The City of Pforzheim

Nexus for the Golden City

Due to rising IT demands, the city of Pforzheim virtualized its entire data center

Museum of Jewelry, City of Pforzheim

Where the Black Forest ends and the rolling hills of the Kraichgau-Stromberg region begin lies the golden city of Pforzheim, beautifully located in one of Germany's most scenic areas. Situated between the larger cities of Karlsruhe and Stuttgart, Pforzheim is one of the most attractive towns in the state of Baden-Württemberg. It is a traditional city whose history is closely tied to that of the jewelry and watch-making industry, such that it enjoys an international reputation as a hub for these industries. Pforzheim is a very innovative and modern city and operates its own data center to handle all of the city's administrative and IT needs. Due to rising IT demands and in order to reduce complexity and administration expenses, Pforzheim is now modernizing its data center with Cisco solutions like the Nexus 5000.

All city applications run on about 200 servers. Almost 3,000 workstations and 40 schools are connected to it and use it for e-mailing, special city administration functions, the Internet, and even SAP and Oracle applications. Furthermore, the city of Pforzheim has implemented special applications through its data center, such as one for the city's utility company that "takes readings" directly online and then generates electricity bills based on the readings. The city library also runs library applications via the data center and the technical agencies offer a graphic room information system. The Information and Communications Technology Department, headed up by Andreas Hurst, is responsible for managing and maintaining the data center. Not only that, he and his team handle all of the city's IT needs, including communication, VoIP services, server, storage and other applications.

City Library, City of Pforzheim

"Even though the number of applications and thereby the administration overheads have risen sharply over the years," says Andreas Hurst, "the personnel capacity of IT department today is at the same level as it was five years ago." Yet today the city's IT department is faced with special challenges and is making every effort to better respond to user demands while reducing costs at the same time. The data center is therefore the main hub of IT activity. The costs for electricity, air-conditioning, and the data center's lease are constantly increasing and, in the meantime, account for a major portion of the operating costs. The fact that it has become more complex to manage is also increasing the operating costs and additionally means a heavier workload for the IT department.

Data center, city of Pforzheim

An update was essential

The city of Pforzheim has long used many servers embedded in a data center structure which was as old as ten years in some parts. "It was becoming increasingly difficult to monitor the system because it kept getting more complex over the years," explains Hurst. The data center's restructuring and modernization were also intended to reduce the level of complexity. Nevertheless, availability and scalability were also going to be increased. Part of the project also involved considerably simplifying the networking of all departments and simultaneously virtualizing the entire data center. Because through universal virtualization, individual services and applications can be allocated, depending on demand, to external suppliers and easily re-integrated depending on personnel capacity.

However, in the beginning, the basic planning concept was initially available: "Only with an outstanding operating concept can operations be simplified by means of virtualization," explains Andreas Hurst. He and his team found an ideal product for implementing the concept in the Cisco Nexus 5000. With the Nexus family, Cisco had already implemented the first step toward Unified Fabric, i.e. the merging of LAN and SAN via Fiber Channel over Ethernet (FCoE) as a prerequisite to completely virtualizing the data center. Nexus 5000 is therefore the first switching product from Cisco that already supports Fibre Channel over Ethernet (FCoE) and therefore facilitates the set up of a Unified Fabric. Unified Fabric unifies server and storage networks into a common, uniform, and manageable platform that clears the way for the comprehensive virtualization of all services and resources in the data center. Nexus particularly addresses the need for I/O consolidation in the access layer, for example in densely packaged server racks. Cabling and management are dramatically simplified. Power consumption and ongoing costs decrease while availability increases. "We had already deployed individual virtualization solutions in the past," says Hurst. "For example, we have been running server virtualization with ESX from VMWare for almost four years. Ultimately, 80 to 100 servers can also be reproduced on three virtualization servers. This saves enormously on costs."

Cisco Nexus 5000

The ideal solution: Nexus 5000

With the Nexus 5000, however, the city of Pforzheim now has the opportunity to completely virtualize its data center. Version 1.2 of the Cisco VFrame system, the comprehensive solution for network-based orchestration of virtualized resources, works seamlessly together with ESX from VMware. Server groups can be reproduced for the first time on a virtual ACE device, which improves resource utilization, alleviates management, and heavily expands recovery options. The investment needs as well as the ongoing costs consequently decrease while availability increases. This is because Nexus 5000 combines different components and facilitates the use of FCoE, the key to virtualizing data centers. The result is higher redundancy and more scalability without additional administration overheads. Moreover, with 10GB, Nexus provides sufficient bandwidth so that network-oriented traffic, storage, and voice traffic can be transported via a medium. The servers are redundantly connected at the switch so that all of the data traffic can be replicated in the form of voice, video or from the storage area via this network.

When selecting the product, Andreas Hurst therefore quickly decided in favor of Cisco as a partner: "Cisco currently has a clear leadership role in the field of storage via Ethernet and FCoE." Quite recently the company had adopted the FCoE standard and its Nexus switch is now the only device on the market that already offers functions in the field of FCoE. "Nexus is not only a switch, rather a complex system with FCoE. With this product, Cisco has an absolute unique selling point that is helping all cities and their data centers," adds Andreas Hurst. "The personnel situation is ultimately the same everywhere and though demands are increasing, the number of administrators is not necessarily rising along with them."

Market place, city of Pforzheim

Expansion with future potential

"Implementation went incredibly smoothly," says Andreas Hurst. "We had a soft transition because the modernized data center was operated concurrently with the old one. Thanks to virtualization, we were able to easily move individual components and physical servers by converting over to the new environment. Because the conversion was often done during evenings or on the weekend, users did not notice a thing," Even the reduction of the Ethernet and FC to FCoE went smoothly. Thanks to lossless Ethernet, it feels like a native FC and there has been no packaging loss or delay. "All adapters and cables worked flawlessly for the first time and even the conversion from IOS to NxOS was no problem at all in terms of operation," states Hurst.

The result of the conversion has met all expectations. Today, the city of Pforzheim has a data center that not only performs better, but, above all, is considerably easier to operate with existing personnel. As part of the process, the network is now more flexible and scalable in terms of running applications. Individual applications can be allocated externally, if desired, without endangering the security of the application or even the entire data center. Moreover, even users are benefiting from the changes. The 10 GB connection can now be fully utilized. Additionally, Nexus provides outstanding performance for NAS-oriented systems (Network Attached Storage). With the NetApp solution, IT experts achieved almost 50 percent savings in storage allocation by means of de-duplication and thin provisioning and are now benefiting from simple storage management.

In the future, Andreas Hurst would like the data center of the city of Pforzheim to have greater flexibility and scalability in the server environment. To do so, the security of the data is the top priority because the servers will always be physically located in the city's data center. For the next development step, Andreas Hurst would like to work with the Cisco Nexus 1000v and the Cisco Unified Computing System and work out a solution concept. The Unified Computing System is the first architecture worldwide to make the full range of virtualization options available for data centers. It unifies access to processing power, network resources, memory access, and virtualization to an energy-efficient system with the network as a platform. The ideal solution for innovative and modern data centers like that of the city of Pforzheim.

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