Overview
Sparda-Datenverarbeitung eG (SDV) is the IT service provider for the Sparda-Bank Group in Germany. The group's 12 banks employ over 7,300 people and operate more than 400 branches, serving 4.2 million customers with 23 million accounts.

SDV develops secure and innovative IT solutions for retail banking, payment, distribution and financing to improve the products and services of Sparda-Bank Group.

Challenge
Today's customers expect easy and quick access to their banking accounts. As usage patterns change and customers increasingly use mobile apps on the go, availability and speed have become even more important. SDV wanted to boost the performance of systems that rely heavily on information from its core banking solution.

SDV also needed to ensure the reliable operation of the growing application landscape it provides to bank customers and bank staff. With a growing number of services executing millions of transactions, SDV wanted a standardized solution to ensure quick and efficient disaster recovery processes. Bernd Bohne, Department Head, Central Systems Technology, said: “Our clients require round-the-clock availability to provide reliable banking services to their customers. Minimizing downtime in an event of disaster is crucial to avoid disruptions—and losses—in this fast-paced banking environment.”

“SUSE Linux Enterprise Server for System z is the perfect platform for us—it combines the reliability and security features of IBM z Systems with the ease of use and cost-effectiveness of Linux. We can deliver maximum availability for fast, uninterrupted customer service.”

BERND BOHNE
Department Head, Central Systems Technology
Sparda-Datenverarbeitung eG

Results
+ Cut software costs by approximately 50 percent
+ Increased administration efficiency; a team of three can manage 120 virtual environments
+ Improved business continuity by providing automated failover within seconds

Sparda-Datenverarbeitung eG
at a Glance:
IT provider for the Sparda-Bank Group in Germany, consisting of 12 banks with more than 400 branches, 4.2 million customers, about 23 million accounts and over 7,300 employees.

Industry and Location
Banking, Nuremberg, Germany

Product and Services
SUSE Linux Enterprise Server for System z
In addition to responding to these performance, reliability and compliance demands, SDV also wanted to reduce its operating costs by optimizing system sizing and software licensing.

**Solution**

**DEPLOYING LINUX ON THE MAINFRAME**

Building on its long experience with SUSE Linux Enterprise Server for System z, SDV expanded its existing Linux environment on the mainframe substantially when it migrated to the latest IBM z13 technology.

The company deployed two IBM z13 servers with 3.7 TB main memory each. To support its new deployment strategy and future growth plans, the company increased the number of Integrated Facility for Linux (IFL) specialty engines first from 6 to 14 (IBM z196), and now to 20 (IBM z13) per server. In addition, both servers are equipped with eight general-purpose processors and 15 IBM z Integrated Information Processor (zIIP) specialty engines capable to execute IBM z/OS workload.

Bernd Bohne said, “We originally selected SUSE Linux Enterprise Server for System z because of the superior driver support on IBM z Systems. Today, we operate about 140 virtualized Linux servers on the mainframe—with excellent availability and performance.”

For many years, SDV used SUSE Linux Enterprise Server for System z mainly to operate large, mission-critical databases. On two virtual machines with 60 GB main memory each, the company runs two Oracle 12 databases with a size of 12 TB. These databases are the foundation of a new controlling and reporting application that helps banks to manage their operations efficiently thanks to complex analytics. The reporting features also help ensure compliance with international regulations.

For other applications, SDV uses IBM DB2 version 10 for Linux, UNIX, and Windows running on SUSE Linux Enterprise Server for System z on the IBM z13. To manage its cash machines, the company relies on the advanced open source database PostgreSQL.

**A PLATFORM OPTIMIZED FOR PERFORMANCE AND RELIABILITY**

Recognizing the advances in microchip technology and processing speeds on the IBM z Systems platform, SDV has started to move application servers from x86 environments to SUSE Linux Enterprise Server for System z. Oliver Röthinger, System Programmer and Administrator z/VM and Linux on z Systems, said, “For high-performance applications where minimal network latency is essential, IBM z Systems is the ideal platform to run both database servers and application servers. By moving these applications to the mainframe, we can benefit from integrated in-memory networking technology and effectively eliminate any delays in network connectivity.”

By using SUSE Linux Enterprise Server for System z, SDV can fully exploit the unique reliability, availability and security features of the IBM z13, and combine them with the flexibility and cost advantages of Linux. The company uses the Geographically Dispersed Parallel Sysplex (GDPS), an IBM z/OS feature that provides a coordinated Disaster Recovery solution for customers running a multi-tiered architecture including the IBM z/VM hypervisor, SUSE Linux Enterprise Server and z/OS on z Systems. This cluster solution that relies on Coupling Facilities—dedicated hardware resources that are part of the IBM z Systems platform—guarantees data consistency across all systems in the cluster. The IBM GDPS technology allows SDV to keep hundreds of systems in sync with consistent data to minimize failover times.

**EFFICIENT MANAGEMENT AND FAST BACKUPS**

SDV manages its large SUSE Linux Enterprise Server for System z landscape with user-friendly software tools such as YaST®, the installation, configuration and systems management framework integrated with the SUSE Linux Enterprise operating system platform. For quick backups of all Linux servers, the company runs IBM Tivoli Storage Manager on SUSE Linux Enterprise Server for System z.

Oliver Röthinger said, “As for application and database servers, our backup solution with IBM Tivoli Storage Manager makes heavy use of the HiperSockets networking technology. It would be very difficult to achieve similar backup performance in a distributed environment where all data needs to go through several network interfaces and switches.”

**EXCELLENT SUPPORT AND AUTOMATION CAPABILITIES**

Over the years, SDV has built up a network of contacts within SUSE and IBM with direct access to specialists at the IBM Germany Research & Development Lab and the SUSE headquarters. With IBM as its main point of contact, SDV can easily request support for all software and hardware components without delays. Oliver Röthinger said, “The smooth collaboration between SUSE, IBM and Oracle helps us to get quick solutions. IBM coordinates the analysis and provides us with a fix, so we do not have to get in touch with different vendors and explain our issue over and over again.”

The team is currently working with SUSE and IBM to optimize systems management further. To match the high automation levels the company already enjoys with Tivoli
System Automation for z/OS in the z/OS environment. SDV plans to deploy Tivoli System Automation for Multiproducts and the open source xCAT cloud management toolkit.

Bernd Bohne said, “IBM z Systems is a platform with a bright future at SDV. With improved systems automation, we will expand our use of SUSE Linux Enterprise Server for System z.”

Results
EFFICIENT ADMINISTRATION
SDV benefits hugely from the reliability and low administration workload of the IBM z Systems platform. At SDV, a team of three manages the entire SUSE Linux Enterprise Server for System z environment. Bernd Bohne said, “While we run more and more systems with SUSE Linux Enterprise Server for System z and have probably 50 percent more instances now than a few years ago, we can still manage the servers with the same team. This scalability illustrates how big the savings in administration costs are compared to other platforms.”

Since the company moved its large Oracle databases to Linux on z Systems, its database administrators have more time for performance tuning. Oliver Röthinger says, “In the past, database administrators often had to deal with all kinds of system administration tasks. With SUSE Linux Enterprise Server for System z, we have standardized the environment, helping database administrators to focus on their core competency.”

By using the highly specialized expertise of database administrators more efficiently, SDV ensures that staff are more satisfied because they can do more productive work and ensure the databases always provide the best possible performance.

While it would be difficult on many other computing platforms to run systems near 100 percent capacity utilization at peak times without performance impacts, the IBM z Systems platform provides this flexibility without slowing down system responsiveness. On average, SDV operates its IBM z13 servers at above 70 percent utilization, leveraging its computing resources in a highly efficient manner.

FAULT-TOLERANT DESIGN AND QUICK FAILOVER
The highly reliable fault-tolerant architecture and the automated monitoring of the IBM z Systems platform supports unmatched reliability, availability, and serviceability—a major advantage for SDV that helps to avoid outages. Advanced technology eliminates single points of failure to provide redundancy that increases uptime and performance.

An example is the sophisticated memory management on the IBM z Systems platform. SDV sees constantly growing memory requirements and many applications rely more and more on in-memory processing. The IBM z13 server monitors its memory continuously and protects data stored in memory using Redundant Arrays of Independent Memory (RAIM) technology. The IBM z Systems transactional memory management feature goes one step further by using the system’s Transactional Execution Facility to ensure data consistency across all processes—leading to fewer locks and improved performance, especially for multi-threaded applications.

“Our clients, the Sparda banks, cannot afford downtime—people want to use cash machines and online banking at any time of the day. For many people, online banking is the main point of contact to their bank, so it is essential to provide fast, uninterrupted service,” said Bernd Bohne.

“SUSE Linux Enterprise Server for System z allows us to run a widely-known operating system—Linux—on a unique platform to ensure efficient application development and the highest possible availability in production.”

Another key benefit of running SUSE Linux Enterprise Server on z Systems is the disaster recovery (DR) feature IBM GDPS. IBM GDPS provides powerful, automated failover processes that enable the company to switch all services from one physical system to the other within seconds. “The great thing about IBM GDPS in combination with SUSE Linux Enterprise Server for System z is that it just works,” said Oliver Röthinger. “It would be very difficult to provide similar business continuity in an event of a failure on a distributed x86 architecture. With GDPS, we do not need individual solutions for different applications, we can use a single approach—and we know that it works when needed, with guaranteed data consistency.”

SDV tests its disaster recovery processes regularly and relies on the technology to schedule system maintenance, to add capacity to existing servers or to perform hardware migrations without service interruption. Bernd Bohne said, “We once experienced a power failure at one location. Thanks to GDPS and SUSE Linux Enterprise Server, our services recovered almost instantly. Today, because of its proven reliability, SUSE Linux Enterprise Server for System z has an excellent reputation within Sparda-Bank Group and it is the preferred system for mission-critical solutions where availability is vital.”

SEPARATED WORKLOADS AND LOWER SOFTWARE COSTS
The advanced virtualization layer on the IBM z Systems platform allows SDV to run application servers and database servers
“In the past, database administrators often had to deal with all kinds of system administration tasks. With SUSE Linux Enterprise Server for System z, we have standardized the environment, helping database administrators to focus on their core competency.”

OLIVER RÖTHINGER
System Programmer and Administrator z/VM and Linux on z Systems.
Sparda-Datenverarbeitung eG

on different virtual machines without impacting application performance. “With in-memory network technology, the IBM z Systems platform provides ultra-fast networking links between SUSE Linux Enterprise Server for System z instances running on the same physical server,” said Oliver Röthinger. “These internal network connections do not require external components such as cables, switches and routers—reducing the infrastructure footprint and keeping the communication secure without the risk of wiretap interception.”

By deploying its database servers and application servers into multiple logical partitions (LPARs), SDV has optimized the sizing of its virtual environments to reduce software licensing costs substantially. “It is very simple: with SUSE Linux Enterprise Server for System z we need fewer cores to run our mission-critical Oracle database servers. And we also need fewer cores to run our Java application servers,” said Bernd Bohne. “For a controlling application we recently deployed, we evaluated various options, and SUSE Linux Enterprise Server for System z was the most cost-efficient platform, with 25 percent lower software licensing and maintenance fees. In total, we estimate that we save about 50 percent in software costs for our Oracle databases, with similar savings for our Java application servers.”

“SUSE Linux Enterprise Server for System z is the perfect platform for us—it combines reliability and security features of IBM z Systems technology with the ease of use, stability and economics of Linux. This highly flexible and scalable configuration allows us to increase capacity without disrupting our IT services helps us to react quickly to changing requirements without compromising business continuity—and this is what our banking clients expect from us.”