software vendors, solutions can be matched to every business need.

The Intel ecosystem includes **ready-to-use, Intel-optimized** enterprise AI applications from priority software vendors.

Intel **actively contributes reference implementations** to the Open Platform for Enterprise AI (OPEA).

Learn how you can power all of your AI goals with Intel AI solutions.

Explore how Intel Xeon 6 processors serve as powerful and efficient host CPUs for AI accelerated systems.

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[1] IDC - "Worldwide Spending on Artificial Intelligence Forecast to Reach $632 Billion in 2028, According to a New IDC Spending Guide," August 2024.
[2] For MRDIMMs compared to DDR5-6400 RDIMMs.
[3] See [9A6] at intel.com/processorclaims: Intel Xeon 6. Results may vary.
[4] See [A9L] at intel.com/processorclaims: 5th Generation Intel Xeon Scalable Processors. Results may vary.
[5] See [9Q2] at intel.com/processorclaims: Intel Xeon 6. Results may vary.
[6] See [9T2Z] at intel.com/processorclaims: Intel Xeon 6. Results may vary.
[7] See [9A2Z] at intel.com/processorclaims: Intel Xeon 6. Results may vary.
[8] See [7A2Z0] at intel.com/processorclaims: Intel Xeon 6. Results may vary.

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Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See configuration disclosure for additional details.

No product or component can be absolutely secure.

Your costs and results may vary.

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