intel XEON

Drive More Business Value Through Analytics and Database Acceleration with 5th Gen Intel® Xeon® Scalable Processors

5th 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, 5th Gen Intel Xeon Scalable processors include built-in accelerators for an integrated solution. This results in better performance per watt, along with a lower total cost of ownership (TCO). Non-accelerator features include a larger cache size for higher performance and lower power requirements.

Enhanced analytics performance with 5th Gen Intel® Xeon® Scalable processors

Up to
3.7x higher RocksDB
performance with 5th Gen Intel Xeon using integrated Intel® In-Memory Analytics Accelerator (Intel® IAA) vs. 3rd Gen Intel® Xeon® processors[1]

Up to
2.85x higher IOPs
and up to
65% latency reduction
for applications performing large-packet sequential reads with 5th Gen Intel Xeon using integrated Intel DSA vs. 3rd Gen Intel Xeon processors[2]

Up to
2.56x higher MS SQL + Backup
performance with 5th Gen Intel Xeon using integrated Intel® QuickAssist Technology (Intel® QAT) vs. 3rd Gen Intel Xeon using default compression[3]

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.

Faster in-memory databases to enable more real-time analytics

In-memory databases deliver speed and scale for many analytics applications. The 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 such as RocksDB, Redis, Cassandra, MongoDB and MySQL. Another open-source analytics database, ClickHouse, had up to 2.49x performance gain using Intel IAA versus 3rd Gen Intel Xeon processors.[4]

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) performs these data movement and transformation operations, accelerating tasks like data integrity checks and deduplication. This provides high-performance memory-to-memory data transfers and efficient read/writes across storage devices.

Speeding up bulk data compression and encryption

5th Gen Intel Xeon Scalable processors integrate the proven Intel QAT accelerator onto the processor. Intel QAT performs 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.

Increased energy efficiency

5th Gen Intel Xeon processors using integrated Intel QAT deliver up to 2.56x higher MS SQL+Backup performance versus 3rd Gen Intel Xeon processors using default compression.[5]

Intel In-Memory Analytics Accelerator vs. Intel QuickAssist Technology

In 5th 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 optimizes storage and networking applications with increased data compression and cryptography performance.

What's the difference?
Intel IAA vs. Intel QAT

In general, Intel QAT is for local, cloud and hybrid storage, and Intel IAA is for in-memory computing. However, the types of data compression are different for each accelerator.

- Intel IAA processes compression/decompression for data in memory to help speed data movement between the CPU and memory. It is suited for columnar compression and database queries and can provide dramatic performance gains for in-memory computing.
- Intel QAT processes bulk compression/decompression for data in storage and transit. It also processes encryption workloads, which makes it ideal for accelerating chained decompress-encrypt-decrypt-compress operations using standards such as LZ4 lossless compression and OpenSSL.

How Intel® Analytics Engines supercharge advanced analytics

Challenge	Solution
Large data footprints are costly to store and process, requiring high-memory-capacity storage.	Intel IAA quickens queries per second, saving memory bandwidth per query versus software optimization–only solutions.
Businesses need to ingest and analyze more and more data to process transactions and generate deeper insights.	Intel DSA moves data fast between CPU memory and cache and attached memory, storage and network devices.
Encryption and compression of bulk data consume significant amounts of CPU clock cycles.	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 5th Gen Intel Xeon Scalable processor provides an alternative approach: enabling the offloading of challenging tasks/processes to built-in accelerators, and greater utilization of cores that accelerate overall workload performance, in a single, integrated architecture.

Learn more

See how built-in accelerators can help improve the performance of your fastest-growing workloads: **Accelerator Engine Overview**

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

Learn more about Intel Analytics Engines

Intel In-Memory Analytics Accelerator architecture specification ›

Intel Data Streaming Accelerator ›

Intel QuickAssist Technology ›

Intel® Query Processing Library (Intel QPL) ›

Intel® Data Mover Library (Intel DML) ›

intel XEON®

[1] See [D1] at intel.com/processorclaims: 5th Gen Intel Xeon Scalable processors. Results may vary.
[2] See [N16] at intel.com/processorclaims: 5th Gen Intel Xeon Scalable processors. Results may vary.
[3] See [D5] at intel.com/processorclaims: 5th Gen Intel Xeon Scalable processors. Results may vary.
[4] See [D2] at intel.com/processorclaims: 5th Gen Intel Xeon Scalable processors. Results may vary.
[5] See [D5] at intel.com/processorclaims: 5th Gen Intel Xeon Scalable processors. Results may vary.