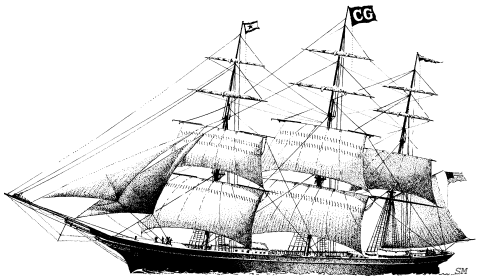
THE CLIPPER GROUP
Navigator™



Navigating Information Technology Horizons℠

Published Since 1993 Report #TCG2009016 March 30, 2009

Simplifying and Optimizing I.T. — Dell Helps Control Data Center TCO

Analyst: David Reine

Management Summary

As the economy and the stock market spirals downward, with only occasional bits of good news, each of us has the opportunity to, and just may need to, rethink our financial plans. The golden rule of investing has been, is, and will always be *diversification!* Do not put all of your nest eggs into one basket, even if the return is "practically guaranteed".

Investing has to be a delicate balance between risk and reward. You should not gamble your entire life savings on the "sure thing", as we have seen with those who gave their entire trust, and retirement funds, to Bernie Madoff. Safe, and lower return investments, need to be mixed in with the high return funds that had grown so fast over the years. We need to invest in both high return *and* low risk properties to ensure a good result, or so the theory goes.

The data center of every business, whether SMB or enterprise, also needs to find its own sense of balance. In this case, however, **it is the balance between *simplification* and *optimization* that needs to be attained in order to lower the total cost of ownership (TCO) of the enterprise information technology (I.T.) infrastructure. Server sprawl, not just throughout the data center, but also through the entire enterprise, combined with an unparalleled surge in data growth, have contributed to a significant increase in the complexity of what tends to be largely inefficient I.T. environments.** When you factor in the increase in staffing required to manage the mission- and business-critical servers, along with a myriad array of storage arrays and networking devices, the TCO of the I.T. architecture begins to exceed the capability of the I.T. budget to handle it. On the one hand, the SMB data center staff must find a way to simplify I.T. operations; while on the other hand, the larger enterprise staff is more concerned with optimizing assets and resources. The data center staff can attempt to resolve this dilemma on their own, or seek out a vendor with the experience and product set to help them consolidate, virtualize, simplify, and optimize their environment. One company that addresses both simplification and optimization is Dell. To learn more how Dell can help lower the TCO or your data center, please read on.

Data Center Pains

The data center staff in every business, large or small, faces the same problems on a daily basis: trying to manage a constantly growing network of under-utilized servers while, at the same time, trying to find a home for business data that is expanding anywhere from 50% to 100% annually. Unfortunately, the pain does not stop with just these physical resources! The TCO for the I.T. infrastructure also includes costs for *communication*, *floor space*, *energy* to drive the architecture while at the same time cool the data center environment, and for the *personnel* necessary to administer this mission- and business-critical network.

IN THIS ISSUE

An overwhelmed CIO faces the daunting task of removing data center complexity to provide the enterprise with an efficient I.T. infrastructure while maintaining or improving performance *and* remaining within an ever-shrinking budget. The majority of data centers are still operating with an older x86 environment consisting of single- or dual-socket, tower or rack-mounted servers with single-core CPUs, running a single application. Unfortunately, they are forced to consume 100% of the IT infrastructure's energy needs, driving up the TCO even further. When the CIO of any of these data centers takes a step back to see what hurdles need to be overcome in order to lower the total cost of ownership of the IT infrastructure, certain issues stick out as pain points as sharp as the thorns on a rose.

One of the sharpest thorns is the utilization rate of both mission- and business-critical servers. Many enterprises have deployed applications on older, open system x86 servers, based upon single-core Intel *Xeon* or AMD *Opteron* processors, in a complex, scale-out architecture. The IT staff typically deploys a single application on each of these servers and, unfortunately, probably realizes less than 15% utilization of the compute power of these platforms, in some cases, even less. As floor space and energy become scarce commodities, wasting 85% of any resource can no longer be tolerated.

In order to make better use of the data center and all of its resources, and to reduce the cost of operations and management, **the typical IT staff is now consolidating multiple rack-mounted servers into multi-socketed platforms, either rack-mounted or in a bladed environment, with direct-connect or internal storage devices evolving into a SAN-attached architecture.** These consolidated servers can be virtualized, perhaps adding complexity, to utilize their processing capability more fully, using a hypervisor from companies such as VMware, Citrix, or Microsoft. Storage for virtualization also becomes more complex, so the I.T. staff must look for storage that is extremely easy to manage and scale in virtualized environments. In this way, multiple applications can share both computing resources and floor space in order to make better utilization of the data center. This enables a smaller IT staff to shift the alignment of resources as business priorities change, enabling the IT staff to lower capital expenditures.

Consolidation *and* virtualization also enable the IT staff to make better use of the energy needed to drive the platforms and cool the data center environment[1]. This requires the availability of an intelligent systems management that can manage the amount of energy being consumed precisely, not only by each processor, but also by each core within the processor architecture. If the IT staff can control, perhaps even reduce, the amount of energy being consumed, they then may avoid the acquisition of the $5M server – the one that forces the enterprise to build a new data center!

In many cases, however, **the virtualization of the server environment requires the data center to dedicate *more* physical resources to the server.** This includes additional memory to support multiple applications on a single shared resource. It also includes increased disk activity in the array to allow multiple applications to communicate with shared storage.

Unfortunately, the 1Gb ports available on existing servers are no longer sufficient to handle the throughput of a virtualized environment. Not only does the server require increased bandwidth, but each application also needs its own communication path for network connections. In much the same fashion as Amtrak enables trainloads of passengers and train cars of freight to share the same sets of tracks (infrastructure) although they may be heading to different destinations, the server I/O bus needs to have multiple lanes so that each application can have its own dedicated bandwidth. Furthermore, not all applications are created equal – some have a significantly higher throughput requirement than others. **The I/O bus needs to be flexible enough to share its resources; with multiple 10Gb pipes available, there should be more than enough bandwidth for all to share.**

In terms of storage growth, the data center is challenged to keep control. Many mission-critical applications require the highest performing Tier-1 disk devices to satisfy an insatiable Internet. In some cases, *highest performing* can refer to throughput and reliability, with disk arrays utilizing 15K RPM SAS or Fibre Channel drives being deployed to provide the quality of service (QoS) demanded. Some transactional applications and high-performance computing (HPC) environments require an even higher level of IOPS than a disk can provide. For these solutions, the data center staff may have to install the newest Tier-0 solid-state disks (SDDs) to reach the level

[1] See the issue of Clipper Notes dated November 24, 2008, entitled *Capping Energy Demand in the Data Center – "It's Not Easy Being Green!"*, and available at http://www.clipper.com/research/TCG2008061.pdf.

of I/O activity required[2]. In order to simplify the networking infrastructure, the storage administrators may want to deploy an iSCSI array or, in the future, a F.C. SAN over Ethernet (FCoE) in order to reduce network complexity. Other business-critical and web-facing applications have a greater need for high capacity storage than for throughput or reliability. For these applications, high-capacity 10K RPM SAS or SATA drives (at Tier 3) may provide the right answer. Quite clearly, a combination of all three tiers might be appropriate for your architecture, perhaps including even tape, as Tier 4, for long-term archiving.

In order to reduce the TCO of the data center, the IT staff must take advantage of every tool at its disposal. **Consolidation and virtualization of both servers and storage can provide the enterprise with the tools that they need to find the right balance between *simplification* and *optimization* of the IT infrastructure.**[3] The SMB data center may be focusing on simplifying the environment so that a less experienced IT staff can manage it. On the other hand, a large enterprise with hundreds (thousands) of servers and PBs of storage may be seeking to optimize their architecture. In either case, the final result will not be at either extreme of this sliding scale. The SMB will not be able to afford to run an underutilized architecture, while the enterprise will seek to simplify a fully consolidated and virtualized environment, in order to control its TCO, also. Both **need to find the right balance point to incorporate simplicity and optimization into their framework.**

Updating the Data Center

In order to achieve these goals and eliminate the waste that pervades the data center, **the CIO must invest in the right technologies to find the right balance between striving for simplification and striving for optimization for his or her data center that will achieve tangible business results.** By consolidating now, the CIO can reduce server count – lowering maintenance costs, reducing software license fees, conserving energy, reducing administrative headcount, and recapturing needed floor space. **Despite the economy, the enterprise needs to spend money to save money!**

These investments should focus on the standardization of IT infrastructure in order to remove infrastructure complexity, wherever possible, and to simplify operations and management, where over 50% of the data center budget is going. Depending upon the size of the enterprise, finding the right blend of simplification and optimization could revolve around moving to a bladed architecture with a F.C. or enterprise iSCSI SAN to provide a shared database in order to minimize the waste of IT resources and energy. For an SMB, this could mean replacing the existing rack-mounted servers with a more efficient multi-socketed platform, taking advantage of the existing IP infrastructure with an iSCSI SAN.

What is clear is that in an economic climate where reduced staffing is the prevalent scenario, most, if not all, enterprises do not have the resources to scope out the correct balance of simplicity and optimization for them. They need to find a partner that has the experience and the product set to guide them in upgrading the data center to meet the business priorities of today *and* tomorrow.

Clearly, the data center needs to find a partner with a technical support team qualified to understand its business goals, one experienced in putting together a balanced infrastructure. **If today's data center tries to take on this task themselves, they can be sure that they will invoke what could become Murphy's Law of Simplification – *the more that you try to simplify, the more complex everything becomes.***

This partner also needs to have a focused and standard product set that will enable the data center staff to deploy the right blend of open systems hardware and software to minimize the TCO of the IT infrastructure. The CIO may not want to extend the life of a proprietary solution already in place or allow the IT staff to be distracted by vendors who may be simply trying to prolong the life of a legacy platform. Where can you find a partner that brings all of these qualities to the table? One good place to start your data center transition might be with Dell.

Finding the Right Balance with Dell

Dell is a well-known name in the executive offices of every enterprise. It is well known for its supply chain prowess along with its customized, build-to-order, laptops, desktops, and servers. Fortunately, that is just your *father's Dell*. **Today's Dell is much more than that – a total system's provider, from soup to nuts. Dell's**

[2] For more on this topic, see the issue of Clipper Notes dated February 10, 2009, entitled *A New Tier of Storage Appears – Faster, Solid-State Drives State Their Case*, and available at http://www.clipper.com/research/TCG2009006.pdf.

[3] See the issue of Clipper Notes dated March 26, 2009, entitled *Feeling Overwhelmed in the Data Center? – Understanding Why*, which is available at http://www.clipper.com/research/TCG2009014.pdf.

technical support teams can help you consolidate and virtualize your data center to achieve the economies of scale that you need to lower data center TCO through simplification and optimization. In fact, Dell prides itself on the fact that *We Simplify IT*. For the new Dell, IT includes servers, storage, services, management, and solutions.

A major component of Dell's simplification strategy is in their commitment to open standards – a commitment of 100%. They have no portfolio of legacy products to push, no proprietary base to protect, and no specialized software development staff to finance. Dell long has been committed to the x86 architecture with servers based on both Intel's *Xeon* processor and AMD's *Opteron* CPU and has been a long-time proponent of utilizing iSCSI in both the SMB and Enterprise.

However, as a surprise to many, their *PowerEdge* server family is designed to support enterprise requirements for tower, rack, and blade platforms, providing both the SMB and enterprise with the flexibility required to optimize their data center operations with outstanding energy efficiency. Now designed with more memory and more I/O than previous generations, the PowerEdge family is ideally suited to optimize the virtualized environment that the data center needs to achieve the utilization rates and operations cost savings that they are looking for.

Furthermore, Dell is committed to a server strategy consisting of a *Unified Fabric* – with converged traffic on 10Gb links to optimize, and reduce, the number of cables, adapters, and switches, and complexity, needed for server deployment. Dell's new technology will enable the IT staff to virtually allocate and fine-tune the 10Gb Ethernet bandwidth for virtual-machine-hosted applications at the server.

With a common image across the entire family, Dell can simplify operations to lower data center deployment and management costs for server administration. With its increased focus on optimization, Dell now delivers on both sides of the equation.

Dell's *PowerVault* and *EqualLogic* lines of storage products provides the data center with a broad spectrum of storage solutions to optimize according to the "value" of the data as it ages. With direct-attached solutions for the SMB or remote office, Dell can provide the correct balance of performance and capacity needed with SAS and SATA devices. When it acquired EqualLogic, Dell gained access to one of the most-respected family of enterprise iSCSI arrays in the industry, and with their partnership with EMC, Dell can simplify the sales and support process while providing any enterprise with the potential to deliver optimized performance and capacity. Dell can even provide the SMB and enterprise with a full line of tape devices for data centers with backup and long-term archive needs.

Thus, Dell is more than a hardware provider. Their PowerEdge, PowerVault, and EqualLogic solutions are more than simple platforms that other vendors also can provide. Dell's edge comes with the services and solutions they provide that enable the IT staff to deploy integrated, and optimized, solutions into the data center, simply. With Dell *OpenManage*, the data center has a simplified, embedded tool to streamline server configuration and deployment from days to hours. With Dell's *Management Console*, the IT staff can manage an entire network from a single pane of glass, eliminating multiple complex and proprietary consoles required by others. And with Dell's new Lifecycle Controller, customers are able to simplify provisioning, deployment and maintenance of their systems. Dell also provides a variety of services such as infrastructure consulting, deployment, managed services, and a modular suite of professional support services to aid the data center in optimizing the IT infrastructure.

Conclusion

You cannot be totally simplified and totally optimized at the same time. It just can't be done. You need to choose what degree of simplification and optimization will deliver the right balance and success. By consolidating and virtualizing today, you can invest in your data center in order to meet the needs of tomorrow. Getting the best ROI is the trick. Dell can help you find the correct balance point for your "seesaw" between simplification and optimization.

Dell has the portfolio of optimized solutions to enable you to optimize your portfolio of IT infrastructure. You can try to do this yourself; however, for most, we do not recommend it. With a complete menu of open systems platforms, systems management applications, services, and solutions, Dell is equipped to simplify your operations and lower your TCO.

About The Clipper Group, Inc.

The Clipper Group, Inc., is an independent consulting firm specializing in acquisition decisions and strategic advice regarding complex, enterprise-class information technologies. Our team of industry professionals averages more than 25 years of real-world experience. A team of staff consultants augments our capabilities, with significant experience across a broad spectrum of applications and environments.

- ***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. 123. (Please dial "123" when you hear the automated attendant.)***

Regarding Trademarks and Service Marks

Disclosure

Officers and/or employees of The Clipper Group may own as individuals, directly or indirectly, shares in one or more companies discussed in this bulletin. Company policy prohibits any officer or employee from holding more than one percent of the outstanding shares of any company covered by The Clipper Group. The Clipper Group, Inc., has no such equity holdings.

Regarding the Information in this Issue

The Clipper Group believes the information included in this report to be accurate. Data has been received from a variety of sources, which we believe to be reliable, including manufacturers, distributors, or users of the products discussed herein. The Clipper Group, Inc., cannot be held responsible for any consequential damages resulting from the application of information or opinions contained in this report.