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AUTOMATION

Melbourne Central Retail

+ Building Management and Metering System upgrade

Melbourne Central is one of the city's most well-known and popular shopping centres.

Constructed over five years from 1986, the centre was designed by Japanese architect Kisho Kurokawa. It opened to the public in 1991 with 160 speciality shops, 30 cafes and food outlets, and the Japanese department store Daimaru occupying six floors. The design combined the old with the new, with the site's historic shot tower encased by Kurokawa's iconic 20-storey glass cone. The site also featured a 55-storey commercial office building.

In 2002, owner GPT embarked on a $250 million renovation that saw ARM Architecture successfully open the shopping centre up to the city streets and integrate the city loop train station below.

Today, Melbourne Central brings together over 320 retailers across five levels. Kurokawa's glass cone and the historic shot tower remains one of the city's most recognisable landmarks.

+ Business Needs

Melbourne Central is a large and complex site featuring a combination of naturally ventilated and mechanically ventilated spaces, and building services of varying age and function.

Over the course of the centre's near-30 year history, a number of upgrades and changes had been made to the Building Management System (BMS) and controls, with overrides and programs applied that had effectively covered over some of the operational issues associated with the centre's HVAC systems.

Additionally, the use of disparate lighting protocols including DALI (digital addressable lighting interface), Dynalite and CBUS across the site, and in multiple locations, had brought complexity and inefficiency to lighting controls and efficiency.

Melbourne Central is continually evolving. Along with commencing an aesthetic enhancement program in 2017, GPT aligned its capital masterplan to maximise opportunities for efficiencies and identified the BMS as a critical path in the overall plan.

The aim of the BMS upgrade project was to install a new open, non-vendor management layer over the existing field hardware. Incorporating this layer into the building services network would simplify improvement works and offer the capability of integrating new building services in a seamless and scalable manner in the future.

+ Solution Overview

The latest non-proprietary, truly open framework Tridium Niagara 4 platform was selected for deployment at Melbourne Central shopping centre.

The Tridium Niagara 4 platform is a proven, reliable solution with open protocol standards, no lock-in licensing or software agreements. It allowed for BACnet and Modbus protocols to be integrated into all facets of the platform, throughout the centre with networking incorporated into the building's fibre network.

With decades of experience in the retrofit of controls systems and strategies in existing buildings, Airmaster's senior building automation system engineers worked closely with the GPT project team and consultants.

The existing BACnet MS/TP subnetworks were segregated into logical groups of 30 devices per network, with these and associated devices migrated onto a new Niagara N4 management layer and supervisor software.

Additionally, the Energy Management and Metering System installed by Airmaster Automation for electricity, gas and water was also migrated to the new BMS.

+ Overcoming challenges

With the support of the Airmaster projects team, the upgrade works were delivered with minimal disruption to tenants and while the centre remained fully operational.

To achieve this, a parallel management layer network was implemented that ensured engineering and graphics were completed ahead of any migration works. This network was directly connected to the building services network (CSN) with the supervisor software residing on virtual machine.

The management layer hardware was installed in communications rooms adjacent to the fibre nodes throughout the building and fed via the communications racks' uninterruptable power supply (UPS). By installing and commissioning this hardware first, the impact of migrating the live field devices and associated data was significantly reduced.

Network segregation testing was conducted afterhours with all equipment overridden as ON at the mechanical services switchboards (MSSB). Once tested, a revised segregated network topology drawing was submitted to the project consultant for review, before being implemented gradually onto the new N4 management layer.

Additionally, by removing the use of 20 year old network cabling routes, switches and patches, the building services network (CSN) will harden the site's cyber security.

+ Verified Results

The main works of the Melbourne Central BMS upgrade project were completed by mid-2020, with the replacement of old, legacy field controllers continuing.

As a consequence of the BMS upgrade, GPT now has full control of how it progresses with planned renovation and development works at the shopping centre. Additionally, GPT and Melbourne Central's facility management team can rely on one system that normalises all HVAC control, lighting protocols and metering, and better manages data.

The upgrade will also allow for a high focus on energy efficient control strategies supported by an ongoing building tuning plan in conjunction with the project consultant.

+ Customer Benefits

+ Standardisation of building systems under the Niagara N4 management layer including HVAC, lighting, extraction and metering
+ Improved cyber security
+ Simply, accurate and informative graphical user interface with video-based tutorial
+ Non-proprietary, open protocol standards

About Airmaster

Airmaster is an award-winning building services company, providing HVAC&R management, smart building solutions and fire services across Australia, New Zealand and South-East Asia. Founded in Melbourne in 1988 and with 13 branches across Australia and New Zealand, Airmaster's holistic approach to building management makes for a comprehensive range of service offerings.

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