

Data center trends for midmarket growth

Formerly looked upon as just a cost center, the data center has taken center stage as the heart of your business operation. It has become an indispensable, critical component of your company's competitive strategy. As such, your data center has the same needs as the business it serves, the need for agility, flexibility, and adaptability to respond to new opportunity as quickly and effectively as possible.

DON'T FORGET THE FUNDAMENTALS

While we're looking at the latest trends in data centers for midmarket companies, the newest equipment as well as best practices, it's important not to overlook the basics.

For example, a critical function in your data center operations is the backing-up of your valuable business data. In many cases where significant data loss has resulted in costly business disruption, one of the key causes of the failure was found to be the lack of a sufficient supply of backup media. Re-using the same media repeatedly without rotation leads to data backup failure. Whether your backup system requires CDs or DVDs, or LTO Ultrium or RDX cartridges, maintaining a sufficient supply to allow proper rotation is as critical to successful data center operation as any piece of equipment housed there.

Don't forget appropriate high-density, multimedia filing systems, clear professional labeling and initialization (L&I) so your operators don't need to search for media or strain to identify correct media when they need it most. Stick to the most reliable brands when selecting media, including Fujifilm, Imation, HP, Quantum, Maxell, IBM, Sony and TDK.

TRENDS AT EVERY LEVEL

The information technology (IT) industry has never stood still. New developments are constantly emerging. Evaluating and selecting those that will improve your company's strategic advantage is key to remaining on the top of your markets. We've come to expect continuing improvements in the key areas that all data centers need to pay attention to, including:

Power Management & Conditioning

Data Backup

Disaster Recovery

Business Continuity

Security

Compliance

In this white paper, we'll cover the latest trends that will promote your data center's growth beyond the current state.

SOFTWARE-DEFINED-EVERYTHING

All data centers depend upon network routers, switches and other communications equipment to connect to the Internet and, in turn, suppliers, customers and other associates. Similarly, most data centers have long ago gone beyond storage directly attached to servers (DAS) and used storage appliances that are directly attached to the network (NAS) or built storage area networks (SAN).

In the early 1990s, developers of networking and storage equipment began integrating the "intelligence," the operating software for their products, right into intelligent products like routers, switches, storage devices, servers, and more. It seemed so efficient and so logical.

More recently these manufacturers have realized that keeping the software locked inside the circuitry of their appliances significantly restricted the flexibility that operators needed to achieve greater efficiencies and control in their environments. By moving the intelligence back out of the devices and running it instead on servers they have given back to data center architects and operators far more flexibility and control.

Software-defined networking and storage also promote lower cost. Instead of purchasing expensive dedicated hardware, operators can connect the servers they run the operating software on to far less expensive commodity hardware.

HYPERCONVERGENCE & REFERENCE ARCHITECTURES

Midmarket companies are enjoying the arrival of a growing variety of software ideally scaled to their business. Adding a new Enterprise Resource Planning (ERP) or Customer Relationship Management (CRM) system can produce tremendous new revenue and profit growth very quickly.

To remain competitive these midmarket companies must be able to respond quickly to opportunity. All too often the obstacle to rapidly launching a new software initiative comes from the time it takes for staff to properly configure and obtain new servers, storage, and other systems.

Manufacturers have responded with two highly effective strategies for overcoming these obstacles and delivering effective system configurations in very little time at significantly reduced cost.

Premier computer manufacturers today offer "hyperconverged" systems in a growing catalog of configurations each of which is specifically designed to support different workloads, including ERP and CRM along with many more. These hyperconverged systems can be ordered by their stock keeping unit (SKU) identification and delivered within a few days instead of weeks or months. Upon arrival, operators simply plug everything in, turn everything on, and get immediately to work.

For those companies who feel they require more specificity in the customization of their systems, a variety of manufacturers publish and provide reference architectures that help system designers short-cut the configuration process by providing the core, fundamental design required. Customer technology personnel can simply make the modifications they require and rapidly deploy the configurations they need.

AUTOMATION & ORCHESTRATION

As a midmarket company grows in revenue and operations, the demands upon its data center drives significant growth as well. As that data center grows in size and capacity it also grows in complexity. Operators must coordinate a variety of systems to work well in concert with each other.

At a given point, the size and complexity of a data center may outgrow the ability for IT staff to keep track of everything that needs to happen. This is where Data Center Infrastructure Management (DCIM) software can support the IT team in their efforts.

From the introduction of microprocessor-based computer servers in the 1970s, each server in a data center was used for one network operating system and a limited number of key functions.

Virtualization technology made it possible to run many “instances” of the network operating system on the same server hardware. The ability to rapidly move these “virtual machines” (VM) from one server to another for performance or fault-tolerant purposes, enabled new levels of performance. DCIM software constantly monitors all of the physical servers in a data center, looking for opportunities to achieve higher performance by orchestrating the location and resources available to each VM and moving them quickly and transparently from server to server.

Automated orchestration like this even seeks opportunities to move all of the VMs off of a given server so it can be shut down, saving electrical power until that server is next needed to host additional VMs.

BIG DATA

[Predictions of the growth of “Big Data” range from 20 times to 50 times and more. Computer Science Corporation](#) projects that more than 35 zettabytes of data will be passing through the cloud by the year 2020. Where we once spoke of megabytes, then gigabytes, today we speak of terabytes and petabytes. Zettabytes are 1,000,000,000,000 gigabytes. Big Data just keeps getting bigger.

Where is all this data coming from?

Big Data is the result of the emergence of so many new ways to collect more and better data. Where retailers, for example, used to collect one data point from an “electric eye” that a customer had entered their store, they now collect hundreds of data points about each customer using scanners incorporated into

digital signage, point-of-sale systems and more. Thousands of data points about thousands of customers across hundreds of locations every day. Big Data.

Of course all that unstructured data needs to be stored, processed, analyzed, and transported to where it will do the most good. Scaling capacity and performance are big concerns, and scale-out strategies that add more processing power as they add more capacity without adding more cost are becoming more and more popular.

Next, servers are becoming available with one or more terabytes of DRAM, meaning entire workloads can be held and processed in memory without ever crossing the data bus to or from storage. This will redefine the speed of processing, and the cost.

INTERNET OF THINGS (IOT)

When most people hear about the Internet of Things, they envision another Internet built specifically to accommodate devices. This is not the case. [Cisco](#) reports that there have been more devices connected to the public internet than people since as early as 2008.

While there will not be a separate Internet built, literally billions of things like sensors, controls, and other devices are being connected to the public Internet for a variety of business and consumer uses. Data centers will continue to access the Internet and will now need to provide control and monitoring functions for many of these things.

Some of the devices that will leverage the internet include Industrial Control Systems (ICS) that will monitor how many people are in a given space and provide sufficient heating, cooling and other fundamental services for them automatically at the most efficient cost possible. Other applications of IoT technology improve communications, personal safety, operational efficiency and much more.

The growth anticipated for the public internet is so great that it will require a fundamental change to its structure, including the completion of the transition to IPv6.

CLOUD

Today's data center must be very agile and highly responsive to the needs of the enterprise. The addition of new workloads and applications used to require the design, configuration, specification, and acquisition of new equipment, a process which could take weeks or months to complete. Not responsive.

In the current IT environment, the roadmap for improvements and upgrades of data centers seldom add more equipment to respond to new opportunities. Instead, they add cloud-based resources to their existing environment. Cloud servers can be easily and seamlessly added to infrastructure already in the data center. All that is required is to click a few boxes on the cloud service interface. New storage capacity, more operating memory, even more processor power

becomes available instantly. Data centers enjoy new latitude in expanding and contracting to serve their company's needs with the highest efficiency at the lowest possible cost.

MOBILITY

Today's worker sees work as an activity more than a destination. Employees and executives want to and can work on the device they're most comfortable using, from laptops to tablets to smartphones. With proper security and access controls they can use their own device to access company network and data resources. With the simple addition of a Bluetooth-connected keyboard and headphones even a small smartphone can become a viable workstation.

To meet these demands, data centers will need to support these smartphones and tablets as well as laptop and desktop computers, and more. Each device must be securely configured to access the network properly while preserving the privacy of corporate data.

Data center operators will need to balance between the corporation's requirement to protect the network and the data while also facilitating the ease-of-use and ease-of-access that users crave.

IPV6

Protocols are the standards and agreements that various devices use to communicate with each other. The entire internet runs on a combination of Transport Control Protocols and Internet Protocol (TCP/IP).

IP, Internet Protocol, includes the addressing system by which all things connected to the internet are numbered. The original 8-bit numbering system, IPv4, provided 430 Billion different addresses. The last of these available addresses was assigned in 2011. There are no more.

To continue adding devices to the internet we've played many clever technical tricks, including a Dynamic Host Control Protocol (DHCP) that makes up its own IP addresses and hides them from the internet, assigning them as needed to devices inside their organization's network. You've probably seen or used these "fake" IP addresses when setting up your home router. They look like this: 192.168.0.1, which would be the internal address for your router. DHCP performs network address translation (NAT) which takes all traffic coming into your router and routing it to the correct device within the network. Thus, all devices within each network do not use up IP addresses other than the one assigned to the router from outside.

By 2011, the [Federal CIO Council Strategy and Planning Committee - Technology Infrastructure Subcommittee of the Federal IPv6 Working Group's](#) plan was to convert to IPv6, the new 64-bit numbering system that delivers 32 undecillion available addresses. Soon, all the clever tricks we put in place to allow more devices onto the internet will no longer be able to accommodate the growing volume. Data centers need to complete their transition to IPv6 very, very soon or a late transition will become an emergency.

PHYSICAL PLANT

Remember that all of the equipment, furnishings, racks, cabling, and other physical components of a data center require as much attention and care as does the digital data.

Identify an ideal resource to keep your data center clean, both on the surface and underneath where all the cables and connections live. Assure that the maintenance of all equipment is in place to avoid lengthy outages that can disrupt operations, including phone systems, storage drives and accompanying media. Keeping control over costs includes the fundamental cost of powering, heating, and cooling the data center. Have professional energy assessments performed regularly. The cost of the assessment will return almost immediately in savings.

TECHNOLOGY AND PEOPLE

It's an exciting time to be in business. All of these new developments and many more will continue to make our lives easier and our work more fulfilling long into the future. Cultivating a relationship with your local technology resource is always a good idea to help you stay on top of what has recently become available. Your data center is now one of your most powerful strategic advantages. To keep it going, keep it a growing and lively place for people and technology to work together.