



JR East Japan improves IT service quality through efficient data sharing

HPE Moonshot System consolidates monitoring of multiple IT infrastructures

Objective

Improve operational efficiency and continuously improve IT service quality by sharing health and performance information from 200 separate IT systems with the entire company

Approach

Deploy HPE Moonshot System as the platform for a company-wide fault information system built on open source software

IT Matters

- Lowered power consumption by installation of HPE Moonshot System with Intel® Atom™ Processor C2750
- Simplified configuration and operation in comparison to an individual general-purpose server by using a single chassis populated with 45 server cartridges to perform workloads such as Web serving, application delivery, database, etc.
- Integrated servers and storage into an environment of "1 chassis = 1 system"

Business Matters

- Enhanced IT service quality by sharing IT system health and performance information with the whole company
- Reduced power consumption and footprint without virtualization technology
- Strengthened open source software development capabilities of JEIS subsidiary SKK with support from HPE Open Source Expert Services



JR East Japan Information Systems Company (JEIS) has fully adopted open source software to develop a business-critical fault information system on the HPE Moonshot System ultra high-density server platform. The company consolidated all the functions required for the fault information system into a single 4.3U Moonshot 1500 Chassis populated with 45 HPE ProLiant m300 Server Cartridges.

Challenge

Supporting the infrastructure of daily life in Japan

Since JR East Japan Information System (JEIS) became independent from the information systems department of East Japan Railway (JR East) in 1989, JEIS has developed and managed the IT infrastructure for approximately 70 JR East companies and more than 200 of its major systems.

"The systems that JEIS is responsible for impact many everyday services such as railways, bullet trains, and Suica systems. The main system supports social infrastructure including safe and punctual railway services, and an innovative electronic money service," says Minoru Muto, general manager of the Safety Measures Promotion Office.

“Being able to select an optimal system for a variety of workloads will become increasingly important, and having an ultra high-density environment such as the HPE Moonshot System is greatly valued. The evolution of this new server technology and our own understanding of how it can impact our business have just begun.”

— Minoru Muto, general manager of Safety Measures Promotion Office, JR East Japan Information Systems Company

Safe and punctual railway operation is one of the well-known Japanese world-class social infrastructure services. As an example, the Yamanote Line, which operates a train every two minutes during rush hour, symbolizes the Japanese standard for reliable railway transportation.

Kenji Nakagawa, group leader of the Safety Promotion Group, explains, “In order to maintain its timely schedule, the Safety Measures Promotion Office must react to all system problems and initiate countermeasures to provide quick resolutions.

“Creating a database of failures and countermeasures to prevent similar troubles and recurrence is a big part of our role. We made the decision to shift to the entirely new ultra high-density server platform. This new system allows the entire company to share cause and effect data with corrective action for issues through a fault information system.”

When a software failure is found, the status of the software is immediately flagged on the fault information system’s portal, and statistical analysis results are provided to the development team. Shinkichi Itaki, sub-leader of Safety Promotion Group, highlights the possibilities of the fault information system using the HPE Moonshot System. “For hardware failure, this information is used to set priority components for review or

inspection. Also by measuring the medium to long-term trend, we can estimate the risk of future failures and prevent them.” The fault information system needs to continuously improve the quality of IT service at 1400 locations monitored by JR East Group every day.

HPE Moonshot System saves space and power usage

The Moonshot System is an innovative server architecture released in April, 2013. A single 4.3U form factor chassis holds 45 server cartridges. With the system-on-chip (SoC) design, HPE Moonshot System reduces up to 80% of space and 89% of energy usage compared to traditional servers. Moreover, a variety of server systems are available depending on what type of cartridge is used.

Kakuichi Nakamori from JEIS subsidiary SKK recalls his first impression of the HPE Moonshot System: “I was surprised by the configuration of 45 cartridges in one chassis, and also its capability to be configured in order to meet requirements of systems and applications. It is very unique.”

Mr. Nakagawa recalls: “Initially we planned to develop our fault information system as Windows®-based. However, we later made the big decision to apply open source software throughout in order to aggregate all the functions of the fault information system into one chassis with the HPE Moonshot System.”

¹ According to a survey by HPE



Kazunori Nishijima from SKK says, “I am excited by the potential of this innovative technology. I had a feeling that we could increase efficiency using a high-density server design that appropriately distributes the 45 server cartridges and their resources. Also, the Moonshot System scalability, and ability to manage data without using external storage was intriguing.”

The HPE ProLiant m300 Server Cartridges that JEIS deployed are equipped with Intel® Atom™ Processor C2750 (8 core, 32GB memory, 1TB HDD or 240GB SDD). This small cartridge, which is just slightly bigger than the palm of your hand, achieves performance comparable to a 1U server of entry-class¹.

Solution

MySQL Cluster open source database provides scalability and lower cost of ownership

According to Mr. Nakamori, the first challenge was to figure out how to hold all the data in the chassis. It was necessary to have a distributed database to complete the web application within one HPE Moonshot chassis.

Mr. Nishijima adds, “We focused on MySQL Cluster open source database, which was a referral from Hewlett Packard Enterprise. MySQL Cluster can manage the distributed data on multiple nodes of servers as well as ensure availability by redundancy of data. It is a big benefit that we can use SQL statements in the same manner as commonly used databases in business systems even though this is what is called NoSQL.”

HPE Technology Services Consulting

HPE Technology Services Consulting helped JEIS develop the fault information system using open source software. Mr. Udo from SKK says: “We had a variety of discussions with HPE OSES members about everything from the design of the system architecture to the selection of technologies, and got their advice. When we were faced with an issue while in development, HPE OSES prepared the same environment as ours to troubleshoot. HPE’s knowledgeable engineers provided a great deal of know-how and a wide range of problem-solving services for issues with open source development of the OS and middleware.”

The SKK development team made a prototype of the fault information system to verify the performance and operation of HPE Moonshot System and that inspired confidence. “We deployed a solid state disk (SSD) for the MySQL Cluster data node which requires high-speed reading and writing. Three HPE ProLiant m300 Server Cartridges were configured as a single node group and the data was designed to disperse on those three node groups,” Mr. Nishijima says.

Moreover, the Moonshot System built-in system monitoring capabilities help simplify management. “We assigned two server cartridges for monitoring the entire Moonshot System. Because of the unique Moonshot architecture, completely independent individual servers can be used to design a monitoring system without affecting other server nodes and databases,” reports Ms. Mishina.

Case study

JR East Japan
Information Systems
Company

Industry

Information
technology

Customer at a glance

Hardware

- HPE ProLiant m300 Server Cartridges
- HPE Moonshot 1500 Chassis

Software

- HPE Insight Cluster Management Utility

HPE services

- HPE Open Source Expert Services
- HPE Foundation Care Services
- HPE Installation and Deployment Services

Benefit

HPE Moonshot System evolves with users

When the system design was nearly complete, JEIS and SKK staff visited HPE's server development facility in Houston to exchange opinions. Their discussion centered on the capability of having mixed, single-purpose cartridges in one chassis providing a

"Web Infrastructure in a Box." Also the JEIS and SKK team learned about HPE Insight Cluster Management Utility, which automates deployment of the HPE Moonshot System and this secured their confidence that the system was ready for the production environment.

HPE Moonshot System has continued to evolve in response to users' and partners' feedback. In the background of this, there is a growing need for flexible use without waste between virtualized and physical environments.

Mr. Nakamori states, "Although virtualization technology has brought many benefits, it is not necessarily universal. Forty-five server

nodes, which can change where to assign data, or turn on and off depending on the requirements, make the potential of the HPE Moonshot System very attractive."

Mr. Nakagawa adds, "We are always seeking ways to provide the service quicker and for less cost. Our development of this fault information system on the HPE Moonshot System using open source software will be a milestone. We have also embarked on a plan to build more mission-critical business systems."

Mr. Muto concludes, "Being able to select an optimal system for a variety of workloads will become increasingly important, and having an ultra high-density environment such as the HPE Moonshot System is greatly valued. The evolution of this new server technology and our own understanding of how it can impact our business have just begun."

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