



B2B Enterprise Technology Story

Web Summary:

Consolidation Benefits

Business pressures are driving a mature technology solution known as server consolidation. Today, it is not surprising to observe more and more businesses consolidating their processes, operations and systems – so as to empower and enable the enterprise to compete more effectively and efficiently in the global marketplace. This article deals with the practical issues concerning server consolidation.

Synopsis:

Consolidation Benefits

by Leon A. Enriquez

Over time in the IT landscape, we have witnessed the morphing of computing environments from single large monolithic entities (mainframes) to widely distributed server configurations. Unfortunately, the initial promise of less costly, more scalable, and more flexible platforms has not materialised.

On the contrary, many organisations have realised that there is a need for the consolidation of distributed servers. In fact, this swing back to a more centralised approach offers greater control, standardisation, performance and cost savings. This server consolidation idea should be carefully considered by all companies – to determine if it is appropriate to redefine their computing environment.

As expected, corporate IT agendas are now changing again. For instance, priorities are shifting back – from business units, divisions and departments – to large-scale organisational systems that support consolidated enterprise requirements.

Reading Time:

3 minutes (Synopsis);

28 minutes (Main Text)

Reader Benefit:

- ◆ Overview of what server consolidation means;
- ◆ Insights about the necessity for server consolidation;
- ◆ Practical ideas on what you need to do.



The latest goals are mostly business-driven, e.g., business integration and transparency of information across the entire enterprise. Outdated and fragmented legacies must now be purged from many organisations – such as the rapid proliferation of distributed servers – before new challenges can be achieved.

Notice the paradoxical scenario: integrated systems are too large to run on small servers. Furthermore, for such mission-critical systems, a well-run company cannot afford to risk the instabilities and management issues that exist in such fragmented environments. From this simple realisation, the focus of enterprise application deployment must now move to large scale, and more stable platforms. Consolidation is thus the solution that comes to mind.

The proliferation of servers throughout the enterprise has brought many companies to the point where – they have gone beyond obtaining value from this option – they are now suffering from such excesses. Yes, too many distributed servers present serious problems in the areas of customer and user service and operational costs. This escalates the situation and even threatens the viability of the business concern.

Considering the aspect of service delivery, the following list contains some of the more frequently encountered problems:

1. Service availability with outages of significant duration;
2. Service response times due to LAN bottlenecks or overload;
3. Difficulty of developing new cross-application or data services;
4. Ability to support Web-serving based on secure and consistent data; and
5. Uneven data integrity and security.

Initially, small server environments were implemented under the guise of savings from reduced server costs. However, with practical experience, many companies have found that the actual operating costs of these systems is not limited to just server cost alone. The total cost to the company is actually higher in the distributed environment.



Considering the operational cost implications, the following problems contribute to higher overall costs:

- ◆ Controlling system management costs are more difficult;
- ◆ Network management;
- ◆ Configuration management;
- ◆ Problem and change management;
- ◆ Operational management – for both automated and manual operations;
- ◆ Security administration costs;
- ◆ Requirement for diverse professional or technical skills and their dispersion in the enterprise;
- ◆ Hidden costs inside departmental operational costs;
- ◆ Excess server-based software license costs;
- ◆ Increased costs due to poor utilisation of resources: servers, disks, maintenance; and
- ◆ Lack of scalability as demand growth results in further server proliferation.

Many organisations are now looking to consolidation as the viable solution for addressing changing IT and business requirements. The advantages are becoming clear: larger and more adaptable computing platforms, concentrated data availability, and reduced network traffic requirements. Also, a single point of reference for systems management and support offer significant advantages to mission-critical applications. Put another way, server consolidation is fashionable once again.



Consolidation Benefits

by Leon A. Enriquez

One of the hottest IT trends today is the need for consolidation. In fact, it is becoming increasingly commonplace for more and more businesses to consolidate their processes, operations and systems. This strategic decision enables such enterprises to compete with better focus and faster agility to address the dynamic needs of the global marketplace. In short, business pressures are driving a growing technology trend known as server consolidation.

In today's computing environment, two practical worlds of thought have emerged, namely, the data centre and the client/server. The data centre – long dominated by the mainframe – world evolved from a sense of efficiency. In contrast, the client/server world is born from a sense of effectiveness – fuelled by the distributed computing paradigm – i.e., being able to respond promptly to the business unit's needs.

However, in actual practice, the client/server idea has been rather complex and the total cost is much higher than the initial outlay when compared to a centralised computing model. Through consolidation, IT managers are generally responding to the need to cut high management costs associated with the runaway proliferation of small to mid-size distributed servers in their organisations. However, multi-tiered client/server computing remains highly viable for businesses starting out, and it is a fact that today's environment is even now more distributed than ever.

What is server consolidation? In simple terms, server consolidation is about bringing together applications, databases, and services onto fewer and highly reliable servers. In fact, in analysts reports, it is estimated that between 50-75 percent of clients are planning some level of server consolidation noted the leading research firms such as D H Brown, Forrester, GartnerGroup, IDC, Ovum, and Meta Group.

One overriding fact emerges, and it is this: the server consolidation benefits significantly impact the business bottomline. For instance, through consolidation initiatives, IT managers can respond to the need to cut high management costs – associated with the proliferation of small to midsize distributed servers in their organisations. This means utilising computing resources more efficiently, and thus lowering Total Cost of Ownership (TCO). For instance, companies cite increased service levels, improved availability, better skills utilisation, reduced floor space demands, and increased control as justifiable reasons to pursue consolidation.

Still, the idea of consolidation is not new. However, recent advances in open system functionality – on the part of hardware vendors – have paved the way for increasing opportunities to consolidate. The fundamental goals of reducing IT complexity, lowering total cost of ownership, and thus providing a better way to access and manage an organisation's information and resources are inherent to server consolidation initiatives. Today, this approach is both a practical idea and an attainable objective.



Consolidation is not just a tactical initiative but is a vital part of a larger, strategic data centre direction for many companies. Such organisations are using consolidation to control costs and complexity. At the same time, people are combining consolidation with other infrastructure initiatives – to move toward a more flexible and responsive overall IT architecture – to meet the challenges of today’s demanding business environment.

Consolidation Route

There are several different ways to consolidate. For example, you can make a simple start by bringing existing systems under common management practice. Another route would be to consolidate many heterogeneous applications and services on one or a few systems.

Yet, all server consolidation initiatives involve several steps – from high-level consideration of business goals to tactical planning and timeline. Undoubtedly, since consolidation can be quite complex, many companies start with a pilot project – and later leverage their experience into larger efforts. Some IT organisations have the resources to perform consolidations in-house. However, most companies depend on outsourced service firms and consultants to manage the entire consolidation project, or manage certain portions of the consolidation effort on their behalf.

For many companies, the overriding benefit of a server consolidation project is more efficient use of resources as well as reduced total cost of ownership. For instance, new server technologies such as domains and dynamic reconfiguration, enable in-house IT professionals to allocate resources dynamically and manage service levels. This results in enabling better utilisation and control of system resources.

By integrating a server consolidation initiative with flexible systems, IT management can reduce the number of hardware and software platforms it has to deal with. In addition, you can also apply more standardised procedures to a streamlined, decentralised environment. Just imagine a simplified management leads to – improved service levels, and uptime for the organisation – which results in more efficient resource utilisation.

Under-utilisation is common observation in distributed environments. Yet, many companies also have systems that are taxed beyond the limit because the workload exceeds capacity. This leads to degradation of response time, and even system downtime. Consider a company where technicians develop, test, and run production environments on the same distributed servers. Such workgroups can work at cross-purposes or even conflicting work patterns – with the developers testing applications by pushing them to the limit, while production managers strive to keep the environment stable.

Server consolidation enables an organisation to accomplish two specific objectives as follows:

1. To plan how applications are combined onto specific systems; and
2. To apply consistent management practices that keep systems and information available.



A more effective computing environment thus leads to better skills utilisation. With distributed systems, many users have had to perform double duty as systems administrators – a job they’ve often not prepared to handle effectively, or rarely learn thoroughly. When systems are consolidated and recentralised, an experienced data centre professional can do a much better job of bringing together multiple disparate platforms, and running them as a single seamless environment.

Cost-wise, companies that have consolidated require fewer IT administrators. They can often re-deploy such skilled IT professionals to strategic development projects instead of the routine maintenance tasks. Also, a company that is consolidating its systems has a better case of justifying the hiring of people with the right IT expertise. It is a sensible approach that a consolidated environment facilitates proactive management rather than reactive management.

Findings

Over the last few years, large corporations have realised that both decentralised and distributed server systems have hidden costs beyond just the initial capital outlay. The analysis of total cost of client/server computing has been documented by the various industry analyst reports from such firms as GartnerGroup, International Data Corp, Meta Group, International Technology Group, Price Waterhouse and KPMG Management Consulting, to cite a few. (See Table 1)

Analyst Group	Type of Environment	Annual Cost per User (US\$)
GartnerGroup	Enterprise Server	5,324
	Workgroup configuration	10,162
	Divisional configuration	13,270
International Data Corp	LAN Decentralised configuration *1	8,040
	LAN Distributed configuration *2	6,624
	Unix Servers Decentralised *1	10,176
	Unix Servers Distributed *2	6,144
Meta Group	PC/LANs	8,084
International Technology Group	Client/Server configuration	6,445
	Mainframe configuration	2,282
KPMG Management Consulting	Peer Support and Help Desk	10,000+
Price Waterhouse	PC/LANs	9,000+
Notes:		
*1= Decentralised means spread over wide geographical area such as country to country.		
*2 = Distributed means different segments in the same office LAN.		
<p>Table 1: Analyst’s Findings on the Annual Cost per User (Source: Various analysts as cited)</p>		



The alternative to server consolidation is to leave servers distributed as they are. In such a case, organisations can take the tact of synchronising all systems with the same software and the same maintenance levels. This idea may sound simple but is in fact, a very difficult proposition to implement and maintain in reality.

Impact of Consolidation

The question now arises: What is server consolidation all about? According to D. H. Brown and Associates, “Consolidation represents combining, a gathering together. At the most basic level: the physical siting of hardware. Server consolidation typically involves relocating distributed systems which were geographically dispersed, and unifying them into a central location. Server consolidation also focuses on the administrative efficiencies of a combined logical configuration, managed in a consistent, disciplined manner by highly experienced staff.”

Put another way, server consolidation refers to the consolidation of different functions performed by many servers onto one or a few large servers. In essence, the idea is to maintain the effectiveness of the client/server environment while approaching as close as possible to the efficiency of the data centre. The challenge is to deliver the best of both worlds. The so-called ‘new data centre’ is what this blend of client/server effectiveness and mainframe efficiency is known as.

Is server consolidation an exercise companies in the Asia Pacific can afford to embark on in these difficult times? In a recent survey, one in four of established firms in the region said they are investing in this solution right now. After all, the Return-on-Investment for server consolidation can be seen almost immediately – through the improved opportunities in business agility, and the cost savings from not having to manage a proliferation of servers.

What is notable today is the fact that many fast-growing enterprises are struggling to cope with computing systems that are growing at an exponential pace. IT departments are increasingly faced with multiplying numbers of disparate systems moving into the data centre, mounting system administration tasks, low individual server utilisation, and a lack of prime floor space to house these hardware. To harness the power of such varied and distributed computing systems, many companies are approaching consolidation as the means to increase availability and productivity, and paradoxically, reduce the management and maintenance costs.

Through server consolidation, customers can achieve increased value, capacity planning and control of hardware and software standards, enjoy significant savings, easier and faster service and support. There are some issues to consider in server consolidation. In order for an integrated approach to enterprise computing to succeed, there must be consistency in deploying integrated applications and data access in the first instance. Consolidation also means a single, focused view of the enterprise IT infrastructure and data access. From this, you can realise obvious advantages of better performance and reliability at both ends, the client as well as the server.



Key Consolidation Issues

Before server consolidation can be effectively implemented, there is a need to identify your business motivations, and understand the key business issues that affect your business. Consolidation should also take into consideration the future directions of company and the needs of the end-users. Server consolidation will help companies meet their immediate and future needs. Once you know and understand these, you can then formulate your server consolidation strategy to deal effectively with the unique needs of your enterprise.

The two key points for server consolidation are:

1. *Reduce the TCO (Total Cost of Ownership):* The TCO reflects the actual long-term costs of managing your entire IT infrastructure. This really goes beyond your initial capital costs in hardware and so forth. Consider the human resources needed to maintain and manage the entire IT systems and networks. What's the staff strength required? The main point of server consolidation is to effectively and efficiently manage the human, financial and IT resources which include:
 - ◆ Optimising server capacity;
 - ◆ Improving reliability and availability;
 - ◆ Reducing systems management complexity;
 - ◆ Increasing physical and data security;
 - ◆ Reducing administrative staff; and
 - ◆ Decreasing floor space needed.
2. *Enhance Functionality:* The other critical factor is the need for faster access. This translates to mean faster response time, increased access to data, and improved performance. Enhanced functionality may include the following:
 - ◆ Enhanced intra- and extra-organisational data sharing derived from server consolidation and integration of disparate databases;
 - ◆ Standardising applications and services for all business units in the company;
 - ◆ Upgrading of existing enterprise systems. For example, ERP solutions such as SAP R/3 or data warehousing solutions are deployed to replace department-specific legacy applications or databases;
 - ◆ Managing the scalability or flexibility of a system such that it can scale processing and storage capacity without having to add physical devices. This also means that you have the flexibility to partition and allocate resources whenever required.

Consolidation Approach

There are many approaches to server consolidation. For instance, there is a methodology that is based on data architecture that closely resembles the client/server classification:

- ◆ Physical; and
- ◆ Logical.



The logical server consolidation method is achieved by using systems management, database and middleware software. Another approach is to simply consolidate based on a combination of both Physical and Logical, also known as the rationalised model. (See Table 2: Server Consolidation Types.)

<p>Types of Server Consolidation: Logical, physical, and rationalised consolidations reflect a natural progression but are not necessarily built on each other.</p>	
<p>Logical: The standardisation of technology (database products, key applications, system components) and standardisation and centralisation of management related to systems (policies, processes, and services).</p>	<p>Best when:</p> <ul style="list-style-type: none"> ◆ Distributed environment with many systems. ◆ IT processes and policies not normalised. ◆ High systems management costs.
<p>Physical: Racking systems within a floor space or moving systems to a centralised location to facilitate management, increase security, and decrease floor space.</p>	<p>Best when:</p> <ul style="list-style-type: none"> ◆ System distributed beyond a single room. ◆ Floor space restraints. ◆ Insufficient security. ◆ High communication costs due to distance between systems. ◆ Network bandwidth compromised.
<p>Rationalised: Housing applications from many different systems onto one system (application stacking).</p>	<p>Best when:</p> <ul style="list-style-type: none"> ◆ Each application resides on a separate server. ◆ Multiple instances of same application on many systems. ◆ Servers underutilised. ◆ Management complexity. ◆ High software licensing costs.
<p>Table 2: Server Consolidation Types (Source: Hewlett-Packard and Sun Microsystems)</p>	



Why Server Consolidation?

Reasons for Consolidation	Benefits of Consolidation
<ol style="list-style-type: none">1. Difficulty in tracking number of servers.2. Problems due to scalability restrictions.[3. Ratio of administrators to servers is low.4. Running several operating systems.5. Difficulty in controlling software licenses.6. Less costly to buy new servers than to do capacity planning.7. Purchasing is decentralised whereas management is centralised.8. Single digit utilisation rates for more than half of the servers.9. Physical space constraints for each server.10. Server maintenance costs are skyrocketing. <p><i>Note: If your organisation is facing even one of these issues, it's time to consider consolidation.</i></p>	<ol style="list-style-type: none">1. Consolidation can help reduce TCO (Total Cost of Ownership) by 30 percent (<i>Source: InfoWorld</i>); and improve ROI (Return On Investment) by 15 to 75 percent (<i>GIGA Information Group</i>);2. Increased CPU utilisation by combining applications onto underutilised servers.3. Reclaimed disks from consolidating duplicate data sets.4. Reduced number of peripherals needed for backup and data storage.5. Decreased communication costs and increased network performance.6. Reduced administrative headcount by using tools to increase the number of servers per administrators.7. Lower support prices by moving to consolidated contracts.8. Lower environment charges due to small footprints on operations centre floor.9. Lower software licenses fees through either consolidated purchases or moving to usage-based licenses fees.

Table 3: Reasons and Benefits for Server Consolidation

(Source: Hewlett-Packard)



According to the leading industry experts, a greater number of customers are moving away from distributed server infrastructures each year. Server consolidation has become a popular way of accomplishing this due to many of the new technologies and trends developed in the industry. (*See Table 3: Reasons and Benefits for Server Consolidation.*)

Being successful in any consolidation requires attention to all aspects of consolidation and this obviously goes beyond a quick product fix. According to HP, another strategy is called systems consolidation which is to deliver a total solution that encompasses much more than just server consolidation.

Implementation

The server consolidation implementation process can be easily classified as follows:

1. Centralisation:

This is when existing servers are relocated to one or fewer sites. For example, some issues of the client/server computing can be solved by moving distributed servers to a central data centre, best described as traditional data centre consolidation. Centralisation has been popular among large enterprise which have multiple regional offices.

Here, cost-related factors are the main motivation for this aspect of centralisation which include:

- ◆ Simplicity and ease of management;
- ◆ Tighter personnel and resource management and control; and
- ◆ Reduction in space requirements.

2. Physical Consolidation:

This reduces the number of servers by replacing with bigger, higher performance servers which is a simple and straightforward approach. For example, you can easily take multiple Intel or Unix servers and consolidate them on one single platform. You can accomplish this task at say a single site, department or enterprise level.

Cost-reduction is the primary motivation for physical consolidation which include:

- ◆ Optimisation of server utilisation;
- ◆ Cost and availability of skilled administrative resources;
- ◆ Reduction of system management and complexity;
- ◆ Improved administrative resource control; and
- ◆ Reduction in space requirements.

3. Data Consolidation:

By today's standards, complex supply chain or ERP processes, e-commerce or e-business, and a host of Web-based applications have created a serious need to combine data from many different sources into a single repository and common format. For instance, you may desire to move data from many discrete sources to a data warehouse or a large server or mainframe.



The key customer requirements for data consolidation include:

- ◆ Availability;
- ◆ Scalability;
- ◆ Ease of access
- ◆ Usability of data;
- ◆ Data security; and
- ◆ Information security.

4. Application Integration:

The key motivation for application integration is the deployment of new business processes in the areas such as:

- ◆ Complex vertical industry and cross-functional applications;
- ◆ Supply chain or ERP applications; and
- ◆ e-commerce or e-business applications.

From the perspective of application integration, the server consolidation process include:

1. *Data and Application Integration:* This involves migrating an application or data to a new platform in order to co-locate application and data.
2. *Mixed Application Workload Integration:* This approach combines multiple different application workloads onto a single- or multiple-tier architecture platform.

Strategic Planning

Based on your decision to go with this solution concept, your server consolidation strategy will include – a number of planning stages, from high-level consideration of business goals to tactical planning and timeliness.

One bit of input before you get started. If you are planning a large-scale or enterprise-wide consolidation program, you should consider running a smaller pilot project first. Why? Simply because consolidation is a complex process that's partly art, and partly science. And most organisations with the expertise – and experience in server consolidation strategy and implementation – recommend that you start small and break the process into phases.

Consider Sun Microsystems' "Recipe for Successful Pilot Projects" as follows:

1. Start with one key area;
2. Select an architecture;
3. Show progress quickly;
4. Pay attention to organisational issues;
5. Document success and what you learn; and
6. Plan and justify larger projects.



Outline for Success

The following rough outline will take you through the basic steps of server consolidation:

1. Business Goal Clarification:

You need to prioritise your company's business goals and then decide what you want consolidation to do for your enterprise.

These goals may include:

- ◆ Deploying new or modified applications faster, more cost effectively, and with more reliable support.
- ◆ Providing accurate and timely information for better decision making.
- ◆ Improving user satisfaction with computer services.
- ◆ Reducing TCO, including hardware, software, and management costs.
- ◆ Improving overall IT organisational effectiveness; providing better service at lower cost.

Once business goals are defined, supporting technical objectives can also be determined. For example, to reduce TCO, your company may want to reduce storage costs associated with data replication, purchase fewer large systems, reduce third-party software costs by supporting fewer versions, and so on.

2. Asset Identification:

The first tactical step in server consolidation is to inventory your environment. Expect this step to be not only tedious and difficult but time-consuming. Yet, to achieve the best possible ROI (Return-on-Investment), it's crucial to establish and to know exactly what hardware, operating systems and revision levels, databases, custom software, and packaged applications are deployed in each consolidation target area.

3. Capacity Study:

Once you've inventoried what you have, you can determine the right types and number of servers for the pilot project. The best targets for consolidation are systems with stable configurations and well-understood usage and performance characteristics. This ensures that compatible servers and applications are consolidated.

To make sure you deliver service that meets, or exceeds pre-consolidation levels, it's important to understand operational and performance characteristics of the consolidation targets.



For example, for each of the systems that you're planning to consolidate, you should specifically zoom-in and evaluate critical issues such as:

- ◆ Downtime;
- ◆ Batch job windows;
- ◆ Disaster recovery scenarios;
- ◆ Data and information backups;
- ◆ Concurrent users; and
- ◆ Response time.

4. Proposal and Plan Development:

The consolidation proposal and plan document should take the information gathered from the asset identification and capacity study and recommend a configuration for the consolidation server.

A typical proposal would include a TCO study, developed from a base of acquisition costs, depreciation, operating costs, and other customer-supplied information. This document then provides a basis for comparing distinct solutions. In addition, the proposal and plan should give a detailed timeline for the entire implementation, from start to finish.

5. Consolidation:

Some companies have the in-house expertise to carry out a server consolidation pilot project from start to finish. However, most companies will seek out a consulting firm with the relevant expertise in enterprise servers, storage systems, system software, networking, and database environments. For instance, if porting or special customisation is needed, the consultants will often enlist the support of outside technical resources.

In addition, the consulting firm should be able to:

- ◆ Help design reliability and performance tests for consolidated systems;
- ◆ Recommend or offer software development and system management tools;
- ◆ Keep your technical personnel informed of present consolidation trends; and
- ◆ Keep you posted of the results that other or similar consolidation customers are experiencing.

Fundamentally, server consolidation is about changing the way IT is viewed and managed in your business. Consolidation must be correctly managed. This means that the successful implementation requires high-level management support.

In fact, many companies report that once the consolidation effort is completed, users across the enterprise start enjoying the benefits which include a return to core competencies, improved service levels, lower costs, faster response to user needs, and consistency and reliability.



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