

Consolidation – The Sun Way

Analyst: David Reine

Management Summary

Since the 1960s, the constant flux in the state of the computer industry has always had a major impact on enterprise operations. From the arrival of the mainframe in the “glass house” to the appearance of the departmental mini-computer, we have seen the centralization of computing resources. From the birth of the personal computer to the adoption of client-server architectures, the computer industry has pulled major enterprises worldwide from one distributed environment to another. A worldwide network of computer servers has now populated the post-Y2K computing landscape for almost every enterprise, each with its own mission. Each server, complete with its own computing resources, including storage, is scattered across a telecommunications morass designed to give to any CIO heart palpitations. **Once again the computer industry finds itself with a growing need to be able to consolidate the distributed environments by pooling resources and striving to automatically allocate them, dynamically, to whichever application is current and in demand of computing horsepower.**

Cost controls and government and industry regulations, such as Sarbanes-Oxley and HIPPA, have imposed stringent rules on how enterprises must play the game. These new laws have had a tremendous impact upon the risk associated with the management of financial information, the integrity of email traffic, and the implementation of lifecycle controls on all enterprise data, in databases, file systems, or unstructured data. These rules have led the data center to try to pool all of its storage resources within Storage Area Networks, or to consolidate them into multi-tiered, monolithic information warehouses. In this way, the CIO is better able to match the changing value of the data to the cost of the storage, i.e., via Information Lifecycle Management (ILM), thus reducing the cost of doing business.

At the same time, these CIOs are also taking advantage of a positive economy to upgrade, or replace, an aging fleet of servers that have not seen a refresh since the impetus to modernize the data center for Y2K. **That was a full five - seven years ago.** As was the case pre-Y2K, so it is today. Whom does the enterprise turn to when there is a requirement to consolidate every server and every storage device within its computing environment? What company has the resources, the insight, and the architecture to take a myriad of diverse, heterogeneous servers and mold them into a cohesive unit? Sun Microsystems, for one, has implemented a *Blue Print for Consolidation* to assist enterprises into compliance with not only federal regulations, but also the budget guidelines that management has ordained. To see how Sun’s plan for consolidation in the data center conforms to your requirements, please read on.

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Challenges in the Data Center

One of the greatest challenges that every enterprise faces today is trying to do more with less. How can the enterprise improve the performance of the corporate data center? With over 50% of the Information Technology (IT) budget tied up in managing data center assets, how can the IT staff optimize the resources under their control and manage costs? How can they simplify systems management while, at the same time, protecting the investment that the enterprise has made in computing resources? How can the CIO improve the service levels for mission critical applications to attain a reliability rating of 5 “9s”, i.e., achieve an uptime of 99.999%?

Better Storage

Among the Fortune 500, it is not unusual to find enterprises supporting hundreds, if not thousands, of systems. This is a result of mergers and acquisitions, the growing demand for immediate data availability, and often, the low cost of server hardware compared to the signing authority of mid-level managers. As a result, **single-purpose servers configured for peak load often proliferate underutilized resources and add unnecessary complexity to the total cost of ownership (TCO) of distributed systems.** As a result, the enterprise suffers from nearly out of control “storage proliferation” with reckless growth in the number and diversity of storage systems. Consolidating the data distributed throughout the enterprise into a single location, optimally onto a Storage Area Network (SAN), provides a good first step toward lowering the TCO of storage resources. What are some of the indicators that an enterprise’s data center needs storage consolidation? Here are a few:

- There are more disk arrays in the data center than floor tiles;
- There are more operating environments and versions than IT employees;
- Admin costs and management complexity are up, but performance is down; and
- There is plenty of unused storage capacity, but you cannot find it.

Storage consolidation is just one of four

Exhibit 1 –

Four Stages of Consolidation

1. **Geographic** – All of the servers and storage devices in the enterprise are re-installed in a common facility (data center) where a single person or a small team can manage them.
2. **Infrastructure Consolidation** – Separate all of the storage from individual servers and install it behind a SAN switch that interconnects this centralized pool of storage to all of the servers, or to a monolithic array.
3. **Application Consolidation** – All of the iterations of a single application are moved to a single larger server which can make better use of the overall systems’ resources
4. **Heterogeneous Application Consolidation** – All of the applications involved in enterprise operations are moved to a single server or set of servers.

consolidation stages that also includes different levels of server consolidation. See Exhibit 1, above, for a view of these stages.

ILM

Once a CIO makes a decision to consolidate, Information Lifecycle Management can enable better control of the acquisition costs associated with enterprise storage systems, along with the management costs. Another advantage of implementing a sound ILM policy is the resulting automation, which creates an active management environment to migrate data from primary to secondary storage tiers, and possibly back to primary as the need arises. This enables the data center to ensure that mission-critical applications that are generating revenue for the enterprise get access to the primary storage when they need it. See Exhibit 2, on the next page, for a list of various problems that the enterprise may experience and some of the benefits resulting from consolidation.

Larger Servers

The data center can achieve another level of

Exhibit 2 – Consolidation Drivers/Benefits

Drivers

Budget Constraints
 Out of Control Growth
 Increased Complexity
 Imbalanced Growth
 Idle Assets
 Misuse of Floor Space

Benefits

Reduced Costs
 Increased Service Levels
 Improved Manageability
 Improved Scalability
 Reduced Backup Window
 Higher IT Productivity

consolidation by migrating common applications to a larger server. It can attain a higher level by migrating mission-critical, heterogeneous applications to a clustered multi-processor server. Many times enterprises are running different applications for the same function; ERP, for example. The consolidation process can be used to select a single, enterprise-wide solution, at significant cost savings in software licensing. Even mono-processor servers can contribute to the consolidation process through the implementation of virtual application software that enables the partitioning of a single processor between different applications. See Exhibit 3, below, for different ways to reduce cost through consolidation.

Sun Consolidation Solution

The Sun Consolidation Solution consists of 6 elements, each of which may contribute to the overall success of any given consolidation project.

Datacenter Reference Architecture

The Sun *Infrastructure Solution for Enterprise Consolidation*, developed for

Exhibit 3 – Reduced Costs

- Hardware Maintenance
- Software Licensing
- IT Management
- Storage Acquisition
- Disk Utilization
- Processor Utilization
- Office Space

internal use at Sun, provides one of the most effective solutions to attain these goals. In addition to innovative hardware and software platforms, Sun offers proven methodologies in addition to state-of-the-art open systems products, technologies, and services to help the IT staff consolidate to a uniform environment. This new architecture will have fewer and more powerful servers, with fewer

and better-utilized storage arrays. Sun’s stated goal is to build next-generation data centers with reduced management costs and complexity, and with increased responsiveness and agility.

The Sun Process involves a careful implementation of their Reference Architecture, including:

- Taking extensive inventory of all applications, servers, and server configurations;
- Identification of under-utilized resources;
- Review of all software requirements; and
- Evaluation of human resources and business processes

Services

In support of this process is a staff of Sun Systems Engineers who are prepared to help optimize the consolidation or to take on the task themselves, driving a common system consolidation process throughout the enterprise, using best practices. To do this, Sun provides a suite of services to facilitate this process, including:

- *Enterprise Consolidation Workshop* – This workshop is a 2-day working session to address the enterprise’s high-level issues and requirements to make sure that Sun meets those requirements. The workshop helps the enterprise understand Sun’s architectural vision and to provide them with a roadmap for getting there.
- *Enterprise Consolidation Justification Review* – This is 2-week in-depth justification and TCO analysis. The focus is to assist the enterprise in determining whether consolidation of their IT environment will

deliver solid business benefits, as well as to quantify that improvement in financial terms such as ROI.

- *Sun Enterprise Consolidation Architecture Service* – an 8-14 week engagement to define the architecture and configuration for the consolidation solution. Sun develops a detailed design plan that itemizes and prioritizes specific actions that it takes to build a sound, standards-based framework for the IT organization. The finished plan presents key IT strategies, policies, and practices to form a migration plan.
- *Sun Management Center* – a broad, system administration application to enable companies to evaluate and enhance application availability, scalability, and performance.
- *StorEdge Resource Management Suite* – a set of Web-based, centralized, enterprise-storage resource-management applications to help optimize storage optimization, and
- *Solaris Resource Manager* – a compute, tool designed to help improve resource utilization and availability.

Whenever consolidation occurs within a shared environment, change management is essential to ensure a smooth and successful implementation. The Sun process enables this smooth transition.

Platform Products

Sun Microsystems has put together a comprehensive set of datacenter products consisting of servers, storage arrays, and horizontal software products to complement the Solaris Operating System. These products constitute the Sun consolidation platform. See below for a complete description.

Innovative Technologies

Sun prides itself on introducing new technology into the computing arena. Whether it is 64-bit computing, the introduction of Opteron servers, or implementation of techniques to maximize the utilization of system resources, Sun engineers deliver the capabilities that the data center needs to reduce the cost of operation.

iForce Centers

Sun has implemented a worldwide network of iForce Centers, facilities designed to enable IT staff to build and test prototype consolidation solutions and to make an informed investment decision. There are three iForce locations in Sun facilities, Menlo Park, Paris, and Tokyo, and 29 centers run by solution providers throughout the world, led by partners such as EDS, Oracle, SAP, and Siebel. Each center represents a wealth of engineering experience and provides the resources for you to help minimize the risks and costs associated with developing and deploying a consolidation solution from proof-of-concept to sizing and tuning.

Financing

Sun has developed an extensive Server Consolidation Trade-in Program to enable customers to trade-in older UltraSPARC II and UltraSPARC III servers towards the purchase of the latest UltraSPARC IV architecture. In addition, SUN has a program for the migration of multiple, distributed UltraSPARC IV servers towards the purchase of a single consolidated server. Consolidation enables the data center to lower its TCO by enabling the reduction of the number of applications as well as the number of servers.

In addition, Sun also supports the trade-in of multiple storage arrays into one consolidated Sun StorEdge Array. Combining building blocks, like this, creates a high-performance network storage system that can be administered centrally. This way, the IT staff minimizes acquisition and operating costs and reduces the footprint requirement. Every consolidation is different, so your CFO will need to discuss finance terms with Sun.

The Sun Consolidation Platform

Sun's systems consolidation strategy involves implementing mission-critical applications in an end-to-end IT infrastructure including servers, storage, tape, software, and services. With storage optimized for the *Solaris* Operating Environment, Sun tailors their solution to *Sun Fire* servers and their best-of-

class *StorEdge* storage arrays, with Solaris providing the glue to hold it all together. With Solaris 10, Sun provides users with a robust resource management and a common binary environment across all servers. This enables the implementation of the same application set, no matter how many users need support, over SPARC, x86, and AMD64 platforms. Solaris 10 also introduces:

- **Predictive Self Healing** to provide online error detection and auto recovery;
- **N1 Grid Containers** to enable multiple software partitions to share a single instance of the operating system; and
- **Process Rights Management** to deliver easy to use military grade security features

The Sun Fire server is an ideal platform for consolidation. No matter how many users are connecting, no matter how many applications are installed, there is a cost-effective platform available. Within the UltraSPARC Enterprise server line, the data center can install solutions based upon a dual-processor system all the way up to a 72-CPU Sun Fire E25000. Moreover, Sun has a line of volume servers based upon the x86 architecture that now includes an Opteron¹ processor for 32- and 64-bit compatibility. Further, even if you select servers from both families, Solaris enables your applications to run the same on both platforms.

The scalability of the Sun Fire and StorEdge families are equally attractive. No matter where you enter, there is always headroom to add more processing capability to the original server or by upgrading within the family. Not only is the server scalable, but so is the storage. Beginning with a workgroup class *StorEdge 3500*, the IT staff can upgrade from a few drives to 1.72TB of storage, with the mid-range supporting up to 45 TB in the *StorEdge 6300*, and up to 147.5TB in the *9900*.

Storage software is another key to every successful consolidation. The infrastructure consolidation is clearly facilitated by the Sun

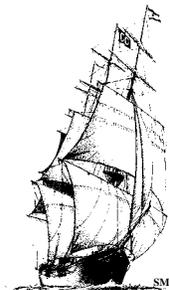
StorEdge Open SAN software architecture. Open SAN provides a full-fabric SAN network that enables high-availability interconnect between data centers and workgroups with *StorEdge* or any other open storage array. Combined with the Services and Support capabilities, the Sun Consolidation platform can provide the reliability, growth and performance that the data center requires.

Conclusion

Many vendors have consolidation programs to get enterprises where they want to be. However, in an economy where time-to-market will determine the success or failure of any project, **enterprises need a partner who is committed to success and whose solutions stand apart.** Sun's edge has four points:

- **Sun recognizes that there is more to a consolidation than a forklift upgrade to a disk array.** Sun delves into the infrastructure between servers, software, storage and networks to develop a total solution, relying on eight years of experience. The results of this experience has led Sun to publish a book on consolidation entitled *Consolidation in the Data Center*, simplifying IT environments to reduce the total cost of ownership.
- **Sun focuses on software as well as hardware** and has remained an innovator in developing sophisticated application solutions for storage management and data protection as well as partnering with leading application providers.
- **Sun delivers end-to-end solutions** addressing every aspect of data center operations, from data collection to disaster recovery, reducing costs by standardizing on Solaris.
- **Sun recognizes the importance of reliability** and takes the extra step to ensure a holistic approach to delivering a 7x24x365 environment

If your enterprise needs to meet performance, reliability, and budgetary demands, check out consolidation, and check out Sun.



¹ See **The Clipper Group Navigator** dated March 4, 2004, entitled *Sun Expands Data Center Product Set with Multi-Technology Offering* at <http://www.clipper.com/research/TCG2004018.pdf>.

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- ***The Clipper Group can be reached at 781-235-0085 and found on the web at www.clipper.com.***

About the Author

David Reine is Director, Enterprise Systems for The Clipper Group. Mr. Reine specializes in enterprise servers, storage, and software, strategic business solutions, and trends in open systems architectures. He joined The Clipper Group after three decades in server and storage product marketing and program management for Groupe Bull, Zenith Data Systems, and Honeywell Information Systems. Mr. Reine earned a Bachelor of Arts degree from Tufts University, and an MBA from Northeastern University.

- ***Reach David Reine via e-mail at dave.reine@clipper.com or at 781-235-0085 Ext. 23. (Please dial “1-23” when you hear the automated attendant.)***

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