

PANOS ing.

MBT CONFERENCE

OPATIJA 2025.



35 years of
navigating
your signals



Highly Resilient, Fiber-Like Private Wireless Broadcast Network

mmW Products Overview

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May 2025



Our mmWave Portfolio

E-band and V-band PtP / PtMP / Mesh



EtherHaul™ Hundred Series

V-band E-band

Street-level

- V-Band: EH-600TX/614TX
- E-Band: EH-710TX
- 1Gbps aggregated
- Up to 2km (V) / 5km (E)
- PoE-In & Dual PoE Out



EtherHaul™ Kilo Series

E-band

Backhaul

- EH-8010FX/8020FX
- Up to 20Gbps FD
- 0.5 / 1 / 2 FT antennas
- Up to 2 mi / 3.2km
- ExtendMM +9mi / +15Km



IP-50EX Series

E-band

High power MBH

- EX/EX-A/EX-P variants
- 1/10/25 GbE ports
- Up to 20Gbps FD
- 1 / 2 / 3 FT stabilize ant.
- SyncE / 1588 timing



MultiHaul™ TG Series

V-band

PtMP/MESH

- DN: N265/366/367
- CN/TU: T260/261/265/280
- Up to 7.6Gbps full duplex
- PtMP: Up to 700m
- PoE-In & Out



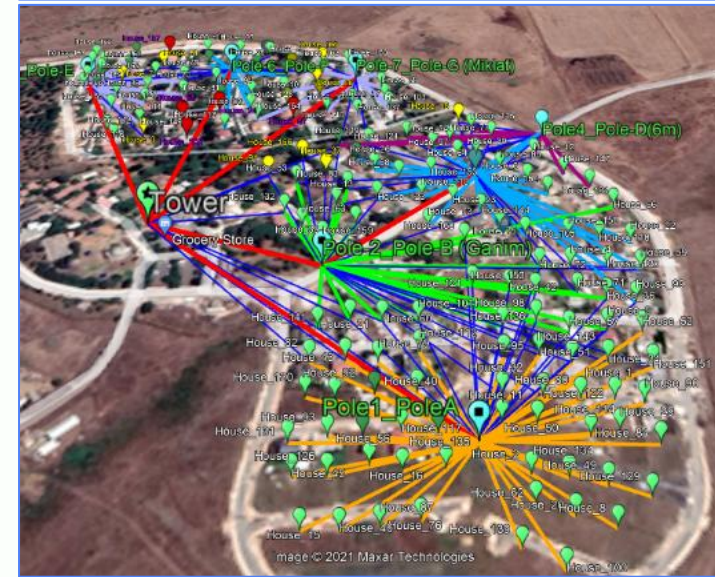
SmartHaul™ Network Design & Operation

Software Tools

- Wireless Network Design Engine (WinDE)
- Link Budget Calc. (LBC)
- Network Management System (EMS / Insight)

WiNDE network design tool

- Ceragon's SmartHaul™ Wireless Network Design Engine (WiNDE) automates the many tasks involved in designing a complete mmW wireless network.
- WiNDE integration in an operator's planning environment takes days compared to traditional tools that can take weeks or months.
- The engine reduces days of complex work and tedious details to hours.
- Intuitive and easy to use, the 5-step wizard will guide a user with 20 years or 20 days of network design experience to the same swift results.

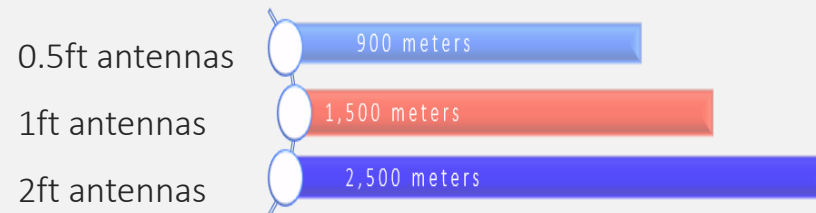


60GHz EH-614TX

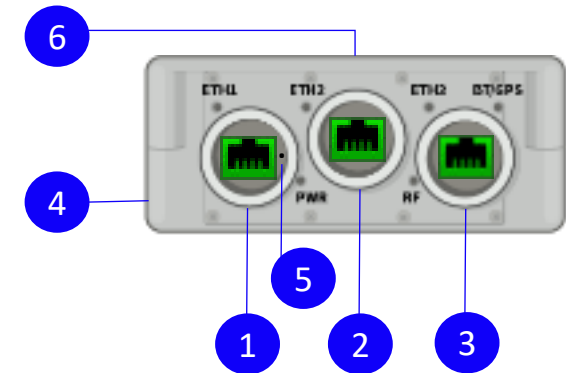
License-exempt, easy to deploy extremely reliable street-level radio

Small size ideal for both rooftops and street level deployment

- Hitless adaptive modulation 125/250/500MHz up to QAM64
- 1Gbps aggregated capacity (user configurable 0.75/0.25Gbps or 0.5/0.5Gbps)
- 14x non-overlapping channels
- 3x Gigabit port switch with **dual PoE-Out**: 2x 26W or 1x 52W
- Fully configurable layer 2 services, G.8032 ring protection
- MEF compliant QoS, shaping and policing
- Reduced OPEX with built-in capacity tester and spectrum analyzer
- Field proven 90-year MTBF
- Reach:



EH-614TX PHYSICAL INTERFACES



1. GbE RJ45 - PoE In
2. GbE RJ45 - PoE Out
3. GbE RJ45 - PoE Out
4. Grounding
5. Alignment / Reset push button
6. Antenna port



70/80GHz EH-8010FX

Leading 10G Range E-band Radio

- Scalable licensing starting at 1Gbps
- Max. capacity: 10,000Mbps full duplex
- 9 levels OQS aware adaptive modulation
- Up to +18dBm TX Power
- World record E-band 10G range: 16Km!!!
- Fiber SFP+ and copper RJ45 10G port
- Easy installation: out-of-the-box operation
- Dual redundant power inputs

99.99% availability; ExtendMM 99%

**2 port Switch:
1G RJ45 and 10G combo**



EH-8010FX Series ODU+0.5ft / 1ft / 2ft antennas



Antenna size options and resulted ranges

0.5ft	1ft	2ft	2ft ExtendMM
1Km	2Km	4Km	16Km

EH-8020FX PRODUCT OVERVIEW

EASIEST TO INSTALL, 2GBPS TO 20GBPS UPGRADABLE E-BAND RADIO

RADIO

- Max Capacity - 10Gbps (20Gbps with XPIC)
- Channel BW - 250, 500, 1000 & 2000MHz
- 9 levels adaptive coding modulations
- Tx power range: 14 to 18dBm
- AES128 (H/W ordering option)

CONFIGURATIONS

- 1+0, 2+0 (XPIC)
- Multiband support with Ceragon ODU's/3rd party

SIZE

- ODU + 0.5ft antenna: 11" x 8.2" x 5.7" / 28cm x 21cm x 14.5cm
- ODU + 1ft antenna: 12.6" x 8.2" / 32cm x 221cm
- ODU + 2ft antenna: 25.6" x 13.4" / 65cm x 34cm



INTERFACES

- 1x 1Gbps RJ45 PoE in
- 2x 10Gbps SFP+
- 48V DC (redundant with the POE in)
- RSSI measurement
- XPIC signaling

RELIABILITY

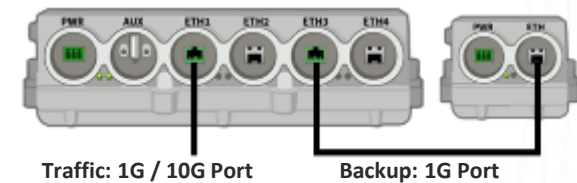
- IP67 sealed
- 90 years MTBF
- Operating Temperature: -45° to +55°C (-49° to +131°F)

WEIGHT

- ODU + 0.5ft antenna: 9.2 lbs / 4.1kg
- ODU + 1ft antenna: 11.7 lbs / 5.3kg
- ODU + 2ft antenna: 30.6lbs / 13.9kg

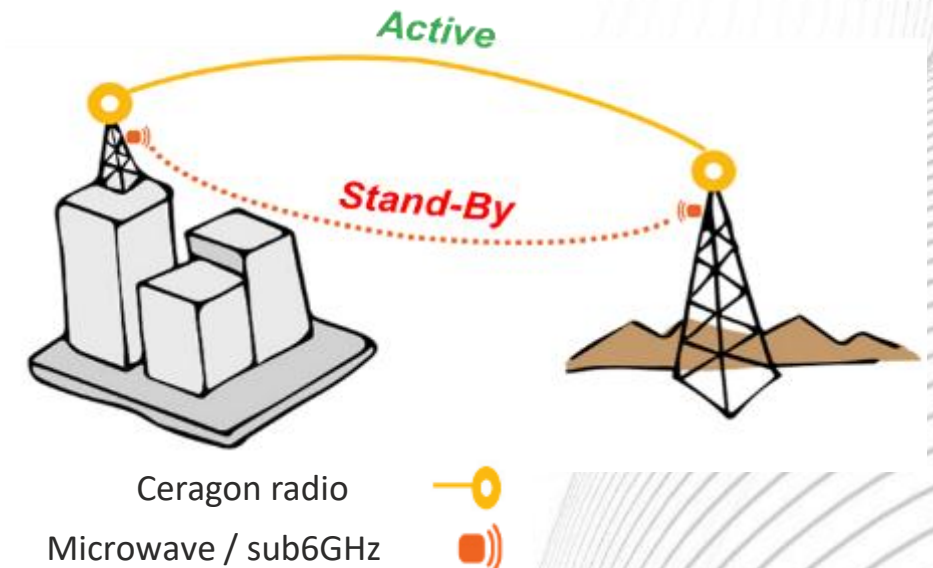
ExtendMM™ - always-on, extended range

- Combine any **EtherHaul™** millimeter wave radio with **your existing/new** microwave/sub6GHz
- With a single click you turn the two radios into a single **high-performance long-distance link**
- **No additional networking equipment is needed:**
The EtherHaul™ powerful, integrated networking engine does everything for you, seamlessly



Ceragon
EtherHaul

Backup radio



Ceragon's MultiHaul™ TG PtMP Product Line

Best in Class: Integration and Performance

Node with 360°(90°) coverage & simple single-cable installation



Works out of the box (NW controller is still optional)

IPv4 for management only (IPv6 in the future)

Built-in switch eliminates external or 3rd party box

Integrates with billing and OSS practices (name assigned by the user; no MAC address)

Short & Long Range (beam-forming or dish antennas)



Widest choice of TU configurations, longest range

Easy L2 operations, lowest latency, high packet/second

Full VLANs support

Provider bridge

MultiHaul™ TG's PtMP Connectivity Options

Solution's Main Building Blocks

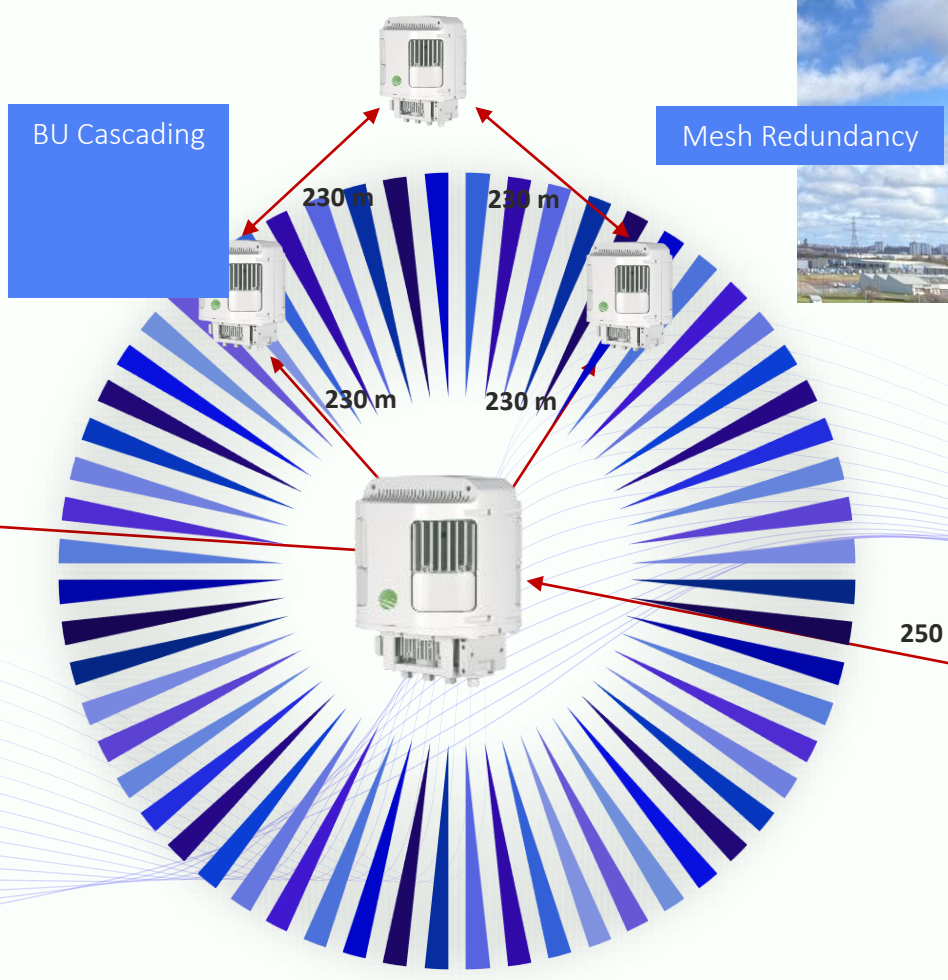
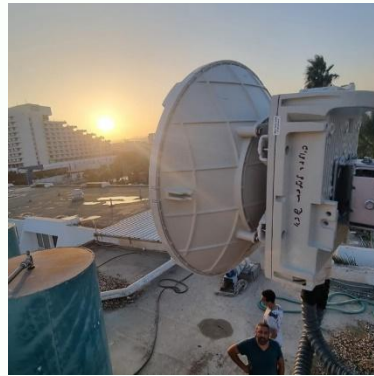
360° BU
Base Unit



Short range TU
Terminal Unit



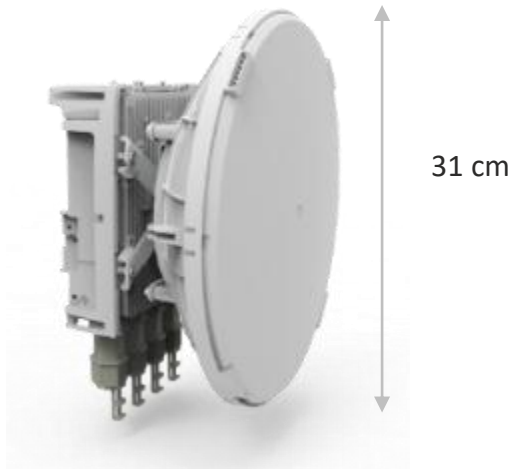
Long-range TU
Terminal Unit



MultiHaul™ TG's PtP Connectivity Options

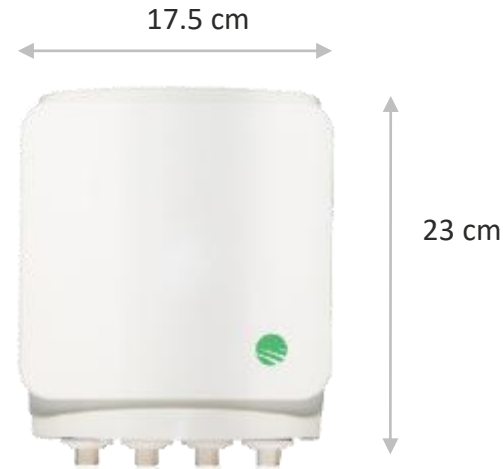
MultiHaul™ TG T280-1ft

- Order ODU, MK, antenna, POE
- Range: ≤ 1,200m
- Capacity: ≤1.9Gbps FD
- X2 RJ45 ports: 1Gbps+2.5Gbps
 - X1 SFP+ port
 - X1 PoE out



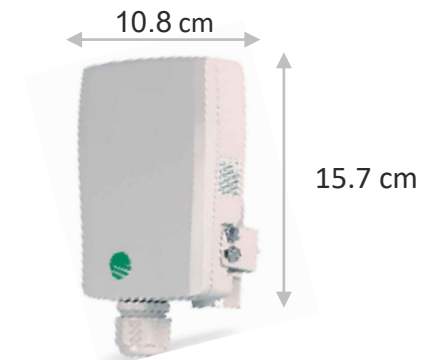
MultiHaul™ TG T280-0.5ft

- Order ODU, MK, antenna, POE
- Range: ≤ 700m
- Capacity: ≤1.9Gbps FD
- X2 RJ45 ports: 1Gbps+2.5Gbps
 - X1 SFP+ port
 - X1 PoE out



MultiHaul™ TG MPL-261

- One P/N for full link kit
 - 2x ODUs with 90° scanning antennas
 - 2x Mounting kits
 - 4x Steel metal bands
 - 2x IP67 Glands for cables
 - 2x AC PoE power adapters
- Range: ≤ 300m
- Capacity: ≤1Gbps full duplex
- X1 RJ45 port
- **Pre-configured: out of box running**
- Smallest and most affordable



CASE STUDIES

The background features a solid red color with a series of thin, white, wavy lines that create a sense of motion and depth, flowing from the bottom left towards the top right.

Evolving from Safe to Smart City

Municipal LAN

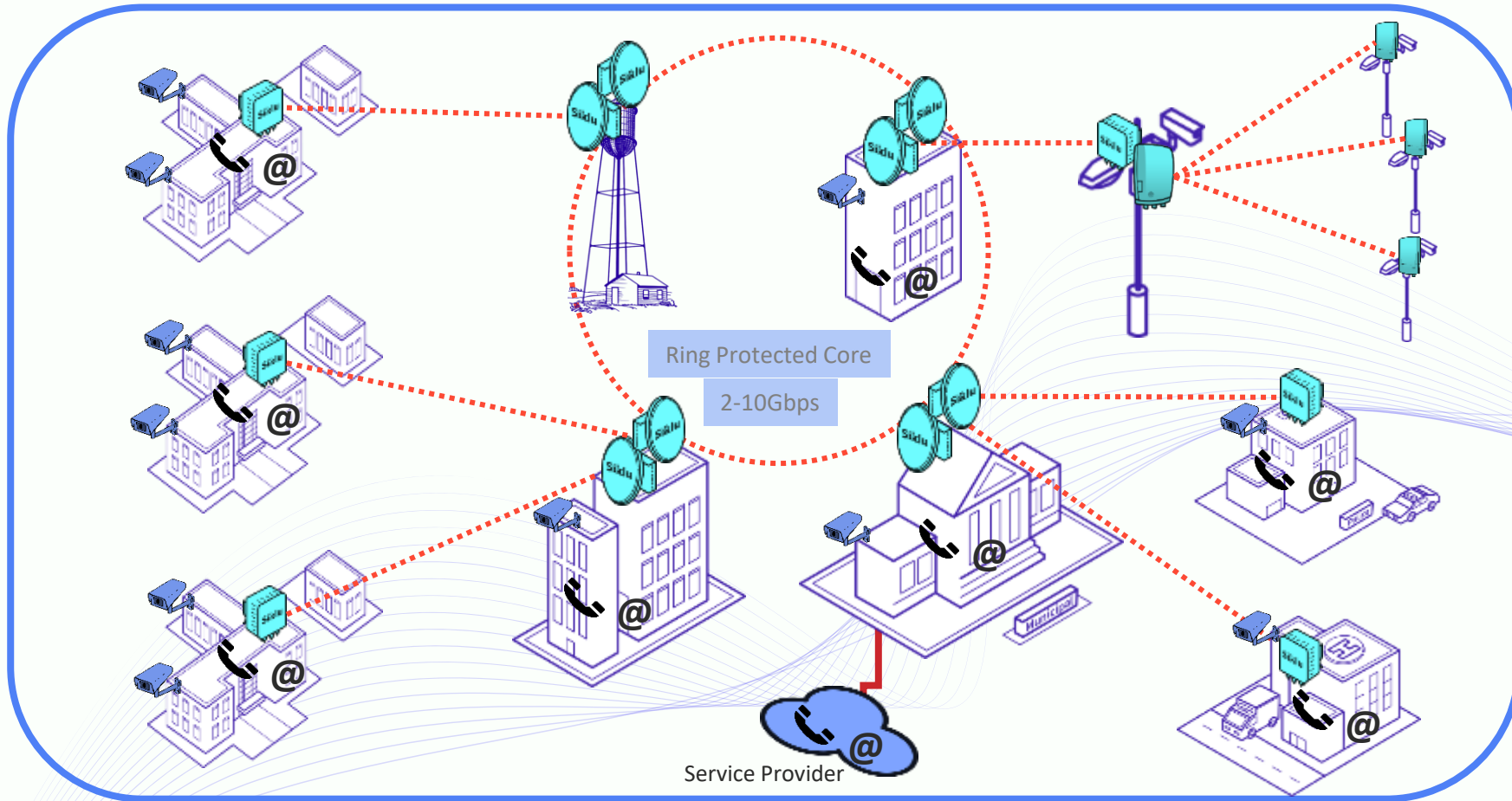
Internet

Telephony

HLS

Public WiFi

IOT Hubs



A Real Example: calculated ROI and benefits (Israeli municipality)

Leased lines BEFORE:

- 60,000 NIS per month
- 720,000 NIS per year
- Metro lines, limited bandwidth: 10 to 50 MB
- Adding cameras to an existing site: Request to increase bandwidth - requires an increase in monthly payment

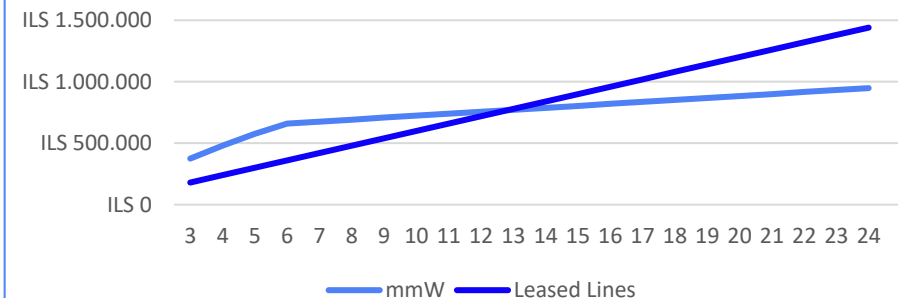
Adding camera sites:

- Usually involves excavations (Fixed Operator does not have infrastructure on traffic islands) that create "seams" (ugly, height differences) in the roads
- Installation fee + excavation cost
- Excavation involves:
 - Risk of damage to infrastructure
 - Safety hazard: sidewalks/roads open for days

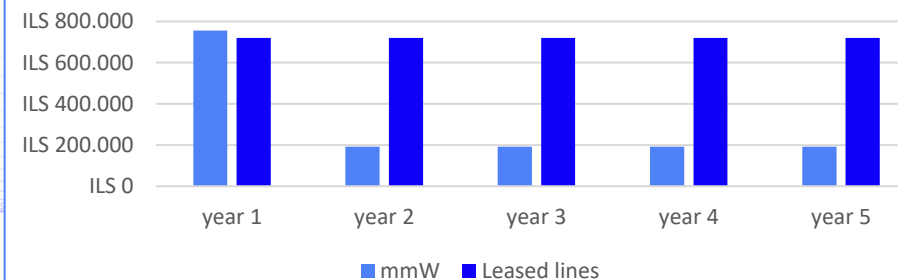
Estimated setup time: up to 6 months

- Return on investment: 13 months
- Saving over 5 years: ILS 2,000,076

24 months ROI analysis



5 years analysis



Security

// Enhancing CCTV security and connectivity at the Omaha Zoo

Vertical	Security-enablement // Internet Access
Location	Omaha Zoo, U.S
Customer	Johnson Controls (JCI)
Tech Deployed	EtherHaul 8010FX // MultiHaul TG N366 // MultiHaul TG T265 // T280
Importance	“The network also gives us the flexibility in the future for pop-up venues throughout the Zoo that were not possible before.” – Zoo CFO



THANK YOU

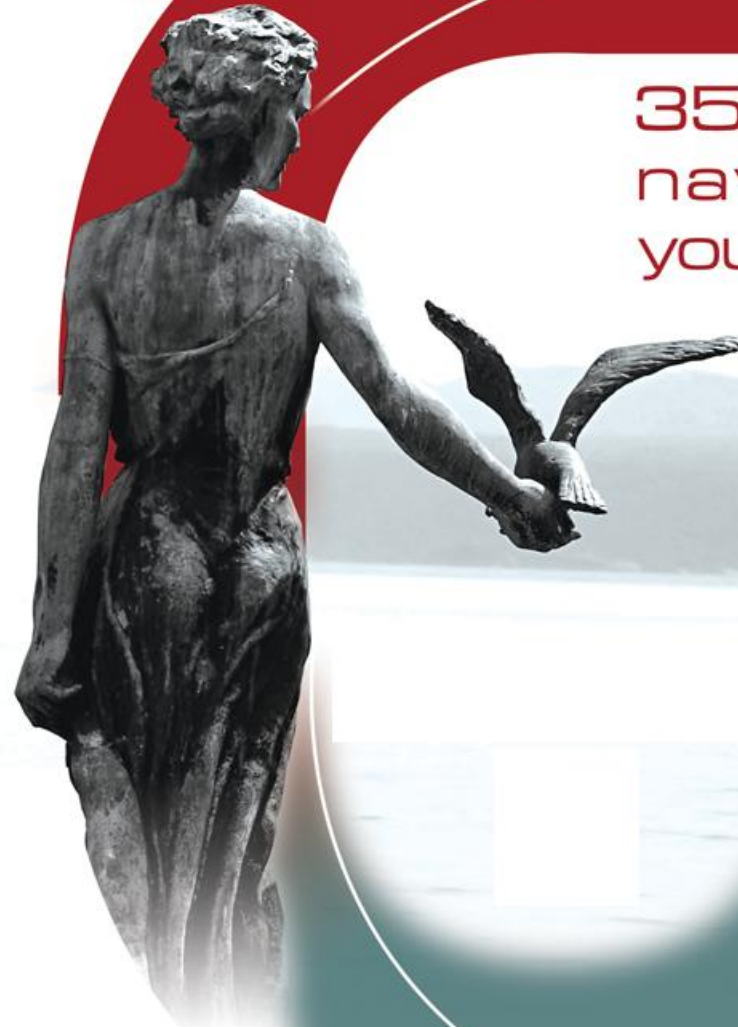


DELIVERING CONNECTIVITY EVERYWHERE

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