AberdeenGroup

Profile

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Server Consolidation: It's about Rationalizing the Architecture

Executive Summary

Server consolidation is increasingly important to users — but it means far more than simply combining two servers into one. Increasing competitive pressures and concerns such as Year 2000 are causing IS to take a closer look than ever before at the design of the networks (including the distribution of servers and storage) that support business-critical applications.

IS is finding that a critical success factor for these applications is to "design in" a network architecture and component servers that handle new technology flexibly and that scale rapidly and cost-effectively. Fewer servers may be the result; but *good design*, not mindless replacement, is the best means.

This *Profile* describes the new design techniques and approaches that are beginning to yield rational long-term architectures — combinations of platform and network structure for particular applications that adapt readily and cost-effectively to new demands and new technologies, and thus will not require major upgrades or "restarts" in the short or medium term. This *Profile* also examines the approach taken by IBM's new Server Consolidation Solutions Unit as an example of the type of business benefits that can be achieved by supplier-user architectural-design partnerships.

Why Users Care about Server Consolidation

As the conflicting pressures of costs, scarce resources, and the need for competitive advantage squeeze ever harder, the advantages gained by IS from *proactive* solution design are becoming ever clearer. In an increasing number of cases, enterprises creating a competitive-advantage application find out after the solution is in place that it is not scalable or flexible enough to handle rapidly mounting numbers of end-users, or to deal with large quantities of data poured over the network, or to avoid increased architectural complexity — all leading directly to administrator overload and solution downtime.

These immediate problems aggregate to a much larger set of longer term problems, including:

- *Increased TCO* (Total Cost of Ownership) — e.g., increased hardware, software, and maintenance costs from failure to "design in" cost-effective upgradeability, and costs of excess administrators to handle unnecessary network complexity (and, in some cases, to deal with lack of adherence to corporate standards);
- *Increasing fragmentation of data and applications* across the enterprise, as decentralized solutions proliferate;
- *Lessened ability to exercise financial oversight*, as unintegrated, complex solutions in departments and lines of business escape anyone's ability to comprehend — much less monitor; and
- *Increased business costs* due to slowdowns or outages, potentially leading to an inability to take customer orders or even causing complete business failure from data loss.

One approach to these key-application problems is simply to fix individual problems as they arise. However, to get it right for the long term, IS is beginning to perceive that it must design proactively: IS must focus on network-architecture design, incorporate upgradeability and integration considerations into the design, and customize a vanilla architecture to anticipate highly specific solution requirements. And IS needs to do this for each application in a coherent and consistent fashion. Thus, IS must *rationalize the solution architecture and its design*.

Increasingly, users care about "server consolidation" because it is an architecture-rationalization tool as well as a shorthand term that expresses the results of rationalizing solution design. Good solution design means:

- *Fewer, more cost-effective servers* — the most visible result;
- *Improved service levels* for applications and end-users (i.e., greater application availability, higher performance, and improved data access across the enterprise), plus *lower administrative costs* and *less system downtime* due to reduced system complexity;
- *More rapid deployment* of new applications and features: a flexible design methodology reduces deployment surprises and translates easily to other deployment situations;
- *Greater standardization* of procedures and processes across the organization; and
- *Lower acquisition costs*, because the system reaches capacity less often and is easier to upgrade cost-effectively — meaning fewer, smaller new purchases.

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Of course, architecture rationalization and server consolidation are more useful in situations where architectures are less efficient today. Table 1 lists some situations where good solution design is particularly likely to yield high value-add.

Table 1: Some Key Server-Consolidation Situations

Situation	Likely Architecture-Rationalization Value-Add
Implementing a scalable NT-based packaged application or scaling a departmental NT implementation to the enterprise	- Decreased architectural complexity leading to reduced administrative costs - Fewer (and often more cost-effective) servers - Information about departmental computing.
E-commerce-enabling existing business-critical applications and business processes	- Rapid deployment and higher scalability of more robust solutions - Often, lower acquisition costs through reuse of existing resources - Faster time-to-market - Broader information access
Integrating distributed applications and distributed data	- Often, reduced administrative costs from cross-application/cross-database administration - Often, decreased acquisition costs through fewer servers, less storage - Key business data more widely available across the enterprise, allowing better leveraging and exploitation of information as a corporate asset

What It Takes to Rationalize the Architecture and the Design Process

As IS gains experience in "getting it right the first time," critical success factors for consistently delivering adequate long-term solution architectures are becoming clearer. Four factors stand out from the rest as differing from past "best practices":

- The design process should be *exceptionally adaptive*. Most of these solution designs involve unique mixes of multiple suppliers; integration with environments that are highly distributed and decentralized in ways that vary from location to location; and remote databases that are often decentralized in different locations, depending on the application.
- The design should focus on the infrastructure, especially on the *infrastructure network*. A consistent theme of user experiences is that inadequate network bandwidth is a frequent and often-overlooked cause of solution bottlenecks. Proactive network design involving not only high-capacity communications but also Internet multiplexing and load-balancing application servers and messaging, yields the most efficient and flexible network. This network is tuned not just for today's but tomorrow's loads.

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- The design requires unusual attention to *optimizing support costs*. Studies show that service and support (as opposed to hardware and software acquisition costs) constitute more than 70% of solution TCO, and their share of TCO is rising. Attention paid to network complexity — especially decreasing the number of servers, applying proven systems-management techniques and "best practices," proactive monitoring, performance tuning, and storage management is particularly well rewarded.
- The design typically requires a relatively high investment in up-front and ongoing *analytical and systems integration* services to integrate the components of the solution and to connect the solution to existing databases and applications. Especially effective implementations leverage this systems-integration investment by capturing the design process as a "best practices" methodology and by capturing design data as an "asset database." This asset database inventories the solution and associated computing resources. In these efforts, partnership with an outside services supplier can be a major benefit.

Server Consolidation As an Architecture-Rationalization Tool

If server consolidation is a result of architecture rationalization, it is also a prime weapon in the arsenal of effective solution designers. In other words, the solution designer seeking the optimum distributed-computing environment for a key application will find that simply combining existing and new servers takes IS a large step toward the final goal. And the more sophisticated the server consolidation, the greater the potential value added.

Today's server consolidation activities can be classified as one of four types, listed below in order of increasing sophistication:

1. *Centralization* — Relocating existing servers to fewer sites. An example in recent years is datacenter consolidation, which in many cases has simply closed some datacenters and moved their hardware to other sites.
2. *Physical Consolidation* — Using this approach, the user replaces many smaller servers in the same architecture with fewer, more powerful servers. This is especially appropriate for implementations of key packaged applications such as SAP R/3, PeopleSoft, and Baan, where little integration with other applications and data is required. Aberdeen believes that this approach is also appropriate for many NT implementations, because many users are creating application-on-NT solutions (often without careful integration planning) that are proliferating servers and costs. LAN file/print servers using NT, Novell-NetWare, or OS/2 solutions represent another area ripe for savings.

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3. *Data Integration* — Instead of attacking the servers themselves, this approach focuses on the proliferation of databases across the enterprise by physically combining a wide variety of data into a single repository. The result, of course, is that the merged data can reside on fewer servers and more centralized storage devices. An obvious example of this approach is data warehousing, which often merges previously unconnected OLTP data.
4. *Application Integration* — This approach involves actually migrating multiple applications to a new platform. The resulting architecture or integrated architectures contain multiple/mixed applications or workloads. Because of Year-2000 resource constraints and the difficulties of migrating from one platform to another, users today rarely try this — but the business value from application integration can be greater than for the other three approaches.

Table 2 shows the advantages and limitations of each server-consolidation type. Users should also note that they can combine types — e.g., centralize and physically consolidate servers.

The Business Benefits of Server-Consolidating Solution Design

The main business benefit of focusing on rationalizing the solution architecture and its design is that it allows IS to directly target its key long-term problems cited above — steadily increasing TCO, increasing fragmentation of data and applications, lessened ability to exercise financial oversight, and increased business costs because of system outages or slowdowns. Thus, the new approach should lead to:

Decreased/optimized TCO. One of the most attractive features of this approach is that it is especially effective at reducing support and administrative costs, which, as we have pointed out, constitute a majority of TCO. Users should also note that this approach can also be targeted selectively at existing "low efficiency" solutions, giving IS a much bigger "bang for the buck."

Effective consolidation of data and applications. Although the tide of decentralization may be difficult to reverse, effective application of architecture rationalization and server consolidation — especially the data/application integration types of server consolidation — can minimize *inefficient* decentralization that can increase administrative and support costs. Moreover, the asset databases produced by a good design process give IS better knowledge of related application and data assets, allowing them to leverage existing computing rather than reinventing the wheel.

Increased ability to oversee key solutions financially. A replicable design process and asset databases give better adherence to corporate standards and better information for IS and CFO oversight.

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Service-level improvements leading to decreased business costs. Simplifying the architecture can significantly improve key applications' uptime and availability. As noted above, this approach can avoid customer-losing or business-risking downtime.

Table 2: Key Factors in Considering Server Consolidation Types

Type	Key Advantages	Limitations/Considerations
Centralization	- Decreased administrative costs from reduced numbers of sites	- Applies mostly to users with multiple existing sites, not to new solution architectures - Useful after corporate mergers and acquisitions
Physical Consolidation	- Decreased administrative costs and less solution downtime from reduced numbers of servers - In some cases, reduced acquisition/per-user costs - Simplicity - Greater economies of (server-size) scale	- Does not fully rationalize database design - Does not rationally integrate the solution with other applications - Almost always uses the same platform - Target servers should use key scalability and robustness technologies (e.g., parallelism)
Data Integration	- Reduced administrative costs from reduced numbers of databases, common admin. tools - Often, reduced acquisition costs from fewer servers, less storage - Often, faster deployment by using existing data - Higher availability, improved recoverability, and easier management of enterprise data	- Does not rationally integrate the solution with other applications - Often requires effective data-migration tools and planning - Storage Area Networks and dynamic partitioning can be of particular benefit here
Application Integration	- Decreased multiple-application administrative/acquisition costs - Decreased administrative and acquisition costs for high-complexity architectures - Opportunities for business-process synergy (e.g., between OLAP and OLTP) - Simplicity	- Often for multiple-supplier-platform situations - Enterprise Application Integration tools especially useful here

The new approach can also lead to *faster deployment of new solutions*. Users can apply the architecture-rationalization process not only to specific new business-critical applications, but also to the entire enterprise infrastructure that supports

existing applications. These applications and infrastructure typically form the foundation on which new solutions (e.g., e-business, ERP, and supply-chain management) are built. By optimizing the infrastructure, IS makes it easier to build more flexible new solutions, speeding deployment and achieving faster time-to-market.

Architecture Rationalization's Value-Add

In fact, beyond the immediate advantages of applying good design to a particular project, the architecture-rationalization approach has "side effects" that translate into other long-term advantages.

First, the new approach embeds a strong design process in solution development. In effect, that design process is an efficient way to ensure that enterprisewide considerations factor into line-of-business and departmental "decentralized" application creation while reducing the need for central-IS control or support efforts.

Second, the asset databases created by the process often aggregate to a new "information base" for enterprisewide asset management. Experience shows that such an asset-management information base is useful not only for financial oversight, as noted above, but also for more efficient reuse of existing applications and data — saving acquisition costs.

What to Look for in a Server Consolidation Provider

Aberdeen believes that a so-called "server consolidation" provider should not only partner in companies' efforts to rationalize their solution architectures, but also be aggressive and comprehensive in supporting IS's effort to take a "broader view" of solution design. Specifically, a good server-consolidation supplier should:

- Emphasize analytical and systems-integration services, not selling boxes;
- Handle multiple platforms (e.g., Unix, Microsoft Windows NT, S/390, AS/400, Novell NetWare) from multiple hardware suppliers effectively;
- Have systems-integration services that aid in creating and maintaining a highly customizable design process;
- Focus the design on infrastructure and minimizing support costs, not on minimizing hardware costs;
- Create an asset database from each design effort for the client's use;
- Help IS to embed the new design approach in its own processes, if IS chooses to do so.

Example: How IBM's Server Consolidation Solutions Unit Meets the Criteria

Aberdeen finds that IBM has a particularly strong offering for architecture rationalization and server consolidation. IBM leads with services directly aimed at good solution design — more specifically, an initial "best-candidate" identification

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methodology presently called OASIS (Optimization and Simplification of IT Infrastructure). The OASIS methodology allows users to develop a database capturing links between existing applications and specific servers and architectures, as well as other application attributes. For example, the OASIS-generated database can contain mission-critical application information such as existing service levels, source-code dependencies, structure of existing databases, and TP-monitor characteristics. IS can then apply sophisticated analytical tools to the resulting data, yielding key insights into potential areas for cost savings and service-level improvements.

OASIS is designed to be highly customizable for a wide variety of customer situations. One key output is an asset database; another is user training in the OASIS methodology. OASIS draws on IBM's unmatched breadth of service resources, based on IBM's (and its consultants') decades of architectural-consulting experience.

Another technique that IBM provides is the Business Solution Assessment (BSA). BSA is a service offering and methodology that includes modeling, predictor, sizing, and porting tools, a Web-based Application Questionnaire, business-requirements analysis, application analysis, and portability assessment. BSA can be especially effective when users are considering porting an existing application to a different architecture or platform.

IBM uses the analyses provided by OASIS and BSA to custom-build a solution or set of recommendations tailored to a particular customer's requirements. IBM applies the OASIS and BSA tools and methodologies on an application-by-application basis and aims to incorporate best-of-breed hardware, software, and services not only from IBM but also from business partners, ISVs, and even OEMs in the resulting solution.

IBM's specific offerings for server consolidation include the following:

- One-stop-shop solutions comprising hardware, software, services, and even financing. These solutions are available and customizable on a global basis.
- "Peace of mind" guarantees and Service Level Agreements to aid users in managing project risk.
- Multi-supplier and multi-platform services and service resources — especially for integrating Unix, Windows NT, IBM's AS/400, Novell NetWare, and mainframes such as S/390.
- Specific IBM, business-partner, and OEM hardware/software solutions for specific types of customer situation. Table 3 lists some typical user situations in which architecture rationalization may yield high value-add, as well as the IBM solution that may be especially appropriate for the situation.

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Table 3: IBM Solutions for Some Server Consolidation Situations	
Situation	**Solutions**
Unix-workload consolidation	RS/6000 SP and SMP
Intel-server consolidation (including file, print, and e-mail servers)	Netfinity
Lotus-Domino-workload consolidation	Domino on AS/400 or S/390 servers
Physical consolidation of existing AS/400 workloads from smaller/older systems	Enterprise-class AS/400s
LAN file/print server consolidation	S/390 LAN Data Series
Storage of data from various platforms (Unix, NT, AS/400) in one physical structure	SSD Versatile Storage Server
Physical combination of Intel-based workloads/servers plus data integration	Integrated Netfinity Server for AS/400
Integrating select Unix workloads (e.g., Domino, SAP R/3, Oracle) to S/390	OS/390 Unix System Services

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Aberdeen Conclusions

IS increasingly needs to save money and deliver competitive advantage sooner by getting solution design right the first time. This mandate means that architecture rationalization (and its tool/result server consolidation) is more useful to IS than ever before. Aberdeen research shows that, depending on the situation, good solution design can yield major dividends (e.g., decreased TCO, less fragmentation of data and applications, greater ability to exercise financial oversight, improved service levels, lower acquisition and administrative costs, less system downtime, and more rapid deployment). Good solution design, in this context, means customizability, a focus on infrastructure robustness and minimal support costs, and an effective ongoing systems-integration methodology. Partnership with a savvy services/solutions supplier like IBM can aid in achieving these goals.

At the same time, IS should think not only about server consolidation's advantages but also about where enterprise IT trends are leading. In many cases, the proliferation of line-of-business and departmental applications and data over the last decade is reaching the point where IS no longer can afford to pick up the pieces — unless IS achieves greater architectural efficiency. This problem can only get worse, and taking a fresh approach with a methodology like architecture rationalization should be a key part of any solution.

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