



Personalized High-Bandwidth Wireless Connectivity Enables Water Management Communications



Oman Water & Wastewater Services Company | **Diam Haya**
Member of Nama Group



“We are highly satisfied with the improved throughput, user experience and cost savings that the Cambium solution is bringing to the Public Water Authority. Since implementation, the wireless solution has been key in the maintenance of the water distribution network.”

PRADEESH P.S.,
DIRECTOR - SALES & MARKETING,
ELITE INTERNATIONAL INFORMATION SYSTEMS, LLC

SUCCESS FACTORS

- Cambium equipment’s connectivity speed and lack of recurring charges allow Elite International Information Systems to operate efficiently.
- Reliable communications from pumping stations to control centers are key in water distribution network maintenance.

Overview

IN MUSCAT, OMAN, THE PUBLIC AUTHORITY OF WATER (PAW) – DIAM needed a new wireless connectivity solution to support a proprietary Supervisory Control and Data Acquisition (SCADA) system. The previous connectivity solution was costly, underperforming and not available at all control centers. Partnering with Minerva Technologies, Elite International Information Systems set out to deploy a more cost-effective, reliable and personalized network solution for PAW – Diam’s needs.

The Challenge

IN PAW’S EXPERIENCE, connectivity from internet service providers in the region can be unreliable... if it’s even available at all. When it is available, the monthly charges for connectivity are steep. Previously, they used a Multiprotocol Label Switching (MPLS) line to connect between the Basher National Control Center and Barka Regional Control Center. PAW needed to switch to a wireless backhaul solution that would support wireless access control, CCTV applications, ID card solutions, power solutions and POS systems.

The Solution

ELITE INTERNATIONAL INFORMATION SYSTEMS chose to deploy Cambium products, which are proven to work under high interference and near-line-of-sight environments. Specifically, they chose PTP 670 connectorized units for fixed wireless backhaul, which offers up to 450 Mbps aggregate throughput. They implemented four links as part of this project. The high-bandwidth





connectivity was chosen to support live SCADA communications to the Public Water Authority’s central control center from their regional control center.

Planning and deployment went smoothly. First, Elite International Information Systems conducted a detailed project feasibility study. Then, they planned the network. A couple of the links operate over long distances, one of which operates throughout geographical elevation changes and obstructions. The total distance between the links is 49.7 kilometers.

Four 35-meter towers were constructed to overcome these obstacles. Elite tested the links with high load and saw convincing results. Following the installment, they completed the handover and trained the PAW staff to manage the network. Overall, the process took Elite International Information Systems two months to fulfill.

Equipment			Wireless		
Attributes	Value	Units	Attributes	Value	Units
Link Name	SCADA station - Ghala Indus.		Wireless Link Status	Up	
Unit Name	Master_58_26_17		Wireless Link Up Time	1 Day 09:07:14	
Site Name	SCADA Station		Wireless Encryption	None	
Software Version	8.0.0.0.0.0.0		Maximum Transmit Power	27	dBm
Hardware Version	8.0.0.0.0.0.0		EIRP	27.0	dBm
Unit ESN	8.0.0.0.0.0.0		Remote Maximum Transmit Power	27	dBm
Unit MSN	8.0.0.0.0.0.0		Transmit Power	25.0, 24.3, 24.0, 24.0	dBm
Regulatory Band	6.2 - 5.1 GHz / 5.2 GHz - Other		Receive Power	-59.5, -60.3, -61.6, -60.1	dBm
Elapsed Time Indicator	1 Day 09:07:47		Vector Error	-16.6, -21.5, -25.6, -21.5	dB
Ethernet / Internet			Link Loss	132.4, 131.0, 129.8, 131.0	dB
Main PSU Port Status	Copper Link Up		Transmit Data Rate	153.51, 121.46, 97.59, 125.44	Mbps
Main PSU Port Speed And Duplex	100 Mbps Full Duplex		Receive Data Rate	125.44, 100.02, 70.15, 70.15	Mbps
MAC Address	88:00:00:00:00:00		Link Capacity Variant	Full	
Remote Identification			Link Capacity	307.09	Mbps
Remote Unit Name	Slave_58_25_D6		Wireless Link Availability	100.0000	%
Remote MAC Address	88:00:00:00:00:00		Data Bridging Availability	100.0000	%
Remote Internet Address	http://169.254.1.4		Transmit Modulation Mode	64QAM 0.92 (Dual) (45 MHz)	
TDD Synchronization			Receive Modulation Mode	16QAM 0.87 (Dual) (45 MHz)	
TDD Synchronization Interface	Disabled		Link Symmetry	Adaptive	
			Receive Modulation Mode Detail	Restricted Because Of Byte Errors On The Wireless Link	
			Range	8.4	km

Link #1

Attributes	Value	Units	Attributes	Value	Units
Equipment			Wireless		
Link Name	Al khouth link-Ghala Indus		Wireless Link Status	Up	
Unit Name	Master_58_26_A2		Wireless Link Up Time	00:23:46	
Site Name	Ghala Indus.		Wireless Encryption	None	
Software Version	8.0.0.0.0.0.0		Maximum Transmit Power	27	dBm
Hardware Version	8.0.0.0.0.0.0		EIRP	27.0	dBm
Unit ESN	8.0.0.0.0.0.0		Remote Maximum Transmit Power	27	dBm
Unit MSN	8.0.0.0.0.0.0		Transmit Power	27.0, 26.7, -15.0, 27.0	dBm
Regulatory Band	8 - 5.4 GHz - Other		Receive Power	-57.3, -60.5, -110.0, -60.9	dBm
Elapsed Time Indicator	00:24:21		Vector Error	7.2, -22.1, -29.0, -23.4	dB
Ethernet / Internet			Link Loss	138.1, 133.0, 0.0, 135.9	dB
Main PSU Port Status	Copper Link Up		Signal Strength Ratio	5.3, 4.8, 0.0, 4.8	dB
Main PSU Port Speed And Duplex	1000 Mbps Full Duplex		Transmit Data Rate	10.87, 7.76, 0.00, 7.89	Mbps
MAC Address	88:00:00:00:00:00		Receive Data Rate	138.10, 102.16, 0.00, 121.66	Mbps
Remote Identification			Aggregate Data Rate	145.99, 109.92, 0.00, 129.55	Mbps
Remote Unit Name	Slave_58_26_AA		Link Capacity Variant	Full	
Remote MAC Address	88:00:00:00:00:00		Link Capacity	162.66	Mbps
Remote Internet Address	http://169.254.1.2		Wireless Link Availability	100.0000	%
TDD Synchronization			Data Bridging Availability	100.0000	%
TDD Synchronization Interface	Disabled		Transmit Modulation Mode	BPSK 0.63 (45 MHz)	
			Receive Modulation Mode	64QAM 0.75 (Dual) (45 MHz)	
			Link Symmetry	Adaptive	
			Receive Modulation Mode Detail	Limited By The Wireless Conditions	
			Range	18.7	km
Status Page Refresh Period	3600	Seconds	<input type="button" value="Update Page Refresh Period"/> <input type="button" value="Reset form"/>		

Link #2



Attributes	Value	Units	Attributes	Value	Units
Equipment			Wireless		
Link Name	Alkhud - Mabela		Wireless Link Status	Up	
Unit Name	Mabela-Slave		Wireless Link Up Time	18 Days 01:22:47	
Site Name	Mabela		Wireless Encryption	None	
Software Version	80000-00-70		Data Bridging Status	Enabled	
Hardware Version	80000-00-70-000		Maximum Transmit Power	27	dBm
Unit SKU	C050067B006B		EIRP	None	dBm
Unit ESN	800000000000		Remote Maximum Transmit Power	27	dBm
Unit MSN	800000000000		Transmit Power	25.0, 24.4, 24.0, 25.0	dBm
Regulatory Band	16 - 5.9 GHz - Other		Receive Power	-67.3, -69.0, -71.8, -69.0	dBm
Elapsed Time Indicator	27 Days 20:18:16		Vector Error	-14.4, -17.0, -21.4, -17.1	dB
Ethernet / Internet			Link Loss	150.3, 148.0, 146.7, 147.9	dB
Main PSU Port Status	Copper Link Up		Signal Strength Ratio	-1.7, -2.3, -2.6, -2.3	dB
Main PSU Port Speed And Duplex	1000 Mbps Full Duplex		Transmit Data Rate	91.54, 56.86, 13.97, 61.61	Mbps
MAC Address	80-00-00-00-00-00		Receive Data Rate	203.95, 92.56, 51.19, 99.01	Mbps
Remote Identification			Aggregate Data Rate	222.25, 149.42, 122.16, 160.62	Mbps
Remote Unit Name	Alkhud-Master_58_83_C7		Link Capacity Variant	Full	
Remote MAC Address	80-00-00-00-00-00		Link Capacity	146.62	Mbps
Remote Internet Address	http://169.254.1.5		Wireless Link Availability	99.9932	%
			Data Bridging Availability	99.9932	%
			Transmit Modulation Mode	16QAM 0.87 (Single) (45 MHz)	
			Receive Modulation Mode	16QAM 0.63 (Dual) (45 MHz)	
			Link Symmetry	Adaptive	
			Receive Modulation Mode Detail	Limited By The Wireless Conditions	
			Range	5.8	km

Link #3

Attributes	Value	Units	Attributes	Value	Units
Equipment			Wireless		
Link Name	Mabela - Barka		Wireless Link Status	Up	
Unit Name	Slave_58_83_C8		Wireless Link Up Time	1 Day 16:12:07	
Site Name	Barka		Wireless Encryption	None	
Software Version	80000-00-70		Data Bridging Status	Enabled	
Hardware Version	80000-00-70-000		Maximum Transmit Power	27	dBm
Unit SKU	C050067B006B		EIRP	None	dBm
Unit ESN	800000000000		Remote Maximum Transmit Power	27	dBm
Unit MSN	800000000000		Transmit Power	27.0, 25.0, 24.0, 25.0	dBm
Regulatory Band	8 - 5.4 GHz - Other		Receive Power	-71.4, -74.8, -78.0, -74.5	dBm
Elapsed Time Indicator	1 Day 16:12:22		Vector Error	-2.1, -17.3, -20.3, -17.9	dB
Ethernet / Internet			Link Loss	166.0, 163.8, 161.7, 163.8	dB
Main PSU Port Status	Down		Signal Strength Ratio	-3.5, -4.3, -7.5, -7.1	dB
Main PSU Port Speed And Duplex			Transmit Data Rate	67.63, 32.24, 9.51, 32.95	Mbps
SFP Port Status	Fiber Link Up		Receive Data Rate	67.63, 29.56, 9.66, 32.54	Mbps
SFP Port Speed And Duplex	1000 Mbps Full Duplex		Aggregate Data Rate	77.29, 61.81, 32.35, 65.49	Mbps
MAC Address	80-00-00-00-00-00		Link Capacity Variant	Full	
Remote Identification			Link Capacity	79.25	Mbps
Remote Unit Name	Master_58_83_06		Wireless Link Availability	99.9996	%
Remote MAC Address	80-00-00-00-00-00		Data Bridging Availability	99.9996	%
Remote Internet Address	http://169.254.1.7		Transmit Modulation Mode	16QAM 0.87 (Single) (30 MHz)	
			Receive Modulation Mode	16QAM 0.87 (Single) (30 MHz)	
			Link Symmetry	Adaptive	
			Receive Modulation Mode Detail	Limited By The Wireless Conditions	
			Range	16.8	km

Link #4

The Results

THE HIGH-BANDWIDTH COMMUNICATIONS SOLUTION from Cambium Networks surpassed Elite's expectations. The connectivity mainly supports SCADA communications from PAW's central control center to the regional control center which, in turn, receives data from water reservoirs and pumping stations. Now, 30 subscribers use the network.

It addresses their major pain points and runs without any major maintenance, saving their teams valuable time. The low latency, ability to relocate the system, reliability and lack of recurring charges also satisfy its requirements.

WHY THEY CHOSE CAMBIUM NETWORKS

- Rugged equipment works well in harsh, near-line-of-sight conditions
- High reliability and interference mitigation features



ABOUT CAMBIUM NETWORKS

Cambium Networks delivers wireless communications that work for businesses, communities and cities worldwide. Millions of our radios are deployed to connect people, places and things with a unified wireless fabric that spans multiple standards and frequencies of fixed wireless and Wi-Fi, all managed centrally via the cloud. Our multi-gigabit wireless fabric offers a compelling value proposition over traditional fiber and alternative wireless solutions. We work with our Cambium certified ConnectedPartners to deliver purpose-built networks for service provider, enterprise, industrial, and government connectivity solutions in urban, suburban, and rural environments, with wireless that just works.

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