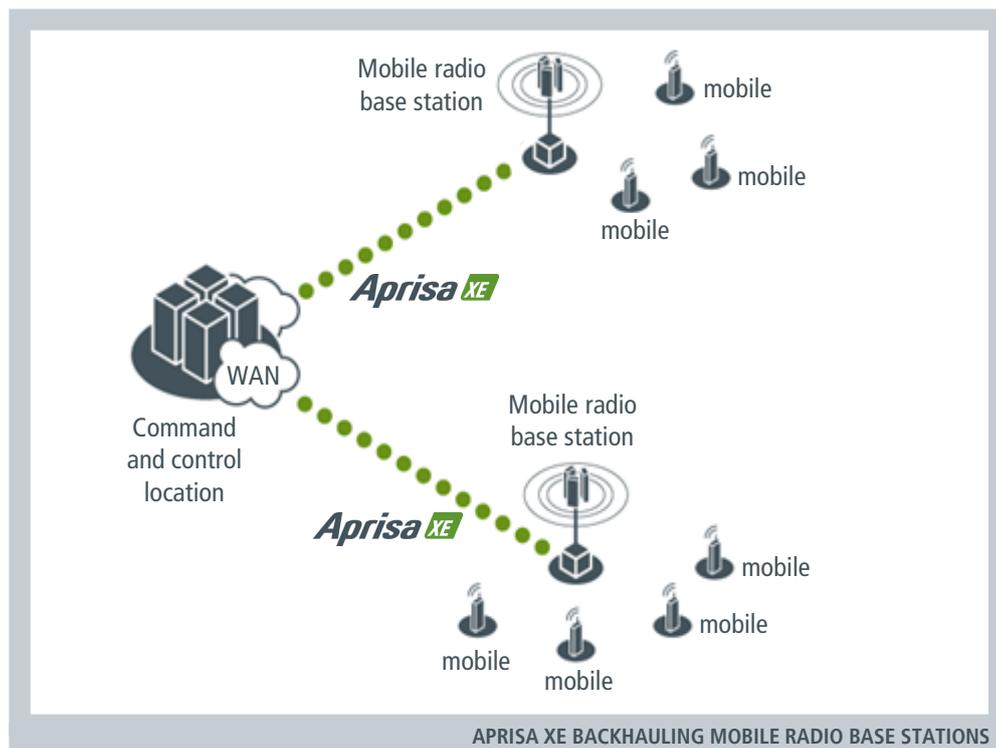


Aprisa XE backhauls state-wide first responder mobile radio network

When one of Australia's largest and oldest police forces needed to replace the leased line infrastructure connecting their mobile radio base stations, they turned to 4RF. Now more than 350 Aprisa XE radios are deployed throughout the state, connecting analogue and digital mobile base stations. The network was designed to optimise use of the available spectrum and to support the transition to IP-based communications.



APPLICATION AND DEPLOYMENT REQUIREMENTS

When connecting mobile radio base stations together to backhaul traffic, traditional solutions have included fixed line circuits and analogue UHF duplex links. Today, as the world moves to IP, new backhaul solutions are required. When a 4RF customer, a state-wide Australian police force, found its leased line infrastructure being withdrawn from service it needed an alternative technology. With hundreds of police stations and thousands of employees serving a population of 7 million, the mobile radio network could not be compromised and the chosen solution had to:

- Backhaul both analogue and digital mobile base stations and support the transition to IP
- Provide the quality of service guarantee needed by first responder communications
- Support the network throughout the state, including rural and remote locations

POLICE SERVICE

AUSTRALIA



“ With hundreds of police stations and thousands of employees serving a population of 7 million, the police mobile radio network could not be compromised. ”

NETWORK DEPLOYMENT

4RF worked with its local Australian partner to design and implement the appropriate state-wide backhaul network for the police force. One of the key considerations was that of spectrum. While licensed spectrum is a valuable resource that needs to be carefully managed, using unlicensed radio frequencies is not appropriate for safety of life systems. This is because the RF spectral availability of unlicensed products can never be guaranteed, as it is not known what is transmitting alongside your transmission. The local regulatory body will have no obligation to investigate a potential RF complaint in an unlicensed band. When transmissions need to be guaranteed, such as in this application, licensed spectrum is the only option.

The Aprisa XE was selected as the ideal solution for the network not only because of its use of licensed frequency bands but also because of its superior performance, flexibility and reliability. With its range of interface cards, the Aprisa XE supports a variety of both analogue and digital mobile radio standards, which means that it could be used throughout the network. The use of sub 3 GHz frequency bands had the advantages that not only could long distances be achieved to rural and remote locations across the state, but lightweight infrastructure could be used, to make deployment easy, fast, and highly cost effective.

The police network comprised base station equipment from two major APCO P25 manufacturers and the Aprisa XE provided seamless interfacing with both V.24 synchronous P25 legacy support and IP circuits for new P25 equipment. Analogue 4-wire E&M circuits supported analogue LMR requirements. The network used multiple frequency bands and channel sizes for optimal performance and use of the available spectrum:

- 400 MHz band: 25 kHz channels provide a capacity of 112 kbit/s at 64QAM, for analogue land mobile radio and digital P25 backhaul. Small Yagi antennas can be used in this band
- 900 MHz band: 25 kHz channels provide a capacity of 112 kbit/s at 64QAM. Channels of 200 kHz provide more capacity, 1024 kbit/s at 64QAM, used for P25 and Tetra backhaul
- 1.5 GHz band: from 1427 to 1535 MHz, this band is the world's most popular low capacity linking band, providing up to 17 Mbit/s at 64QAM. The Aprisa XE was deployed with both 1.75 MHz and 3.5 MHz channel sizes, using 1.8 metre grid style dish antennas

RESULTS

Over an 18 month period, over 350 Aprisa XE radio terminals have been deployed throughout the Australian state, and the network is being expanded by more than a hundred additional terminals. The police service have been able to reliably support both analogue and digital standards in a single network. When a mobile radio base station is migrated from analogue to digital, a simple software configuration change is needed in the Aprisa XE. The network has been operational for more than two years, with constant operation and the quality of service needed for first responder communications. A huge benefit to both the police service and the whole of Australia is that the high configurability and flexibility of the Aprisa XE has meant that the use of the valuable radio spectrum resource has been optimised.



Aprisa XE

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... lightweight infrastructure could be used, to make deployment easy, fast, and highly cost effective

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ABOUT 4RF COMMUNICATIONS

Operating in more than 120 countries, 4RF Communications provides radio communications equipment for critical infrastructure applications. Customers include utilities, oil and gas companies, transport companies, telecommunications operators, international aid organisations, public safety, military and security organisations. 4RF point-to-point and point-to-multipoint products are optimized for performance in harsh climates and difficult terrain, supporting IP, legacy analogue, serial data and PDH applications.

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