TAKENAKA

NTT Communications
Transform. Transcend.

Takenaka Corporation

Consolidated management of all documents, data and BIM data via cloud.

Establishing a digital info-sharing platform for all stakeholders.

**Service: Arcstar Universal One
Enterprise Cloud
Nexcenter**

Challenges
- Fewer workers and an aging population demand higher productivity
- Siloed sites reduce data sharing and business continuity
- IoT, big data, AI and robotics require a foundation for future use

Solutions
- Migrate main and branch office server functions to the cloud
- Use high-speed technology to match on-premises data access speeds

Benefits
- Data is accessible to employees and customers anywhere, any time
- The cloud serves as a foundation for future digital transformation

Keizo Iwashita
Dr. Eng
General Manager
Group ICT Promotion Department
Head Office
Takenaka Corporation
"By establishing a fundamental base for sharing all kinds of data, I believe we have successfully taken the first step in driving digitization of the construction industry."

Customer profile

Name: Takenaka Corporation
Revenue: JPY 1,216.5 billion (as of March 31, 2017)
Business: Takenaka Corporation is a major construction company that worked on such buildings as Tokyo Tower, Tokyo Dome and Abeno Harukas — buildings that symbolize the times and have become national landmarks of Japan. In recent years, working under the concept of Healthy Community Development, by striving to create spaces and urban communities that contribute to a society of longevity and health, Takenaka Corporation has sought to realize a sustainable society where people can live with peace of mind at all stages of urban development.
URL: www.takenaka.co.jp

Challenges
The distributed management system for each construction site restricted the sharing of documents and BIM data

Takenaka Corporation has always provided architecture in response to customer needs based on its management philosophy: "Contribute to society by passing on the best works to future generations." Takenaka Corporation has worked on numerous buildings symbolic of their eras — including Tokyo Tower, Tokyo Dome, Abeno Harukas and more.

Takenaka Corporation is also known as a company that leads its industry in using advanced ICT. "As with other industries, the construction industry is facing major problems such as a human resources squeeze and the aging of skilled workers. It is now essential for companies to continue to pursue business efficiency and productivity in multiple directions. ICT is essential for solving these problems," says Mr. Keizo Iwashita of Takenaka Corporation. Based on this thinking, in 2014 Takenaka Corporation established the Group ICT Promotion Department to comprehensively manage ICT for the Takenaka Group. Around 7,000 mobile terminals were distributed to sales, design and construction sites, and measures such as "Takenaka Smart Work" were developed to promptly respond to customer needs and improve productivity.

Recently, problems with using ICT have become evident. These problems concern the management and operation of data used at construction sites.

The company has around 500 major construction sites across Japan. Each site handles design and construction information, including documents, CAD and building information modeling (BIM) data, but they also maintain other forms of data such as contracts with partner companies and quality, cost, delivery, safety, environment (QCDSE) process charts. The company has conventionally promoted information sharing among workers and a paperless workflow by storing data on NAS file servers installed at each site.

"However, because this was ultimately a closed system at each site, it was difficult for workers to check data using mobile terminals when leaving the office, or when sharing information with the Osaka or Tokyo head offices, branch offices nationwide, or partner companies across Japan. When attending off-site meetings based on drawings, employees had to print out the data beforehand or send the data ahead of time, and if we wanted to check other data in the course of the meeting, we couldn't do that," reflects Mr. Iwashita.

This method also posed risks for data retention and business continuity in the event of a file server failure or natural disaster at a field site. Since this was an on-premises model, creating backups involved time, effort, and expense, as well as a lot of effort to restore data.

Solutions
Migrate to a cloud file server, aiming to maintain similar response times to the on-premises model

Takenaka Corporation sought ways to manage essential data more easily and reliably. After considering the matter carefully, it decided to build a new file server environment in the cloud and concentrate data collectively. "At this time, we thought about creating a mechanism enabling information to be viewed from the main offices and branch offices, partner companies and from mobile terminals — by consolidating all the documents, various forms of data, BIM data, and more, handled by the main offices and branch offices, in addition to the data at each site," states Mr. Iwashita. By building in redundancy on the cloud side, restoration work in the wake of any disaster would become easier. The company decided this would solve all their problems, including unnecessary operational management of file server equipment.

Figure: Image of cloud file server configuration
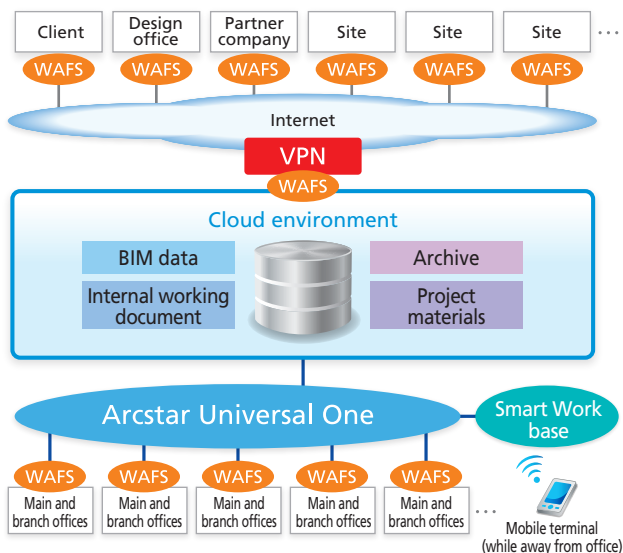
WAFS: Wide Area File Services

File servers that had previously been operated individually at various sites, main offices and branch offices were consolidated in the cloud. This solved the problems of data sharing, operational management and business continuity.

For the data migration destination, Takenaka Corporation selected a private cloud environment proposed by NTT Communications (NTT Com). This cloud file server environment combines the Nexcenter data center service, Enterprise Cloud service and Arcstar Universal One network service among others. In making this selection, the company prioritized support for BIM data access times, a requirement peculiar to construction sites. Specifically, since BIM data handled on sites can exceed several hundred megabytes, display speed often becomes a restrictive bottleneck when using a general-purpose cloud environment. So, the ability to maintain the same level of usability as the original system was incorporated into the requirements.

"NTT Com responded to our request not simply by offering the WAN speed-up solution, but also by thoroughly speed-tuning the system. Although we requested proposals from multiple vendors, it would have proved difficult to comprehensively investigate and eliminate the cause of this speed reduction without NTT Com's ability to provide everything from cloud infrastructure to lines and networks as a single all-in-one provider," said Mr. Iwashita.

Benefits
Established a cloud data-sharing infrastructure to serve as a foundation for digitizing construction sites

Takenaka Corporation is migrating the data from each of its sites, main offices and branch offices to the cloud. Work is still underway to migrate data from about 500 major sites, as well as main offices and branch offices, over a period of 2 years.

Sites that have performed the data migration have achieved the expected results. "Personnel at our company and partner companies can now check data at any time and any location their authority allows. During meetings held externally, they can also view drawings via mobile terminals, which certainly improves productivity," says Mr. Iwashita. Response times for viewing BIM data are good, and the same level of usability as before has been achieved.

Business continuity has also improved. Transferring data to NTT Com's data center makes it impossible for information to be lost even if a site office is struck by some disaster. At the same time, the cloud environment implements redundancy between physically remote data centers to ensure further security.

"Since we're able to leave operational management to NTT Com, we've also been able to reduce the burden on employees who previously managed equipment and handled disaster response," Mr. Iwashita adds.

As these efforts have resulted in a certain level of success, the company intends to develop and expand similar systems across its Japanese group companies and sites in Europe, the USA and Asia.

"The construction industry worldwide has steadily steered its efforts toward digitization. As we have established our complete basic data-sharing infrastructure, we can now move forward with innovative improvements to productivity using digital fabrication, big data, AI and more, with a view toward Construction 4.0, which we have set as a future goal," emphasizes Mr. Iwashita.

Takenaka Corporation's efforts are set to continue as a core player in the Japanese construction industry.

NTT Communications Corporation
Website www.ntt.com