Abstract

Small and Medium businesses need to support growth while wringing every ounce of value out of the investments they’ve already made. This is especially true in IT data centers where data growth can sap server performance and require physical expansion. More and more, companies are deploying virtual servers to save money and increase data center performance. Since Microsoft SQL Server fuels many line of business applications, hosting applications on virtual servers is a high value investment. Companies that consolidate servers through virtualization save money on hardware purchases, deployment and maintenance, software licenses, and power and cooling requirements. At the same time, they increase reliability with the easy load balancing and application migration that virtualization allows. And virtual servers and storage devices scale easily to affordably support inevitable database growth. Implementation of virtual servers is greatly simplified by working with a vendor that provides the hardware (servers and storage), software, and services required. Dell’s product offering and technical experience with virtual servers hosting Microsoft SQL Server makes it the vendor of choice.
SQL Server’s Role Inside SMBs

The thing that separates small and medium size businesses from large enterprises is size. And size matters. SMBs are extremely resource conscious. They have to get as much out of every investment as possible. That’s especially true in IT and the data center in particular where resources are relatively expensive and mission-critical (when servers go down work stops). Since SMB business plans are typically focused on growth, lean and mean, high-performing data centers also have to anticipate plans for additional users and expanding databases.

Microsoft SQL Server is a mature, reliable, market leading database that serves as the foundation for many business applications. Many departments from Finance to Human Resources rely on data that is securely centralized, stored, organized, and distributed via a Microsoft SQL database.

Given its central role in business operations, ensuring performance and availability of Microsoft SQL Server databases is often at the top of IT’s priority list.

IT’s Biggest Data Center Concerns

As a company grows, so does the data that drives it. IDC recommends that organizations plan for 60% year to year data expansion. That makes sense when you add up all the data that has to comply with various legal and financial regulations that are on top of the data that is added in the course of doing business. New customers add new sales and marketing records, ongoing marketing programs add information about prospects, new hires add exponentially to human resources data, and each shipment out adds a record, as does every single financial transaction.

Simplistically, if a company is doing and well and growing, it’s easy to keep expanding the data center which in turn supports continued growth. Unfortunately, it’s not that simple. SMB data centers have to affordably accommodate expansion before expansion happens. And IT has to make sure that data centers always perform reliably; as long as business is being conducted, reliable access to business data is a requirement.

It’s possible to break down the data center requirements for solid Microsoft SQL installations.

- **Reliability** – It’s typical for employees of SMBs to work long hours putting in time during the evening, over the weekend and even while on vacation. Essential data has to be available not only during regular work hours but around the clock. Employees expect that whenever they need to pull financial data to create a presentation for investors, compile of list of sales visits, analyze results of a banner ad campaign, or complete a report of monthly shipments to distributors, the database will be available to them. Any interruption of service can be calculated as a productivity loss.

- **Agility and efficiency** – IT managers can’t wait for a server to run out of database space before adding capacity. Data center management requires has to assume database growth and implement technologies that allow easy, fast expansion.

- **Affordability** – While high-performing, reliable data center operations are important to all SMBs, no IT manager ever gets a blank check for new servers. Even during the most profitable years there is pressure to hold the reins on budgets and provide the performance and reliability needed in the most cost-effective manner.
Virtualization is the Solution

The constant reality of those concerns is exactly what has turned many SMB IT managers to virtualization. Virtual servers allow multiple operating systems and applications to run independently on a single server. That’s in contrast to a traditional one application/database per server configuration. So, rather than having an accounting server that is dedicated to the financial management system and associated data, a company with virtual servers could have one server that is supporting the financial management, sales contact management, and human resource systems.

The advantages of virtualization are immediate and clear. (We’ll discuss them in greater detail below.) The ability to save space, save energy, save on hardware purchases and software licenses, management, maintenance, and reduce IT overhead is compelling. Gartner estimates that, around the world, between 60% and 80% of SMBs began deploying virtual servers prior to 2009. Technology uptakes like that reflect real value and appreciable return on investment.

Companies that move to a well-planned and managed virtual server strategy have achieved consolidation rates of 10:1 — that is, one virtual server has replaced ten sole purpose servers. Of course, not all companies will achieve those rates but, just considering the savings that consolidation affords, it’s easy to make a business case for virtualization.

How Virtualization Improves Data Center Performance

Money is one thing, and important thing to be sure, but beyond allowing IT managers trim budgets, virtualization helps them increase data center performance by:

- increasing reliability and ensuring continuity
- speeding deployments, upgrades, and overall data center expansion
- reducing IT overhead and giving staff the time and money resources needed for other strategic projects

Increasing reliability and ensuring continuity

Virtual servers allow easy load balancing from one machine to the next. If one virtual server fails, other virtual servers can immediately pick up the slack. Applications and databases remain accessible and end-users continue on with their work. That not only keeps end-users productive, it greatly reduces the number of calls to the IT help desk which keeps the IT staff productive.

Secure data storage is also key to business continuity. Many SMBs that deploy virtual servers also implement central storage for all data that is replicated and stored off-site. Should a virus, power outage, or physical server failure corrupt a database, the information is quickly retrieved and restored to a virtual server that has picked up the load with no need to rebuild images or databases.

Speeding deployments, upgrades, and data center expansion

Think of what happens when IT is asked to deploy a new customer management system (CMS) or any other line of business application. IT has to source, test, and deploy at least one new piece of equipment, a server. They have to find space for it in the data center. Security and backup have to be configured. That could take days or weeks.
When virtual servers are in place, time to deployment is significantly reduced. A server image is simply copied to a physical machine that is already in place. That server has already been secured and tested and, because it is a virtual server, it ensures reliability for the CMS (or other application.)

These fast deployments get end-users up and running on line of business applications that are usually justified for their business benefit and positive return on investment. When those justifications don’t include virtualization as a means to shorten time to business, the return on investments and productivity benefits they include could be delayed.

**Reducing IT expenses**

And now, back to the financial benefits of virtualizing Microsoft SQL Server. The first is clear, the fewer physical servers you have to buy, the more money you’ll shave from the IT budget. Fully configured servers cost between X and X so, financially justifying the move from sole purpose servers to virtual servers can be as simple as multiplying the number of servers you’ll save by that purchase figure. Of course, the savings are even greater than that as service and maintenance costs also define the fully burdened cost of a server.

The fewer servers required by an SMB, the less space an SMB has to allocate to the datacenter. Figuring the square footage cost that will be saved by eliminating servers gives you another measure of dollar savings. Of course, a lot of datacenter space is taken up by cooling requirements — hot servers can’t be jammed closely together. Square footage savings have to also take cooling space into account.

Not only do fewer servers mean less cooling related space, they mean less cooling related power. Dell estimates that one server costs $200/month in power and cooling costs. An SMB that eliminates five servers through Microsoft SQL Server virtualization saves $1,000 or $12,000 per year.

**Going Virtual**

Once the IT team has established ROI expectations for virtualization, is time to determine the best way to deploy servers in the data center. Implementing any IT change can be complex, no matter how great it’s pay off. The first important step is to simplify the change process.

One of the easiest ways to simplify implementation is to focus on a vendor that provides a complete solution and, ideally, one that has deep experience in virtualization. SMB IT staff is always stretched for time and having a single vendor relationship to turn to for advice on best practice can take hours off the implementation process.

Sourcing a complete, tested, hardware and software solution means that in-house testing can be shortened. The hardware/software combination has already been validated so testing can be confined to making sure that everything is running well in the SMB data center.

Finally, an experienced vendor will be able to help scale virtual servers so that, as Microsoft SQL databases inevitably grow, the data center will continue to support them at the required performance and availability levels. Ideally, the vendor should have deep experience with organizations of all sizes, SMB through large enterprises, to ensure that successful relationships can continue as the SMB grows to new levels.
The Dell/Intel Solution

Dell and Intel have teamed to provide servers that are optimized for virtualization. Not only do they ensure performance, reliability, and cost savings, they actually add to those benefits.

Dell PowerEdge Servers with Intel® Xeon® Processors

Dell PowerEdge Servers powered by Intel processors are tailored to the current size of a company and able to accommodate any level of corporate growth projection.

- **Reliability** – With no single points of failure, Dell Power Edge servers are highly reliable. Redundant components are redundant so should a fan fail, for instance, the backup fan will take over until the broken primary unit is replaced. On top of being redundant, fans, power supplies and other components are hot pluggable meaning they can be removed and replaced while the server is up and running. Reliability is also assured with dual internal SD (Secure Digital) modules for storing virtualization hypervisors. End-users do not lose access to applications when fixes are being made. Redundancy and hot pluggability create a safety net that protects access to critical line of business applications.

- **Performance** – Intel Xeon multi-core processors offer 6.36 times better performance per watt than single core processors. That means that intense data retrieval (for reporting) processes run fast. End-users don’t have to wait for the information they need to complete orders, process invoices, or generate end of the quarter financial reports.

- **Energy-savings** – Intel Xeon processors are also known for energy efficiency. Power consumptions is scaled to workload. Even if servers are left on to accommodate around the clock workers and off-hours processing, less energy will be used at off-peak periods. That adds power savings benefits above those gained through server consolidation.

Equal Logic Storage – Dell EqualLogic storage devices, which like Dell PowerEdge servers come in a broad array of configurations, are built to accommodate virtual server environments. All devices assume database growth and can scale out performance and capacity. SMBs purchase only the storage they need knowing that expansion can easily happen at any time. This prevents over purchasing and under-utilization. It’s also why these devices are considered extremely cost-effective.

Like PowerEdge Servers, EqualLogic storage devices have redundant, hot-swappable components (fans, power supplies, disk drives with hot spares). Those features along with a fault-tolerant, redundant controller and enterprise-class RAID protection enable devices to offer 99.999% availability.

Management Tools – Dell provides virtual server management tools including VmWare High-Availability Failover Protection and vCenter Site Recovery Manager to make speed data recovery. Rather than taking hours to restore a Microsoft SQL database, it takes seconds.

FlexMem Bridge Technology – The PowerEdge R810 rack and M910 blade models feature Dell’s innovative FlexMem Bridge technology, which allows them to seamlessly scale memory from 4GB to 512GB* in either 2 socket or 4-socket configurations. This patent-pending technology lets Dell deliver a compelling platform that can economically scale according to customer and application needs.
Dell also configures virtual servers with Microsoft Hyper-V R2, a bare metal hypervisor that allows multiple virtual machines to reside on one server. Hyper-V R2 allows ensures reliability through easy load balancing and live application or database migration.

**Dell Services**

Dell offers a high-value, single vendor relationship for SMBs that are adding virtual servers to their data centers. Dell configures complete solutions before they are shipped. Servers and storage units are ready to go right out of the box. Every solution is tested before it is shipped to shorten or eliminate in-house testing requirements.

Dell technicians understand SMB business models and technology environments. Technicians are able to offer one-on-one advice and help IT managers inside SMBs anticipate and plan for growth. Dell experts are able to walk through expansion plans and make suggestions for ways to further consolidate servers, implement security, scale storage for growing databases, and reduce power and cooling requirements.

Given the broad range of Dell products and services and experience with virtual servers in general and virtual servers running Microsoft SQL Server in particular, SMBs can consolidate vendor relationships at the same time they are consolidating equipment.

**Conclusion**

SMBs around the world are turning towards virtualization as a way to save money. Server consolidation cuts budgets for hardware, software, data center space, power and cooling, and IT overtime. Beyond important dollar savings, virtual servers increase availability and performance which are both key to end-user productivity. Virtual server value is especially high when applied to Microsoft SQL Server databases. Business data grows exponentially and since virtual servers scale in capacity while maintaining performance and reliability standards, their value is felt immediately. Dell offers a broad array of Power Edge servers powered by Intel Xeon processors, Equallogic storage devices, memory and management technology and implementation services that add even more value to virtualization. Dell’s service team is well-versed in virtualization deployment and is able to specify hardware/software combinations that will add the greatest value to business environments. That combination of products, knowledge, and services makes Dell the vendor of choice for Microsoft SQL server database virtualization.