

## EXECUTIVE SUMMARY

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A combination of compute density, the need for improved management efficiencies, energy conservation and information quality has driven the issue of data centre consolidation to the top of every CIO's agenda.

Typically organisations have often responded to these challenges by employing server virtualisation solutions. However, this paper will argue that though virtualisation has brought undoubted benefits, it is not the only solution available to organisations, particularly when it comes to guaranteeing availability

and the need to reduce management costs. We will show that next-generation grid-based solutions are now available that can help address the issue of data centre consolidation, without compromising on the need to guarantee uptime.

These latest solutions have been specifically designed for grid computing, delivering a high quality of service to business processes at lower costs, creating a single IT infrastructure that can be shared by those multiple business processes.

# MAKING THE BUSINESS CASE FOR DATA CENTRE CONSOLIDATION

"We even had a situation where one of our engineers pulled the plug on the main database server and it just carried on – it didn't miss a beat. Using Oracle Database in a cluster makes our life so simple."

*Adam Spindler, IT manager,  
Energy Saving Trust*

*Source: Oracle Magazine, May 2009*

## SETTING THE SCENE

Organisations with large-scale IT infrastructures are facing a double-edged challenge. The financial pressures exerted on IT budgets by the credit crunch have been exacerbated by the never-ending increase in demand for storage and compliance requirements, along with the ever-present need to provide resilient business continuity solutions. In short, CIOs are being asked to do more with less to a greater degree than ever before.

Associated with the rise of the internet has been the arrival of service-enabled systems – with software now being seen as a service that can be bought, sold and rented just like any other. More specifically, the advent of service oriented architectures (SOA) has led to an unpredictability of demand that we have never before witnessed. The assumption from end users, more so now than ever, is that applications are available 24x7, 365 days a year. This need for trust in systems is an intrinsic part of expectations from customers, partners and employees.

Early July 2009 witnessed a crisis week for datacentres around the world, with some big names suffering high-profile downtime. Rackspace Hosting, Equinix and Google's App Engine cloud computing platform all suffered significant amounts of downtime resulting in upheaval for businesses and consumers. There were also disruptions for VoIP services in parts of Australia and the popular website DailyMotion went down in Paris. Meanwhile, even pop star Justin Timberlake was 'tweeting' about his frustration at being unable to access websites. The message is clear: failure to deliver continuous service is likely to make headline news.

Meanwhile an increase in energy prices, shrinking floor space and

the creation of ever larger masses of data, has made the 'green data centre' a focal point of interest for environmentalists. Figures reported by the Environmental Protection Agency indicate the total power consumed by servers (including cooling and auxiliary infrastructure) accounted for around 1.2 percent of total U.S. electricity consumption in 2005—more than double the use when compared with 2000—with IT hardware and data becoming the leading national contributor of carbon emissions.

### INCORRECT RESPONSES

The benefits of virtualisation in being able to reduce costs for large-scale organisations are undeniable. However, while server virtualisation has brought major benefits, it can also introduce potential vulnerabilities. In a physical server environment, loss of a single server has significantly less impact than in the virtual world where, workload dependant, the consolidation ratio of virtual machines running on a single physical server could be in the 10-15x range.

A physical server failure can affect all of the virtual machines and applications running on that piece of hardware. Similarly failure of the virtualisation layer itself impacts all running virtual environments. The complexity of this scenario grows as organisations standardise on server virtualisation and deploy tier one applications in a virtual server environment. In short virtualisation, while hugely effective in what it does, is not enough on its own to provide safeguards against unplanned downtime. Furthermore, while server virtualisation can address consolidation at the server level, it can be found wanting at the level of storage, data and applications.

# MAKING THE BUSINESS CASE FOR DATA CENTRE CONSOLIDATION

## CORRECT RESPONSES

### BENEFITS OF LATEST GRID-BASED SOLUTIONS

- Consolidation
- Cluster failover
- Live migration
- Rolling patches
- Online upgrades
- High availability
- Failover protection for database and server failures
- Server scalability with no core limit
- Online load balancing and scale-up
- Standardised database deployment across enterprise

Some enterprises may not be in a position to deploy a grid infrastructure. The reasons for this may be one of enterprise size, footprint size, IT policy, outsourcing, lack of budget, or ISV certification. In these circumstances it is generally recognised as good practice for applications with non-intensive workloads to use server virtualisation in order to maximise consolidation.

However, where maximising consolidation, availability and agility are of paramount importance, a combination of server virtualisation and grid-based solutions are the best way to maximise the benefits of consolidation, availability and agility. Working in tandem, they can ensure enhanced server virtualisation, the ability to dynamically scale within and across nodes, and the dynamic resizing of virtual nodes.

Compared to other models of computing, IT systems designed and implemented in the grid style deliver a higher quality of service, at a lower cost, with greater flexibility. Higher quality of service results from having no single point of failure, a powerful security infrastructure, and centralised, policy-driven management.

Lower costs, meanwhile, derive from increasing the utilisation of resources and dramatically reducing management and maintenance costs. Rather than dedicating a stack of software and hardware to a specific task, all resources are pooled and allocated on demand, which eliminates

underutilised capacity and redundant capabilities. Grid computing also enables the use of smaller individual hardware components, which reduces the cost of each individual component and provides more flexibility to devote resources in accordance with changing needs.

Forward-thinking enterprises are implementing grid computing to take advantage of database consolidation, running multiple, disparate workloads on the shared resources of the grid. The result is a more available, scalable, flexible and cost effective infrastructure resulting in better service levels to customers, users and partners.

Latest grid-based solutions are now available that also offer all the benefits of server virtualisation to single-instance databases on a physical hardware infrastructure. Many databases can be consolidated into a single cluster with minimal overhead while providing the high availability benefits of failover protection, online rolling patch application, as well as rolling upgrades for the operating system.

With these next-generation grid-based solutions, there are no limits to server scalability and if applications grow to require more resources than a single node can supply, they can be easily upgraded online. If the node becomes overloaded, users can migrate the instance to another node in the cluster using an online migration utility with no downtime for application users.

## QUESTIONS TO ASK A PROSPECTIVE SUPPLIER

- Can you provide availability to ensure there is no single point of failure?
- Can you allow for the dynamic provision and de-provision of workload?
- Can you ensure virtualisation at all levels throughout the stack including storage; database servers; mid-tier servers and mid-tier memory?
- Can you ensure protection of one system or group of users from another?
- Can you provide both server virtualisation and grid solutions?
- Can you offer the pre-integrated hardware and software required to enable a grid-based solution?

For further information on grid computing visit:

<http://www.oracle.com/technology/tech/grid/index.html>

## CONCLUSION

Increasingly organisations are using data centre consolidation as a way of reducing costs, increasing operational efficiency and ultimately optimising the utilisation of data centre resources. Companies have also begun to realise how environmental concerns and business success can work in tandem, illustrating that greener data centres can accommodate growth and create a positive impact on the organisation's bottom line.

However, the path to effective data consolidation is fraught with multiple pitfalls as numerous vendors vie for the hearts and wallets of organisations. It is essential not to dismiss grid-based

solutions in the headlong rush to unlock the cost savings of virtualisation based on the profile of an application today. It is all too easy for organisations to find themselves in a situation where SLAs are missed and business is lost simply because a grid strategy has not been implemented.

Latest grid solutions are now available that can help alleviate commonly-cited data centre challenges, such as excessive power consumption, server under-utilisation, expensive proprietary hardware and software solutions, and the sprawl of complicated and expensive multi-vendor stacks to manage, synchronise and secure.