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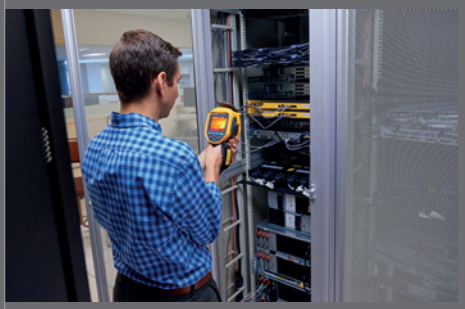

Transport for London

High availability guaranteed – with double-security switching technology from Socomec

The resilience of critical installations - the ability to remain operational even when there has been a power outage, hardware failure or other unforeseen disruption – is high on the agenda of every Facilities Manager. With a spotlight on the direct costs and consequential losses associated with downtime, today's electrical infrastructures require a robust continuity strategy.

The demands placed on today's hard-working electrical infrastructures are unprecedented – and in critical applications, interruptions to the provision of facilities can be catastrophic.

Availability – designed-in

It is now possible to design-in availability, in part as a result of developments in switching technology that now deliver solutions geared specifically for the unique demands of high availability architectures – providing a double-security assurance of performance.

Static Transfer Systems (STS) are intelligent units that transfer the load to an alternative source when the primary source is out of tolerance, guaranteeing the redundancy of the power supply to critical installations by means of two independent sources.

DOUBLE SECURITY

Ensuring high availability of the power supply for sensitive or critical installations, these switching solutions facilitate the design and expansion of installations that themselves guarantee high availability power supplies – whilst increasing overall site flexibility, and enabling simple and safe maintenance of source replacement.

The latest switching technology increases overall availability of the system during abnormal events and programmed maintenance.

Furthermore, the latest solutions can improve system efficiency whilst minimising design budgets – making the most of limited space available whilst optimising performance, introducing flexibility and maintaining business continuity.

One such system, Socomec's STATYS technology, allows for plant segmentation and smart fault maintenance, therefore increasing the global uptime of the supplied system. Compact in design, the system also saves up to 40% of valuable space.

Socomec's Static Transfer Switches (STATYS) enhance power availability whilst simplifying the electrical architecture. Supplied by two independent sources, STATYS provides redundant power to mission and safety critical loads, increasing the power supply availability by selecting the best quality power supply and preventing fault propagation.

Colin Dean, Managing Director, Socomec, explains; "The provision of reliable, cost-effective power , which can be scaled to meet rapidly changing capacity demands, is the foundation upon which our clients' businesses are built. Our fourth generation STATYS technology ensures the high availability of a power supply to critical loads, is simple to design-in to an electrical infrastructure and makes extensions to facilities easy.

PROTECTION AGAINST DOWNSTREAM DISTURBANCE

"The STS operating principles avoid fault propagation to healthy loads, as they provide unparalleled protection against downstream disturbance and distribution faults. Other loads remain undisturbed by the fault, as the STS in question locks the transfer and stays on the conducting source, providing a clean transfer for the second STS. The STS continues conducting in order to clear the fault – but can be programmed to stop after 200ms if the short is present, for maximum safety."

Operationally secure, and easy to use, remote data can be accessed in real time and from any location. With mean-time between failure at more than 6,000,000 hours, Socomec is widely established as the STS specialist, with over 30 years of experience in the field.

The STATYS single and three-phase systems have been engineered for the most demanding applications and critical power loads, including dual or single cord servers, linear or non-linear loads, IT or electromechanics.

For new or existing installations, STATYS is available in three formats: 2 wires and 2 poles switching to be connected between phase/neutral or phase/phase; a 3 wire arrangement without neutral with the benefit of reduced cable costs and ideal for local zoning using insulating transformers and; a 4 wire three-phase arrangement with neutral, with or without neutral pole switching.

PROTECTION - GUARANTEED

Providing protection against main power source outages and failures in the upstream power distribution system, Socomec's static transfer switches also protect against failures caused by faulty equipment supplied by the same source as well as against operator error.

Each STS is rated according to the load it protects, and a preferred source can be set on each unit. The STS detects any power quality disturbance, and manages source failure by providing a clean transfer for the critical load without disrupting supply to the load.

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- **Prevents fault propagation.**
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- **Plant segmentation.**
- **System flexibility**

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Polish Aruba Cloud Data Centre, a step further in the global strategy of Aruba Group

Aruba Cloud, a European cloud provider, is expanding its business in Poland. The company has opened a data centre in Warsaw which will not only meet the needs of the local customers, but will also become a foothold for expansion into other markets in Central and Eastern Europe.

Warsaw, Poland, October 25, 2017 – Aruba S.p.A. (www.aruba.it), the market leader for web hosting, email, certified email PEC and domain registration, and one of the top companies in the world in terms of data centre and cloud services, has officially opened its data centre in Poland DC- PL1 (www.arubacloud.com). The data centre, located in Warsaw, at the highly – reliable Tier III+ Polish data centre market leader. It is the eighth Aruba Group data centre in Europe meeting the needs of the local customers, and becomes a foothold for further expansion into other markets in Central and Eastern Europe.

The opening of the new data centre is a logical step in the development of the company, which has been building its position in its home market for more than two years. Since entering the Polish market, Aruba Cloud has won nearly 15,000 customers. The new Polish data centre will allow local customers to store data exclusively in their local market. It is also an element of Aruba Cloud's strategy to extend its services to the East, especially to Ukraine, where the company sees great interest in the cloud model.

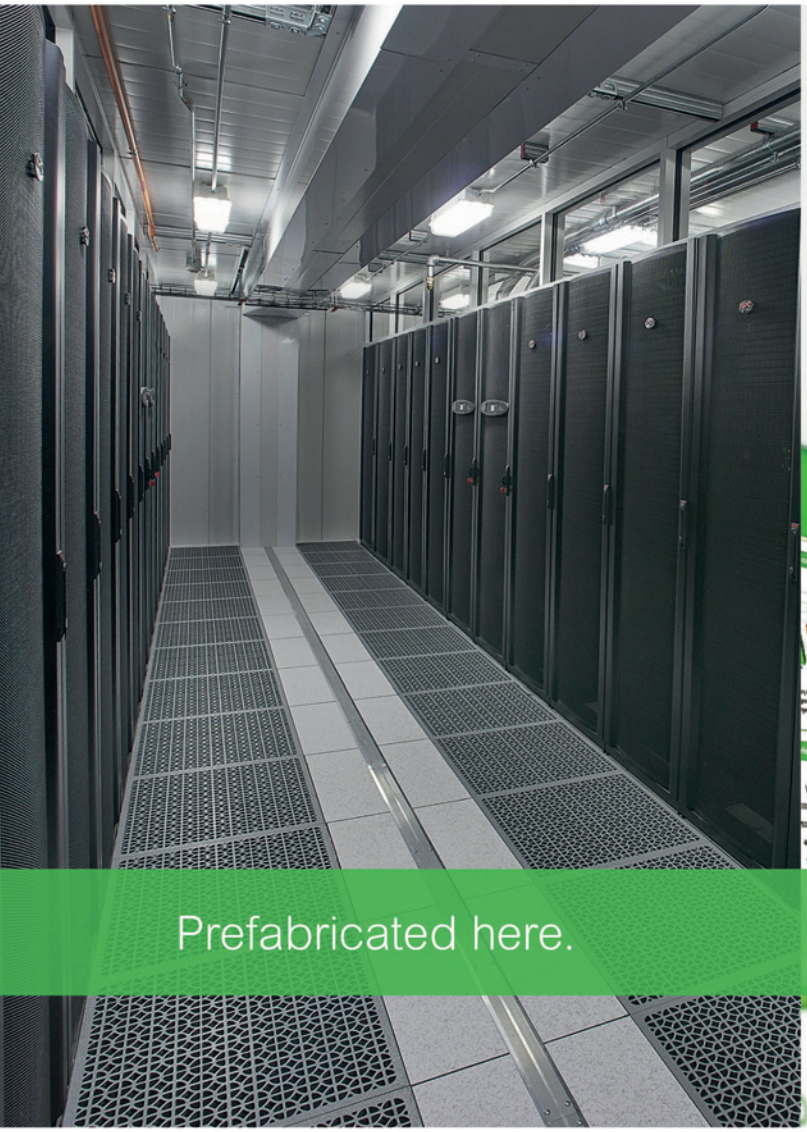
The Aruba Cloud DC – PL1 is renowned for the use of high-end equipment. In line with Aruba's global strategy, the Polish data centre is equipped with high-quality infrastructure provided by well-known manufacturers with whom Aruba has been working with across Europe for years. The hardware includes the latest Dell servers, Intel processors (Xeon® E5) and SSDs. The emphasis on the data centre's highest quality is evident in the fact that Aruba Cloud – unlike many competitors – does not run more than two virtual hosts on a single processor. This translates into higher performance and stability of the Cloud Pro service, the standard applied to all Aruba data centres.

In the new data centre, domestic Aruba Cloud customers will be able to use all types of IaaS (Infrastructure as a Service) provided by Aruba for Western European markets. These include three types of cloud services: virtual cloud servers (VPS SSD), public (Cloud Pro) and private cloud, as well as a host of other tools, including a cloud backup solution. All services are offered at promotional rates for customers who are using selected packages.

In addition to the highly technical strengths of the cloud-based Aruba Cloud infrastructure, data security and compliance with the new regulations are extremely important. All cloud services provided by Aruba Cloud are in line with the provisions of the CISPE Code of Conduct for Data Protection. Importantly, the CISPE code has preceded the introduction of the General Data Protection Regulation (GDPR) and it is compliant with the requirements of the new EU regulation, coming into force in 2018. Aruba Cloud's solution users are assured that Aruba does not process their personal data, for its own benefit or for the resale to third parties, such as for the mining of personal data, profiling of data subjects, marketing or similar actions. This is just one of the many restrictions that Aruba follows as a member of CISPE.

"Just a few weeks after the big opening of the Global Cloud Data Centre, we're proudly announcing another strategic step for our pan-European expansion of our data centres. The new data centre in Poland, Warsaw, is in fact another benchmark for the central and eastern European markets, an area that is proving more and more aware of the IT industry, in particular of Cloud services. The Polish data centre is the eighth data centre of Aruba Group, whose company vision is aimed at a new economy that looks towards Europe, considering this new focal point of continental IT." said Stefano Cecconi, CEO of Aruba S.p.A..

"Opening a data centre in Poland is a very significant event for us. So far, local Aruba Cloud customers have been using services provided by international data centres, not that this has prevented us gaining nearly 15 thousand users. In a very competitive market, where strong national brands operate alongside global giants, we are very pleased with this result. The Polish market is very important to Aruba Group, because of both its growing strength of the Polish economy as well as its strategic locations for possible further expansion into the neighbouring markets – explained Marcin Zmaczyński, Country Manager CEE, Aruba Cloud. – The opening of the centre in Warsaw, the business capital of the CEE region, gives us the opportunity to reach more customers in Poland and expand to the East. Especially to the Ukrainian market, where companies are keen to move their IT to the cloud. While our growth in the region is fueled by the popularity of VPS, we see the potential to offer public and private cloud to large organisations in the coming years. As the new data centre in Poland will attract new customers, we're also planning to expand our local sales and technical support team to support our customers" – added Zmaczyński.



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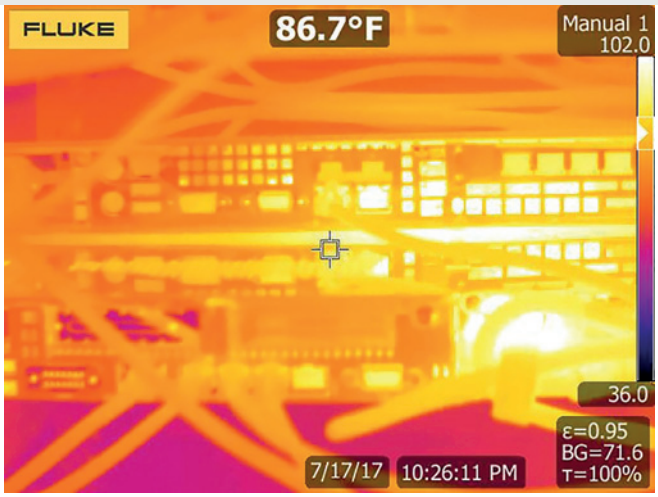
A market in need of measurement

The international law firm depicted in this story owns no data centres, despite the large amount of data it stores and retrieves. Like many other high-tech companies, it rents space for its servers in data centres owned by others. "The sites we use are just hosts," says the law firm's data centre support analyst. "The racks we have there are ours, but we rent the environment, power and bandwidth." Paul Gay explains



Each of the firm's offices has one or two racks of servers in a local data centre to service that site's needs. In addition, the company has a centralised U.S. server location, a secondary centre for backup and redundancy, and plans for new locations overseas.

FLUKE INSTRUMENTS USED

At present, the analyst uses two Fluke instruments to monitor the firm's data centres and the status of its servers in those centres:

The Fluke 975 AirMeter can record ten fundamental parameters associated with indoor air quality. Of special importance to data centres are air temperature, relative humidity and airflow (air velocity). Since servers generate considerable heat, they must be cooled to manufacturer-specified temperatures and subjected to no more than 45% to 50% relative humidity.

The Fluke Ti400 Thermal Imager makes two-dimensional representations of the surface temperatures of objects in an infrared image. The support analyst uses the Ti400 to monitor data centres for general cooling efficiency and to inspect the law firm's servers in those centres. Software that comes with the imager allows him to change key parameters, optimise images, and extract maximum details from collected data.

PROBLEMS AND SOLUTIONS

As the law firm seeks to expand its data handling capabilities, the biggest problem the support analyst faces is that data centres lack the required power and cooling capabilities to support new technologies.

"We want to take advantage of the latest blade servers, but it's difficult to find data centres that can support them," he says. "Blade servers are much more efficient (than traditional servers). ▶

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We can pack six or seven virtual servers onto a single blade. An enclosure or rack holds eight blades, but each full enclosure requires a lot of power. Many data centres simply can't supply that power. They want us to use an older technology so they can support our needs."

Blade servers also produce considerable heat and require more cooling than many centres can supply. In such cases, the analyst uses the Fluke Ti400 and Fluke 975 to: (1) map cooling patterns in data centres;
(2) find faulty cooling arrangements; and (3) determine when cooling, air flow and air temperatures are inadequate to guard against breaches of server warranties.

Mapping cooling patterns allows company personnel to see the overall effects of cooling within a data centre. This may seem like a duplication of effort, since data centres themselves monitor the environmentals—power, air, humidity, cooling, etc. However, "our primary use for these tools is to check what we are told by the data centres," the analyst says. "Then, if necessary, we can suggest corrective measures to keep our servers functioning efficiently."

The support analyst cites the local data centre as an example: "The way the room is set up right now greatly restricts the air flow going to some of the devices positioned across the room from the air-conditioning unit. Using the Ti400, we were able to take temperature readings of surfaces in each area of the room. Then, using those readings, we were able to plot out where the cool air travels. We found that while one area of the room is cold, as we worked our way around the room, areas were gradually warmer and warmer."

He says that the Fluke 975 AirMeter used in conjunction with the Ti400 allowed for a more in-depth analysis of the local data centre: "Temperature and humidity readings indicated that the hot air that should be exhausted from the room is actually being dumped back into the room in an endless cycle. The air-conditioner cools itself down and shuts off. But the circulation fans keep working. They actually kick the hot air back into the room. Overall, it's a very poorly-designed room. We're looking to the data centre to restructure the cooling system."

Finding faulty cooling arrangements for the law firm's servers is another of the analyst's uses for the Ti400. "Because of the cooling requirements for blade servers, we have been using the Ti400 to monitor the temperatures of the air flowing into the fronts and out the backs of our blade racks," he says.

A common problem experienced by their blade servers is hot air entering the front of the blades. Only cooling air should be entering the rack fronts. Two situations that lead to this problem are (1) missing blanks on empty rack slots, and (2) server aisles set up with servers arranged front to back. The first situation usually occurs because a user of the data centre does not need all eight slots in a rack, or because the data centre lacks the capability to provide power to a full rack. In either case, there are empty slots. Blanking panels should cover those unused slots so that they are not open to the environment.

The analyst says that he has documented instances of missing blanking panels at the firm's secondary centre. "There were empty spaces on the top four slots," he says. "Nobody could believe it, but hot air from the backs of the servers was circulating over the tops of the racks and coming right back in the front. That greatly increased the temperature of the blades and decreased their efficiency. We needed to fill the tops of those racks with blanking plates."

The best strategy for a data centre – especially a data centre with blade servers – is to install servers back-to-back in rows facing the fronts of servers in adjacent rows. This creates alternating hot and cold aisles.

"A lot of data centres are set up with one row of servers after another – back to front, back to front, back to front," he says disapprovingly. "The hot air from one row of servers blows onto the fronts of the next row, and that's continued throughout the centre. In Europe, we are looking for a centre with alternating hot and cold aisles."

Safeguarding server warranties is the analyst's principal impetus for monitoring the law firm's servers. "Our blade manufacturer has a recommended maximum temperature that servers can reach. If a server gets above that threshold, it is no longer covered under our warranties and contracts. That would be a huge problem for us."

Because of these warranty considerations, company personnel need to verify what data centre owners tell them about the cooling in their facilities. And while the blades themselves have internal monitors that track their temperatures, the analyst needs to know how effectively the cooling supplied by the data centre is doing the job. He uses the Ti400 to collect thermal images of the fronts of the blades to determine the temperature of the air flowing in. Then, he compares this temperature to the temperature of the air coming out the back of the rack. Finally, he compares these temperatures to the blade manufacturer's recommended temperature threshold for the servers.

"If necessary," he says, "we can go back to a data centre's owners and say, 'This is the airflow that you are telling us we're getting, and this is what we see. You're not meeting our requirements. We need you to upgrade your systems to make sure you meet our specifications.'"

ADDITIONAL CAPABILITIES WITH THE FLUKE 975

The Fluke 975 AirMeter allows the analyst to precisely measure air temperatures and convert the air-meter data into reports for superiors or data centre operators. Using the Ti400 Thermal Imager and the 975 AirMeter together "provides results from different angles," he says. "If we use the imager to reveal the surface temperatures, then we can use the airflow meter to register the actual temperature of the air going into racks."

The 975 AirMeter also measures relative humidity (RH) and airflow. Excessive humidity in a data centre can lead to condensation on equipment and places an undue load on the air-conditioning system. RH readings played a significant role in uncovering difficulties at the local data centre. Regarding airflow, "In our primary and secondary data centres, the air comes in through the floors," he says. "We can use the airflow sensor on the 975 to make sure that airflow is at the rate required by our servers." ▶

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CREATING TRACKING DATABASES

The analyst's job includes creating and maintaining tracking databases. To do this, he periodically uses the Ti400 to make images at specific points in the primary and secondary data centres. He then logs the data into the database for review as necessary. "We can graph the data for each location and see if the temperature is rising, falling or staying the same over time," he explains.

Equipment frequently moves within data centres, as clients expand their server capacity or stop using the centre altogether. If the law firm brings a new piece of equipment into a data centre or reacts to a temperature problem by moving an existing server, the tracking database allows them to assess how the change affected ambient temperatures.

From such findings, the support analyst, in cooperation with data centre personnel, can determine when the centre needs more cooling or when equipment is packed in too densely. In general, the database lets the law firm and data centre personnel pinpoint areas where the air is more or less cool or where there is more or less airflow. The analyst speculates that as he becomes more familiar with the 975 AirMeter and its data logging capabilities, it will play a greater role in his tracking databases.

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STEGO launches DC Line for applications with DC power supply

Our world is getting more and more digital. Complex process and control technology is increasingly gaining entry to electronic applications in the course of industry 4.0. This also involves the use of thermal management components, which are operated with DC voltage. STEGO with its many years of competence in DC products is aware of these needs and now focuses on this trend. DC Line items for cooling and lighting applications mark the starting point.

AC or DC? This is the initial question for the electrical design of control cabinets. The decision for AC or DC voltage to supply an application is fundamental and influences the entire circuit layout as well as the component selection. DC supply, that is, the transformation of AC voltage in DC voltage before entering the enclosure for the supply of the internal components, is becoming increasingly prevalent in the course of industry 4.0 and more complex process and control technology. The electronics protectors from STEGO know these needs and have many years of experience with DC products in the segments of heating, regulating, cooling and lighting. Integrating our products into the DC Line takes this development into account. The enclosure light LED 025 Ecoline with operating voltages from DC 24 - 48 V (min. DC 20 V, max. DC 60 V) and the Filter Fan Plus FPI/FPO 018 with DC 24 V and DC 48 V mark the start in the STEGO DC Line.

The LED 025 Ecoline lights in their DC variants score with high fail-safety as well as long service life (60,000 h). Glare-free brightness with daylight color temperature (6,000 - 7,000 K, 400 Lm at 120 ° beam angle) lead to true-color illumination with low power consumption (5 W). Mounting the compact LED lamp is easy with a choice between screw, clip or magnetic fixing. Optional connection for an external switch integrated on/off switch or integrated motion detector round off the features.

As DC variants the Filter Fans Plus FPI/FPO 018 also prove their innovative advantages. Available in three standard sizes (92x92, 124x124 and 176x176 mm), the Filter Fan Plus is mounted easily and tool-free by means of its patented ratchet mount mechanism. The outstanding air flow performance by comparison to the fan diameters is due to the innovative air-flap outlet technology, which ventilates the air more unobstructed than in conventional systems from the enclosure. With low power consumption of 2.7 W to 12 W the Filter Fan Plus impressively confirms the efficiency of the DC approach.

The innovative and high-quality thermal management solutions from STEGO are committed to the principles of "STEGO Engineering". With the introduction of the DC Line STEGO proves to be a reliable and application-oriented partner for OEM manufacturers and integrators in the field of electrical engineering.

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Free cooling? Harnessing the power of nature to ensure an optimum IT energy balance

Clive Partridge Rittal's Product Manager for IT infrastructure

Optimising costs in data centres is a significant challenge. Energy usage is a case in point, particularly in terms of what's required to cool the servers. While cooling equipment has become ever-more efficient, there are other alternatives; natural sources of cooling can also be considered, including cold water and cool ambient air.

First, I should perhaps qualify that free cooling in the climate control technology context does not mean a system that is completely free of charge (nice thought though!). Instead, it involves reducing the use of compressor-based refrigerating machines as far as possible – ideally to a point where energy is only required for fans and any pumps which are needed for the cold water.

The efficiency of the system therefore depends largely on the relevant climatic conditions on site. A data centre in Northern Scandinavia will operate much more cheaply than one in southern Europe.

HOW DOES FREE COOLING WORK?

Free cooling uses convection to remove heat from the medium to be cooled (usually a water-glycol mixture) via the ambient air. The free cooler is installed outdoors and might contain a lamellar heat exchanger - or something comparable - through which the warmed water-glycol flows to remove the heat. The larger the contact surface of the lamellae, the more efficient the system.

Air flow can be increased using additional fans, thus boosting the cooling output while expending minimal energy consumption for cooling. But the inlet temperature this achieves will only be just above that of the ambient air. Climate control technicians use around +3°C as a guideline figure for design purposes.

DIRECT FREE COOLING – ADVANTAGES AND DISADVANTAGES

In free cooling, a distinction is made between direct and indirect methods.

Direct free cooling uses the cooling medium as directly as possible to remove the heat generated by the data centre. For example, large data centre operators with uniform environments use the outside air - they literally blow outside air directly into the data centre. A good example is the Yahoo self-cooling data centre in New York State, near the border with Canada. The buildings were erected at right angles to the prevailing wind direction and fitted with a roof extension running the entire length, similar to a cockscomb – hence its nickname, the "henhouse". Cold air flows into the building via slats in the side walls, while the warm air is dissipated via the roof. Ideally, the only additional energy this solution requires is using fans to help with moving the air.

As easy as this sounds in principle, there are disadvantages. The intake air needs to be purified using filter units. It is also necessary to mitigate for weather-related temperature fluctuations. For example, a mixer can feed warm waste air from the data centre outside, if the outside temperatures are too low. Conversely, if the outside temperature is too high, a refrigeration compressor must be used. A further challenge is the humidity, which changes due to factors such as rain. Air that is too moist or dry can have a negative impact on the service life of IT components. Finally, the ducts which draw in the fresh air are usually very large, so there has to be further built-in protection against rodents and insects.

ADIABATIC COOLING – WATCH OUT FOR GERMS

Adiabatic cooling is a complementary technology which improves the efficiency of direct free cooling.

Before intake air reaches the heat exchanger, water is sprayed into it. The water droplets evaporate immediately and this transition from liquid to gaseous state results in the water extracting heat from the surrounding air. This makes it possible to lower a cooling system's inlet temperature.

But using water droplets brings with it a risk of bacterial infection, notably legionella. This necessitates regular cleaning, a high water flow and shielding from sunlight. Overall, adiabatic cooling systems offer great potential for energy optimisation but need precise planning and expert oversight.

Users of large amounts of water need to keep an eye on how much they are consuming. The Green Grid has defined the Water Usage Effectiveness (WUE) metric for data centres. This metric determines the annual water consumption in relation to the energy consumption of the active IT components. The unit of WUE is litres per kilowatt hour (l/kWh). This can be used in tandem with other consumption values to optimise IT running costs.

INDIRECT FREE COOLING – CLEAN SOLUTION

Those living in Northern latitudes who need cooling for a medium-sized IT infrastructure of up to around 200 kW will typically opt for an indirect cooling system. This applies in particular to SMEs who rarely have the resources to pay for major cooling systems.

In the case of indirect systems, the outside air cools a heat transfer fluid (such as water). The water is used to feed cooling energy into the data centre based on the fact that it conducts heat up to 4,000 times better than air. As no outside air is blown into the data centre, fewer filter systems are needed and no outside humidity is brought into the building. However, there needs to be at least one air/water heat exchanger as well as pumps in the cold water system, which will be connected to mains electricity.

Many prefer this solution because it's clean, stable and predictable.

EFFICIENT EXAMPLE – LEFDAL, NORWAY.

Lefdal Mine Datacenter is a cloud data centre built in a decommissioned mine on the Norwegian coast. The developers used seawater from the adjacent fjord as a cooling medium. The cooling water is drawn from a depth where the water temperature is around a constant eight degrees Celsius, fed into a heat exchanger system's primary circuit. The secondary circuit then supplies the cooling into the mine at the required temperature. As the weather and temperature conditions are extremely constant, the operators have very stable control over the thermodynamic system. To protect against corrosion, the system uses titanium-coated surfaces within the primary cooling circuit.

PRACTICAL TIP – CUSTOMISED COOLING CONCEPT

A minimum data centre load is needed for some systems (such as Lefdal) to heat water that is too cold. A cooling concept should always be designed and engineered specifically to match the need.

Suppliers such as Rittal use up-to-date weather data, for example, to calculate the temperatures for free cooling at each of the relevant sites. Other significant parameters include the humidity and dew point. The internationally recognised industrial association ASHRAE provides guidance across these parameters. It defines the conditions that enable an IT environment to operate reliably meaning it is possible to operate a server at an ambient temperature of 25 degrees Celsius or higher, for instance.

CONCLUSION

Cooling concepts used in large data centres such as those at Facebook, Google and other hyperscalers are not easily purchased and adapted. These are customised solutions that take into account the IT infrastructure system utilisation and ambient temperatures. Users looking for reliability will choose a sealed cooling solution they can control themselves covering all the cooling circuit's parameters. Only by removing uncertainties from the equation such as the weather can users get stable and, above all, failsafe infrastructures.

Critical power management for Transport for London

Project Brief:
Transport for London (TfL) had a basic Energy Monitoring System in place at their Palestra offices, Southwark. This system was insufficient to provide TfL with the level of resilience and protection required at one of their most critical London sites.

TfL needed to install a combined Energy Management and Power Quality Management System, to provide detailed information and reports to their infrastructure team.

Site Specifics:
Within the building, TfL wanted full Monitoring & Control of the following;

- 5 Incoming Utility Supplies
- HV & LV Switchgear
- UPS Systems
- Generator's
- CHP
- Fuel Cell

The data for the above equipment must be visible within the Scada Software and provide TfL with site-wide animated single line diagram including the status of main switchgear and busbar,

A virtual real-time simulation of field equipment, with specific overview's, Branch Circuit Monitoring and bespoke report generation.

In order to satisfy the requirements set out by TfL, E-TEC Power Management, a principal partner with Janitza in the field of energy management, were introduced to TfL, with a view to expand and deliver the EMS and PQMS systems.

E-TEC are a leading Power Engineering company, who are specialist's in Generator, UPS, Switchgear and Power Management.

The Solution:
TfL's requirement to monitor the complete power consumption of the building as well as the status of existing equipment on site – all to be viewed in one head-end software package both locally or remotely, made E-TEC a perfect Integrator for the project.

In order to monitor the complete power consumption of the site E-TEC installed over 350 devices; both Power Quality Monitors and standard Power Analyzer's were installed to capture CBEMA, transients and events. Through a combination of retrofit, replacement and new switchgear, these devices were connected to a dedicated Ethernet backbone reporting onsite to the E-TEC; e-Power Monitoring System.

All power monitors push recorded data to the SQL database and can be reviewed and exported either automatically or manually.

The e-Power solution combines scada and dual redundant PLC control system. Over 300 interlock circuits-provide a complete high level interface to all of the power meters and the e-Power Scada allows intelligent load shedding if/when required.

e-Power also controls & monitors the onsite UPS Systems, Generators, CHP and Fuel Cell to provide detailed live and historical information and alarms.

The software is visible locally at the Building Control Centre Workstation or remotely via the secure corporate VPN allowing building managers anywhere within the estate to view the project with full functionality and visibility.

As part of the TFL drive to reduce carbon, the e-Power software platform, sends daily reports to TFL's national energy portal to allow profiling of the building's energy consumption.

For more information on our solutions, contact:

E-TEC Power Management Ltd
Phone: +44 (0)1252 744800
E-Mail: sales@e-tecpowerman.co.uk
Web: www.e-tecpowerman.co.uk

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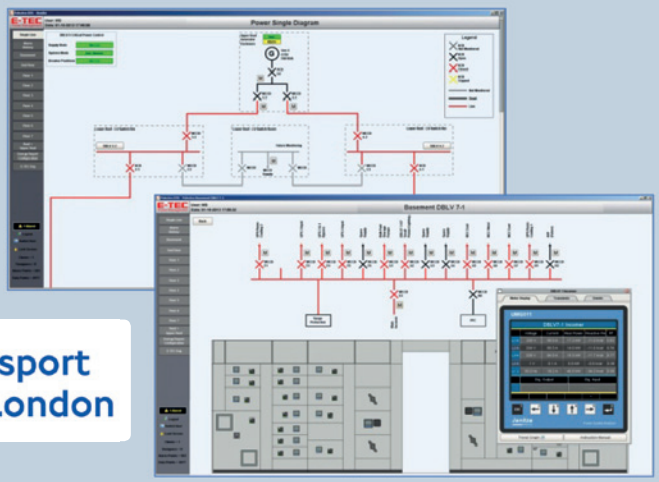

Transport for London

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Homepage

Janitza®

Supporting a Seamless Service for Häfele UK

When it comes to maximising business productivity, power fluctuations and disturbances can cause a major disruption to efficiency, and can ultimately impact on a business' bottom line. Having a robust back-up power supply in the form of a UPS device is therefore key for any organisation that needs to continue operating at maximum capacity until full power is restored.

Here, Häfele UK invite Riello UPS to deliver a bespoke UPS solution in a brief which focuses on a seamless installation process, whilst offering maximum confidence in the ability to secure a return on investment.

INTRODUCING HÄFELE UK

For Häfele UK, an internationally trusted name supplying furniture fittings, ironmongery and hardware to trade, ensuring an efficient, seamless service for customers is paramount.

With Häfele UK delivering to almost 30,000 customers per year, any disruption to operations at the company's head office and distribution centre in Rugby, Warwickshire, even if only fleeting, had the potential to prove very costly. To guard against this eventuality, having experienced a series of sporadic power outages, Häfele UK made the decision to invest in Riello UPS technology, through reseller Computer Power Protection. A bespoke solution was required that would ensure reliable, continuous power to keep Häfele delivering the highly efficient service it is known for.

ELIMINATING DOWNTIME

Häfele UK Facilities Manager, Shaun Smith who oversaw the UPS installation project from start to finish, was focused on removing the risk of power supply disruption that had previously been the cause of machinery downtime at the company's distribution facility. He says, "We had experienced a number of instances where our electricity supplier had given very little notice of an impending power outage, or issues with alternating supply that had blown fuses or caused damage to circuit boards.

"The resulting downtime for the warehouse machinery, which includes a number of 105ft cranes caused disruption which we just could not afford to tolerate, especially when you consider the time it took to get things up and running again once the power came back on."

A diesel back-up generator previously installed by Shaun and his team provided a partial solution to the power outage problem but still meant a 30 second power drop as the supply switched from the mains to generator. To eliminate this issue and protect critical operations across the business from power dip risks, Shaun sought out Riello UPS Ltd technology via leading supplier, Computer Power Protection.

THE UPS SOLUTION

Having consulted closely with Häfele to establish the exact requirements of the business, Riello and Computer Power Protection supplied two Riello Master Plus 250kVA UPS systems to support the entire warehousing and office facility. The Master Plus is suitable for a wide range of applications, including IT and the most demanding industrial environments. Thanks to its compact foot print the Master Plus is easy to install and front access to internal assemblies and top panel ventilation make space allocation within confined data processing or plant rooms easy.

HÄFELE

riello ups

As one of the most generator compatible uninterruptible power sources available, the Master Plus was the ideal choice for Häfele's existing back-up generator set-up. It is also one of the most environmentally friendly UPS' on the market.

To support Häfele's server rooms, two Riello MST20 (Multi Sentry) UPS' were also installed and Hafele's telecommunications function was supported with a number of SEP 1000 Riello Sentinal Pro Single-phase UPS'. This specific UPS technology was selected as it offered the highest levels of reliability and protection for critical servers, voice and data processing IT systems.

EFFICIENT INSTALL

A swift, efficient installation process was essential. Shaun Smith explains, "We couldn't afford to carry out mains work during the week, given the potential risk to business continuity, so we had to ensure that the UPS installations took place over the weekend in as slim a window of time as possible."

The Riello UPS and Computer Power Protection teams were committed to achieving the installation in accordance with Shaun's tight timeframe. Shaun says, "We were able to complete the entire project and have everything up and running within less than 48 hours, starting on a Friday night and finishing in the early hours of Sunday. I was really impressed by how hard the team worked and by the level of efficiency and professionalism demonstrated. The install ran very smoothly."

SECURING A RETURN ON INVESTMENT

Being able to eliminate the risk of business disruption caused by an unreliable power supply has been invaluable to Häfele, according to Shaun but the decision to invest in new UPS technology was not taken lightly. He says, "This was a major investment for the business and we needed to have absolute confidence in the supplier before making a commitment.

From the outset, Riello UPS Ltd and Computer Power Protection were able to reassure us. They have complete confidence in the technology and were able to allay any fears we had in regard to business continuity."

Shaun continues, "In the past, power stoppages, no matter how brief have had a knock-on effect when it comes to revenue and, for a major sales and distribution centre like ours the financial impact can be significant. The new UPS technology will not only help us to protect against loss of revenue but it will also help us to reduce energy costs and our carbon footprint. As a result, we will soon see a return on investment. And, importantly, by being able to keep our business running, thanks to first-class uninterruptible power sources, we are gaining the edge over competitor companies, who are losing power around us."

With such a high cost associated with any amount of downtime, businesses cannot afford to ignore the power protection benefits of a reliable UPS. Having the right UPS and support in place offers the added peace of mind that even when the worst happens, the impact on the business can be managed.

To find out more on the right UPS solution, contact the Riello UPS UK team on 0800 269 394, email sales@riello-ups.co.uk or visit www.riello-ups.co.uk.

Cooling datacentres in the Nordics

Who'd have thought, in the often sub-zero climate of the Nordics and Northern Europe, that data centre cooling would be an issue?

But as most engineers know, nothing is ever as simple as it seems - and cooling is no exception. Whilst ambient temperatures can frequently be -30C or even -40C, there are days where it can be as high as 26C or 27C. Very low humidity at the low temperatures is also a serious issue.

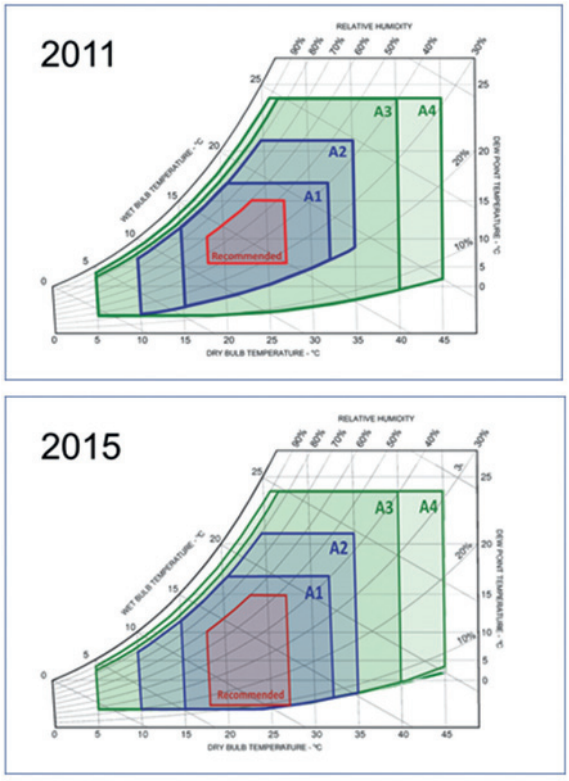
All of which makes it clear that data centres in these regions need a radically different cooling solution to that we're used to in the temperate regions.

Alan Beresford, CTO and MD with free cooling specialists EcoCooling has spent the last two years designing cooling solutions for Nordic and Northern European climates - so we asked him to share the design knowledge he has learned.

There is a 'bible' for the data centre environment. It's produced by ASHRAE – the American Society of Heating Refrigeration and Air Conditioning Engineers. Working with server and other active equipment manufacturers, ASHRAE produces environment standards (mostly based around refrigeration cooling).

In essence ASHRAE does all the hard work of understanding temperature, humidity and IT equipment reliability and then produces rules illustrated by somewhat complicated-looking graphs with coloured boundary-boxes on them (see Dia 1).

There are two of these boxes that matter to us in data centre atmosphere/environmental control and they are firstly the

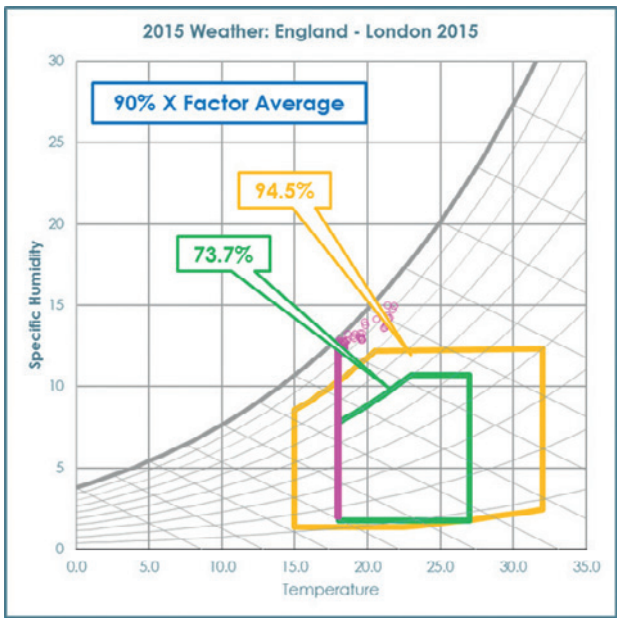



Alan Beresford, CTO and MD

THE X-FACTOR

ASHRAE calculated failure rate variation with operating temperature (extract)

This is based on the rate of failures expected when operating at a constant 20C as the 'norm' and shows the % relative to that.



'Recommended' box which shows the ideal operating constrains of temperature and humidity.

The second important box is the larger A1 box which covers the 'Allowable' operating range.

For all of us, when designing data centres, the aim is to keep the operating environment 100% within the 'A1' box and as much as is reasonably and economical practical within the 'Recommended' box.

SOUNDS SIMPLE DOESN'T IT? IF ONLY IT WAS!

You'll note, I've added two arrows to the 2015 graph that you don't usually see. ASHRAE calls this extra variable the "X-Factor" which predicts IT equipment failure rates. In essence, there's a significant trade-off between higher failure rates at cheaper/easier to achieve high operating temperatures - and lower failure rates at lower temperatures (see box-out).

Incidentally, before the 2015 (4th Edition) of ASHRAE, you can see that the 2011 Recommended and A1 boxes were very much smaller. Thankfully, modern equipment is far more tolerant to both higher and lower excursions of temperatures and humidity.

IS COLDEST BEST?

As readers may know, EcoCooling has been leading the march towards direct fresh air 'free cooling' backed up by adiabatic (evaporative) cooling as a significantly lower cost alternative to refrigeration cooling. It's important to note that this approach works in climates that are not constantly hot and humid. As this article is about cooling in Northern Europe and the Nordics, that's spot on target.

When we first started developing fresh-air/evaporative cooling systems, we worked on the basis of keeping to the lowest temperature in the -Recommended ASHRAE box (green on the following diagrams).

It you look at Dia 2, there are 8760 purple dots (one for every hour of the year) plotted for a London data centre with an EcoCooling system.

The purple 'line' is actually the main concentration of the dots – showing that by enabling evaporative cooling at 18C, we could keep the data hall at 18C for most of the year.

In terms of compliance with A1 (orange box on these diagrams), this gave us 73.7% compliance with Recommended and 94.5% compliance with A1/Allowable. It also gave a 90% X-Factor, so 10% fewer server failures than the norm.

MAKE IT HOTTER

Next we looked at allowing the temperature to rise higher towards 23C, the level generally found in refrigeration-cooled data centres.

On the one hand (Dia 3) it was better; Recommended compliance went up to 97.6% and Allowable to an impressive 99.5%.

But – and it's the Elephant-in-the-Room that no one ever talks about - the X-Factor at 23C is 115%. That means the server reliability is seriously degraded. 15% worse than the average enterprise data centre and 10+15=25% worse than our previous 18C 'keep-it-cold' solution.

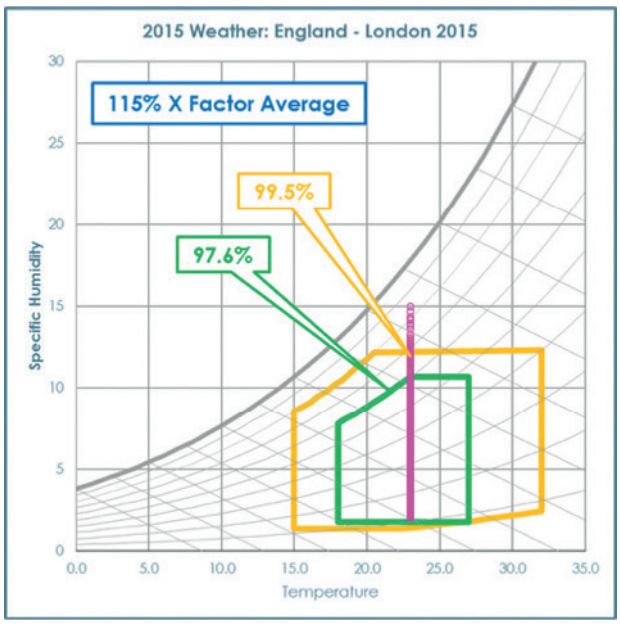
MORE FRESH AIR PLEASE

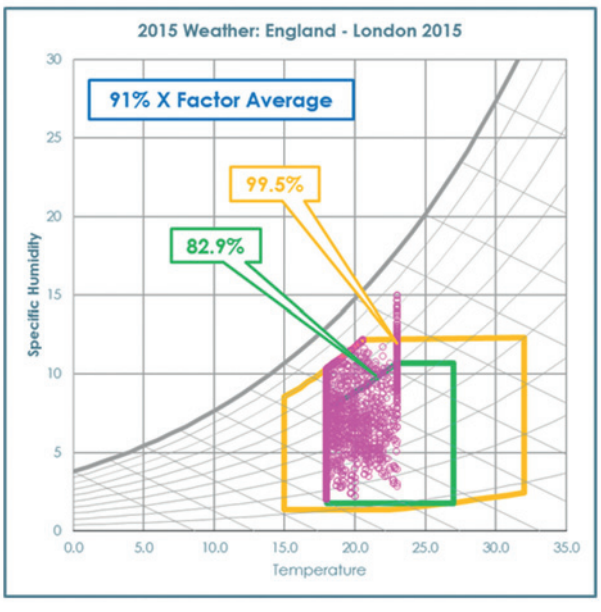
What we now needed was to create a more intelligent solution – one that increased compliance without introducing reliability issues. So our next development was to program our bespoke CREC controller to defer the temperature at which evaporative cooling kicked-in from 18C up to 23C.

This reduced the proportion of time that the evaporative cooling needed to run; increasing the amount of 'free cooling'. This took the green/Recommended compliance to 82.9% and the orange/Allowed to 98.2% (Dia 4).

And at 91%, the X-Factor was very significantly better than 115% in the previous scenario.

It was a very positive improvement – but not quite 'there' yet. ▶





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Data Centers

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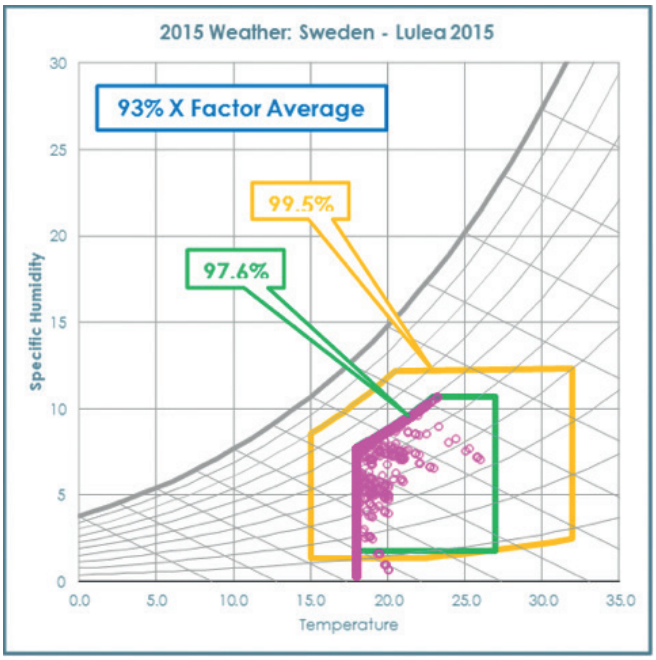
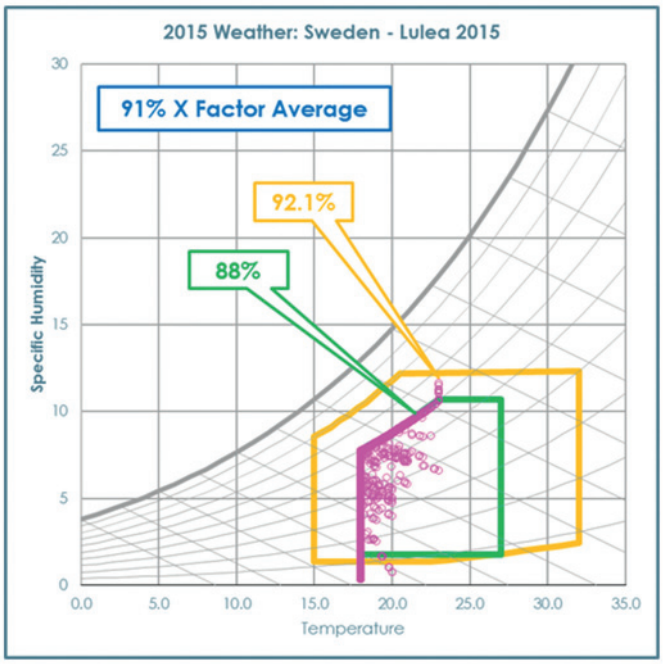




IT'S A BIT TOO WET

We noticed that those purple dots that are 'outside' the green and orange boxes are almost exclusively where the humidity is out of bounds. And that gave us an insight as to what to do next.

You may know that Relative Humidity (RH) and air temperature are inextricably linked. So using our software controller, we developed Dynamic Humidity Control such that, when RH looked set to exceed the ASHRAE 60% line, it would increase the air temperature slightly until the RH dropped back into spec.

If you look at Dia 5 you'll see the results were stunning! Compliance flew up to 97.6% in the green/Recommended zone and 99.5% Allowable.

An X-Factor of 91% means server reliability is 24% better than in many refrigeration cooled data centres where the X-Factor is 115%.

And I should also mention that the operational saving that can be made cooling, for example, a 1MW data centre using this approach is around £75,000 (in London, UK) and £240,000 (in Lulea. Sweden) per year compared to a traditional refrigeration approach.

MIGRATING NORTH

Now, all of the research and development I've mentioned above was based on temperate climates (think latitudes from London or Paris up to the top of Scotland).

Then, our clients started asking us to design solutions for even further North – in Northern Europe, and the Nordic countries.

Now, you might think a year-round supply of very air cold would be ideal to free-cool any amount of server equipment. But very cold air is also extremely dry and even with our advanced Temperature and Dynamic RH Control system there were a significant number of hours (amounting to about 8% of the year) where the purple dots show the humidity out of spec at the bottom and top of the graph (Dia 6).

TAKE A LITTLE MORE WATER WITH IT!

Although the ambient temperature can be -20C to -30C in the winter months , there are also days when it goes up to +26/27C – so we reckoned that we'd still need to provision evaporative coolers to cover the cooling requirement on those days.

We already had quite a sophisticated attemperation (air mixing) algorithm built into our control system. This mixes hot air from the data centre exhaust back into the cold air from the evaporative chillers so that it's kept to an ideal temperature to feed the server inlets based on the current cooling demand and inlet temperatures.

It was very easy to extend this to attemperate the extremely cold external air which, as I mentioned earlier, would wreak havoc if allowed directly into the IT areas of the data centre - damaging both equipment and any people working there!

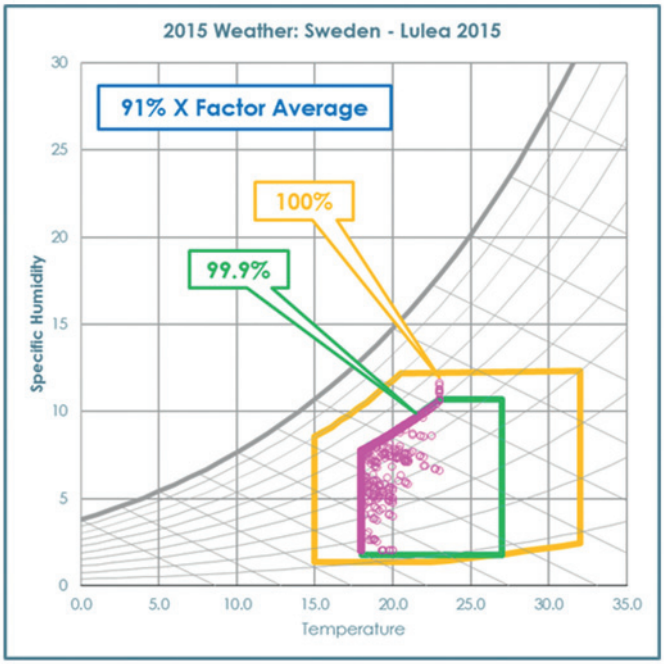
Dia 6 showed that with our normal combination of free fresh air, evaporative cooling and dynamic RH Control, although we were 92.1% in the ASHRAE Allowable zone, we would have only 88% compliance with Recommended due to the low humidity of the fresh-air.

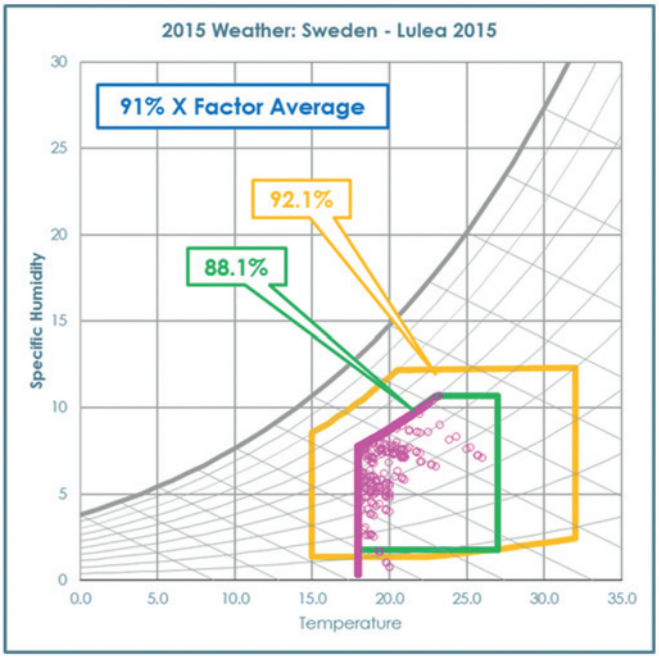
We figured that our evaporative coolers could also be used just to provide humidification on the days where all incoming air was too dry. A very simple solution and without any additional capital expenditure for separate humidifiers. Unlike conventional humidifiers – which are very energy greedy – our evaporators hardly use any energy at all. So a very low cost solution.

Adding in the new humidification process (Dia 7) smashed 99.9% compliance in the Recommended zone and 100% Allowable! A fantastic result – and with 24% better reliability than many refrigeration-cooled data centres.

A NEW NORTHERN PARADIGM

Having done all of the R & D work against the back-drop of 'conventional' enterprise data centres in temperate and cool markets, some of our more northerly clients wanted to reduce their total TCO (total cost of ownership) still further. ▶





They asked us to model the cost-benefit of dispensing with both evaporative cooling and humidification. This would require allowing a small amount of deviation outside the ASHRAE A1/ Allowed zone in return for reduced capital and operating costs. This was done in line with the principles found in the EU Code of Conduct for Data Centres.

So it was that we developed a set of fresh-air-only ventilation cooling units for deployment in high-grade colocation data centres.

THE RESULTS WERE IMPRESSIVE!

Although it's not immediately obvious on the diagram (Dia 8), this solution was 100% compliant on temperature control within the ASHRAE Recommended zone at a 91% X-Factor. The only excursions being at the bottom due to low humidity. Studies of the modern server equipment being deployed showed to our clients' satisfaction that these excursions would cause no appreciable problems provided that normal anti-static precautions were taken within the data centre.

In cost benefit terms, our clients were very excited by the outcome.

Our CloudCooler® ventilation cooling units, the result of this development programme, allow for the very rapid installation programme that many of these new business applications require – they literally are plug-and-play requiring no plumbing; just electric supply and network connections.

We already have a 2MW installation of our intelligent ventilation-only product line in Lulea, Sweden for Hydro66 and they've announced plans to grow to 12MW by early 2018. Paul Morrison of Hydro66 said, "This unique combination of cooling solutions allowed Hydro66 to continue working with EcoCooling, a single vendor who could meet multiple use cases, both for enterprise and more price sensitive clients".

As an example of the type of rapid growth we're seeing in these northern territories, we are currently working with one customer who is rolling out 4MW of cooling and processing per week! Many other installations are now in progress.

Having demonstrated 100% in-service compliance on temperature, with only small dips out of ASHRAE Recommended at low humidity, the case for low cost, rapid roll-out, ventilation-only cooling for data centres in Northern Europe and the Nordics is incontrovertible. And the requirement is growing rapidly.

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TRANSFORMER DIAGNOSTICS MAD SIMPLE

A monitoring and diagnostic tool from ABB will help operators keep tabs on their aging transformers and optimise their maintenance spend. The system, called Transformer Intelligence, uses the latest sensor and diagnostics technology to monitor and manage the electrical transformers that are essential to power transmission and distribution networks.

The system, which can be installed as a new or retrofit solution, is based on two monitoring solutions: CoreSense and CoreTec. The former is a dissolved gas analysis (DGA) sensor while the latter is a complete transformer monitoring system. When combined with other sensors, it gives operators a complete asset health monitoring solution and the confidence to schedule maintenance.

ABB • 01925 741111
www.abb.com

MICROSITE RESOURCE SUPPORTS DATA CENTRE PERSONNEL

Fluke has developed a web microsite to support the smooth running of data centres, specifically targeting those running and maintaining the infrastructure. A range of downloadable information will be helpful to facility managers, contractor services managers, electrical engineers and UPS, HVAC, mechanical and electrical technicians. Easy contact can be made possible with an expert from Fluke who will be able to advise on the best Fluke tool to solve a problem, the company claims.

More information can be found at www.fluke.co.uk/datacenters

Fluke • 01603 256606
www.fluke.co.uk

MODULAR PLUG DELIVERS FUTURE-PROOF CONNECTIONS

The RockStar ModuPlug, from Weidmüller, consists of modules, module frames and data inserts. The four sizes allow for individual plug solutions that save a huge amount of space, and the smaller pitch also makes for an optimised design. The company can now offer a whole range of heavy-duty connectors from a single source that fit together perfectly and meet a wide range of requirements.

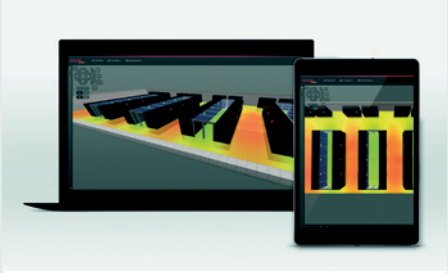
With its new plug system, Weidmüller will start by offering ten modules, and will then gradually add more as applications dictate.

Weidmüller • 0116 2823470
www.weidmüller.com

SOFTWARE REDUCES DATA CENTRE RISK

A DCIM system from Digitronic Software has been designed for the monitoring and optimisation of data centres and will help operators identify potential savings, optimise performance and reduce Opex. CyberHub ECO.DC minimises operational risk by safeguarding reliability.

The software uses 3D visualisation to assist with planning and optimisation of room layout, as well as mapping of temperature profiles – essential for effective thermal management, protection of critical IT infrastructure and enhancing energy efficiency. Fully understanding the effects of room layout on air flow, when making changes or during capacity expansion, for example, gives operators the confidence they need that cooling performance is assured.



Stulz • 01372 749666
www.stulz.co.uk

MISSION CRITICAL SYSTEMS ENSURE HIGH EFFICIENCY

Power protection specialist, Riello has launched two systems into the power requirements market.

Next Energy and Sentinel Dual, are both used in mission critical applications. The Next Energy UPS device is a high-tech solution offering efficiencies of up to 97% and low running cost. The system also boasts double conversion technology at VFI SS 111 classification, integrated IGBT three-level design and an in-built energy control system as standard.

The Sentinel Dual is designed for maximum power reliability and is suitable for many different applications, from IT to security. It is available in 5-6-8-10 kVA/kW models. With an easy-to-use digital display and a user-replaceable battery set, the Sentinel Dual can be installed as tower (floor standing) or rack, to suit network and server rack applications.

Riello • 0800 269394
www.riello-ups.co.uk

BETTER BATTERIES FOR UPS SYSTEMS

Vertiv, formerly known as Emerson Network Power, has launched an energy storage solution for several of its Liebert uninterruptible power supply (UPS) systems. These lithium-ion batteries are designed specifically for UPS applications and are smaller, lighter and longer lasting than traditional valve-regulated lead acid (VRLA) batteries. The new products are available now across Europe, Middle East and Africa (EMEA) and are fully tested and compatible with Liebert EXL S1 and Liebert Trinergy Cube. Vertiv engineers are currently working to extend these to the entire three-phase UPS portfolio.

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Generators

PDU

Onsite 24/7 Services

ONE SUPPLIER ...

Providing turnkey critical power solutions, including design, installation & maintenance

- 3-Year Warranty
- Call now for a **Free Site Survey & Health Check**
- World class impartial advice saving you time & money
- Nationwide sales & engineering team, on hand 24/7

DO YOU NEED INSTALLATION?
We can help you.

We provide a range of on-site services whether your project is for a single UPS and Generator or remote monitoring across multiple sites.

You can find out more online:

Call sales: **0800 978 8988**
24 hr service: **0845 519 3928**
E-store: **criticalpowersupplies.co.uk**
Email: **sales@criticalpowersupplies.co.uk**

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CRITICAL POWER : When it matters most

Power and accuracy when you need it most

Just like basketball stars, our UPS solutions utilise everything at their disposal to deliver amongst the highest power densities on the market and class-leading efficiency of up to 98%, while still offering you the flexibility and control you need to achieve your financial and business objectives.

Each simple to install module can add up to 100 kW of protection and up to five modules can be added within a single frame to deliver 500 kW of protection (400 kW N+1). What's more, up to six racks can be paralleled to deliver scalable power up to 3 MW.

Uninterruptible Power Supplies Ltd

A KOHLER COMPANY

To find out more call or email us today: 01256 386700, sales@upspower.co.uk

www.upspower.co.uk