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NBN: Will we ever get there?

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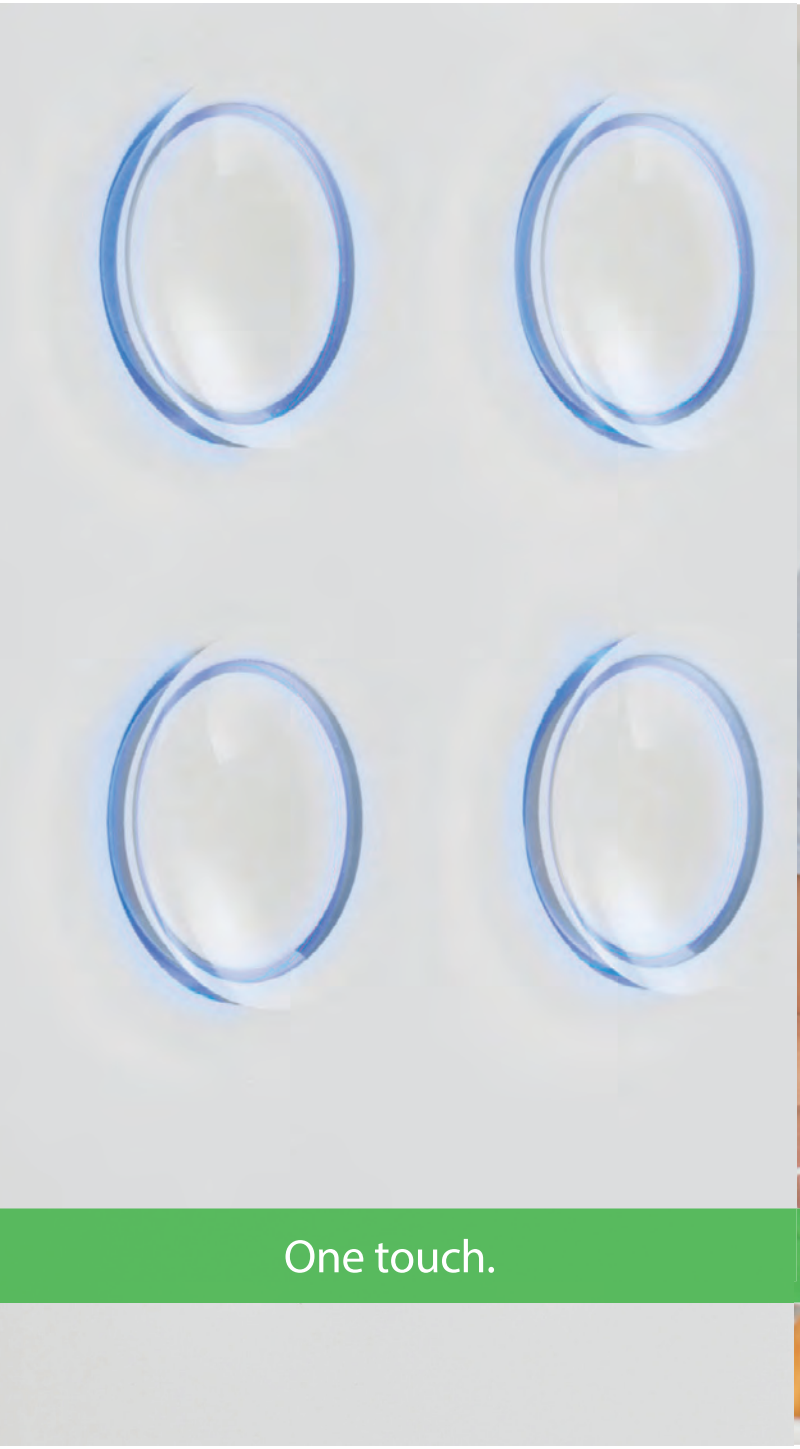
Optimising infrastructure ■ Network pressures



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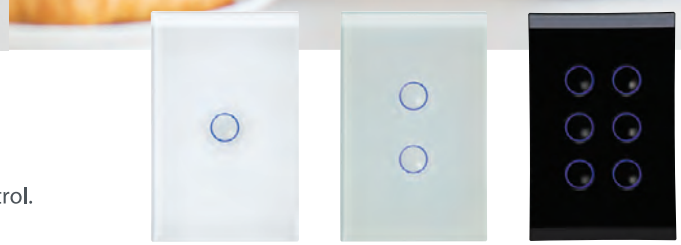

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CONTENTS

04 NBN: Will we ever get there?

10 Electrical Distribution

10 Preventive maintenance more valuable than ever

18 Protecting LED lighting from power surges

25 All-Energy Australia 2016

31 Ensuring electricity smart meters are future compliant

34 Comms + Data

34 Optimising cabling infrastructure

38 Addressing IIoT challenges

40 Cloud computing moves to the edge

46 Why security is essential in planning wireless network deployments

48 The cost of network pressure

FROM THE EDITOR

By the time you read this column, we will have lived through Australia's longest electoral campaign and (presumably) decided who our government will be. Although, as our recent political history shows, there are no guarantees when it comes to the top job. Whatever the outcome, let's hope that a bit of stability comes with it, if nothing else.

The problem with federal elections is that their impending approach often becomes a reason for industry to do nothing, as does a never-ending stream of leadership challenges and changes within the major parties. A constant state of flux inspires zero business confidence, which impacts on investment and slows the economy to a crawl. We could do with a bit of direction and a steady hand — less talk, more action. We live in hope.

The most recent election brought the national broadband network back into the limelight — not that it was ever relegated too deeply to the shadows. It would be nice to see some coherent decisions, rather than just political arguments and sound bites, guide this one to the finish. When compared with Australia's largest infrastructure undertaking, the Snowy River Hydro-Electric Scheme, the contrasts are stark, as you will see in our lead article.

We've got some great feature articles in this issue on the topic of networks. You'll find content on all you need to consider in terms of cabling, lighting, network design and security.

As per usual, we've included some project case studies that are sure to inspire, along with the most interesting products to hit the market. I do hope you enjoy this issue.

Best regards,

Dannielle Furness – Editor
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NBN: WILL WE EVER GET THERE?

Dannielle Furness

In the history of our fine country, has there ever been a more maligned infrastructure project than the NBN?

As the pinnacle of Australian engineering, it's hard to imagine the Snowy Mountains Hydro Electric scheme causing much of a commotion back in the day. In fact, the Snowy is so venerated that it is described as "an important symbol of Australia's identity as an independent, multicultural and resourceful country" on the scheme's official website.

By contrast it was revealed in March this year that the Hybrid Fibre Co-Axial (HFC) rollout of the National Broadband Network (NBN) was referred to internally by nbn staff as "Operation Cluster***". We'll let you fill in the blanks but, suffice it to say, it's not exactly engendering the same level of admiration.

Of course, back in 1949 when construction of the Snowy commenced, the majority of the population probably just went about their business and continued to so for the 25 years it took to reach completion, happy in the knowledge that the end point was a world-class feat of engineering that would deliver a more efficient electricity supply system. Well, we now live in very different times. A ceaseless flow of information means that each and every turn of the torturous path to a national broadband network is reported on a daily basis, often with evident political bias.

We've been talking about the NBN in one form or another for around a decade and it's been in the headlines pretty much every day since inception. These headlines are rarely what could be called complimentary and it appears unlikely that everyone will be happy with the eventual outcome, no matter what form it takes.

Continuity chaos

The lead-up to a federal election made matters even more extreme. The NBN predictably became the political football we all knew it would, with each party blaming the other for design shortcomings, budget blowouts and delays.

During campaigning, both major parties assured the Australian public that they would deliver a better product once elected and would somehow achieve what their opposition could not. With every statement to the media came a slew of analyst reports and opinion pieces that picked apart the content and highlighted the pros and cons, perceived truths and lies. It was a full-time job to keep up to date with every new development.

By the time this issue of *ECD* goes to print, the Australian public will have decided one way or the other who'll be running the show. Whether this truly affects a final decision on a fibre-to-the-node or fibre-to-the-home architecture and its subsequent rollout is anybody's guess.

As befits an infrastructure project of this scale, the NBN has been scrutinised, dissected and probed from every angle. It's taken up more column inches than anything else in recent memory and has been praised or blamed for any number of effects including: job creation; job losses; being too slow to roll out and being rolled out before its ready; of raising the rate of educational dropout; of putting lives at risk; of not adequately servicing regional areas (or doing so at the expense of metropolitan centres); of being too expensive; of not being fast enough; of being under-designed, over-designed and completely lacking the facility to effectively handle future demand... the list goes on.

Then there's the company created to oversee the project in the first place. nbn, previously NBN Co, has endured more board shuffling than the Lido Deck on the *Pacific Princess*. Every change in government or shift in the economic landscape seemingly calls for a reorder, making relative continuity even more difficult to achieve.

Warts on the wall

What seems to have remained consistent, however, is that overall ugliness of an NBN install from the perspective of the occupant. It's a two-fold problem, being both ugly in terms of unsightly and ugly in terms of a smooth transition.

Don't take our word for it, peruse the letters section of any local media servicing areas where the rollout has already occurred. There are thousands of tales from disgruntled consumers — the reasons for complaints vary wildly, but a consistent grievance appears to be the installation of multiple hardware devices in seemingly random locations, as chosen by a designated contractor, along with less-than-stellar cabling installs. There are even Facebook

> THE NBN HAS BEEN SCRUTINISED, DISSECTED AND PROBED FROM EVERY ANGLE.

groups devoted to showcasing the worst examples and a multitude of online forums full of questions from confused home owners and tenants seeking to understand what the official requirements are and how much say they have in the final result.

This is where the distinction between the Snowy scheme and the NBN is so pronounced and makes it clear why one project is so revered and the other reviled. Where the hydro-electric scheme was essentially a step removed from the public, the NBN is feeding directly into each and every connected property and that feed is, for better or worse, highly visible to the occupant.

So, things are personal and it isn't difficult to see the situation from the end-user's perspective. Of course there's plenty of information available in the resources section of the nbn website, but much of it is either too technical for the average punter, too hard to find or is relevant only to new-build scenarios, which isn't much help to a tenant whose landlord has given them the barest of instructions when it comes to the preferred install outcome in an existing property. There are countless stories detailing equipment being positioned in locations against a customer's expressed wishes and photos that range from vaguely amusing to borderline terrifying.

It's not a new problem either — back at the end of 2011, NBN Co advised the then government that the single biggest source of complaints from test-site users was the presence of the required large back-up and power unit, many of which were just slapped up on the living room wall. Five years on and things haven't changed much — there is a complete lack of end-user awareness in terms of what an NBN installation should (or can) encompass and look like. Customers simply don't have a clear understanding of what equipment will be installed and what, if any, alternatives are available to them.

The nbn website advises that only registered cablers should be engaged and that they must follow the Australian Communications and Media Authority (ACMA) rules. It specifically states that these rules "make sure the cabling is done safely and that the cabler has the skills to do the job", but certainly contains nothing about how elegant the install should be.

Opting out

Many electrical and comms contractors have elected to ignore the entire market and it is little wonder. It's hard enough to turn a buck in this day and age, without taking into account the extreme customer-led variations that NBN installs often present. Making money means getting on and off a job as quickly as possible and nothing slows that process more than an indecisive client with an emotional attachment to the look of their home.

Of the contractors that have opted to service the market, many will undertake the bare minimum, installing equipment in the location that represents the easiest and fastest turnaround without regard for aesthetics, leaving a posse of angry customers behind who take to the internet to vent their spleens.

As always, where one man sees a problem, another sees opportunity. In this instance, Jared Smith, former electrician and systems integrator with over fifteen years' experience behind him, saw a hole and decided to fill it. Smith founded Built Boards, which designs and supplies electrical enclosures constructed for specific install requirements and he reckons a lot of the market has got it wrong.

"A great proportion of our business is sales for new builds," he said.

There's no surprise here, it makes sense to incorporate the NBN install into the broader electrical package and install it at the frame stage. It almost certainly represents a better potential revenue stream for the installer as part of a bigger picture, but Smith believes there's an infinite amount of potential in the existing dwelling market, which is currently under-represented because it's seen as too hard.

"There are more factors influencing the install than the average home owner or tenant often realises," he said.

"Obviously, there's the NBN hardware itself, but you've got to factor in the router as well, plus data cable, patch leads and any other existing or future network components. There are access considerations — the equipment needs to be easily reached if there's a problem, but it shouldn't be so accessible that it dominates the room, or that toddlers can make contact and the dog can chew through cables. These sorts of things might not even be on the radar of the NBN installer," he said.

Smith sees a basic lack of end-user awareness and the time and revenue pressures of the installer both contributing to delivery of a less-than-satisfactory outcome in many cases.

"NBN publishes installation guidelines — but they're chiefly along the lines of 'the simplest and most practical' method of installation and, to that end, kind of open to interpretation. The end user needs to know that they are equally able to engage their own independent contractor or installer, who can supply any number of additional value-add items, such as extra data points, conduit and NBN-ready enclosures. That's a win for both sides," he said.

Opportunity abounds

"There's opportunity for installers to seek input from the customer and ultimately guide them toward a more agreeable outcome. Using an NBN-compliant enclosure satisfies a number of issues; it houses everything so therefore delivers a much neater install, it's lockable, which means there's no danger of unauthorised or accidental access and, best of all for the contractor, it's all pre-installed, which means less time on-site," said Smith.

He thinks the pre-existing homes market can provide enough work to last years, which seems highly likely given the current rollout schedule, and should be enough incentive to attract contractors and installers. The exact target for completion of the NBN remains a point of conjecture, but it's still in the relatively early stages — across metropolitan centres anyway — so it may be worthwhile securing a piece of the pie while it's on offer.

No matter how the whole thing washes up, it's unlikely we will ever regard the NBN with the same reverence as the Snowy Mountains scheme. Australia's largest ever civil engineering project was constructed under seven successive prime ministers, representing both major parties, and required the participation of 100,000 migrant workers from 30 countries to get it across the line. Most significantly, it was delivered on time and on budget — indeed, we live in different times.

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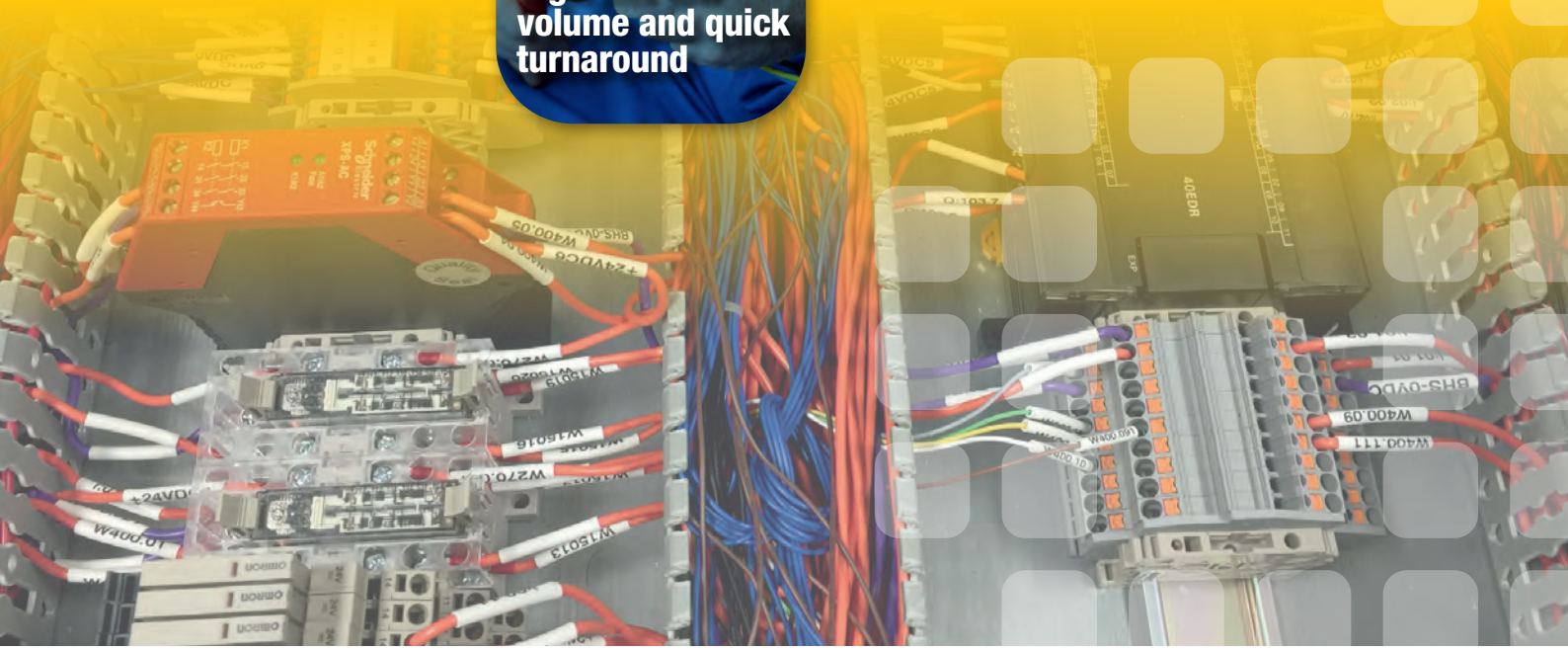

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A SHEEP'S HEAD TOPS LIST OF 2015'S UNUSUAL POWER OUTAGES

A sheep's head and a golfing gaffe were among some of the most unusual reasons for power outages in 2015, according to a report released by Eaton Industries.

The Australian and New Zealand Blackout Tracker Annual Report 2015, compiled by the power management company, showed blackouts affected almost one million people last year across Australia and New Zealand, causing a total of 174 power cuts, with 17,000 minutes (or 12 days) of power lost.

Weirdest of all was probably a sheep's head that was dropped by an eagle directly onto a powerline in Geraldton, WA, causing more than 2000 people to lose power for 15 hours.

A comparable incident in North Adelaide saw a golfer short-circuit two 11,000-volt power cables when his club flew out of his hands and struck powerlines while teeing off. This unfortunate blunder also left around 2000 people powerless for approximately three hours.

Image courtesy of Jannes Pockele under CC BY-2.0

Across the Tasman, curiosity killed the cat — literally — when it climbed onto outdoor electrical switchgear in Tauranga; it also caused the power outage for around 10,000 North Island customers.

However, it's extreme weather events that remain our biggest power threat. 200,000 customers were left without electricity in the biggest storm to hit New South Wales in a century last April, while earlier in the year a powerful cyclone in Queensland downed 1800 powerlines and knocked out power to 50,000 properties for three days.

Technical faults also caused major outages, including a control room issue in Lismore, NSW, that left 66,000 customers without power and an interconnector failure that left 45,000 customers in the dark from Sellicks Beach to the Barossa Valley in South Australia.

Gordon Makryllos, ANZ managing director at Eaton, said that while the stories behind some of the power cuts may make for an amusing anecdote after the event, an outage of any size causing downtime is disastrous.

"When systems are unavailable, businesses in particular suffer an irretrievable loss of productivity, revenue and, potentially, their reputation," he said.

"Being prepared is key to protecting your power supply and taking steps to minimise any potential downtime should be an integral part every organisation's risk management strategy."

New Zealand's North Island had the most trouble with 61 blackouts, followed by New South Wales (31) and Queensland (24). Victoria and Western Australia each recorded 13 blackouts, followed by Tasmania (4) and South Australia (3).

The Northern Territory was the only state or territory across the two nations that did not report any outages.

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NATIONAL ROADMAP FOR SMARTER STREET LIGHTING

The Institute of Public Works Engineering Australasia (IPWEA) has forged a new initiative to advance Australia's uptake of LED road lighting. The government-backed Street Lighting and Smart Controls Program (SLSC) brings together the multiple sectors that contribute to the street lighting and smart controls industry in Australia.

The SLSC strives to increase the nation's uptake of LED road lighting and integrated smart controls in order to achieve greater energy efficiency and to further the smart cities initiative.

According to IPWEA CEO Robert Fuller, "Australia cannot afford to be lag behind the rest of the OECD world in the rapid rollout of LED and smart control lighting and technology. Only about 11% of Australian lighting has converted to LEDs, yet there are compelling reasons to switch over.

"Cost savings for cash-strapped councils, reduced greenhouse gas emissions, less maintenance, longer life, reduced road accidents, increased safety and security measures and a raft of other proven benefits have been substantiated by cities overseas that have installed hundreds of thousands of LED lights over the last five to six years.

Industry bodies, commercial lighting and smart controls suppliers, energy networks and the Australian Government will unite to produce a two-year plan of coordinated action to harmonise the industry under the SLSC Roadmap, which is currently being drafted. "We acknowledge that there are some regulatory hurdles and historical matters that we believe can be overcome with a will to move forward. The SLSC Program, being presented at last month's COAG meeting, was a positive start in this change process. "The industry has committed to work collaboratively and to pool their knowledge for the sake of getting this new technology right for Australia. We are too small a player on the world scene not to be adopting proven and leading-edge technologies and systems from overseas," said Fuller.

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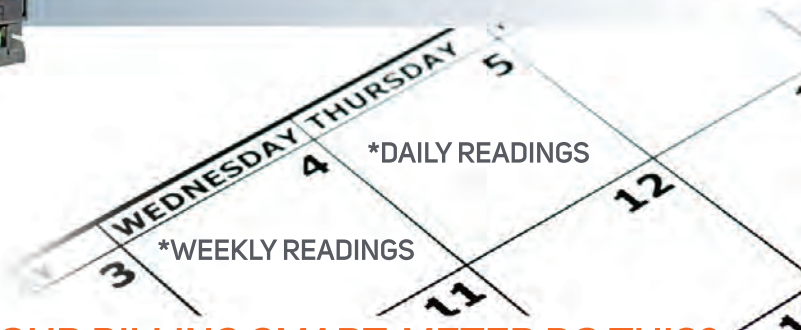

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PREVENTIVE MAINTENANCE

MORE VALUABLE THAN EVER

Farokh Ghadially, Head of Sales and Marketing, Services

The ability to connect one device to another is a simple concept that's making a huge difference.

While much has been made of this phenomenon in both the home and urban centres (in the form of smart homes and smart cities), the full potential of the Internet of Things (IoT) revolution is yet to be realised in the foundation of cities — buildings.

Underpinned by a market push towards an 'always on' digital economy, the IoT is infiltrating all types of companies across a range of industries, including education, health, mining, construction and utilities. As the role of IoT and demand for round-the-clock connectivity has grown, so too has the importance of electrical distribution systems. From lighting and HVAC to automated machinery and conveyor belts, these days virtually everything relies upon electricity to operate. Put simply, electrical distribution systems are the backbone of all modern businesses because without this vital equipment, everything stops.

Whilst it's recognised facility managers of today are under mounting pressure to increase productivity, drive revenue and reduce costs, what is less considered is the maintenance of the systems that support this crucial equipment. Indeed, as businesses focus on driving efficiencies through the implementation of automated devices, IoT and other electronically powered solutions maintenance can fall by the wayside due to competing resources.

Out of sight, out of mind

Despite powering the machines and systems responsible for key processes, electrical distribution systems are often overlooked. When they're not cared for, the systems become stressed, leading to malfunctions and system breakdown; continuity is disrupted, a specialised team is called in to carry out repairs, spare parts and labour are (more often than not) sold at a premium and costs fly through the roof. The consequent impact of business downtime can result in devastating loss of profits.

The bad news is that repercussions are not only financial. When electrical distribution systems are neglected, the probability of an accident increases, bringing about a host of OHS concerns and potential loss of human life. Equipment such as circuit breakers, protection relays or transformers ensures the safety and protection of employees and bystanders — and when they fail unexpectedly, the possibility of an unsafe situation rises significantly.

Without a routine maintenance program in place, a facility is effectively operating in a 'run to failure' mode; it's only a matter of time before things go pear-shaped. In today's highly competitive business environment, no company can afford disruption to productivity and, as such, the value of electrical preventive maintenance has never been greater. Given our reliance on electrical distribution systems is growing, what can you do to ensure the safe and efficient functioning of your business?

Inspect, detect and correct

A regularly scheduled electrical preventative monitoring (EPM) program aims to inspect, detect and correct electrical issues before they escalate and become major problems. Establishing an EPM program is a sound business decision that will significantly improve the productivity of a facility whilst benefiting its bottom line. If you think about your car, the cost of regular maintenance like an oil change is nothing when compared to the cost of replacing a blown motor. This principle holds true when applied to a facility's electrical system, as studies show there is a direct correlation between the level of maintenance and the reliability of the electrical equipment.

Minimising the likelihood of system downtime by improving equipment reliability is just one of the many benefits associated with preventive maintenance. The key objective of an EPM is to

> ELECTRICAL DISTRIBUTION SYSTEMS ARE THE BACKBONE OF ALL MODERN BUSINESSES.

ensure electrical parts and components are operating as their design intended — ie, at their optimum level. By regularly monitoring, identifying and resolving potential faults, optimisation is improved, fewer disruptions occur and facility uptime is maximised. Unlike reactive maintenance, preventive maintenance can be performed during off-peak business periods when there is less impact to the business, as well as the customer.

Maintained electrical equipment is also more energy efficient. Over time, normal wear and tear causes stress to components that can result in diminishing device energy efficiency. When a device is not routinely maintained, it uses (and wastes!) more energy while it is running.

Monitor, maintain and then monitor some more

Perhaps one of the best advantages of a preventive maintenance program is that it allows you to track results over time. Best practice involves the compilation of quality reports that provide detailed information around the 'present state' of a distribution system and its reliability relative to the present needs of a facility's operators. By keeping a record of all maintenance and repair activities, facility managers can analyse trending data and better predict when a fault may arise.

Whether your electrical distribution system requires maintenance every week, month or year, the most effective programs take into consideration the state of the system in its entirety, regardless of there being equipment from multiple manufacturers. With conflicting maintenance procedures and requirements, this can be tricky; however, it is the only guaranteed means of ensuring the power distribution system is reliable and operating as intended. Specific maintenance of separate pieces can only be considered a bandaid fix — this disjointed approach is riddled with risk and should not be encouraged.

Another factor to keep in mind is that some facilities require more frequent maintenance than others. Facilities with unfavourable environmental conditions like humidity, excess dust, dirt or a corrosive atmosphere may demand more TLC than premises protected from the elements. Equipment with heavy loads or that run constantly will also need to be serviced more often. Every electrical preventive maintenance program should adopt a 'made to measure' approach that caters for the distinct needs and requirements of the specific plant or facility.

Prevention over cure

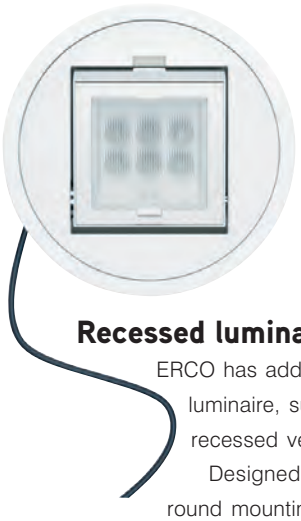
Whether you're getting your car serviced or going to the dentist for a check-up, it's safe to say that being proactive is almost always less costly that being reactive. For electrical distribution systems, reactive maintenance can be three to four times more expensive than preventive maintenance. In addition, it takes less time to carry out preventive maintenance with a scheduled outage than it does to conduct emergency repairs during an unforeseen one. The bottom line is that electrical preventive maintenance helps to reduce total cost of ownership (CapEx + OpEx) and creates more value for your business.

Faced with the burden of having to cut costs, operating expenses like preventive maintenance programs are too often first to go. Financially, this can be a huge mistake. Systems without a routine maintenance program in place are known to have a failure rate three times higher than those that do. With a fixed-rate maintenance agreement, it's much easier to prove the value of an EPM to key decision-makers. When payments are made little and often, the bite doesn't itch quite so much.

Smart business

When advocating for the implementation of a preventive maintenance program, it's important to calculate and demonstrate the financial impact of an unplanned outage and what this means to the operation of a business. It's also worth noting that, in the case of an incident or major event, the focus is on restoring power as quickly as possible — this almost always comes at a debilitating cost to the business. A preventive maintenance program will not only add to the life expectancy of your equipment, it will save you significantly on your expenses — it's smart business and worth jumping up and down for.

Schneider Electric Industry Business
www.schneider-electric.com



Recessed luminaire

ERCO has added to its range of track spotlights with the Cantax recessed LED luminaire, suitable for commercial spaces such as shops or museums. The recessed version is available as a spotlight, floodlight and lens wallwasher.

Designed with a square luminaire head, the recessed spotlight has a round mounting detail, enabling it to be rotated 360° in the ceiling, whilst the horizontal hinge ensures tilting of the luminaire head up to 90°. The flexible adjustment of the beam in any direction offers diverse lighting effects, including accentuating a single object, emphasising a horizontal display and illuminating wall-to-wall shelving.

The interchangeable Spherolit lenses, made of optical polymer, provide a variety of light distributions, from narrow accentuation through to widebeam floodlighting and wallwashing. ERCO control gear ensures continuous dimming of the LEDs down to 1% of their connected load.

Available in three sizes, the product covers different power ranges from 2 W and 210 lm through to 24 W and 3300 lm. The lighting tool is particularly well suited to rooms with ceiling heights of 3–6 m, ensuring precise illumination of the target surface even from great heights.

It is available in warm white or neutral white, 3000 or 4000 K, and offers a switchable, phase or DALI dimmable option.

ERCO Lighting Pte Ltd
www.erco.com

Power supplies

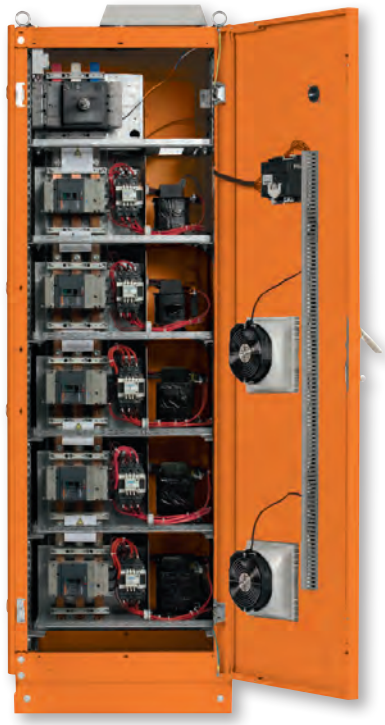
Phoenix Contact has released its next-generation TRIO 2 Power Supply range, which ensures the reliable supply of all loads even under the harshest ambient conditions.

The devices have a high MTBF (mean time between failure) value of more than 1 million hours at 40°C. They operate at a temperature range of -25°C to +70°C and feature device start-up at a low -40°C.

The dynamic boost feature delivers reliable starting of heavy loads with an overload capability of 150% for 5 s, which securely absorbs starting currents and short overload situations during operation without a drop in output voltage. The rugged electrical and mechanical design ensures the power supplies can withstand high shock and vibration. Increased isolation between the input and output connections ensures the endurance of high electrical transient surges.

Designed to facilitate hassle-free installation, push-in connection technology enables fast connection and the tool-free wiring design saves the technician time.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au



Low-voltage capacitor banks

The VarSet Low Voltage Capacitor Banks from Schneider Electric offer smart, simple and reliable power factor correction. The series has been certified to Australian and New Zealand Standards AS/NZS 61439.1&2 and IEC 61921.

This range of wall-mounted and floor-standing capacitor banks offers fixed, automatic and dynamic compensation for reactive power to improve power quality and reliability.

VarSet is specifically designed to deliver improved power quality, and operations can increase energy efficiency, lower utility costs and prevent costly, unplanned downtime due to power loss.

Reactive power and harmonic distortion can cause stress and damage to an electrical network. In addition to the risks associated with the lack of reliability and stability, many utilities charge for the reactive power consumed through kVA tariff billing.

Designed for easy installation and maintenance, the wall-mounted enclosures are available from 25 to 100 kVAr and the floor-standing enclosures from 125 to 500 kVAr.

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A master work

Antoine Bourdelle — along with Auguste Rodin — is one of the pioneers of 20th-century monumental sculpture. The Musée Bourdelle in Paris has recently been given a lighting update with LED technology using ERCO's photometric precision to enhance the dynamic style of Bourdelle's sculptures for optimised three-dimensionality.

Tucked away on a quiet street near, and yet so far from, the bustling Gare Montparnasse in Paris, the Musée Antoine Bourdelle is an unexpected oasis of tranquillity and meditation that is reminiscent of an ancient temple. This is where Antoine Bourdelle, a pioneer of 20th-century monumental sculpture, lived and worked from 1884 until 1929.

Bourdelle's work was frequently inspired by mythological themes, which he captured in powerful and dynamic sculptures using materials such as plaster, bronze or marble. The structures on the premises are from a number of different periods. Once the home and studio of Bourdelle, the buildings originating from the 19th century were turned into a museum.

Image credit: ERCO. Photo: Edgar Zippel

The 'Great Hall' was built by architect Henri Gautruche to mark the 100th anniversary of Bourdelle's birth, whilst the extension to the museum was added in 1992, designed by architect and Pritzker Prize winner Christian de Portzamparc.

Recent renovations of the Musée Bourdelle included an upgrade of the lighting system with LED technology. The lighting inside the museum was optimised for maximum visual comfort with lighting tools from the ERCO Light Board, Logotec, Parscan and Pollux ranges.

Designed to overcome great distances, the luminaires bathe the Great Hall in superbly uniform and glare-free light across an impressive height of 10 m, allowing visitors to look at the monumental sculptures from different angles.

Using various lenses and different beam characteristics, as well as two light colours with 3000 and 4000 K, the sculptures are illuminated with photometric precision, accentuating their surfaces in varying nuances depending on the texture.

The Musée Bourdelle has several landscaped gardens with lawns, bushes and trees that provide a natural setting for Bourdelle's bronze sculptures. Embellished with a green patina, the sculptures blend effortlessly with the lush vegetation.

The artwork and selected garden features are illuminated effectively from different angles using outdoor luminaires of the ERCO Grasshopper range, with neutral and warm white light. Designed with a compact housing, the lighting tools remain virtually invisible, whilst precise light distributions eliminate glare for the visitors and neighbours, so as not to detract from the enjoyment of the sculptures as well as the gardens and night sky.

ERCO Lighting Pte Ltd
www.erco.com

Image credit: ERCO. Photo: Edgar Zippel

Image credit: ERCO. Photo: Edgar Zippel

START HERE

Do you do NBN installations?

NO

You must hate money. The NBN rollout, for all of its challenges, is still the biggest single infrastructure project taken on by the Australian government in recent memory.

YES

Do you use NBN Enclosures compliant to NBN-NO-GDE-0011

NO

Naughty. NBN Co specifically states the specs for an enclosure, the last thing you want is to have to go back and replace it as the NBN contractors will either knock it back or install their hardware next to it. It's best you contact **Built Boards** now to get hold of a genuinely compliant NBN enclosure.

YES

Are you using **Built Boards** NBN Enclosures?

NO

You are a noble person with insight and intelligence beyond measure. Your peers should bow before you and your country thanks you.

YES

Does the enclosure you use come standard with a double GPO and Data outlet?

NO

Built Boards enclosures come standard with a double GPO and CAT6 6 Gang outlet installed free of charge. This saves you time and money on every install. You should ask your local electrical wholesaler about making the switch.

YES

Does the enclosure you use bend and warp when you install it?

YES

Many manufacturers use plastic or low gauge sheet metal to save costs. All **Built Boards** NBN enclosures are made from sturdy 1.2mm sheet metal that will stand up to installation and years of use. You should ask your local electrical wholesaler about making the switch.

NO

Does the enclosure you use have a pad lockable door so the keys can't get lost before handover?

NO

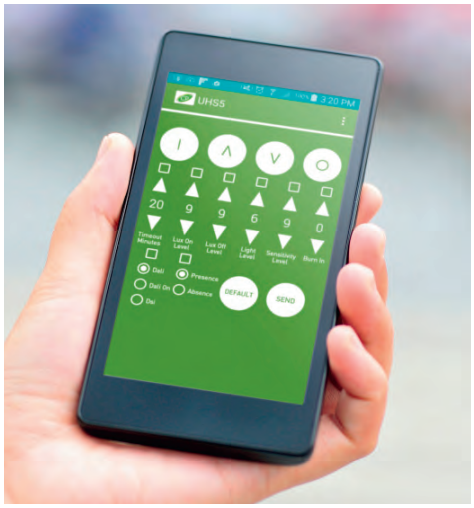
Built Boards NBN enclosures have a padlockable door, so there are no keys to lose on site before handover. This has saved many of our clients $1000s in callouts just to drop off keys. You should ask your local electrical wholesaler about making the switch.

YES

Impossible you made it this far. The latest **Built Boards** NBN Enclosure is engineered for the Australian market based on feedback from hands on electricians. None of our competitors have the features we do at the price we offer. That's why we are number 1 in NBN enclosures. You should ask your local electrical wholesaler about making the switch.

BUILT BOARDS
AUTOMATION SWITCHBOARDS

t: 03 8510 8943
e: sales@builtboards.com.au
w: builtboards.com.au



Lighting control smartphone apps

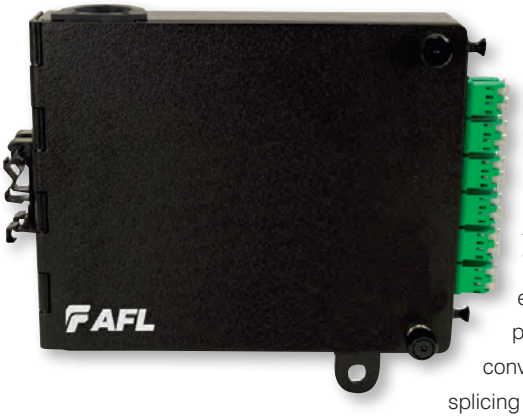
mySmartCTI has introduced apps, developed by CP Electronics, which provide users with programming and broad functionality for lighting control direct from a mobile phone.

Users will be able to raise and lower lighting levels, turn lights on and off and select scenes. The UHS7 and UHS5 apps will replicate the functionality of their handset counterparts. While the UHS7 app will have exactly the same layout as the UHS7 handset, many of the multiple programming options available via the UHS5 handset have been streamlined, making them simpler to use.

Downloadable from the Google Play Store, the apps are suitable for infrared-enabled mobile phones working on Android 4.1 Jelly Bean and above.

mySmartCTI

www.mysmartCTI.com.au



Wall-mount interconnect enclosures

AFL has introduced the WME-01 and WME-12 wall-mount interconnect enclosures, featuring LGX mounting positions, which provide a convenient convergence point for interconnecting or splicing in wall-mount applications. They are suitable for new and existing interconnect, cross-connect and co-location environments, as well as hub/OTN sites, telecommunication closets and campus/enterprise environments.

Developed with one LGX-compatible adapter plate or optical module, the WME-01 enclosure features an engineered solution for fibre and cable management on both the top and bottom openings of the enclosure. It includes a front access door that is lockable with a common padlock or tube-style keyed lock. With one LGX mounting position, the enclosure has a 12 to 24 fibre patch and splice density.

Provisioned for up to 12 LGX-compatible optical modules, the WME-12 enclosure by comparison features an engineered solution for fibre and cable management on both the ingress and egress openings of the enclosure. The product contains discrete access doors with separate locking options for flexibility and security. With 12 LGX mounting positions, the device has up to 288 fibre density.

Both enclosures have a steel construction that ensures high levels of protection for sensitive components, while integrated roll-formed hinges eliminate possible fibre pinch points at the same time as deploying or servicing components within. The modular design is compatible with Poli-MOD Patch and Splice Modules and XFM optical cassettes.

AFL

www.aflglobal.com

Utilities post-storm damage assessment

Hexagon Safety & Infrastructure has released Intergraph Damage Assessment (IDA), an application that enables end-to-end automation of the entire post-storm damage assessment process. IDA can be used for simple outage patrols as well as in times of devastating storm damage, making it an everyday solution that maximises return on investment for electric utility companies.

The web-based application's integrated components originate in the storm room and extend to the field and back for a complete, automated solution. Supervisors can assign assessment work and view and analyse up-to-date data from a web-based application. Field crews using tablets can perform assessments against GIS network facility data and send results back in real time.

Unlike disaster documentation systems, IDA is specific to utility workflows and, unlike other damage assessment applications, integrates with any geographic information system (GIS) or outage management system (OMS), featuring both a field application and supervisory dashboard for end-to-end workflows.

A tablet-based mobile application uses web services to provide views of outages, crews and GIS facility information as a layer on top of commercial maps, which enables workers to collect data in the field for comprehensive damage assessment. Using the web-based application back in the storm room, supervisors can view that information and run reports and analysis to determine the extent of damage and aid in restoration strategy. Server-side event processing and industry-standard messaging enable integration with other systems for collection results, including materials required to rebuild the network, leading to real-time intelligent decision-making, which is not possible when using outdated paper maps.

Hexagon Safety & Infrastructure

www.hexagonsafetyinfrastructure.com

Smart circuit breaker

The upgraded Emax 2 smart circuit breaker from ABB is equipped to manage the different power sources that make up a typical microgrid. It combines advanced protection, programmable logic, full connectivity, easy integration and comprehensive microgrid energy management into one device.

The all-in-one solution integrates both standard and advanced microgrid functionality to meet a broad range of on- and off-grid requirements, improving quality and saving costs. Software embedded into the Emax 2 optimises the microgrid where locally generated power, energy storage, loads and utility power work together. ABB algorithms measure and evaluate energy consumption, enabling constant power loads or peak power reductions, depending on requirements.

ABB Australia Pty Ltd
www.abbaustralia.com.au

Digital thermal multimeter

The Fluke 279 FC TRMS Thermal Multimeter is an integrated digital multimeter (DMM) and thermal camera test tool for electricians and maintenance technicians.

The device lets users quickly and safely check for hot spots in fuses, wires, insulators, connectors, splices and switches with the imager and then troubleshoot and analyse issues with the DMM. It features 15 electrical measurement functions, including AC/DC voltage, resistance, continuity, capacitance, diode test, min/max and frequency. The optional iFlex clamp can wrap around conductors and wires in tight, hard-to-reach spaces and expands the device's measurement capabilities to include AC current up to 2500 A.

The product features a 3.5″ full-colour LCD screen and comes with a rechargeable lithium-ion battery that lasts up to 10 h under normal conditions. It also has CAT III 1000 V and CAT IV 600 V safety ratings.

Fluke Australia Pty Ltd
www.fluke.com.au

PROTECTING LED LIGHTING FROM POWER SURGES

LED technology has become prevalent in many areas due to its long service life and high energy efficiency. To prevent damage in the event of an error and to protect investment in LED technology, a comprehensive power-surge protection strategy cannot be overlooked, even in street lighting.

LED modules have made lights much more compact and they can be dimmed and adapted to the needs of the user by means of sensors, but they are inherently more sensitive to power surges than conventional lighting. The destruction of sensitive control drivers and LED modules by power surges reduces cost savings — not least because the cost of replacing the equipment is much higher than for replacing conventional lighting technology.

For LED lights to operate safely and efficiently long term, all of the installation components must be carefully selected. Professional lightning-current and power-surge protection is recommended for all types of lighting: interior, exterior, tunnel and object lighting.

Suitable safety devices increase the LED equipment's service life and contribute to personal and system safety. They also reduce maintenance and repair costs.

In order to protect the expensive components from premature failure, Phoenix Contact has developed special lightning current and surge voltage arresters for a safety strategy that is attuned to the application.

Power surges and their consequences

Power surges in street lighting have various causes:

- Direct lightning strikes to the lights, the power supply cables or the street lighting peripheral equipment.
- Indirect lightning effects due to capacitive or inductive coupling in the power supply cables.
- Switching operations due to ground faults, short-circuits or triggered fuses.

Whether a partial or complete failure is produced depends on the energy density of the current pulse and the sensitivity of the components to power surges. It is also possible for LED lights to sustain damage from a power-surge event and still remain functional, but this usually reduces the service life of the lights.

Lightning strikes near the lights can generate voltages of up to several tens of thousands of volts in the lines. Lightning striking a building that has external lightning protection, for example, or even a tree in the area, creates a voltage gradient and the ground potential rises to several thousand volts. The magnitude and intensity of a power surge depends, in turn, on the lightning intensity and internal resistance of the soil. If the insulation strength of the components is exceeded, the insulation breaks down at the weakest spot. Electronic devices, LED modules, power supply cables and/or cable junction boxes are damaged or destroyed. Insulation failure always poses a lethal risk and in the worst case can lead to electric shock if there is contact with metallic parts such as a light pole.

Power surges can also be generated by capacitive or inductive coupling in the power supply cable — the cause here is the lightning current flowing to the ground. Thus, for example, the current flow into the down-leads of exterior lightning protection systems generates an electromagnetic field around itself, which in turn induces power surges in power supply cables arranged in parallel.

Such effects must also be taken into account for a direct lightning strike to a tree, which, under unfavorable circumstances, can also lead to street lighting failure. A comprehensive lightning-current and power surge protection strategy also protects the LED lights from power surges — and thus increases the availability.

What does a suitable protection strategy look like?

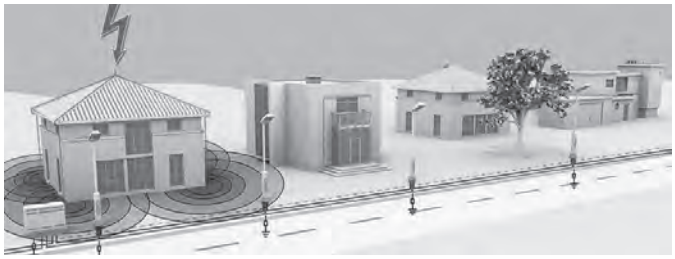
A multistage power surge protection strategy for a street lighting system based on LED technology focuses on three installation locations:

1. Directly in the LED lighting.
2. In the cable junction box at the base of the pole.
3. In the power supply cable distribution boxes.

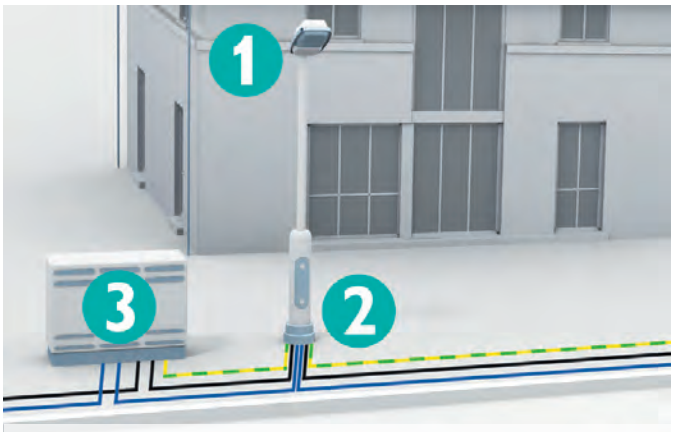
Integrating a Type 2 power surge protection device in the light protects the electronic components directly in the light from power surges due to nearby lightning strikes. The light manufacturer has a direct influence on the positioning of matched components.

The protective ground conductor in a Lightning Protection Class II LED light with doubled or reinforced insulation must not be connected. This is because there are suitable power surge protection devices between the phase (L) and neutral (N) conductors.

The current European product standard for lights, IEC 60598-1, which applies to protection classes I and II, states that for Protection Class II stationary lights, the power surge protection devices must not be connected to ground or the metallic light housing. In contrast, in Protection Class I lights, power surge protection devices may be installed in accordance with IEC/EN 61643-11. In



The danger to street lighting from lightning and voltage gradients caused by nearby lightning strikes — creation of power surge through inductive coupling.



Possible areas of use for comprehensive power-surge protection in street lighting: (1) directly in the LED light, (2) in the cable junction box at the base of the pole and (3) in the cable distribution boxes for the power supply.

Australia and New Zealand, the surge protection standard is AS/NZS 1768:2007 and the AS/NZS 3000 wiring rules detail the correct installation techniques.

The cable junction box is also suitable for installation of the power surge protection device. The advantage relative to an installation in the light is that the protective ground conductor also goes into the cable junction box. Intended for connecting to ground, it can also be used for Protection Class II LED lights. This provides effective protection against transient power surges. Another advantage is easy access for inspection or retrofitting. The retrofitting of suitable power surge protection is often neglected for cost and time considerations.

High wiring flexibility

The power surge protection devices from Phoenix Contact's Blocktrab product family are suitable for both installation locations. Their compact design allows them to be easily integrated into the existing installation. Therefore, light manufacturers and installers of new installations and light retrofits are not restricted in terms of cable lengths, cross sections and colours.

The reinforced insulation means that the protection devices can be used in Protection Class II LED applications without additional measures. For grounded systems, a protection device with a protective ground conductor connection is provided. The status of the protection devices is indicated directly on the device, and the signal can be transmitted to the lamp via the so-called 'L' connection. If the power surge protection device's disconnect device is triggered due to an overload, the light is also switched off. This considerably simplifies routine inspection of the power surge protection devices.

The protection devices are designed with a lower protection level — (L-N) < 1.3 kV — for typical LED applications. This is because the protective effect is given only when the protection level of the power surge protection device is below the impulse withstand voltage of the light and the LED driver. The power surge protection devices from the Blocktrab product family have been inspected by Dekra for quality and safety and have received KEMA approval according to the current IEC/EN 61643-11. Thus the user not only benefits from increased security, but enjoys a financial advantage with additional approvals for the LED light.

The lighting industry has made great advances in energy-efficient LED technology. However, because this technology is more sensitive against power surges than conventional lighting technology, specific protective mechanisms must also be included. These will increase the service life of the LED lights and ensure that the new technology is a good long-term investment.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au/LED

Thermal imaging digital multimeter

FLIR Systems has added the FLIR DM284 to its test and measurement instrument line-up, designed to inspect, identify and help users avoid major electrical issues. The all-in-one digital multimeter is equipped with a built-in thermal imager powered by FLIR's Lepton thermal micro-camera core and is the latest test and measurement instrument to feature the company's Infrared Guided Measurement (IGM) technology.

The device combines an 18-function industrial True RMS digital multimeter with IGM technology, which helps to guide electrical professionals with thermal imaging to the precise location of temperature anomalies and potential problems. For example, when facing cluttered wires or scanning complex electrical panels for issues, the thermal micro camera helps users pinpoint potential hazards without requiring any direct contact with the test site. Once an issue is observed using IGM, the product's current, voltage and other functions can be used to diagnose equipment problems. This combination of capabilities also reduces the number of tools electricians need to carry.

FLIR Systems Australia Pty Ltd
www.flir.com.au

Controller for high-speed applications

The Allen-Bradley CompactLogix 5380 controller from Rockwell Automation helps increase production speed and throughput, providing more precision, connectivity and up to 20% more application capacity than previous CompactLogix versions. It is suitable for high-speed packaging applications with up to 20 axes of motion to keep production running smoothly.

When combined with the Allen-Bradley Bulletin 5069 Compact I/O system, scheduled outputs improve I/O response time to as fast as 0.2 milliseconds, while event triggers from the I/O modules provide near-instantaneous task executions. This allows engineers to design compact machines that achieve higher accuracy and precision.

A dual-configurable, 1 Gb Ethernet port supports device-level-ring (DLR) topologies or the use of multiple IP addresses. The ability to create multiple IP addresses is useful for manufacturers seeking to establish network separation between plant-floor and enterprise-level traffic.

Diagnostic indicator lights display the status of communications, module health and I/O module activity, allowing operators and technicians to immediately understand problems without connecting the controller to a computer. The controller also incorporates security technologies and software features, including digitally signed and encrypted firmware, controller-based change detection and audit logging.

Rockwell Automation Australia

www.rockwellautomation.com.au

Towel rail timer

The HNS710RT-2 S-Click towel rail timer from CABAC can be adjusted to an individual's routine with a single two-second press of a button, setting up the desired interval and delivering warm and dry towels only when they are needed. It saves energy by powering the rail only for the interval time and then automatically switching off. The device can hold 16 routine times, is backed up by batteries and will retain routine times even after a power loss of over 24 hours.

The device kit comes with timer, CABAC wall plate, cable clamp, CABAC-, HPM- and Clipsal-style push-button, insulation breakdown sticker, instruction sticker and instruction manual.

CABAC

www.cabac.com.au

This year's All-Energy Australia conference features more than 150 industry speakers covering seven topic centres.

The conference streams include smart grid, off-grid solutions, community energy, investment opportunities, electric cars, bioenergy and wave energy technology.

Overarching the seven streams are three key areas of focus: energy storage, smart grid and energy efficiency. According to the exhibition director, Robby Clark, the focus on these three areas in 2016 is part of a concerted effort to pack in as much quality content as possible into the free, two-day program.

"Our delegates are hungry for the latest technology and expert advice in the sector, which is what this year's program and its three focus areas will bring to the table.

"In addition to focusing on these areas, we will be announcing later this year information about the MeetMe networking opportunity, which is a matchmaking service for delegates interested in scheduling one-on-one sessions with some of our world-renowned exhibitors," he said.

Event partner the Clean Energy Council (CEC) coordinates a number of key initiatives centred on bringing the potential of energy storage to a practical, safe and well-considered reality of deployment throughout Australia's energy networks. CEC's Storage Advisory Group and Energy Storage Network also enables the industry's key players to source products and services in energy storage that are tailored to their particular use in order to expand business networks and to drive innovation.

Clean Energy Council Chief Executive Kane Thornton said the organisation was proud to continue the partnership, which would "ensure the renewable energy industry could access the best innovations, experts and solutions in the one place".

"All-Energy Australia 2015 was a resounding success, and we look forward to building on that success in 2016 through the Clean Energy Council's solar technical program and professional development components, which are free to attend," he said.

As part of the Clean Energy Council's Professional Development (PD) Day, solar installers will have access to expert advice on the big design and installation issues facing the industry. Designers and installers will get the latest updates on standards and compliance issues.

Clean Energy Council Accreditation Manager Sandy Atkins said, "All-Energy is the perfect opportunity for solar installers to complete some valuable professional development, all at no cost.

"The Clean Energy Council accredits more than 4000 solar installers right across Australia, and the partnership with All-Energy Australia has allowed us to vastly improve the conference and professional development opportunities we deliver to them," said Atkins.

The program also features the ATRAA conference, which will delve into more detail on technical and business issues and opportunities across two streams.

The technical stream will focus on new technologies, battery storage issues and case studies from the Clean Energy Council Industry Award winners. This year will also see an entire session dedicated to answering all burning technical questions. The business stream will examine issues facing the industry, including panel integrity, warranty concerns and challenges facing commercial installs.

"The technical solar conference (ATRAA) and Professional Development Day at All-Energy are both first-rate in terms of the content and expert presenters. In 2016, we will once again incorporate all the hot topics the solar industry wants to hear, including battery storage, important changes to standards and regulations, installation how-to's and the latest exciting technologies," said Atkins.

The event is taking place from 4–5 October at the Melbourne Convention and Exhibition Centre and is free to attend. Registrations are now open and the full 2016 program is available for review. Visit www.all-energy.com.au for more information.

Reed Exhibitions
www.all-energy.com.au

Individually protected power distribution unit

RackLink has introduced a new configuration of PDU (power distribution unit) where each outlet comes protected with either a thermal overload breaker or user-replaceable fuse. This enables users to limit the current to each individual outlet.

If a fault develops on a single piece of equipment (connected to a single outlet on the PDU), only the corresponding thermal overload or fuse will trip, keeping other critical equipment powered. Currently available in standard 19″ 1RU (horizontal mount), it contains six outlets which can be configured with 10/15 A GPO (Australian 3 pin), IEC-Lock C13 outlets, or a mix of both.

Users can also specify the circuit breaker values, up to a total of 32 A across the PDU. The IEC-Lock outlets increase the security of existing installation without having to replace cabling and will lock into any existing IEC C14 cabling.

Also available are 19″ 2RU 5x 10/15 A GPO or IEC-Lock C13 outlets with individual thermal-magnetic breakers (C, D or B curve), total rating up to 50 A; and 19″ 3RU 10x 10/15A GPO or IEC-Lock C13 outlets with individual thermal-magnetic breakers (C, D or B curve), total rating up to 50 A.

RackLink

www.racklink.com.au

Emergency DC UPS

Magellan's new emergency DC UPS is a complete solution for avoiding any loss of DC power in substations. The unit is light, compact and portable and combines an advanced, integrated, reliable battery charging system and light weight, high efficiency Lithium batteries, along with an integrated intelligent battery monitoring system (BMS).

The charger operates from 240 VAC, providing dual uninterruptible 110 and 24 or 48 VDC power. The unit is to be kept connected to mains at all times when it is not being used in order to make sure that the batteries are charged and are available at full capacity when needed. The weight is around 145 kg with batteries and 80 kg without them.

Magellan Power

www.magellan-power.com.au

MASTER ELECTRICIANS AUSTRALIA

Apprenticeships still the most valuable way to address skills shortages

Malcolm Richards

It may surprise you to hear that the apprenticeship model in Australia has been around as long as European settlement — almost 230 years!

But the reason it's lasted so long is because it has evolved with the times and continues to evolve as society changes.

But there's been a worrying decline in the number of apprenticeship and training commencements in recent years, on the back of major economic disruption. Unfortunately, when there is an economic downturn, employers can find it understandably difficult to commit to taking on apprentices and trainees, and are, of course, far less financially able to do so.

While it's expected that numbers will fluctuate as economic conditions do, the downward trend has continued steadily since 2012.

Last year's figures, released by the National Centre for Vocational Education Research (NCVER), showed that apprenticeship and training commencements between March 2014 and March 2015 decreased by almost 20% on the year prior.

The situation is dire enough to warrant a stern warning from Federal Senator and Minister for Education and Training Simon Birmingham, that without a strong supply of apprentices, Australia's economic performance would be placed at risk.

At last year's INAP Conference, Senator Birmingham praised the apprenticeship model, and said its beauty lay in its work-placed learning nature.

"We can have great confidence that it is always up to speed in terms of its linkage with employment outcomes, with the needs of business, and it is why I think it is such a successful and iconic model here in Australia and many other corners of the world," Birmingham told conference attendees.

"We see great strengths in this system. There are many things that do work in relation to apprenticeships. It of course helps to deliver highly trained, highly skilled individuals and it is well regarded internationally, and that is demonstrated by the presence of so many of you here today and this conference coming to Australia," he said.

Senator Birmingham warned that it has never been more important to get more people and more businesses embracing the opportunities that apprenticeships have to offer.

As we all know, the long-term effects of low apprenticeship numbers naturally include skill shortages, and a comprehensive list of these trades can be found on the National Skills Needs List, which is based on detailed labour market research and analysis undertaken by the Department of Employment.

And electricians — both general and special class — are on this list. Our profession is officially considered as a skills shortage, so if you're thinking about putting on an apprentice, now is the time.

On a positive note, under the Australian Apprenticeships Incentives Program, an Australian apprentice undertaking a Certificate III or IV qualification that leads to an occupation that's listed on the National Skills Needs List may be eligible for additional employer benefits and personal benefits.

Some of the employer benefits can include support for Australian Apprentices payments, the Rural and Regional Skills Shortage incentive and Trade Support Loans.

Apprenticeships help young people move into meaningful employment and to make the transition from school to work. But while young people most certainly still dominate (approximately 13% of young people aged 15–19 who are in employment are in apprenticeships), the Australian Apprenticeships Incentives Program is also a great way for employers to take on a mature-age apprentice — in fact, almost one in four current apprentices across all industries is aged between 25 and 39. Some of the most recent evidence actually suggests that mature-age apprentices 45 and over are the most likely of all age groups to finish!

But we do believe we need more incentives for employers to put on apprentices. We have to make it more viable for SMEs in the electrical industry to play their part in turning these figures back around, and we'd like to see all sides of government come together to offer more support to Aussie businesses when it comes to apprenticeships and traineeships.

Master Electricians Australia
www.masterelectricians.com.au

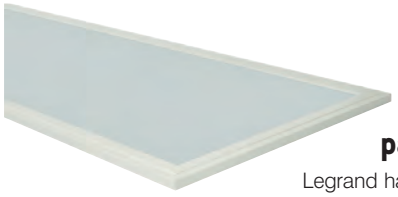
Inverters

Redback Technologies is launching a second generation version of its smart hybrid inverter and a family of grid-tie inverters. The products utilise the Internet of Things and cloud technology to give household and commercial users more options.

The Single- and 3-Phase Grid Tie Family and the Generation II Hybrid for residential and commercial customers revolutionise the traditional inverter, which converts DC power generated by solar panels into AC power for general use. Both the Grid-Tie range and Gen II Hybrid incorporate Ouija Board software, a cloud-enabled intelligent system for analytics and remote control. The Gen II Hybrid inverter is battery- and solar panel-agnostic.

Redback's system will use machine learning to gather intelligence over time, learning from user preferences as well as drawing data from external factors like the weather. This will ensure energy usage is optimised, thus providing an accelerated return on investment. The Redback solution is hosted in Microsoft's Azure IoT Suite cloud platform, ensuring easy updates and upgrades as technology develops.

Redback Technologies Australia
www.redbacktech.com



LED flat panel lighting

Legrand has launched its Luminess LED Flat Panels, providing an energy-efficient alternative to fluorescent lighting and better glare control for commercial office, school, retail and healthcare applications. Following significant research and development to achieve glare requirements, which LED has traditionally been unable to meet, the Luminess LED Flat Panel combines the right optical distribution to deliver a unified glare rating (UGR) of less than 19 to create more comfortable and productive workplaces.

The panels feature a lifespan of 50,000 h at L70 for improved lighting maintenance and longevity and can also be integrated with Legrand's range of energy and lighting management solutions for advanced energy savings and room automation. When connected to the Legrand BUS/SCS systems, local and remote command of other devices (such as window shutters, projector screens and air conditioners) can be enabled for further energy savings. The recessed panels deliver a streamlined aesthetic, and four modular sizes allow for flexible design and installation. In addition to an output of up to 3700 lm, the panels feature a 4000K colour temperature, making them suitable for task-based environments. A colour rendering index (CRI) of greater than 80 enhances skin tones, hues and textures in rooms. The panels feature an opal microsprismatic diffuser and are available with a mains or DALI connection option.

HPM Legrand
www.hpmlegrand.com.au

CASE STUDY

Panda power

The Kew Recreation Centre in Victoria is an impressive site from the air, featuring one of the area's largest rooftop solar installations.

The City of Boroondara had dual concerns of climate change and rising electricity prices in mind when it decided to investigate installing a solar system at one of the council's largest sites. Council approached EnviroGroup, a member of Yingli Solar's YINGLI 4 YOU partner program, for advice on how to determine and create the most sustainable and suitable solution for the aquatic and health facility.

The City of Boroondara is serious about renewable energy, with Kew Recreation Centre being the 10th council site to incorporate a solar installation since 2010. It's also the largest, according to former Mayor of Boroondara Councillor Coral Ross, as well as being a project that realises ongoing benefits.

"This is by far the largest solar project we have undertaken — embracing solar energy, not only do you save money by generating your own power, but you also reduce your carbon footprint. It feels good on all fronts," she said.

The system installed includes a massive 365 PANDA 270 W N-type monocrystalline series modules, 72 of which utilise cutting-edge DC optimiser technology from Tigo. The 99 kWp solar array is installed across a number of rooftops and generates power equivalent to taking 45 medium-sized cars off the road.

"Having been on the roof to look at the sea of solar panels, I can certainly say they are a magnificent sight!" said Ross.

"But even more striking is the contribution they will make to reducing our reliance on energy from fossil fuels. They will also reduce our electricity bill," she said. The expected savings equate to an emissions reduction of 190 tonnes and $16,000 per annum.

The system also incorporates an SMA Sunny Tripower 25000TL inverter and is expected to yield around 131,270 kWh annually.

Yingli Green Energy Australia Pty Ltd
www.yinglisolar.com/au

Image credit: ©Yingli Solar

Hazardous area LED lighting

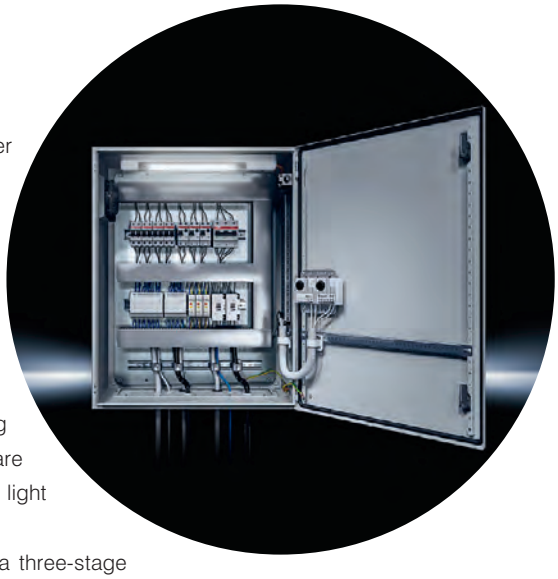
Control Logic has released the 6002 and 6402 series of LED lighting from R.STAHL that is suitable for nearly any environment. Explosion proof and energy efficient, the fittings are suitable for general lighting such as ceiling installation, pendant lights or pole lighting in zones 1, 21, 2 and 22. Using a familiar and widely used form factor ensures that changing over from traditional fluorescent tubes to LED light sources is an especially straightforward process.

The series utilises the latest LED technologies with one 52 W luminaire being equivalent to two conventional 36 W fluorescent lamps. This provides up to 100,000 hours of operation, while retaining a high luminous flux of up to 5800 lm and luminaire efficiency of well over 100 lm per W.

Both models feature a slim low-profile GRP housing that benefits from less weight. In addition to its IP66/IP67 design, the series can be used in harsh environmental temperatures from -30°C to a blistering +55°C. They are available in either economical 28 W or 52 W standard versions, with or without diffusers in lengths of 700 mm and 1310 mm respectively.

Control Logic Pty Ltd
www.control-logic.com.au

Compact wall-mounted enclosure



The Rittal AE compact wall-mounted enclosure is available in over 75 variants including powder-coated steel in light grey RAL7035, 304 and 316 stainless steel with 400 grain finish.

Standard gland plates can easily be exchanged for those with metal or plastic knockouts for simple and fast cable entry and wall-mounting brackets can be attached to the enclosure from the outside, meaning retrospective fitting is achievable.

An installation rail can be fixed to the side, floor or roof areas, creating a larger internal workable area and doubling the mounting area within a small exterior enclosure footprint. The enclosures are compatible with other Rittal accessories such as door switches, light systems, fans, filters and connectors.

The AE features high corrosion resistance, made possible by a three-stage surface treatment and paint process. The surface finish provides optimum corrosion protection and is resistant to mineral oils, lubricants, machining emulsions and solvents. It is certified in protection ratings IP55 to IP66 to provide protection in harsh environments and all parts are manufactured from a single piece of steel, seam welded, providing optimum strength.

Rittal Pty Ltd

www.rittal.com.au

Multiphase test connector

HARTING has released the 10 B multiphase test connector designed to prevent failures and ensure worker safety when performing maintenance on machinery. Featuring simple measurements, the tool is a suitable control device for service technicians and engineers, as well as all personnel tasked with the installation, service and maintenance of three-phase motors (230/240 VAC, 50 Hz).

The reliable operation of machinery and equipment is indispensable for production and servicing. Failures result in high costs and demand quick response. This is especially true during maintenance, when replacing defective equipment, and during the connection and installation of replacement components. Improper procedures, inadequate testing and defects during installation can irreversibly damage motors and result in manufacturing interruptions.

The multiphase test connector, however, determines the connection of the phases (L1, L2, L3) on the AC motor power supply, as well as the interconnection at initial torque (star or delta connection) and the direction of rotation. These parameters are important for safe connection, swapping components and servicing, and for avoiding maintenance errors. The test connector also meets DIN EN 61010-1 standards.

HARTING Pty Ltd
www.harting.com.au

Waterproof adhesive terminals and splices

The Molex Perma-Seal terminals and splices provide a rugged, environmentally sealed connection for wire sizes 8–22 AWG that will insulate, seal and protect joints from physical abuse and abrasion, water, salt and other corrosive compounds.

The inner wall of the heat-shrinkable sleeve is lined with a hot-melt adhesive that is inert at room temperature, permitting wires to be inserted easily into the splices and terminals. As the sleeve is heated, the adhesive melts and flows under pressure from the tubing. This action fills any existing voids and creates a seal that repels moisture or dust incursion, even during pressure cycling, and withstands rigorous tests that can be applied to high-performance splices, for example, the salt fog test in MIL-T-7928.

The insulation is made of high-performance NiAc third-generation material, which the company claims shrinks up to 40% faster and is significantly thicker than competing polyolefin or nylon products. This provides good durability, improved efficiency and lower labour cost, and reduces the potential for wire insulation damage. The product is also abrasion resistant to prevent wearing caused by excess vibration.

A broad range of terminal styles is available to suit various applications.

Molex Premise Networks Pty Ltd
www.molexpn.com.au

Interior lighting

Brightgreen has added more fittings to its Surface Series range of interior lights. The D550 SHX Curve downlight and T550 H Curve track light expand upon the range of surface-mounted LEDs, providing flexible track and surface-mounted luminaires for areas that require precision lighting.

Featuring directional beams, both fittings provide the ability to design with light, rather than simply wash spaces with uniform illumination. Projecting 550 lumens at a 36° angle, the tight beam and small body complement the larger 900 lm fittings in the range. Key features include: Tru-Colour technology to enhance the appearance of interior surfaces and colours; dual-axes adjustments featuring a 355° body rotation and 90° angle tilt using a constant friction hinge; high-performing dimmers and control systems; a 36° directional beam for precision illumination; a durable, pure aluminium body available in black and white finishes; and a 70,000 hr lifetime. The fittings are available in 3000K warm white and 4000K neutral colour temperature options.

Brightgreen Pty Ltd
www.brightgreen.com

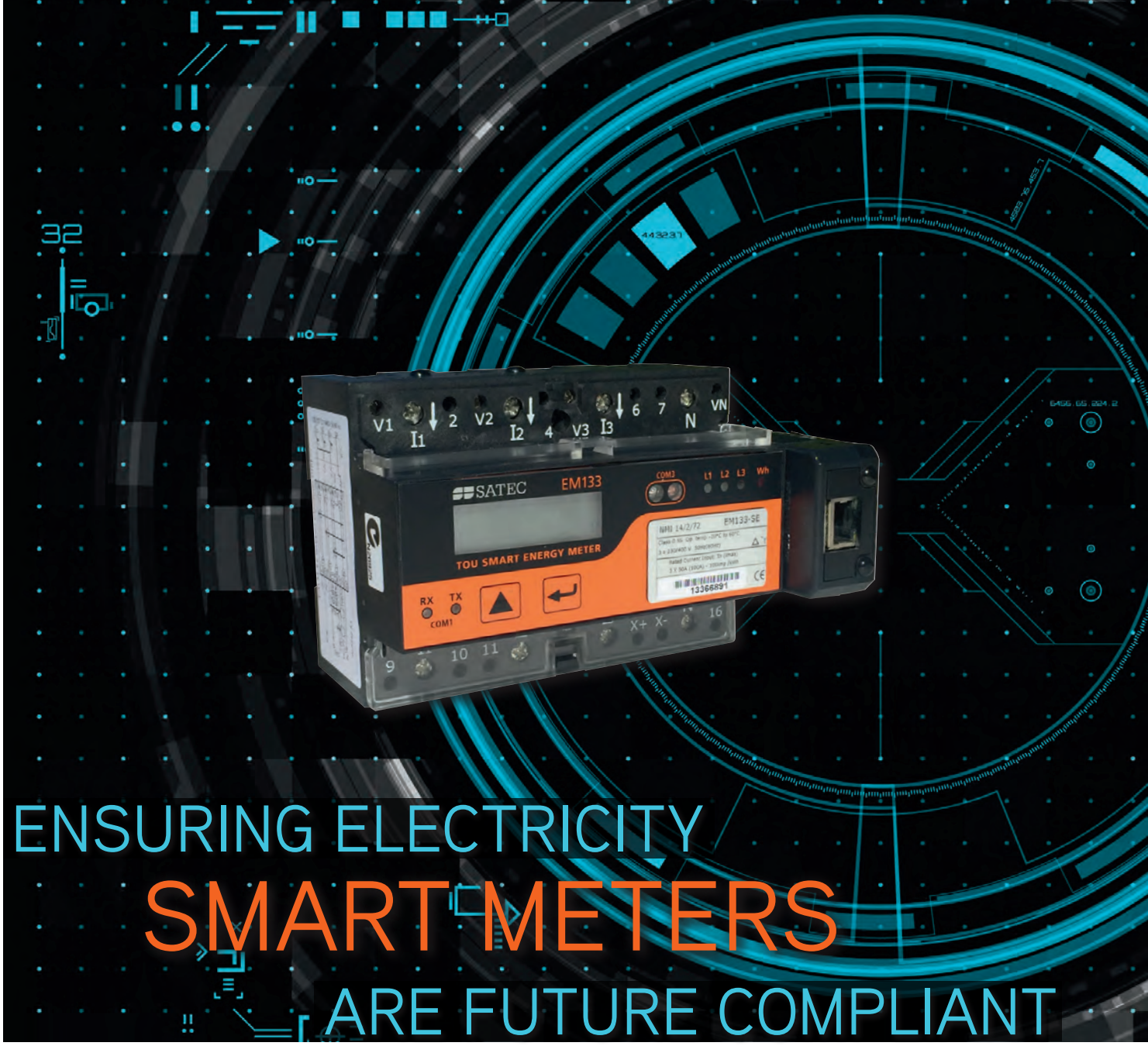
Bollard luminaire

The Castor bollard luminaire from ERCO Lighting is suitable for illuminating open areas and pathways. The LED fitting is available with 360° radial beam for open areas or with a light aperture designed to spread the light 180° in a semicircle onto pathways.

Versions of each are available — the 180° model has a connected load of between 8 and 12 W and with lumen packages between 840 and 1650 lm. The 360° version delivers between 16 and 24 W, with lumen packages between 1680 and 330 lm. Castor comes at a height of 800 or 900 mm and is available in two different colours. The luminaires are switchable or DALI dimmable.

The LED module features high-power LEDs on a metal-core PCB in warm white (3000K) or neutral white (4000K). Castor is made of corrosion-resistant cast aluminium.

ERCO Lighting Pte Ltd
www.erco.com



ENSURING ELECTRICITY SMART METERS ARE FUTURE COMPLIANT

Electricity meters come in many forms. Understanding features and capabilities, as well as the requirements of an application, can ensure that today's meter will meet tomorrow's requirements.

There are many electricity metering options available today, with a range of features and capabilities. Many low-cost meters lack the functionality to ensure these devices will remain useful in the future. Accuracy, sampling rate and the electrical parameters measured can vary greatly from meter to meter, but more complex capabilities are where the future truly lies.

Smart features

Tomorrow's meters will need to encompass time of use (TOU) tariff functions, communications for automatic meter reading (AMR), regulatory approvals, reading import and export of power, data logging capabilities, real-time clock (RTC), disconnect/reconnect capability, read and write in registers for remote control, as well as reprogramming and analysis of data for forensic investigation. Ensuring 'energy smart' meters are feature rich means now that future needs and market or regulatory changes will be met, reducing the likelihood of meter churn and overall lifecycle costs.

Applications such as solar energy generation may require metering to have four-quadrant measurement. In addition, interval metering with 15- or 30-minute data logging with date/time stamping is essential in today's world, while gross and net metering require smart devices with the appropriate four-quadrant measurement functionality. Interval meters record energy or other electrical measurements at 15, 30 or 60 minutes intervals, or other intervals of time, providing date/time stamp of recorded data.

Electricity and energy meters that incorporate event logs can provide additional information and date/time stamping for analysis in the event of problems such as voltage outages or reprogramming by unauthorised personnel.

Not just electricity

The expansion of additional energy readings for cold and hot water, gas and greywater monitoring can be an integral part of smart meters which incorporate pulse inputs. Pulses from water and gas meters can be sent to the smart meter, using pulse data logging, which can in turn be forwarded to billing systems and/or building management systems (BMS) and other third-party software AMR solutions.

Improved measurement standards, such as Class 0.5S accuracy to AS/IEC62053-22, have led to increased accuracy performance in smart metering without any major cost impact. Class 1.0 accuracy meters are widely accepted in the market. However, advances in standards coupled with new technology has provided for enhanced measurement with Class 0.5S, particularly at low loads.

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> MORE COMPLEX CAPABILITIES ARE WHERE THE FUTURE TRULY LIES.

Space savings

Advances in technology have improved the space-to-design ratio performance of smart meters. Reduced meter design space additionally reduces required panel space, while ensuring that operational and performance specifications are not compromised.

Space is a premium in embedded networks, in both new installations and in existing buildings where retrofits or upgrades are required. Providing space savings using advanced smart metering designs can provide space savings upwards of 90%, when compared with typical 'bottom up connect' utility meters. This reduces the triple bottom line and provides savings across the board; from the architect to the builder or developer and the electrical contractor.

Sustainability support

Smart metering now utilises algorithms to profile energy usage showing daily, weekly, monthly and quarterly readings. This function provides electricity, water and gas usage information in an easy-to-read format and ensures data is presented in a way that supports the reporting for sustainability rating tools and schemes including Green Star and NABERS, without the need for dedicated software.

Improved communications

Advanced communications capability provides further benefits, allowing the meter to be read locally or remotely. Initially, the use of RS232 protocol provided only a 1:1 ratio of a master/slave relationship and the use of RS485 improved this to a ratio of 1:32. These topologies provide only limited communication, however, as software connections are restricted to a single master polling the downstream nodes or devices. Using Ethernet TCP/IP, as found in smart metering, provides multiple TCP socket support and therefore has the added advantage of providing flexible 'multiple' relationship configurations.

As we move into the age of Internet of Things (IoT), smart meters are increasingly connected directly to the internet and the addition of an application programming interface (API) ensures interoperability via third-party software applications. As the NBN is rolled out across Australia, smart metering connectivity is inherently NBN-ready, or easily connected to the internet via ADSL-2, 3G or 4G, and data access is available to the end user without the restrictions traditionally associated with proprietary data.

Advanced assurance

Trade billing measurement in Australia must comply with the National Measurement Institute of Australia (NMI) M6-1 standard, which provides assurance to the end user that the meter will continue to operate and function under varying metrology conditions, thus ensuring repeatability with accuracy standards.

When considering the available options in smart energy metering, ensuring that the vendor has the required technical knowledge and can offer ready support should always be factored in, as should the warranty period on offer and the proposed warranty on accuracy performance.

SATEC (Australia) Pty Ltd
www.satec-global.com.au

Handheld wireless tester

NetScout Systems has launched the AirCheck G2 Handheld Wireless Tester, which includes enhancements such as troubleshooting and diagnosing Wi-Fi networks built using the increasingly adopted 802.11ac standard, access point backhaul testing and free access to the Link-Live Cloud dashboard.

The tester is designed to enable frontline IT to quickly and easily identify issues responsible for spotty connections, dead zones and slow speeds, as well as locating rogue access points and unauthorised devices. This functionality supports installation and troubleshooting of IoT wireless edge infrastructure for a range of applications including industrial IoT, smart buildings and smart homes.

Enhancements in this generation of the device include: 802.11ac 3x3 radio to support next-generation wireless initiatives; Link-Live integration for collaboration, reporting and results management; a 5″ touch-screen display for improved ease of use; and ethernet tests for AP backhaul verification.

NetScout

www.enterprise.netscout.com

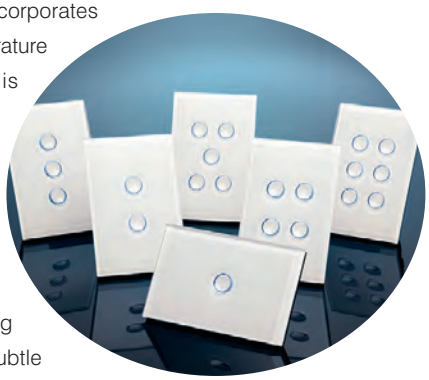
Switching and dimming controls

Clipsal by Schneider Electric has updated the Saturn OneTouch range of touch-sensitive controls, which features multiway switching and dimming capability.

First launched in 2012, the Saturn range enabled contractors to achieve multiway switching and dimming of Clipsal LED loads. The result of the update is a modular range of integrally switched electronic switches and dimmers that incorporate advanced touch control technology.

Designed for universal load compatibility, Saturn OneTouch products utilise powerful and sophisticated microcontroller-based universal dimming technology to provide full control of almost any type of load. With a full 6AX rating, the small switch mechanism provides switching capability while offering dynamic multiway control. When coupled with Saturn OneTouch secondary units, up to three-way switching and dimming can be achieved while using traditional multiway wiring standards.

Saturn OneTouch also incorporates overcurrent and overtemperature protection devices and is capable of withstanding persistent short circuit conditions.



The range is available in Ocean Mist, Pure White and Espresso Black, with each switch plate featuring a glass look finish with subtle bevelled edges.

Schneider Electric Clipsal Partner

www.clipsal.com

Smart lighting control solution

The RAPID Series 3 smart lighting control system by CP Electronics comes with updated technology and an easy-to-use graphical interface. Fully addressable and networkable with modular mechanics, it meets demanding lighting control and energy management applications, without the cost and complexity of other systems.

Combined with the company's patented Energy Measurement technology, the smart lighting solution can be configured to control rooms, floors or an entire multifloor building. The control modules are networked together on each floor, while multifloor systems are linked together using RAPID Area Controllers. The latest RAPID lighting control module (LCM) comes standard with eight outputs, which can be extended to provide an extra four outputs with a plug-in module. It also includes mixed dimming and volt-free output options.

mySmartCTI

www.mysmartCTI.com.au

AUSTRALIAN SMART LIGHTING SUMMIT 2016

PREMIER LIGHTING FORUM

Featuring local and internationally renowned lighting experts from around the world, the 4th Annual Australian Smart Lighting Summit is being held 6–7 September at the Melbourne Convention & Exhibition Centre.

The summit is a forum for leaders within the smart lighting industry to converge and share ideas on the significance and impact of smart lighting technology within Australia, amongst lighting designers, architects, engineers, consultants, manufacturers, developers and public sector representatives.

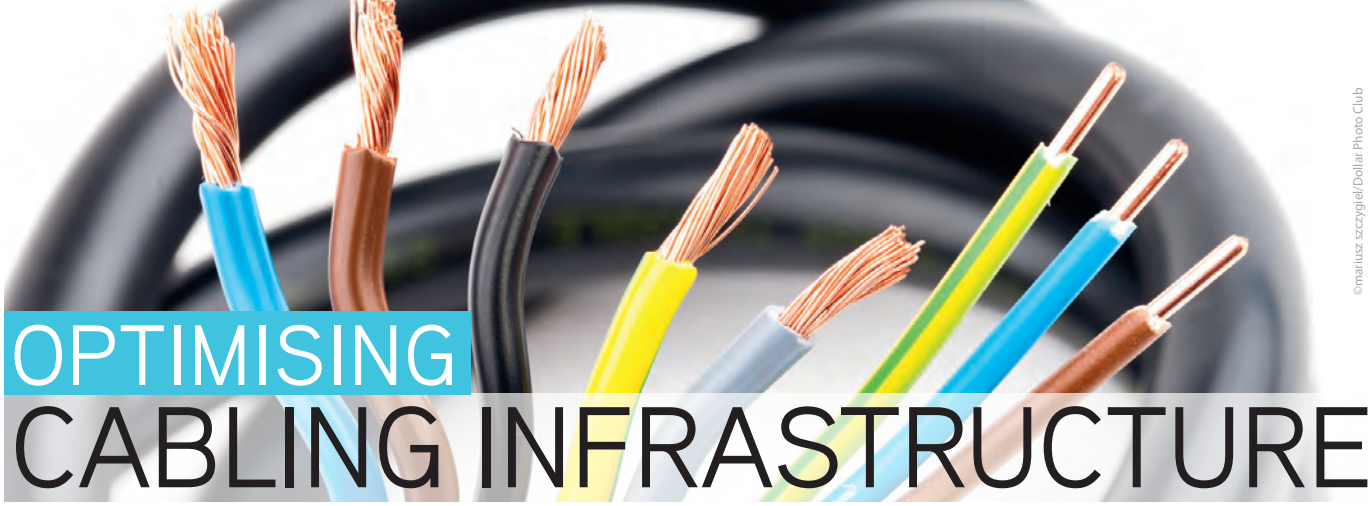
The 4th Annual Australian Smart Lighting Summit will feature topics on:

- Exploring the Internet of Things (IoT) and Public Lighting: With the growing influence of IoT and the convergence of wireless technology along with internet-enabled devices, cities like Adelaide are currently embarking on trials to test smart lighting technology and data connectivity.
- Smart Urban Lighting and Smart Cities: Case for Australian Local Governments Presentation from Bob Parks, Executive Director of the Smart Outdoor Lighting Alliance, Washington DC, currently serving as chair of the IES environmental outdoor lighting committee. He will be discussing what Australian local governments can learn from smart street lighting trends across US cities.
- The Northern Lights Project Seven councils in the Northern Inland region will benefit from the installation of new energy-efficient street lighting under this project coordinated by Regional Development Australia Northern Inland (RDANI).
- Future Lighting — Debating LED: Presentation and discussion of the latest LED technological trends taking place within the industry, as well as specs into current LED lifespan and progress, including the future viability of LED technology.

The summit will also feature an address by Lighting Council Australia, as well as presentations from City of Melbourne.

Supported by IESANZ, the 4th Annual Australian Smart Lighting Summit is being held 6–7 September at the Melbourne Convention & Exhibition Centre. For more information: www.lightingforum.com.au, www.linkedin.com/groups/7040840.

Expotrade Australia Pty Ltd
www.lightingconference.com.au



OPTIMISING CABLING INFRASTRUCTURE

Shielded versus unshielded — which cable is best for your application?

Since the early 1980s, shielded cables have been a popular choice for data networking applications. Most notably, IBM standardised an S/FTP cable for its Token Ring LAN systems, creating an industry norm. In many parts of the world, shielded cables continue to be the dominant ICT infrastructure choice, particularly across Europe. Conversely, other countries, including the United States, opt for unshielded varieties.

The preference for shielded versus unshielded cable has been the cause of passionate debate over the years. Ultimately, determining the appropriate choice comes down to a number of factors including the applications to be supported, the external environment and, of course, budget. The primary reason for selecting a shielded cable is to protect the transmission signal within the cable from external electromagnetic interference (EMI). In addition, the shield also acts to stop these signals from exiting the cable and causing interference with nearby electrical and electronic systems.

Cable anatomy

Obviously, the construction of CAT6A cable will vary depending on its external nature — shielded or unshielded. However, even among shielded cables, there is variation in the shielding method used, which can impact on its suitability for a particular application.

To clarify, there are three main types of cable in broad use today:

1. U/UTP — unshielded twisted pairs with cross filler element/pair divider. (Figure 1.)
2. F/UTP — outer foil shield around all four pairs with cross filler element/pair divider. (Figure 2.)
3. S/FTP — foil shield around each pair, outer metal braid around all four pairs with no cross filler element/pair divider. (Figure 3.)

There is, however, another type of shielded cable construction that has also been around for many years and is about to change the status quo: U/FTP. This variant combines the noise immunity advantages of a fully shielded cable with the ease of installation of an unshielded one.

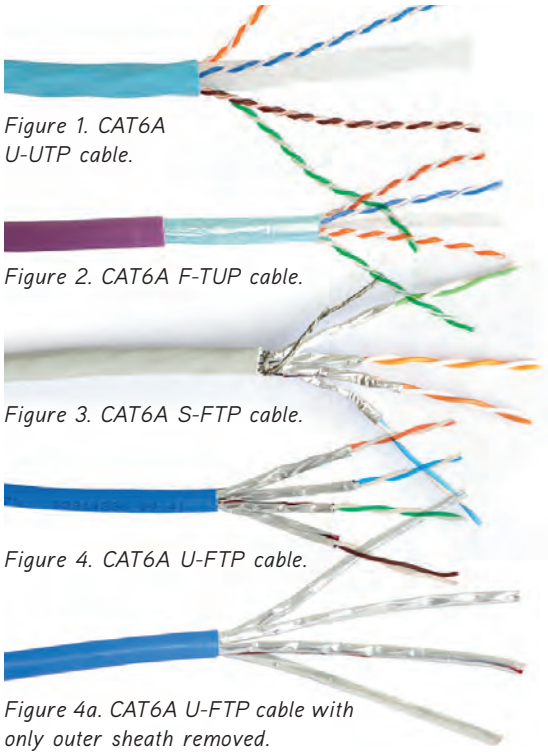


Figure 1. CAT6A U-UTP cable.

Figure 2. CAT6A F-TUP cable.

Figure 3. CAT6A S-FTP cable.

Figure 4. CAT6A U-FTP cable.

Figure 4a. CAT6A U-FTP cable with only outer sheath removed.

Benefits of U/FTP

The benefits of U/FTP are numerous, but relate mostly to performance, ease of installation and physical size.

Performance

When installed correctly, the U/FTP pair shielding provides superior crosstalk and EMI performance. The individually shielded pairs enable the use of a more relaxed twist rate than U/UTP or F/UTP.

For most installations, U/FTP also removes the need for dealing with the extra shielding found in an S/FTP cable construction. Additionally, permanent link tests have shown that U/FTP provides superior headroom for most measurement parameters when compared with U/UTP and F/UTP variants.

Ease of termination and installation

Perhaps the biggest surprise for installers is the increased speed and ease of termination of U/FTP in comparison to other available variants.

U/FTP has the advantage of not requiring a cross filler element to maintain pair geometry and crosstalk performance. In the case of F/UTP cable, there is a plastic layer which surrounds the pairs that needs to be removed for termination, and removal of that shield can often be problematic. The construction of U/FTP means that removal of the four shields is easy and quick, thanks to the looser twist rate. This facilitates rapid termination, saving time and money.

Physical characteristics

For applications up to CAT6A, U/FTP cable features a much smaller diameter than U/UTP and F/UTP varieties. This is because the cross filler element is not required, decreasing overall cable width.

The benefits are obvious — a smaller cable diameter reduces congestion in cable trays, conduits and in racks. The physical construction and smaller diameter also make U/FTP more flexible and therefore easier to route.

The upshot is that U/FTP cable is a viable alternative to the many other options and features excellent transmission performance, as well as physical characteristics that can save time and money in any installation.

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Preparing for the networked world

Bryan de Caires, CEO

Fixed-line telephones have been with us for more than one hundred years but, just as with most technologies, things have moved on and the days of analog phone lines are numbered. In recent years we have seen a dramatic decrease in the use of landlines (or 'cord-cutting' as it is sometimes referred to), largely driven by younger Australians who prefer the mobile phone option.

With the demise of analog, we are seeing the emergence of a rapidly growing array of exciting new technologies and applications.

It is estimated that by 2020 there will be 30 billion smart appliances connected around the world. The Internet of Things is changing the way we live.

With Internet Protocol Version 6 (IPv6), the number of connections to the internet has increased to 78 octillion — that's 78 billion, billion, billion. Which, according to international futurist Marc Goodman, is enough space to give one trillion IP addresses to each grain of sand on Earth!

The challenge faced from a security perspective is that we have struggled to protect the devices already connected online today, so as more things get connected and are susceptible to hacking, how are we going to protect these? As Goodman warned in an address to an ASIAL forum last year, "While we have been excellent at wiring the world, we have failed to secure it and that's something we need to give grave consideration to."

Within the security sector, the use of IP communications and IP cameras connected (wired or wireless) to a home or business network has been one of the fastest growing areas. These devices often include their own web services which enable users to access them remotely using a computer, smartphone or other mobile device.

Networking in security systems is fast becoming the norm. While networks offer many benefits, security remains a critical issue. When installing a system serious consideration needs to be given to provide protection against sophisticated internet threats, which can include malicious acts by organised crime syndicates and foreign adversaries using the internet to attack systems.

The cybersecurity threats we face are real and growing in severity and frequency. "The rapid nature of the move to digitisation has created cybersecurity challenges that need to be addressed, given that we live in a connected world where demand for solutions to protect networks and systems from internal and external hacking and data breaches is growing.

Network security has become an important priority and installers of security systems need to be across the solutions they can provide to clients to protect them.

Network security activities protect the usability, reliability, integrity and safety of the network and data. Effective network security targets a variety of threats and stops them from entering or spreading on a network.

Many network security threats today are spread over the internet. The most common include:

- viruses, worms and Trojan horses;
- spyware and adware;
- zero-day attacks, also called zero-hour attacks;
- hacker attacks;
- denial-of-service attacks;
- data interception and theft;
- identity theft.

Due to the complexity and nature of threats faced, there is no single solution available. A more measured approach is needed, one that involves multiple layers and which offers protection should one layer fail.

Network security is achieved through both hardware and software. Among the key security components are:

- antivirus and anti-spyware, firewalls to block unauthorised access to your network;
- intrusion prevention systems (IPS) to identify fast-spreading threats, such as zero-day or zero-hour attacks;
- virtual private networks (VPNs) to provide secure remote access.

It is also essential to ensure that software is constantly updated and managed to ensure networks are protected from emerging threats.

With the move to the networked world, one of the fundamental challenges facing security installation companies is ensuring that they have a suitably skilled workforce capable of meeting the needs of customers. Investment in staff training not only boosts skills but can also improve loyalty.

'There just aren't enough skilled technicians out there' is a complaint often mooted in this industry. Yet very few companies do anything about addressing the issue, rather they wait for the problem to fix itself, which is not going to happen. Thankfully there are some forwarding thinking and resourceful operators who have taken the initiative by engaging technicians who understand the Internet of Things, IP, the National Broadband Network and the vast multitude of new product innovations. These operators have upskilled their technicians on IP Networks, Advanced CCTV, Access Control, Optical Fibre and Structured Cabling through the ASIAL Security technician Certification program.

In short, we live in a networked world where understanding how networked security systems work and can be protected will be critical to the future success of your business. So rather than fighting change, look to embrace it — you may be pleasantly surprised by the exciting opportunities that arise from doing so.

Australian Security Industry Association Ltd (ASIAL)
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ADDRESSING IIoT CHALLENGES

Connecting disparate devices from multiple manufacturers is a key first step to creating the Industrial Internet of Things (IIoT). This article explains how protocol conversion addresses the challenges of connecting legacy equipment.

The IoT is a hot topic these days, mainly due to the projected rapid growth of interconnected devices. According to Berg Insight, the number of wireless IoT devices in automation networks is forecast to grow at a compound annual growth rate of 27.2% to reach 43.5 million by 2020.

However, the Industrial Internet of Things (IIoT) is more of a near-term reality, with many industrial firms striving to take advantage of its benefits. There are many different terms for IIoT, including Industry 4.0 and the Connected Factory. Whatever you choose to call it, how can you take steps to get in the game?

The challenge — IIoT readiness

One might wonder how to get started with IIoT, especially when it involves equipment from different manufacturers that is five, 10 or 20 years old. How do you solve the challenges of being IIoT-ready when you use legacy devices to operate many of your processes?

Replacing equipment is not an option, due to cost and integration time, so it's important to find a way to not only protect an existing investment, but equally to make it compatible with more modern equipment. This may seem to some like a 'best of both worlds' scenario.

The answer — protocol conversion

Protocol conversion is a key first step in solving the multivendor and legacy equipment challenge. Protocol converters are devices that translate standard or proprietary protocols in one device so that it can be understood by others, resulting in interoperability.

Using a manufacturing floor as an example, there are typically many different devices in operation, each with its own protocol, and there is a need to handle these disparate protocols in order to gather required data. The ability to provide information conversion in a human machine interface (HMI) — or other automation products — across a multivendor environment is an efficient way to connect different devices with differing protocols and to enable aggregation of that data collection.

Protocol conversion allows users to collect data from different devices and different protocols and to 'translate' those in a centralised device, enabling easy collection and compilation of data from all over the factory floor. This data is then turned into usable, trend-related information and reports from which informed decisions can be drawn and effective resource planning carried out. This is sometimes referred to as the mining and displaying of data for actionable intelligence, which gives users real-time visibility and helps make operations more efficient.

Connect — speaking the same language

There are benefits in bringing new and legacy equipment together on the same network. Again on the factory floor, some newer equipment may be ethernet-ready, while older equipment may use a serial connection and a legacy protocol specific to that vendor. By integrating different devices (and enabling legacy devices to talk to newer devices), it's possible to have disparate equipment communicating across multivendor environments.

Industrial environments are embracing newer communication infrastructures such as cellular M2M, Wi-Fi, Gigabit Ethernet, fibre and Power over Ethernet. These communication technologies help deliver and enable higher-bandwidth applications that bring more information and intelligence to manufacturing environments.

Monitor — using data to visualise processes

Protocol conversion is also important for monitoring processes — collecting and analysing data to develop more efficient operations and reduce downtime. In particular, when protocol conversion is implemented in multivendor environments, users can leverage visual management solutions to display key performance indicators (KPIs) that can be used for tracking, assessing and analysing manufacturing processes. These performance measurements are commonly used to evaluate success in relation to goals and objectives. While KPIs tend to vary by organisation, common examples of KPIs in manufacturing include: count (good or bad), reject ratio, rate, target, Takt time, overall equipment effectiveness (OEE) and downtime.

Control — increasing operational efficiencies

Protocol conversion can help integrate PLCs, PCs and SCADA systems to collect and process data in real time to control devices and applications that directly affect operations. Exercising control over operations could mean such things as having the ability to turn legacy serial-connected equipment on or off, or open or close valves regardless of location.

Addressing IIoT challenges through protocol conversion enables organisations to improve productivity and increase operational efficiencies through real-time device connection and data processing. Using this technology, all devices — legacy and new — communicate to provide a holistic environment view that allows for more effective planning and action. By enabling disparate devices to communicate, users can connect, monitor and control operations from a single platform. This type of data-driven monitoring and decision-making will get any organisation well on the way to true IIoT readiness.

Control Logic Pty Ltd
www.control-logic.com.au

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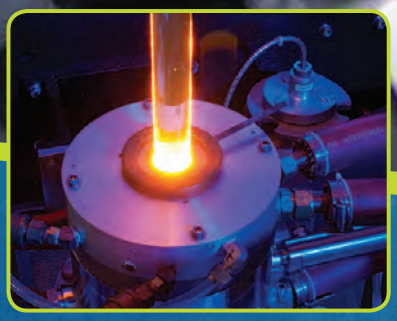

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CLOUD COMPUTING MOVES TO THE EDGE

John Schmidt, Data Center Solutions Lead, CommScope

The face of data centre infrastructure is changing, thanks to the cloud.

Global data centre networks are fully integrated into our daily lives and activities. Every post, tweet, email, online purchase, financial transaction, picture and video we collectively produce flows through an intricate network of switches, routers and servers connected via fibre optics inside monolithic, concrete buildings we elegantly refer to as the "cloud". As a society we are wholly reliant on this infrastructure and it is fundamentally changing. In 2015 the world's population produced 3.7 exabytes of mobile data on a monthly basis, which is a 74% increase over 2014 and a 4000x increase over the past decade[1].

As a result of this unprecedented growth in data consumption, content is being pushed closer and closer to consumers, or to the edge of the network. This change in architecture has profound implications on data centre networking and design that we will discuss further. First let us examine the drivers that are pushing content to the edge of the network.

Latency

As data consumption increases the corresponding willingness to wait for content has decreased. Our expectation of immediate service continues to increase even as richer content is served up and devoured. A consumer viewing Netflix in high definition has an expectation of near zero buffering. That same consumer has the same expectation for 4K video even though the corresponding bandwidth is 5x higher[2]. Consumers have an expectation that native data on a tablet or mobile device and apps utilising data from the cloud have the same user experience.

The average user has the same expectations of a movie that is downloaded and played and one that is streamed in terms of both quality and instantaneous access. New technologies such as virtual reality/augmented reality, high-resolution cloud-based gaming, and cloud-assisted autonomous vehicles will require even lower latencies to support evolving user expectations. Content delivery networks (CDN) have made a science of caching and delivering content within local regions. CDN has previously been a niche market dominated by companies such as Akamai, but now major players like Amazon and Google are offering their own CDN for both their own use and their customers. CDN performance will increase dramatically from a buildout at the edge of the network. The closer these networks are to the user, the better the performance. Of course this need for lower latency is not relegated to consumers only. Businesses are also driving the need for edge computing. Most notably, brokerages and in particular high-frequency trading (HFT) rely on minimal latency to provide the highest level of performance to their clients.

Data sovereignty

The concept of data sovereignty is centred on the belief, and in many jurisdictions the law, that digital data is subject to the regulations of the country in which it is stored. With cloud computing, data could reside nearly anywhere in the network. Strict interpretations enacted by various countries mean that it is the responsibility of the network provider to make sure that data that originates in a given country is stored locally to ensure compliance with the law. The obvious method to make this happen is to have local data centres in country.

This is generally counter to the concept of a virtualised cloud where data could exist in various instances globally. With edge data centres, cloud providers have the ability to comply with even the strictest interpretations of the law while also providing optimal service to the local region. In the long run, cloud companies are lobbying for safe harbour exemptions, but until then they must find alternative means of compliance. Edge data centres provide a means to this end.

Bandwidth consumption costs

Most consumers think they are the only ones that pay for access to high-speed pipes. The debates around net neutrality are focused on access for the customer, but in the backbone of the internet, transport costs are a multibillion-dollar business. In 2015, the cost for a 10 Gbps long-haul transport was US$4,000 per month.[3]

The further the data centre is located from the user, the more costs incurred from long-haul transport. Large service providers have built out their own networks, but this remains a very capital-intensive business, especially with trans-ocean subsea networks. As the edge of the network is pushed closer and closer to the user, the costs for long-haul transport will decrease or even be eliminated.

Analytics

The original purpose of data centres was simply to store and access data. This required companies to have a local primary data centre with a geographically separated disaster recovery centre. Networks have evolved to distributed computing in order to support content delivery. With all the storage of data, it was inevitable that companies would want to mine this information for trends to make better decisions.

Big data became the latest buzzword as a new field of data analytics formed and, again, this changed the network from just long-term storage to one of processing and ready access to data. We now exist in the era of real-time analytics. Machine learning has given data analysts the ability to apply algorithms to massive amounts of data in real time and a great example of this is the ads that pop up when we do an internet search. The ads appear on our screen in real time, but behind the scenes sophisticated algorithms are identifying and monetising the ads that you are most likely to click through based on your current search term as well as your browsing history. In order to make this process as transparent as possible, companies must put massive amounts of processing power as close as possible to the user. The field of real-time analytics will continue to expand and the demands on the network will continue to be stressed.

> AS DATA CONSUMPTION INCREASES THE CORRESPONDING WILLINGNESS TO WAIT FOR CONTENT HAS DECREASED.

Impact on data centre design and location

As data centres move close to users at the edge of the network, one of the obvious considerations is location. Since data can reside anywhere, data centres in the core of the network are logically placed where they are most convenient to the owner. Those decisions can be driven by economics, tax incentives, existing real estate, proximity to renewable energy or a number of other factors. The key requirement for data centres at the core is to the need for power and communications and this dynamic fundamentally changes in this new paradigm since by definition the edge of the network in close proximity to users. As a result, edge data centres must be flexible and innovative. As an example, Microsoft recently announced it was testing an underwater data centre citing that 50% of the world's population is within 200 km of the ocean. Other innovative avenues for bringing computing resources to the edge of the network must also be explored. A handful of options follow.

Colocation

A number of colocation (colo) services are now building out white space in tier 2 cities with the express purpose of positioning them as edge data centres. This trend will likely continue as companies desire to push their content closer to the user without incurring fixed capital costs associated with building out brick-and-mortar locations. This provides companies with a relatively straightforward and scalable means of deployment. Assuming the colo provider already has infrastructure in place, the speed of deployment is also optimal. Several service providers also have global operations for companies that are expanding or servicing a global user base. Many hyperscale and cloud providers have already used this as a means to deploy their global network of edge data centres. The downside, if any, to colo is that a company is bound by where the service provider chooses to locate, which may or may not be optimal for the network. With so many choices globally, this potential issue is quickly being resolved by the service providers responding to customer demands.

Central office consolidation

The telecoms have seen a significant decline of telephony lines and as a result there is additional real estate available within these central offices. As circuit switched infrastructure is decommissioned, it makes room for Ethernet switches and servers and, due to the distance limitations of fixed line telephony, these central offices are already located at the edge of the network. The main obstacles to overcome are power and cooling. Telecoms are traditionally the domain of DC power and hardened equipment. Data centre equipment is more likely to be AC powered and require significant cooling. This could be a systemic change that limits the ability to convert this valuable communications real estate to edge computing centres. Further innovation is required to facilitate this transition.

Innovations around DC-powered equipment, lower power servers and modular data centres can solve this issue.

Modular data centres

Prefabricated or modular data centres, sometimes called "data centre in a box", may be an elegant solution to the challenges of edge buildouts. As a self-contained solution, they can be deployed in a much shorter time frame than traditional brick-and-mortar facilities and can be deployed nearly anywhere. Any existing real estate with access to power and communications could be transformed into an edge data centre and modular solutions can also be deployed alongside existing central offices to leverage existing real estate and communications lines. Because of their flexible size, modular data centres can be deployed in a wide variety of applications to suit the client's unique requirements. They can also be designed to be very efficient on power usage, with certain designs leveraging adiabatic or free-air cooling as opposed to direct exchange cooling used in many traditional designs.

Operational challenges

Another value proposition of edge data centres is that the staffing may be minimal to non-existent. As the number of total data centres increases, it is challenging and costly to fully staff the sites to the same degree as core data centres. At the same time, understanding what is happening within the data centre has never been more critical. As a result, technologies like data centre infrastructure management (DCIM) and automated infrastructure management (AIM) will become essential in edge deployments. DCIM is critical to the remote monitoring of all major aspects of the data centre, in particular power, cooling, security and communications that are the life blood of the data centre. One benefit of DCIM is the ability to monitor the health at the edge of the network from a centralised location, but more important for edge data centres is the ability to document and coordinate the interaction of multiple sites globally.

This level of coordination is absolutely critical in the deployments of multiple edge sites. Remote management is also a driver of AIM, which can monitor, track and alert any changes in state to the physical layer infrastructure. Imagine an outage caused by a physical disconnect in a site hundreds or thousands of miles away from core of the network — AIM can identify the exact location down to the port and patch cord so the problem can be corrected. Without AIM to identify outages, it is akin to finding the needle in the proverbial haystack. Implementing AIM at the edge will lead to superior operation and management of the distributed data centres, enabling IT managers to remotely have full visibility of all the physical connections, instant knowledge of any changes and up-to-date reports on what devices are connected where and how. This will significantly shorten troubleshooting time required in case of downtime, gives limitless control onto the physical infrastructure, improves work order management, provides better security and improves change and asset management.

The future of the edge

We will continue to see buildouts closer and closer to the edge of the network as content becomes richer, devices become more intelligent and user expectations continue to increase. This will drive the need for innovation at the edge of the network and innovation will take place on multiple fronts including hardware, software and the facilities themselves. In particular, we will see more deployments of modular data centres to offer flexibility and increase efficiency being coupled with advanced DCIM and AIM capabilities to monitor all aspects of the remote sites. This move to the edge will ultimately benefit the entire network of users and clients as network efficiency is improved. Network transformation is not simply desired for better performance, it will be essential to providing us with the content and analytics that will drive our businesses and our lives in the very near future.

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Building for the future

Canberra Data Centres (CDC) was formed in 2007 with the purpose of being a trusted partner for data centre services. CDC currently operates three data centres, each of which is custom-designed and built to provide the utmost functionality, security and reliability, with a focus on environmental concerns.

The Department of Immigration and Border Protection recently looked to install an AFL MTP solution in the CDC.

"There were a range of factors that forced us to move our in-house data centre into a colocation data centre. The primary reason was the inability of our existing DC to support the new higher density Compute and Storage platforms that the Department intended to migrate to," said Nathan McGlynn, MACS [Snr] CP, Data Centre and Infrastructure Services for the Department.

"Another reason was the lack of power required to run our systems, as we were constantly running at 75–85% of the total power capacity," said McGlynn.

The final factor was to align with the AGIMO Data Centre policy to reduce the number of in-house centres run by government agencies and relocate to 'greener', more efficient, colo facilities. CDC worked closely with AFL staff and MultiSystem Communications (certified system designers and installers) to design a solution to best meet the Department's needs. A combination of AFL's optical fibre distribution frames (OFDF), MTP cabling, Category 6 copper and enclosures was used in the network to ensure an effective outcome. AFL's high-density MTP solution, coupled with the OFDF, provides high-speed communications in a limited space. This allows more efficient cooling, reducing cooling costs and the amount of power needed.

Challenges associated with the project included the sheer volume of the fibre core count (5000+ cores) that was installed and tested within a four-week window.

Some of the backbone trunk connections were required to patch directly from a fibre enclosure into active equipment, requiring the design of a custom trunk with a 24-fibre MTP connector on one end that fanned out to three 8-fibre MTP connectors on the other. The active equipment was a BROCADE BLADE CHASSIS, which had a specific pin-out configuration. It was fundamental that the configuration was considered when the trunks were being manufactured to ensure the correct input/output fibre cores aligned with each other.

This was of particular importance as there was also further patching from the fibre enclosure through other backbone cabling into different cabinets in the POD. This process proved to be quite involved but, with help from the AFL team, a custom trunk was designed and manufactured to suit the specific needs of the end user.

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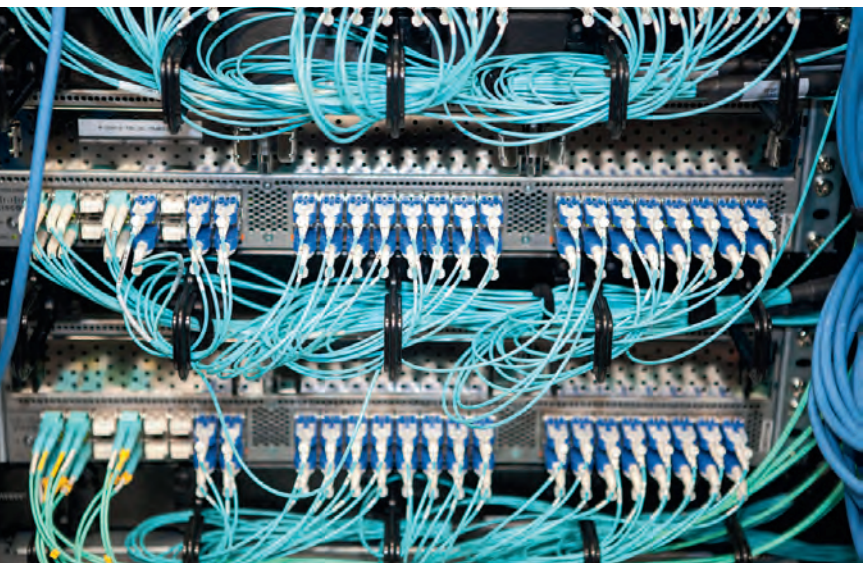

180˚ HD Wi-Fi camera

D-Link ANZ has launched the DCS-2630L full HD 180° ultrawide-view Wi-Fi camera, offering advanced features including HD video quality, two-way audio, sound and motion detection, microSD Card slot for local recording and automatic day/night viewing — making the camera a suitable start to a security solution for any home or small business.

Using de-warping technology, the 180° wide-eye lens takes a 'fish eye' view and transforms it into a more viewable video stream with less distortion. Built-in night vision offers up to 5 m of viewing in total darkness; with two-way audio, users can respond to what they see and hear.

The camera features a microSD card slot, giving users more flexibility to record video locally to the camera without impacting network or internet bandwidth. In addition, users can choose different options for recording based on event trigger, schedule or continuous recording for more control of what video they want to record.

When combined with the mydlink Camera Recorder (DNR-202L), users can simultaneously stream, record and play back up to four D-Link Wi-Fi cameras for home security 24/7. The Camera Recorder records footage locally to an attached USB hard drive. There is no need for cloud-based storage, contracts or fees, delivering a comprehensive surveillance solution.

Along with full HD video quality, the camera can be easily accessed and managed with the free mydlink Lite app for iOS and Android devices, as well as Windows Phones. In addition, built-in 802.11AC Wi-Fi technology enables users to connect the camera to the 5 GHz band, providing better bandwidth for streaming HD video.

D-Link Australia Pty Ltd
www.dlink.com.au

WHY SECURITY IS ESSENTIAL IN PLANNING WIRELESS NETWORK DEPLOYMENTS

Ilan Rubin, Managing Director

The Internet of Things, bring-your-own-device (BYOD) office environments and cloud-based applications are contributing to rapid changes in how organisations deploy and use wireless networks. With these changes come new security challenges for wireless networks and different approaches to deal with them.

Security should be one of the biggest factors when planning an enterprise wireless network deployment. Wireless networks can be used by hackers to gain unauthorised access to networks and access sensitive information.

Most people are aware that public wireless networks can pose a risk to those using them, but unsecured enterprise wireless networks can also expose companies to risks. All it takes is one person to get past a network's defences for a serious breach to occur.

To protect themselves, their employees and their customers, organisations should plan their wireless networks with the security implications in mind. This means building networks designed to maximise the effectiveness of security platforms, with architecture that aids in the monitoring of network traffic and swift action in the event of an attempted attack.

Regarding security infrastructure, organisations should look for solutions that combine comprehensive security with enterprise access, enable segmentation of devices and access layers across both wired and wireless networks. Security technology protecting wireless networks should also embody a flexible platform with end-to-end protection and be easily scalable to enterprises of all sizes.

It is far more effective and advantageous for organisations to design their wireless networks around cybersecurity capabilities, rather than viewing security as an afterthought. This way, enterprise access in a secure architecture framework is guaranteed from the outset.

If possible, wireless network architecture planning should incorporate the hardware as much as it does the software elements. For example, some wireless network infrastructure offerings come with integrated access points, application appliances and controller-based management facilities. This sort of solution can be deployed and scaled for organisations of all sizes.

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THE COST OF NETWORK PRESSURE

Luke Mackinnon, Chief Technology Officer

Enterprises in all sectors are becoming technology businesses in their own right. IT infrastructure now not only supports operations, but also increasingly drives customer interactions and overall business success.

It's not only happening across banking and retail — sectors which are widely known as having undergone a disruptive shift from bricks-and-mortar to a digital focus — but for all companies who rely on the internet, software, computers and network systems.

And disruptive technology advancements are set to continue.

Cloud exchanges to connect public cloud services are gaining popularity with businesses as they enable organisations to significantly improve performance, bring down infrastructure overheads and ensure high availability and security. As the penetration of cloud increases, businesses need to be able to fully harness the power of the cloud provider of their choice, whether it be Microsoft Azure ExpressRoute, IBM SoftLayer or Amazon Web Services.

Additionally, the need to process and store information is increasing for businesses exponentially. In many ways, data analysis is the lifeblood of the contemporary enterprise, with unified communication technologies also a key consideration for businesses as the uptake of services like instant messaging, video conferencing and mobility grows.

In fact, research firm Frost & Sullivan predicted that the Australian unified communications (UC) market will see an 8.6% growth between 2011 and 2018, and will be worth over $1 billion by the year 2016.

However, the challenge this has created for many companies is the size, scale and flexibility required of the IT department. Many organisations aren't prepared for, or don't recognise, the amount of digital information connected devices and big data will provide. To make matters worse, many businesses overlook the pressure these new technologies will place on their legacy IT network.

While the impact might seem minimal, this pressure can manifest itself in slow speeds and bottlenecks — problems that prevent staff and business owners from getting work done, eventually limiting a business's ability to respond quickly to market conditions. Further to this, poor network management results in costly downtime. Downtime is expensive due to a combination of labour and revenue cost. In addition to the damage the business can suffer with customers, there's also the loss of faith in the infrastructure supporting a business, which can result in poor employee engagement. No one wants to be working in an organisation that can't deliver basic IT services.

The ramifications of poor network management not only affect end users, administrators and business owners, but network engineers too. The job of an enterprise network engineer has moved from crimping cable to managing traffic, as well as solving problems ranging from backups to firewalls and viruses. Each task comes back to moving data across the network in an efficient and secure manner, so engineers have a vested interest in futureproofing the network to save headaches and inefficiencies in the long run.

As the engineer is ultimately responsible for the functioning of the network, capacity is also a key concern. As more devices become internet-enabled, business will look to network engineers to maximise performance and uptime; yet this is an impossible task if IT departments don't have the necessary financial and structural support from the business.

> DISRUPTIVE TECHNOLOGY ADVANCEMENTS ARE SET TO CONTINUE.

If network engineers are focused on putting out fires, and the reactive day-to-day maintenance of infrastructure, they have no capacity to focus on high-level design and planning, which is business-critical in today's competitive market.

Given the expense and opportunity costs when networks fail, it's incredible to think that many enterprises are reliant on IT networks that have remained unchanged for years.

Even though the demands and requirements for infrastructure today are far greater than they once were, businesses are still operating with networks designed for a time before cloud and unified communications technology. As much as technology is an opportunity for companies to drive efficiencies, innovate and grow, it also creates a need to actively manage and improve IT infrastructure. For IT departments and staff to know where to start when futureproofing their network, the first step is to define it, followed by identifying and prioritising traffic. Once this has been completed, reviewing the links in place and improving the quality of the links that are in use allow the IT operators to focus on network redundancy, making sure the network is available in case of a network device or path failure and unavailability.

Even with the best technology and IT systems, a business can only function as well as its underlying infrastructure, and businesses can fall prey to downtime when focus is taken off what is truly important to operations — the network.

Vocus Communications
www.vocus.com.au

Case study

nib, one of Australia's fastest growing health insurers, is a company that recently saw fit to upgrade its network infrastructure. The rapid growth of its business and customer base has seen nib expand across the ANZ region with hubs in Newcastle, Sydney and Auckland. While the expansion has resulted in great success for the business, the company identified an opportunity to improve intrabusiness collaboration due to the physical separation and distribution of its offices and workforce. Additionally, increasing demand from customers had resulted in larger call volumes to multiple, dispersed contact centres which was placing significant strain on the traditional network.

nib sought to solve these problems by implementing a dependable trans-Tasman solution — a network that would not only be able to improve communication channels between nib's internal teams, but also result in greater customer service outcomes for its thriving customer base.

Brendan Mills, chief information officer for nib, said, "We needed to further enhance our internal communication touchpoints and develop the scalability of our customer contact centre so that we could better handle peak call demands.

"To do so, we implemented a new network model that provided converged contact centre SIP voice connectivity and IP WAN data network services. The voice services are predominately SIP-based, which instantly improved our ability to manage and shift calls within our contact centre delivery points. Furthermore, this enabled us to cater for peaks and troughs in call volume as we could reallocate calls, routing them wherever we wanted.

"The IP WAN network services allowed us to present rich communication to end points across our network, including improving communication channels between our internal teams by introducing collaboration tools such as video conferencing. Our old infrastructure simply did not have the bandwidth to handle video," said Mills.

The new communications model has not only allowed nib to continue to expand its operations without any disruption, but has also opened the door to further development in terms of online customer service and communication.

"We think video will become a channel of choice for customers wanting to interact with us and we are now confident that we can offer that with the bandwidth we have in place.

"The new model is commercially sound, and it will also deliver cost savings in terms of downtime, but the greatest benefit to our business has been the overall improvement in the delivery of communications services," said Mills.

CASE STUDY

Low-voltage luxury

ABB has installed its first smart low-voltage network in a cutting-edge shopping mall in the EmQuartier, Thailand.

The EmQuartier — a 250,000 m² luxury shopping and entertainment venue that is part of a multimillion-dollar transformation of Bangkok's business district — is the first retail development to use ABB's Emax 2 circuit breakers and Ekip View supervision software, which has control and connectivity features for remote management of its power grid.

Image courtesy of: Sry85 (Own work) CC BY-SA 4.0

The EmQuartier now boasts a smart low-voltage network.

The Emax 2 circuit breakers' built-in sensors and connectivity, configured with the supervision software, enables remote monitoring, management and control (even the ability to limit power consumption) of the low-voltage network. The software connects more than 100 Emax 2 air circuit breakers with moulded case circuit breakers (MCCBs), miniature circuit breakers (MCBs) and multimeters, as well as the mall's central monitoring system. The Emax 2's connectivity features enable it to integrate into a wide array of automated systems so that facility managers can receive alerts and communicate remotely via a tablet.

The company said its low-voltage solution improved the project's delivery time by 35% and reduced engineering costs by around 60% due to its integrated SCADA functionality.

The network was developed in partnership with local panel builder PMK Group.

"Building operators need solutions that make energy management easier and that help reduce total operating costs — ABB's complete solutions simplify the whole process for everybody: panel builders and system integrators save time and money while making the end-user's operations simpler to manage, safer, more reliable and energy efficient," said Giampiero Frisio, managing director of ABB's Protection and Connection business.

"By pioneering the introduction of more integrated, intuitive and connected low-voltage solutions, ABB is taking power and productivity to the next level."

With each node in the electrical distribution network connected, everything from energy consumption to trend analysis and testing can be controlled remotely. The air circuit breakers' touchscreen user interface supports 10 different languages, including Thai, making the network simpler to manage.

ABB said it is partnering with panel builders and system integrators worldwide to support the introduction of smarter low-voltage power grids that make site management more effective and cost-efficient.

These systems can be deployed at a single site or multiple sites and supervised at a central location. By collecting detailed data from each device at a site, operators can compare different time windows, or similar time windows at different plants.

The company said by monitoring the status of assets for issues such as contact wear, life expectancy, alarms or circuit breaker position, with notifications sent to mobile devices, this can ensure more timely interventions.

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