THE FREEMANTLE PORT AUTHORITY LOOKS TO THE FUTURE OF PORT CONNECTIVITY

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The Fremantle Port Authority (FPA) at the mouth of the Swan River in Western Australia faced many connectivity challenges unique to the port environment. Indeed, an industrial port doesn't easily lend itself to traditional wireless networking. From moving ships and cranes, to drifting walls of shipping containers, the conditions are constantly in flux. The situation called for a connectivity solution that could match an industrial port's rigors and provide reliable connectivity with real-time video streaming, and asset tracking.

Overcoming the limitations of traditional networking solutions like reduced mobility, signal interference, and inefficient redundancy measures was paramount for FPA. These obstacles represented significant threats to successful project outcomes and the solution needed to build on existing infrastructure to protect investments through integration rather than replacement.

Posing many challenges for wireless connectivity, the shipping containers are made of rippled metal surfaces, which are reflective to radio frequency (RF) but disperse radio signals due to their shape. With FPA situated in an urban environment, additional RF sources, including Wi-Fi networks, LTE coverage, and ship radar, were all in play. With more than 75,000 vehicles and over 32 million mass tons of cargo moved in 2019-20, a steadfast, reliable wireless network was imperative to provide situational awareness and monitoring of personnel, vehicles, infrastructure, and precious shipments.

DEFEATING CONNECTIVITY CHALLENGES OF PORTS

Another considerable challenge was the matter of maintaining appropriate network security. Given that the world's shipping community conducts 90% of global trade, ports are likely candidates for malicious actors to target. This situation is exacerbated by the fact that ports are spread over a vast, sprawling terrain that requires data-intensive monitoring across both fixed and mobile assets. Ultimately, Rajant Corporation provided the system that delivered continuous awareness of the ships, people, machinery, and infrastructure in the Industrial Internet of Things (IIoT) operation via its highly resilient and secure Kinetic Mesh network technology.

Rajant Kinetic Mesh is comprised of BreadCrumbs, dependable and robust wireless radios that can be deployed as fixed or mobile nodes, meaning that any port asset can be brought online. Vehicles, including ships and cranes, equipment, and cameras are all now viable assets to be assimilated into the network and given a network node's added capabilities. These BreadCrumbs, instead of communicating with centralised

access points, are each fully capable of receiving and transmitting the necessary data to others, resulting in a highly connected, real-time network of intelligent nodes with no single point of failure.

Rajant addressed traffic congestion and enabled mobile trailers to connect and communicate with the fibre optic LAN throughout the Fremantle Ports inner harbour. In a port environment, with hazards moving across the site constantly, a network that can intelligently adapt to any interference was critical. If one Rajant BreadCrumb goes down, the network will intelligently self-heal, actively calculating the most efficient re-route of data to compensate for the compromised hardware, in turn, maintaining the network effectively.

DELIVERING VALUE

As downtime in a port environment is measured in lost revenues, any communications breakdown across a network can have a detrimental and costly impact on port compa-

nies. Kinetic Mesh eliminates any downtime and makes the system easy for port operators to manage and maintain. Just as important as this increase in efficiency is people's health and safety within the port environment. With Rajant, location tracking for employees is enabled regardless of location.

Rajant's network was able to perform incredibly well at the Fremantle Port. Not only able to deliver connectivity to assets outside the planned coverage zone, but the technology weathered lightning storms when other infrastructure didn't. In terms of resilience, Rajant's ruggedized BreadCrumbs have repeatedly proved to be robust in the face of port hazards. The self-healing capability, if one BreadCrumb is facing physical damage, allows it to dynamically be replaced without jeopardising the entire network.

EXCEEDING EXPECTATIONS

To berth even one ship at a port, multiple values and data points are required. From wind and temperature measurements

to many other key metrics that facilitate successful operations, having a real-time network constantly providing you with accurate data is an advantage. Knowing that you need not worry about downtime or a loss of access to these valuable metrics is a significant reassurance. A Rajant Kinetic Mesh network will enable Fremantle Port to easily scale their deployment to capture this data and help digitize their operations.

With FPA being one of Australia's busiest ports, it demanded a scalable and resilient solution that can be built upon to provide connectivity now and into the future. This will give the maximum return of investment and enable the IIoT functionality to future-proof the Port's complex daily operations. Having access to wireless connectivity to elevate efficiency and track its valuable assets will be crucial for the port to thrive exponentially without worrying about costly downtime or health and safety risks.

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