

Accelerated Operations for Telecom and Financial Services

Online Transaction Processing

Intel® Xeon® Processor E7-8800 v4 Product Family

Support high online transaction volumes in real time, for a smooth customer experience even at peak loads. Optimized performance of the AsialInfo ADB* database on the Intel® Xeon® processor E7-8800 v4 product family provides smooth operation for service providers when they need it most.

AsialInfo ADB* is a scalable database for online transactional processing (OLTP) that specifically targets mission-critical usages, such as those in the telecom and financial services sectors. The database is highly optimized for the Intel® Xeon® processor E7-8800 v4 product family, enhancing its performance and scalability in customer implementations.

Deploy AsialInfo ADB* on the Intel® Xeon® processor E7-8800 v4 product family.

- **Serve large numbers of customer operations** in real time
- **Support high scalability** to help ensure 24/7 operation
- **Maximize the value of capital investment** with high data-center efficiency

Mission-Critical Architecture of AsialInfo ADB

AsialInfo ADB is widely used in mission-critical implementations that require high availability, large throughput, and flexible scalability. One example is to support the online charging system (OCS) that is at the heart of many operations in the financial services industry, and its performance directly influences end-user experience and customer satisfaction.

Implementation on Intel® architecture benefits customer OCS systems by helping them serve large numbers of online charging and recharging operations in real time, even during peak business hours. In addition, high reliability reduces the frequency and cost of server downtime while helping to protect the integrity of critical customer data. Flexibility of the solution also helps save on operating costs and reduces IT complexity.

“The Intel® Xeon® processor E7-8890 v4 product family demonstrates **great technology advantages**, in terms of performance and reliability. It enables AsialInfo ADB customers to experience a 27% performance improvement compared to the previous generation, and a 78% gain compared to the Intel® Xeon® processor E7-8890 v2. These gains will provide **better user experiences** for our customers¹.”

- Jiang Mingjun, R&D Manager, AsialInfo

AsialInfo ADB meets the requirements for these critical implementations through both internal design characteristics and synergies with Intel architecture, including the following:

- **Cluster-based operation.** The ability to spread computation across the cluster allows multiple systems to contribute to high transactional performance, scaling out as needed. Replication across nodes helps protect data in the event of hardware failure, enhancing availability and guarding against loss. High throughput and traffic-management offloads from 10 Gigabit Intel® Ethernet Converged Network Adapters optimize these capabilities.

- **Data-record persistence.** Intel® Solid State Drives (Intel® SSDs) deliver fast data-access speeds and provide a non-volatile memory store to retain an intact set of data, even in the event of a system failure or restart. That record persistence improves system stability and helps protect customers against costly loss of mission-critical data.

- **Processing headroom.** Transactions are accelerated by the massive resources afforded by the Intel Xeon processor E7-8800 v4 product family, including up to 24 TB of RAM per system², up to 24 cores per socket, and up to 60 MB last-level cache. These performance increases are essential as service providers expand their range of offerings and grow their subscriber bases.

Performance Optimization for the Latest Intel® Xeon® Processors

To enhance customer outcomes, Intel engineers are engaged in an ongoing collaboration with the team at AsialInfo to optimize AsialInfo ADB for the latest enhancements to Intel architecture. As shown in Figure 1, benchmark results show a speedup on the Intel Xeon

processor E7-8800 v4 product family of 1.27X compared to the previous processor generation, and a speedup of 1.78X compared to the generation before that¹. These results demonstrate that customers can achieve significant performance gains through hardware upgrades, even if they already have relatively new servers. Workload acceleration ensures headroom for providers as they add more customers and new services.

Overall performance of AsialInfo ADB is aided by accelerated data access from the Intel® SSD DC P3700 series using the fast PCI Express* bus. Comparison of benchmark testing with the Intel® SSD DC S3700 series (which access data using SATA connections) shows a performance increase of 1.58X, as shown in Figure 2³. This faster data access helps service providers maintain application responsiveness, even when customer traffic peaks.

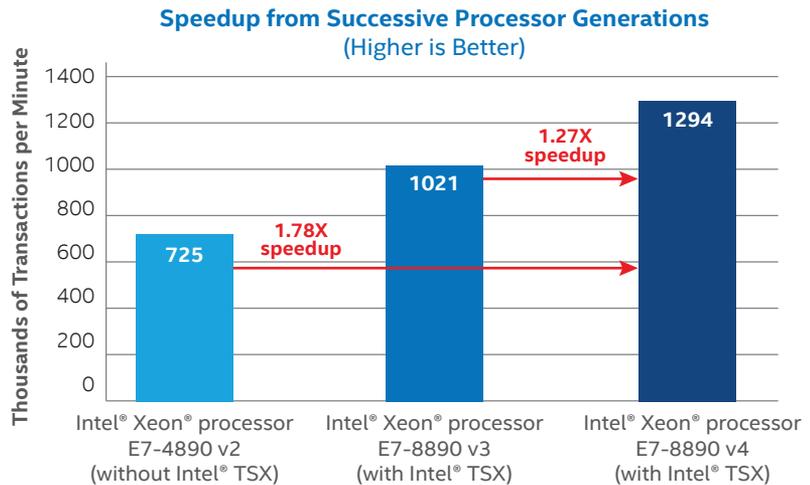


Figure 1. Generation-to-generation performance increases for AsialInfo ADB* on the Intel® Xeon® processor E7-8800 v4 product family.¹

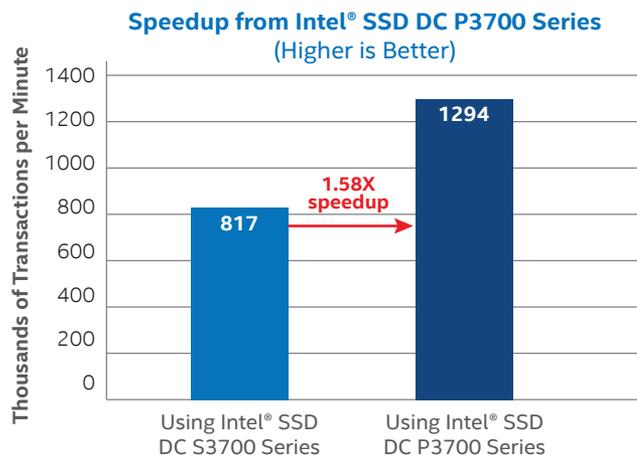


Figure 2. Performance increases for AsialInfo ADB* using the Intel® SSD DC P3700 series.³

Hardware optimizations made through co-engineering by the Intel and AsialInfo teams contribute greatly to these advances in performance. For example, enablement for Intel® Transactional Synchronization Extensions (Intel® TSX), which was introduced in the Intel Xeon processor E7 v3 product family, lets database code take better advantage of the parallelism from large processor core counts, helping providers scale their operations without performance compromises. In fact, tests using the current-generation processor (not shown in the figure) showed a speedup of 1.22X when Intel TSX is enabled⁴.

Intel® Advanced Vector Extensions 2.0 (Intel® AVX 2.0) also contributes to accelerated database performance. Optimization using this technology enables AsialInfo ADB to handle the complex algorithms often associated with advanced services more rapidly, helping ensure a positive customer experience. One example is the database's row-compression scenario: tests using the current generation of processors (not shown in the figure) showed acceleration of this scenario by 1.34X when Intel AVX 2.0 is enabled⁵.

The increased performance and scalability from these advances help expanding enterprises, including telecom and financial service providers, deliver enhanced customer experiences as they seek out new sources of profitability.

Conclusion

The Intel Xeon processor E7-8800 v4 product family provides a robust foundation for mission-critical infrastructure to support the demands of modern, data-driven businesses. AsialInfo ADB is optimized to take advantage of platform capabilities that range from the increased performance of the processor itself—including enablement for features such as Intel TSX and Intel AVX 2.0—to accelerated storage based on the latest Intel SSDs.

This breakthrough compute performance helps service providers be more responsive to their end customers, even at times of peak usage. At the same time, the solution stack eliminates the need for expensive special-purpose hardware, delivering substantial CAPEX advantages, **so enterprises can do more with less.**

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¹ AsialInfo ADB*: AsialInfo ADB* Database OCS - k-tpmC workload. OS: AsialInfo ADB on Ubuntu 15.10, Kernel 4.2, ADB v1.1, glibc 2.21. Testing done by AsialInfo and Intel April 2016.

BASELINE: 4S Intel® Xeon® processor E7-4890 v2, 2.8GHz, 15 cores, turbo and HT on, 256GB DDR3/1333, DIMM, BIOS 38R02, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network.

NEXT GENERATION: 4S Intel® Xeon® processor E7-8890 v3, 2.5GHz, 18 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS 56R01, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network.

NEW: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network.

² 8S design with latest 3DS LRDIMMs.

³ AsialInfo ADB*: AsialInfo ADB* Database OCS - k-tpmC workload. OS: AsialInfo ADB on Ubuntu 15.10, Kernel 4.2, ADB v1.1, glibc 2.21. Testing done by AsialInfo and Intel April 2016.

BASELINE: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 800 GB x 3, 10-Gigabit Intel® X540-AT2 network.

UPGRADED SSDs: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network.

⁴ AsialInfo ADB*: AsialInfo ADB* Database OCS - k-tpmC workload. OS: AsialInfo ADB on Ubuntu 15.10, Kernel 4.2, ADB v1.1, glibc 2.21. Testing done by AsialInfo and Intel April 2016.

INTEL® TSX DISABLED: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network (ADB compiled with disable TSX option).

INTEL® TSX ENABLED: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network.

⁵ AsialInfo ADB*: AsialInfo ADB* Database OCS - k-tpmC workload. OS: AsialInfo ADB on Ubuntu 15.10, Kernel 4.2, ADB v1.1, glibc 2.21. Testing done by AsialInfo and Intel April 2016.

INTEL® AVX 2.0 DISABLED: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network (enable data compression option, disable avx2).

INTEL® AVX 2.0 ENABLED: 4S Intel® Xeon® processor E7-8890 v4, 2.2GHz, 24 cores, turbo and HT on, 256GB DDR4/1600, LVDIMM, BIOS: 338R00, Intel SSD S3700 for OS, Intel SSD P3700 2TB x 2, 10-Gigabit Intel® X540-AT2 network (enable data compression option, enable avx2).

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