GERMANY
Diamantwerkzeuge GmbH

Brilliant Solution for Supplier of Diamond Tools

Virtualization of Servers and Storage launched at DieWe Diamantwerkzeuge GmbH

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The Company

For 25 years now DieWe Diamantwerkzeuge GmbH has been one of the leading suppliers of diamond instruments in Germany and the rest of Europe. The company, from the Augsburg area, is a classic medium-sized industrial enterprise with just under 120 staff. From the development stage through to production and delivery of diamond instruments, DieWe always orients itself to the latest technologies, the situation on the market and the requirements of its customers. Thorough raw materials selection, extensive tests in the lab and documented test series ensure that only high grade and high-performance diamond instruments are made.

The Initial Situation

The system integrator – and this is typical for small and medium-sized companies – came across an IT infrastructure with 8 Windows servers and some 100 clients that had simply developed over the years. Utility-controlled requirements had been chiefly responsible for the extensions. In particular, parts of the infrastructure consisted of heterogeneous components involving a variety of server configurations and different ages. Most of the data was stored on local FDDs.

The introduction of a new merchandise management system produced database performance problems which were resolved in the short term by Direct Attached Storage (DAS) on an SCSI basis. However, corporate-wide deployments then resulted in I/O performance problems.

The data was backed up on various network drives, which produced a considerable load on the network and the backup window became ever larger. There was no central backup system – which meant that the requirements placed on archiving security, rapid disaster recovery and compliance could not be met.

The administration team was faced with an infrastructure that had developed gradually over time and was very maintenance-intensive, as there was no uniform access to the servers, and the diversity of the server systems and architectures meant that collective resource and update planning was either impossible or only possible with great manual effort.

"Our infrastructure has grown significantly over the past few years and requirements are certainly not going to recede over the next few months," stated Frank Nehmer, Head of IT at DieWe. "That is why we have decided to run in a solution in good time – one directed towards growth and scalability in all fields."

The heightened requirements placed on storage space from the database systems and documents (Office and graphics files) produced considerable capacity problems within the storage infrastructure. The customer also wanted greater resilience from the entire IT system including server services, server hardware and storage solutions, in particular.

System integrator

losstech GmbH

Losstech GmbH is a medium-sized system integrator from Lutzhorn near Hamburg. Since 2001 it has been providing support to small and medium-sized firms across Germany in the planning, realization and maintenance of Windows networks and workstations. In so doing, losstech GmbH is always at pains to find preferably optimum and low-cost solutions for its customers. It provides its services not only on the spot but increasingly through teleservice and teleinstruction via the Internet. "As a result, our customers save on expensive travel-over and overnight stay costs and our deployment rate rockets. Our customers benefit from this in the form of a quick, flexible service without the delay of a journey across to them," says Boris Hajek of losstech.

The Decision

Following a number of workshops and a detailed analysis of the existing structures – including requirements coming from the departments and appropriate applications – a concept was devised ahead of project planning to both optimize the processes and bring about an IT infrastructure adapted to future needs.
Attention was given to the following requirements in order to provide the customer with simplified IT systems administration and the necessary functionalities:

- Simple, low-on-maintenance administration of storage and server hardware (Windows ADS, DHCP, DNS, file services, MSSQL databases)
- Raising the resilience of the whole system for operation with little or no downtime – a maximum two-hour recovery time in worst-case scenarios – with due consideration of the total cost.
- Scalability of the servers and storages
- Scalability of the bandwidth and I/Os for future enhanced requirements that have not yet been conceived
- Reduction/elimination of downtime thanks to maintenance
- Hardware lifecycle management with architecture consolidation
- Migration simplification should the systems have to be transferred to other/newer hardware
- Emergency and recovery concept for the IT systems based at different sites
- VPN access concept for second company site and teleworker
- Reducing the network load and backup execution rate
- High availability of the software systems and server services
- Maximum no-risk investment of the system
- Hardware consolidation

Implementation

Firstly a test system for the storage domain was set up and a visualization server attached with XEN as the lab network. The storage solution came in the form of the Open-E DSS (Data Storage Server) – a complete IP and FC storage operating system (FC Fibre Channel) providing NAS, iSCSI and FC functionality (target and initiator) in a single application complete with straightforward operation and a high degree of resilience for companies of any size.

Storage

The storage server solution provides a rapid, dependable and scalable platform for IP storage permitting collective file access, storage consolidation, backup and recovery. Another field of considerable relevance in today's world is virtualization or replication – something covered by the Open-E DSS.

Since the operating system has been optimized for environments with dedicated storage and company networks, the solution is especially suited for network environments with an array of clients or utilities with high memory requirements. Thanks to the support of Windows, NIS or LDAP domains, the existing IT infrastructure can be easily extended. The Web-supported graphics user interface for management and administration ensures dependable control of the storage unit and processes for backing up vital data. The DSS server provides some of the storage space secured by RAID-6 as Windows shared folders (synchronized with the existing ADS), as iSCSI targets and NFS shares in the Ethernet (copper 1Gbit).

Hardware/Software used

Hardware

- 3 x eXtremetec XEN x8 xtc virtualization nodes
- 2 x eXtremetec pureStor 16 storage systems with SAS and SATA fixed disk drives
- 1 x eXtremetec pureStor NAS Disk2Tape Backup Bot LTO-3
- Various 3COM network and VPN products

Software

- 3 x Open-E DSS (Data Storage Server)
- 3 x XENSource Enterprise Servers and XENCenter Administration tools
- 7 x Windows 2003 Servers
- 1 x Microsoft Exchange 2003
- 2 x Microsoft SQL Servers
- 1 x Microsoft Terminal server

Server Hardware

eXtremetec xtc Server and pureStor storage hardware – a private brand of losstech GmbH based on the well-known Supermicro technology. Thanks to self-construction and complete control over the components used, customers can rely on a standardized, scalable, stable and tested hardware platform. This platform has been optimized as an out-of-the-box solution for the different requirement profiles and stays standardized across the entire lifetime or leasing period.

Virtualization

Following the setup of the storage solution and test servers for virtualization purposes, the server services were investigated regarding their virtualization effectiveness. Appropriate technologies made it possible to migrate images of the ongoing servers onto the virtualization system and iSCSI drives (a representative section of the data). No problems arose – when virtualized all the utilities ran exactly as before.

At the same time, a migration plan was drafted for the individual systems. The follow-up tests were related to the data throughput, I/O throughput and network load. Splitting up the networks (Clients/Server<->Server services; Server <-> Storage; Storage<->Storage; Storage<->Backup), use of the corresponding switches and Open-E DSS produced a 60% cut in the network load. The switch infrastructure was prepared accordingly

Migration

Live migration followed the implementation of all tests and a trial run of the risk scenarios and/or the emergency plan.

The administration network and server/storage hardware (XEN and Open-E DSS) were the first to be taken into live operation.

The file server – as the first service – was migrated to the Open-E DSS and directly placed at the disposal of the clients (a dedicated file server was dropped). Non-critical services such as DHCP and DNS were then migrated. Finally, the ADS servers, the exchange server and database server were taken on.

Effective Benefits

Use of centralized storage meant that the customer had the assurance that the capacity and performance (I/Os) of the present system could be extended at any time and without any difficulty.

Using XENSource as the virtualization solution (precisely with Open-E as the network storage system) produces a multitude of advantages for the customer:

- The Windows servers and services are not hardware-dependent, which means that the server container can be migrated at any time to another hardware node – without any downtime. No interruption to operation results, even when system hardware components – for instance given a fault – have to be replaced.
- High availability of the server services is very much down to an N+1 redundancy of the server hardware at unrivalled low costs and without the use of expensive cluster software/additional cluster machinery.
- Thanks to the storage/mirror system, mirror replication and fail-over can be used to safeguard data high availability.
- Backup can be carried out at the same time as daily operations. There is thus no need for any tape replacement or intervention in the event of problems outside office hours.

In addition, the dedicated admin-network and protected VPN connection now enable the administrator to administer the system at any time, wherever he/she is (notebook and Internet connection being the prerequisites). 3rd level support can also be carried out by losstech GmbH at any time.

"We can now access the systems at any time and enter remotes into fault rectification without being directly on the spot," reported Mr. Nehmer of DieWe. "This has allowed internal support costs to be substantially cut and the load for administrators to be successively adjusted." It was also possible to reduce the number of servers to 3 energy-efficient hardware nodes in the farm. They provide a 30% reserve for future growth i.e. lower basic purchasing costs, lower energy requirements, less power to be backed up for the USV systems, less heat generation and high availability rates at the same time, no downtime when hardware is being serviced, extensions by means of extra nodes and space requirement scaling, CPU and RAM possible without any difficulties and at any time. The same holds good for storage systems in view of the excellent extendability of the Open-E DSS systems.

The IT system also became extremely "migrationtransparent". This will lower the follow-up to a minimum in 36 months time, when the hardware is replaced, and ensure transfer without any outage or faults. In addition, there were the energy economizing effects of the new IT system making up 40% of previous costs.

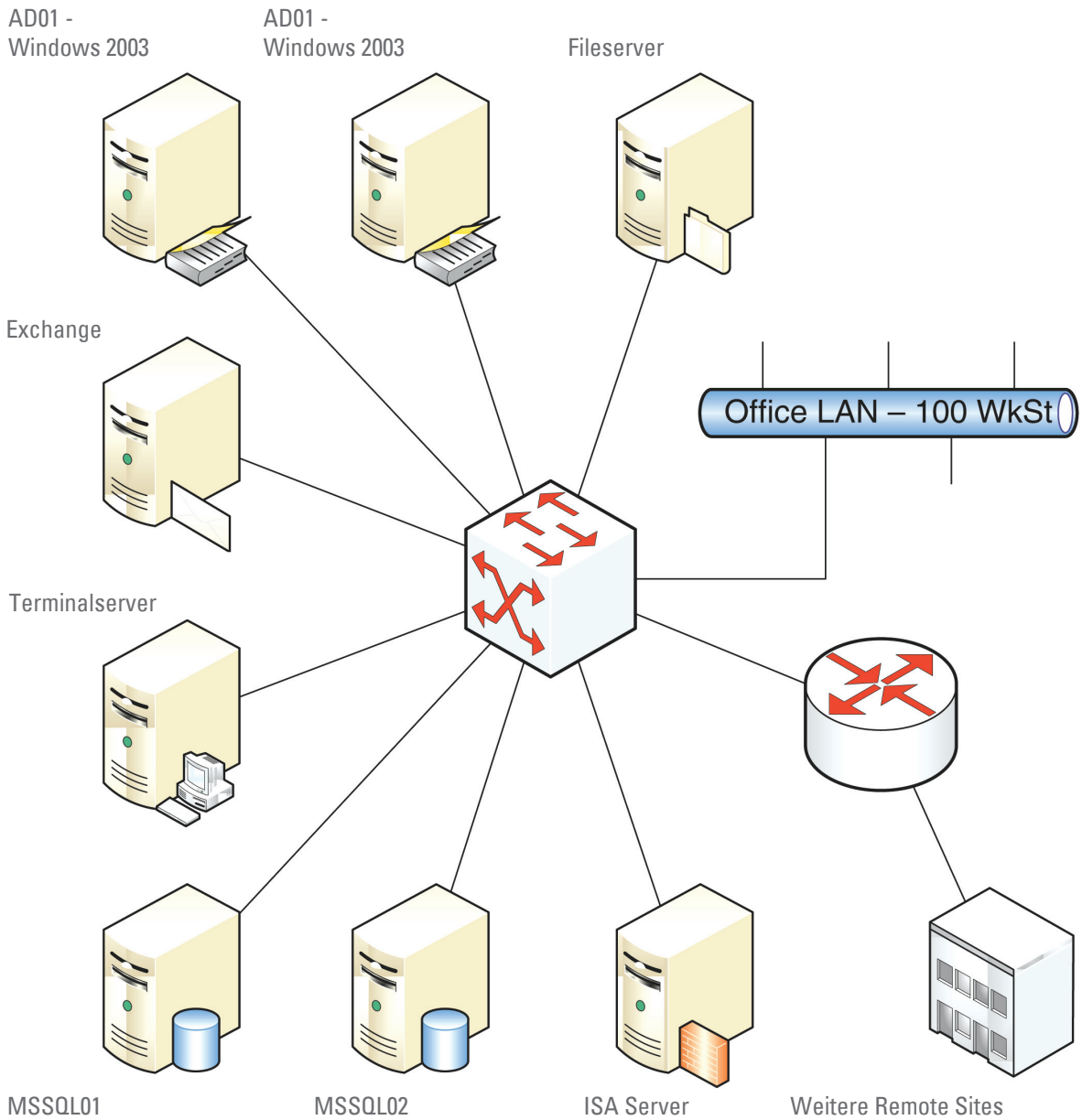
Conclusion

"The Open-E and Xen solution from losstech GmbH have totally complied with our requirements and expectations," says Mr. Nehmer of DieWe. "Some of the benefits did not come to light at the very beginning – it was only later that they did so." Even for small and medium-sized undertakings, virtualization solutions have a lot to offer in many fields. And in association with a centralized storage solution, they are of real benefit to both classic utilities, such as merchandising management, and resource-devouring applications, such as databases and communication systems.

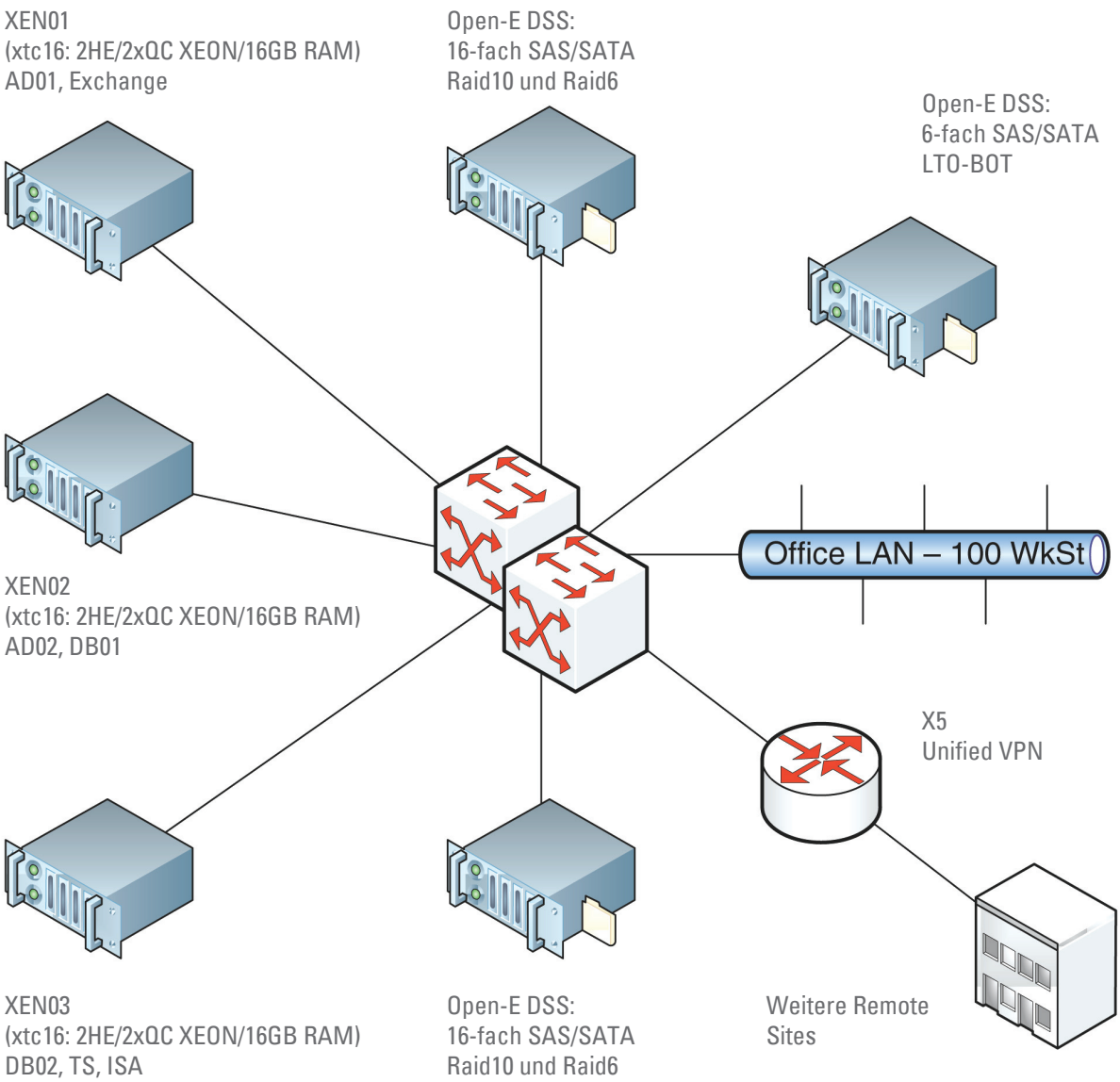
losstech services comprise:

- Centralized storage solutions (NAS/SAN/iSCSI/FC) with innovative Open-E products
- Full server hardware and virtualization solutions based on XEN and Microsoft
- Documentation of existing, developed IT systems and their re-planning and migration
- Training and certification of the in-company staff to the Windows Administrator Level 1 and 2
- Level 2 and/or Level 3 assistance for your internal administrators on an hourly basis or under the provisions of a maintenance agreement
- Maintenance of your complete network either on the spot or through teleservice (Levels 1/2/3)
- Drafting IT reports as the basis for emergency plans and deployments (member of the "Deutsche Sachverständige Gesellschaft" – German association of qualified experts)
- If needed, supplying agreed-to components and consumables for your entire IT infrastructure from a single source (PCs, servers, storage, network components and printers)
- Areas of deployment: Germany, Austria and Switzerland
- There are contacts for you in Lutzhorn (near Hamburg) and Augsburg.

- Direct attatched storage
- Network backup with high load
- High administrative effort
- High maintenance and investment costs
- High electricity costs
- Complex reinstallation on new servers
- Long recovery times



Conservative infrastructure: before project realization, the company IT amounted to a classic, conservative structure – with lots of potential and work.



Virtualized infrastructure: following project planning and implementation, the company's IT is now housed in an optimized, efficient structure – scalable to a pronounced degree and providing maximum availability.

Field	Solutions
I/O performance, storage extendability	Alternatives: 1)Local storage in the servers with SAS technology and high-performance RAID controllers 2)Local Solid State Discs (SSD) 3)Network storage (NAS/SAN) on iSCSI/FC technology
Administration	Running in an “out-of-band” admin. Network for the central administration of storage and servers; assimilation or same layout for the server hardware (Problem: different requirements on CPU/RAM/IO performance/storage)
Raising resilience – storage	Centralized system with scope for mirroring data onto fail-over storage or replication of the data (also between the sites)
Raising resilience – server	Alternatives: 1)Cold standby/Cluster systems for individual servers 2)Virtualization of the servers and services for hardware autonomy; saving on the local disks for the virtual systems
Hardware lifecycle management	Replacing the servers every 36 months with up-to date hardware (to be had from leasing with no-change installments)
Vereinfachung der Migration	Launching virtualization for all server systems and services
Reducing network load and raising backup speed	Data is centralized on network storages connected to a suitable LTO-3 autoloader. It can communicate with the storages over a dedicated VLAN.
High availability of the systems	Is the result of deploying virtualization
Reducing duration of the maintenance window	Is the result of deploying virtualization