

Data Centre Power, Cooling and Security: A Look Ahead



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Computing at the edge is blurring the boundaries of the traditional data centre. The growth of the Internet of Things (IoT) means more data processing is being done on an ever-increasing range of smart devices in non-traditional locations such as manufacturing floors, warehouses and outdoors. As the network spreads, such critical factors as power management, cooling and physical security are taking on expanded roles – and even greater importance – in network operations. As we look to 2019 and beyond, we forecast a more holistic approach to data centre operations, in which infrastructure, hardware and software are addressed as a unified system.

In Europe, we are seeing fast adoption and rapid growth of IoT across markets. Keeping pace with the increasing demands of edge and digital building initiatives next year will require support and protection of critical equipment, regardless of where it is located. Like the proverbial chain that is only as strong as its weakest link, any limitations in network design or performance will result in unacceptable quality of service. Playing a key role in maintaining network operations will be advanced rack and cable management solutions that can sustain the rigors of today's technology demands.

Intelligent Power May Get More Traction

While rack densities continue to rise in Europe, they are still low compared with some other markets. An average data centre deploys 2-4 kilowatts (kW) per rack (in some isolated cases we see that being pushed to 10-15 kW). For that reason, a large portion of power deployments are conditioned by basic metered power distribution units (PDU). There has been a slow adoption of the new generation of intelligent PDU (monitored/switched), with price being the main stumbling block to greater market entry.

This situation should continue to evolve in 2019, because higher-density computing will require ever-more complex power distribution, monitoring and reporting. And even if rack densities do not increase significantly, compute power is increasing. As chip manufacturers add cores to processors (CPUs), Moore's law will drive continued increases in computing per watt. Further, the size of the CPU package continues to increase, so the heat flux due to the CPU is decreasing. Basically, servers are more power efficient and support higher utilisation.

So rack densities will probably not climb significantly, but the amount of compute power (utilisation) per rack will. Further into the future, we will have to keep an eye on developments in artificial intelligence (AI). Typically, the PCI cards required to drive AI run at 100-percent power when models are being trained. When AI takes off, we expect extremely large and sustained loads on the data centre that will increase the average workload.

The latest examples of products that can help reduce the complexity of delivering power to equipment includes three-phase PDUs equipped with power monitoring that stretches across the enterprise. Also accessible through an IP connection, they enable an IT team to monitor anything from anywhere—all the way down to the device level. For all these reasons, we expect to see a growing interest in intelligent PDUs in 2019 as customers prepare for the next technology upgrades.

Growing Focus on Airflow Management

As equipment densities continue to increase, airflow management will become an even more vital practice for optimising energy efficiency and maintaining enterprise uptime. Partial containment is still widely deployed, but methods exist to maximise thermal efficiencies (free cooling) by following best thermal management practices. Within the rack, for example, good airflow management requires the use of snap-in filler panels to block open rack-mount spaces as well as air dams to block airflow around the sides and top of equipment. Additionally, passive cooling solutions and vertical exhaust ducts (chimney) help isolate hot exhaust air from cooled air, reducing cooling demands at rack and room levels. With the added benefit of lower energy costs for the end user, we can expect to see greater deployment of this approach to providing equipment cooling performance throughout the data centre.

For this to happen, solution vendors need to provide more education to users on thermal management practices in 2019. The No. 1 thermal management question that vendors hear is “Can I manage higher density without added cooling capacity?” This indicates that many do not yet grasp the benefits of passive cooling in reducing energy consumption and lowering construction and operational costs. There is a common perception that, for high-density environments, it is safer to deploy active cooling devices such as in-row cooling. The majority of data centres continue to oversupply cold air in order to overcome inefficiencies.

We know that customers would like to support higher rack densities within acceptable operational temperatures. At these higher rack densities, however, adding more air conditioning to the room isn't an effective option. Solutions like Passive Cooling® from Chatsworth Products provide ideal airflow to cool each rack even if the room design limits the amount of airflow volume. They meet the needs of these applications within the architectural limitations of the facility, completely segregating hot and cold air, and can be applied at the cabinet or aisle level, providing increased equipment cooling performance in all elements of the data centre mechanical plant.

Protecting Data and Privacy is a Growing Concern

Finally, security will remain a major area of focus in 2019, as data breaches have become a growing concern among data centre managers, CIOs and end users. The main concern appears to be linked to security from a physical and cyber standpoint. We see a considerable number of enquiries related to electronic access control with two layers of authentication (mostly biometric) and monitoring devices to better control and manage all the devices deployed in the data centre.

In terms of market growth in 2019, we anticipate some positive movement in a number of areas, including cloud applications, colocation, enterprise data centres, and more development at the edge of the network. Cloud and colocation data centres should see the fastest growth and expansion, as large corporate users seek ways to reduce costs related to their IT network deployments and management.