

Making the case for migration: Gerber Scientific selects IBM XIV Storage System for its SAP production environment



“Since switching to IBM XIV as our exclusive SAP production storage platform, we have been able to achieve a significant performance increase in effective IOPS under load compared to our previous storage platform.”

Raf Cohen,
CIO of Gerber Scientific



“IBM XIV has reduced our total cost of operations while improving our service levels to our worldwide SAP user community. The XIV architecture has allowed Gerber Scientific to improve performance for operational tasks: one function that used to take eight hours is now completed in just 15 minutes, giving our IT staff time to focus on other projects.”

Raf Cohen,
CIO of Gerber Scientific

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About this paper

This brief describes how Gerber Scientific, working with an IBM storage implementation team, migrated its production SAP applications and Oracle database from an existing proprietary storage infrastructure to the IBM XIV Storage System. IBM Rational Performance Tester was used to simulate the target SAP workloads during the project's proof of concept (POC) phase. Since completing the migration from the previous storage array, Gerber Scientific has benefitted from the XIV system's ability to deliver significant increases in application performance as well as substantial operational and cost efficiencies. Today, IBM XIV storage is the company's exclusive SAP production storage platform.

Customer Objectives

- *Replace an aging, proprietary storage subsystem*
- *Increase storage capacity to meet the needs of a growing SAP portfolio*
- *Deliver consistently high performance to support more than 2,200 concurrent users*
- *Ensure 24x7 availability*
- *Consolidate and reduce capital expenditure on storage hardware*
- *Reduce electricity, air conditioning and floor-space costs*
- *Establish a scalable storage strategy for future expansion.*

IBM Solution

- *One IBM XIV Storage System, with 79TB usable capacity, integrated with IBM Power Systems servers, which host SAP ERP 5.0 on IBM AIX*
- *An IBM team assisted Gerber Scientific in migrating its SAP production database onto the XIV storage system and integrating it with the company's existing IBM Power Systems servers*
- *To test XIV system performance, Gerber Scientific simulated transactional and batch workloads using the IBM Rational Performance Tester Extension for SAP Solutions.*

Customer Benefits

- *Migrated the entire SAP production database in just 45 minutes*
- *Achieved over 65,000 inputs/outputs per second (IOPS); given that the current SAP ERP production environment requires only 10,000 IOPS, this provides ample headroom for future growth*
- *Reduced response times for end-users from 4-5 seconds down to fewer than 2 seconds*
- *Significantly improved performance for SAP processes; the SAP system refresh (SAP Cloning) that previously required 8 hours can now be completed in just 15 minutes*
- *Enabled the running of simultaneous SAP batch jobs, rather than scheduling according to disk array performance*
- *Reduced backup time by 50%*
- *Gained the ability to rapidly expand storage pools, with no downtime*
- *Achieved POC-to-production in less than 60 days*
- *Gained enough capacity for future consolidation of two smaller departmental storage arrays onto the XIV platform. By eliminating the internal Power Systems disks, Gerber Scientific will also be able to consolidate four server racks to one rack.*
- *Reduced CAPEX investment, as the XIV system provides twice as much storage capacity at 60% of the cost of the replaced storage system*
- *See additional benefits in 'Solution Acceptance' page 9*

Background, starting point and objectives

Gerber Scientific Inc., located in South Windsor, Connecticut, USA, is a world-leader in innovative end-to-end customer solutions for a wide range of industries, including sign-making and specialty graphics, ophthalmic lens processing, apparel and flexible materials, and print and packaging. The company's software, computerized manufacturing systems, supplies and services are fully integrated, for maximum customer support and flexibility.

Gerber Scientific employs 2,200 people worldwide and generates annual revenues of around US \$640 million. The global organization is supported by an IT infrastructure built around SAP ERP 5.0, which handles financial accounting and controlling, and sales and distribution processes.

Gerber Scientific runs SAP on IBM Power Architecture, and its aging storage area network (SAN) systems, based on an aging proprietary storage device from another vendor, needed to be replaced as it was causing performance bottlenecks and was running out of capacity.

Gerber Scientific sought a new storage solution that would resolve its existing performance and space problems, as well as support future expansion. To deliver adequate performance for the existing SAP environment, the new infrastructure needed to be capable of supporting at least 10,000 inputs/outputs per second (IOPS), as well as multiple instances of the Oracle database.

To achieve these goals, Gerber Scientific chose the IBM XIV Storage System for their SAP environment.

Gerber's Objectives

- Replace an aging, proprietary storage subsystem
- Increase storage capacity to meet the needs of a growing SAP landscape
- Deliver sufficient and consistent performance to support more than 2,200 concurrent users
- Ensure 24x7 availability
- Consolidate and reduce capital expenditure on storage hardware
- Reduce environmental (power and cooling) and floor-space costs
- Establish a scalable storage strategy for future expansion.

Existing SAP Landscape

The SAP applications and the underlying Oracle 10g database run in IBM AIX 5.3 logical partitions (LPARs) on three IBM Power Systems p5-570 servers, each with 8 POWER5 processors and 48GB memory. In the event of unplanned downtime or scheduled maintenance on the primary server, the production database LPAR can be failed over to a second server using IBM HA (High Availability) cluster software.

The IBM Power Systems server platform has offered excellent performance for Gerber Scientific's SAP environment amid significant growth in recent years. However, the company's storage area network (SAN), which was based on a three-frame proprietary storage array managed by two Dell servers, was running out of capacity – and causing an I/O bottleneck which limited the performance of the whole environment.

To build a storage architecture that would support future expansion, Gerber Scientific needed to replace the aging storage array with new infrastructure. To deliver adequate performance for the existing SAP ERP production environment, this new infrastructure needed to be capable of providing at least 10,000 inputs/outputs per second (IOPS) to support multiple instances of the 1.6TB Oracle database.

In addition to improving performance, Gerber Scientific sought to reduce operational costs by consolidating to a storage system with a smaller physical footprint and lower power and cooling requirements – without compromising reliability or scalability. While evaluating different vendor products, the company grew interested in the IBM XIV Storage System.

Gerber Scientific asked IBM to perform a POC to demonstrate that the XIV system could deliver the performance, reliability and scalability required by its SAP ERP environment.

IBM XIV Storage System

- The IBM XIV® Storage System is a high-end disk system designed to support key current and future business requirements for a highly available information infrastructure. Built from a grid of standard Intel®/Linux® components, XIV is connected in an any-to-any topology by means of massively paralleled, non-blocking Gigabit Ethernet. The XIV architecture delivers outstanding performance, scalability, availability, and reliability.
- The XIV system uses a massively parallelized architecture and advanced caching algorithms to balance workload equally across a grid of Very High Density Slower Rotation (VHDSR) disks – eliminating hotspots and achieving performance levels beyond the capabilities of Fibre Channel (FC) disk-based systems. A single rack can hold up to 79TB of usable capacity, and all data is mirrored across at least two disks on separate modules – providing complete reliability and rapid rebuilds should an individual disk fail.

Planning and design phase

To prove that IBM XIV was the right platform for Gerber Scientific's new storage infrastructure requirements, the project team needed to simulate the company's SAP production environment workload and measure the results of running that workload on the XIV system. This involved copying the full production database to the XIV hardware, and the use of automated testing tools to generate a realistic load on the system.

Gerber Scientific chose IBM Rational Performance Tester Extension for SAP Solutions as the tool for handling the automated testing workload.

A detailed test plan was developed comprised of over 40 scenarios, from simple to complex, to test XIV functionality, including:

- Creating, deleting, and resizing of a Virtual Volume (LUN)
- E-mail and SNMP notification
- Validating expected XIV behavior in the event of drive or module failure.

IBM Rational Performance Tester Extension for SAP Solutions

- The IBM Rational Performance Tester Extension for SAP Solutions is an advanced performance testing tool that enables testers to create reusable test scripts very rapidly by simply recording the tester's interactions with the SAP GUI.

The tool can play back these test scripts with predefined variations to simulate realistic user loads on a given system – analyzing results to provide a performance and bottleneck report for different solution components.

Key features of IBM Rational Performance Tester

- Identifies the presence and cause of system performance bottlenecks
- Creates code-free tests quickly, without the need for programming knowledge
- Provides a rich, tree-based test editor that delivers both high-level and detailed views of tests
- Automates test data variation and enables insertion of custom Java code for flexible test customization
- Automates identification and management of dynamic server responses
- Offers flexible modeling and emulation of diverse user populations
- Enables Windows, Linux and mainframe technology-based test execution
- Reports in real time to enable immediate recognition of performance problems and renders an HTML browser-like view of Web pages in the test
- Collects and integrates server resource data with real-time application performance data
- Offers Windows and Linux software-based user interface
- Minimizes the memory and processor footprint, enabling large multi user tests with limited hardware resources
- Supports load testing against a broad range of applications such as HTTP, SAP, Siebel, SIP, TCP Socket and Citrix.

Executing the POC

The Gerber Scientific in-house team worked with the IBM team to install the XIV system in its data center and migrate a complete set of production data onto the new system. The test data migration process took just 1.5 hours, and was carried out without any disruption to business users. The XIV system was then connected to one of the company's Power Systems p5-570 servers to run the SAP test environment defined for the POC.

The Gerber Scientific team then installed Rational Performance Tester on a standard Windows/Intel server. They recorded all the test scripts themselves via the SAP GUI, with no help from external consultants, and managed the entire testing process.

Rational Performance Tester was set up to simulate 150 virtual users accessing the SAP applications concurrently, to provide a realistic depiction of transactional workloads at up to three times the load of the real production environment. Other scripts were created to simulate batch workloads – up to 12 times the real load. All test runs were repeated multiple times to provide accurate performance figures.

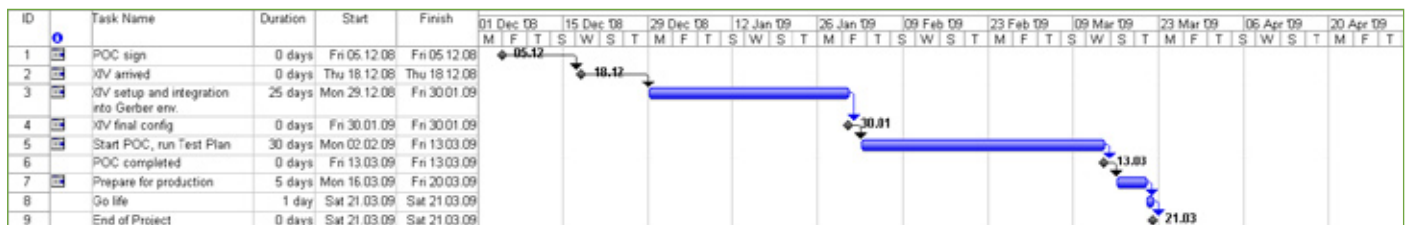
All test cases were validated successfully within just 30 days (totaling six business weeks).

Timeline from POC to Live Production

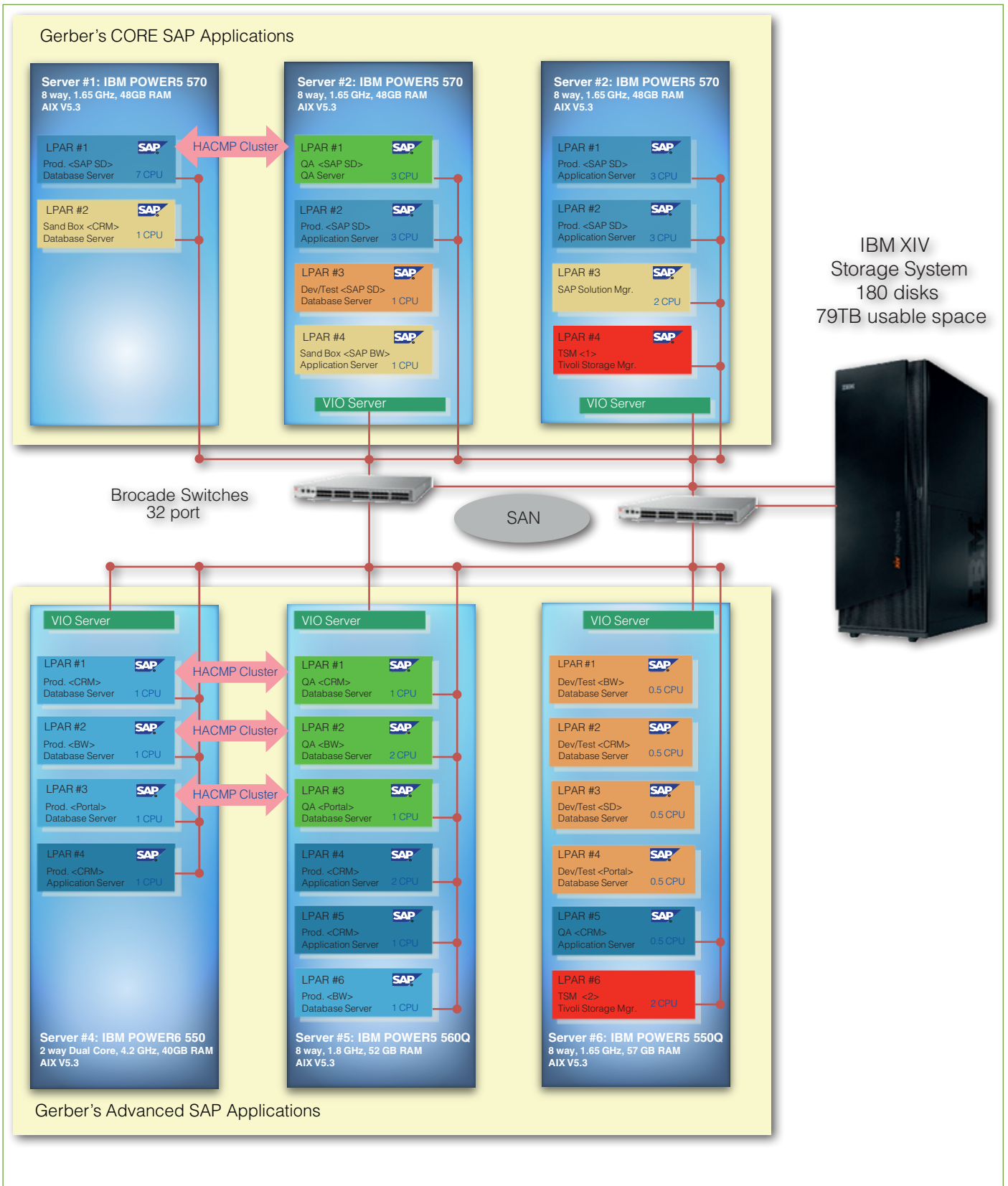
- Gerber Scientific agreed to the POC in December 2008
- The XIV system arrived less than two weeks later
- Setup and integration into the existing environment was achieved in five weeks
- All test cases were executed successfully within 30 days
- Just five days were needed to prepare to go live and switch to the XIV system
- The actual switch took just 45 minutes, moving the XIV system into production in mid-March 2009, several weeks ahead of schedule.

In summary

After successful completion of the POC, the SAP production database was moved from the existing device to the XIV Storage System. During this process, the SAP core production database (SAP SD) was taken off line, and approximately 100 standard AIX copy commands were executed in parallel. The entire data copy process was completed in just 45 minutes; within one hour, the SAP production system was up and running on the XIV system.



The schedule put together by Gerber and IBM



This figure shows Gerber Scientific's new SAP landscape with IBM Power Systems server and the new IBM XIV Storage System

Target SAP Landscape

- The production servers, as well as the QA servers, use a dedicated FC Adapter
- The Dev/Test systems and Sand Boxes use a VIO server
- Each connection from an LPAR or VIO server to a switch uses at least two fibre channel connections; in the diagram, for clarity, just one line has been drawn for each twin connection.

In total, six IBM Power Servers – with more than 26 LPARs – are fail-safe connected through two switches to the IBM XIV system.

Because the XIV system manages the LUNs, it automatically distributes LUNs across all the available disks, and no storage layout planning was necessary. The only configuration task was to create the LUNs and assign them to the LPARs.

Solution Acceptance and Move to Production

The evaluation demonstrated that the IBM XIV Storage System was capable of delivering over 65,000 IOPS – 550 percent faster than the speed required to handle the current SAP ERP workload effectively and 1200 percent faster than the existing storage array. For many of the company's common business processes, these results translated to dramatically better performance and service to end-users worldwide. For example, one SAP batch process that previously took eight hours was completed in just 15 minutes. The IOPS result also meant that end-users would experience response times of one second or less for the vast majority of SAP transactions.

As part of the POC, Gerber Scientific also tested a number of different failover scenarios; all were completed successfully with no failures and no degradation of performance.

As a result of the positive outcome of the POC, Gerber Scientific decided to move the XIV solution into production immediately.

The whole process, from project start to live production, was completed in less than 60 days – and the production cutover was achieved seamlessly, with minimum downtime or disruption of service to business users. With the XIV system in production, Gerber Scientific is already realizing additional benefits, including:

The massively parallelized XIV architecture has enabled backups of the SAP environment in less than half the time. Shorter backup and batch processing windows reduce the need for complex task scheduling, reducing IT efforts and maintaining high levels of overall system performance 24x7.

At Gerber Scientific, the XIV storage system is able to serve six IBM Power Systems servers, with a total installed power of approximately 200,000 SAPS.

The compact footprint and large capacity of the XIV system enables significant space savings. When the entire storage environment has been migrated to the new platform, the company will have reduced its floor-space needs from five racks to just one. Equally, the highly efficient power supply and cooling technologies in the XIV rack reduces electricity costs and helps the company meet increasingly stringent environmental requirements.

The XIV system provides twice as much storage capacity as the previous array, and required 60 percent less CAPEX investment.

Gerber Scientific is currently considering investing in Rational Performance Tester licenses to help plan and execute other infrastructure projects in the future.

Next Steps

Gerber Scientific uses IBM Tivoli Storage Manager (TSM) as a backup solution for their SAP environment, as well as for their entire IT infrastructure. At the time of deployment, TSM for Advanced Copy Services (an integrated IBM solution for performing online SAP backups utilizing storage-based copy functions like FlashCopy or XIV snapshots) did not yet support the XIV system, so Gerber Scientific currently uses standard UNIX shell script commands to take advantage of XIV snapshot technology. The new Tivoli Storage Manager Version 6 now supports XIV; Gerber Scientific intends to exploit this solution in the near term.

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“The IBM Rational Performance Tester Extension for SAP Solutions is an easy tool to install and use – and was crucial in validating the SAP transaction workload.”

Raf Cohen,
CIO of Gerber Scientific



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David Hutchinson
Information Technology SAP Director of Gerber Scientific



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