Creating the right server environment for your business

A guide for IT Professionals

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Introduction

From power distribution outlets to available network connectivity, server deployment can be a demanding process. Wanstor's IT infrastructure experts have developed this document with considerations for IT Managers to factor into any server deployment checklist, and to help differentiate between converged infrastructures and disaggregated servers.

Comprehensive server deployment involves more than purchasing adequate computing resources at attractive prices. Talented IT professionals need to source, acquire, prepare, install, configure, manage and support servers within a data centre. Reducing the hardware footprint along with costly manual operations may mean important issues are overlooked.

Wanstor's experience in deploying, managing and advising customers on server environments has helped us identify these issues, which require factoring into any deployment checklist. This may also represent a useful guide to other areas of consideration when moving forward with demanding server deployments.

Can your data centre facility handle the server load?

Every server installed in a data centre demands rack space, power, ventilation and cooling. It is also important to ask the question "Where will new servers be located?"

Even when deploying minimally into unused rack space it is still important to check that new placements will not affect air flow or temperature performance within the environment. When adding numerous servers to existing racks, real estate, power demands and sufficient cooling become concerns of paramount importance.

At Wanstor we find that modern hardware tends to use less energy and run cooler than legacy servers - this doesn't mean ignoring BTU data when verifying that top-of-rack, end-of-row or hot and cold aisle cooling systems and checking they can handle additional temperature.

Location, Location, Location

Multiple servers necessitate new racks and rows, affecting data centre space and floor loading. Such expansion projects also necessitate re-engineering of additional building systems - fire suppression, physical security and water handling, keeping racks and piping apart. Projects like these may also demand more building management systems or data centre infrastructure management sensors.

This includes checking that circuit capacity and power distribution systems have spare capacity for the additional load.

Make sure there are enough licences for the software

Licensing software can be a costly venture, with many enterprise class licenses costing thousands of dollars each year, multiplied by the number of VMs running on each system. Licensing expense for large server installations can total much more than combined hardware costs.

New servers need an operating system, a hypervisor and/or virtual container layer, applications and management tool agents. Each piece of software is also governed by licensing. IT administrators must plan server software requirements and license requirements in advance as part of the server deployment checklist.

We recommend IT Managers take the time to negotiate volume discounts with software licensing vendors. Quite often, replacing an existing server with a hardware upgrade is typically not as expensive as adding new servers, since most software and associated licenses can be transferred across.

Additional VMs instanced to the new server could, alternatively, add license costs.

Network connectivity

To connect to a data centre network, new system network interface connector (NIC) ports need connections to local patch panels and then to local switches interconnecting beyond the rack. Verify that ports are available on local patch panels and switches to accommodate these new systems.

Clusters and resilient computing, as well as additional network traffic demands of virtualized servers, ratchet up the number of NIC ports that go on production servers. It is cheaper, and redundant, to add one or two 1 gigabit Ethernet ports than to install a single 10 GigE or a faster port. A server may require two, four or more network cables to the patch panel and switch ports.

If planning to add even as few as 10 new servers, the number of new ports required may be surprising. Insufficient capacity at the patch panel or switch requires another panel and interconnected switch if there is rack space. Alternatively upgrade existing patch panels and switches to high-density versions.

Beware the effort and downtime involved in configuring switches and cabling, and plan accordingly. Large-scale server installations don't suffer network capacity oversights because IT administrators will plan server installation and switch capacity as part of project design.

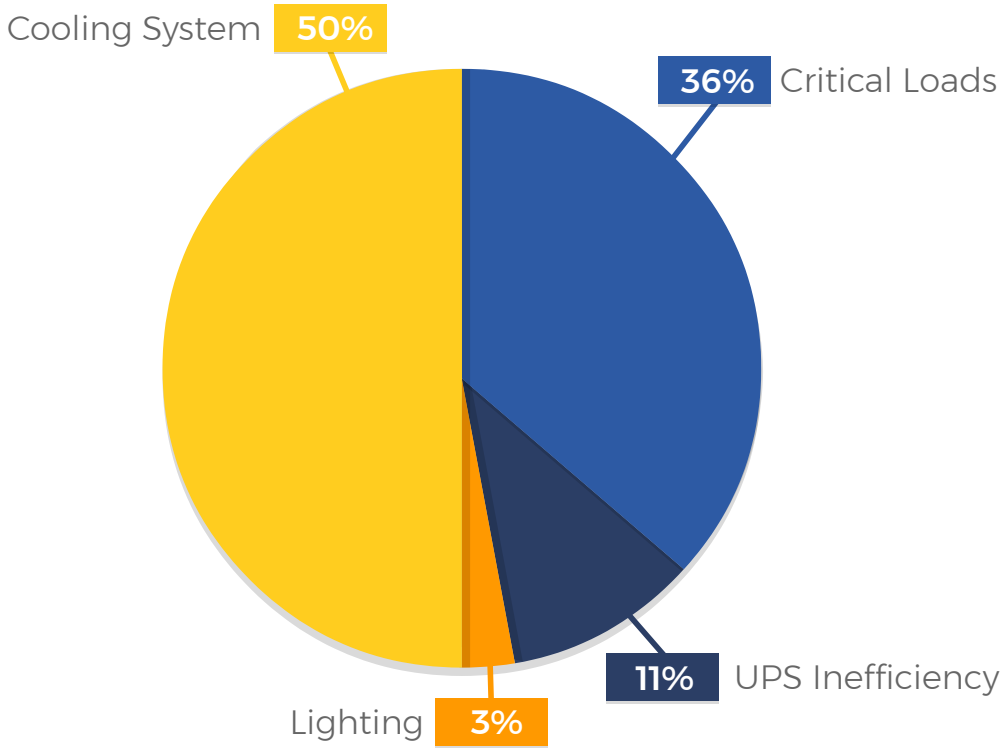

figure 1 : A simplified Data Centre Core Power Map

Server outlets and UPS capacity

Determine new servers connections before deployment. We often see customers attaching new servers to racks without considering consequences; this detail has been known to disrupt the simplest server deployments. Power distribution units (PDUs) deployed in server racks offer a finite number of outlets.

Heavily utilized racks may not have enough PDU receptacles to accommodate additional servers, or available receptacles for power cabling.

The IT team may rearrange this, but only by unplugging servers and causing system downtime. We suggest that before deployment, you check uninterruptible power supply (UPS) capacity; even the best UPS has limited wattage capacity and battery support time.

Overloading UPS systems may trip internal circuit breakers, and greater load means less battery runtime, so determine how the additional servers will affect available UPS backup time in advance.

In some cases, the added load may shorten the battery backup time too much, preventing an orderly system shutdown.

Therefore, IT Managers should investigate a UPS upgrade or other changes to UPS power distribution within the racks before deploying more servers.

Large-scale expansions rarely face PDU and UPS oversights because new racks typically furnish new power infrastructure for the servers.

Clear configuration templates

New servers are configured by tasks such as installing software, setting up server roles, setting IP addresses and working with domain name system and Active Directory details. This type of work was traditionally performed manually and may still be a manual process when one or two new servers are involved.

Prepare for your server installation with a clearly defined configuration plan

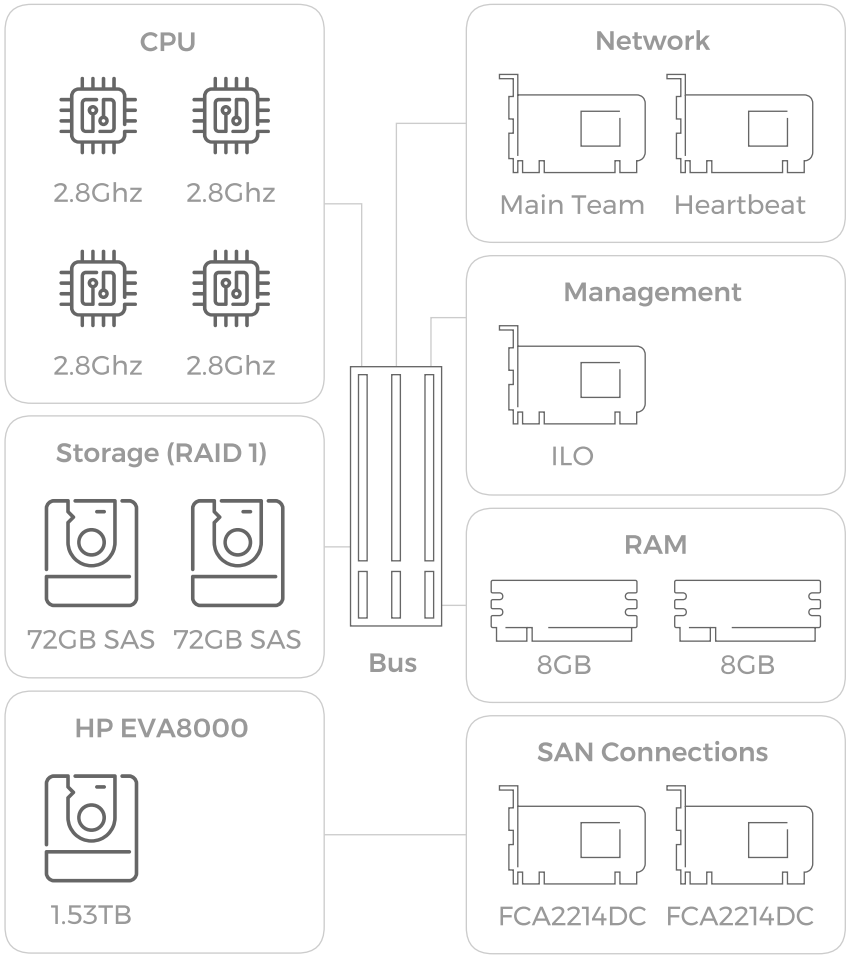

figure 2 : A Basic Hardware Configuration for Server Deployment

But manual configuration is a time-consuming and error-prone process for even the most experienced IT professional.

There are too many potential mistakes and oversights that might delay the deployment, trigger unnecessary troubleshooting, expose unexpected security vulnerabilities, or simply leave a working system that is configured differently from others, leading to confusion or errors in the future.

To overcome these issues, Wanstor suggests an IT Manager should prepare for server installations with a clearly defined configuration plan. This can certainly be a manual effort if the system's configuration is well-documented and if it follows a consistent checklist.

But large deployments rely increasingly on established base image files that define the overall suite of software to be installed, along with scripting and automation tools that drive the setup and configuration procedure in a predictable and consistent manner.

Your net result is faster server deployment with fewer errors. This consistency can also contribute to corporate compliance at data centre level.

Don't forget patching and updates

Once a server is configured and software is installed, IT Managers will then need to update and patch the software. This is usually as directed by the established configuration checklist, template, script or prevailing automation tool, such as a server configuration management tool.

However, patching and updating after installing an established software image isn't always the right choice. The latest version of an operating system or application is not necessarily the best version for a business's specific production environment.

Many enterprise-class environments prohibit automatic updates to prevent untested changes to the production servers.

Many businesses take the time to test and verify software patches and updates in a lab environment before authorising updates to the production servers through configuration change management tools. Eventually, base image files used to create new servers will reflect new software versions.

Integrate new servers into the wider data centre environment

Just installing and configuring software on a server isn't necessarily enough to make it production ready. The new servers must also integrate into data centre operations. New servers must join the backup or replication process.

The new servers need management agents to interoperate with the business's remote management platform and appear in management logs, reports and alerts. IT administrators may want to pool the new server resources and make them available for provisioning from the virtualization management platform such as VMware.

It should be noted the exact series of steps for a functional server deployment can vary dramatically depending on a business's size and needs, but the underlying consideration is vital. Checklists, scripts and automation tools speed the integration process while reducing errors and oversights, especially for large deployments.

IT Managers must remember the implications for data centre and corporate compliance from processes such as data protection and backups as well.

Server documentation

One of the final steps in any server installation checklist is to generate comprehensive documentation that details setup, configuration and software complement. Proper documentation helps IT administrators overcome issues with equipment in future because any deviation between systems documented and detected state will usually reveal problems.

It also helps with compliance auditing by ensuring that every server is configured according to established standards and every piece of software has a current license.

Documentation manually entered and updated on spreadsheets and charts rarely works well because changes and updates are frequently ignored.

Modern enterprise data centres rely on configuration and infrastructure management tools that recognise and inventory new systems, determine hardware and software configurations, track licenses and support contracts, and generate charts highlighting relationships and dependencies.

Finalise server installation by updating documentation and verifying automated tools have correctly identified and inventoried the new systems.

What should you do with the server packaging?

Server deployment considerations do not end when the server is operational. Servers are generally shipped with a significant amount of packaging material: foam, cardboard, papers, plastic and metals, and in some cases even wood from pallets and crates. Waste from small server projects with up to 10 systems can often be disposed of with the normal business waste stream.

Large projects generate enough waste material to fill whole storerooms, with additional fire and personnel safety implications. Consider how to handle this mix of recyclables and waste. Server vendors or resellers involved in server preparation and installation will usually take care of server packaging disposal as part of their offering, but it is always best to check beforehand.

What should you do with old servers?

One thing often overlooked with a new server deployment is disposal of old server equipment. Recycling or safely disposing of old equipment is vital to avoid large amounts of waste. Many businesses will repurpose old servers, which can sometimes handle lower value production workloads or test and development projects.

Displaced systems offer a spare parts inventory for similar systems still in use, especially if service contracts expire and no parts are readily available. One final consideration is to resell unused hardware on.

We understand server disposal is a serious concern, affecting not only businesses but the environment as well. Electronic components and assemblies typically contain toxic chemicals and cannot be discarded along with normal waste - these should always be disposed of or recycled appropriately.

Conclusion

The topics covered in this document should provide IT Managers with a decent starting point in terms of what they should be considering with regards to procuring new equipment for their server environment.

This guide should help IT Managers to plan ahead, regardless of the number of new servers they are deploying. At Wanstor, we find it is not the biggest server deployment projects that get IT teams into trouble. Often it's the smaller deployments that cause most headaches.

We have over 15 years of experience in helping businesses select, deploy and manage server technologies. The server solutions we put in place for our customers help them save IT costs, reduce errors and improve the end user's computing experience.

Feel free to contact us at the details below if you are investigating server solutions for your business. We will be happy to help you with the procurement, deployment and in life management of your server estate.

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