Why Consolidate Databases on Lenovo X6?

Article (withdrawn product)

It is common to have several databases with varying workloads running on multiple physical servers. This has led to many issues such as server sprawl, high power consumption, increased datacenter footprint, and inefficient resource usage.

Databases tend to be widespread across the enterprise. Because databases form the foundation of so many business systems, IT departments can easily lose control of the number of databases that need to be maintained. This leads to a proliferation of databases and machines running database instances that are strong candidates for consolidation.

To address these issues by advantage of virtualization, clients need to consolidate several applications on a single, large server. Therefore organizations require servers with strong computing power, extremely high availability, and energy efficiency that enable customers to achieve better consolidation of applications.

Server consolidation translates into improved cost efficiency from higher utilization of resources, standardization, improved manageability of the IT environment, and reduced energy consumption.

Drivers for Consolidation

The following are the main drivers for consolidation:

- **Reducing Cost**
  Through consolidation, servers will run closer to capacity, reducing inefficiencies and allowing for fewer larger machines. Reducing capital and operating expenditure is one of the biggest factors driving companies to consolidate. Upgrading to fewer machines and newer hardware allows for reductions in rack space, power, and cooling needs. Database sprawl is also minimized, because the machines are more easily centrally managed. Central management provides better control, reducing administrative overhead and maintenance overhead, and it can also help reduce licensing costs.

- **Application Performance**
  Some applications and workloads lend themselves particularly well to scale-up rather than scale-out deployments. Factors contributing to a decision to consolidate rather than scale out include processing and memory requirements, the number of end users, scalability cost, and administrative cost.

  Consolidating to larger servers allows you to add more CPUs, memory, I/O, and storage to your servers, and it does not require you rewrite your application to harness the aditional horsepower. For large databases, scale-up architectures can provide higher levels of scalability than large numbers of scale-out distributed databases, and scale-up servers are often easier and less expensive to manage.

- **Standardization and Centralization**
  One of the issues in database sprawl is an inconsistent approach to database structure and management. Consolidation can be used to pull these various databases into a centrally managed system. By having a common set of requirements and methodologies, administrators are able to take advantage of predictable workflows for patching and configuration, better audit control over security configuration, and streamlined hardware requirements. This also increases the opportunity to simplify deployment and provisioning, as well as improving application interoperability.

- **Lack of Space**
  Lack of space in the data center is one of the more direct reasons for needing to consolidate. As companies grow, so too do their hardware needs and with them the need for someplace to store all of that hardware. Acquiring new space through expansion of the data center or the creation of new data centers can be expensive, disruptive, and sometimes impossible. Clients should focus on enabling consolidation by upgrading to newer, larger servers to take advantage of higher performance and scalable growth.

- **Agility**
  Consolidation helps with building a long-term dynamic and power-aware IT infrastructure that allows for better control and flexibility of computing resources in terms of their placement, sizing, and overall utilization. If you move applications onto newer hardware, those applications can take advantage of improved performance and reliability from the new machines, which can be better configured for high availability scenarios, reducing downtime and allowing for rolling upgrades.

- **Green IT**
  Focusing on providing a “greener” operating environment is similar to the motivations for reducing cost and increasing efficiency, but the ultimate goal is environmental benefit rather than cost savings. Consolidation plays an important role here in reducing the data center footprint. Fewer computers and fewer idle machines result in lower power consumption and a reduced need for cooling. New hardware can also provide better energy efficiency as well, because it can take advantage of more efficient technologies.

Why Lenovo X6 is the Perfect Consolidation Server?

The Lenovo X6 servers are the high end of Lenovo’s server portfolio. The x3850 X6 is a 4U rack server scalable to four processors. The x3950 X6 is an 8U rack server scalable to eight processors.

Lenovo X6 servers are perfect for consolidation for the following reasons:

- **High Computing Power**
  The Lenovo x3850 X6 and x3950 X6 provide a tremendous amount of computing power. Database engines can use available cores for parallel query processing to achieve faster query execution time. The larger processor cache improves query processing while reducing the latencies involved in fetching data from main memory. When fully loaded, the Lenovo x3950 X5 provides up to 192 cores, which enables you to achieve a higher consolidation factor for migrating and consolidating many databases on to a single host. This reduces the datacenter footprint as well as power and cooling costs.

- **Scalability and Agility**
  Lenovo X6 servers provides seamless scalability to meet increasing workload demands and allow you to scale from 2 processors all the way up to 8 processors. The agility and adaptability of the Lenovo X6 modular rack design enables you to design a fit-for-purpose solution that meets your needs. You can also realize infrastructure cost savings by hosting multiple generations of processor and memory technology in a single platform.

- **Unmatched Reliability and Availability**
  To ensure business continuity and increase end-user productivity, it is imperative that you maximize the uptime of your server hardware and server operating systems. All Lenovo servers have strong RAS capabilities, but the Lenovo System x3850 X6 and x3950 servers have advanced RAS features not found in other servers. The differentiated X6 self-healing technology proactively identifies potential failures and transparently takes necessary corrective actions. The Lenovo X6 servers provide mainframe-like RAS because they integrate across the hardware and software stack.

- **High Speed and High-Capacity Memory**
  The capacity and speed of the main memory are crucial to memory intensive applications, such as databases. The Lenovo x3850 X6 supports up to 6TB of memory and the x3950 X6 supports up to 12TB of memory. This massive amount of memory enables X6 servers to support many database virtual machines seamlessly on a single host, thereby achieving a better database consolidation factor.

- **The Most PCIe slots for Scalable Networking and Storage Access**

  I/O-intensive workloads running on the physical host can easily saturate the underlying networking cards. Therefore, it is essential that the host be able to support a large number of PCIe slots, which enables customers to start with a minimal configuration and expand network bandwidth as required.

  The x3950 X6 supports an unmatched 22 PCIe slots *plus* two dedicated mezzanine LOM slots which provides the flexibility to get started with a minimal number of network cards and then scale up as more virtual machines are consolidated on the server. This helps to reduce network latencies and improve network bandwidth.

- **SSD IO Performance**
  X6 servers provide multiple backplane options, for greater storage flexibility. The x3950 X6 supports up to 16 SAS SSDs (the x3850 supports eight), which provide more reliable and higher-performing storage than HDDs.

  The x3950 X6 supports up to eight NVMe Enterprise Performance SSDs. (The x3850 X6 supports four.) These hot-pluggable 2.5-inch front-loading SSDs provide many more IOPS than traditional SSDs, along with much lower latencies. These can be used to store the I/O-intensive server database content.

Further reading

Read other Lenovo Press articles in this series:

- Supporting Mission Critical Workloads with X6
- Matching Workloads with Lenovo X6 Servers
- Lenovo X6 Server RAS Features
- 10 Advantages of Lenovo X6 Servers

About the author

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Related product families

Product families related to this document are the following:

- 4-Socket Rack Servers
- 8-Socket Rack Servers
- Large Memory Capacity Servers

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