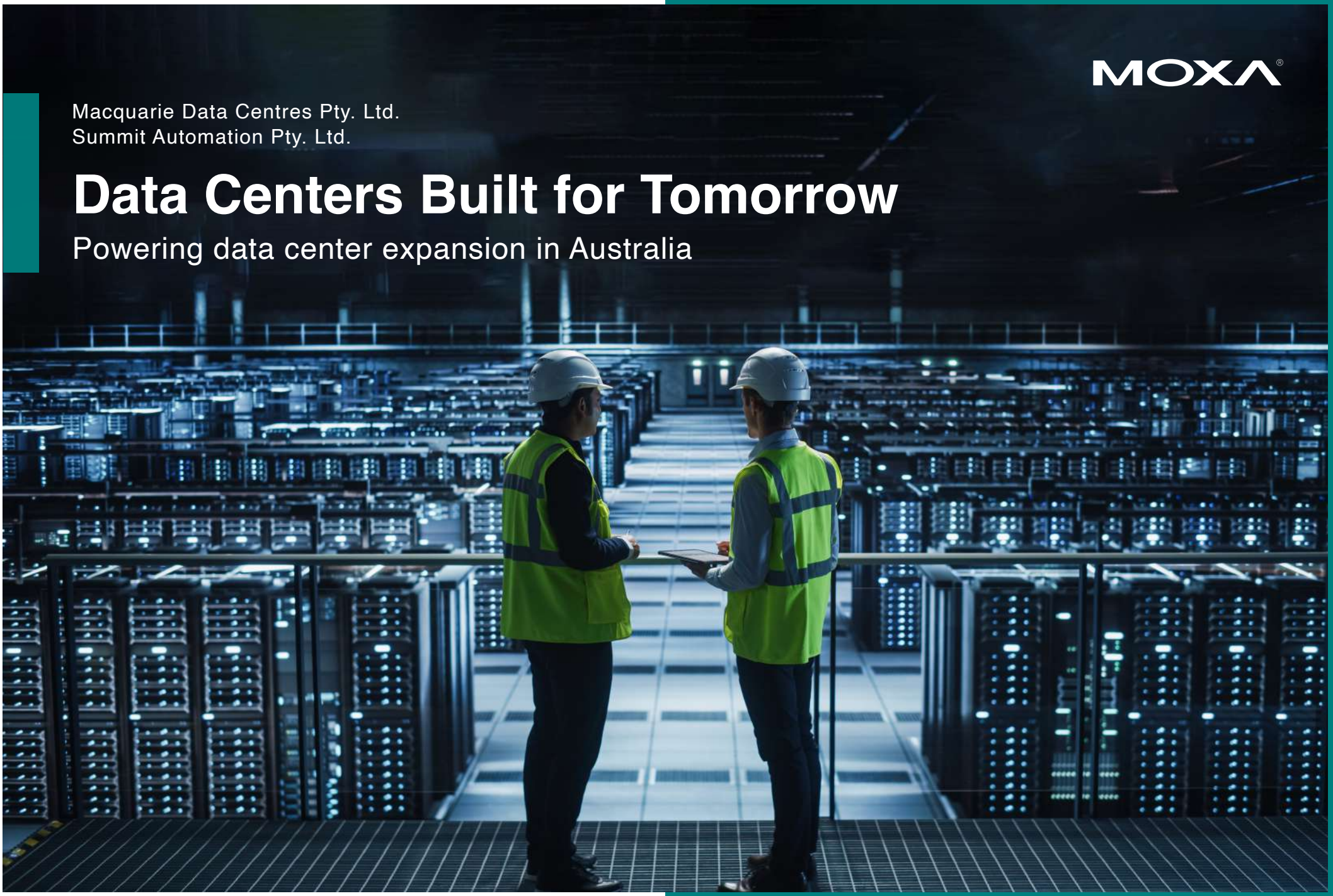
Macquarie Data Centres Pty. Ltd.
Summit Automation Pty. Ltd.

Data Centers Built for Tomorrow

Powering data center expansion in Australia



Australia—Embracing Digital Transformation Boosts Data Center Construction

With almost 300 data centers nationwide, Australia is one of the world leaders in the global data center industry. What's more, that number is expected to grow exponentially in the coming years. Behind this data center boom is the growth of hyperscalers, fueled by the increasing number of enterprises moving their services and applications to the cloud and adopting advanced technologies such as AI, big data, and the Internet of Things (IoT).

Although Australia is one of the most mature data center markets in Asia-Pacific, it continues to experience market transformation (and, of course, challenges). To lower latency and make things more convenient for their customers, many data centers want prime positions in densely populated metropolitan or industrialized areas, such as in Sydney and Melbourne.

However, building a data center in Sydney while balancing economies of scale is no easy feat. Scarcity of prime space in these cities means high prices in an increasingly competitive market. Furthermore, supply chain issues caused by a shortage of materials and the lingering effects of the pandemic continue to cause disruption and delays with construction in Australia.

Macquarie Data Centres is adopting a more flexible approach in preparation of future expansions of their data center.

Sydney Data Center: One-off Design, Multiphase Expansion

Because of these challenges, modern data centers seek a more flexible expansion approach.

That's exactly what Australia's leading data center provider, Macquarie Data Centres, did when they designed their Macquarie Park Data Centre Campus. The scalable campus approach provides a blueprint for innovative data center design and build.

With a stellar reputation and impressive track record for compliance and security, Macquarie Data Centres has seen vigorous growth driven by increasing demand. Which is why their Macquarie Park Data Centre Campus was designed with this growth in mind. The facilities were built to be highly flexible and scalable without compromising on quality. The strategy was to build one cohesive campus with three separate, but interconnected, data centers in a multiphase project over several years. The large-scale data center campus allows Macquarie Data Centres to achieve maximum efficiency for its clients through economies of scale.

Flexibility and scalability are fundamental to our design strategy when building state-of-the-art data centers. It's this approach that allows us to not only best support our hyperscale, multinational, and Australian Federal Government clients, but also to drive innovation in the industry.

Paul Christensen, General Manager, Macquarie Data Centres

macquarie DATA CENTRES

Macquarie Data Centres
Founded in : 1992
Headquarters: Sydney, Australia
Industry: IT Services and IT Consulting

Data Center Expansions Are Not So Easy After All

Although data center operators embrace the opportunities that come with the expansion of data centers, they also face many challenges.

Interoperability Dilemma

To build a truly innovative facility, Macquarie Data Centres knew it had to build one that was data-centric. It needed a well-interconnected system that could monitor multiple streams of activity across multiple sites in real time to provide unparalleled service to its customers.

To achieve this, they had to overcome the challenge of getting all the new control devices to communicate with each other across its expanding campus to achieve seamless diagnostics and control . Introducing advanced technologies between multiple systems inside data center infrastructure can cause interoperability issues, because different systems use different controllers and I/Os, and the communication protocols are not always the same. Overcoming this challenge was critical for building a modern, efficient data center.

During the expansion, the project relied on the smart grid for its substation. To achieve an uninterrupted power supply and data stream, the data center complied with the IEC-61850-3 standard. Its advanced IED devices required PRP/HSR to achieve 0 ms network recovery for protection. However, the main control PLC, using traditional RSTP protocols, did not support PRR/HSR.

Macquarie Data Centres, compliant with the IEC-61850-3 standard, mitigates interoperability issues while integrating advanced technology between systems.

Seamless Provision

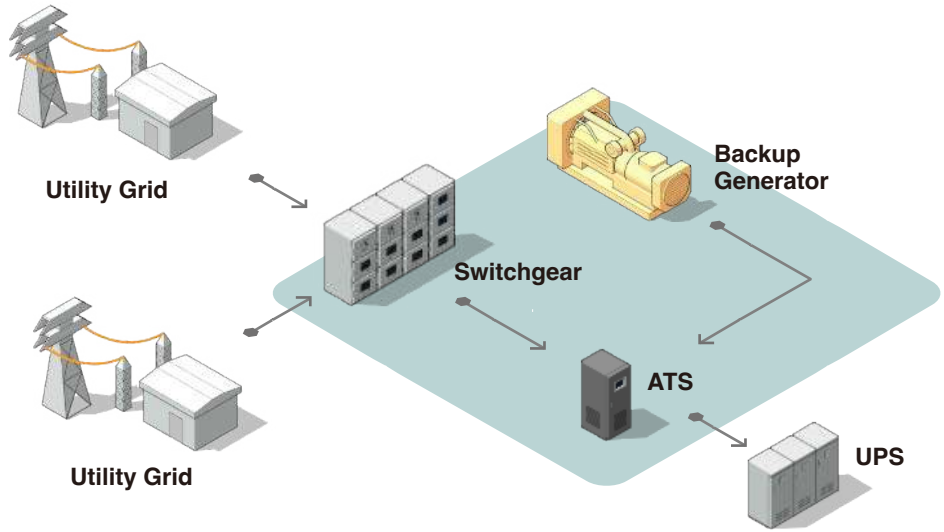
Macquarie Data Centres needed a solution that would ensure a seamless implementation process to better serve its clients, which include global hyperscalers and Australian Federal Government agencies. The data center needed a partner that could meet tight timelines and high expectations for a well-integrated system.

Coordinating and completing such a complex project, involving the cooperation of different parties and technologies, without a hitch within a short time, was challenging. Here, Summit Automation played a vital role regarding the data center’s critical power supply during the project.

Advanced Simulation Shortens Deployment Time and Reduces Defects

Summit Automation is a boutique system integrator with abundant experience in large standby generator systems across a variety of industries. The company also has many other experiences related to the electrical field, particularly in high-voltage switching, standby generator controls, and synchronization projects for data centers.

Summit Automation boasts advanced simulation technology developed from experiences accumulated and extracted from a variety of projects over a long time. For most data center projects, the company runs everything in a simulator and then builds the project from there, as it cannot afford the risk of disrupting the power on-site. Compared to other service providers, Summit Automation shortens the deployment time with minimal changes and completes the tasks within a few hours, whereas other processes take a few days or even weeks.



The scope of the project in this Sydney data center expansion.

Our ability to thoroughly test a project in a simulation environment prior to implementation on-site results in reduced deployment time and less defects. This minimizes the disruption and risk to the end client.

Michael Dwyer, CEO at Summit Automation

Summit Automation Pty. Ltd

Founded in | 2000
Headquarters | Melboume, Australia
Industry | Power and Infrastructure

From Concept to Deployment

Besides advanced simulation and planning, Summit Automation needed a networking partner to support and provide comprehensive connectivity solutions. Therefore, Summit Automation partnered with Moxa, an OT network connectivity expert, to fulfill on-site communications.

We tossed around different ideas, which were all worked through with Moxa. Moxa has supported the project from the conceptual stage through the production stage for getting it done.

Michael Dwyer, CEO at Summit Automation

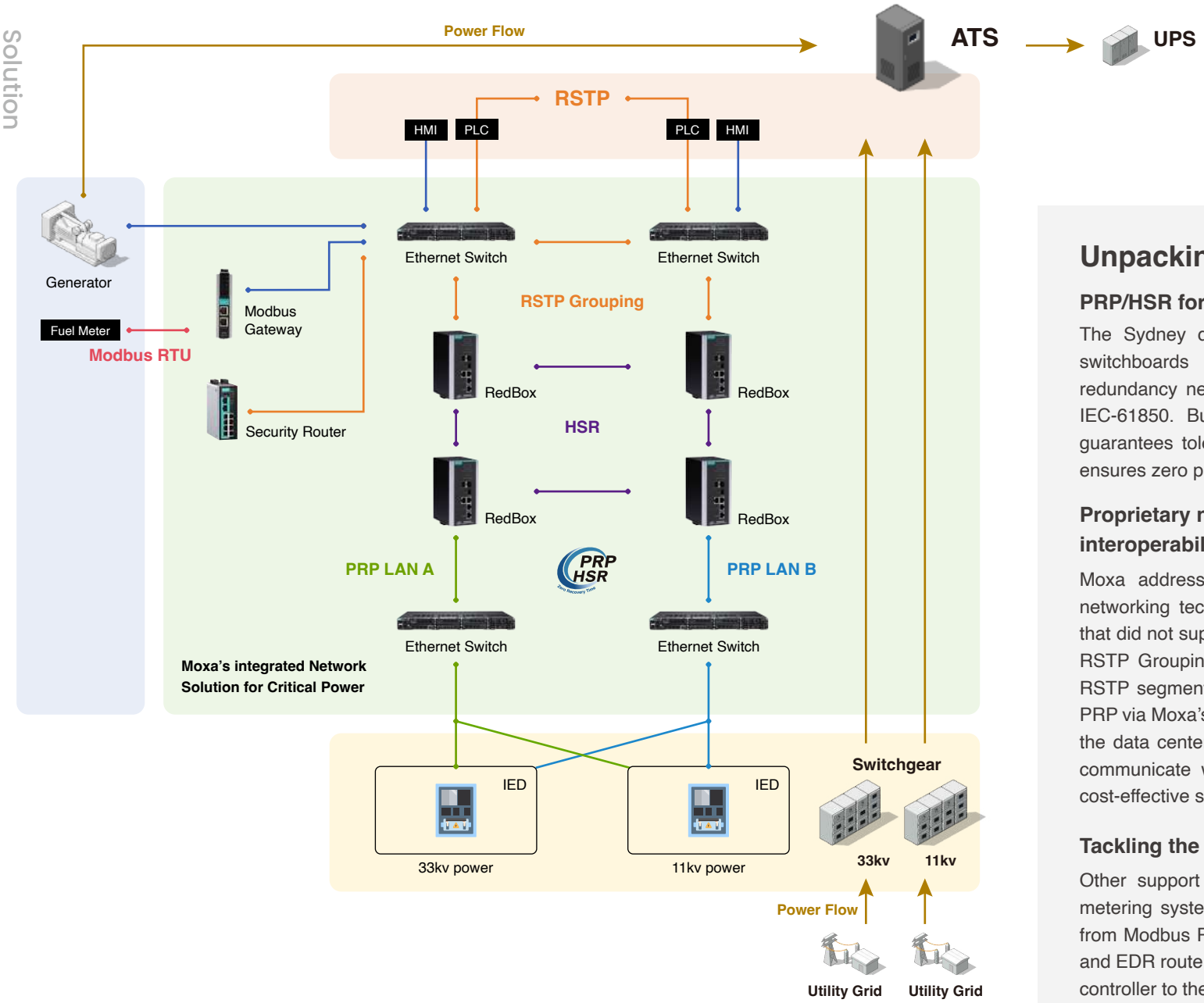
Abundant OT Experience in IT-OT Convergence

This project ran the gamut from a mix of the electric utilities professions to addressing concerns regarding connectivity with IT equipment and integrating all control devices. To enable connectivity among such a mix of devices, Moxa's rich OT experiences in IT-OT convergence, wide portfolio range, and expertise in connectivity came in handy.

Moxa fulfills complex connectivity in the Macquarie Data Centres' power infrastructure.

Fulfilling Complex Connectivity

"The design of this critical power data center automation included a diverse technology mix," said Sever Sudakov, solution architect at Moxa. The IEDs required PRP/HSR technology to ensure zero packet loss and zero recovery time. For those traditional RSTP protocol devices that did not support PRR/HSR, Moxa addressed the interoperability challenge with its proprietary networking technology, RSTP Grouping. It enabled Macquarie Data Centres to accomplish this integration in IC2 and IC3 with a more efficient and cost-effective approach.



Unpacking the Technology Details:

PRP/HSR for smart substation protection

The Sydney data center has multiple incoming feeders. The HV switchboards have IEDs communicating through a bumpless redundancy network, requiring PRP/HSR technology to comply with IEC-61850. Built by Moxa switches with two redundant rings, it guarantees tolerance for any single-point failure in the network and ensures zero packet loss and zero recovery time.

Proprietary networking technology meets the interoperability challenge

Moxa addressed the interoperability dilemma with its proprietary networking technology. For those traditional RSTP protocol devices that did not support PRR/HSR, Moxa's leading networking technology, RSTP Grouping, was implemented. RSTP Grouping allows hooking RSTP segments to the HSR network, which can then be coupled to PRP via Moxa's Redbox switches. Because of Moxa's RSTP Grouping, the data center can achieve its aim of having all the control devices communicate with each other, thus proving to be an efficient and cost-effective solution.

Tackling the communication limitations

Other support included enabling Ethernet connectivity for the fuel metering system and converting the legacy communication interface from Modbus RTU protocol to Modbus TCP. Moxa's MGate gateways and EDR routers were deployed to support the routing of the generator controller to the subnet of the control system because of IP addressing and routing limitations.

Results

“The project couldn't have been completed without Moxa's support. It has been an excellent partnership.”
Michael Dwyer, CEO at Summit Automation

Embracing Data Center Growth and Expansion

The successful execution of this project required many discussions and a close working relationship between all three parties from the very beginning. Summit Automation and Moxa partnered to conduct the proof of concept to validate the design and meet Macquarie Data Centres rigorous standards for a state-of-the-art facility.

Today, Macquarie Park Data Centre Campus is a highly functional facility with data centers that support global hyperscalers, federal government agencies, and many Fortune 500 companies . Summit Automation and Moxa are working together to apply advanced technologies and enhance network management.

As the trend of data center expansion continues, the market expects a growing demand for complicated system requirements to achieve expansion flexibility, interoperability, and operational efficiency.