

Product Brief



Intel® Analytics Engines
4th Gen Intel® Xeon® Scalable Processors

Drive More Data Value through Data Analytics and Database Acceleration

“In credit applications, fraud detection, or supply chain visibility, losing a fraction of a second could cost you a sale, a customer, or an opportunity. With 4th Gen Intel® Xeon® Scalable processors, we’re able to offload specialized tasks onto hardware accelerators built into the CPU, so analytics workloads run faster, and CPU cores can be freed up to do other important work.”

—Jeremy Rader, Head of Enterprise Strategy and Solutions Group, Intel

4th Gen Intel® Xeon® Scalable processors feature Intel® Analytics Engines, a series of accelerators integrated into the processor. These accelerators deliver faster data analytics by offloading certain tasks to improve CPU utilization for higher overall workload performance. A faster data analytics pipeline can process more transactions and enable businesses to make better decisions, so they stay competitive.

What if your CPUs could give your business an edge?

Speed is everything in data analytics. The insights that come from analytics drive both the executive decisions that guide the enterprise, as well as the day-to-day transactions that bring in new sales, customers, and opportunities. You can always add discrete accelerators to increase performance, but doing so will lead to higher cloud or infrastructure costs and more complexity to manage. To address these challenges, 4th Gen Intel Xeon Scalable processors include built-in accelerators for an integrated solution.

Intel® Analytics Engines: The processor does more by doing less

The latest Intel Xeon Scalable processors offload resource-intensive tasks like compression/decompression and data movement from CPU cores to built-in accelerators. Offloading these tasks clears clock cycles for analytics and database operations, which means more transactions per second, more customers served, and more data processed to fuel insights.

Enhanced analytics performance with 4th Gen Intel® Xeon® Scalable processors



Faster databases
Intel® In-Memory Analytics Accelerator (Intel® IAA) >

Up to

3x higher
RocksDB
performance¹



More-efficient read/write
Intel® Data Streaming Accelerator (Intel® DSA) >

Up to

1.6x higher IOPs
and up to
37% latency
reduction
for large-packet sequential
read²



Fewer cores, faster compression
Intel® QuickAssist Technology (Intel® QAT) >

Up to

95% fewer
cores
and up to
2x higher
throughput
for Level 1 compression³



1. See [D1] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel® Xeon® Scalable processors. Results may vary.

2. See [N18] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel® Xeon® Scalable processors. Results may vary.

3. See [N16] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel® Xeon® Scalable processors. Results may vary.

Reducing memory footprints for faster in-memory databases

In-memory databases deliver speed and scale for many analytics applications. The Intel® In-Memory Analytics Accelerator (Intel® IAA) accelerates compression and decompression for faster in-memory data processing. Smaller memory footprints allow for fast data transfers and more transactions per second for in-memory databases, open source databases, and data stores like RocksDB, Redis, Cassandra, and MySQL.

Accelerating data movement across CPU, memory, and external devices

Within a system, the processor uses several clock cycles, moving data between resources, including memory, cache, and external I/O devices. The Intel® Data Streaming Accelerator (Intel® DSA) takes on these data movement and transformation operations, accelerating tasks like data integrity checks and deduplication. This innovation can provide high-performance memory-to-memory data transfers and efficient read/writes across storage devices.

Speeding up bulk data compression and encryption

4th Gen Intel Xeon Scalable processors integrate the proven Intel® QuickAssist Technology (Intel® QAT) accelerator onto the processor. Intel QAT takes on both compression for bulk data storage and encryption for Secure Sockets Layer (SSL) and other networking protocols. Intel QAT can help speed up database backups and accelerate online transaction processing (OLTP) operations.

What's the difference?

Intel® In-Memory Analytics Accelerator vs. Intel® QuickAssist Technology

In 4th Gen Intel® Xeon® Scalable processors, both Intel® IAA and Intel® QAT offload data compression workloads from the processor cores. However, the types of data compression are different for each innovation.

- Intel IAA is suited for columnar compression and database queries and provides dramatic performance gains to in-memory databases.
- Intel QAT, in addition to offloading encryption workloads, accelerates bulk data compression in chained operations for standard codecs such as LZ4 lossless compression.

Both Intel IAA and Intel QAT will benefit workloads in the cloud and on-premises. While Intel IAA improves overall in-memory database performance, Intel QAT enhances storage and networking applications with increased data compression and cryptography performance.



How Intel® Analytics Engines supercharge advanced analytics

Challenge

High demand for hot data access in memory: Large data footprints are costly to store and require high memory capacity compared to traditional storage.

Increasing volume, variety, and velocity of data: Businesses need to ingest and analyze more data to support more transactions and generate deeper insights.

Priority workloads include encryption/compression: Encryption and compression of bulk data consume significant amounts of CPU clock cycles.

Solution

Intel® In-Memory Analytics Accelerator accelerates queries per second, saving memory bandwidth per query vs. software optimization-only solutions.

Intel® Data Streaming Accelerator (Intel® DSA) moves data fast between CPU memory and cache and attached memory, storage, and network devices.

Intel® QuickAssist Technology (Intel® QAT) speeds encryption and data compression to help improve overall performance in networking and storage applications.

Conclusion: Focus more on business-critical workloads with Intel Analytics Engines

Adding more cores and discrete accelerators is one way to meet the ever-increasing demand for more compute, but it adds cost and complexity and consumes more power. The 4th Gen Intel Xeon Scalable processor provides an alternative approach—offload common tasks/processes to built-in accelerators, enable greater utilization of cores that accelerate overall workload performance, and do it in a single, integrated architecture.

Learn more

See how built-in accelerators can help improve the performance of your fastest-growing workloads at intel.com/4thgenxeon.

Explore how to get the most out of Intel Xeon Scalable processors with built-in accelerators at intel.com/xeonscalable.

Learn more about Intel Analytics Engines

[Intel In-Memory Analytics Accelerator architecture specification >](#)

[Intel Data Streaming Accelerator >](#)

[Intel QuickAssist Technology >](#)



1. Up to 3x higher RocksDB performance. See [D1] at intel.com/processorclaims: 4th Gen Intel® Xeon® Scalable processors. Results may vary.
2. Up to 1.6x higher IOPs and up to 37 percent latency reduction for large-packet sequential read. See [N18] at intel.com/processorclaims: 4th Gen Intel® Xeon® Scalable processors. Results may vary.
3. Up to 95 percent fewer cores and up to 2x higher throughput for Level 1 compression. See [N16] at intel.com/processorclaims: 4th Gen Intel® Xeon® Scalable processors. Results may vary.

Notices and disclaimers

Availability of accelerators varies, depending on SKU. Visit the [Intel Product Specifications](#) page for additional product details.

Performance and power vary by use, configuration, and other factors. Learn more at 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.

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

No product or component can be absolutely secure.

Your costs and results may vary.

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