CASE STUDY

Low CAPEX Network Upgrade

Background

TEXAS — In 2016, a large independent oil and natural gas exploration and production company expressed a need to upgrade an existing network in Texas in order to meet increasing data flow demands and implement field software applications that would help boost production. A Fortune 500 company, its operations focus onshore in the United States and Canada. The company produces about 1.6 billion cubic feet of natural gas and about 130,000 barrels of natural gas liquids per day.

Specific Need

The upgrade would replace an existing network of FreeWave HTPlus radios with new FreeWave ZumLink Z9-PE radios in high profile pilot project. Although the existing HTPlus network was still functioning to specs in a hot and humid environment, many of the radios were nearing a decade of constant operation and the company wanted to ensure that ZumLink would meet their future performance expectations.

The objective of the high speed upgrade was to improve throughput performance and boost production at the Texas location while continuing to leverage the existing infrastructure of antennas, towers, and SCADA equipment. The company wanted to enhance its OPEX savings model by continuing to employ the 900 MHz Frequency Hopping Spread Spectrum (FHSS) technology developed by FreeWave. Once deployed, the system OPEX is nearly zero, and by utilizing the ZumLink platform, the company would not have pay for the boost in data throughput. Additionally, it needed additional bandwidth in order to meet new business requirements. Not only would the company have integration and equipment connectivity issues with a cellular infrastructure (such as interfacing into existing SCADA equipment), but it would also need to pay for every byte of data leaving the field. An FHSS model avoids this cost and brings OPEX to nearly zero.

Furthermore, the company wanted a low CAPEX upgrade that would enable the company to optimize production operations and control costs at the Texas location. Accordingly, a successful pilot would lead to implementation of the same upgraded communications infrastructure to other sites across the continental US.

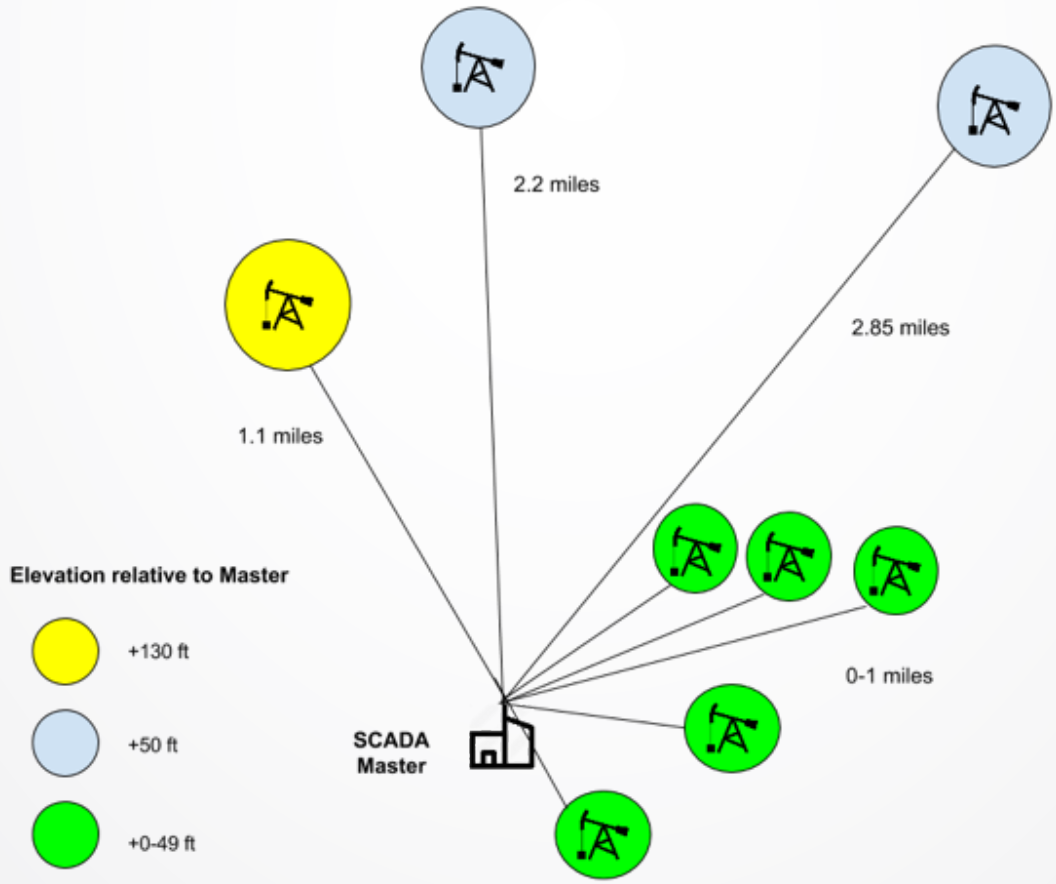
Network Expectations

FreeWave engineers met with the company's field management and operations to learn about and understand their expectations for the network, which included:

- An increase in throughput (up to 2 Mbps possible) for a point-to-multipoint radio network with 1 gateway and 21 endpoints. Two of the radios in the network would be connected to multiple RTUs via a switch, with twenty-five RTUs total.
- The ability to control and monitor SCADA data, wellheads, and RTUs for plunger lifts and other production activity.
- Reliable data links of up to 5 miles.
- Industrial grade, ruggedized platform able to deliver high performance in extreme environmental conditions

With locations constantly communicating mission-critical Modbus TCP/IP data to a PLC that provides the locations with permissions to pump, the network had to ensure high rates of reliability and uptime. Furthermore, it expressed the need to eventually deploy field applications (e.g., plunger lift optimization) to streamline operations. Indeed, the company expected the ZumLink radio network to serve as a solid foundation for truly robust Industrial Internet of Things ecosystem.

Network Topology



Zumlink Network Solution And Installation

Working collaboratively, FreeWave engineers and field management crafted a solution to replace the older radios while maintaining the existing network infrastructure. A network path study was completed by FreeWave to ensure optimal performance of ZumLink in their environment.

Moreover, the FreeWave team provided onsite ZumLink installation and configuration training to eight of the company's field engineers and positioned them to successfully pre-provision twenty-two ZumLink radios at the field site. Training took less than one day.

Relative to the physical installation of the equipment, the company wanted to minimize the downtime on the network, so the team sent six different trucks out to various locations to install the radios simultaneously and brought up the network in a few hours. Within the same day, the team was able to validate all wells were polling and sending data into the company's ERP.

HIGHLIGHTS AND PERFORMANCE

- In short, the transition from legacy radios to high-speed radios was seamless, as the radio upgrade and configuration took approximately one business day. FreeWave engineers essentially duplicated and mimicked the existing network. With the installation of ZumLink Z9-PEs, the site now has a Mbps instead of a Kbps network that not only addresses current data needs, but also future-proofs the network in case more robust sensors (or even video) are deployed in the future. Furthermore, with the ZumLink platform, the company can install Java, Python, C+ or GO field applications that can further enhance operations and reduce costs at the wellhead level.

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