

“Before we implemented IPStor, our storage concept was very server-oriented, which required a high amount of attention. Today, if one of our leasing contracts for hardware systems runs out, we can easily migrate storage to the new hardware systems. With IPStor as a hardware-independent data mover, it is very simple to transfer data from the old onto the new system.”

– Andreas Hurst, Head of the IT department at the City of Pforzheim

City of Pforzheim, Germany

Over 1000 Year Old German City Chooses IPStor to Reduce Operational Costs in its Local Government ...

About the City

The city of Pforzheim, situated on the southwest border of Germany, is very close to Stuttgart, Karlsruhe, Baden-Baden and Strasbourg (France). Founded about 90 A.D., it is currently an industrial, progressive city with a population of about 120,000 citizens. Pforzheim enjoys worldwide recognition as the center of the European jewelry and watch making industry. Furthermore, a whole range of metal industry, communication products and mail order warehouses are now included in the industrial landscape which is dominated by SME companies like Hammer & Söhne, Witzenmann, Ungerer, Doduco, Degussa, Klingel, Bader etc. Some other well-known major companies in the area include Alcatel, DaimlerChrysler, Porsche, Bosch, IBM, and Hewlett Packard.

Business Need

“We were looking for a solution to consolidate our storage hardware in one place, to maximize capacity utilization by aggregating and provisioning storage capacity according to actual requirements, and to provide high data availability through IPStor storage services, such as Synchronous Mirroring, Snapshot Copy, Active-Active Failover, and Zero-Impact Backup,” said Andreas Hurst, head of the IT department at the City of Pforzheim.

The city’s problem was that costs were being driven up endlessly because its direct-attached storage environment was as diverse and dispersed as the mixed set of purposes it was serving. Storage capacity was either running out – causing downtime – or it was lying unused in different machines. Separate management of the many storage devices and the backup of each was requiring excessive (and therefore expensive) attention. The LAN-based backups were also difficult for the city’s backup administrators to complete within the ever-shrinking backup window.

Moreover, it was clear that nonstop availability of data was now a necessity for a progressive 21st-century municipality. In this modern age, the success of vital public systems (consumption calculation of municipal utilities, graphical room information system, building administration, human resources, borrowing processes of the public library, etc.), an Internet/eGovernment portal, and an external SSP strategy was increasingly dependent on the ability to process and access relevant data at any given time.

FalconStor Solution

Pforzheim adopted IPStor software into daily use at the beginning of 2002 together with the components for a storage area network (SAN). The implementation supports Solaris, Windows 2000, and .NET Server, as well as Oracle and Microsoft Exchange databases. The next step will be the integration of the city’s Novell NetWare servers.

To ensure high availability of the city’s systems, two IPStor Servers are deployed in an Active-Active Failover configuration. Should one IPStor Server or path to it fail, the other immediately and transparently takes over the failed partner’s workload. Data processing is not impacted. When the primary IPStor Server is back online, failback occurs automatically.

Industry

Municipality, ISP, SSP, Library

Application Environment

- Public systems: consumption calculation of municipal utilities, graphical room information system, building administration, human resources, and borrowing process in public library.
- Internet/eGovernment portal
- External SSP strategy

IT Challenges

- Heterogeneous direct-attached storage environment required too much administrative attention
- Direct-attached storage did not provide high availability of data
- Capacity could not be shared, so out-of-space conditions meant downtime
- LAN-based backup of data was management-intensive and difficult to complete within backup window

FalconStor Solution

FalconStor Professional Services

IPStor Software Deployed

IPStor Server
IPStor SAN Clients
Active-Active Failover Option
Synchronous Mirroring Option
Snapshot Copy Option
Zero-Impact Backup Enabler

Benefits

- Reduced management costs (only 1 or 2 people needed to manage 4TB) and optimized workforce time and resources through centralized storage management
- Storage migration capabilities for zero-downtime upgrades and repurposing of existing storage devices (e.g. legacy SCSI JBODs)
- No out-of-space downtime through pooled storage capacity
- No need for additional software layers on the application servers to perform storage virtualization
- Consolidated heterogeneous OS & applications management
- Storage services able to be offered to external customers, further maximizing ROI on IPStor
- Future-proof architecture and high scalability

Management of Pforzheim's entire legion of storage is now centralized at the single Java-based **IPStor Console**. So now, instead of keeping teams of staff busy managing storage and backups at each server, the same operations can be accomplished by just one or two people at a central location. This has vastly reduced management costs and has made administrators' use of time much more efficient, freeing up staff for critical projects.

Pforzheim has been able to leverage IPStor's seamless storage migration capabilities for zero-downtime upgrades and other transactions. With IPStor's **Snapshot Copy Option**, the city's IT staff can easily duplicate large amounts of data and even entire system drives. IPStor has performed flawlessly, even with heavy workloads. For example, when migrating a database server's 1.5 terabytes of integrated storage to virtualized storage made up of high-performance drives in the IPStor-managed SAN, the allocation of virtual resources via the IPStor Console took only about ten minutes.

IPStor's snapshot technology has also eliminated the risk involved with routine individual system tasks such as operating system updates, copying service packs, etc. – tasks which are, at best, annoying if errors occur in the process, or, at worst, result in data loss. In this context, the administrator takes a snapshot “photo” of the virtual drive before any tasks are carried out. If necessary, the data can then be restored immediately and the task repeated without any of the mission critical data being lost. “These are crucial requirements when we, as a service provider, enter into Service Level Agreements that specify restore times in the event of a failure,” says Andreas Hurst.

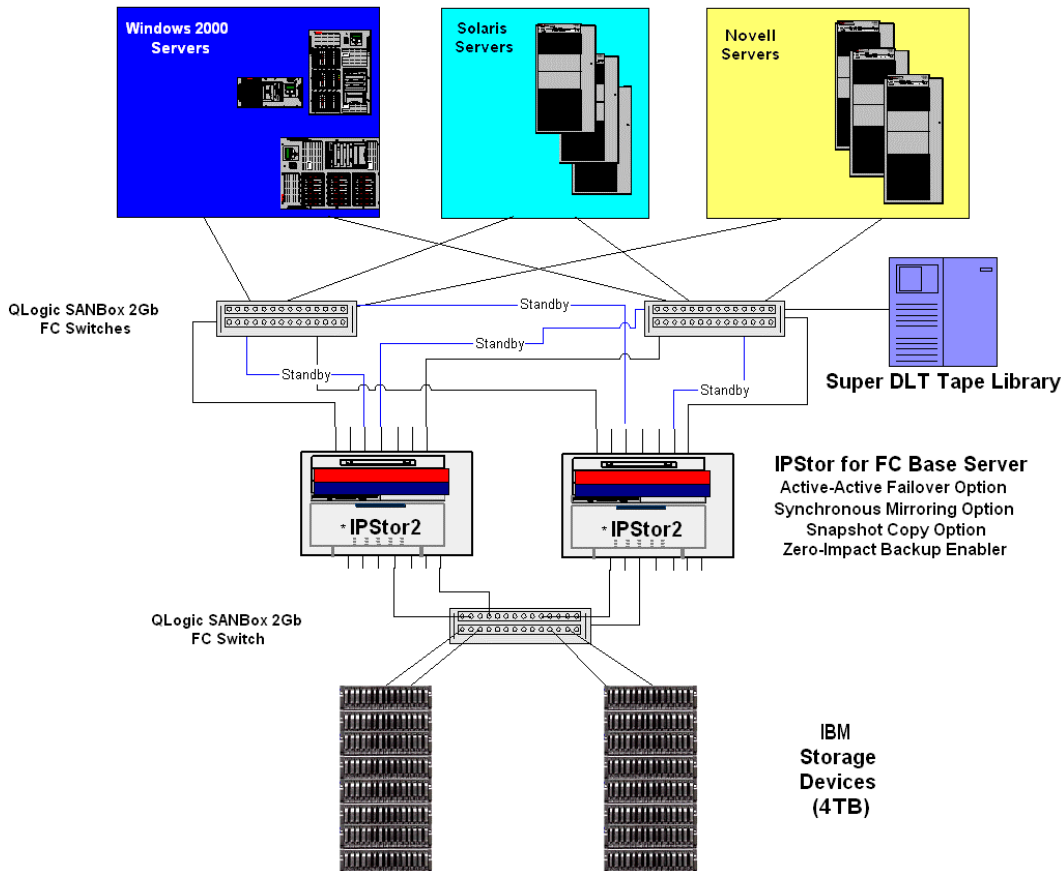
The IT group at Pforzheim agrees that taking the plunge into **storage virtualization** has paid off. Virtualization allows cross-vendor/storage type/protocol/OS storage pooling which enables consolidated resource management and elimination of out-of-space downtime. Hurst is particularly happy that the many benefits of virtualization “not only apply to the day-to-day work of the administrator— the freedom that the use of IPStor brings to planning for the future is just as important.”

By placing the software-driven virtualization engine into the network itself (at the IPStor Server), IPStor eliminates any need for additional software layers on the application servers to perform storage virtualization – minimizing overhead, software expenses, and enabling almost any OS to participate. “The storage area has become totally independent thanks to virtualization,” explains Pforzheim's Bernhard Enderes. “Instead of having to purchase new brand-oriented servers to meet storage requirements, we now have a free hand in searching around for attractive alternatives. This flexibility is needed, particularly from the point of view of connecting other offices.”

In addition to running the city's storage network, IPStor storage services can be offered to external customers further maximizing ROI on IPStor. The flexibility and scalability of IPStor make it a future-proof solution for the city.

Deployment Details

City of Pforzheim IPStor Configuration



Pforzheim Hardware Configuration

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| <p>(2) IPStor Servers
 RedHat 7.2 / Linux Kernel 2.4.9-31smp
 Supermicro Server P4DL6
 2 * Pentium Xeon 2.2 GHz / 512 KB L2 Cache
 1 GB RAM
 3 QLogic SANBlade 2302F / 2 Port / 2 Gb/s FC HBAs</p> <p>(3) Switches
 QLogic SANBox 2-16 Port 2 Gb/s Switches</p> <p>Storage</p> <p>(3) IBM ProFibre DF4000R-D Arrays
 - 1 GB mirrored user data cache
 - 120 drives into 32 LUNs
 - 15 FC-drives per Enclosure
 - 8.8 TB per Subsystem
 - Active-Active RAID Controllers
 - Four 2 Gb/s FC (AL and fabric) Host channels
 - Two 2 Gb/s FC-AL Drive channels
 - Redundant, hot-swappable Components</p> <p>(6) IBM ProFibre DF4000J-D JBODs
 - 30 Seagate ST318451FC, 18.4GB/15000 RPMs
 - 90 Seagate ST336605FC, 36.7 GB/10000 RPMs</p> | <p>(9) Application Servers:
 (3) Microsoft Windows 2000 Servers
 (3) Sun Solaris Servers
 (3) Novell NetWare Servers, soon to be replaced by .NET Servers</p> <p>Tape Library
 Quantum ATL P4000
 Fibre Channel/SCSI Router
 171 Slots
 (3) SuperDLT1 Drives (SDLT)</p> |
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Summary

The city of Pforzheim significantly reduced storage management costs and dramatically increased storage efficiency and availability through deployment of IPStor software as the intelligent infrastructure for its new SAN.

The easy, boundless scalability of the IPStor-based storage environment allows the city of Pforzheim to expand its centralized storage management model to include other public institutions at any time. Future projects are already in planning.