The Port of Hamburg now has a uniform infrastructure for managing traffic, collaborating, videoconferencing and IT

Case Study
Hamburg Port Authority (HPA)

With close to 1,800 employees, the HPA manages the port on its own in a future-oriented manner and is responsible for dealing with all matters that pertain to water and shore-side infrastructure, the safety of shipping traffic, port railway facilities, real estate management and working conditions at the port.

A Network for Water, Roads and Rail

The Hamburg Port Authority has unified four previously separate infrastructures. By making this move, they were able to lower the costs of operation and management quite significantly and have now gained a more powerful network that is even more readily available. IT-supported traffic management, data exchange and video and telephone conferences all run on the same system. This means cargo containers can be forwarded more quickly by water, road and rail. Forwarding agents and private individuals also stand to benefit from fewer traffic jams and standstill times. And the employees who work for the Port of Hamburg are now able to communicate with each other more efficiently and continue doing their work regardless of where they are or what terminal they are using.

Each year, some 12,000 ships ranging from the Queen Mary, which is 345 meters in length, to the largest container ships the world has ever seen, enter the Port of Hamburg. The transport management system that covers the nearly 28 square mile grounds is therefore extremely complex and sophisticated. Here, the many cargo containers, in particular, pose a major challenge. Once they enter the port, these must be forwarded on water as efficiently as possible all the way to the quay wall and then either by road or rail. This requires a comprehensive traffic management system for ships, trucks and trains.

The Hamburg Port Authority (HPA) was founded as an institution under public law in 2005 that would perform this very purpose. All of the port- related responsibilities of the various authorities in Hamburg are taken care of by this organization. With close to 1,800 employees, the HPA manages the port on its own in a future-oriented manner and is responsible for dealing with all matters that pertain to water and shore-side infrastructure, the safety of shipping traffic, port railway facilities, real estate management and working conditions at the port.

Turning four networks into one

The HPA had previously relied on four different networks from various vendors to perform traffic management and communication. These were used for the radar system, the train, telephone communications and IT. These networks were

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Background

The Hamburg Port Authority (HPA) was founded as an institution under public law in 2005 for this purpose. With close to 1,800 employees, the HPA is responsible for dealing with all matters that pertain to water and shore-side infrastructure, the safety of shipping traffic, port railway facilities, real estate management and working conditions at the Port of Hamburg.

The Challenge

Four previously separate IT, telephone, rail and radar infrastructures had to be converted into a single uniform network that would allow for comprehensive management of ship, car and rail traffic to facilitate efficient transportation of containers. At the same time, the system had to allow for more efficient communication between employees.

The Solution

Hubs for the core network were installed at ten locations on the grounds of the Port of Hamburg and connected using optical waveguides. The various LANs were then docked onto these. This allows employees to communicate with each other and exchange documents regardless of where they are and what device they happen to be using.

The Benefits

- More efficient traffic management on water, roads and rails
- Quicker communication between employees by holding videoconferences
- Better collaboration due to shared access to documents
- Lower costs thanks to one uniform network and virtualization

Frank Schöneberg, Sales Manager for Central Government at Cisco Systems, and Dr. Sebastian Saxe, member of management, CIO&Head of Services, Hamburg Port Authority, at the award ceremony on the eGovernment competition 2011 involving Cisco and BearingPoint, at which the HPA received 1st Prize in the category Germany's Best Modernization Program.

unable to communicate with each other, however. Furthermore, they were not accessible all over the port grounds. It was impossible to make phone calls on water, for instance, and there was no access to the radar system on land.

"To improve communication and optimize the efficiency of work processes, we wanted to merge these four networks into one single network," explains Dr. Sebastian Saxe, CIO of the Hamburg Port Authority. "Our vision was to enable all of the users in different parts of the port to be able to connect with each other very easily with the new HPA_{Net} regardless of what device they were using. We were able to achieve this with the help of a comprehensive, intelligent network from Cisco," he adds.

Future-proof and powerful

"We decided to go with Cisco technology from the very start," Sebastian Saxe notes. "My experiences in using these solutions at my previous place of employment were extremely positive. Furthermore, as the largest player in the industry, Cisco stands for future-proof, state-of-the-art technologies. We can thus develop new solutions for port management and share these with the other companies based on our grounds."

Implementation of the new network took from July, 2009 until December, 2010. After taking stock of the current situation, planning and setting up the core network, the various LANs were connected. With respect to the hardware from Cisco, Nexus and Catalyst Switches, Catalyst Wireless Controllers, Security Routers, an ASA Firewall, a Call Manager and telephones are now being used. The number of network components was reduced by half to 200 and the number of core sites from 16 to 10. The network is still failsafe despite this consolidation. The Service Level Agreements that were signed ensure even higher availability and performance. The new network also made comprehensive server virtualization possible. This means the HPA is now able to use 48 instead of 242 servers to operate its infrastructure. This lowered the investment costs to €576,000 or only one-fifth.

Comprehensive traffic system

The network provides the basis for all IT-supported applications. These include traffic management for the most part. For example, it calculates the best route from the port entrance to the quay wall for the port pilot on the ship. The radar component of the network, on the other hand, identifies ships. One main timetable informs train drivers of when they are allowed to use specific tracks of the 300 km rail network inside the Port of Hamburg. They must be able to approach the quay wall, leave the port and maneuver and park their locomotives and wagons. This calls for coordinating no fewer than 83 rail freight companies from various countries.

Three large and 14 smaller digital display panels are located along the streets where they serve as a traffic management system for both car and truck drivers. Approximately 300 detectors are used to measure the flow of traffic. In this case, not only conventional induction loops, but also innovative technologies, like Bluetooth, are used. It is thus possible to check how many vehicles pass by the somewhat critical 53 m high Köhlbrand Bridge and immediately inform the drivers of high traffic. This also reduces the standstill times for trucks and cars on the port grounds, lowers carbon dioxide emissions and enables cargo carriers to work more efficiently.

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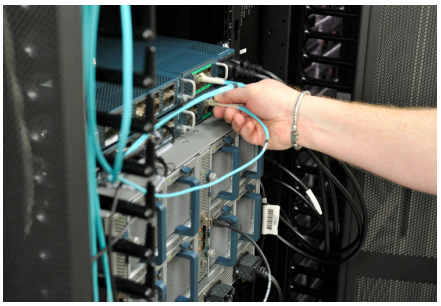

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Effective collaboration

Besides traffic management, the new **HPA$_{Net}$** also uses videoconference systems to significantly improve collaboration. Here, the HPA relies on both telepresence room systems and the online conference solution WebEx from Cisco. This makes internal communications between the various sites on the spacious port grounds much easier. At the same time, exchanges with other ports all over the world take place much more quickly and efficiently by relying on videoconferences. Last, but not least, this also protects the climate by avoiding drives and flights. The employees of the HPA embraced this new technology rather quickly. Only a short time after it had been introduced, they were already holding virtual conferences two to three times a week.

Mobile working is now possible for the first time too, thanks to the embedded WLAN technology. This enables every employee anywhere inside the port area to access contacts, data and applications. The HPA also introduced Microsoft SharePoint together with its new network. This solution makes it possible to exchange and work on documents together. It is used in all the HPA's departments to strategically plan the infrastructure, design new quay walls and buildings, rent out real estate on the port grounds or coordinate the port railway, for example.

Lower costs in addition to an award

Thanks to the new network infrastructure, the HPA will be able to lower its operating costs alone from 5.3 to €1.5 million over the course of seven years. Compared to the expenditures that the four old networks required, the costs have now dropped from 2.4 to €1.6 million. Furthermore, the much easier administration, thanks to the remote maintenance that is now possible for the first time ever, and has resulted in lower management costs, also deserves mention. The new solution has convinced not only the HPA, but also the jury of the 11th eGovernment Competition 2011. They called it "Germany's Best Modernization Program."

"We are obviously very proud of this award, nevertheless, we never would have received it without the support of Cisco and our solution partners," Sebastian Saxe notes. "Our successful relationship with Cisco has once again proven to be extremely professional and innovative with this project as well. Support Services always provides us with the right answers very quickly. We also remained in constant contact with the service providers who developed just the right solutions together with Cisco," he adds. Four partners in total were involved in this project. Dataport was responsible for installing the cables, Computacenter took care of the hardware, Dakosy managed the software, and Lufthansa Systems served as the project planner for the port rail network.

Even better performance in the future

"We plan to introduce unified communications with the help of the Cisco Call Manager that we are already using," Sebastian Saxe explains. "Our employees will then immediately be able to see how the person whom they need to talk to can be contacted most easily. In addition, a chat can then be quickly extended into a videoconference," he adds.

The HPA is also interested in integrating the remaining three control stations for coordinating the traffic on water, road and rail into one main control station. At the same time, they are planning to install a new application for controlling the port railway to better cope with the projected growth in sales. Container throughput in the Port of Hamburg is expected to double by 2025 compared to today's levels. Due to the fact that the entire port grounds are already being used to full capacity and no new water or land routes are available, the HPA has no alternative but to improve its processes.

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