

## Sal. Oppenheim claims first-mover advantage with a grid solution from IBM and Platform




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### Overview

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#### ■ Challenge

*Compute the value of complex financial instruments at high speed; create a high-performance computing infrastructure capable of rapid, low-cost, non-disruptive growth; achieve high levels of availability*

#### ■ Solution

*Working with IBM and Platform Computing™, created a grid architecture based on IBM System x™ and IBM BladeCenter® servers running SUSE Linux® Enterprise Server 9*

#### ■ Key Benefits

*Tenfold increase in computational speed supports efforts to go to market faster than competitors; ultra-high computing power at low cost of ownership; plug-and-play scalability; high resilience from fully redundant architecture; high capacity for growth*

With more than 3,200 employees managing some €136 billion of assets, Sal. Oppenheim ([www.oppenheim.com](http://www.oppenheim.com)) is one of Europe's leading private banks. Founded in 1789, Sal. Oppenheim has more than 20 offices in Germany and other European countries, offering asset management and investment banking services to corporations and high-net-worth individuals.

A major growth area for Sal.

Oppenheim is in exotic financial instruments called "rainbow options." These are derivative instruments linked to two or more underlying values, where the complexity of the instrument and the volatility of the underlying options make it very difficult to compute the total price in real time. Sal. Oppenheim uses compute-intensive stochastic volatility models to design and value the options it offers to market and relies on advanced grid computing technology to remain competitive.

"Sal. Oppenheim saw a clear opportunity to take leadership in the emerging rainbow options market, and we realized that this would require phenomenal—and growing—amounts of computing power," says Arno Radermacher, Head of Technical Applications and Systems at

Sal. Oppenheim. "Using technologies from IBM and Platform, we built a grid architecture that continues to grow in line with our needs more than two years on. We will soon almost triple the original number of CPUs in the grid, and we can already compute ten times faster than before—which translates into faster time-to-market."

### **Growing with grid**

Sal. Oppenheim initiated the project in 2003, having determined that grid computing represented a more cost-effective and scalable solution than continuing to expand its existing symmetric multiprocessing (SMP) infrastructure. In particular, the use of grid technologies would allow Sal. Oppenheim to start with a small, cost-effective solution—then expand the solution in line with growing business requirements.

"Our decision to move into complex basket options required us to significantly boost the power of our IT infrastructure," recalls Radermacher. "It was immediately clear to us that internal demands for computing power would grow constantly and that we needed an architecture that would offer extremely high, non-disruptive scalability. Grid was the obvious solution, allowing us to drive extremely high performance from low-cost, generic hardware in a highly redundant architecture."

In choosing partners for its deployment of grid technologies, Sal. Oppenheim placed particular emphasis on the long-term sustainability of the relationships. Right from the outset, the bank planned to grow the grid and needed to be sure that its technology partners would continue to invest in development. Says Radermacher, "Platform and IBM had the clearest and most ambitious roadmap of all the grid providers we evaluated and offered the closest fit to our business needs."

He adds, "The offering from Platform was also technologically superior, and the ability to run multiple operating systems and multiple applications in a single grid was a big plus. This enabled us to preserve existing IT investments while providing interoperability as new nodes are added to the grid."

Today, the grid plays a vital role in helping Sal. Oppenheim maintain a competitive edge in the options market, providing the vast computational power required to enable the bank to take new instruments to the market rapidly. The total number of CPUs in the grid has almost doubled, and Sal. Oppenheim expects to scale the grid to 900 CPUs by the end of 2007 reflecting very strong growth in its derivatives business.

### **Integrated grid solution**

The Sal. Oppenheim grid has a five-layered structure: the hardware at the bottom, the operating system layer; the clustering software layer to organize the machines into groups; the grid layer which manages and schedules tasks across the clusters; and the application layer.

Sal. Oppenheim chose to build its grid on the IBM System x platform, initially selecting more than 60 model x336 servers, each powered by two Intel® Xeon® processors, running the SUSE Linux Enterprise Server 9 operating system. As the grid grew, Sal. Oppenheim added 12 IBM BladeCenter systems, containing in total more than 160 IBM LS20 blade servers, each powered by two AMD Opteron processors.

Sal. Oppenheim chose IBM Cluster Systems Management (CSM) and IBM Tivoli® Monitoring software to cluster the physical servers together and enable them to be managed easily from a single point of control. In addition to providing all the key functions for administration and maintenance of typical distributed systems, CSM is designed to deliver the parallel execution required to manage clustered computing environments effectively.

The grid layer of the architecture is based on Platform Enterprise Grid Orchestrator (EGO) software, which virtualizes, then allocates and prioritizes the available computing resources to meet the changing business needs.

The Platform Symphony grid scheduler, which sits on top of Platform EGO, manages the distribution of workload across all the nodes of the grid, and allows new computing resources to be added to the grid on-the-fly, without requiring existing processes to be halted. Equally, if a server should fail, the grid can simply re-schedule the jobs it was doing, without major impact on production.

“The IBM and Platform grid solution combines high performance and tight integration with exceptional resilience—in financial services, these are two key attributes,” says Radermacher. “The grid is highly redundant, so the failure of any single component has a very limited impact on the solution as a whole—and it offers us the ability to expand our computational power as rapidly as the business requires.”

He adds, “One of the advantages of working with IBM was the ability to get the bottom three layers—hardware, OS and clustering—from a single supplier. This reduces the chances of inconsistencies between the layers and helps the overall reliability of the architecture.

*“We estimate that the grid architecture costs five times less to acquire and operate than a comparative proprietary SMP solution—and the scalability is far greater and more cost-effective, too. But the most important aspect of the solution is the increased competitive advantage that it provides. Our speed-to-market helps us to stay ahead of our rivals, and the grid architecture will enable us to keep pushing up the performance as our derivatives business grows.”*

– Arno Radermacher, Head of Technical Applications and Systems

Over the years, we have built a very strong relationship with both Platform and IBM, and we are confident that they have a good understanding of our long-term goals and the ability to work well together.”

#### **Open operating environment**

By selecting Linux and IBM grid technologies for its architecture, Sal. Oppenheim gained enterprise-class resilience and performance at low total cost of ownership. The platform-independence of SUSE Linux Enterprise Server enables it to run on practically any computer architecture, so that Sal. Oppenheim is no longer tied into costly proprietary systems. With support for Linux across all its server lines, IBM enables its customers to migrate to the appropriate architecture for their workload requirements.

“With Linux, we have an open, high-performance operating system that runs on low-cost hardware,” says Radermacher. “This helps us to significantly reduce our hardware acquisition and maintenance costs, and allows us more flexibility in expanding the grid. When you install large SMP machines with many processors in a single unit, you have to pay for the complex infrastructure inside the machine—the switches, the backplane and all of the built-in redundant components. Using Linux in a computing grid based on commodity hardware takes the complexity out of the machine and makes it much easier to operate and work on, and therefore, more cost-effective.”

“The grid architecture means there is no single point of failure, and no requirement for the built-in resilience of a high-end proprietary server platform—the Platform grid technology provides the necessary availability.”

## Market-leading performance

Operating in the complex derivatives market, Sal. Oppenheim requires high performance and availability from its grid, with the ability to scale rapidly and non-disruptively. The IBM and Platform solution delivers all of these qualities, in a cost-effective and open Linux-based environment.

Radermacher concludes, "We estimate that the grid architecture costs five times less to acquire and operate than a comparative proprietary SMP solution—and the scalability is far greater and more cost-effective, too. But the most important aspect of the solution is the increased competitive advantage that it provides. Our speed-to-market helps us to stay ahead of our rivals, and the grid architecture will enable us to keep pushing up the performance as our derivatives business grows."

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