Using Cloud Computing to Achieve Stable Operation of a Remote Surveillance/Maintenance System Supporting More Than 1,100 Automated Vertical Parking Lots throughout Japan

IHI Transport Machinery operates a remote surveillance/maintenance system that monitors the company's vertical parking lots, enabling rapid detection of malfunctions or any other signs of trouble. Because it affects safety, the system needs to operate continuously 24 hours a day, 365 days a year. However, because the company was operating the system on premises, there was concern about business continuity. To assure reliable, uninterrupted operation, the company migrated the system to NEC's Cloud Infrastructure Service, "NEC Cloud IaaS." Not only has this made it possible to ensure safety thanks to NEC's robust data centers and thorough internal control measures, but it has also allowed IHI to take advantage of all the other benefits of cloud computing such as the ability to expand and update server resources as and when required.

Customer profile

Name: IHI Transport Machinery Co., Ltd.
Address: ST. LUKE'S TOWER, 8-1 Akashi-cho, Chuo-ku, Tokyo 104-0044, Japan
URL: http://www.iuk.co.jp/english/

Takashi Nito
Deputy General Manager
Control Regulation Group
Maintenance Technology Department
Maintenance Management Department
Parking System Division
IHI Transport Machinery Co., Ltd.

Koki Suzuki
Deputy General Manager
Development Group
Technology Department
Production Management Department
Parking System Division
IHI Transport Machinery Co., Ltd.

Concerns about business continuity prompt move away from on-premises system

IHI Transport Machinery develops, designs, and manufactures parking systems, in particular, multi-story vertical parking and mechanical parking systems that facilitate the parking of more cars in a smaller and more compact space. The company also manufactures large cranes, such as those used in the construction of the Tokyo Skytree. Known for delivering Japan's first vertical parking lot to the Takashimaya department store in Nihonbashi, Tokyo, in 1962, IHI Transport Machinery has been responsible for the introduction of numerous innovative products since then and has been a leader in pushing forward the progress of motorization in Japan.

In recent years, customers have demanded features such as energy efficiency, low noise, and low vibration for vertical parking lots. But the most important, and the one upon which IHI Transport Machinery places priority, is safety. To this end, the company continuously strives to improve the quality and reliability of its machinery, as well as making effective use of IT in maintenance and inspection operations by deploying a remote surveillance/maintenance system that detects breakdowns or any signs of trouble by performing real-time surveillance of operation conditions and remote inspection.

Specifically, this system collects and stores operation data transmitted via dedicated lines from modules located in the parking facilities. Whenever there is a problem, the system is able to visualize when the problem occurred, what happened, and where, sending a real-time alert to an operator who can immediately assess and confirm the problem and take appropriate measures, such as promptly dispatching engineers to the site to repair a malfunction.

As this system is mission-critical, it is imperative that it be able to operate continuously and reliably 24 hours a day, 365 days a year. IHI Transport Machinery was concerned, however, that its existing on-premises infrastructure was vulnerable to service interruptions that could pose a risk to safety in its parking facilities.

Takashi Nito of IHI Transport Machinery explains it this way. "We were trying to increase reliability by duplicating the system. Even so, it was an on-premises operation at our headquarters, so there was a risk of service suspension if a fire or

outage occurred due to a disaster. In fact, after the Great East Japan Earthquake, planned outages were implemented even in Tokyo, and now it is feared that an earthquake could occur whose epicenter will be directly below Tokyo. We were looking for an environment that would allow us to continue operating the system no matter what happened."

Preparing to migrate to the cloud by evaluating the safety and robustness of data centers

To enhance the reliability of its remote surveillance/maintenance system, IHI Transport Machinery decided to migrate its system to the cloud. Looking back, Koki Suzuki of IHI Transport Machinery says, "We put the service details of all the companies who had made us a proposal in a table and carefully compared their specifications."

Based on their evaluation of the results, IHI Transport Machinery chose NEC's Cloud Infrastructure Service, "NEC Cloud IaaS".

When top management personnel visited the NEC Kanagawa Data Center, which operates the NEC Cloud IaaS, the first thing they noticed was the state-of-the-art equipment used at the facility. Everyone on the tour was particularly impressed by the robustness of the facilities, which included redundant power supplies and extremely high-level security using face recognition and metal detection sensors.

Another factor contributing to the company's decision to adopt the NEC Cloud IaaS was expandability.

According to Mr. Nito, "Our company's parking system business is steadily expanding, and the targets for our remote surveillance/maintenance system now number about 1,100 and are increasing every year. To assure effective coverage, we had to prepare more server resources than would actually be necessary, taking account of peak periods. With the NEC Cloud IaaS, however, we have more flexibility as it gives us the ability to increase resources as necessary depending on the growth of the business."

Centralized system for faster identification and analysis of problems

The NEC Cloud IaaS offers a combination of advanced availability, reliability, and convenience.

The NEC Kanagawa Data Center is located more than 14 kilometers away from an active fault and more than 30 kilometers from the coast, outside the damage-prone area on the hazard map specified by the national and municipal governments. The data center fully complies with FISC Security Guidelines of the Center for Financial Industry Information Systems and is currently preparing to obtain the internal control assurance reports such as SOC 2 Type 1 report. As a result, it is able to provide customers with the highest level of reliability and safety.

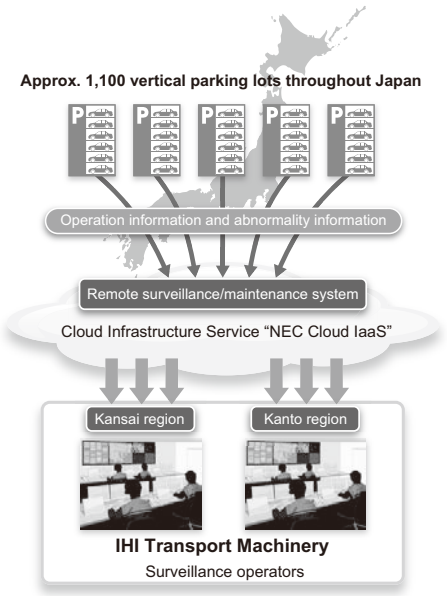
NEC takes security very seriously and has implemented additional security measures of its own. Technical specialists for the NEC Cloud IaaS work in cooperation with NEC's internal security organizations - the Computer Security Incident Response Team (CSIRT) and the Cyber Security Factory - to establish monitoring and reporting structures that will ensure the highest levels of safety and security.

The system now used by IHI Transport Machinery features 10 high-availability (HA) virtual servers on the NEC Cloud IaaS. In addition to the LAN in the data center, NEC also provides WAN lines for secure networking.

This makes it possible for NEC to respond rapidly to any problem such as a slowdown in response time, quickly locating and analyzing a problem to determine whether it resides in the server or in the network, then taking appropriate action to resolve the issue.

Looking for a proactive response to system failures

By migrating its remote surveillance/maintenance system to the NEC Cloud IaaS, IHI Transport Machinery was able to significantly enhance the safety of its systems and facilities (**Fig**.). They are very much looking to NEC to assure the reliability not only of the installation environment such as the robustness of the data center, but also for its commitment to the security and operation infrastructure of the NEC Cloud IaaS itself,



The remote surveillance/maintenance system, which supports the safe operation of vertical parking lots, has been migrated to the NEC Cloud IaaS. This environment supports continuous operation for 24 hours a day, 365 days a year, as well as providing mechanisms that enable rapid, flexible system expansion as necessary to meet the needs of the business.

Fig. Conceptual diagram of current remote surveillance/maintenance system configuration.

which operates in that environment.

As Mr. Suzuki says, “It was difficult to perform comprehensive system surveillance under normal conditions due to the restricted number of staff. But now we will be capable of dealing with system failures more proactively once the transition to the NEC Cloud IaaS is complete.”

Besides the enhanced security and reliability, of course, IHI Transport Machinery can now benefit from the unique advantages of cloud computing, such as significant reductions in operational and management loads and equalization of costs.

Mr. Nito has nothing but praise for NEC’s support throughout the transition. “It has been a very challenging period for our company,” he says. “We are very grateful to NEC, which has been very supportive, going beyond simply assisting us in the technical aspects throughout the project, and doing things such as providing material required for consensus-making in our company.”

Support for overseas expansion

Currently, IHI Transport Machinery is focusing on expanding their parking system business in overseas markets, and movement towards Southeast Asian markets is already underway. The company plans to begin operation of vertical parking lots in the Southeast Asian region from 2015.

“We are now studying whether it makes sense from a business standpoint to apply our surveillance/maintenance system to the vertical parking lots overseas,” says Mr. Suzuki. “If we do decide to adopt the system, we have total confidence in NEC because they have excellent global network service and support.”

As already mentioned, the remote surveillance/maintenance system collects and archives detailed data on the operation conditions in IHI Transport System’s vertical parking lots. The company is currently looking at ways to make more effective use of this data.

“An enormous amount of data has already been collected,” says Mr. Nito. “When this data is combined with externally available data such as weather data to perform so-called ‘big data’ analysis, we think we will be able to gain knowledge that will be useful for our business. In this aspect too, we are greatly looking to NEC, which is an IT professional and at the same time well versed in our business.”

NEC is committed to continuing to give its full support to IHI Transport Machinery’s business by enabling them to take advantage of its advanced technology and expertise in a wide range of fields, including the utilization of big data.

- This article was written in November 2014 and is based on the interview to IHI Transport Machinery Co., Ltd.
- The company names and product names listed herein are the ordinary trademarks of the respective company or registered trademarks of that company.

Information about the NEC Technical Journal

Thank you for reading the paper.
If you are interested in the NEC Technical Journal, you can also read other papers on our website.

Link to NEC Technical Journal website

Japanese

English

Vol.9 No.2 Special Issue on Future Cloud Platforms for ICT Systems

Vol.9 No.2
June, 2015

Special Issue TOP

NEC Information