



cognian
technologies

Scalable, Secure Open Wireless IoT Connectivity Fabric

Willow / Cognian and Microsoft – Simplified Integration

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Contents

Table of Contents

1. EXECUTIVE SUMMARY.....	4
2. THE TECHNOLOGY.....	5
3. THE BUSINESS NEED.....	5
4. THE SOLUTION.....	5
5. THE POTENTIAL.....	6
6. BETTER TOGETHER.....	7
7. OUR VISION.....	10
8. CONCLUSION.....	14

1. EXECUTIVE SUMMARY

Cognian, a fast-growing Australian property technology company, recently announced a new global integration of its Syncromesh wireless canopy technology with Microsoft Azure Sphere to deliver secure IoT solutions for smart buildings together with Digital Twin leader, [Willow](#).

Buildings are dynamic, constantly changing and have extremely complex ecosystems with multiple systems running simultaneously. Covid has accelerated the need for understanding the health and current state of commercial buildings and the realization of preparing assets to be human-centric, futuristic, open, secure, and sustainable. Building owners and facilities managers need to understand the health of the building and how the data is being captured, reported, and stored.

Leveraging technology to deploy an open end to end smart building solution is an investment your organization's competitive advantage.

Currently in a building there are multiple services that are siloed, independent, isolated and as a result data is difficult to manage, maintain and analyze. These devices must be interconnected to work optimally.

Cognian, Microsoft and Willow are collaborating to address their customers key challenges; security, scale, open, simple to install, manage and gain insights. This can be achieved by supporting an open architecture and providing actionable insights that transform buildings into human-centered smart buildings (both new builds and retrofit).

We will provide further insight into how technology and smart workspaces can be built together seamlessly to analyze the environment and make real time adjustments to improve efficiency and productivity. In order to achieve this best practice, an open architecture that is non-proprietary and industry supported is strongly encouraged and seamlessly deployed by clear and concise planning and quality execution.

2. THE TECHNOLOGY

Wireless networks and sensors, tags, and Apps are key to supporting how tenants design and use their spaces and will become the basis for how occupants gain transparency around their indoor environment. Ensuring a technology framework that allows open, fast, and feasible deployments is paramount. Parallel to WillowTwin™ that allows open and normalized data sharing and consumption in the cloud, Cognian's Syncromesh™ decouples IoT devices from proprietary platforms and enables quick integration from edge to cloud. It is anticipated that in-building wireless mesh networks, such as Syncromesh, will be one of the primary methods used to connect devices to on-premise edge devices, BMS, and cloud securely. In the same way as building mobile coverage is an expected service, mesh networks will form the next evolution of tenant services and enable IoT.

3. THE BUSINESS NEED

A recent survey undertaken by **Investa Property Group**ⁱ identified an increased demand by tenants to explore the use of simple to deploy and cost-effective sensor-based and micro-location technologies such as space utilization and people movement tools within their tenancies. There are several barriers – including security, cost, and complexity – those tenants are facing with traditional wired and wireless technologies. These barriers can be addressed by the incorporation of an open, secure, scalable mesh network, such as Syncromesh into the base building service offering.

4. THE SOLUTION

By creating an ecosystem comprising of a Cognian mesh network (Syncromesh), a security and transport layer secured by Azure Sphere and utilizing the Azure cloud offering, and WillowTwin™ (a data modelling, classification and cybersecure SaaS), it is possible to provide tenants access to infrastructure that can be used to:

- Enhance space utilization
- Monitor comfort levels
- Enable collaboration between people and teams
- Simplify the deployment of new sensor technology
- Further enhance the use of their spaces.

Property owners are seeking an open system that allows them to add features at any stage of the building life cycle, without compromising the security of systems and privacy of data.



5. THE POTENTIAL

The key drivers are operational efficiency, proactive management, predictive maintenance, optimizing the user experience, and deploying “best of breed” solutions to ensure a safe, secure, and comfortable return to work experience.

People and the workforce infrastructure are the biggest cost for many businesses and workplaces and monitoring workforce productivity is invaluable.

To provide a service that makes building more secure, smarter, stable, and sustainable. For instance, introducing smart meeting rooms, facial recognition, asset tracking, space utilization and management, indoor air quality, people counting, and providing actionable data insights.

Providing a solution that meets higher occupancy expectations and to enhance tenant experiences by transforming buildings into adaptive and people centric spaces. Well-being is a major driver for occupants.

Another key driver is tenant demand with the aim of improving rental return, increase leasing terms and attract quality tenants.

Utilizing various types of sensors to track occupancy, access lighting levels, energy efficiency, gauge temperature and humidity to optimize room conditions, and monitor energy consumption (ensuring business continuity).

Delivering a solution that focuses on building health assessment, meeting health and wellness compliance standards, and data driven analysis of their environment.

6. BETTER TOGETHER

About Willow

Willow is a global technology company that creates virtual representations of built assets for the real estate and infrastructure sectors. These digital twins enable our users to make better, more proactive, and data-led decisions to grow their profits, reduce their expenses, and better manage risk.

WillowTwin™ is a ground-breaking software platform that captures, structures and labels data in a secured cloud environment and allows asset owners and users, wherever they may be located at any one point in time, to monitor the condition and performance of their assets in real-time.

We seek to then use this data to solve real customer problems which allow customers to generate additional revenue, reduce expenditure or mitigate regulatory and compliance risk.

Customers can undertake data analytics on the data which has been generated from their assets and undertake analyses portfolio-wide, instead of on just one of their assets.

About Cognian

Our vision is to enable open and secure access to building data for every person and organization on the planet.

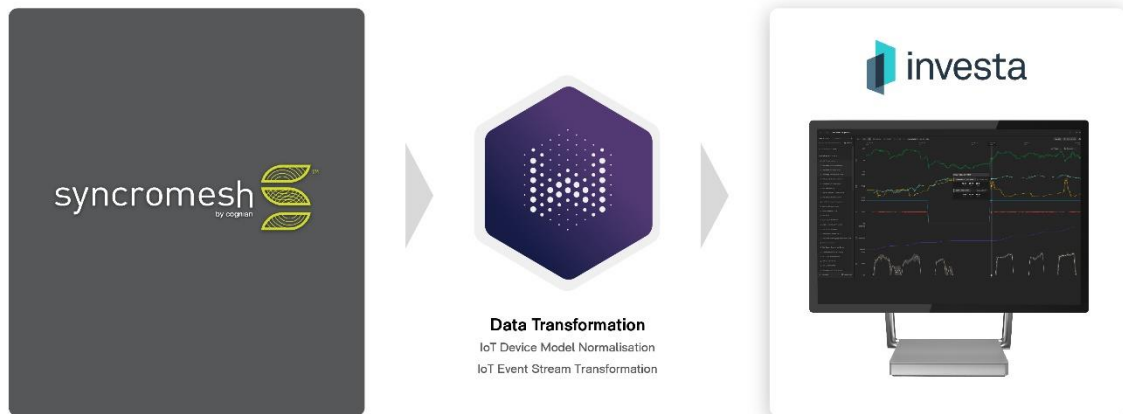
Cognian's philosophy is to provide an open IoT platform technology for all commercial buildings - new and existing. Syncromesh dispenses with the old approach of siloed systems and fixed costs. In creating one standard and open smart building connectivity platform.

The Syncromesh smart canopy is one of the first wireless technologies that scales at commercial level to enable sensors, smart devices, lighting, HVAC, indoor occupancy, and air quality to run off a single platform.

Syncromesh is a bit like a smart phone for buildings – it provides open connectivity using industry standards to a range of applications that are utilizing cloud platforms like Azure, converging OT and IT.

To achieve this, we work with an ecosystem of partners for sensors and applications, across technology, hardware, devices, commercial property developers, and integrators.

The Integration



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A Collaborative Solution

The Cognian integration with WillowTwin provides a powerful means of ingesting data from various types of sensors on the Syncromesh wireless network including space utilization, carbon dioxide, and temperature, that can be trended and visualized over a period of time for future historical analysis.

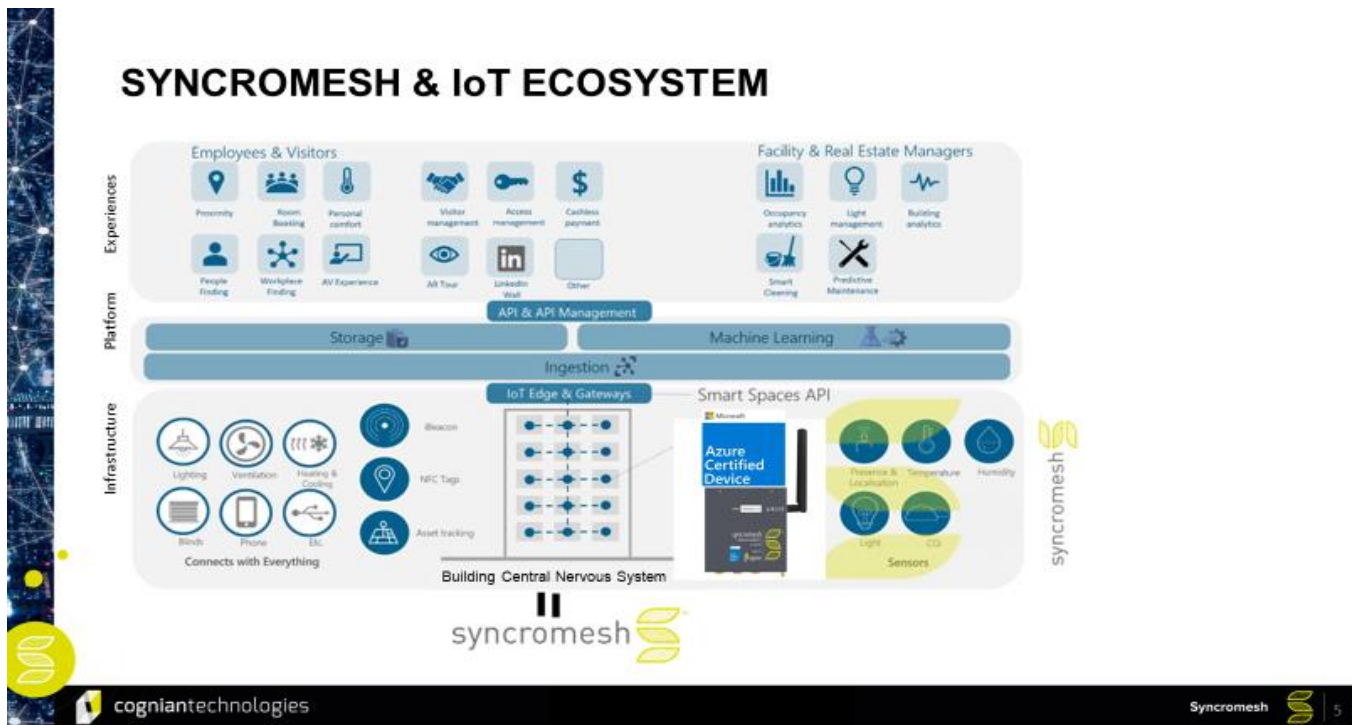
Syncromesh securely enables sensors, smart devices, beacons, lighting, temperature control, and a myriad of other features across a huge range of vendors to interoperate. There are multiple devices that need to be connected and Syncromesh is the enabling technology addressing the provisioning issues related to multiple isolated devices.

Syncromesh creates a wireless canopy that many use cases can take advantage of with off the shelf sensors that have been validated and tested to optimize performance. Put simply, Syncromesh connects easily to existing building management systems while also forming the ideal smart building basis for new structures.

WillowTwin™ allows data to be collected and normalized, for analysis and visualization as well as for sharing with third-party providers, analysts, and consultants to allow operators or occupiers access to make data driven decisions.

The market urgently needs a solution that is open, simple to provision, and secure. The combination of Digital Twin and Open Mesh Sensor Networks technologies is a logical next step to achieve this.

SYNCROMESH & IoT ECOSYSTEM



The following desired outcomes to be delivered in any collaboration model:

- **Interoperability** – the ability to integrate technology is the core to every smart building delivering actionable insights.
- **Security** – To enhance security the various sub systems should be IP addressable and support an open approach with provisioning capabilities.
- **Optimized user experience** – safety, security, wellness, and creating better user experiences.
- **Open** – To enable open and secure access to building data for every person. To securely enable the interoperability of multiple third-party devices and avoid vendor lock in.
- **Cost effective** – The ability to quickly and effectively address faults is a key factor for driving predictive maintenance and proactive monitoring together with a simplified installation approach. Wireless is less cost prohibitive than wired considering the astronomical and unaccounted labor charges.
- **ROI** – Operational excellence, operational efficiency, attract quality tenant and make them stick, leverage technology as a competitive differentiator.
- **Digital transformation** – Technology needs to allow people to collaborate from any place, and access applications 24/7 to deliver an online workplace – human centric approach.
- **Risk mitigation** – simplify the task of managing risk, space utilization, security, compliance, and meeting sustainability requirements by reducing carbon emissions.

7. OUR VISION

To utilize data from the physical environment to drive further insights and actions using the Azure cloud integration.

Azure Sphere protects customer data, privacy, physical safety, and infrastructure, providing a turnkey security solution for IoT devices across hardware, software, and cloud. With Syncromesh secured by Azure Sphere, the result is a single view of a smart building's network and the data generated by interconnected devices, offering better visibility, greater operational efficiency, and stronger security.

Syncromesh allows swift deployment of sensors and applications such as air quality measurement like that which is needed during emergencies such as bushfires. Combining Syncromesh with Azure Sphere, owners and building managers can measure their environment and improve employee wellbeing during times of emergency as well as during normal operating conditions when parameters that affect well-being and productivity such as carbon dioxide levels must still be managed. This data can now be securely accessed and managed in the cloud and on-premises, enabling swift decision-making and the necessary changes to the in-building environment while minimizing threat vectors created through deployment of siloed closed products.


Azure Sphere is an end-to-end security solution securing MCU powered devices by leveraging the 7 properties of highly secured devices addressing the provisioning issues of independent devices. The 7 properties of highly secured devices include:

- Hardware-based Root of Trust
- Small Trusted Computing Base
- Defense in Depth
- Compartmentalization
- Certificate-based Authentication
- Renewable Security
- Failure Reporting

The best practice for a seamless deployment is interoperable hardware, open architecture approach, converged business strategy and a proof of concept. It is imperative that each integration partner is aligned in terms of scope of work, design, network and business continuity, testing, commissioning, and support processes.

To achieve this, we promote open protocols that allows for customers to select best of breed sensors, analytic tools, and the visualization of data resulting in improved decision making.

Phase 1: As a result of phase one, device data can now be used to control air conditioning and HVAC. Issue prevention and maintenance across a range of building elements can be efficiently achieved by funneling relevant data into the centralized management system. Allowing quicker human review and action to rectify issues or tweak elements of the building's operation, be it air control, health and hygiene practices, or other items.



Phase 2: The Cognian partner ecosystem was used to build on phase one. For instance, devices were deployed for people counting and tracking to meet COVID requirements as well as to increase space utilization and location monitoring efficiency. A future stage involving occupancy measurement in commercial properties and heating, ventilation, and air conditioning (HVAC) control to automate cleaning services.

For instance, a third-party environmental air quality sensor connected to Syncromesh provides registered data updates on air pressure, temperature, humidity, the amount of Carbon Dioxide, ozone, and other particles, monitoring of which allows for insights enabling control of air quality and flow. These actions have a positive impact on occupant wellbeing and comfort, which has a knock-on effect for productivity.

Phase 3: Leverages Microsoft's Azure Sphere, adding enterprise grade security and even easier deployment and management at massive scale.

Phase 4: Digital twin capabilities

Sensor networks and data are a fundamental part of a Digital Twin, they provide the physical and behavioral context in a building or building portfolio. WillowTwin centralizes the data from various services that sits in many different systems. The data is then structured in a way that you can understand it, allowing you to investigate, analyze, and generate insights. Willow allows you to take these insights and other critical findings to be actioned in real time and enhance the way buildings are currently managed.

The benefits are ultimately increased tracking data on which to act, lower management costs, and increased ability to meet government requirements, which therefore lead to happier tenants and occupants. Owners can also become more appealing to higher-yield tenants as a result.

Syncromesh can integrate with the various ecosystems of partners such as Willow and Microsoft, which is part of its appeal as an open, horizontal smart canopy connecting infrastructure with applications.

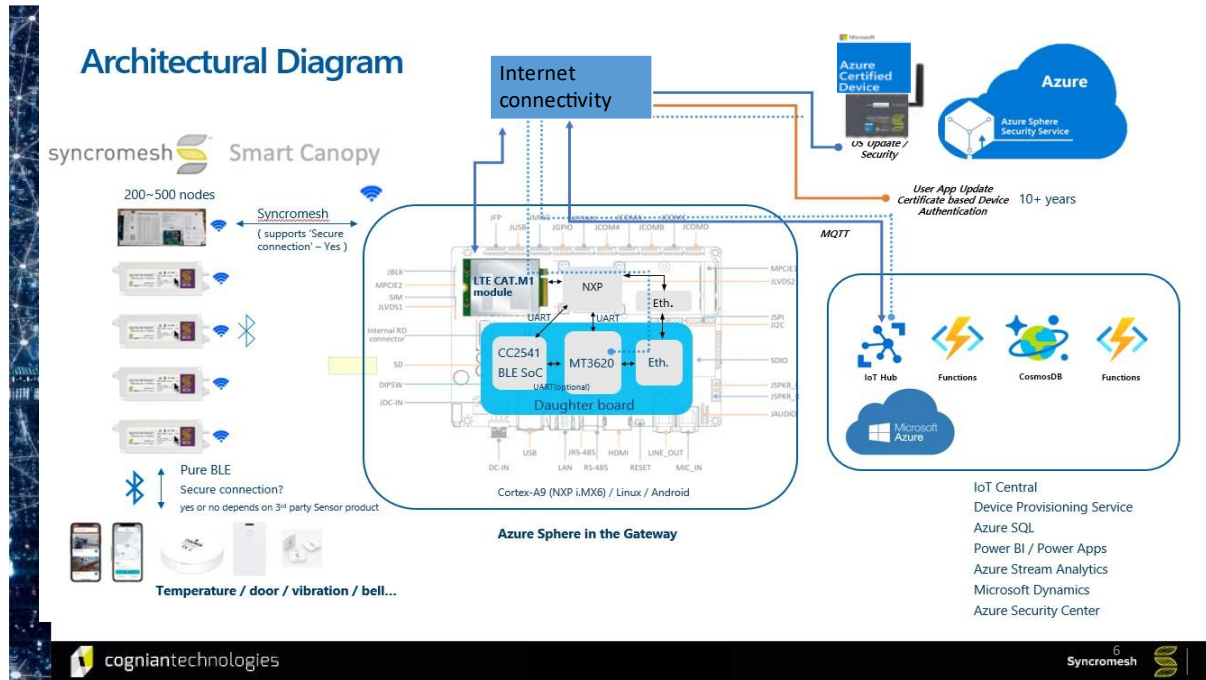
With a wireless canopy embracing all buildings and fit-outs, and managed through cloud infrastructure, Syncromesh is quick to install and configure.

As technology at the edge adopt ontologies like REC and frameworks such as ADT's DTDL, the end-to-end time, effort, and resources to deploy and collect sensor data will be drastically reduced.

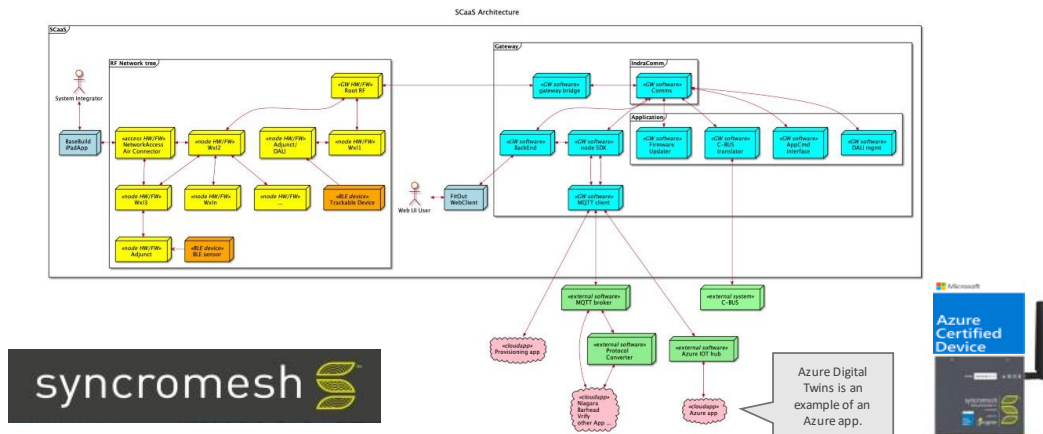
This technology enables your Digital Twin to stay updated throughout the lifecycle of the asset, and the data model stays relevant and evolves as your physical systems change over time.

This architecture reduces vendor lock down both at the edge and at the cloud, providing a single source of truth for your assets' data models and a single pane of glass to these devices, systems, and data.

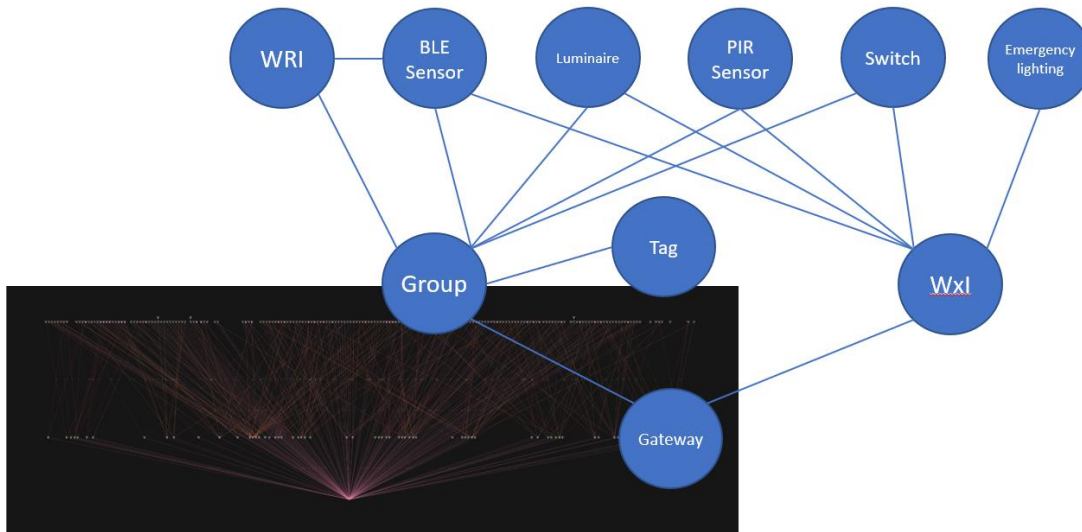
Technical Architecture



Syncromesh General SCaaS architecture



Syncromesh Digital Twins model relationships



Syncromesh Digital Twins DTDL

Examples of our DTDL models.
We have models for:

- BLE Sensor
- Control device
- Gateway
- Group
- Luminaire
- PIR
- WRI
- WxI

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8. CONCLUSION

One of the main asset digitization challenges when it comes to ingesting data from Building IoT sensors, devices, and systems is that these rely on proprietary gateways, platforms, subscriptions, or license fees. Not to mention elevated deployment, configuration, and install costs.

The Syncromesh Gateway (Edge Controller) on Azure Sphere joins the canopy and connects it to the cloud and/or a local building management system (BMS) network.

By liberating this technology from these constraints; owners, operators, and tenants can increase the fidelity of their digital twins and speed-up their digital transformation strategies.

Whether this means achieving operational efficiencies or reducing on-going costs, choosing the right platforms both at the edge and at the cloud can make the digital transformation journey a seamless experience.

"Using technology to drive these outcomes is accelerating these objectives, and the combination of open technology platforms such as Willow and Cognian can drastically accelerate these objectives (or adoption)."

Nathan Lyon, Head of Building Technology, Investa Property Group



ⁱ Investa Property Group is one of Australia's largest, most recognised commercial office real estate companies, committed to helping workplaces to thrive. \$12B in assets under management, 26 Properties owned and/or managed throughout Australia, over 850 Businesses they provide working spaces for.