

5G Edge Computing

Assessing the opportunities that 5G Edge computing presents for distributed generation, real-time monitoring, and distribution automation in the smart grid



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An evolving scenario

High penetration of
Distributed and Renewable Generation

New actors in the
Energy Market

Stability issues

New generation
of Smart Grids
solutions

New solutions
from 3rd parties

Improve system
responsiveness

Security and
reliability

How to achieve those challenges?

Low latency

High speed data

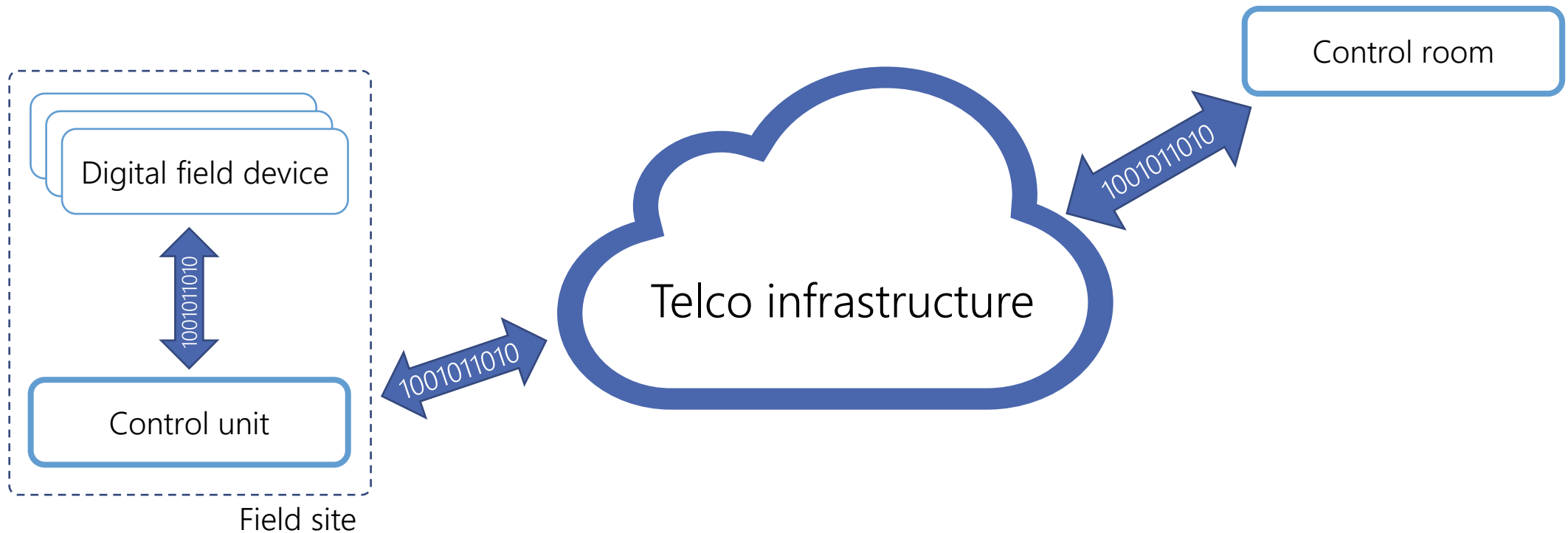
Digitalization

Reliable communication

Safe and resilient connections

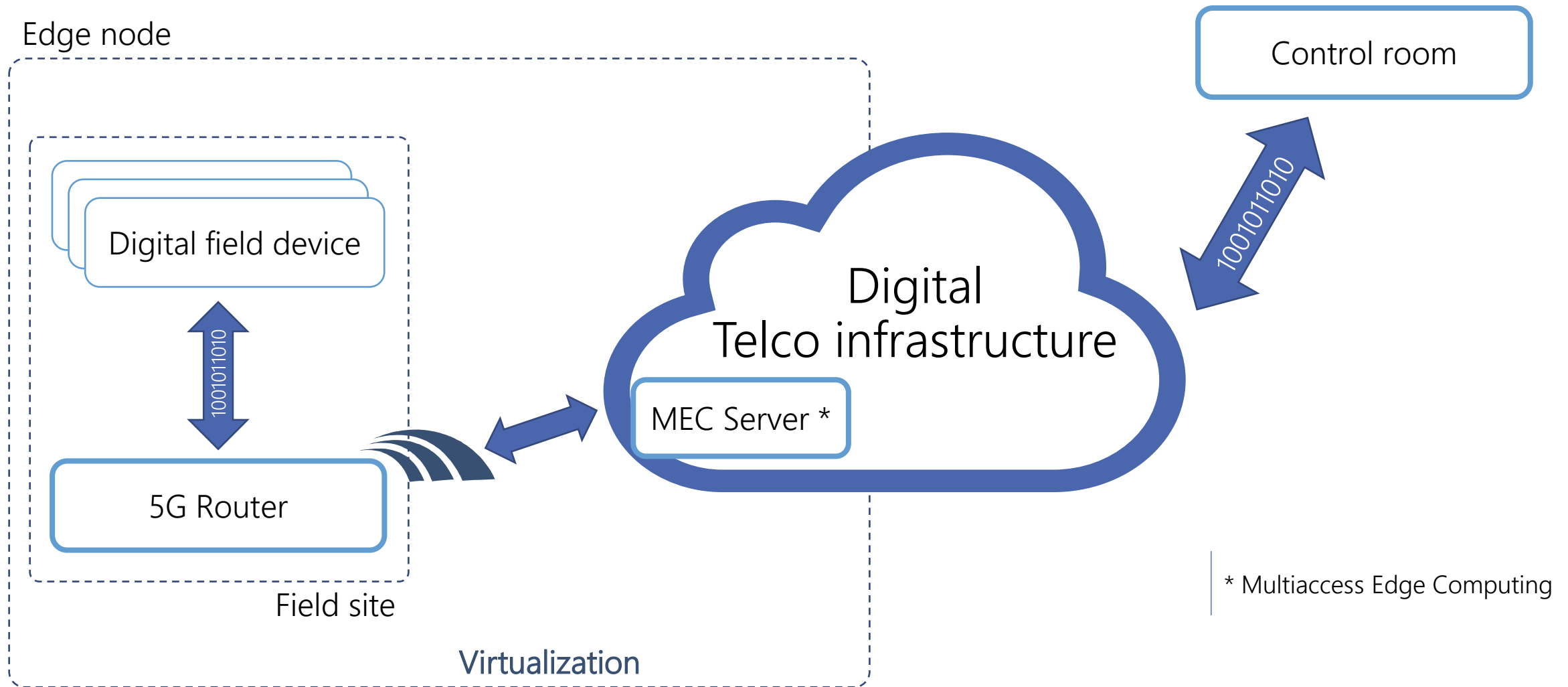
**Digitalisation:
what kind?**

Actual approach



5G-based cloud edge computing

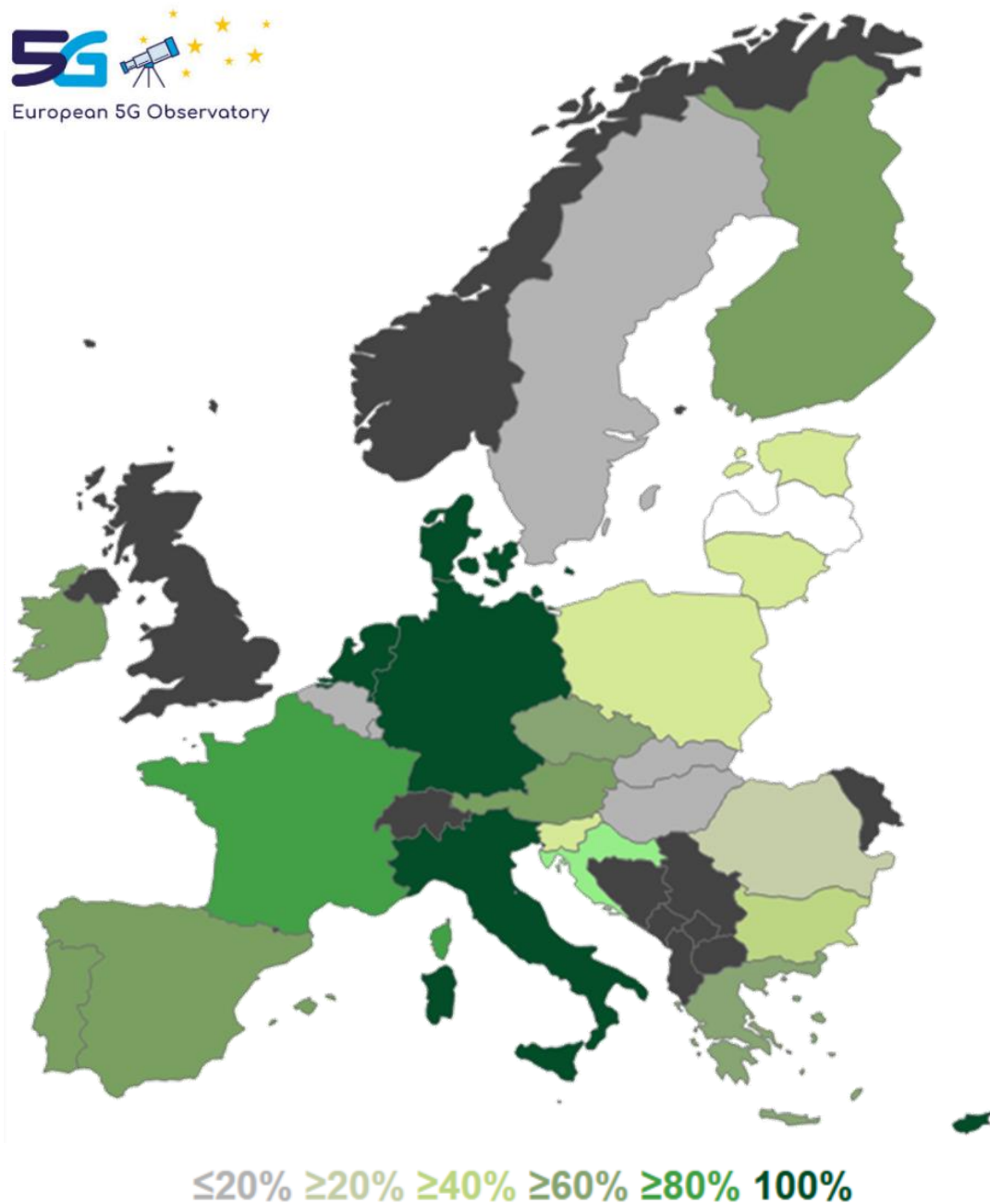
Digital telco paradigm shift



5G: not just a transmission media

- ▶ 5G provides low latency and high transmission speed
- ▶ Compared to Optical Fiber, 5G provides high flexibility with lower costs
- ▶ It's a digital infrastructure that can be duly programmed to the user's need
- ▶ It allows to dedicate a portion of bandwidth for specific applications (slicing)
- ▶ With 5G, users can run their applications in the edge

72% population coverage achieved in EU27



It seems to be easy, why not to use 5G right now?

- ▶ The 5G implementation roadmap is still on progress
- ▶ While in certain areas the radio part is already active, the **Core network** is still based on 4G/LTE
- ▶ APIs are not standard (each vendor provide their own interfaces)
- ▶ TELCOs needs to prioritize the user services to be activated during the roll-out path

Smart5Grid

Demonstration of **5G** solutions for **SMART** energy **GRIDs** of the future



The **Smart5Grid** project aims to investigate the potential of 5G-based Edge-Cloud Computation in the Energy industry, by introducing the concept of **Network Application** for simplifying the 5G complexity. The project testbeds are now available for third-parties' experimenters, fostering the creation of a new market-segment for Network Apps.

GENERAL INFORMATION

THE CONSORTIUM

**24 EUROPEAN
PARTNERS**

(50% SMEs)

**COVERING
7 EU STATES**

DURATION

3 YEARS

TOTAL BUDGET

8M€



Smart5Grid overall concept and key characteristics

Smart5Grid
Open Experimental 5G Platform

Platform layer

Virtualization/Telco layer

Network App

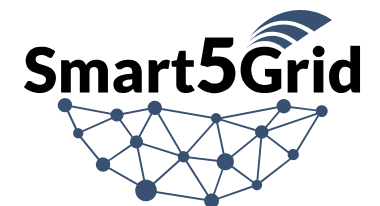
Energy layer



Network App definition,
modeling and implementation

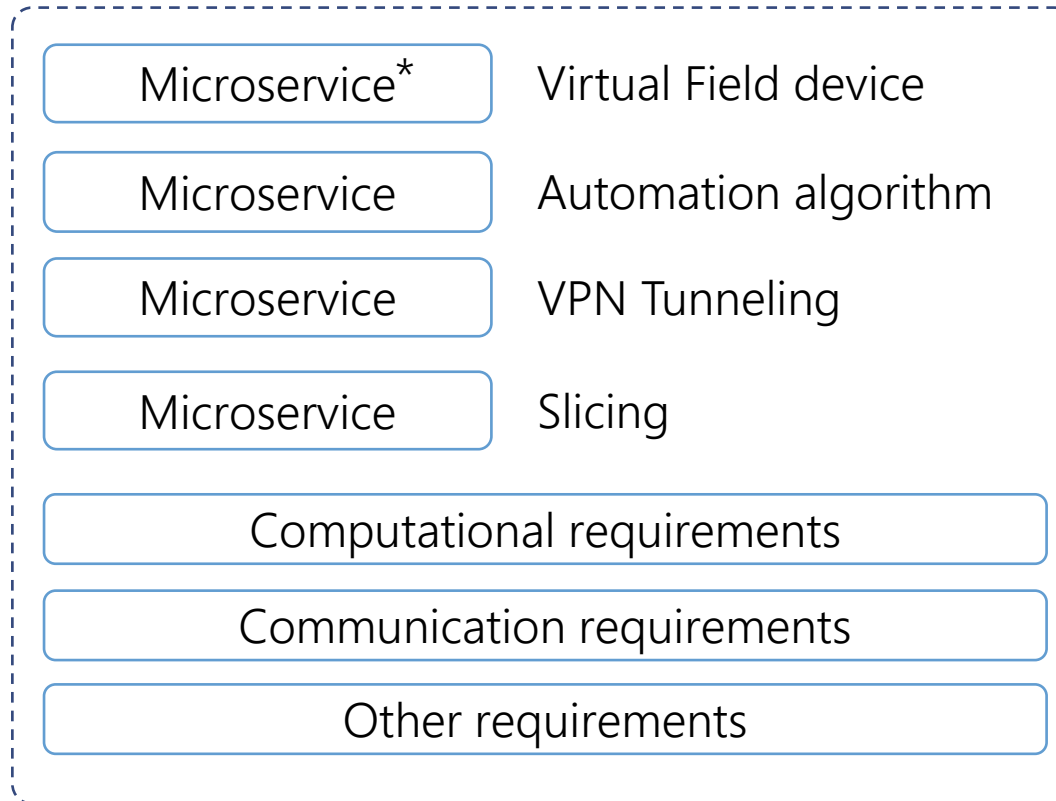
Network App Open Service
Repository

V&V Framework
(Validation and Verification)



A simple Network Application

Network App Descriptor












Network Application

one approach for multiple uses

5G PPP

The 5G Infrastructure Public Private Partnership

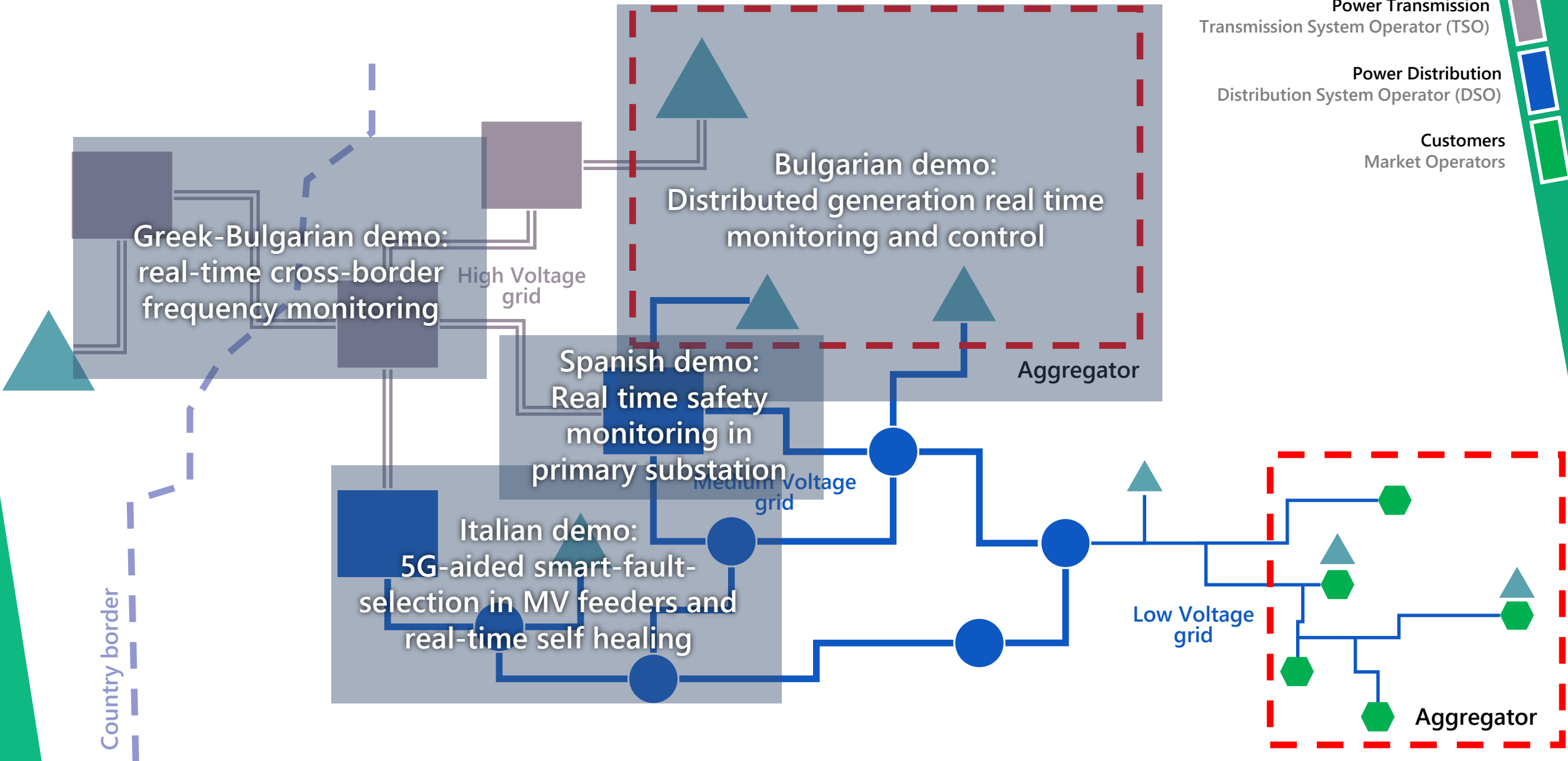
		
		
		

5G PPP Phase 3, Part 6: 5G innovations for verticals with third party services & Smart Connectivity beyond 5G



Energy Vertical: 4 real life demonstrators

- Power generation
- Power Transmission
Transmission System Operator (TSO)
- Power Distribution
Distribution System Operator (DSO)
- Customers
Market Operators



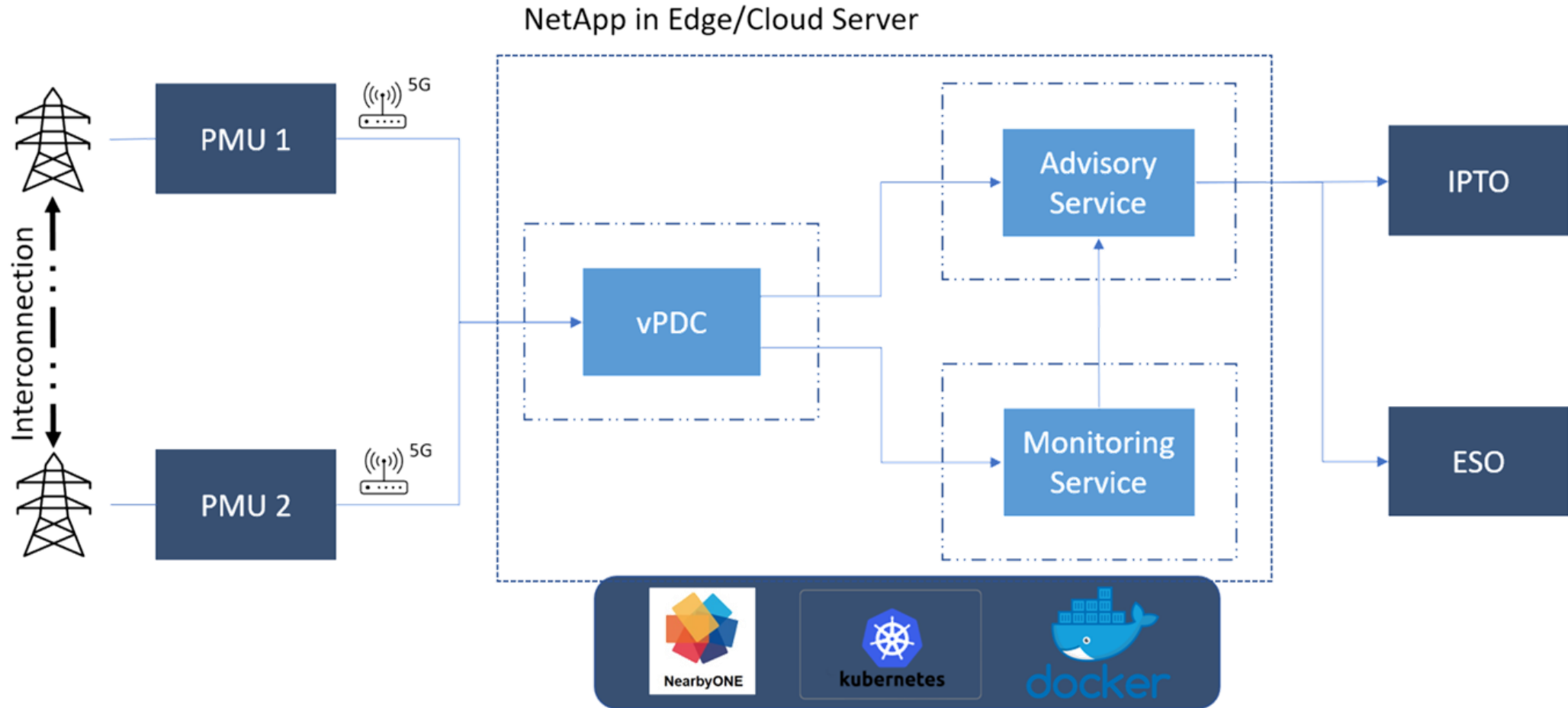


Greek-Bulgarian Demo
Real-time cross-Country frequency monitoring

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Greek-Bulgarian demo

Real-time Wide Area Monitoring



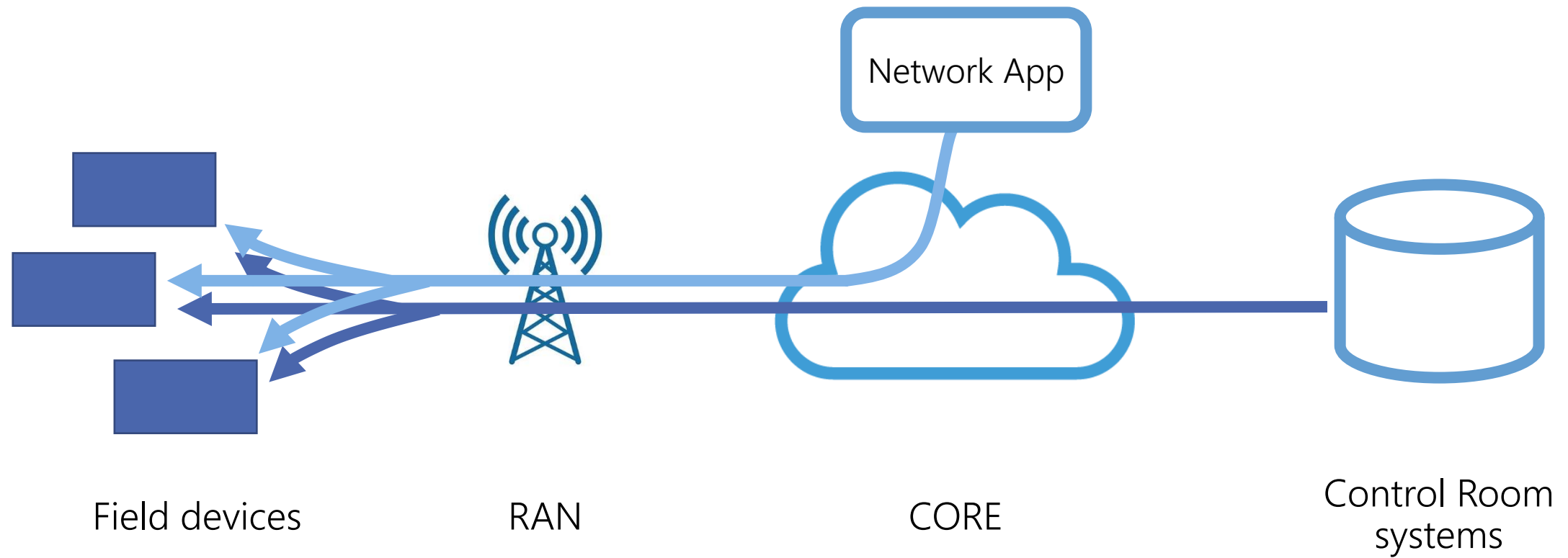


Italian Demo | Olbia
IP monitoring tool for Smart Grid automation

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Italian demo

General purpose



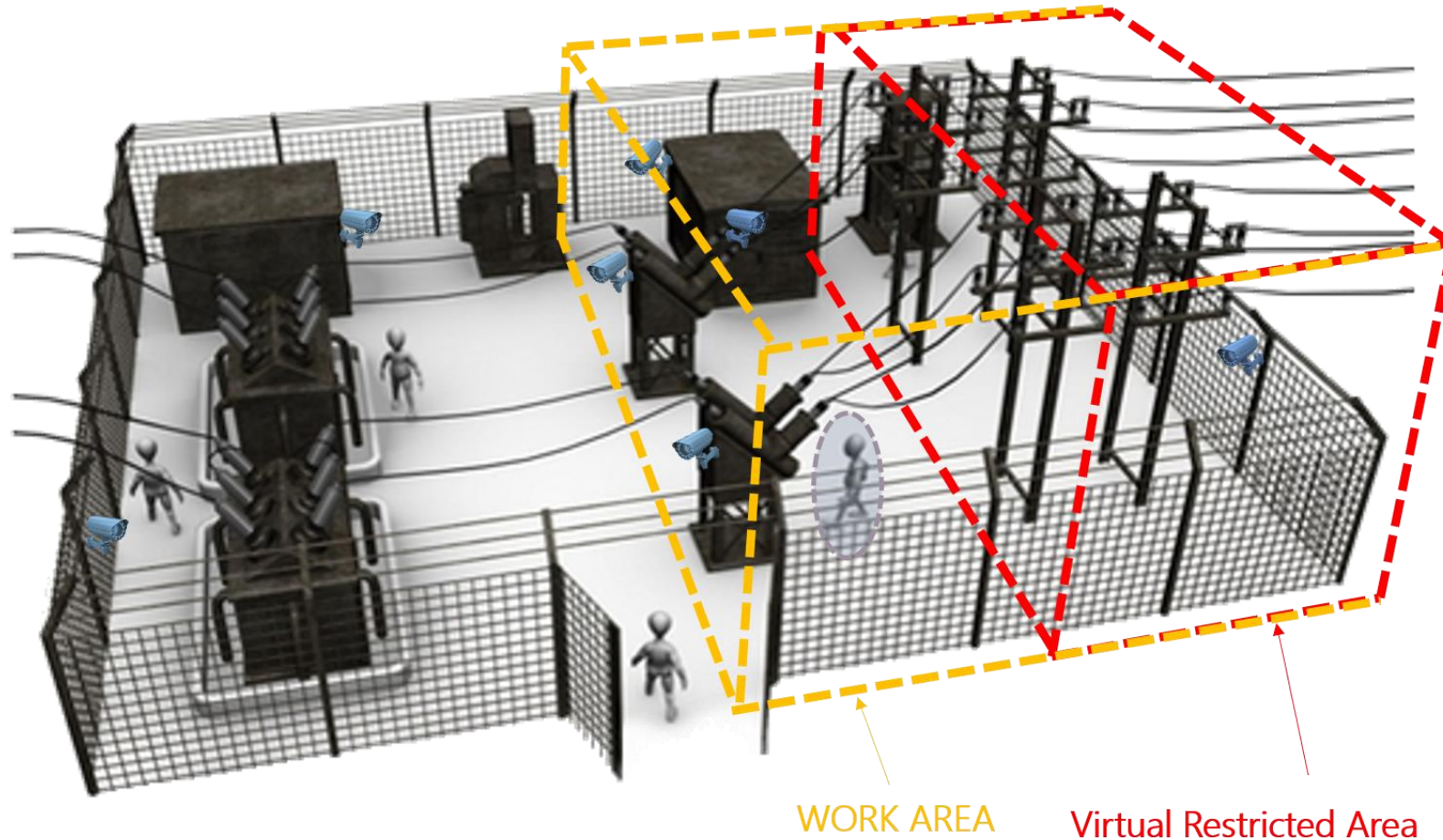


Spanish Demo | Barcelona
Power plant operators' safety monitoring

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Spanish demo

Remote Inspection of Automatically Delimited Working Areas at Distribution Level



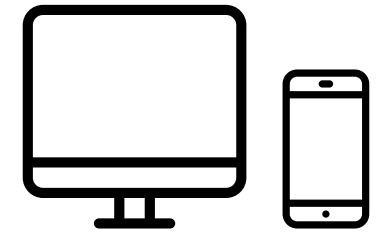


Bulgarian Demo | Sofia
DER management and predictive maintenance

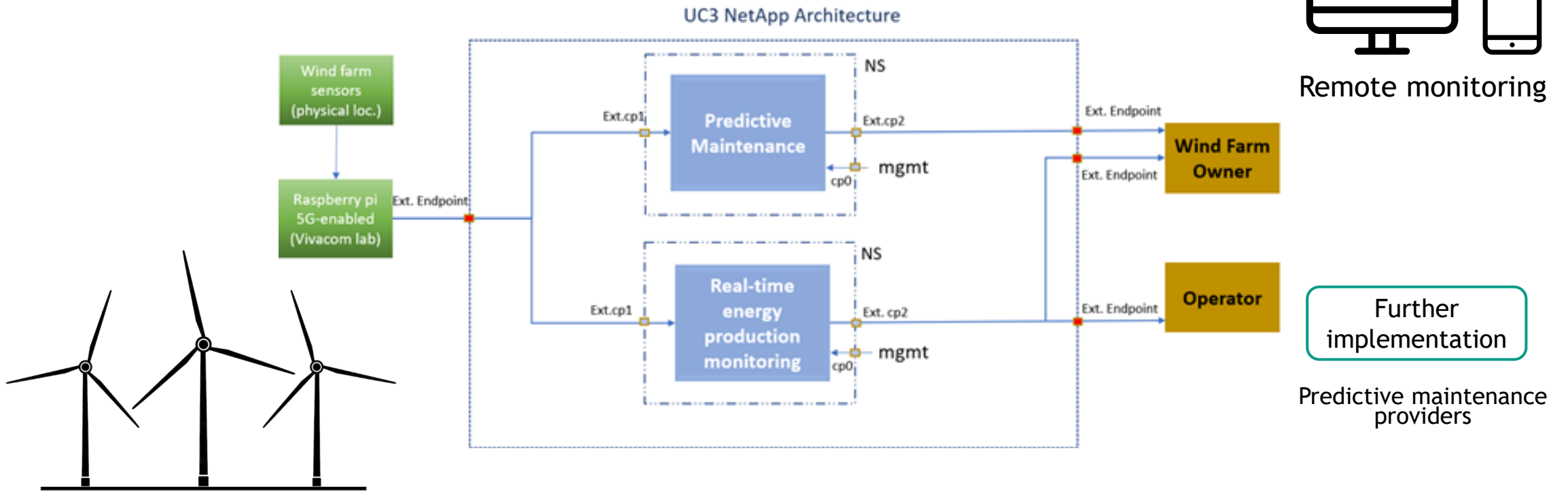
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Bulgarian demo

Real-time Wide Area Monitoring



Remote monitoring



Further implementation
Predictive maintenance providers



**Our testbeds are
open for external
experimenters**





**build and test
your own
Network App**

Third-parties experimentation

Available tools



OSR

Open Service Repository



V&V Framework

Validation and Verification



Contact desk

Remote support for developers



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the Smart5Grid Consortium



Coordinator



TELCOs



WINDTRE

GROUP OF COMPANIES

SMEs



•EIGHTBELLS
Independent Research & Consultancy



NEARBY
COMPUTING

Tech Companies



Universities/Research institutions



SUITING THE FUTURE



DSOs



TSOs



digitizing energy



- SEÑALIZACIÓN INDUSTRIAL
- EQUIPAMIENTO PARA LA
INDUSTRIA



MASTERING EXCELLENCE

*Linked third-parties of Enel Grids



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Thank you!



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