\Orchestrating a brighter world

NEC

SDN Solutions

Takeuchi Mfg. Co., Ltd.

NEC's SDN-based solution helps Takeuchi Mfg. enhance manufacturing capability.

Overview

Takeuchi Mfg.'s core products are compact excavators, track loaders, and other compact construction equipment used to build homes and other buildings. Internet of Things (IoT) utilization has recently become a major topic in the manufacturing industry, and Takeuchi Mfg. has set its sights on leveraging IoT as it continues to push reforms, implement a wide variety of IT systems, and build new factory buildings.

Toward that end, the company has also dramatically redesigned its network.

Challenges

"In order to make use of IoT, you need the right network," explains Osamu Miyagawa of Takeuchi Mfg. "Unfortunately, our existing network had some issues."

The first issues facing Takeuchi Mfg. were "availability" and "fault-tolerance." Companies in the manufacturing industry must prioritize safe factory operation above all else—downtime caused by network equipment outages is simply not an option. Kenji Yamazaki, also of Takeuchi Mfg., explains: "As IoT advances and the connection between production equipment and information systems grows stronger, there will be an even greater risk of networks going down." In addition to keeping operations running, companies in the manufacturing industry will require that outages be visualized and handled quickly.

"Manageability" was another major issue.

Their existing network required highly specialized work, entering commands on the command line to add or change networks when adding sites or installing new facilities. "That's why we had vendors do that for us. In addition to reducing lead times and costs, we felt that we needed to be able to operate our network more easily on our own," explains Yamazaki.

Customer

• Takeuchi Mfg. Co., Ltd.

Challenges

• The right network is required for IoT. There were issues with the existing network.
• Network downtime that could stop factory operations is not permitted. Advances in IoT will increase the risk of network downtime.
• The existing network required entering commands on the command line to make additions and changes; thus, work was outsourced from the vendor. Takeuchi Mfg. wanted to be able to operate their network more easily on their own to reduce lead times and costs.

Solution

• Takeuchi Mfg. implemented NEC's SDN-based Next Generation Factory Network Solution, supporting companies in the manufacturing industry that are using IoT to reform their value chains.
• Although other vendors proposed solutions utilizing SDN, NEC's solution stood out because of its dynamic network control function.

Results

• The new network uses a topology that provides higher availability with no downtime. The solution combines a firewall and SDN to dynamically respond to threats and enhance targeted attack countermeasures.
• The new network offers a Graphical User Interface (GUI) that allows intuitive and visual management of the entire network, helping to streamline operation management work. This helps to reduce lead times and costs; Takeuchi Mfg. expects to reduce operation management costs by around 30%.
• The new environment makes it possible to flexibly connect new systems, devices, and production equipment as needed. This allows Takeuchi Mfg. to realize a variety of ideas related to IoT utilization.

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Solution

Takeuchi Mfg. made the decision to implement NEC's SDN (Software-Defined Networking)-based Next Generation Factory Network Solution.

This solution supports companies in the manufacturing industry that are using IoT to reform their value chains. It provides a network that offers automation, autonomous control, and optimization to realize factories that are connected, uninterrupted, and manageable.

"The solution met our requirements in terms of being future-proof, available, and easy to manage," says Miyagawa. "Since we were looking to utilize IoT, we felt it was truly the best solution for us."

Although other vendors actually proposed solutions utilizing SDN, NEC's solution stood out because of its dynamic network control function.
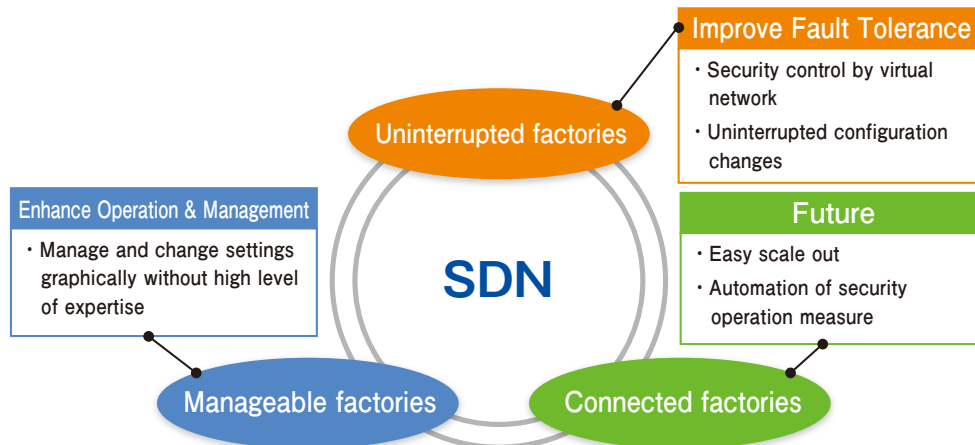
"For example, when an equipment failure occurs, communication paths are automatically set to re-route allowing continuous communication. On the other hand, with solutions from other vendors, the network could only be manually controlled in the same way as traditional technologies. I felt that this point would make a huge difference, especially in terms of availability," says Yamazaki.

The fact that the solution could be implemented in stages also helped seal the deal.

"We decided that migrating the entire network at once was too risky," explains Yamazaki. "On the other hand, NEC's solution seemed like the safer option, as it could work alongside our current network as we implemented it in stages."

●Three values offered by Next Generation Factory Network Solution

Improve Fault Tolerance
・Security control by virtual network
・Uninterrupted configuration changes

Future
・Easy scale out
・Automation of security operation measure

Enhance Operation & Management
・Manage and change settings graphically without high level of expertise

Uninterrupted factories

Manageable factories

Connected factories

SDN

Realizes a network that is best suited to leverage IoT—a crucial management issue in the manufacturing industry. Specifically, the solution provides automation, autonomous control, and optimization to realize uninterrupted, manageable, and connected factories.

Results

"We expect that the new network will enhance our capabilities as a company in the manufacturing industry," says Miyagawa.

• Uninterrupted factories

To provide higher availability with no downtime, the new network uses a topology that leverages the benefits offered by SDN.

Targeted attacks are growing more sophisticated, threatening the safe operation of factories. In response, the new network implements means to strengthen countermeasures against such attacks. The new network also works together with a newly implemented firewall to dynamically handle threats. When the firewall detects a virus-infected terminal, the network automatically isolates the device and quarantines it. "Factories face a variety of security risks—not only attacks from the Internet, but also from malware introduced into the network from USB flash drives and other devices. The new network automatically responds even before we detect the infection. It provides a rapid and accurate initial response that minimizes damage," explains Yamazaki.

With SDN, Virtual Tenant Networks (VTN)—a kind of virtual network that can be logically separated depending on usage—can be created in a single physical infrastructure as the network demands grow. Takeuchi Mfg.'s current network consists of two VTNs (their core system network and a Wi-Fi network for guests). This also helps reduce the risk of malware spreading.

• Manageable factories

Takeuchi Mfg. wanted to totally change the operation of the network they are currently managing: from a command line interface (CLI) that required typing commands on a command line to a graphical user interface (GUI) that would allow intuitive and visual management of the entire network.

"This would make adding and changing networks easier, helping to reduce lead times and costs," says Yamazaki. "In addition to making it easier to configure settings such as the physical topology and VLANs, we would also have a visual representation of the network status, thus allowing us to discover and avoid outages early on, identify causes, and respond quickly. Unlike our previous network, we control the new network ourselves and can try out various settings and

changes. It's very interesting."

The new network also allows them to perform work that they previously outsourced to a vendor. The company expects to reduce operation management costs by around 30%.

• Connected factories

This is an area in which much is expected of IoT utilization.

SDN makes it simple to add and change networks. As a result, it is possible to flexibly connect new systems, devices, and production equipment according to the needs of the organization. "We are still looking into how to use the new network with IoT, and we now have an environment in place to implement a variety of ideas," explains Miyagawa.

For example, RFID tags attached to containers moving throughout the factory can be used to track the movement of people and things. Another possibility is to perform a cross analysis on this data along with management system data or information obtained from sensors attached to production equipment to find efficient traffic lines. This could be a basis to improve factory layouts and work processes.

In addition to managing inventory and other results, the new network could also be used to visualize factory operations in real time and contribute to sales activities, perform production control linked with equipment in each building of the main factory, and more.

Takeuchi Mfg. is also looking to implement SDN in their parts factories and other remote sites, as well as centrally managing all of their networks over a WAN.

Utilizing IoT is a management issue that the manufacturing industry will have to face at some point. NEC will continue to propose solutions using the new network to help Takeuchi Mfg. grow its business.

About

Takeuchi Mfg. Co., Ltd. is an end product manufacturer that supplies construction equipment. Involved in all stages from design development to sales, the company supplies construction equipment such as standard type compact excavators, ultra-compact swivel type excavators, track loaders, track carriers, and industrial mixers.

Takeuchi Mfg. Co., Ltd.