German state office delivers applications and desktops from one source: Citrix

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> Bert Bohn
> Consultant for Information and Communication Technology, Saxon State Office for the Environment, Agriculture and Geology

The Saxon State Office for the Environment, Agriculture and Geology, located in Dresden, pools together very different areas of expertise and tasks under one roof—from environmental consulting and environmental documentation, through advising and estimating political consequences, to applied research, quality controls and laboratory analyses. Today, the individual specialty divisions of the state authority work very closely together in an interdisciplinary manner, for example, in the analysis of climate change and its impact on people and nature. "Competence from a single source" is thus the guiding principle.

Since the tasks of the state authority are constantly being expanded due to complex challenges, great flexibility is also expected from the IT department. New standard and specialized processes must be made available quickly, even for mobile users, teleworkers and external users. At the same time, requirements for the availability of applications have increased significantly. After the devastating flood of the Elbe River in Saxony in August 2002, the organization established a State Flood Center with constant stand-by service, which depends on a fail-safe infrastructure.

The challenge – Provide Windows and web applications efficiently

The IT team has relied on Citrix technology to deliver applications for quite some time. "Nearly four years ago, together with our IT partner Bechtle, a Platinum Citrix Solution Advisor, we set up the first Citrix XenApp server in order to virtualize groundwater data," said Bert Bohn, consultant for Information and Communication Technology at the authority. "We later expanded the solution to a server farm with load balancing functions. The goal was to deliver special applications for the State Flood Center in as reliable a manner as possible."

Key benefits

- Reduces administrative effort with centralized delivery of specialty applications
- Improves availability and security of web applications
- Consolidates server infrastructure for cost savings and scalability
- Enables telecommuting with delivery of virtual desktops
- Optimizes WAN performance by 50 percent

Applications delivered

- Microsoft Office
- ESRI geographic information systems
- Specialty applications for ground water, species directory, systems monitoring, waste management and the State Flood Center

The Citrix® XenApp™ environment currently consists of three server farms with a total of 12 servers. Today, up to 200 users simultaneously access the centrally delivered specialty applications. In addition to 32-bit applications, these include the organization's first 64-bit applications. The IT department introduced XenApp for Microsoft® Windows Server® 2003, x64 Edition, especially for ESRI geographic information systems, and therefore operates a mixed 32-bit/64-bit environment.

Now, employees not only use standard and specialized client-server applications for their work, but more and more web-based services as well. "Today, for example, web map services play an important role for us, that is, interactive maps that we make available to internal and external users via the Internet," Bohn explained. Two years ago, rapidly rising user traffic on the web servers led the IT team to look for a hardware-based load balancer for their backend infrastructure. "Back then we conducted a market analysis and came to the conclusion that Citrix NetScaler, Platinum Edition best met our demands," the IT consultant said. "What was pivotal for our decision was that beyond balancing the load, the solution offers integrated functions for caching, content redirection and the security of web applications."

In addition to traffic management for web servers, Oracle Forms servers, BEA application servers and XenApp servers, the Citrix® NetScaler® systems have taken over a number of other tasks in the datacenter. For example, NetScaler provides security functions. For the state authority, the integrated application firewall in the Platinum Edition protects web-based applications used for recording environmental data from application layer attacks.

Secure application access via the Internet

The next step in the development of the IT infrastructure was made the following year with the incorporation of mobile users. To provide these users with secure access to their working environment via the Internet, the IT department implemented the SSL VPN solution powered by Citrix® Access Gateway™ that is included in XenApp, Platinum Edition. "Above all, the integrated SmartAccess technology is very helpful for us," said Bohn. "It grants users graduated usage rights depending on the access scenario." The authority is also able to incorporate external users via the same SSL VPN infrastructure. For example, a service provider that supports the state authority in mass data entry now receives limited access to certain applications via Access Gateway. All data are thus consistently kept in the protected datacenter while newly entered data are available in real time for further processing.

The administration reform passed in Saxony in January 2008 presented the IT department with additional challenges. Due to the reform, several specialized tasks in the environmental division were delegated from the State Office for the Environment, Agriculture and Geology to the administrative districts and independent cities. This also meant that the respective specialty applications would have to be made available to these municipal authorities in the future. For the IT department, it made sense to offer these applications to the municipalities via the XenApp environment. However, the server room at the state office had already reached its capacity, and thus the topic of server virtualization came into play.

Server virtualization: 50% less hardware

The IT team chose Citrix® XenServer™, Enterprise Edition for its server virtualization platform. According to Bohn, there were two main criteria: "On the one hand, the performance factors spoke in favor of XenServer, since Citrix has optimized the solution especially for the virtualization of XenApp. On the other hand, we were impressed by the cost-benefit ratio, which is clearly superior to comparable solutions." The IT team initially migrated all XenApp servers to virtual machines and was able to significantly improve server utilization and increase user concentration on the physical hardware. Additional workloads were subsequently virtualized, including a good number of application servers.

The authority is operating 12 XenServer hosts in the datacenter, which are integrated into several resource pools. The host computers use the HP StorageWorks EVA 6000 SAN and HP StorageWorks EVA 4000 SAN as joint data storage. "Through virtualization, we have so far been able to reduce the number of our physical servers by around 50 percent," Bohn said. "Also, when technologies are added, we will be able to support them with the existing hardware capacities well into the future."

Desktop virtualization: Dynamic, secure and high performing desktops for telecommuters

One of these new technologies is desktop virtualization. In the summer of 2008, the state office began using Citrix® XenDesktop™ to provide users with virtual Windows® desktops from the datacenter. Around 30 telecommuters from the state authority, who complete the majority of their work from home, were among the first to use the solution. These users previously worked with their applications offline on their home PCs and had to import data and documents later into the office via mobile data storage devices.

With XenDesktop, telecommuters now receive access to their complete user environment with all applications via the Internet from home. The IT team is using the dynamic process of desktop provisioning, which is based on strict separation of the operating system, applications and user settings. The actual Windows XP desktops run as virtual machines on XenServer hosts. All users work with a standard desktop image that is streamed on-demand to the virtual machines with the assistance of the XenDesktop provisioning technology. This means that the storage requirements and administrative effort are reduced because an individual desktop image does not have to be reserved and maintained for each user.

The individual applications are separated from the desktop image and virtually provisioned via XenApp. An individual desktop, which contains all of the required applications, is compiled for the user. The SSL VPN components ensure security when accessing the virtual desktops. The entire communication between the end devices and the servers takes place in the datacenter and is encoded with standard technology; users only receive access to the applications intended for them. The integrated Citrix® EdgeSight® components in XenDesktop enable universal performance monitoring. Data on the availability and performance of the applications is continuously collected. The administrators can thus recognize possible issues very quickly and proactively intervene before the performance of the virtual desktops is affected.

Networking Environment

- Citrix XenServer, Enterprise Edition running on 12 HP ProLiant DL380 G5 servers
- Citrix XenApp, Platinum Edition for Windows Server 2003 x64 Edition
- Citrix XenDesktop, Platinum Edition
- Citrix NetScaler, Platinum Edition, 7000 appliances
- Citrix Repeater 88xx and 65xx
- 1,000 internal and external end devices (50 notebooks, 950 PCs)
- GBit backbone, 100 MBit at the workstations, connection of the external locations via 20 to 100 MBit WAN

"Desktop virtualization is an interesting concept, which, in our opinion, is also very suitable for administrative workstations that place higher demands on system availability," said Bohn. "By operating the user environment on virtual machines, we can also utilize the high-availability functions of XenServer. For example, in the event of an outage of a physical server, the virtual desktops can be automatically restarted on another host server. Users can therefore continue working without any major interruptions."

A platform for all application scenarios

Today the State Office for the Environment, Agriculture and Geology is productively using all components of Citrix Delivery Center™: XenDesktop, XenApp, NetScaler and XenServer. In addition, to optimize WAN performance between the datacenter and locations in Dresden, Freiberg and Pillnitz, the Citrix Repeater™ solution was recently implemented, which cuts the bandwidth requirements for CIFS access to file servers in half.

The holistic approach of Citrix Delivery Center, which combines virtualization technologies and application optimization, has proven its value in practice according to Bohn. "The demands on our IT department are continuously increasing, but the number of personnel remains the same, so separate solutions don't help us at all. On the other hand, with a platform like the Citrix Delivery Center, we are able to react very flexibly and quickly without incurring significant additional work or expense."

CITRIX®

Worldwide Headquarters
Citrix Systems, Inc.
851 West Cypress Creek Road
Fort Lauderdale, FL 33309, USA
T +1 800 393 1888
T +1 954 267 3000

www.citrix.com

Americas
Citrix Silicon Valley
4988 Great America Parkway
Santa Clara, CA 95054, USA
T +1 408 790 8000

Europe
Citrix Systems International GmbH
Rheinweg 9
8200 Schaffhausen, Switzerland
T +41 52 635 7700

Asia Pacific
Citrix Systems Hong Kong Ltd.
Suite 6301-10, 63rd Floor
One Island East
18 Westlands Road
Island East, Hong Kong, China
T +852 2100 5000

Citrix Online Division
6500 Hollister Avenue
Goleta, CA 93117, USA
T +1 805 690 6400

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