



Mission Critical Trading Platform Powered by UniKix Mainframe Rehosting Technology

To keep up with market change and growing trading volumes in a cost-effective manner, NYSE Euronext rehosts a critical trade processing and system order database to open systems servers with UniKix Mainframe Rehosting Software from Clerity.

Highlights:

- Reduced cost-per-transaction rates by over 50%
- Moved over 10 million lines of code; over 98% rehosted without change
- Preserved existing business logic, skill sets, and end user interfaces
- Shortened nightly batch window 25%

Forecasted growth drives need for better cost-per-transaction rates

The Shared Data Center (SDC) team within NYSE Euronext processes trades, orders, reports and quotes for the New York Stock Exchange (NYSE). In addition to handling trades and managing a batch-intensive system order database, the SDC team provides development and operational support for the NYSE in areas such as systems operations, storage management, quality assurance, technical support, and security.

In the fourth quarter of 2006, the SDC team processed over 3.5 terabytes of data per month on in-house, highly customized applications. With globalization, consolidation, price discovery, and the implementation of the Regulation National Market System (Reg NMS), that number was only expected to grow.

The SDC had always been a best of breed shop, running a range of operating system environments. As the SDC team looked at the challenges ahead and analyzed their current operating environments, the decision was made to investigate cost effective alternatives for its mission-critical mainframe workloads.

“After forecasting annual cost and growth trends, we estimated that we would need to operate at least 2500 MIPS on our in-house mainframe before cost-per-transaction rates would be competitive to open systems platforms. We decided to move to an alternative platform that would give us more compelling cost-per-transaction rates without sacrificing functionality or availability,” said Francis Feldman, Vice President of the Shared Data Center.

Evaluating the alternatives

NYSE Euronext competes on a global level and demands fast, reliable performance at a competitive cost. Any alternative selected for the New York Stock Exchange would need to meet the SDC’s stringent security requirements while preserving the valuable business logic of their custom applications.

In addition to lowering ongoing operational costs, it was important to keep the overall project costs involved in switching between platforms down. Other factors

key to the SDC were minimizing the need to retrain staff and making sure that the final vendor selected for the project had clear accountability.

After evaluating alternatives including outsourcing operations and rewriting applications, the SDC elected to rehost its mainframe workload to an open systems environment. The SDC included a proof of concept (POC) in its final decision making stage to ensure there would be no change to core business logic during this move. Online and batch programs were tested during the POC, as well as user interfaces and utilities.

“In addition to assessing each solution providers’ technology with a planned proof of concept, we also did a final test with a handful of vendors using a random piece of code,” added Francis Feldman. “Clarity successfully demonstrated they could address the high online and batch transaction levels we required.”

When all factors were taken into consideration, UniKix mainframe rehosting technology and migration services from Clarity Solutions, Inc. (Clarity) were chosen for the project. With UniKix Transaction Processing Environment (TPE) and UniKix Batch Processing Environment (BPE) software, the SDC’s home grown online and batch applications could be moved to cost effective IBM® System p® servers, as well as HP ProLiant DL585 clustered servers supporting Polyserve, enabling the SDC to obtain better economies of scale and greater flexibility.

A phased implementation

The SDC’s previous application environment ran on a 1660 MIPS IBM® Parallel Sysplex® mainframe complex. Each server was powered off a separate power grid and data was replicated in real time to prevent any single point of failure. Trades executed on the floor of NYSE were matched and sent by these mainframes to the Depository Trust and Clearing Corporation, which clears and settles trades. The SDC’s mainframes handled nightly batch processing and supported regulatory requirements. Over 3.5 terabytes of data were accessed by these applications every month. Given the number of applications, amount of data accessed on a daily basis, and mission critical nature of the environment, the NYSE decided to replatform its workloads using a phased approach.

A three month planning and study phase was undertaken prior to commencing the project. During this time, application and infrastructure environments were assessed. The SDC team categorized its applications by MIPS consumed, data movement, and bridging requirements. Departmental business requirements were also taken into

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Vice President of the Shared Data Center

consideration, resulting in a project schedule that moved the SDC’s applications over to open systems in seven major implementation groups. The Clarity Mainframe Rehosting Reference Architecture was also leveraged to assist the SDC in selecting infrastructure tools and utilities for its target open systems environment.

The SDC and Clarity followed a consistent set of steps during each implementation group:

1. Asset catalog and consistency assessment
2. Workflow bridging and grouping
3. Test environment preparation
4. Application, data, and utility conversion; unit testing
5. Regression and initial acceptance testing; integration and final acceptance testing
6. Operations switch over; data cutover, parallel run, and final cutover

Parallel to completing the project, connectivity changes were addressed at several SDC client sites. Prior to this implementation, several clients of the NYSE still had hard coded network IP address connections directly into a SDC mainframe for communications. The SDC team took the opportunity during this move to transition these legacy connections to NYSE Euronext’s updated Secure Financial Transaction Infrastructure® (SFTI®, pronounced ‘safety’), so that post migration, firms interacting with the SDC would do so through a more secure, modern Domain Name Service (DNS) model.

As depicted in figure 1, *SDC Distributed Target Environment*, the SDC’s 1660 MIPS mainframe complex was replatformed to IBM System p Model 595 servers for online and batch processing requirements. A PolyServe Cluster running on Linux-based HP DL585 Servers was installed on the front end of this implementation. Similar to the previous mainframe complex, the open systems environment was set

up across two data centers for availability, backup, and recovery.

After three months of planning and approximately fourteen months of implementation, the Shared Data Center cut over production on its seventh and final application grouping area and retired its mainframe complex.

Regular communication and careful planning contribute to success

By rehosting its mainframe workload to open systems, the SDC was able to meet all of its requirements for success. Key business logic was preserved and equal-to-better performance was delivered on the new open systems servers. A critical nightly batch window that typically took all night on the previous mainframe environment now completes several hours earlier.

“The performance gains we have been experiencing on the IBM System p 595 servers has been a pleasant surprise. Not only has our critical nightly batch window been reduced by several hours, but as our volumes increase the performance of System p servers has consistently exceeded our previous mainframe levels,” said Joel Wolpert, Director of Performance and Capacity Planning for the Shared Data Center.

According to Joel Wolpert, as with other development and administrative tasks, moving the performance and capacity planning to open systems has gone smoothly. “All the basic

concepts have stayed the same. The main difference has been with the specific tools utilized on each platform of course,” added Wolpert. “I viewed the transition period as an opportunity to enhance my skills and apply a mainframe discipline to an open systems environment.”

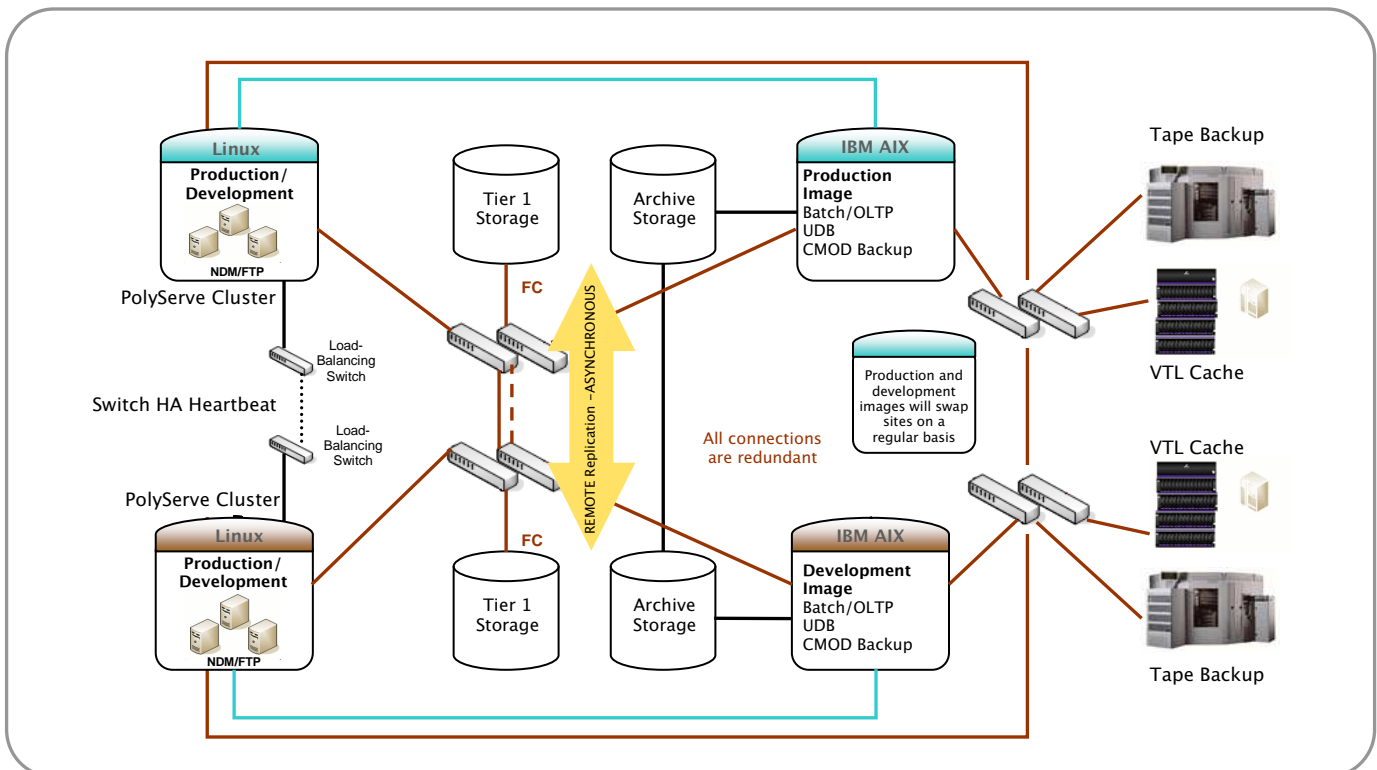
Frequent communication between the SDC and Clerity throughout the entire implementation as well as rigorous testing procedures to validate application and operational metrics contributed to the success. Face-to-face meetings were held early on to build team consensus and establish a common lexicon between both organizations. Francis Feldman also attributes the heavy lifting that was done early on in the project, including the careful cataloging of code and data movement initially to build a comprehensive migration plan, as being key to the project’s successful completion.

Facing the future of the equities market

In addition to lowering cost per transaction rates, the rehost project was used by the SDC as an opportunity to modernize connectivity and enhance end user experiences.

“Now we process more transactions every hour at a far lower price point,” said Francis Feldman. “Rehosting helped our organization avoid a long, costly transformation process and got our applications onto a flexible open systems environment better suited to address future market requirements.”

Figure 1. SDC Distributed Target Environment



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Learn how Clerity can provide an evolutionary path forward for your application and data environments at www.clerity.com.



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