

Use Case 4

Real-time Wide Area Monitoring



Dimitrios Brodimas

UC4 Leader



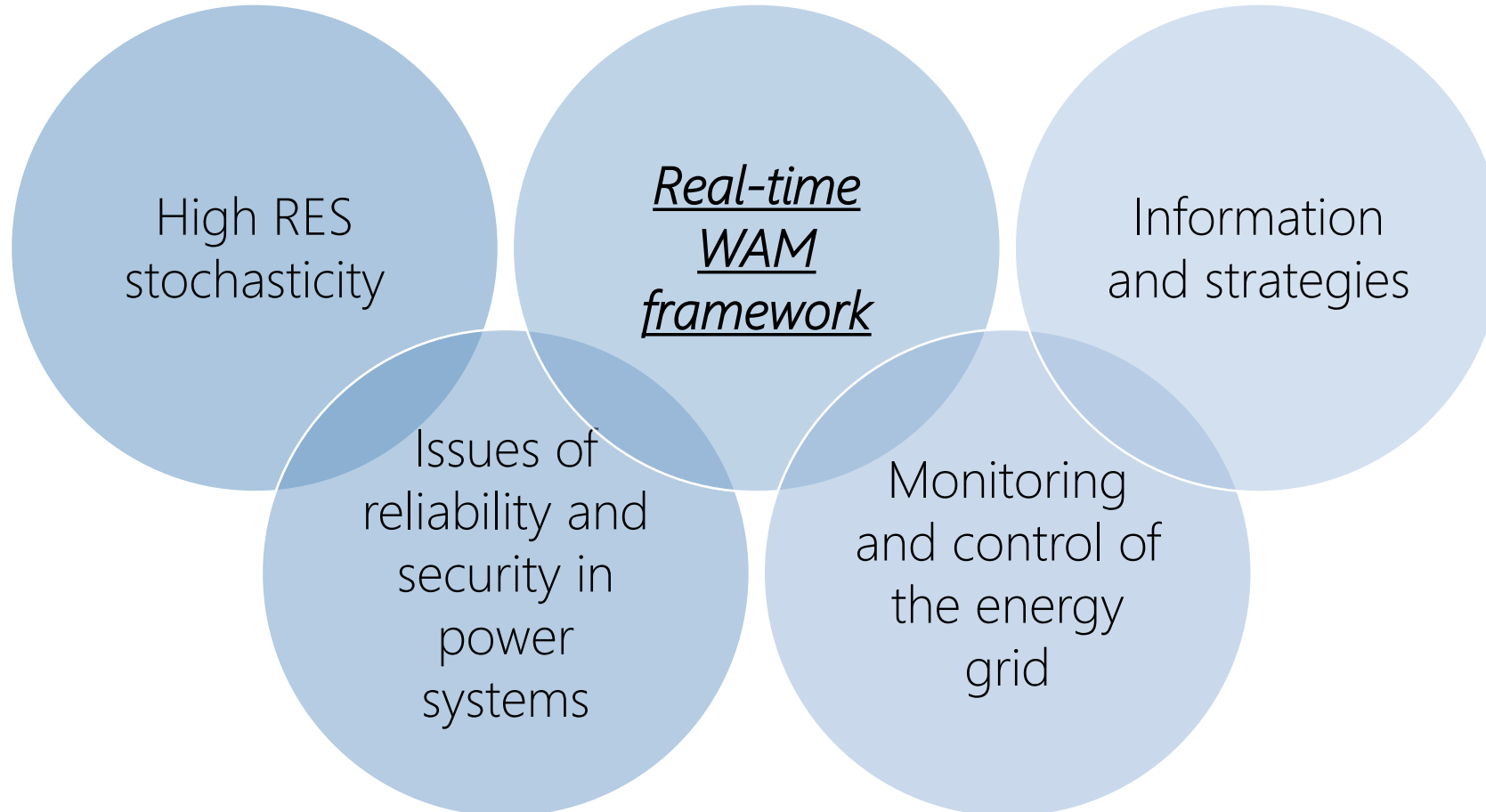
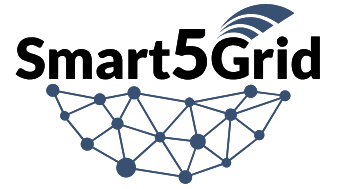
Demonstration of **5G** solutions for
SMART energy **GRIDS** of the future

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the European Union's *Horizon 2020*
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Business Goals

Real-time Wide Area Monitoring



Use Case 4 Objective

Real-time Wide Area Monitoring



Creation of Wide Area Monitoring tool



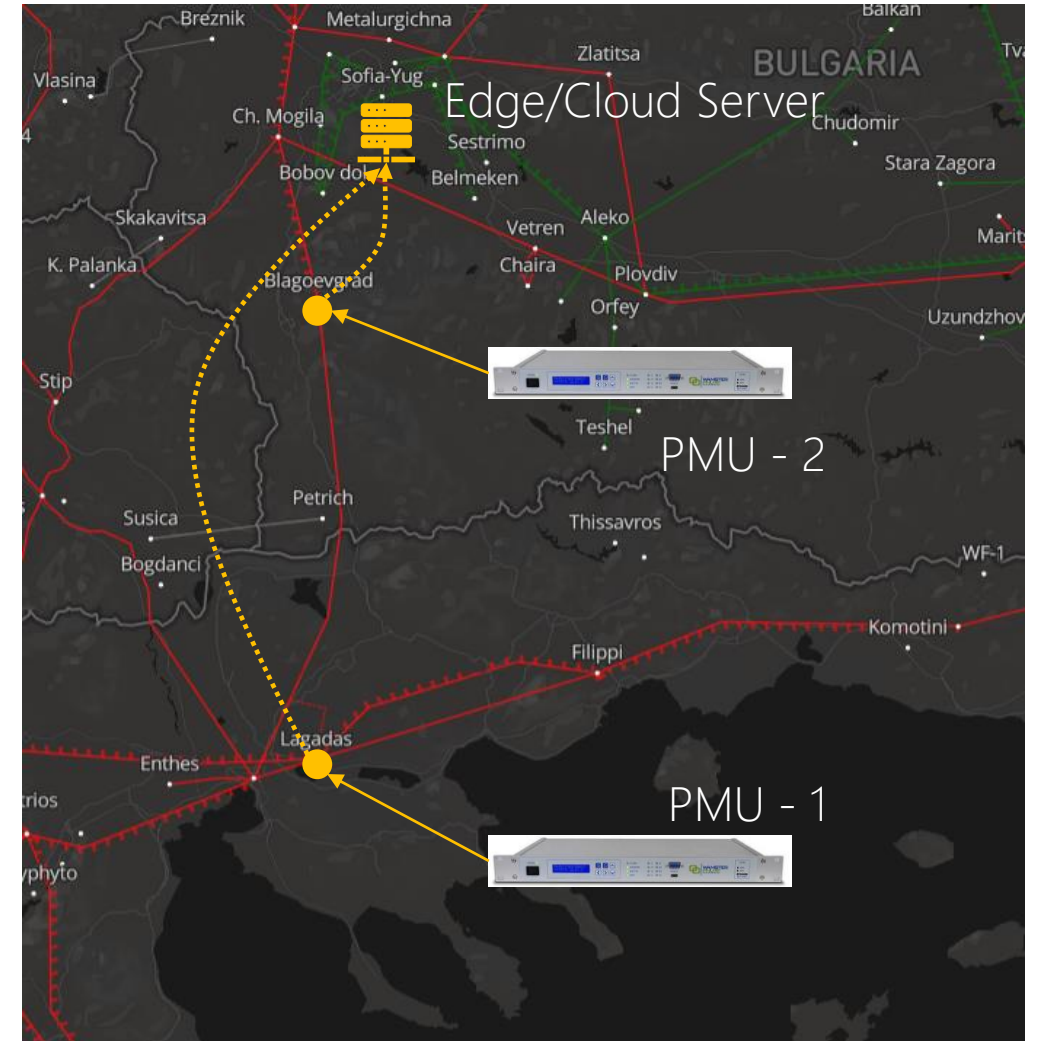
virtual Phasor Data Concentrator (vPDC)



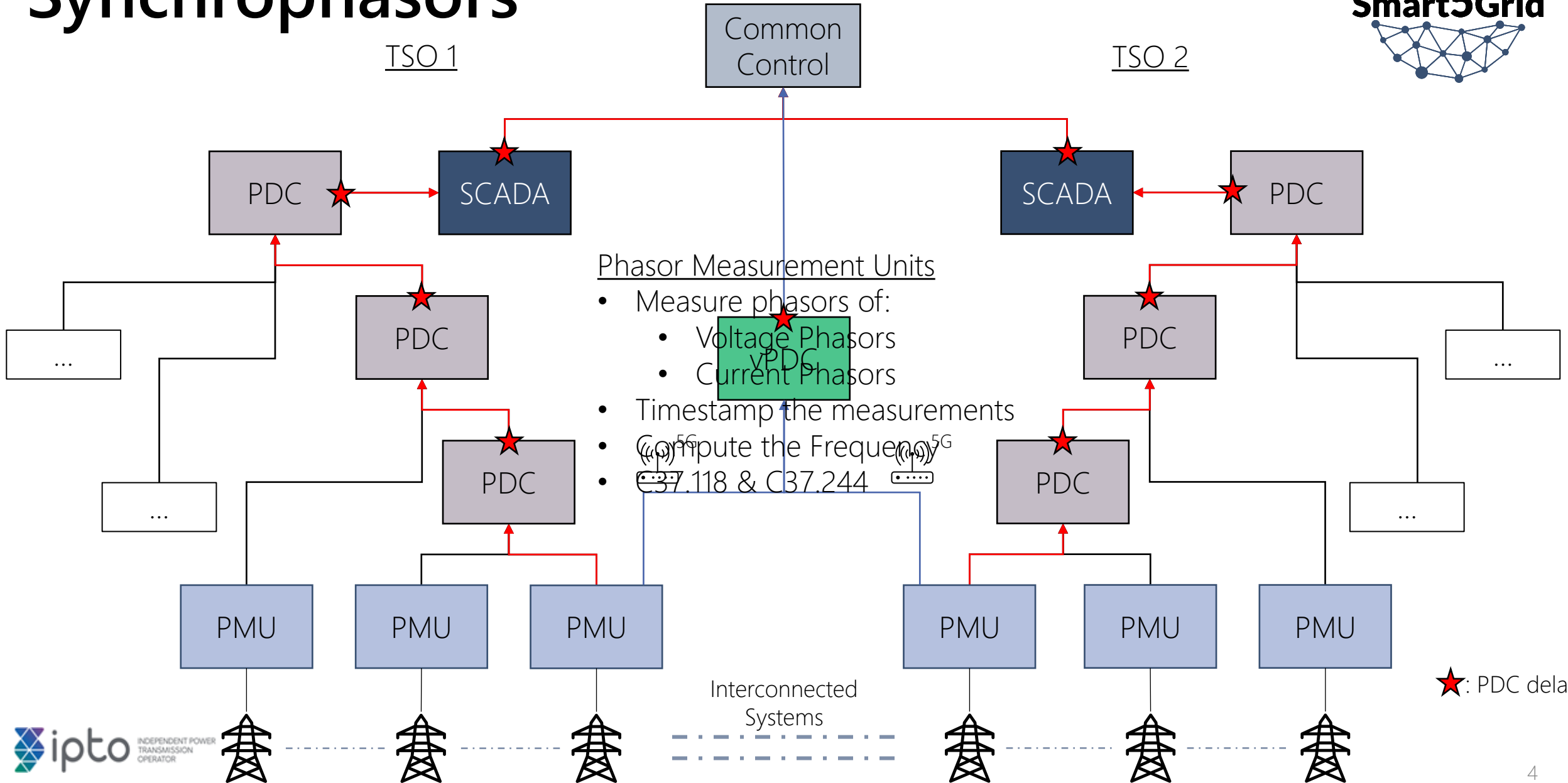
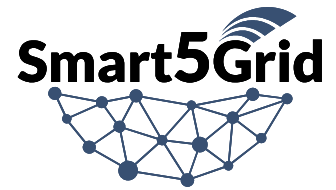
Phasor Measurement Units (PMUs)



5G communication network



Synchrophasors



TSO 1

TSO 2

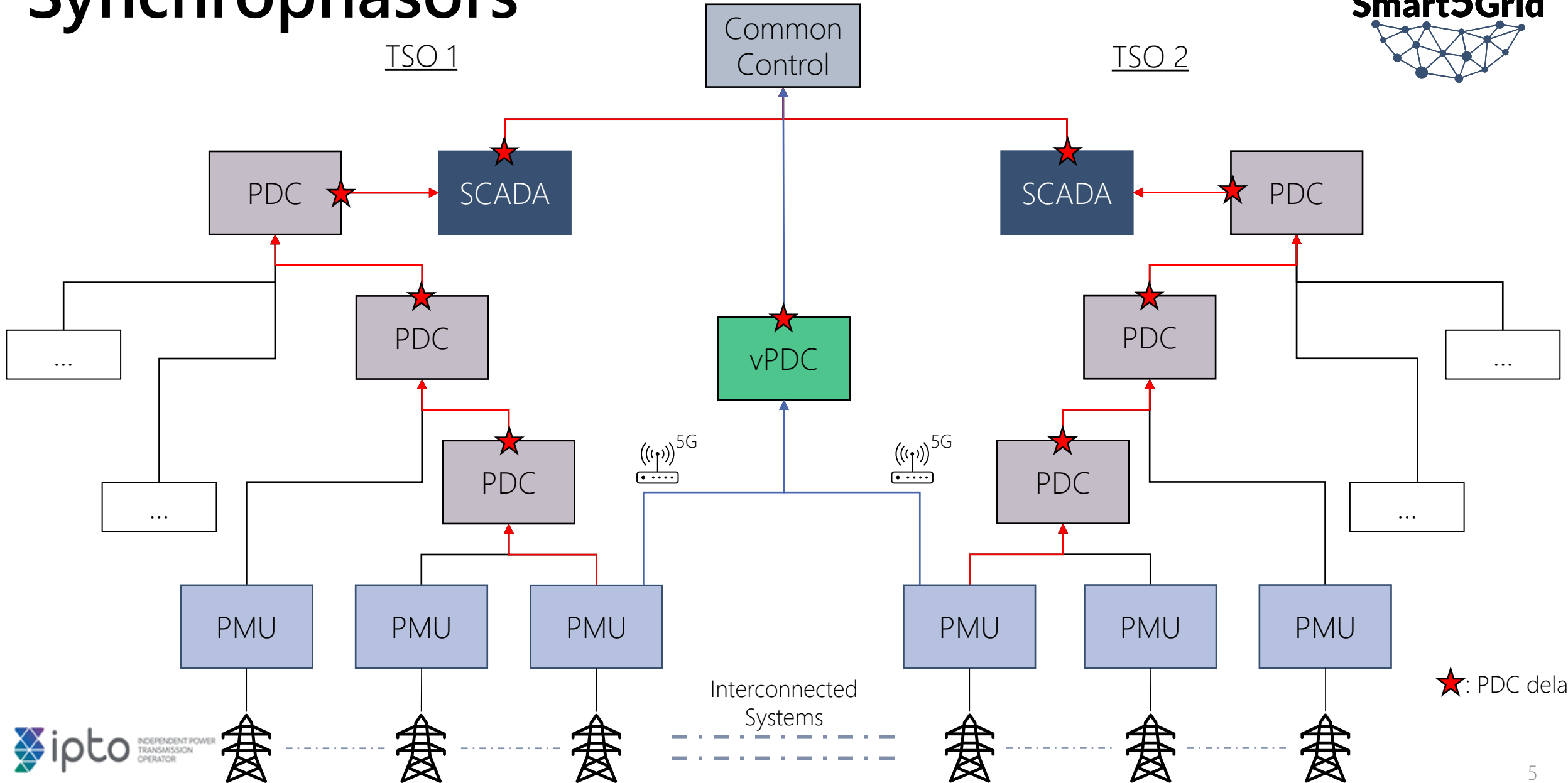
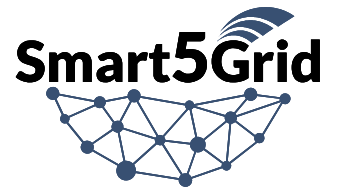
Common Control

Phasor Measurement Units

- Measure phasors of:
 - Voltage Phasors
 - Current Phasors
- Timestamp the measurements
- Compute the Frequency
- C37.118 & C37.244

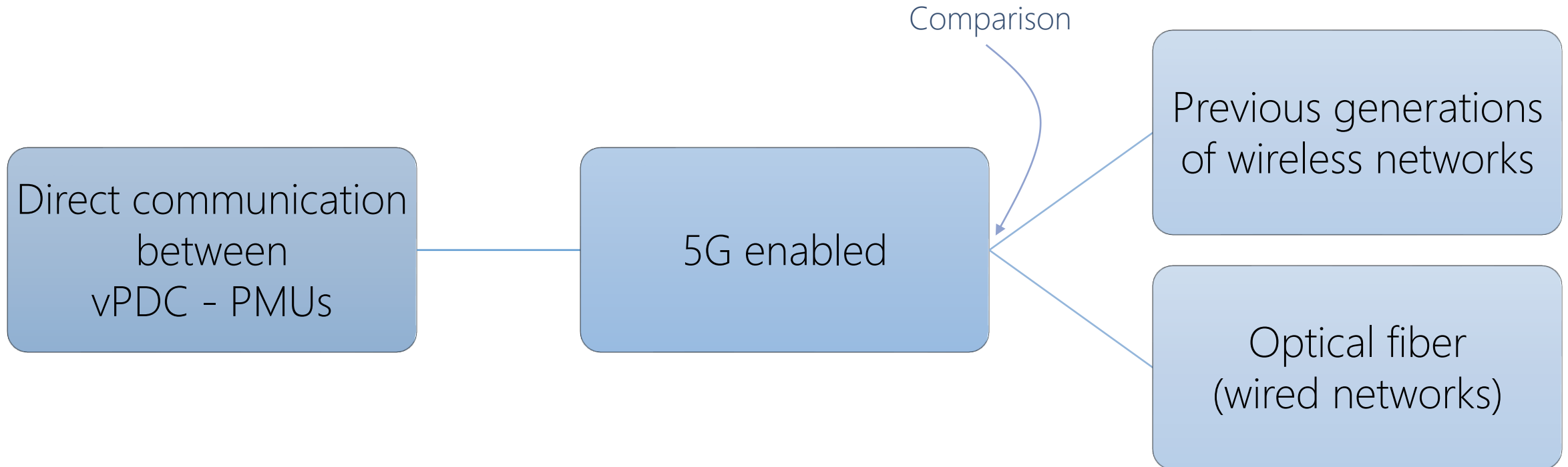
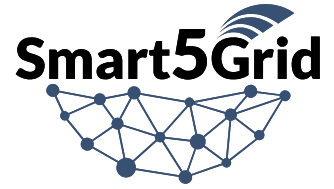
★: PDC delay

Synchrophasors



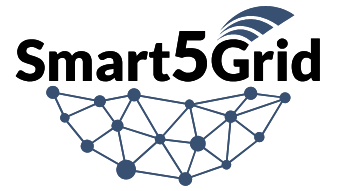
Advantage vs Legacy Solutions

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Impacted 5G-PPP KPIs

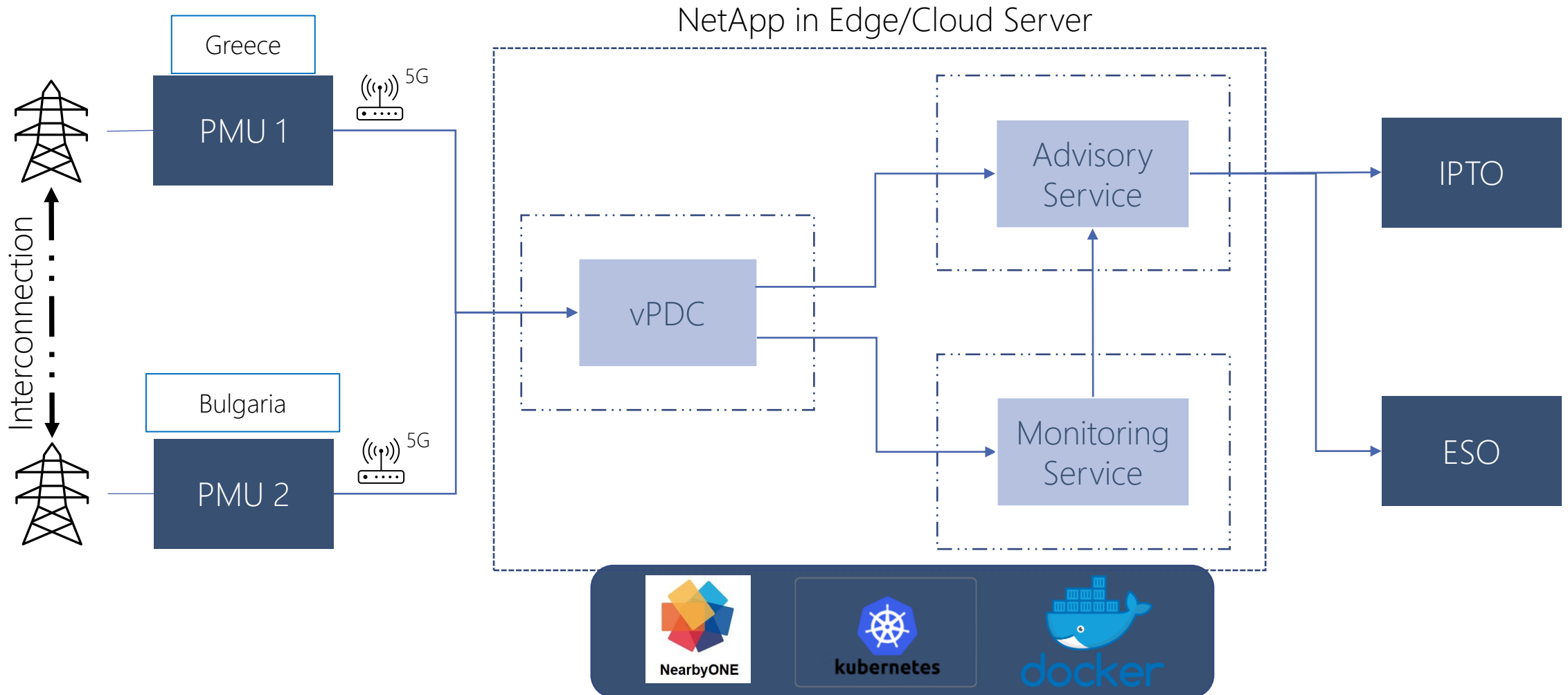
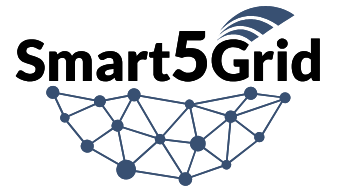
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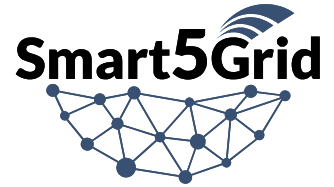
KPIs – Requirements	Values
Reliability	99.999 %
Availability	99.999 %
E2E Latency	40ms-160ms
vPDC absolute wait time	40ms
Bandwidth	699-1500 kbps/node
Security	High

High-level Architecture

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UC NetApps



vPDC

vPDC is responsible for aggregation and synchronization of the data provided by the PMUs placed in the surrounding area between Greece and Bulgaria. The C37.244 protocol describing the functionalities of PDCs will be followed.

Monitoring Service

Monitoring service is responsible to present several status indicators and visualization features of the PMUs such as nominal grid frequency [Hz] , measurements reporting speed [fps] or phase diagram of voltage and current vectors.

Advisory Service

Advisory service will propose remedial actions for the real-time operation at both TSOs and ex-post analysis provision in case of a severe event occurrences in the grid.

Thank you!

Questions?