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How Banks Are Transforming with Real-Time Analytics

Banks can compete better and faster with real-time solutions powered by Intel® technologies.

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Figure 1. Intel's software and hardware platform helps accelerate real-time capabilities

Over the past few years, the financial-services industry has had to transform itself to keep pace with growing customer expectations, increasingly complex regulations, and sophisticated cybersecurity threats. These dynamics have created a ripe opportunity for "real-time" capabilities, which enable computers to predict future outcomes by making use of historical datasets. These capabilities increase efficiency and enable new customer experiences. With real-time capabilities, banks can create new revenue streams and streamline processes related to security and compliance. This can help create a competitive edge and maintain customer satisfaction.

Intel's software and hardware platform, built on 3rd Gen Intel® Xeon® Scalable processors, helps to accelerate real-time capabilities. By supporting heterogeneous architectures, along with hardware accelerators and software partners, Intel products are optimized to help banks transform.

Personalized experiences increase conversion rates for a European bank

Today's financial-services customers expect personalized and consistent experiences across touchpoints. The challenge for banks is to identify and deliver the right experience to the right customer in real time based on everything known about the customer. Recommendation engines are one technique that financial institutions use to create personalized offers. For example, a recommendation engine can tailor a loan offer to a specific individual based on credit score and interest rates.

BNP Paribas Bank Polska, a Polish bank serving both retail and corporate customers, sought to drive product adoption with real-time personalized offers.[1] Unfortunately, the bank's legacy system, a batch-oriented infrastructure based on customer-relationship management (CRM) and data-warehouse technologies, required up to two days to create a personalized offer.

BNP Paribas turned to Intel partner Hazelcast, the developer of a real-time intelligent application platform powered by Intel technology. With the Hazelcast platform, the bank's systems were able to process a higher volume of data and combine it with existing customer data to create personalized offers. Importantly, Hazelcast easily integrated the bank's IT infrastructure. The result? BNP Paribas is now able to process customers' event data in less than 120 milliseconds.[1] At this speed, the bank can now deliver real-time, personalized offers that have increased loan originations by 400 percent.[1]

Largest system payment provider reduces fraudulent transactions by 30x

Banks are responsible for making sure transactions comply with laws and regulations. This means banks must have the technology in place to run instantaneous checks for identity theft, money laundering, and payment fraud.

PayPal, the world's largest payments system provider, faces ongoing challenges with fraud. The company loses more than one billion dollars a year even though its fraud rate is below the industry average.[2]

To address its challenges, PayPal decided to create a system that could identify emerging fraud patterns in real time. The company identified its legacy database as a barrier to reducing system latency—it was unable to process growing amounts of data fast enough.

PayPal turned to Intel partner Aerospike and its real-time data platform. Aerospike's underlying architecture uses Intel® Optane™ persistent memory (PMem) to increase performance. The result? PayPal has experienced a 30x reduction in the number of missed fraud transactions by improving service-level agreement (SLA) adherence to 99.95 percent, up from 98.5 percent.[2]

Top-tier bank accesses cloud analytics to drive business

Financial institutions are on the hook to keep their customers' accounts safe. This means safeguarding customers' money and information. And when a bank uses a cloud-based solution, everything is online, which can introduce additional vulnerabilities.

A top-tier bank planned to use a cloud-based data-analytics platform to achieve its digital-transformation goals.[3] But to use cloud-analytics tools, the bank needed to grant its cloud provider access to unencrypted data including customer and business-critical data. From a regulatory perspective, this wasn't acceptable. Without granting its cloud provider access to the unencrypted data, however, the company was not able to use cloud-analytics tools.

The bank turned to eperi, an Intel partner and leading player in the IT-security sector. The eperi Gateway, combined with Intel technology—specifically Intel Software Guard Extensions (Intel SGX) enclaves—helped to ensure that customer data could be moved to the cloud securely, and that it could remain encrypted while the bank applied cloud analytics. Thanks to Intel and its partner eperi, the bank remained compliant and can access cloud-analytics tools to drive its business.

Real-time banking powered by Intel

Intel technology is the foundation for real-time banking solutions. 3rd Gen Intel Xeon Scalable processors deliver a balanced architecture with built-in artificial intelligence (AI) acceleration and advanced security capabilities. These processors also feature a set of accelerators, which are tools that can help implement innovative, real-time banking products. The set includes:

- **Intel Advanced Vector Extensions 512 (Intel AVX-512)**: Boosts performance and throughput for the most demanding computational tasks. For example, Intel AVX-512 accelerates derivative pricing and X-Value Adjustments (XVAs) portfolio calculations for financial-market risk modeling. Intel AVX-512 delivers up to 1.70x higher Monte Carlo performance on 3rd Gen Intel Xeon Scalable processors versus the prior generation of Intel Xeon Scalable processors.[4]

- **Vector Neural Network Instructions (VNNI)**: Extends Intel AVX-512 to accelerate AI/deep learning (DL) inference. Applications include anomaly detection used to identify fraudulent transactions.

- **Intel Deep Learning Boost (Intel DL Boost)**: A built-in accelerator that provides the flexibility to run complex AI workloads on the same hardware as existing workloads. Intel DL Boost is used to fight fraud, automate experiences through recommendation engines, and manage risk.

- **Intel Software Guard Extensions (Intel SGX)**: Helps to protect data in use via unique application-isolation technology. Intel SGX enables multi-party analytics, confidential computing, and privacy-preserving machine learning (ML).
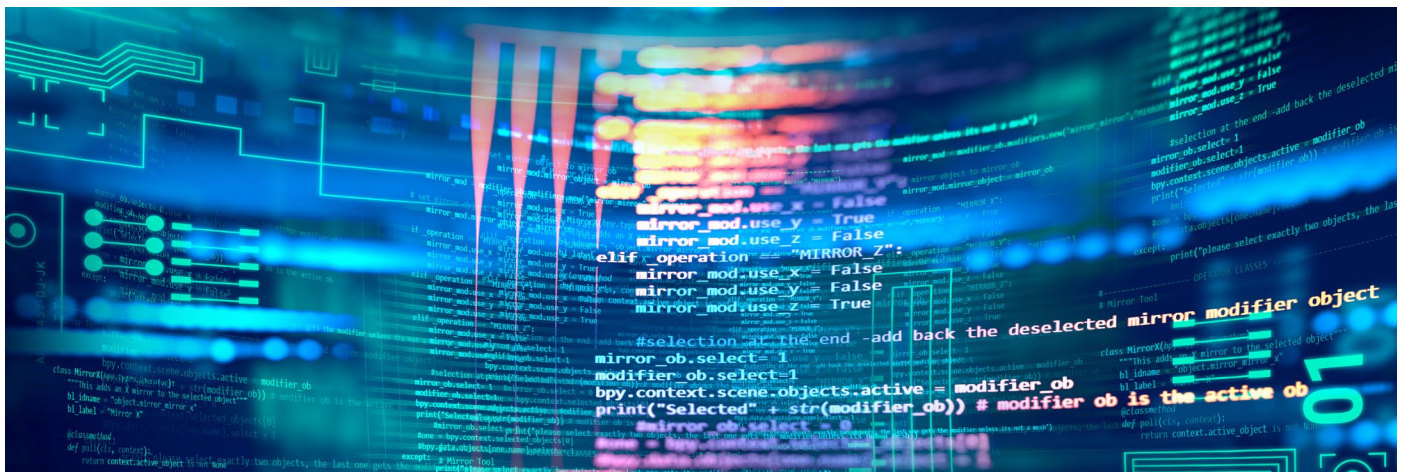

Figure 2. Intel AVX-512 boosts performance for demanding computational tasks

Banks can also benefit from a variety of other Intel investments and programs. For example, the Intel optimization for TensorFlow is a widely used open source ML technology. TensorFlow now defaults to Intel oneAPI Deep Neural Network Library (oneDNN) AI optimizations. Additionally, the Intel Optimization for PyTorch extends PyTorch to provide an extra performance boost on Intel hardware. Intel also supports Analytics Zoo, an open source big data AI platform.

Additionally, banks can take advantage of Intel Optane PMem to run real-time analytics faster using memory tiering. That is, they can use DRAM as a tier for hot data and Intel Optane PMem as a tier for capacity. With this approach, banks gain the ability to process substantial amounts of data faster.[5] With persistent memory, banks gain the advantages of another Intel technology:

- **Intel Optane PMem**: Intel Optane PMem is a revolutionary memory technology that helps banks realize the benefits of real-time analytics. It bridges the gap between DRAM and block storage, providing a unique combination of affordable larger capacity and support for data persistence.

Intel also provides performance advantages for both commercial and open source software—including software from DataRobot, SAS, and SAP. Intel worked with SAP to improve the data and analytics capabilities of SAP Business Warehouse on the SAP HANA platform, making use of 3rd Gen Intel Xeon Scalable processors and Intel Optane PMem.[6] Additionally, cloud service providers (CSPs) collaborate with Intel to optimize customer offerings around intelligent experiences and high-speed connectivity.[7] Finally, the Intel AI Builders program offers optimized and market-ready partner solutions for financial-services firms deploying AI solutions.

Intel and its partners are delivering

As the banking industry transforms itself to keep pace with growing customer expectations, complex regulations, and cybersecurity threats, banks need optimized real-time solutions. Intel and its partners are delivering.

Contact your Intel sales rep or find an Intel partner solution in the Intel Solutions Marketplace.

[1] Hazelcast. "Adding Real-Time Stream Processing to Promote Offers at the Right Time." https://hazelcast.com/resources/adding-real-time-stream-processing-to-promote-offers-at-the-right-time/.

[2] Intel. "PayPal Solves Fraud Challenges." October 2021. intel.com/content/www/us/en/customer-spotlight/stories/paypal-customer-story.html.

[3] eperi. "eperi & Intel SGX – Confidential Computing on a new Level." https://eperi.com/success-stories/intel-sgx/.

[4] 1.70x higher Monte Carlo performance App Version: v1.1; Build notes: Tools: Intel MKL 2020u4, Intel C Compiler 2020u4, Intel Threading Building Blocks 2020u4; threads/core: 1; Turbo: used; Build knobs: -O3 -xCORE-AVX512 -qopt-zmm-usage=high -fimf-precision=low -fimf-domain-exclusion=31 -no-prec-div -no-prec-sqrt

Base configuration: 8280: 1-node, 2x Intel Xeon Platinum 8280 (28C/2.7GHz, 205W TDP) processor on Intel Software Development Platform with 192 GB (12 slots/ 16 GB/ 2933 total DDR4 memory, ucode 0x4002f01, HT on, Turbo on, CentOS Linux 8.3.2011, 4.18.0-240.1.1.el8_3.crt1.x86_64, 1x Intel_SSDSC2KG48. Tested by Intel between February 1, 2021 and February 20, 2021.

New configuration: 8380: 1-node, 2x Intel Xeon Platinum 8380 (40C/2.3GHz, 270W TDP) processor on Intel Software Development Platform with 256 GB (16 slots/ 16 GB/ 3200) total DDR4 memory, ucode 0x055261, HT on, Turbo on, CentOS Linux 8.3.2011, 4.18.0-240.1.1.el8_3.crt1.x86_64, 1x Intel_SSDSC2KG96. Tested by Intel between March 12, 2021 and March 29, 2021.

[5] Intel. "Memory Optimized for Data-Centric Workloads." intel.com/content/www/us/en/architecture-and-technology/optane-dc-persistent-memory.html.

[6] ASUG. "How SAP and Intel Are Collaborating to Improve the Data and Analytics Capabilities of SAP Business Warehouse on SAP HANA." Sponsored by Intel. October 2021. asug.com/insights/how-sap-and-intel-are-collaborating-to-improve-the-data-and-analytics-capabilities-of-sap-business-warehouse-on-sap-hana.

[7] TechTarget. "The Cloudification of Networks Is Here: 5 Ways Google Cloud and Intel Are Advancing CSP Networks." Sponsored by Google and Intel. techtarget.com/searchdatacenter/EdgeTechnology/The-Cloudification-of-Networks-Is-Here-5-Ways-Google-Cloud-and-Intel-Are-Advancing-CSP-Networks.