Intelligent infrastructure for software-defined data centers

Infrastructure with intelligence

Business continuity, lower costs and optimal operational performance

EATON
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Intelligent infrastructure for software-defined data centers

The modern data center challenge

Modern businesses need a better response to ever-changing market dynamics and competitive pressures. Scalable, flexible software-defined IT infrastructures are rising up the agenda in the endeavor to improve business continuity, increase data center agility, resilience and operational efficiency, and deliver more efficient ways of managing assets.

IT managers are looking for new tools that will carry their management capabilities up the technology stack and beyond the data center walls so that they have complete intelligence and control of how the data center is serving the needs of the business.

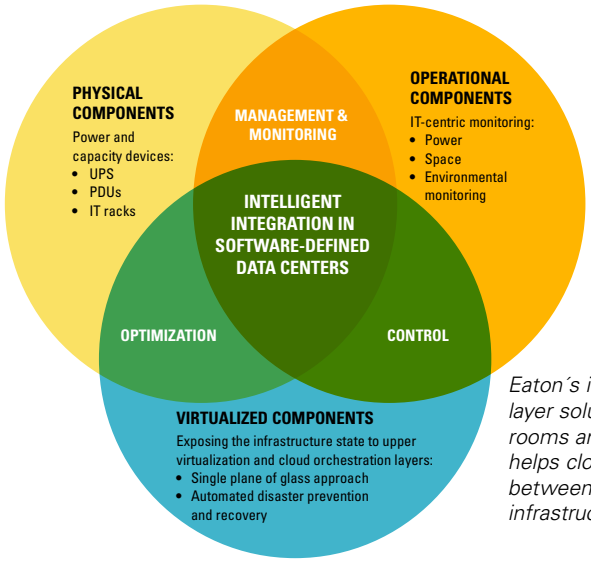
Effective and timely data center monitoring and management has never been a straightforward proposition. Technologies age rapidly, workloads grow exponentially, and the business needs of organizations change unpredictably. Every data center manager knows that the realities of their role demand constant and concentrated thought in order to optimize data center performance and anticipate a constant succession of challenges. Challenges such as a mix of hardware and software from multiple vendors, the frequent lack of co-ordination between Facilities and IT management, and the tendency for data centers to evolve as a collection of siloes. Such challenges and the risks they bring are becoming more pressing in the era of software-defined and cloud-oriented operations. So too are the changes and challenges inherent within data workloads themselves, which require corresponding responses from the physical infrastructure if tasks are to be completed successfully.

Now more than ever, there is an urgent need for a clear, holistic, single view of the whole infrastructure across the operational, physical and virtual/cloud layers of IT applications.

The Intelligent Infrastructure Solution

By bringing together an innovative mix of hardware and software, Eaton offers intelligent integrated solutions helping data center and IT professionals ensure that their data room´s physical infrastructure is reliable, operational performance optimal and continuity of the business is well secured.

Eaton offers you a **3 layer solution architecture** helping close a gap between the physical infrastructure and IT and ensure the integrated approach to the data centre monitoring and management.



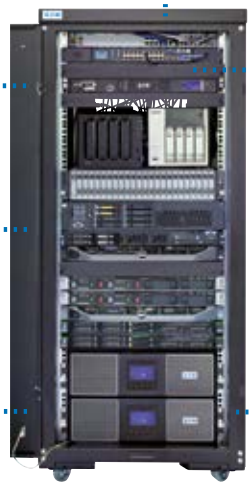
Eaton´s integrated 3 layer solution for IT rooms and data centers helps close the gap between the physical infrastructure and IT.

Eaton´s integrated infrastructure solutions for software-defined data centres

Eaton IT racks: reliable housing of IT equipment and effective airflow management

Eaton ePDUs: intelligent power distribution and monitoring in IT racks

Eaton UPS: reliable power protection of virtual IT environments



Eaton Intelligent Power Manager (IPM) software: management of power devices from a virtualization dashboard and initiation of disaster recovery policies on power and environmental events

Eaton IPM Infrastructure: monitoring of space, environmental metrics and power in IT racks

Eaton sensors and detectors: accurate environmental monitoring

1. Physical components

A physical infrastructure must be robust and reliable enough to ensure high uptime of IT applications and data integrity without compromising efficiency.

Power protection

Each IT appliance requires power. The demand for power in IT applications accelerates following the deployment of modern technologies such as virtual servers and converged and hyperconverged infrastructures. Virtualization's impact on power demand is two-fold. First, every physical server needs more power. Virtualized machines (VMs) run at 70% to 80% capacity, compared to just 10 – 15% for an unvirtualized machine. This significantly increases power density per enclosure. Secondly, virtualization allows applications to move from one server to another at a moment's notice, instantly shifting the power demands within existing infrastructures and highlighting the need for flexibility.

IT teams must allow for the fact that in modern IT environments, demand for computing capacity, and therefore power, is dynamic with workloads, applications and storage moving within and among data centers as business needs dictate. To reach peak operating efficiency while avoiding the risk of power outages, developing a sophisticated power protection strategy and integrating it with the ICT infrastructure is essential.

With these needs in mind, Eaton offers a range of Energy Star qualified high efficiency UPSs which suit different IT applications and installations and are compatible with virtualization environments.

Power distribution

While UPS protects your IT application from power outages, power distribution ensures that the power from the UPS is distributed between the IT appliances you have in your rack. Modern power distribution units can also help optimize IT efficiency, lower costs and improve business continuity. The next generation of Eaton's advanced rack PDUs (ePDU G3) incorporates monitoring and management capabilities. So, in addition to distributing power from the UPS to your IT appliances safely and efficiently, modern distribution units will let you monitor and measure power consumption in an IT rack, remotely shut down power during an outage, and help initiate disaster recovery policies.

IT equipment organization

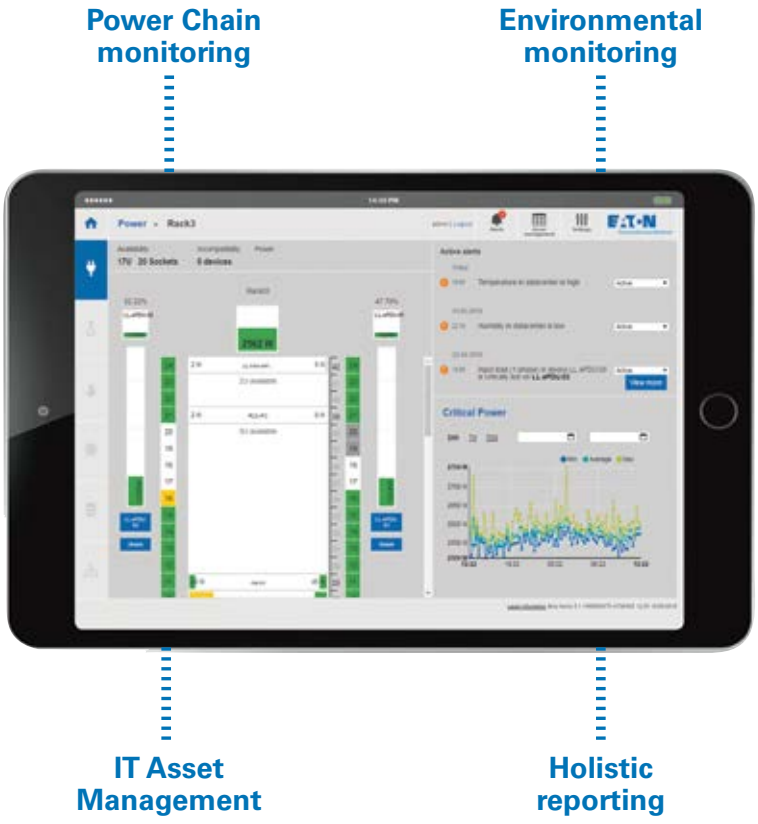
Racks and enclosures are among the first pieces of equipment deployed in a data center or server room and you should make sure you house your IT appliances properly and efficiently. Appropriate cable management and storage accessories are important for keeping racks neat and well organized, and air containment configurations ensure optimized cooling in your data center. Ensure you have the optimal housing solution for your IT appliances with Eaton's comprehensive range of IT racks and airflow containment configurations suitable for different applications to lower costs and improve the safety of your work environment.

2. Operational components

Eaton ePDUs mounted to the back of the rack monitor power usage to +/- 1% accuracy for sub-billing and cost allocation while environmental sensors are attached to the front of each rack to monitor air intake temperature as well as temperature and humidity levels within the site. Paired with Eaton´s Intelligent Power Manager Infrastructure solution consisting of IPM Infrastructure software and Intelligent Power Controller appliance, they revolutionize the overall management of data centers.

The IPM Infrastructure solution can easily integrate into the current data center infrastructure and allows you to understand and monitor power, space and environmental capacity within the context of your IT infrastructure in order to plan change, anticipate challenges, and make intelligent decisions that ensure business continuity and optimize the IT equipment life span. IPM Infrastructure has an intuitive user interface, with drill down navigation capability and capacity management tools making it simple for IT administrators to understand the impacts on and interaction between their power infrastructure and their ICT applications.

The solution builds upon an open source software project called 42ITy (www.42ITy.org). The open innovation process of allowing community members to make use of, and contribute to Eaton work, helps Eaton give you a system that can communicate with equipment from many vendors.



Eaton IPM Infrastructure - main product functionality

3. Virtualization components

Eaton Intelligent Power Manager (IPM) software is a separate software solution that can be deployed alongside IPM Infrastructure, complementing its IT-centric visibility and monitoring capabilities. It enables tight power integration into the leading virtual machine management systems, including VMware® vCenter™, Microsoft SCVMM™, Citrix XenCenter™ and RedHat KVM. This means that status data for all UPS and PDU power devices in the virtual network can be viewed and managed together with network, physical server and storage information – all from a single pane of glass.

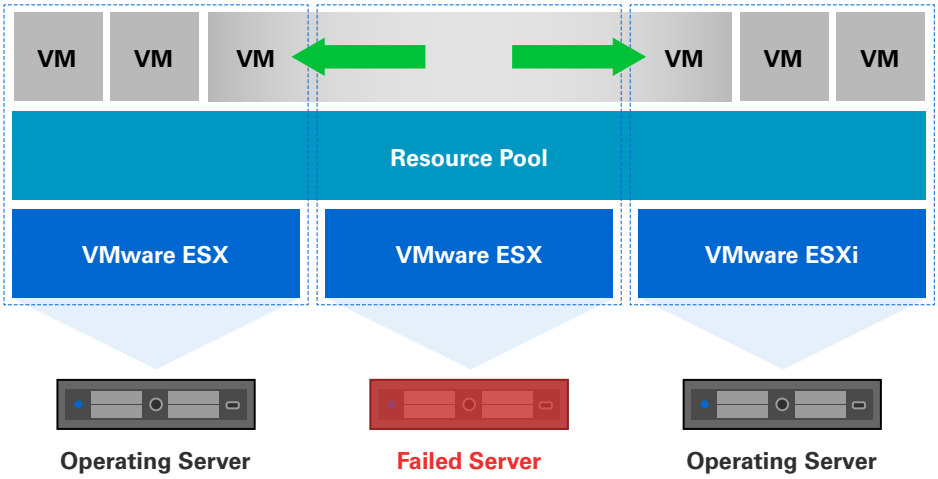
This helps to ensure business continuity as you can make decisions informed by both power and IT equipment status. Reactions can be faster and automated disaster recovery policies become more effective.

During utility failures or environmental events, affected IT devices, both virtual and physical, can be shut down gracefully and automatically, saving work in progress and preserving data integrity. Alternatively, virtual machines can be migrated to other locations or failover sites to keep business moving. The Intelligent Power Manager solution has an intelligent load shedding feature which can suspend non-critical virtual machines, increasing system uptime while extending battery runtime and minimizing the generator load.

IPM's other features include power capping on demand, which helps keep critical workloads running longer during a power outage by limiting the server power consumption. This can yield gains of up to 200 per cent runtime with the same number of UPS battery modules, when paired with policy based load shedding.

In addition, Intelligent Power Manager exposes power chain and environmental health information to cloud orchestrators and management systems such as OpenStack and VMware's vRealize Operations platform. Intelligent Power Manager integrates with OpenStack via a REST API and an OpenStack Nova scheduler filter, enabling OpenStack to ensure power optimized virtual machine (VM placement). Similarly, Intelligent Power Manager provides real-time visibility of power chain and environmental status to vRealize Operations via it's REST API so that power chain and environmental status are factored into overall system health and risk analysis.

This integration between the physical infrastructure and the virtualization layers enables automation of disaster prevention and recovery policies to remove the potential for manual error when your team is acting under the time pressure of a power event.



IPM helps maintain business continuity during power failures by triggering an automatic migration of virtual machines to unaffected parts of the network or to an off-site backup facility, co-location data center or cloud computing infrastructure.

Eaton has the broadest industry alliance partner network in the industry. We work closely with leading IT vendors to pre-validate our solutions and create reference designs that shorten deployment times and reduce uncertainty.

In Summary

Virtualization, cloud computing, and related technology trends mean that now more than ever the data center is a focal point for the effectiveness of organizations across almost every industry sector. Increasingly, if the data center fails, the business fails.

Eaton's intelligent infrastructure solutions are built for this world, transforming the physical data center infrastructure from a siloed black box into a dynamic source of intelligence so that IT and data center managers can see their data center within the context of the organization it serves and perform their role more effectively.

For more information, please visit
www.eaton.eu/data-centre-management

Eaton
EMEA Headquarters
Route de la Longeraie 7
1110 Morges, Switzerland
Eaton.eu

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