the Availability Digest

www.availabilitydigest.com

Roadmap to the Megaplex

July 2010

The Standish Group

In our December, 2009, issue of the Availability Digest, we reviewed Megaplex: An Odyssey of Innovation, a history prepared by The Standish Group (www.standishgroup.com). The history covers 35 years of unique technical innovations brought to us by Tandem computers, now HP NonStop servers.[1] Standish defined the Megaplex as "a fabric of resources that will provide for application services for the next 35 years." It goes on to predict that "in the future, NonStop technology will be the basis for the Megaplex."

The Standish Group has now published a roadmap of how this is going to happen. In its white paper, Roadmap to the Megaplex,[2] Standish further defines the Megaplex as "a collection of server blades acting together as a single system using multiple types of operating systems, databases, and other computer resources. The Megaplex is the cornerstone technology for the truly integrated data center where resources are acting in virtualized peer collaboration. The Megaplex will operate Linux, Microsoft Server, NonStop OS, OpenVMS, and various types of Unix, including NonStop OSS. The Megaplex will also integrate databases such as Oracle, Sybase, DB2, NonStop SQL, and SQL Server."

Standish submits that shifting critical applications from running purely on NonStop systems to running in the Megaplex shifts much of the workload from higher-priced processing to lower-priced processing without sacrificing availability. It estimates that this move can save in the order of 40% for safety-critical applications, 35% for mission-critical applications, 33% for business-critical applications, and 20% for task-critical applications.

The purpose of Standish's paper is to provide a roadmap for moving vertical NonStop stovepipe applications into the horizontal services of the fully integrated data center – the Megaplex. It proposes six steps for modernizing NonStop applications:

1. Database Modernization: Moving from Enscribe, the NonStop legacy file system from the Tandem days, to NonStop SQL, the open standard relational database.

2. User Experience Modernization: Moving from green screens to modern graphical user interfaces (GUIs) and a web presence.

3. Application Modernization: Changing the applications to reflect the features and functions of current principles, processes, and techniques.

[1] Megaplex: An Odyssey of Innovation, *Availability Digest*; December 2009. http://www.availabilitydigest.com/public_articles/0412/megaplex.pdf.
[2] http://standishgroup.com/sample_research/register.php?pid=nsmx.

4. Availability Modernization Changing from traditional availability and disaster-recovery methods to continuous availability.

5. Security Modernization: Moving from the traditional passive security and protection systems to proactive measures.

6. Operational Modernization: Moving from a vertical structure to a horizontal structure by adding horizontal service views.

The paper reviews each of these steps, illustrating them with case studies, estimated savings, and typical products.

Step 1: Database Modernization

Converting from Enscribe to NonStop SQL

This first step is fundamental to progressing to the further steps. For NonStop systems, it means converting from the old Enscribe file system to HP NonStop SQL, the open-standard relational database. Many of the modern GUI, SOA (service-oriented architecture), data mining, reporting, and development tools depend upon SQL.

There are two ways to migrate legacy databases. One is to extract and move the data from Enscribe to a SQL database and to reprogram the applications to use SQL rather than Enscribe. The other is to use a database gateway to make the conversion in real time and then to convert applications and tables in an orderly manner. The first method is expensive and risky. Using a gateway is cost effective and safe.

Logica – A Case Study

Logica is a $6 billion management and IT consultancy providing IT system integration, products, services, and support to the financial community. It markets its thirty-year old BESS wire service and payments system to banks around the world. BESS fully supports the FED, CHIPS, SWIFT, and TELEX protocols and message formats.

Originally developed by Data Architects in the early 1980s, BESS was built using TAL and Enscribe running on the Tandem platform. After its acquisition of Data Architects, Logica significantly expanded the core product over the years. However, several important advanced functions that would be desirable in BESS were considered too risky and expensive to undertake, mainly due to the Enscribe database.

To solve this problem, Logica started a program to modernize BESS in 2007. It used the database gateway approach and chose Escort SQL from Carr Scott Software to make the conversion. Using this approach, Logica had its first database converted and functioning within one week.

The heart of BESS' first modernized release in 2009 was the conversion from Enscribe to SQL. This allowed the banks to add new functionality such as data mining, new business lines, and new program flows. It also allowed Logica to make many fundamental improvements that would have been too risky with the original Enscribe files.

Logica is continuing the modernization of BESS with great success.

Step 2: User Experience Modernization

Replacing Green Screens and Providing Access to the Web

Nothing is more visible to users than a modern GUI. It will change the perception of users and management regarding the application and the NonStop platform.

Opening up the application to the Web gives it access to the greater world, providing more value for the application investment. This one change will make a significant difference in user productivity and acceptance.

There are basically two ways to modernize the user experience – rewrite all of the screens, and modify the applications to use web services; or use a conversion tool. The first method is time-consuming, expensive and risky; whereas the use of a conversion tool makes the migration safe and efficient.

AIT – A Case Study

Applied Industrial Technologies is a major distributor of industrial parts. It developed OMNEX, an enterprise distribution application, 15 years ago. OMNEX quickly became the core of AIT's IT services. OMNEX was written in COBOL and Screen COBOL (SCOBOL) using the standard Tandem requestor/server model.

AIT developed the application for use by its industrial sales specialists using green-screen technology. Its sales professionals adapted quickly to the early system because of its limited functionality. However, as time passed, significant functionality was added; and new sales personnel found the system difficult and intimidating.

Consequently, in 2005, AIT initiated a modernization program called Asyst to replace its green screens with modern GUIs and to integrate OMNEX with other AIT applications and the Web. The new system is now substantially complete, and the learning time for new sales associates has been cut from two years to two weeks. Furthermore, much more information is now available on an order-entry screen, such as product specifications and drawings.

AIT selected the Application Modernization Suite (AMS) from comForte GmbH to do the conversion. Five developers worked on the conversion for only one year before the initial rollout in late 2005. AIT has continued since then to add functionality with little risk to the application.

Step 3: Application Modernization

Integrating NonStop Applications With the Rest of the Enterprise

Application modernization is the process of taking legacy code and using modern languages, tools, components, and other services to add substantial value to the application. This allows changing the application to reflect the features and functions of current principles, processes, and techniques of the organization.

There are several ways that application modernization can be achieved. One way that is safe and relatively quick is to purchase an off-the-shelf product. However, it may need significant enhancement to meet the organization's needs. Another approach is to rewrite the application using modern tools and technology. However, this approach is expensive, time consuming, and risky.

An alternative is to renovate the existing application with a Service Oriented Architecture (SOA). SOA allows the reuse of existing code on the NonStop server with a standard messaging interface that allows the application to interface with other applications running on different platforms. Using SOA technology, an organization can modernize an application while continuing to leverage its current functionality.

Royal Bank of Canada – A Case Study

The Royal Bank of Canada (RBC) is the largest financial institution in Canada, serving more than 17 million clients worldwide. Its Royal International Money Management System (RIMMS) provides wholesale high-value payment processing. RIMMS started out as an off-the-shelf application package in the early 1980s, but RBC purchased the source code and has significantly enhanced it.

Today, RIMMS supports a full range of international wholesale banking instruments, including FX, MM, derivatives, synthetics, debt equities, and loans. It has become a core part of the RBC treasury function. However, RIMMS was written in TAL and COBOL using green screens and was difficult to enhance.

RBC needed to add a web presence for RIMMS and a way for it to interface with other RBC functions such as trading. To do this, RBC decided to encapsulate RIMMS in a service-oriented architecture to bring agility and flexibility to RBC's treasury business. This architecture would allow RIMMS to adapt quickly to the constantly changing business environment. A web presence with modern GUIs would make RIMMS easier to use and more accurate.

RBC used SOAP/AM from NuWave Technologies to create its RIMMS SOA environment. RBC downloaded a trial version of the product and within 30 minutes was building SOA objects via intuitive browser screens. RBC went on to replace its green screens with modern GUIs, and it interfaced RIMMS with its Unix-based treasury applications. Today, RBC has a fully functioning SOA treasury environment.

Step 4: Availability Modernization

Moving to Continuous Uptime

Availability modernization involves moving from the traditional availability- and disaster-recovery methods to a readiness program. Fully implemented readiness programs are comprehensive and cover people, systems, processes, applications, databases, communications, and the many interdependencies between them.

The centerpiece of a readiness program is an active/active system. An active/active system comprises two or more independent processing nodes cooperating in a common application. The database copies at each node are kept in synchronism via data replication. Should a node fail, all that needs to be done is to reroute further transactions to surviving nodes.

An active/active configuration does away with nonproductive chores such as testing and certification because by its nature, the active/active system is always up-to-date; and all of its nodes are being continually tested. Active/active systems also eliminate planned downtime since upgrades can be rolled through the nodes one by one.

Active/active benefits include greater overall availability, reduced costs, less planning, and higher readiness. The heart of an active/active system is the data-replication engine used to keep the databases in synchronism. The data-replication engine can also be used to integrate various heterogeneous systems and to migrate applications from one environment to another.

AOL – A Case Study

More than 40 million people have AOL email and instant messaging accounts. Therefore, AOL services must be continuously available. Several years ago, AOL faced a serious problem. Its login system was running out of capacity and experiencing some downtime. AOL feared that at any time its users might not be able to log in.

AOL initiated a project in 2006 to replace its login system with an ultra-reliable system. There were two constraints on this move:

- The system could not be down during the migration or cutover.
- The system had to be financially viable and provide disaster tolerance for the required capacity.

AOL's first step was to evaluate major hardware and database vendors. Only the HP NonStop system met AOL's rigorous performance and scaling requirements. AOL planned a four-node NonStop active/active system to replace its old login system with one that provided continuous availability.

Its next step was to migrate its old Login Request Complex to the new active/active system. This involved moving a massive database of a billion rows to the NonStop database. The Shadowbase data-replication engine from Gravic, Inc., was chosen not only to implement the NonStop active/active system but also to do the data migration. Six software developers and database administrators from AOL and the replication-engine vendor worked over a period of eighteen months to gradually migrate the database according to a detailed plan, and they did so with no user downtime.

AOL's active/active approach minimized the need for ongoing disaster recovery and testing and significantly reduced the system's server footprint. AOL estimates an annual savings in people, power, and licensing costs of about $1 million.

Step 5: Security Modernization

Moving to Proactive Security Protection

Security modernization means moving from the traditional passive security monitoring to proactive protection. Government and industry regulations such as SOX, HIPPA, and PCI mandate much of this change.

The security process can be very complex, as companies seek to protect hundreds of assets. One way to simplify the security process is to deploy a centralized security management system. In the NonStop world, the fundamental security mechanism is Safeguard. A proper, centralized management system that includes NonStop servers must integrate well with Safeguard.

Over half of organizations have an active program to implement centralized security management. However, of these, about half cannot satisfy auditors demands' to meet the security compliance goals. To do so requires highly sophisticated software to address all key areas of authentication, authorization, access control, accountability, administration, and audit.

Wells Fargo – A Case Study

After its acquisition of Wachovia, Wells Fargo became one of the largest banks in the United States. It is a diversified financial institution with $1.4 trillion in assets.

Wells Fargo uses a three-level security technical-support organization. The first level is a help desk. The second level manages the security products and services used by the bank. The third level follows state-of-the-art security tools and techniques and ensures that the bank is operating at the highest level of security best practices.

Wells Fargo's NonStop systems include twenty-one nodes spread across six data centers. Applications include ATM network management, wholesale banking, international funds transfer, and mortgage tracking, all of which come under security-compliance regulations. It is the job of the third level of security support to ensure that the security products meet or exceed the compliance and auditing requirements of the bank.

Prior to the merger, Wells Fargo and Wachovia both used XYGATE from XYPRO Technology Corporation for their NonStop systems. Wells Fargo continues in this tradition. XYGATE is used for managing and tracking system security privileges, enforcing password quality, managing access control, and auditing, among other security tasks.

Step 6: Operational Modernization

Moving to a Matrix Infrastructure

Operational modernization requires moving from vertical structures to a matrix structure using horizontal service views. The intent is to run the service at the right service level to balance cost and availability. Services that require high availability, security, and data integrity will operate in one space (typically in NonStop servers), whereas services that do not maintain state or that do not have a high value will operate in a less reliable service area at lower cost.

Operational personnel will generally not know nor care where the service takes place. They will be provided with a uniform operational management system across all services. This capability is found in HP's Systems Insight Manager (SIM) with NonStop Essentials.

SIM provides hardware and software management for NonStop servers, other HP systems, and non-HP systems including IBM mainframes. It automates routine operator tasks such as monitoring, recovery, provisioning, startup, and shutdown. SIM's graphical user displays help operators respond quickly and accurately to situations where human intervention is required.

VocaLink – A Case Study

VocaLink provides ATM and POS payment transaction services for banks, large corporations, and government agencies. It handles over a half-billion payments a month with peak daily volumes of 90 million transactions.

In 2000, the British government ordered the banks to reduce payment times. In response, VocaLink developed the Faster Payments System (FPS) on NonStop servers. FPS has cut the transfer of payments from three days to minutes.

VocaLink currently operates thirteen NonStop nodes with 80 CPUs. However, the tremendous transaction volume handled by VocaLink put a strain on its operations staff due to increased cost and training. Its staff was managing all of the systems and applications with old error-prone, command-line technology. Furthermore, system management was on a node-by-node basis, requiring action on all thirteen nodes even for global actions.

To modernize its operations, VocaLink installed SIM so that it could monitor its entire NonStop complex, including servers, storage, and operating-system components, as a single system.

Currently, VocaLink is using SIM only to manage its NonStop Systems; but in the future it will broaden the scope of SIM to manage other environments.

Summary

With its iPhone and iPad products, Apple is moving the world of IT to seamless integration. Users want portability and high performance. They want everything to work with everything. In the Megaplex, NonStop applications must play with all the other applications in order to survive.

The roadmap to the Megaplex is a guide to maximizing the current investment in NonStop applications and to making them a core element of the enterprise. However, the most compelling reason to modernize the NonStop environment is the sheer flexibility and cost savings it provides. By decomposing applications into services, each service can run in the environment that matches its availability, data integrity, and security needs. The less critical the service, the less costly is its environment. Modernization provides the balance between cost and performance for all the applications in the enterprise portfolio.

The Standish Group

The Standish Group's Rapid Performance Measurement (RPM) service benchmarks and assesses the project management skills of its clients. RPM uses the critical success factors determined by its CHAOS studies and surveys to evaluate the best practices in the client's project-delivery organization. The result is a comparison of the client's success rate in terms of cost and time overruns and feature deficiency rates with those of 70,000 projects from 1,000 organizations studied over the past sixteen years.