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CREATING A CIRCULAR ECONOMY IN THE DATA CENTRE SECTOR

Rack your brains

HOW THE RIGHT CABINET ECOSYSTEM IS CRITICAL TO IT STABILITY

Thinking outside of the box

Sam Rodriguez of Chatsworth Products (CPI) looks at how the right cabinet ecosystem is critical to IT stability and sustainability

It's ironic the degree to which the present and future of our ongoing digital transformation is reliant on the once humble equipment rack. But without an efficient, adaptable, workhorse cabinet system the performance, scalability and longevity of IT systems both large and small can be compromised.

MEETING THE NEED

While the selection criteria of containment systems vary, based on business requirements and architectural limitations, there are some common considerations that go into the design and implementation of cabinet infrastructure for increasingly complex IT systems. These fundamentals – such as white space size, cable management, power distribution and cooling – are as important as measures for safeguarding sensitive equipment and data.

In standing-up or updating your server room/data centre, the elements of faster deployment, technological adaptability and unfettered expandability are foundational to your success. So let's start there.

SYSTEM TO ECOSYSTEM

The need – and expectation – for business relevant information to be available instantly and without interruption is a 24/7 responsibility for those tasked with delivering that information. This is why the cabinet infrastructure underlying that implied promise is so critical.

A holistic system combines rugged, adaptable cabinetry ideally built to support an 1,814kg dynamic load and 2,268kg static load, cable routing, power management, environmental monitoring, access control, effective cooling and a data centre infrastructure management (DCIM) solution overseeing that entire ecosystem. Add to the mix high density computing, edge computing, the internet of things and environmental sustainability, and it's easy to see how quickly complexity – and the costs associated with it – can escalate.

All these demands may seem a lot to ask of the humble cabinet but when they're combined into one system working in harmony that's when cabinet components become a cabinet ecosystem. And that's the bare minimum you need to deliver on an always on commitment – now and in the future.

COOL RUNNING

With every successive generation of processors, data centre power and cooling requirements increase. It's not unusual for facility operators to be tasked with powering and cooling high density racks of 50kW or higher – and that trend is not abating.

The heat generated in these high density environments is beyond the capacity of air cooling. Liquid cooling, by comparison, is designed to mitigate such temperatures and can facilitate:

- Server densification for more processing power in the same footprint, while reducing the space needed for air cooling systems.
- Direct on chip cooling, enabling central processing units (CPUs) to run continuously at 95 per cent utilisation.
- Up to 20 per cent reduction in server power draw, plus rack and server hotspot elimination.

From a thermodynamic perspective, liquid can disperse about 3,500 times more heat than air and liquid cooling requires up to 80 per cent less energy than air cooling. This efficiency has immediate downstream benefits, not least of which are reducing costs, decreasing the need for other cooling systems and increasing the density of server racks – adding processing capability within an existing footprint.

BIGGER PICTURE

A robust, future proof cabinet ecosystem can seamlessly incorporate direct to chip cooling, providing uniform temperature management for the chips producing the most heat. In this set-up, liquid cooled heat exchangers are mounted directly to chips, allowing for lower component temperatures, while increasing the performance of the chips. This enables more precise cooling of specific components, reducing the need for excessive cooling across the entire cabinet.

Additionally, liquid cooling reduces the

‘For companies that view environmental sustainability as an important business issue, the right cabinet ecosystem can be a cornerstone in promoting and improving eco-friendly practices.’

need for air cooling fans to run at high settings, resulting in quieter operation. These systems are also scalable, help decrease downtime and contribute to extending equipment life by reducing thermal stress. Collectively, these benefits help free-up funds for other priorities.

STEP FORWARD

As the world moves toward a future of interconnected technology, the right cabinet ecosystem is a proactive step toward future proofing IT systems. The performance, scalability and longevity of those systems, regardless of size, rely heavily on a robust and resilient infrastructure. Sustainable IT is a short phrase for a broad topic. It describes an earth focused approach to the design, use and disposal of IT hardware, software applications and related business processes.

This is particularly persuasive at a time when climate change seems to accelerate faster than our ability to keep up. Various estimates find that digital pollution contributes 2.5 per cent to 3.5 per cent to overall global CO2 emissions. Concurrently, the energy required to power servers and related IT technology is increasing by nine per cent per year.

For companies that view environmental sustainability as an important business issue, the right cabinet ecosystem can be a cornerstone in promoting and improving eco-friendly practices. The capacity to host energy efficient, high density servers, power supplies and cooling systems can significantly reduce energy consumption and associated carbon emissions. Furthermore, incorporating intelligent monitoring to track power usage, temperature and overall system health in real time optimises energy use, and enables proactive maintenance. Collectively, these tools provide invaluable insights into the performance of the cabinet ecosystem, empowering operators to make data driven decisions that enhance efficiency and sustainability.

CIRCLE LINE

Our legacy global economic model has been characterised as ‘take, make and throw away’ – a path that has contributed to our current environmental predicament. By way of contrast, a circular economy model begins by doing away with practices and policies that harm human health and natural systems.

In the context of IT, this includes the massive resources required to power a sprawling infrastructure, the related production of greenhouse gases, mining of materials used in IT hardware and irresponsible management of devices. Lengthening the lifecycle of IT equipment is an essential function of a cabinet ecosystem. It implicates the environmental impacts of manufacturing, transport, usage and end of life disposal.

For an organisation looking to reduce the environmental impact of its IT domain, a circular and sustainable model encourages adoption of innovative products designed for long life at peak performance, keeping materials circulating for as long as possible. The right cabinet ecosystem is an essential part of that model, optimising server usage, extending the use of existing assets and informing the transition to more efficient computing. This, in turn, promotes the reuse or recycling of valuable resources and helps minimise the environmental impact of hazardous materials.

WASTE NOT WANT NOT

Up to 40 per cent of data centre electricity is used to remove unwanted heat from IT equipment. One way to repurpose that energy and reduce related expenditure is to recycle the heat for other uses. Liquid cooling combined with heat exchangers captures heat that would otherwise be wasted. One of the most common uses for this energy is warming the air and water in the facility it comes from. The ability to redirect controllable waste heat at higher temperatures also creates an array of possible applications for industry and agriculture including water desalinisation, greenhouses and manufacture of wood pellets for stoves. By embracing sustainable practices such as these, businesses can not only achieve operational cost savings but also contribute to a greener future. ■

SAM RODRIGUEZ

Sam Rodriguez is senior product manager for cabinets, containment and industrial solutions at CPI. He has over 26 years of experience in the communications market and has been an employee owner at CPI for 21 years. Rodriguez has been an active BICSI member for 14 years and received his RCDD credential in 2005. He is a leader of CPI’s product development organisation and contributes to designing and developing new innovative product solutions.