Solution Brief

Financial Services
Intel® Xeon® Scalable Processors

FinTech Organizations Speed Ahead with Jabil and Intel

Jabil offers Design-to-Dust™ services to help firms create custom solutions that harness powerful Intel® technologies.

A Jabil FinTech customer reduced its trading system latency by 10 percent versus its previous-generation solution by collaborating with Jabil to customize Intel technologies.[1] The increased performance of its 4th Gen Intel Xeon Scalable processor–based server with built-in accelerators allowed the customer to replace two legacy OEM servers with one new Jabil-customized server.[1]

Market makers push limits

Market makers, high-frequency traders, robo-advisors, and other financial technology (FinTech) firms push the limits of technology to create innovative trading solutions. Eurex, a European derivatives exchange, has built its IT infrastructure to detect price changes and inform market participants of those changes in less than one billionth of a second.[2]

In high-stakes trading scenarios, low latency can be critical:

- **Fill or kill (FOK) order execution.** When an investor executes a FOK order, they need to make a transaction immediately and completely or not at all. In this case, the trading platform must execute the order almost instantaneously.
- **Loss mitigation.** When investors encounter adverse news, they need to adjust their trading strategies in near real time to mitigate potential losses. Trading platform servers must support this.
- **Slippage prevention.** Slippage occurs when there is a discrepancy between the price at which a trader intends to buy or sell an asset and the price at which the trade is executed. Slippage lowers revenue over the long term.[3] Low latency can help prevent slippage.

Time is money

Because time is money in the FinTech sector, organizations seek out high-bandwidth, low-latency technology, accelerated data feeds, and data center locations close to exchanges to keep response times low. To accelerate workloads, Jabil tunes Intel-based server components, from the CPU BIOS to network interface controllers (NICs), for the lowest latency. This allows FinTech engineers to write code that pins threads to specific paths for deterministic results.

Jabil takes customization to a new level

Jabil, a global manufacturing company with 100 plants in 30 countries, understands there's no one-size-fits-all solution for FinTech organizations. The company offers a wealth of supply chain, manufacturing, and development experience to create customized solutions.

Jabil delivers its custom solutions through a customer-centric supply chain. It integrates servers, storage systems, network switches, and other devices into racks ready to be placed in data centers to accelerate time-to-deployment. It also provides security-conscious, environmentally responsible recycling and security-conscious disposal services.

Customers innovate with Jabil

Jabil specializes in helping customers innovate with custom server solutions—hardware, firmware, and software, in addition to mechanical, electrical, and cooling systems. For example, Jabil experts open BIOS registers and support customer-specific BIOS images. They also add third-party products like SmartNICs, GPUs, and capture cards that record and store network data packets for testing, simulation, and analytics. Jabil can help customize:

- **Firmware**: Customize BIOS and baseboard management controller (BMC) firmware to shorten boot time and allow engineers to access BIOS options not exposed in off-the-shelf servers.
- **Electrical systems**: Add redundant power supplies and upgrade power distribution units.
- **Thermal systems**: Install additional fans or heat sinks, modify airflow within a server, and install liquid cooling systems to dissipate heat more efficiently. Jabil can also provide advanced cooling techniques in data centers when water use is not an option.
- **Mechanical systems**: Add fans or cooling systems to improve thermal management, install additional hard drives or memory modules to increase storage or memory capacity, and modify the chassis to accommodate additional components.

Jabil case study: Hedge fund management firm accelerates business

A leading hedge fund firm planned to create a next-generation trading platform with advanced algorithms to analyze market trends and enhance trading decisions. The firm envisioned a high-performance solution that executed trades faster than its current platform.

Challenge

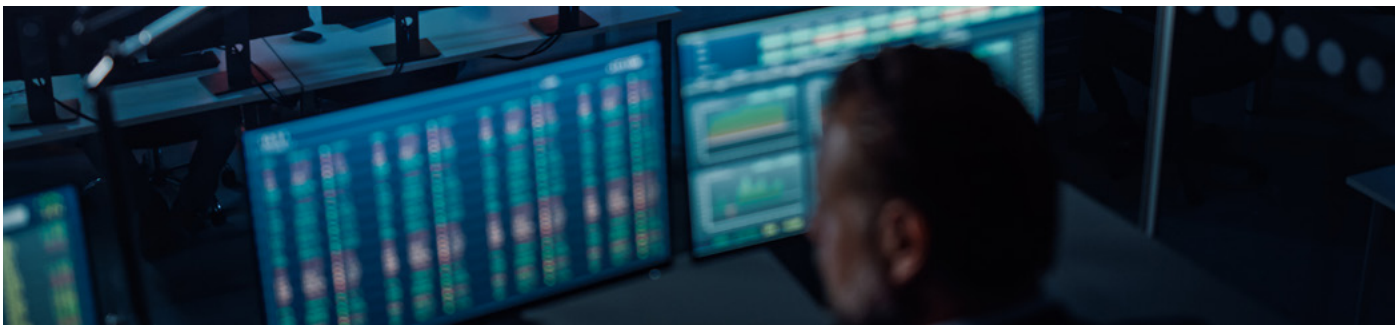
Standard off-the-shelf OEM servers didn't give the hedge fund client the low-latency performance its new trading system required. The company needed server enhancements and multiple customizations to achieve the architecture and outcomes it envisioned. The hedge fund firm's staff was highly technical, but the firm needed a partner to help its staff fill procurement, design, and development gaps. Time to market was also critical because the firm would begin receiving revenue as soon as the server racks were up and running. To address these challenges, the hedge fund firm turned to Jabil for assistance.

Solution

The firm engaged Jabil's Design-to-Dust™ services to achieve the required performance and server latency on an accelerated schedule. Jabil brought in its partner, Intel, and together the teams developed a custom solution based on the latest generation of Intel Xeon Scalable processors.

The teams positioned the customer's servers in a data center near the physical stock market exchanges to achieve the lowest possible latency levels. They also optimized the server architecture to help minimize latency throughout the trading process, from data transmission to trading execution. They made proprietary customizations to the BIOS firmware and electrical, thermal, and mechanical systems. For example, Jabil modified the server chassis to allow airflow to cool the entire system effectively, which improved reliability and contributed to predictable performance. The end design was quiet and helped minimize power usage.

The firm's developers used the Intel® oneAPI Base Toolkit to access advanced compilers and performance libraries.



The toolkit provides access to optimized libraries such as Intel® oneAPI Math Kernel Library (oneMKL) and Intel® oneAPI Threading Building Blocks (oneTBB) that help reduce execution time for financial algorithms within pricing models, risk assessment, and high-frequency trading. The inclusion of tools like Intel® Advisor and Intel® VTune™ Profiler assists in profiling and optimizing code essential for achieving low latency in financial applications. The toolkit's security features, including encryption libraries, comply with FinTech industry standards such as the Payment Card Industry Data Security Standard (PCI DSS).

The developers made use of the CXL 1.1 interface on Intel Xeon Scalable processors to facilitate high-speed communication between the CPU and connected NICs and storage drives for fast networking and high-performance storage. CXL 1.1 supports up to 80 lanes of PCIe 5.0 (32 gigatransfers per second [GT/s]), doubling the input/output (I/O) bandwidth of PCIe 4.0 (16 GT/s), used in previous-generation processors.[4]

Jabil and Intel worked with the client to activate accelerator engines built into Intel Xeon Scalable processors. They used both Intel® Advanced Vector Extensions 512 (Intel® AVX-512) and Intel® Advanced Matrix Extensions (Intel® AMX) to accelerate vector processing to help reach system latency goals. Intel AVX-512 is popular for FinTech workloads because of its floating-point precision. It is also highly efficient for matrix calculations such as the Monte Carlo algorithm.

Jabil also helped the client implement a RAID backup system to meet its reliability needs. The client chose to use Intel® Virtual RAID on CPU (Intel® VROC), an integrated RAID solution specifically designed for high-speed NVM Express (NVMe) solid state drives (SSDs). Intel VROC technology connected the server CPU and NVMe SSDs directly, eliminating the HBA bottleneck to help lower system latency and removing a heat source, improving the thermal performance of the system. Finally, by eliminating the HBA component, the team helped further optimize the system's total cost of ownership (TCO).

Results

Jabil's FinTech customer introduced a new trading system on schedule that demonstrated 10 percent lower latency, as compared to its previous-generation solution.[1] This positioned the hedge fund as a market leader. Intel VROC contributed to reduced system latency and helped lower TCO.

The performance of the Intel Xeon Scalable processor–based server with built-in accelerators has allowed the customer to replace two legacy OEM servers with one new Jabil-customized server.[1] This 2:1 consolidation has helped reduce the customer's data center footprint, saving energy and overall costs.

The server's air-cooled thermal design helped the firm to avoid deploying a costly and complex liquid-cooled solution. Custom electrical and mechanical designs satisfied the customer's specific requests.

Finally, Jabil provided pre-production platforms to support the system launch. Based on Jabil's valuable pre-production contributions and engineering support, the hedge fund firm engaged Jabil to provide ongoing maintenance and warranty support. This aligns with Jabil's goal of investing in long-term relationships with each of its customers.

Intel technologies

Intel Xeon processors and Intel® Accelerator Engines including Intel AMX and Intel VROC provide customization starting points for Jabil FinTech and cloud builder customers.

Intel Xeon Scalable processors

Jabil employs Intel Xeon Scalable processors to boost performance and increase return on investment (ROI). With more built-in accelerators than any other CPU on the market, these processors deliver outsized performance and TCO benefits for AI, database, and networking workloads.[5] Built-in accelerators offload tasks from CPU cores, reducing the number of cores needed per workload. This allows Jabil's clients to expand capacity or run more applications on each server.

Architecture optimized for low-latency workloads

5th Gen Intel Xeon processors offer up to 320 MB last-level cache (LLC) shared across all cores—an up to 3x increase over the prior generation for select SKUs.[6] Larger LLC size is critical for supporting low-latency workloads in FinTech.

Intel Accelerator Engines

Intel Accelerator Engines are purpose-built integrated accelerators found in Intel Xeon Scalable processors. These engines offer an alternative, efficient way to achieve higher performance and increase virtual and physical CPU utilization without purchasing additional specialized hardware.

Intel® AMX

Intel AMX is an Intel Accelerator Engine that improves the performance of deep-learning (DL) training and inference on the CPU. It's ideal for workloads like natural-language processing (NLP), recommendation systems, and image recognition. In FinTech, Intel AMX can enhance the performance of trading algorithms and accelerate portfolio optimization.

Intel® VROC

Intel VROC is an enterprise RAID solution specifically designed for NVMe SSDs. It provides reliability, and it increases storage performance, lowering latency. Intel VROC eliminates the need for an HBA, eliminating both a storage bottleneck and the cost of a component, which helps lower TCO. Jabil embeds Intel VROC driver packages directly into the server platform BIOS and operating system components, making them native platform features.

Lower latency and cost

Intel VROC eliminates the need for a RAID HBA, delivering up to 60 percent higher I/O operations per second (IOPS) and 39 percent lower latency while reducing cost by up to 70 percent.[7]

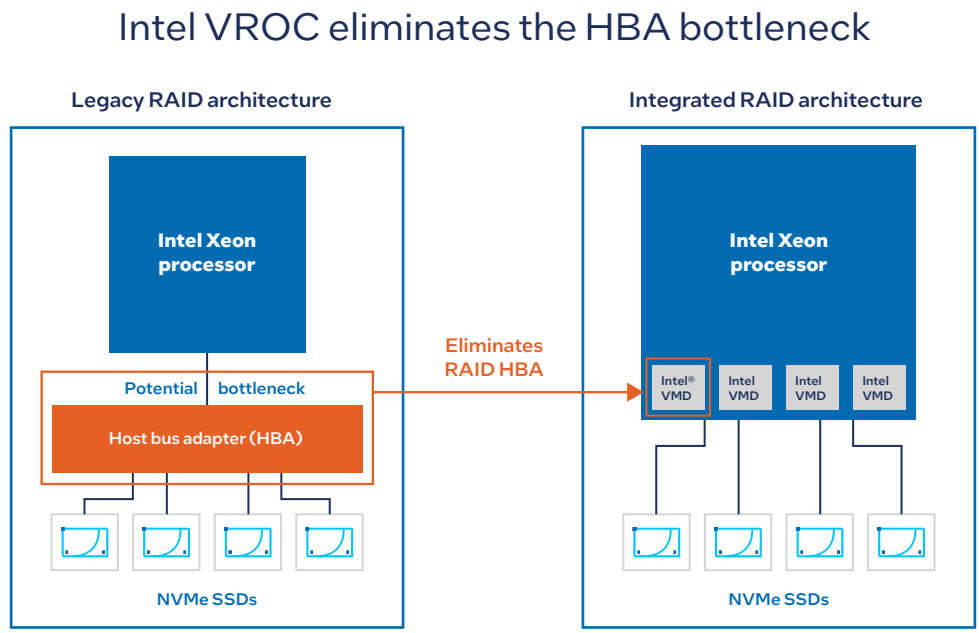


Figure 1. Intel VROC functions with the help of Intel® Volume Management Device (Intel® VMD), an integrated controller within Intel Xeon Scalable processors

Beyond FinTech

The same expertise and services that make Jabil successful with FinTech firms also benefit cloud builders. Jabil provides a one-stop shop for organizations that require unique customization services beyond basic server design, including:

- BIOS version management and customization
- Full software image provisioning for the operating system, drivers, and applications
- Procurement and inventory management
- Server commodity qualification
- Factory racking
- Network configuration
- Asset management

Learn more

Jabil makes the impossible possible with customization services not available elsewhere. The company offers full Design-to-Dust™ services, from procurement to design to warranty services and system retirement. Working together, Jabil and Intel help customers harness innovative technologies for success.

Learn about Jabil cloud solutions.

Read about 5th Gen Intel Xeon processors and Intel VROC.

[1] Jabil. Interview with Prowess Consulting. January 2024.

[2] Meeting Cpp. "Trading at light speed: designing low latency systems in C++ - David Gross – Meeting C++ 2022." January 2023. youtube.com/watch?v=8uAW5FQtcvE&t=186s.

[3] Data Intellect. "Traders Leap Over Where the Latency Is Lowest – an Introduction to Low Latency in Electronic Trading." July 2023. https://dataintellect.com/blog/traders-leap-over-where-the-latency-is-lowest-an-introduction-to-low-latency-in-electronic-trading/.

[4] Intel. "What Are PCIe 4.0 and 5.0?" Accessed February 2024. intel.com/content/www/us/en/gaming/resources/what-is-pcie-4-and-why-does-it-matter.html.

[5] See [A19–A25, D1, D2, D5, N16] at intel.com/processorclaims: 5th Gen Intel Xeon processors. Results may vary.

[6] See [G11] at intel.com/processorclaims: 5th Gen Intel Xeon processors. Results may vary.

[7] See [N63] at intel.com/processorclaims: 4th Gen Intel Xeon Scalable processors. Results may vary.

Availability of accelerators varies depending on SKU. Visit the Intel Product Specifications page for additional product details.

Performance varies by use, configuration and other factors. Learn more at www.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. No product or component can be absolutely secure.

Your costs and results may vary.

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

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

Statements in this document that refer to future plans or expectations are forward-looking statements. These statements are based on current expectations and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. For more information on the factors that could cause actual results to differ materially, see our most recent earnings release and SEC filings at www.intc.com.

Printed in USA 0324/JV/PRW/PDF Please Recycle 358822-002US