Closing the Manageability Gap:

The role of intelligent power management in converged and hyperconverged infrastructures

Executive summary

Often seen as a natural fit for virtualized workloads, converged and hyperconverged infrastructure solutions are emerging as an increasingly compelling choice for a wide range of data center environments.

But they are not a magic bullet and there can be a gap between the potential of these modern IT architectures and what they actually deliver in real-world deployments. This Manageability Gap is frequently created by the absence of an intelligent power management solution.

The Manageability Gap describes the gulf that can open up between the potential offered by converged and hyperconverged infrastructures and the benefits they actually deliver. Intelligent power management can bridge this gap and bring business benefits for the organization.

Powering Business Worldwide

Coming together:
The rise of converged and hyperconverged infrastructures

Data center architectures have experienced unprecedented transformation as they struggle to keep pace with rapidly diversifying business applications generating terabytes of data.

These workloads exploded onto legacy infrastructures typically built upon multiple hardware and software products from multiple vendors, with each product needing its own interface and user training as well as being over-provisioned with its own compute and storage usage.

As IT was tasked to reduce the waste resulting from this clutter, complexity and high costs, integrated systems emerged which brought together existing hardware and software to deliver complete network, compute, storage and virtualization capabilities.

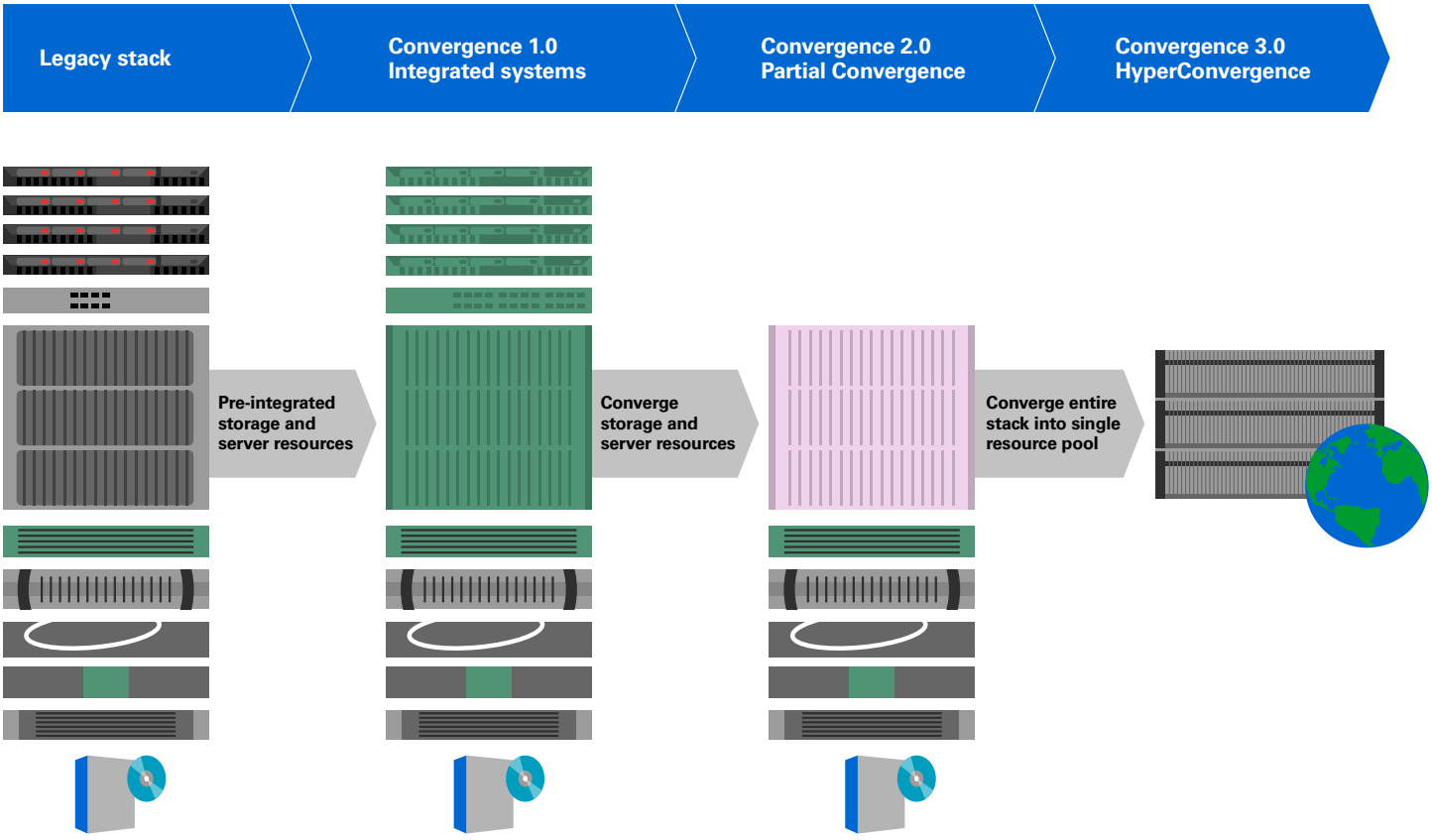
Truly **converged infrastructure (CI)** took this logic a stage further by combining server and storage components into a single appliance, eliminating the need for dedicated storage area network (SAN)-based storage.

The adoption of converged infrastructures was given urgency and momentum because they complement virtualization well, effectively virtualizing the storage layer and allowing it to run in the virtualization platform. CI delivers easier management and advanced automation, rapid app deployment, and organizational agility. It has become a fundamental building block of modern IT— but it does have limitations.

A converged infrastructure is a fixed system, with a defined ratio of resources allocated for compute, storage and networking. This configuration may prove to be a lot less flexible than some organizations require. It may not work with some legacy systems. And once a CI is fully utilized, the customer must buy a whole new unit with all the overheads of time and money this entails.

Perhaps most fundamentally, these systems include just the server and storage resource components which means that, in effect, they simply migrate the storage array onto the virtualization platform rather than fix the underlying data management challenge. That's why the next step forward, hyperconvergence, was to go far beyond this and move towards delivering the full promise of a software defined data centre (SDDC).

Hyperconvergence (HCIS) creates a single infrastructure stack that completely redesigns data architecture to include services such as backup and replication, deduplication, Wide Area Network (WAN) optimization, Solid State Drive (SSD) arrays and cache arrays, and public cloud gateways. Compute, storage, networking, virtualization resources and other technologies are tightly integrated in a single hardware box which means that data management can be radically simplified and costs reduced.



Data center architectures have experienced unprecedented transformation during the last years

Falling apart:
The risks of a Manageability Gap

Despite the sophistication of **CI** and even **HCIS**, there is every likelihood that they will underperform in the absence of one crucial component: a coherent strategy for power management.

It is this phenomenon that can create The Manageability Gap — a big gulf which can very quickly swallow up dangerous amounts of time and money.

The Manageability Gap exists because virtualization has made power management far more complex for data centre professionals.

Virtualization means that every server needs more power. A virtualized machine (VM) will run at 70% to 80% capacity, whereas an unvirtualized machine runs at 10% to 15%. Every enclosure will draw more power too, and data centers will need to have the ability to provide up to 40kW per enclosure. Virtualization allows applications to be moved from one server to another at a moment's notice. This instantly shifts the power demands within existing infrastructures and means that flexibility assumes a new importance†.

Despite this increased importance, people naturally have a tendency to overlook the impacts of the power infrastructure and just assume that power "will always be there".

Often, this assumption is the result of organizational hierarchies in which different teams manage the data center and the facilities side of their business.

Whatever the cause, not factoring in power as part of virtualized environments in general and CI in particular is a big mistake that inevitably creates increased risk:

- Users don't adapt their business continuity policies to best practices
- Costs increase because of over-provisioning of power infrastructure
- Operating conditions are sub-optimal because the right amount of power doesn't go to the right place at the right time
- Data center outages are becoming increasingly costly with a recent report in TechRadar suggesting the true cost of an outage could be $10,000 per minute or more††

Today more than ever, if the power fails, the data center fails. So the conclusion is clear:

Power management must be reckoned as an essential element of converged infrastructure solutions.

†4 Power Challenges Created by Server Virtualization, Matthew Snovner, IT Manager Daily, November 2012

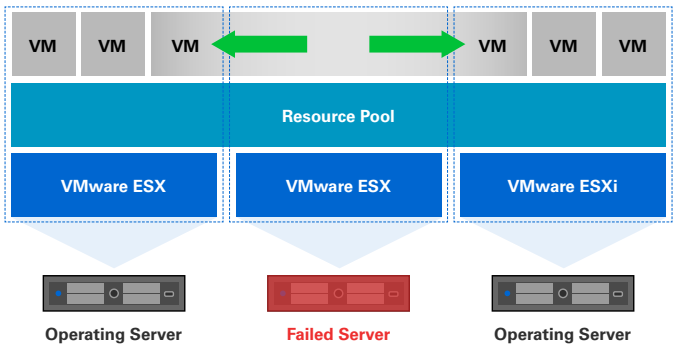
††Techdata

Closing the gap:
The crucial role of intelligent power management

In this changed environment, data centers can no longer afford to examine power distribution solely at a high level. With both virtualization and converged infrastructure, computing capacity is dynamic — workloads, applications and storage are moved around both within and among data centers as business needs dictate. To ensure peak operating efficiency — an absolute necessity given modern business demands — data centers must monitor and manage power distribution at a granular level:

- **IT infrastructure housing** must be secure and reliable, offering easy access to IT equipment.
- **Power protection** should comprise intelligent power distribution solutions and Uninterruptible Power Supply (UPS) backup power sources to avert data loss in the event of extended power outages.
- **Intelligent power distribution** can be enhanced with the use of cables and accessories that deliver outlet and section current information, and thereby improve both management and troubleshooting. Advanced rack Power Distribution Units (PDUs) have the features and reliability today's data centers need to maintain their own operations, but more importantly to support the changing and accelerating demands of the business. Businesses would be wise to develop their power strategy by understanding the current rack environment and workload demands, followed by choosing an optimized rack PDU and then backing up the system with a UPS enabled with virtualized management software. With the addition of power management software, data centers can monitor operations to the outlet level, further optimizing operational efficiency.
- **Environmental monitoring** should remotely measure a range of variables and trigger backup and failover policies to minimize data loss and optimize recovery.
- **Power management functions** should be integrated into virtualization platforms, so that all power devices (UPSs and rack PDUs) in the virtual network can be viewed in the same application, together with network, physical server and storage information. Virtualization-ready power management solutions make it possible to ensure data integrity and improve business continuity by initiation of proper disaster recovery policies on power and environmental events.

A comprehensive and cohesive intelligent power management system such as this effectively closes the Manageability Gap and creates powerful value for the business as a whole.



Sophisticated power management solutions maintain business continuity during power failures by automatically migrating virtual machines to unaffected parts of the network or to an offsite backup facility, colocation data centre or cloud computing infrastructure.

The value of intelligent power management

Improved efficiency of IT infrastructure	Lower costs	Ensure business continuity
Leading power management companies offer pre-engineered power management reference designs certified by converged and hyper-converged infrastructure vendors. These are easy to choose and install, which means there is no need to spend time and money choosing and managing different components.	High-efficiency power devices reduce energy consumption and cost.	Modern power management solutions automate business continuity policies in case of power and environmental events. This extends the uptime of IT applications, ensures data integrity and the continuity of the entire business. These solutions can initiate the following disaster recovery policies: • Shutdown of non-critical equipment to extend run time of critical equipment and applications • Replication of valuable data • Live migration of critical VMs to a backup site or cloud • Graceful shut down of VMs in case of prolonged outage • Sequential start-up of IT equipment once power is restored.
Intelligent power management must deliver the ability to monitor and manage power devices from a virtualization dashboard (a single pane of glass) to save time and increase efficiency.	Pay as you grow capability makes it possible to choose power solutions that meet current needs without creating over-provisioned capacity or hindering easy expansion in the future.	Modern power management solutions are able to expose power and environmental infrastructure state to upper management layers such as cloud management and IT operations management platforms. In doing so, they help ensure business continuity by enabling IT professionals to make informed decisions, to react more quickly and to automate remediation policies.
Modern power management software is easy to install and use: intuitive operation for a fast learning curve.	Intelligent power distribution solutions monitor and manage the power consumption of IT equipment with a very high billing accuracy. This means users can quickly determine exactly where energy is being used, ensuring the identification of rogue hardware consuming more energy than it should. Accurate metering also simplifies load balancing and reveals locations with spare power capacity.	By working with leading power management providers, converged and hyperconverged infrastructure vendors ensure that their power management solutions are fully compatible with converged and hyperconverged solutions for a reliable data center.
	The trend in modern IT systems is to use less cooling, but this often means higher temperatures in the rack enclosure. Modern rack PDUs work at up to 60° C without derating, so they play their part in reducing the cooling costs for data centers.	

The result?

You can be confident of minimizing power disruption impacts — whatever your role in the data center.

If you're a data facility manager, you can look forward to business benefits including improved business continuity, higher efficiency of your IT functions and lower TCOs.

If you're a data facility engineer, you can easily attach power management solutions to your converged or hyperconverged infrastructure using pre-engineered reference designs. In doing so, you can align the management of your power infrastructure with your virtualization platform — enabling you to manage your entire IT application through a single pane of glass. This saves you valuable time, and ensures reliable disaster recovery in the event of power outage.

For more information,
please visit www.eaton.eu/powerquality

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