

Building the Industrial Backbone

National Private Networks

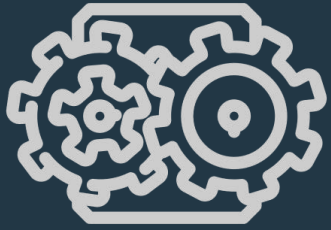
Mahmoud Alkhatib – TAWAL

19th of November 2025

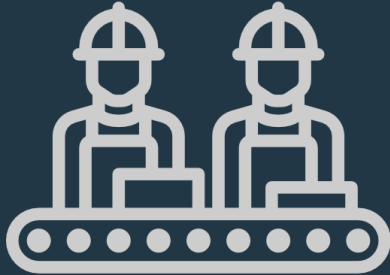
“The success of our vision depends on our ability to innovate and to push the boundaries of what’s possible”

HRH Crown Prince Mohammed bin Salman Al Saud

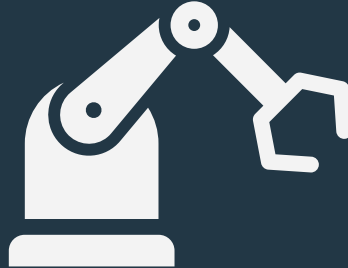
Towards Industry 5.0



Industry 1.0



Industry 2.0



Industry 3.0



Industry 4.0



Industry 5.0

Mechanical

By water and Steam power

Factories replaced Handcraft
Machines Multiplied Human efforts

Electrical

Mass production and assembly line

Making the start of modern economy

Computers

Electronic devices to automate production

Information became the new fuel for growth

Internet

Connected devices and Networks of production

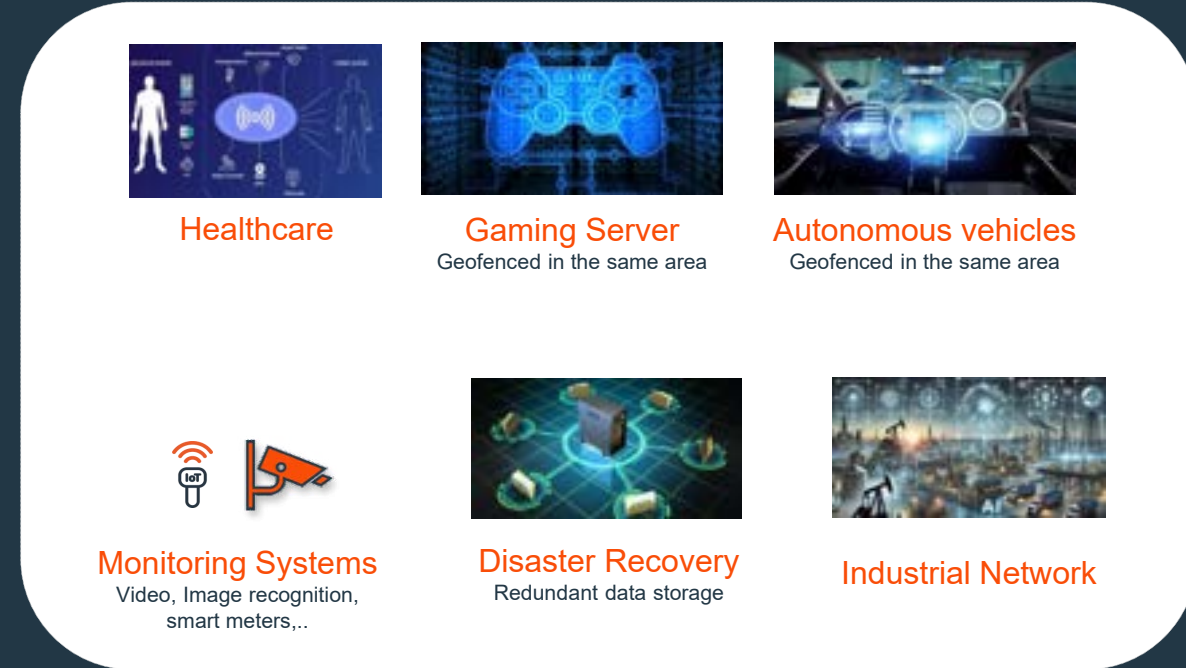
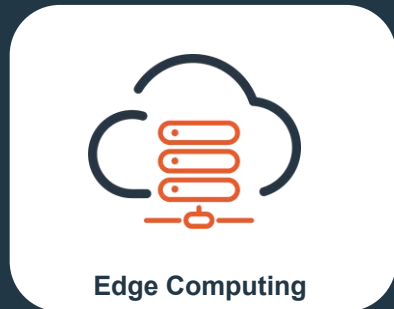
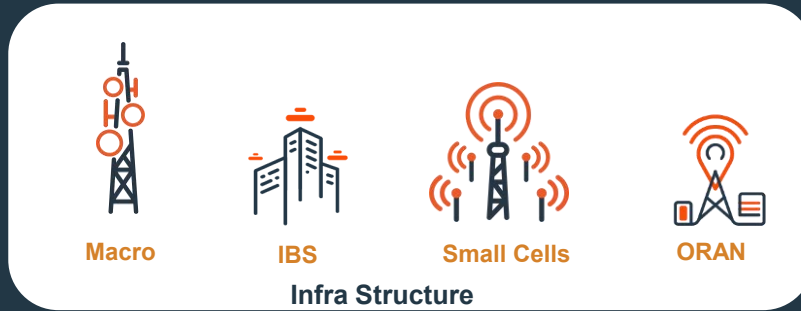
Machines start talking to machines and data started predicting decisions

Artificial Intelligence

Robotics, AI predictions, and Automation as Human

Human-AI Collaboration

Private Networks



System Requirements

Use Cases

TAWAL Products enabling Private Networks



Outdoor Coverage

Colocation

Built-to-Suit

Flexi Tower



Indoor Coverage

In-Building Solutions

Wi-Fi



Smart Infrastructure

Smart Colocation

Smart Pole

Smart Kiosk

EV Charging

Edge Infrastructure



Coverage-as-a-Service

Outdoor mobile

Indoor mobile

Wi-Fi Connectivity



Backhaul-as-a-Service

Fiber to Tower

Microwave to Tower



O&M-as-a-Service

Tower Operations Center

Field Operations



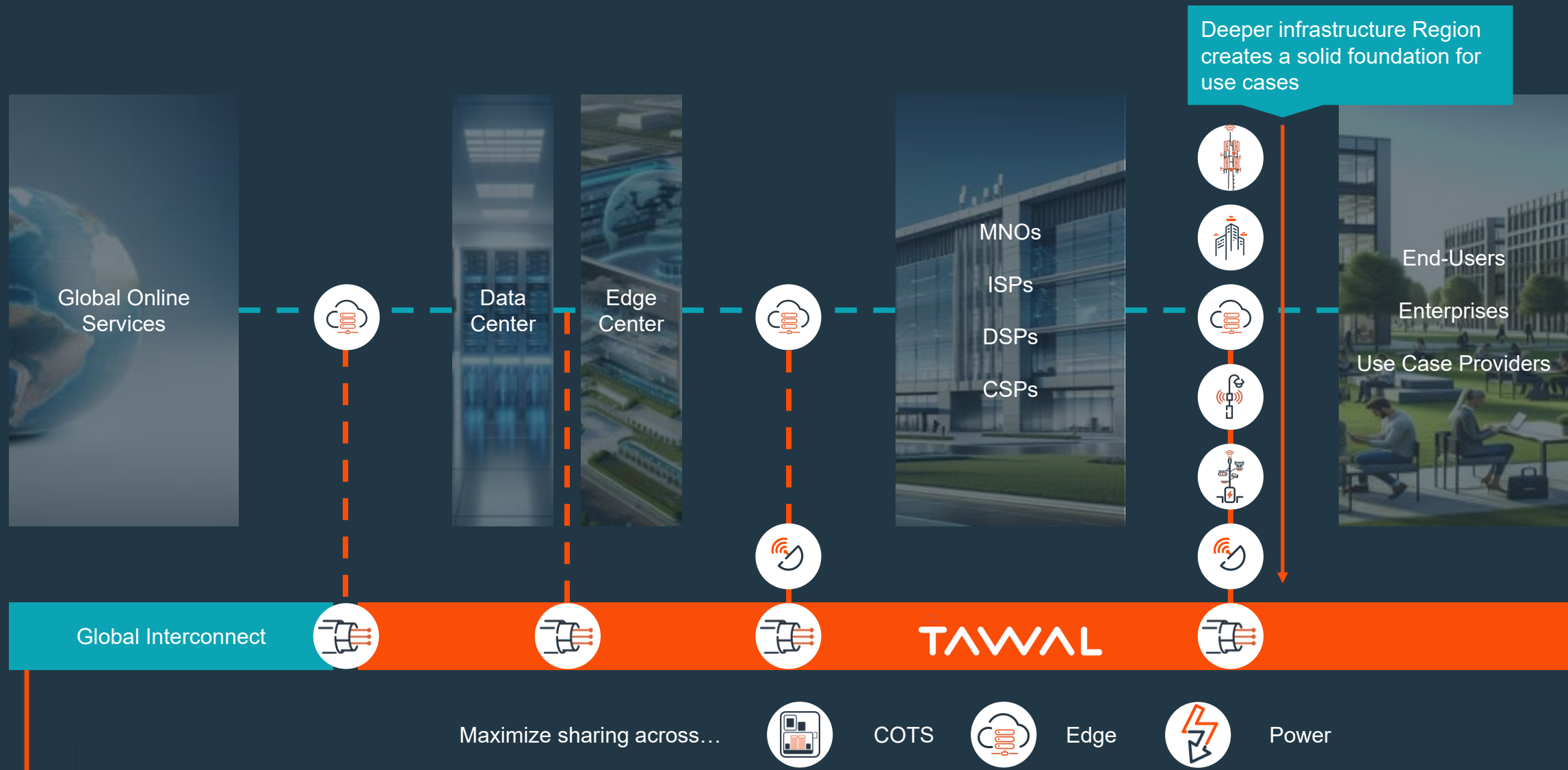
New Services

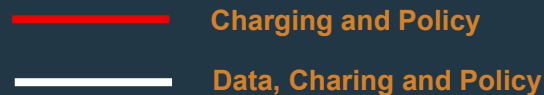
Infrastructure-as-a-Service (COTS)

Private Networks

 New/Developing products

Integrating TAWAL Products to build an Advanced National Private Network





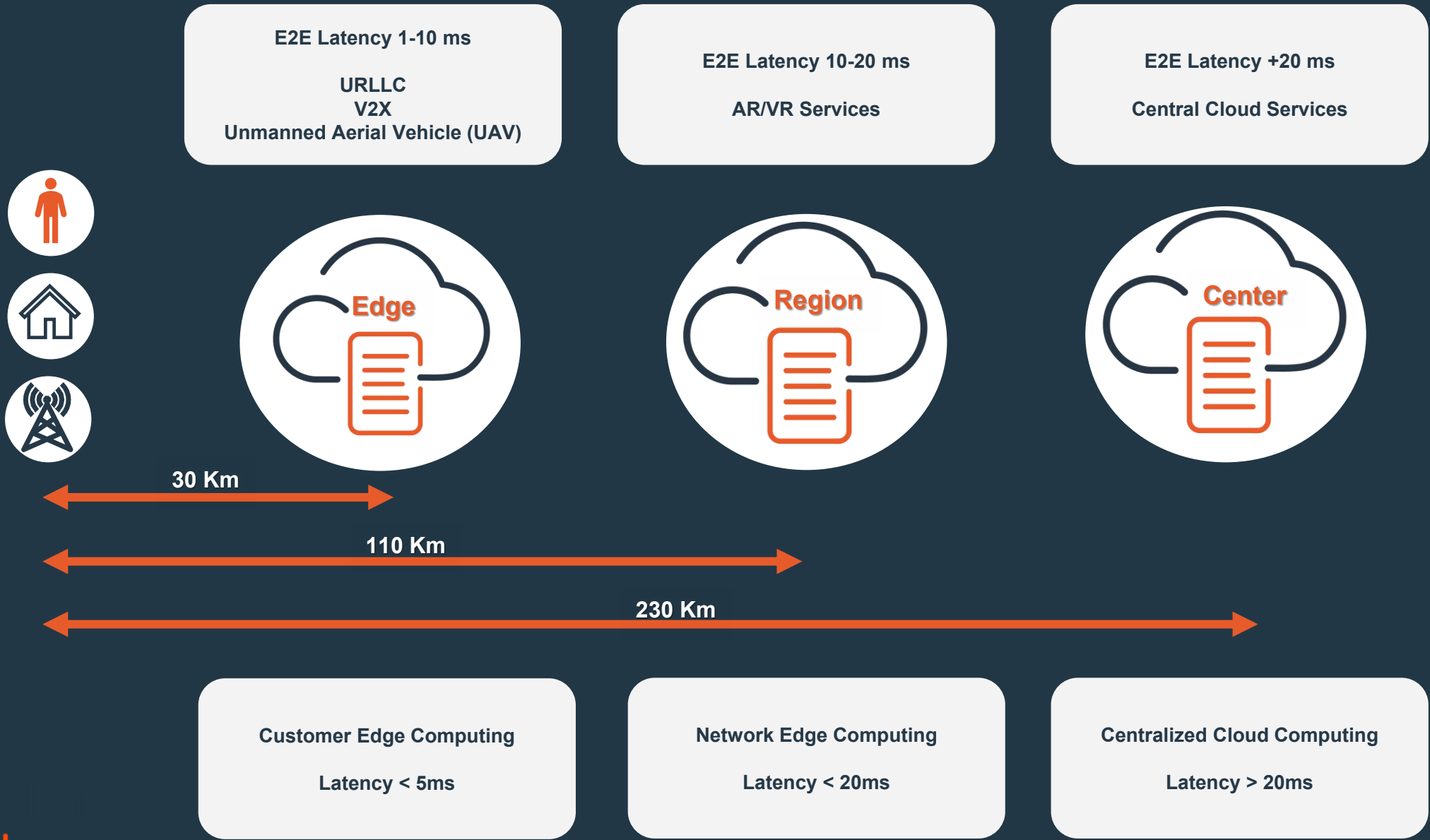
- ❖ Ultra-low latency for
- ❖ Guaranteed reliability
- ❖ Data sovereignty
- ❖ Scalable flexibility for AI, IoT, and future workloads.

Main Benefits for Private Networks

- Low Latency
- High Throughput (Dedicated)
- Cost-Effective
- Context awareness
- Security
- Resilience in isolation
- Compliance and privacy



The needs for Edge Computing



Use Cases Requirements, BW, and Latency

Typical Scenario	Segment	BW (Mbps)	E2E Latency (ms)	Recommended Deployment Location
AR/VR	VoD	+120	<100	Center/Region/Edge
	Live Broadcasting	+120	<50	Center/Region/Edge
	Gaming	+100	AR: <20 VR: <100	VR: Region/Edge AR: Center/Region/Edge
UAV	Gaming	+30	<50	Center/Region/Edge
Connected Vehicles	Autonomous driving	+16	<20	Region/Edge
	Remote driving	+16	<20	Region/Edge
Intelligent Manufacturing	Industrial Equipment Management	+1	<10	Edge
	AGV	+1	<20	Region/Edge
	Industrial Cloud Camera	+100	<100	Center/Region/Edge
Smart Healthcare	Wireless Monitoring	+0.1	<200	Center/Region/Edge
	Mobile Ward round	+0.2	<200	Center/Region/Edge
	Remote diagnosis	+5	<50	Center/Region/Edge
	Emergency Rescue	+0.2	<50	Center/Region/Edge
	Remote Surgery	+5	<20	Region/Edge
Smart Grid	Device Control	+2	<50	Region/Edge
	Information Collection	+2	<200	Region/Edge
	Mobile Application	+4	<200	Region/Edge
Video Surveillance	HD Video Conference	+45	<50	Center/Region/Edge
	Mobile AR face detection	+60	<10	Edge
	Public Security Video Analysis	+100	<50	Center/Region/Edge

Generic Requirements for applications; might be more aggressive depending on the use case

TAWAL Sites enabling Private Networks



Reachability

Almost **100%** of populated areas

More than **1.21** Tenancy Ratio



Connectivity

All sites have BH

Multiple Service Providers

+75 %
Of TAWAL City sites with Fiber

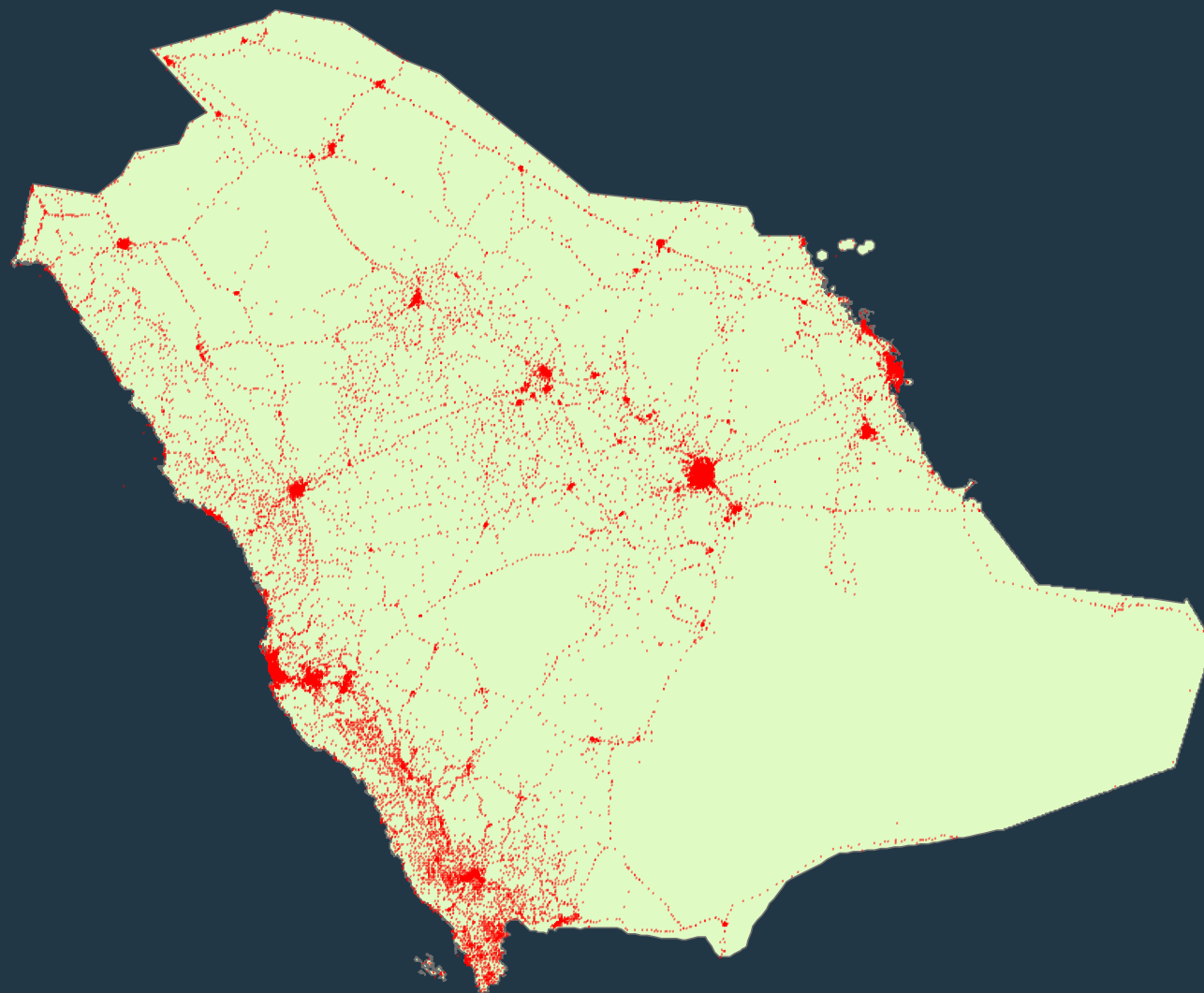


Power

Almost **100%** of TAWAL sites with stable power

~100% of TAWAL sites with backup power source

+1,100 TAWAL sites with triple power source



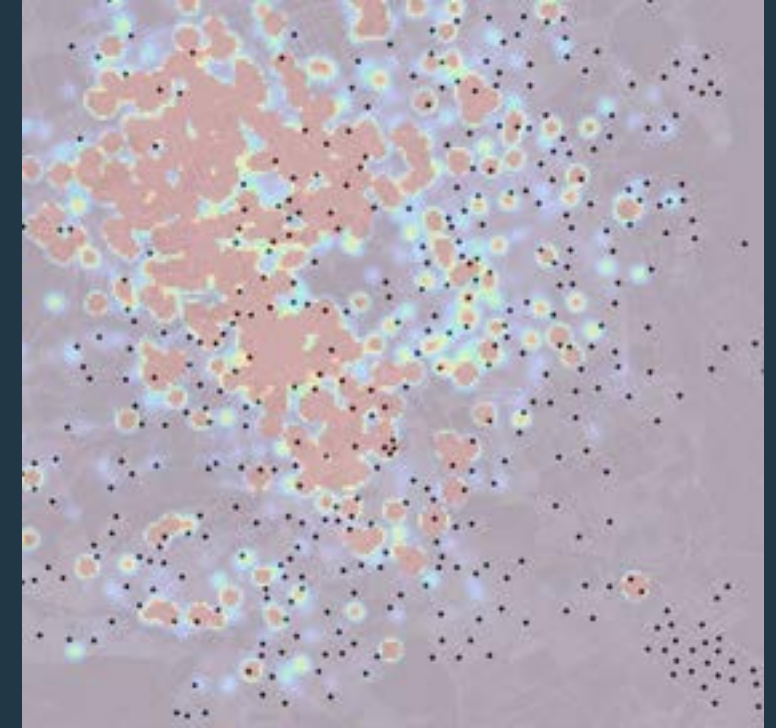
TAWAL Sites enabling Private Networks



TAWAL Shortlisted Sites Vs. Population



TAWAL Shortlisted Sites MEC Sites Vs.
POI



TAWAL Shortlisted Sites Vs. Social
Media Traffic

TAWAL shortlisted **+25%** of Towers portfolio that are diamonds for Private Network and Edge Computing

Use Cases in National Private Networks

Remote Mining

Terminals



Drones



Live Camera



Mining Vehicles



Handsets and Sensors

Coverage



Processing



Edge Computing

Connectivity



Infrastructure Setup

Applications



Environments Monitoring



Remote Vehicle Control



Intelligent Safety Monitoring and Voice/Data Communications

Benefits

Efficiency

Enhancing production efficiency by remote control and monitoring

Cost Reduction

Labors needs will be minimal
Services and Operations outages can be reduced with smart monitoring

Safer

Miners will remotely control vehicles in dangerous areas, and with AI applications through Edge computing, predictions can be generated for risky tasks

Use Cases in National Private Networks

Smarts Ports (Sea and Air)

Terminals



Drones



Live Camera



Handsets
and Sensors

Coverage



Processing



Edge
Computing

Connectivity



Infrastructure Setup

Applications



Video Contents Analysis



Intelligent Tally



Smart Preventive
Maintenance and Supply
Chain

Benefits

Security

Monitoring suspicious behaviors and illegal movements

Cost Reduction

Remote control and security monitor with minimal needs for physical human interaction

Safer

Predictive Maintenance with AI applications to avoid any disaster, especially in sensitive areas

Use Cases in National Private Networks

Industrial IoT - IIoT

Terminals



Drones



Live Camera



Machines



Handsets
and Sensors

Coverage



450 Mhz
Wide Coverage

Processing



Edge
Computing

Connectivity



Infrastructure Setup

Applications



Remote areas monitoring
(Risky areas)



Predictive Maintenance



Voice/Data Communications

Benefits

Efficiency

Enhancing production efficiency by remote control and monitoring

Cost Reduction

Labors needs will be minimal
Services and Operations outages can be reduced with smart monitoring and prediction

Safer

remotely control machines in dangerous areas, and with AI applications through Edge computing, predictions can be generated for risky tasks

We're Here to Shape the Future, with motivation



Thank You!