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Enhancing the Supply Chain with Intel® Architecture

Huawei Technologies Co., Ltd. doubles system performance, boosts database performance by 20 percent, enhances business flexibility, and cuts operating costs by migrating its supply chain system from RISC to Intel® architecture

Huawei is the world's leading supplier of information and communication solutions, with business in over 170 nations and regions, serving approximately one-third of the global population.

CHALLENGES

• **Support more complex business needs.** Both the increasing number of customers and more complex business demand a higher-performing acquisition planning system (APS) to ensure stable and reliable operation.

• **Improve business agility.** Improve the flexibility of the APS to increase business agility.

• **Reduce costs.** Enhance the APS with better performance and higher scalability at a lower cost to enable the company's future development.

SOLUTION

• **Migrate to Intel® architecture.** Achieve better computing performance, higher reliability and enhanced scalability and lower the costs of system operation, maintenance, and expansion by migrating the APS from the RISC architecture to Intel architecture and running the database as an independent system.

IMPACT

• **Improved system performance.** Huawei cut APS job run time by more than 50 percent and improved database performance by 30 percent using the Intel® Xeon® processor E7-4800 V2 product family with enhanced reliability, availability, and serviceability (RAS).

• **Enhanced business flexibility.** The updated APS can be run three or more times per day compared with once a day in the past, maximizing productivity by enabling dynamic adjustments of the production plan.

• **Lower system operating costs.** Both operating and future expansion costs are lower with the new system than with the old RISC-based system.

Huawei Technologies Co., Ltd. was founded in Shenzhen, China, in 1987. Huawei launched APS for advanced planning and schedule-based supply chain management using IBM Power* 780. Considering its growing business in the consumer sector (cellphones, tablet PCs, and home media), based upon Huawei's experience with its APS for enterprise users, and to ensure a clear boundary between its businesses, Huawei launched its user-oriented APS using IBM Power 750 in 2010.

Now, after over two decades of high-speed growth, Huawei has become the world's leading supplier of information and communication solutions. Its APS has become one of the core systems supporting its supply chain planning. More than 50 million rows of data records obtained from sources like enterprise resource planning (ERP) and contract processing platform (CPP) every day were processed in the local database server and then sent to the RISC architecture-based APS engine, which then

Huawei improves performance, reliability, and scalability while reducing costs by switching to Intel® architecture.

computed and generated purchasing and processing plans.

With the growth in orders, the importance of Huawei's APS in balancing procurement, production, and inventory became more apparent. But the RISC architecture-based APS was limiting the flexibility of Huawei's business in terms of computing performance, scalability, and cost.

Huawei's APS is a resource optimization planning system for both short-term production planning and long-term forecasting. It is a powerful tool in improving and optimizing enterprise supply chain management. As a key enterprise application, Huawei APS plays an increasingly important role in helping Huawei maintain its leading position in the industry and sustain business growth:

- Allows planners to make forecasts on the basis of both qualitative and quantitative information and manage fluctuations to the forecasts.

- Supports both constraint- and rule-based scheduling, providing online production visibility.

- Improves visibility and traceability of the plan and provides an interactive simulation function to improve accuracy.

- Allows quick available to promise (ATP) checks and order inquiries, which can aid in order fulfillment. Supports cooperative planning (e.g., forecasting, availability, and purchase orders) with suppliers.

Business requirements for Huawei's APS system

As the needs of Huawei's customers become more customized, the ability to optimize the entire supply chain—including Huawei, its suppliers, and its customers—is a key competitive factor. That includes the ability to prepare optimized production plans for both enterprise and consumer products, minimize production costs, and fulfill customer orders accurately and reliably.

Every Huawei product goes through hundreds of procedures through the supply chain including planning, manufacturing, packing, storing, and delivery. Huawei APS carries out continuous synchronized, real-time calculations for all resources including materials, machine equipment, staff, suppliers, customer needs, and transportation. A change to any single item may require recomputation of complex mathematical calculations, which depend on the computing capacity of APS.

With customer needs becoming more diversified and customized, Huawei must deliver more types of products in a shorter time, making supply chain management more complicated. In fact,

Huawei APS Production Environment

APS Engine
Intel® Xeon® processor E7-4830 v2

Server OS: Microsoft* Windows*

Server OS: Microsoft Windows

APS User

END User

Oracle* Real Application Clusters (RAC)
Intel Xeon processor E7-4830 v2

Server OS: Linux*

Server OS: Linux

Huawei APS Disaster Recovery Environment

APS Engine
Intel Xeon processor E7-4830 v2

Server OS: Microsoft Windows

Server OS: Microsoft Windows

Synchronization

Oracle RAC
Intel Xeon processor E7-4830 v2

Server OS: Linux

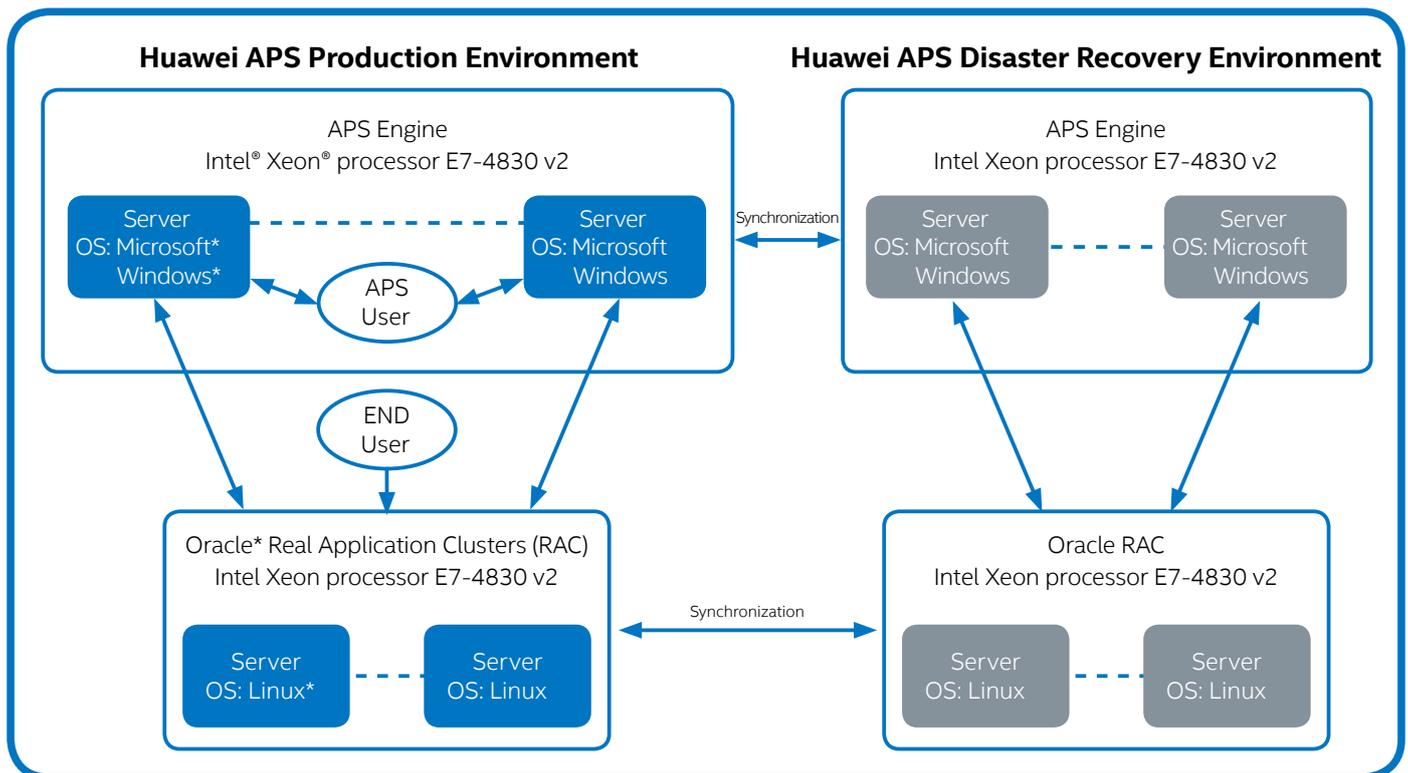Server OS: Linux

Synchronization

Figure 1. Huawei's Intel® architecture-based acquisition planning system (APS) system architecture

Huawei's APS handles five times as much data as it did in 2011. Restricted by the performance of the system, APS could only run once a day. However, the company needed to run the system at least three times a day to prepare accurate production plans, monitor production in real time, and guarantee on-time delivery and smooth production. The performance of the RISC architecture became a bottleneck in Huawei's APS.

The performance of Huawei's RISC architecture-based APS was also affecting the company's business agility. The development and production of any new product also depended on the performance and capability of APS.

Improving the existing RISC architecture-based APS was cost prohibitive, so Huawei needed to move the APS to a platform that provides better performance and scalability at a lower cost.

Migrate to Intel® Architecture for higher performance

After detailed tests, Huawei's IT department decided to migrate its APS from RISC to Intel architecture (Figure 1).

To further improve system performance, Huawei moved the APS engines and database servers from the original single-server design to multiple Huawei RH5885H V3 server clusters based on the Intel Xeon processor E7 v2 product family.

The new APS for enterprise products consists of 18 servers, including 12 in production mode and six for disaster recovery. Among the 12 production servers, application engine and database server are running on eight and four servers, respectively, with active backup. The new APS for consumer products consists of 12 servers including eight in production mode and four for disaster recovery. Among the eight production servers, the application

LESSONS LEARNED

- Business-critical applications need a hardware system with high reliability. Platforms based on Intel® architecture provide performance, reliability and stability at a lower cost.

- With the RISC architecture, keeping up with the demands of new businesses and users was cost prohibitive. Migrating business-critical applications to the Intel architecture can provide a more scalable solution.

- Flexibility and agility are essential to a business. Huawei's Intel architecture-based cluster is much easier to expand than the old RISC-based system.
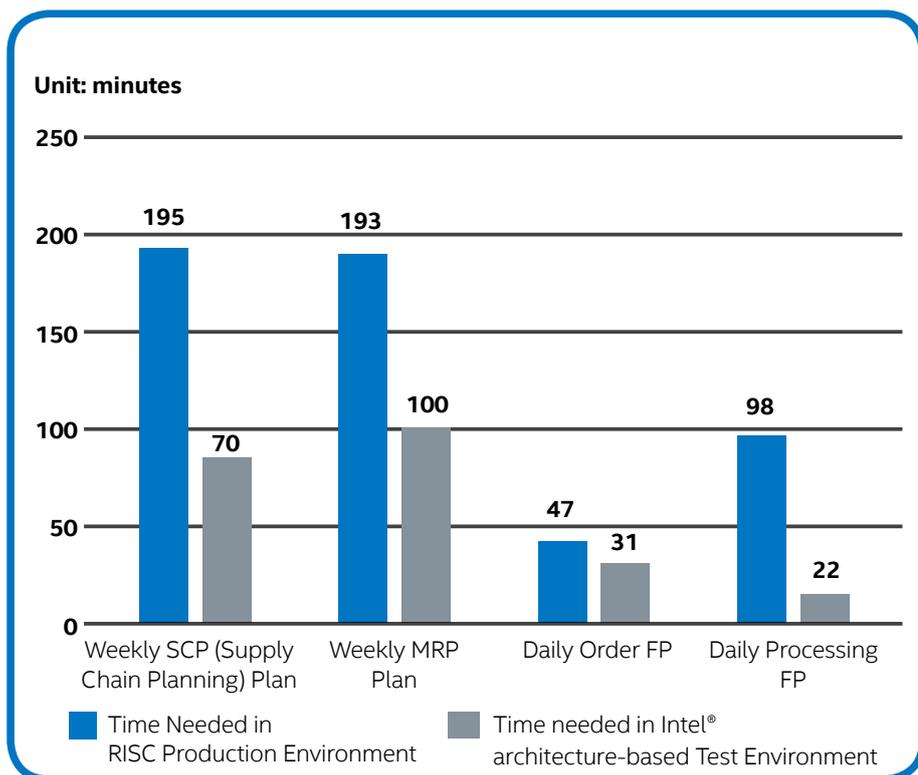
Unit: minutes

Figure 2. Comparison of time required to run jobs on Huawei acquisition planning system

System module	Task name	Time consumption with Intel®architecture (minutes)	Time consumption with RISC architecture (minutes)	Difference (minutes)	Percentage of improvement
data_stg.d00_isolate	main	3.2	8.1	4.9	60%
data_stg.d01_salesorder	main	24.6	35.4	10.8	31%
data_stg.d01_salesorder	main-> copy_sw_order	0.5	8.6	8.1	94%
data_stg.d03_inv	main_p	3.8	4	0.2	5%
data_stg.d04_wip	main	7.5	9.1	1.6	18%
data_stg.d08_organization	main_p	2.2	3.9	1.7	44%
data_stg.d10_poprasl	d10_poprasl_main	32.3	54.6	22.3	41%
data_stg.d12_bom_routing	main	19	23.1	4.1	18%
data_stg.d15_fn	main_p	2.8	4.9	2.1	43%
	Table snapshot	**47**	**67**	**20**	**30%**
data_hub.p05_salesorder	main	37.3	62.8	25.5	41%
data_hub.p06_item	main_p	4.1	7.6	3.5	46%
data_hub.p07_inv	main_p	1.5	2.9	1.4	48%
data_hub.p09_organization	main_p	0.4	0.5	0.1	20%
data_hub.p11_po	p11_po_main	7.7	22.7	15	66%
data_hub.p13_itemgroup_wip	main	9.9	24.3	14.4	59%
DATA_HUB.p14_bom	main	13.3	36.7	23.4	64%
data_hub.p16_fn	main	24.6	40.2	15.6	39%
DATA_HUB.p19_routing	main	11.6	20.4	8.8	43%
data_hub.p20_ph	main_p	0.8	2.1	1.3	62%
data_hub.roi_order_to_aps	wip2purchaseorder_main	0.2	2.7	2.5	93%
	Total snapshot	**64**	**105**	**41**	**39%**

Table 1. Comparison of Huawei acquisition planning system database performance

engine and database are running on six and two servers, respectively, with active backup. After migration, tests show the average running time of the new Huawei APS was reduced by more than 50 percent and the average running time in the database server was 70 percent of the original architecture, which means a reduction by 30 percent. The improved performance of the APS engine and database has enabled Huawei to run the system three times a day, which means Huawei can make three adjustments a day based on changes in materials, staff, supply, customer needs, and transportation. This enables the company to optimize production. Figure 2 compares time consumption before and after the migration. Table 1 shows database performance.

Huawei is very satisfied with the performance of the Intel Xeon processor E7-4830 v2 product family. Huawei's APS can carry out new functions such as more advanced what-if analysis that lets the company quickly combine production information—like orders, routing, inventory, and productivity constraints—to optimize its production plan and decision-making, balancing the interests of both Huawei and its customers. In addition, since Huawei's APS relies on local in-memory data for fast processing, the server supports up to 6TB of memory, enabling high scalability for the APS.

The enhanced scalability of the system architecture lays a solid foundation for Huawei to continue to expand its businesses. In the future, Huawei will only need to add servers to extend the performance of the APS to meet business demands. Huawei estimated the cost of extending the new system will only be one-tenth as much as for the old RISC architecture-based system. The new system architecture also lays the foundation for Huawei to move its APS to a cloud computing platform in the future.

Since APS is a business-critical application for Huawei, the reliability of the system is a key consideration. With scalable performance, large memory capacity, and high reliability, the Intel Xeon processor E7-4800 v2 product family provides a stable foundation for Huawei's APS as well as its business operation.

In the next stage, Huawei will deepen cooperation with Intel and take advantage of the performance of the APS to constantly optimize its supply chain planning and deliver higher-quality products to customers at a lower cost.

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