

WHITE PAPER

Optimizing the Datacenter for Cost and Efficiency

Sponsored by: Dell and Intel

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IDC OPINION

The days of buying servers based on speeds and feeds alone are fast fading away. The changing dynamics of the datacenter are driving customers towards new criteria in selecting the products and, indeed, vendors. The rising complexity and cost are two key challenges most enterprises are grappling with, and they are looking for architectural and software breakthroughs to help them build a more dynamic IT fabric.

The availability of faster processors, more capacity and denser architectures at relatively lesser cost, have led to an escalation in densities inside the datacenter. This is because enterprises have, over the years, found it easier to add more servers and storage to maintain availability and scale. However, it is evident to them now that this has led to the following disadvantages:

- ☒ Rising operational overheads driven by the increasing management and energy costs. The current economic environment has exacerbated the prioritization of controlling these costs.
- ☒ Poor efficiency due to under-utilization of IT assets since a lot of redundancy has been created within the organization, both from an IT and business process perspective.
- ☒ Complexities that make it challenging to integrate information within the organizations to make better business decisions.
- ☒ Inflexibilities that have made it difficult to expand faster and also in adapting to new business models.

IDC's latest Asia/Pacific survey of over 2,000 respondents across 14 countries identified "investing in better management/automation tools to reduce cost and improve efficiency" and "consolidation/virtualization to create space, improve utilization and reduce spend" as the top 2 most prominent priorities with respect to the datacenter.

CIOs today have a two-pronged agenda of controlling costs and adding value to the business. They understand this means transforming the current datacenter, which requires a different way of sourcing, managing and deploying IT within their datacenter.

SITUATION OVERVIEW

The Present Challenge

The technology infrastructure of today's corporations has grown in depth and complexity through the years. This has created significant challenges to the deployment, use and maintenance of IT infrastructure, and made IT management a top concern for those charged with growing the business.

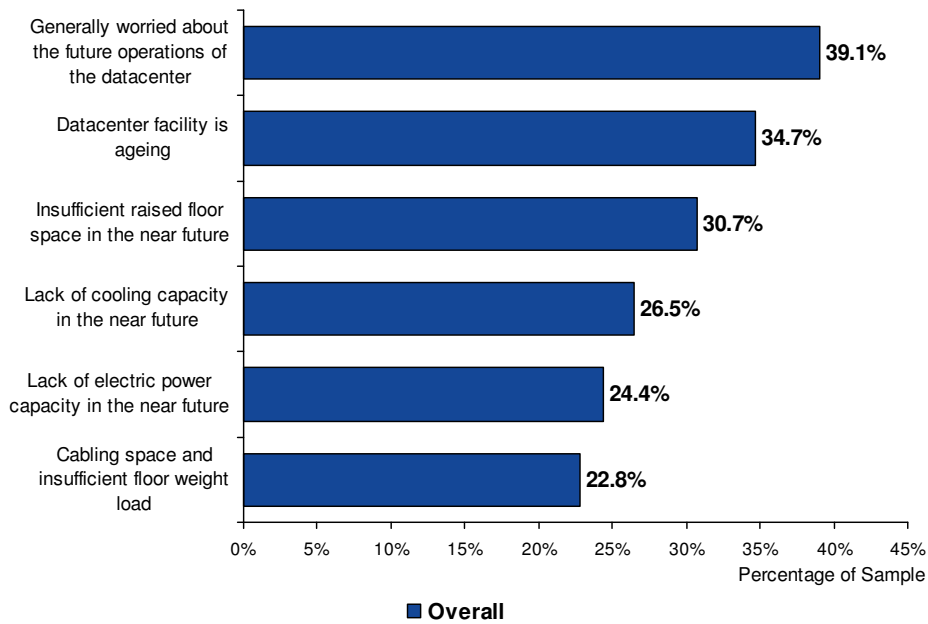
Under the pressure of a global economic crisis, IT infrastructure and IT budgets have come under greater scrutiny. What has emerged are clearer business mandates around agility, and improved responses and time to market while reigning in costs and improving efficiency. Tighter budgets and poor business climate have actually placed more emphasis on leveraging accurate, real-time information. Business requirements and needs continue to grow and evolve even more so in a trying business climate, demanding IT keeps pace and aligns itself in order to support the business objectives. For instance, anecdotal reports have surfaced where business units have required accurate reports on the health of the business with greater frequency, placing more demands on IT to help produce them. And certainly tough times like this require businesses to keep customers closer and respond more speedily to their needs.

Arguably, in the middle of it all is the datacenter. IDC's Asia/Pacific Datacenter Study, 2008, revealed how most datacenter owners in the region feel their datacenters are reaching end-of-life. These were built six to 10 years ago, and many datacenter managers are finding it increasingly difficult to cope with today's business requirements and technologies. Higher power densities in today's servers are posing a huge challenge for these datacenters that were built at a time when 2-3KW per rack was more than enough. However, the average has more than doubled today and even higher if an end user is looking at high-performance workloads. Add to that the challenge of not being able to cool the datacenter such that servers do not overheat. Indeed, the layout and design of the facility is causing huge challenges for datacenter owners to keep their servers up and running.

Figure 1 shows responses from 1,106 respondents across Asia/Pacific on their current datacenter pain points. Almost all countries cited having problems establishing how long the current datacenter would be running. Respondents also indicated a critical need to revamp or retrofit existing datacenters in order to accommodate additional servers or even keep the existing one running smoothly

FIGURE 1

Datacenter Challenges in Asia/Pacific - Pain Points



n = 1,106

Source: IDC Asia/Pacific Datacenter Study, December 2008

Transforming the Datacenter

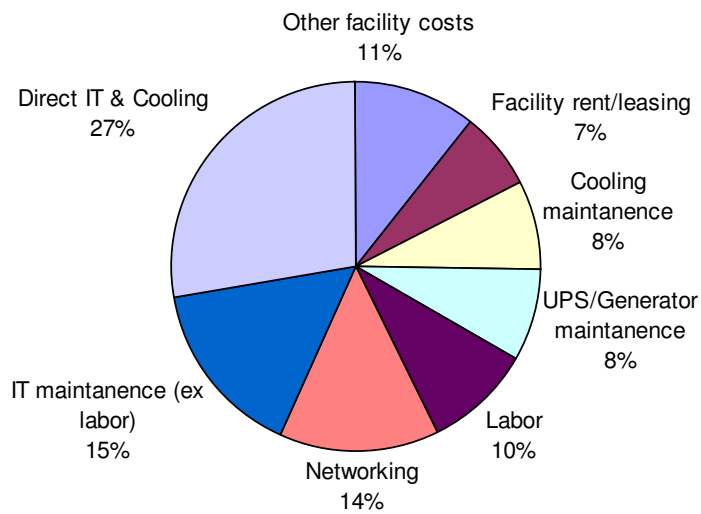
The current state of the datacenter, as shown in Figure 1, demands a transformation that helps in improving space utilization and lowering power consumption while still providing the scale and availability the business requires. IDC's datacenter survey revealed that many customers have no choice but to revamp their datacenters from a power/cooling provisioning standpoint, but a majority also considered consolidating or virtualizing at the same time to lower the overall server footprint and improve space utilization. We believe there will be significant interest in solutions that help the customers in controlling costs while enabling them to deliver to business expectations. Today, lowering the energy and administration/management costs are two key focus areas of datacenter managers in the region.

Rising Power Costs

IDC research in Figure 2 shows where the dollars go to in datacenters from an opex standpoint. Depending on the type of datacenter, energy costs are between 30% and 40% of an organization's operational costs in the region, and they are slated to grow further if customers continue to add more server, storage and networking equipment without consciously embarking on an energy-saving strategy. Power costs, as we all know, are increasing worldwide, and customers have been experiencing an increase in the MW capacity in their datacenters due to higher server densities and consequent overload on facilities that were built for yesterday's technology. In addition, the next wave of datacenters is being built at more than double the capacity, which may compound the problem. Part of the problem is that energy costs are not included in IT budgets but within the general administration or facilities overheads, thereby making it someone else's problem.

FIGURE 2

Datacenter Operational Expenditure Breakdown



n = 455

Source: IDC Asia/Pacific Datacenter Study, December 2008

However, as the CFO gets more involved in this discussion, datacenter managers will need to start focusing on reducing power costs in a significant manner, and that maybe a cumbersome exercise if done in hindsight. IDC's datacenter survey also shows that out of a third of the total respondents that have critical power and cooling issues, 71% are looking to revamp their datacenter to address power or cooling issues, while the rest are also looking at consolidation or virtualization as a solution to the problem. IDC's opinion is that the type and number of servers that a customer will deploy in the datacenter will have a marked impact in growing or reducing the intensity of this problem. Taking measures to invest in energy smart solutions, and consolidating or integrating workloads using virtualization will go a long way in addressing these issues.

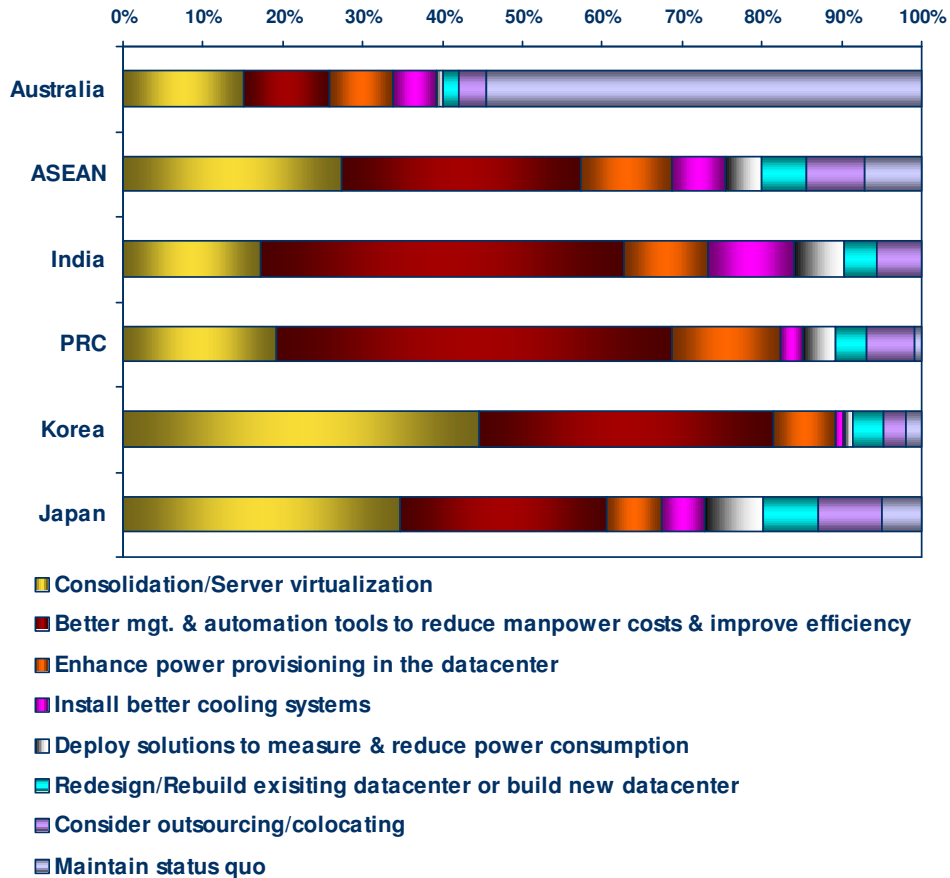
Managing "Virtualization"

One of the biggest problems with most datacenters is over-provisioning. They are planned for peak periods that come once in a while, and for the rest of the period the excess capacity is grossly underutilized. In the past few years, organizations have addressed this redundancy with the deployment of virtualization. However, one problem is at risk of being replaced with another as customers are again creating too many servers – only of the virtual type instead. The problem is addressed with better management and automation tools that can help improve utilization, create more capacity for scale and help improve the provisioning of IT.

FIGURE 3

Inside Datacenters in Asia/Pacific

What are your datacenter priorities today?



n = 2,137

Source: IDC Asia/Pacific Continuum Survey, March 2009

The deployment of virtualization has proved itself in the arena of IT consolidation but as deployment of virtual servers grow, organizations must pay heed to the growing need to manage both the physical and virtualized portions of their infrastructure. IDC believes that management requirements will become more significant as organizations leverage virtualization technologies more. Organizations should also leverage management technologies that are able to automate as much of the infrastructure so as to prevent virtual server sprawl going out of control and robbing them of the benefits they had set out to achieve, as shown in Figure 3.

FUTURE OUTLOOK

The global financial crisis has placed greater pressure on datacenters around the world to adapt and align to provide agility to the business and enable business strategy. In the near future, majority of organizations expect to focus on finding any way to enhance datacenters to accommodate more (or better) servers, storage and cooling designs as well.

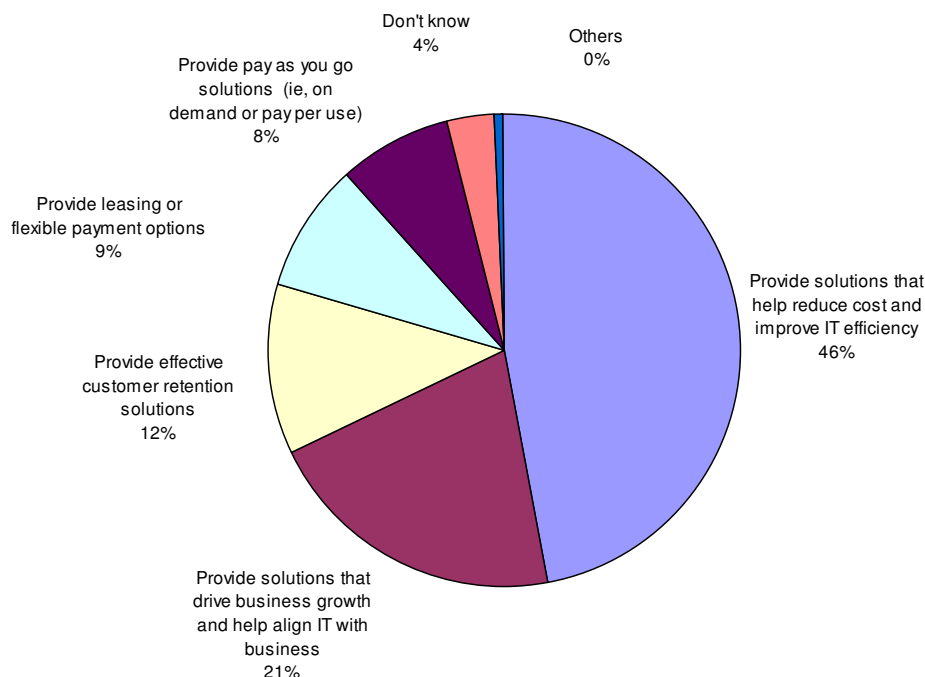
IT organizations should bear a near-, mid- and long-term view in mind. And as they seek solutions to their current immediate crisis, they should figure into their plans the future needs and capabilities of the datacenter in order to extend and improve the overall lifecycle of their aging facilities. While building an entire new facility might be a hard solution to swallow in these poor economic times, optimal thinking should replace panic cost-cutting decisions instead. Strategies to consider include replacement of older generation servers and consolidate them with more efficient and smarter server architectures so that the datacenter is overhauled in evolutionary steps that fit better into stringent budgets of today. And at the same time, organizations move through to more mature deployment of virtualization technologies to include policy-based automation, cloud-based computing and the achievement of the next-generation datacenter.

Organizations are looking to their IT vendors to help them through these tough times, and they are primarily focused on solutions that reduce cost while increasing IT efficiency, as shown in Figure 4. However, organizations also acknowledge the need for solutions that will help drive growth and align IT to business strategy as well as those focused on helping them keep their customers. While the crisis continues, it will abate at some point, and enterprises as well as the IT vendors that serve them need to bear in mind that with a forward-looking strategy, they will be better equipped to capitalize on growth opportunities when that turnaround comes.

FIGURE 4

User Expectations from IT Vendors

In the current economic environment, which of the following actions could an IT vendor take that would help an organization like yours?



n = 2,137

Source: IDC Asia/Pacific Continuum Survey, March 2009

DELL'S ENTERPRISE COMPUTING PORTFOLIO

Answering the challenges faced by its customers, Dell has debuted a new portfolio of products and services specifically designed to help businesses become more efficient. The combination of innovative software and services with next-generation storage and server products, offers customers technology solutions specifically designed to cut costs and increase efficiency.

Dell 11th Generation PowerEdge Servers

The main tenets of Dell's 11G servers include smarter design, integrated simplified management, and better energy efficiency. In addition, Dell is making the offerings virtualization friendly with Intel Microarchitecture, codenamed Nehalem, embedded hypervisors, expanded memory footprint and I/O, and services that help decide on the right virtualization strategy.

The "Nehalem" Advantage

At the core of Dell's 11G portfolio is the Intel Xeon Processor 5500 Xeon Series, previously codenamed "Nehalem-EP" that is optimized for intelligent performance, adaptable energy efficiency and flexible virtualization. Notable features, as shared by Intel, include Intel Turbo Boost technology which automatically increases processor frequency to adjust to the peak workload requirements, hyper-threading to reduce latency when multi-threading, and Intel QuickPath Technology that provides high-speed, point-to-point connections between microprocessors and the I/O hub. This last feature can prove beneficial for memory-intensive workloads by providing, as per Intel, 3.5 times the bandwidth of previous generation processors.

The intelligent energy-efficiency capabilities of Intel Microarchitecture Nehalem will be a very welcome feature with enterprises. They have been playing catch-up with the increasing power capacities of new dense servers from a provisioning perspective, and now they can perhaps address the energy cost challenge, too.

Smarter Design

Dell has focused on creating a modular design that is built on commonality and consistency. This makes it easier for the customer to integrate and build as they grow. They have reviewed and made changes to many physical design aspects to build better robustness and reliability. In addition, Dell mentioned they have paid a lot of attention to improving the thermals by using more energy-efficient power supply units (PSUs), modular fan designs, and introducing power capping features that will definitely help datacenters in accommodating newer technology in existing facilities – and be able to scale as they grow. They have made numerous enhancements that will offer a far denser form factor from an overall compute capacity perspective.

Lastly, Dell has included embedded management known as Lifecycle Controller that provides datacenter managers a single point of control for streamlining updates such as firmware and drivers to their physical servers, without having to go through multiple CD ROM drives and Web sites manually. The software runs in tandem with embedded hardware components that help manage this experience for the customer. As per Dell, this will help in faster deployment of the OS, faster system updates and in running diagnostics that inhibit easy deployment of physical servers.

Integrated Management

Another prominent inclusion is the management suite that has been bundled within the Dell 11G offering. Dell management console (DMC) is powered by Symantec's Altiris technology and offers basic management capabilities for free that can be extended to more advanced functionalities with snap-in modules. The basic package includes the below mentioned features that Dell feels is most critical for running the servers:

- ❑ Discovery, Inventory, and Reporting: Holistic view of the IT environment. A user can choose from the device tree view, graphical reports, or exportable tables and drill into any device to see in-depth hardware inventory data.
- ❑ Hardware Monitoring: Proactive heartbeat monitoring on user-defined schedule as well as asynchronous event reception for Dell systems. Ability to import SNMP MIBs to receive events from non-Dell devices.
- ❑ OS Monitoring: Monitor utilization of memory, CPU, free space, and I/O. View historical reports or live graphs for monitored devices. Generate alerts based on user-defined thresholds.
- ❑ Hardware Updates: Push agent, bios, driver, and firmware updates to Dell servers. Console can be configured to download latest updates from DELL.com on a scheduled basis.
- ❑ Hardware Configuration: Push configuration changes to many devices simultaneously.

IDC thinks this is a good move by Dell, since they were lacking a specialized management tool offering in the past. This modular approach of adding more features as the user sees fit is a key benefit.

Adding the EqualLogic Value Proposition

One of the key challenges that enterprises are facing while virtualizing servers is to be able to provide adequate storage and network I/O support for these servers. Dell deals with the storage challenge by including its EqualLogic portfolio in the 11G offering. Built on patented peer storage architecture, the Dell EqualLogic PS Series storage arrays not only promise performance with ease of deployment and scaling, they are also built for virtualized server environments with flexibility of connectivity with the 'host operating system' and 'hypervisors'.

With this, Dell deals with the dual challenges of providing seamless scale and management of storage. It delivers a modular and cost-effective solution that can be deployed in appropriate increments for both small and medium-sized businesses, and large enterprises requiring capacity and high-end performance.

CHALLENGES/OPPORTUNITIES

Dell's 11G offerings are clearly a big improvement from the past since, apart from Intel Microarchitecture Nehalem, they have integrated a lot of good management features and design improvements that will help enterprises run the infrastructure more efficiently. The addition of EqualLogic in the 11G offering has made the discussion more holistic than being just server-centric as the EqualLogic software

stack includes thin provisioning capabilities to address the problem of over-provisioning in datacenters as well as procurement and power savings as capacity is optimized.

However, Dell is entering a space where they will face challenges presented by the incumbent infrastructure and software vendors which have a head start in the management space. Bundling the basic management software within the server offering helps, but the test will be to get the enterprises to appreciate the value proposition of something they are not paying for. Also, as other vendors announce their Intel Microarchitecture Nehalem-based servers, the onus will be on Dell to differentiate themselves based on the greater value proposition they offer through design and integration advantages.

Dell's announcements, notwithstanding the challenges, will enhance the confidence of Dell's installed base. IDC believes they will welcome the new improvements which will help them run their datacenter more efficiently while delivering the necessary scale that they need.

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