



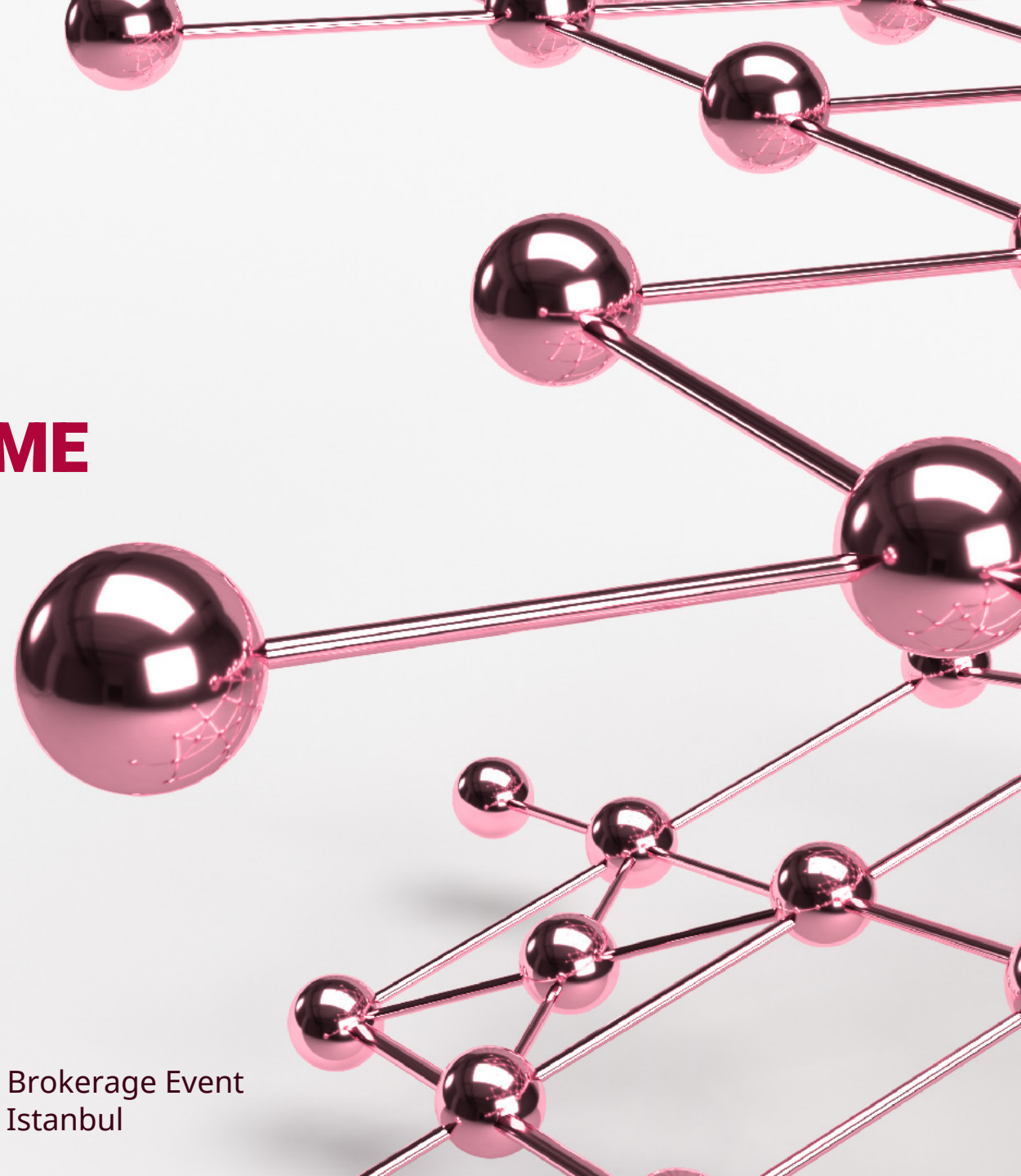
DESIRE6G: TOWARDS EXTREME NETWORK KPIS WITH DEEP PROGRAMMABILITY IN 6G

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Multi-scale Networked Systems, Informatics institute,
University of Amsterdam



6G SNS JU 2024 Calls Brokerage Event
23-11-2023, Istanbul



DEEP PROGRAMMABILITY & SECURE DISTRIBUTED INTELLIGENCE FOR REAL-TIME END-TO-END 6G NETWORKS

Project coordination:
University of Amsterdam

Technical coordination:
Ericsson Hungary

Duration:
01/01/2023 - 31/12/2025

Total Cost:
6.227.919€

HORIZON-JU-SNS-2022
STREAM-B-01-01

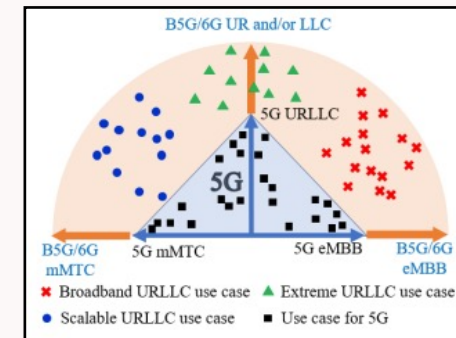


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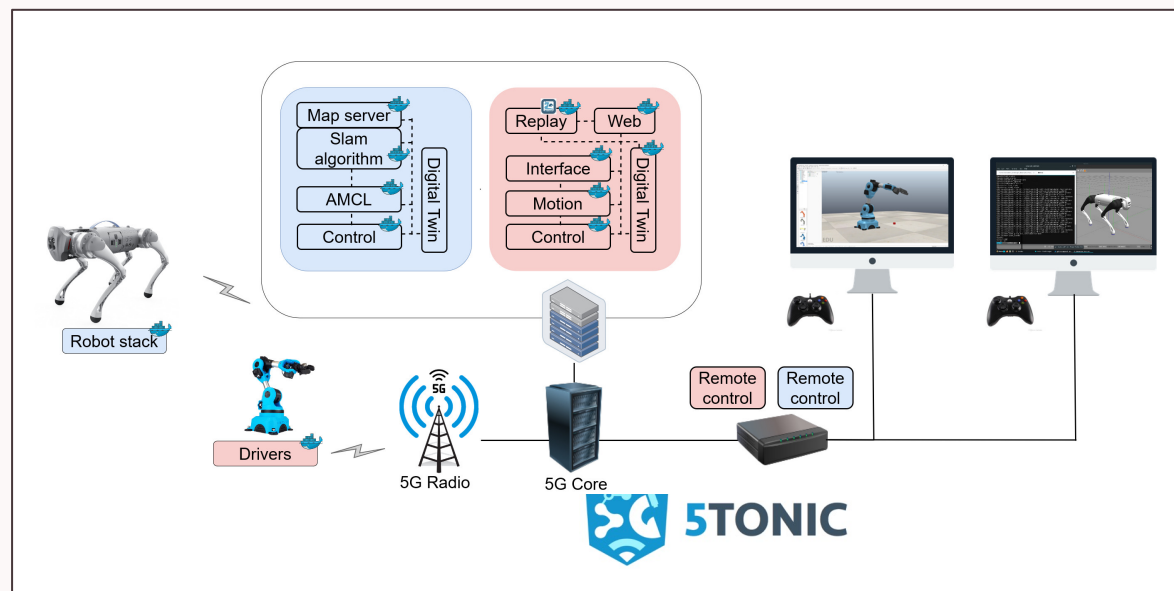
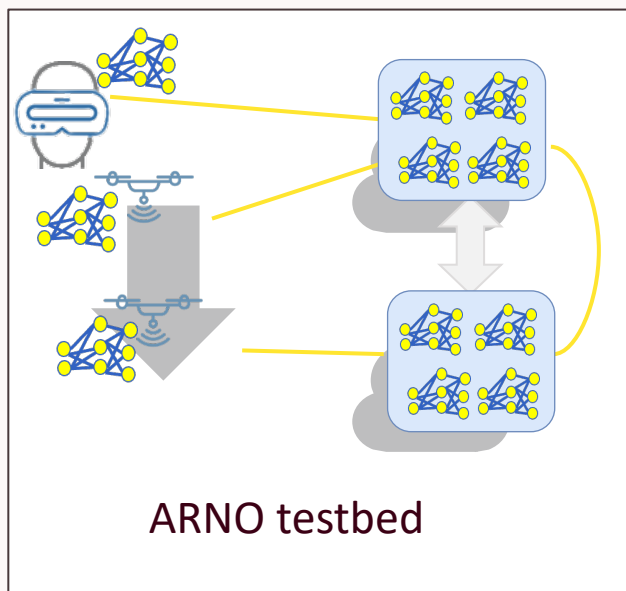
> DESIRE6G <

PROJECT SCOPE & OBJECTIVES

- Zero-touch control, management & orchestration platform, with native integration of AI, to support eXtreme URLLC requirements over a performant, measurable & programable data plane.
- Use cases: AR and a Digital Twin application at two distinct experimental infrastructures.

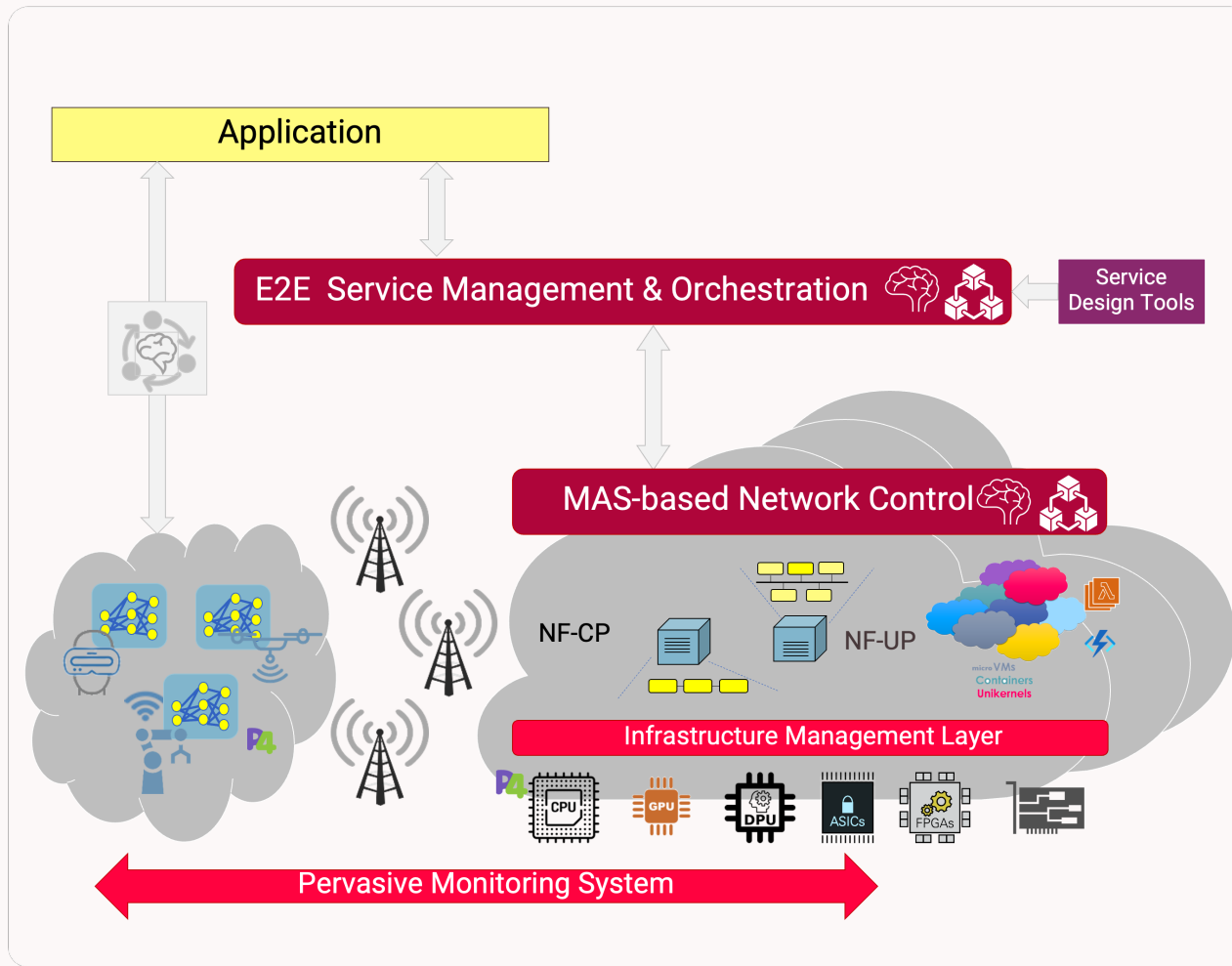


URLLC evolution and new service classes [1]



[1] Alves H. et al. "Beyond 5G URLLC evolution: New service modes and practical considerations." ITU Journal on Future and Evolving Technologies, 2022.

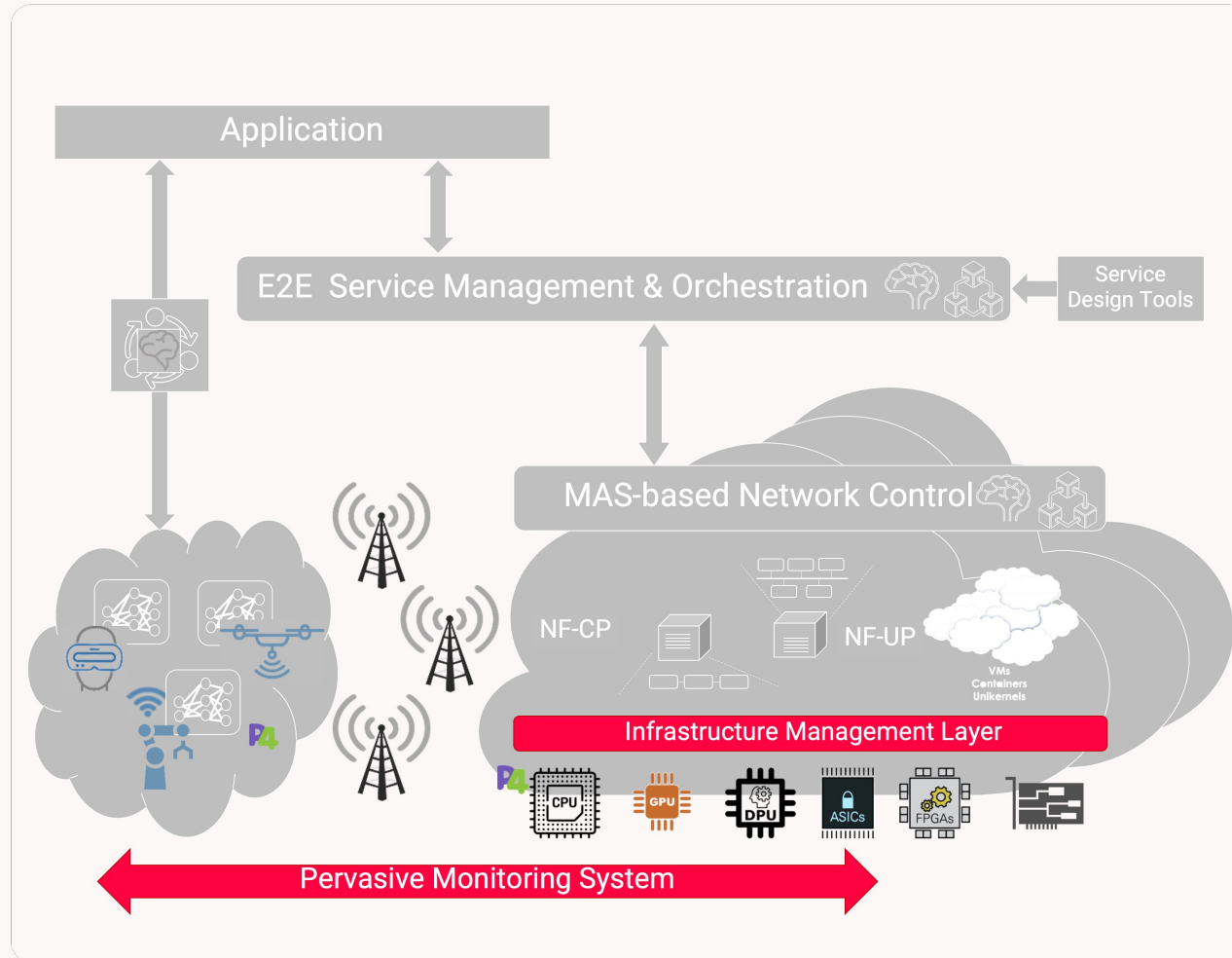
D6G KEY INNOVATIONS



Innovation

- xURLLC services
- Edge Intelligence
- Intent-based orchestration
- Blockchain-based federation
- Secure distributed intelligence
- RAN-core convergence
- Edge-to-Cloud continuum
- Serverless architecture
- E2E programmable data plane
- Multi HW acceleration
- E2E network telemetry

DEEP PROGRAMMABILITY



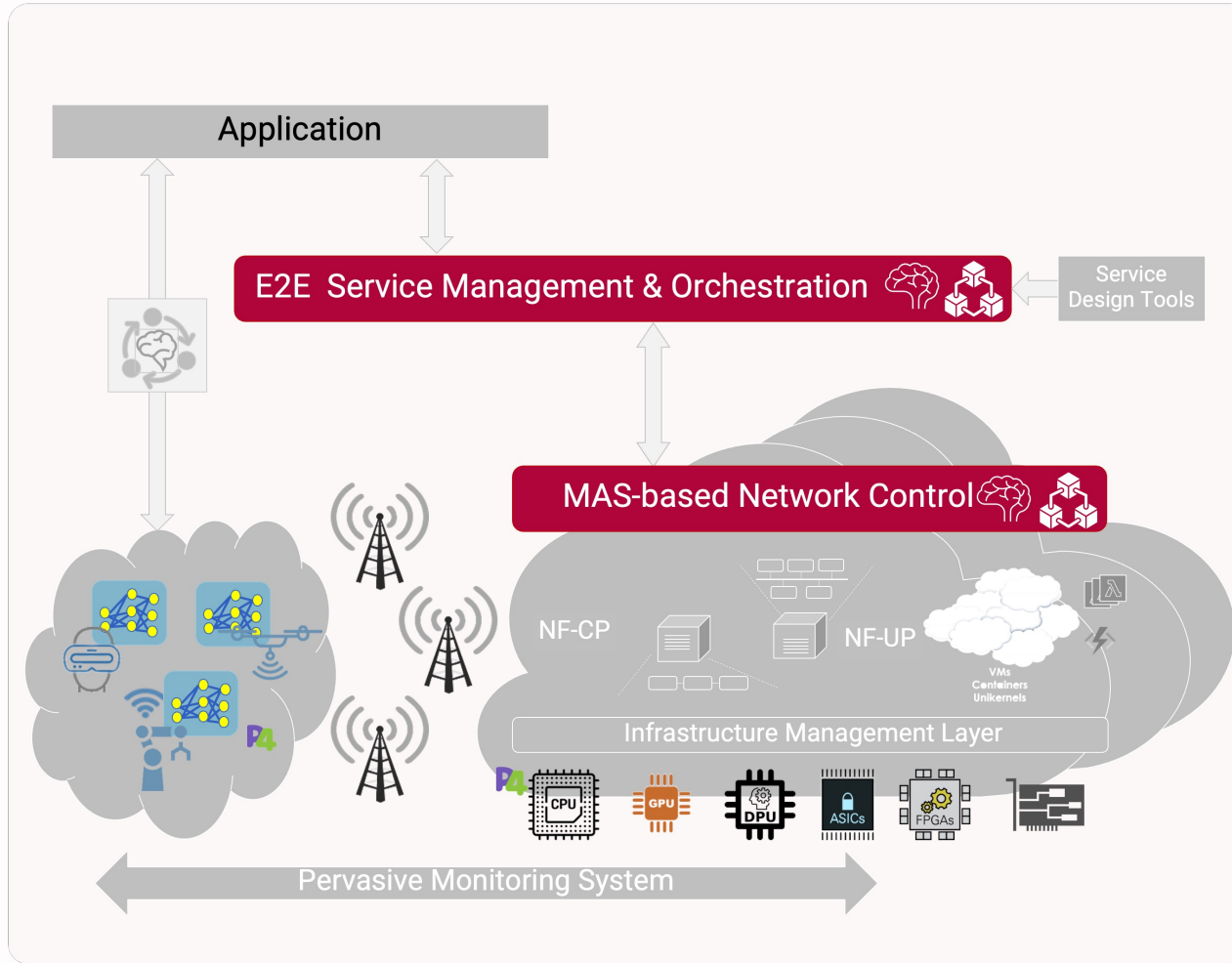
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E2E programmable, measurable, data plane

- Flexible function offloading, customized network behavior
- E2E network visibility

PERVASIVE AI



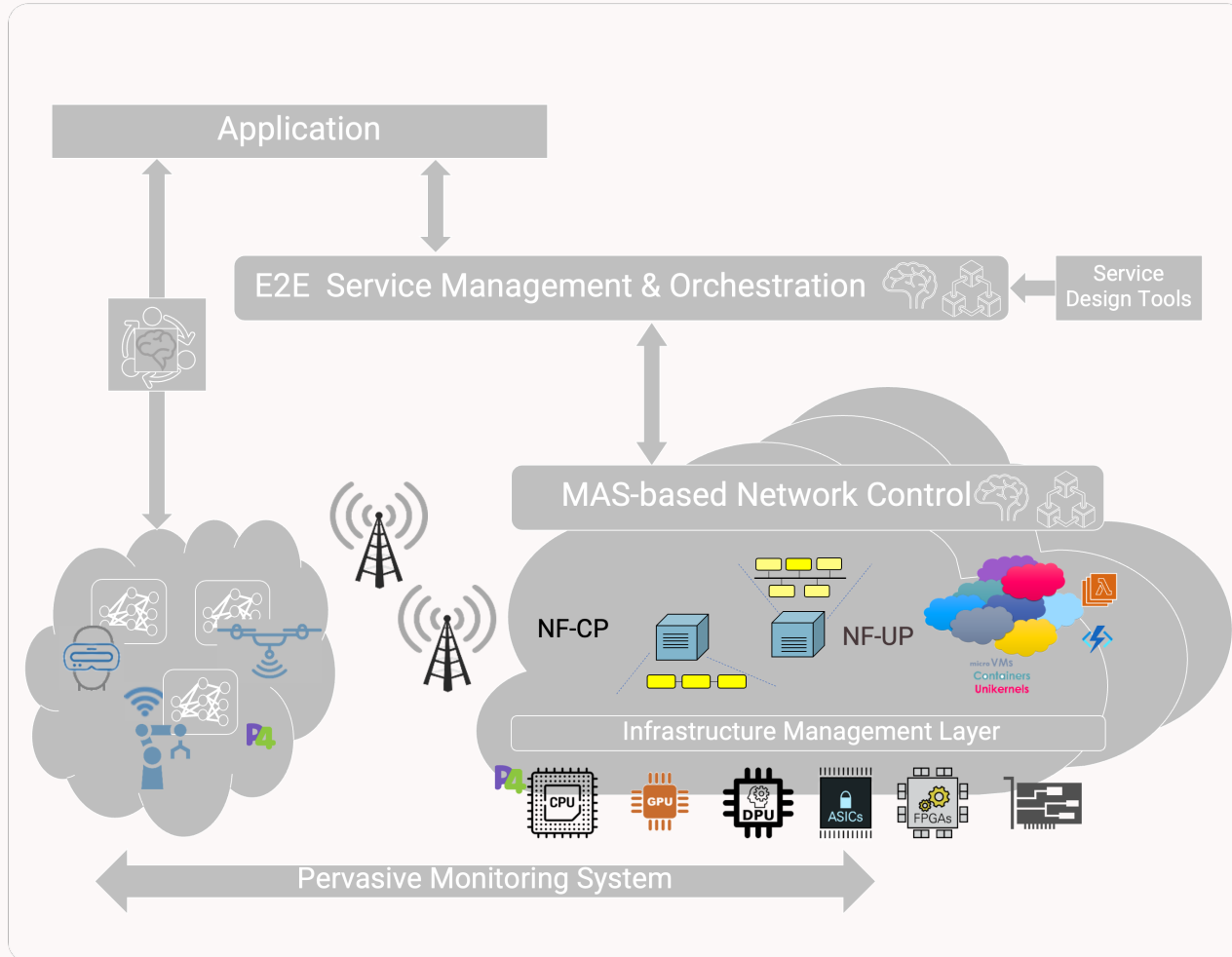
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Non-RT intelligent service/resource management

NRT distributed control

- AI-driven decision making
- Actuation / reconfiguration

CLOUD NATIVE

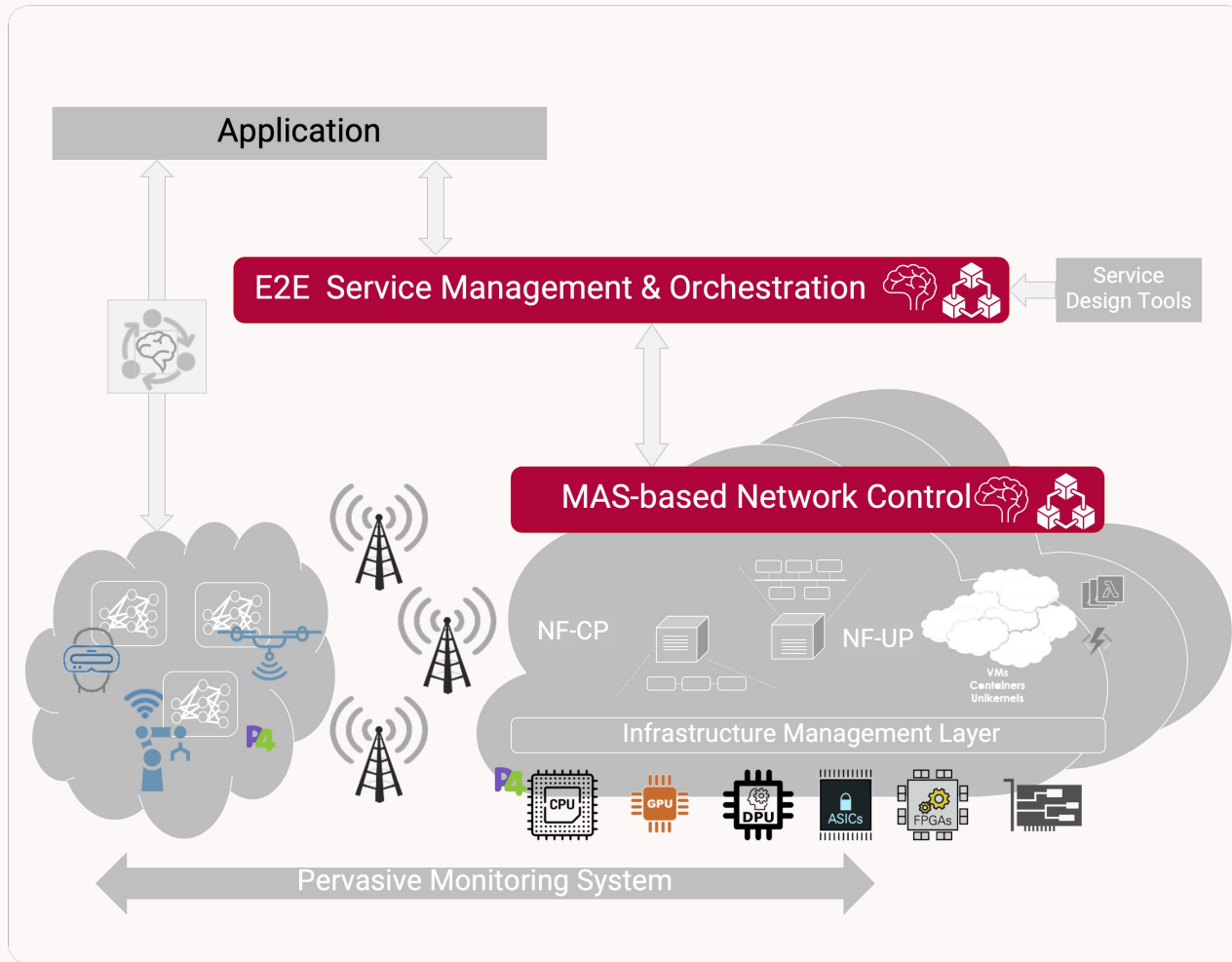


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- Software delivery is through OCI artifacts
- Deployment via custom container runtimes for diverse & heterogeneous devices

DLT FOR ZERO-TRUST ARCHITECTURE

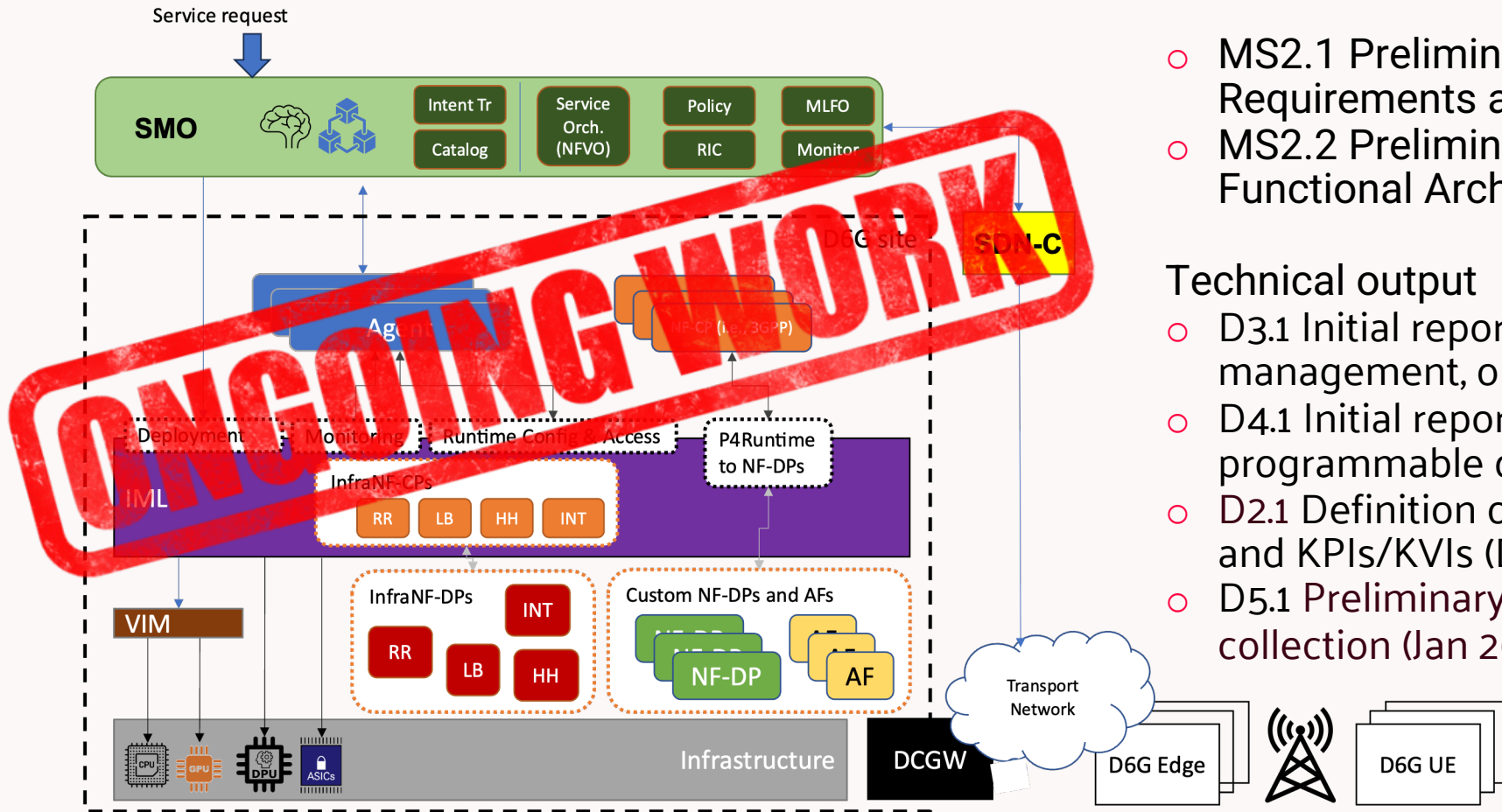


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← Service Federation
← Securing multi-agents system

THE STORY SO FAR..

D6G SYSTEM ARCHITECTURE



- MS2.1 Preliminary definition of Use Cases, Service Requirements and KPIs/KVIs (Mar 2023)
- MS2.2 Preliminary definition of DESIRE6G Functional Architecture (Jun 2023)

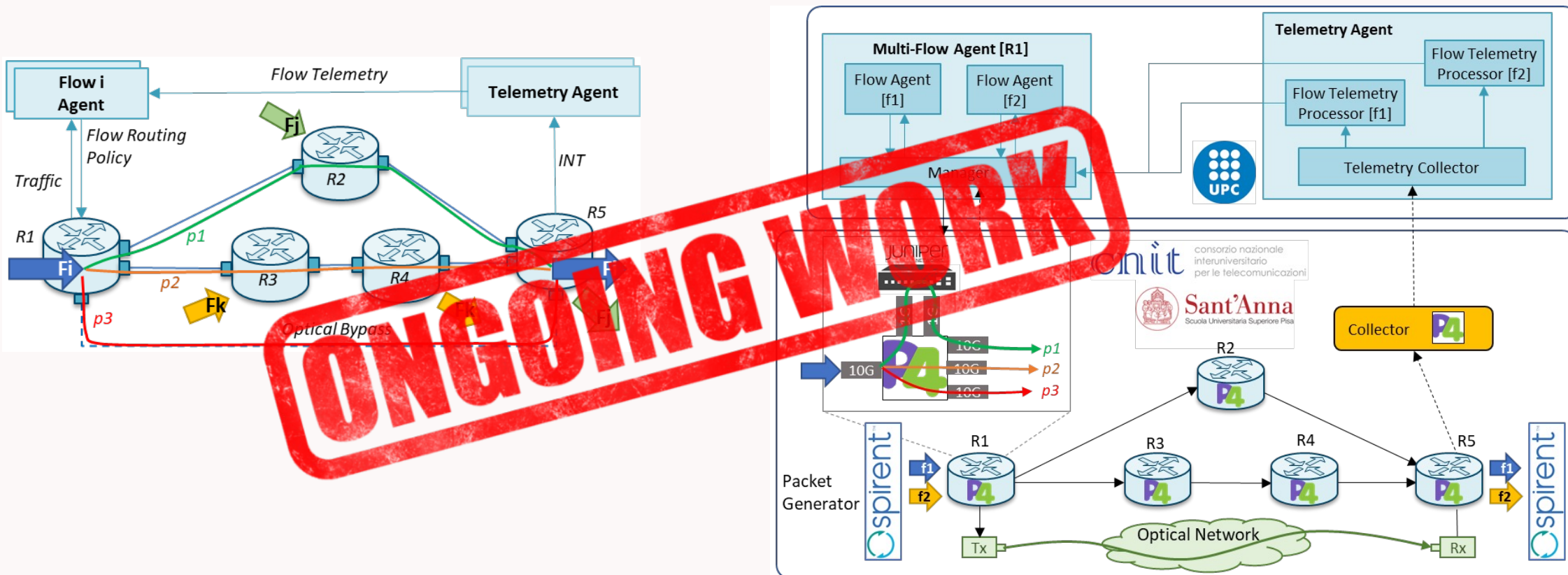
Technical output

- D3.1 Initial report on the intelligent and secure management, orchestration, and control (Nov 2023)
- D4.1 Initial report on the DESIRE6G unified programmable data plane layer (Nov 2023)
- D2.1 Definition of Use Cases, Service Requirements and KPIs/KVIs (Dec 2024)
- D5.1 Preliminary experimental setup and data set collection (Jan 2024)

THE STORY SO FAR..

D6G POCS (IND.)

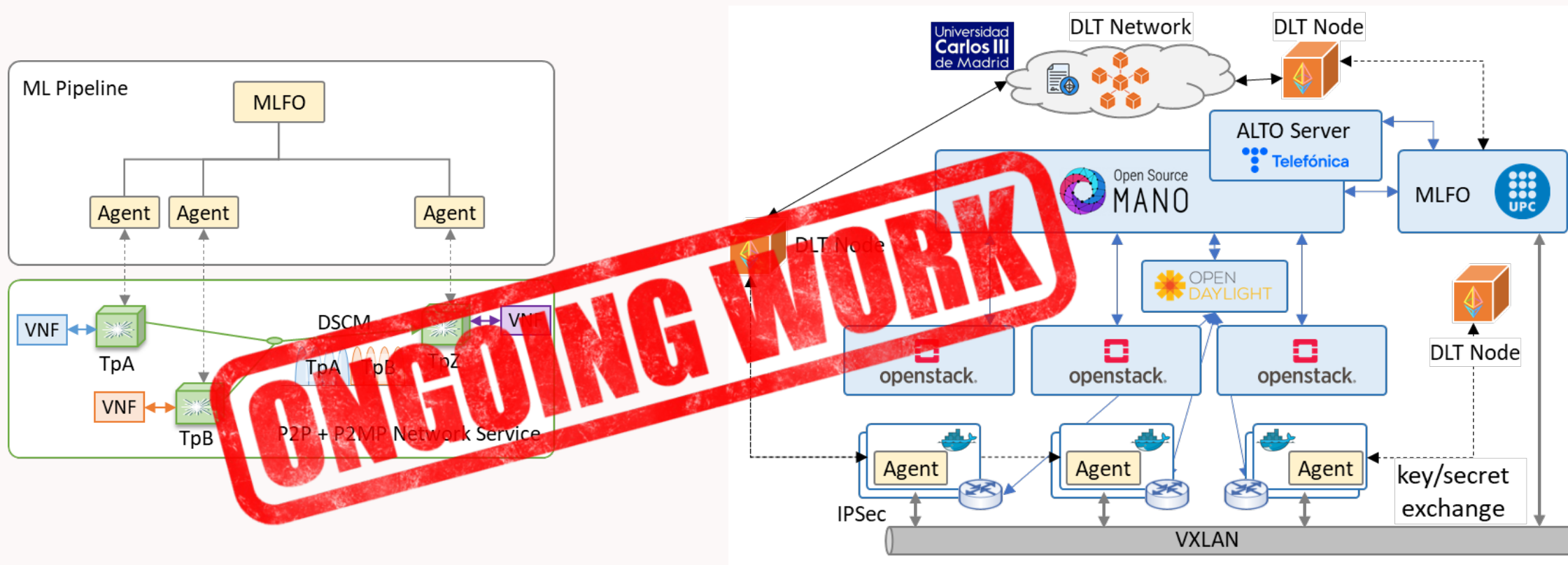
“Distributed Multi-Agent System fed with Telemetry Data for Near-Real-Time Service Operation” submitted to OFC demo zone, 2024



THE STORY SO FAR..

D6G POCS (IND.)

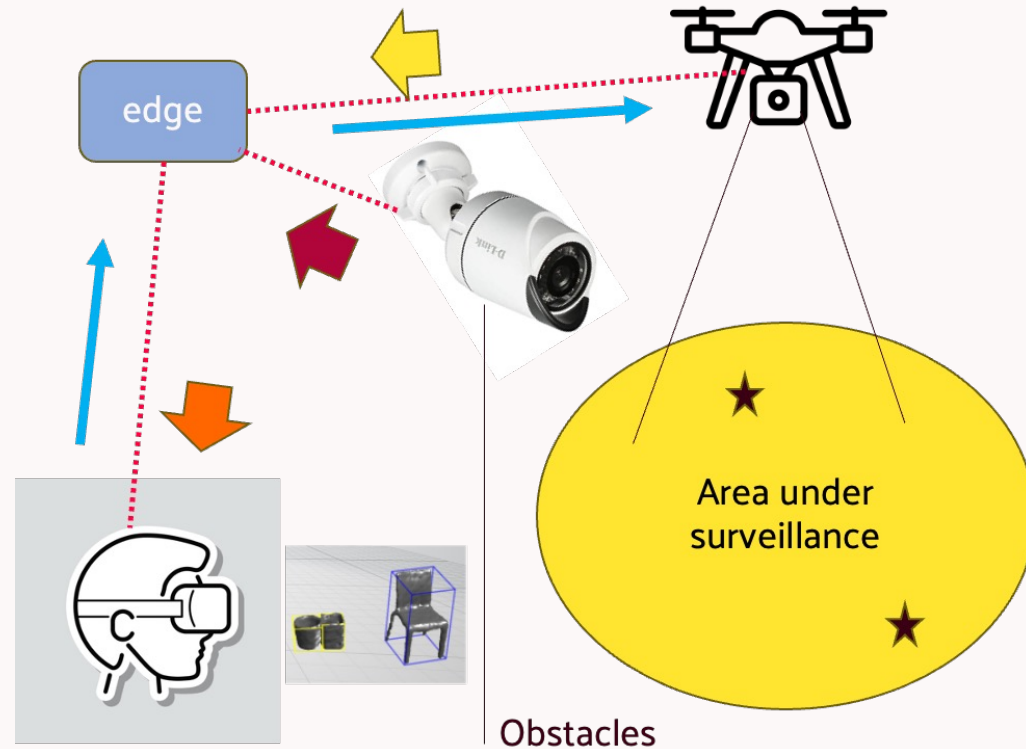
“Deployment of Secure Machine Learning Pipelines for Near-Real-Time Control of 6G Network Services” submitted to OFC demo zone, 2024



THE STORY SO FAR..

D6G USE CASES: AR APPLICATION @ ARNO TESTBED (IND.)

Perceived zero latency immersive experience to a human user, equipped with a proper headset for remote surveillance.

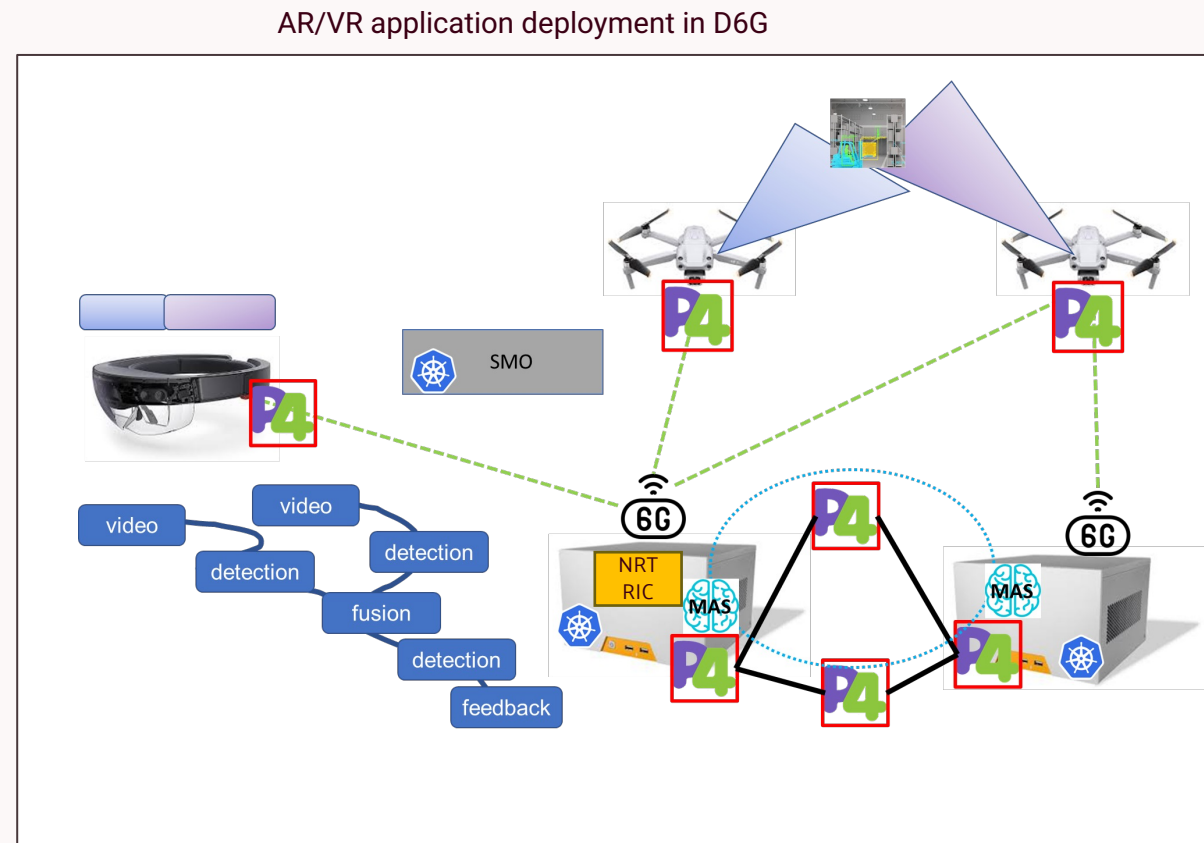
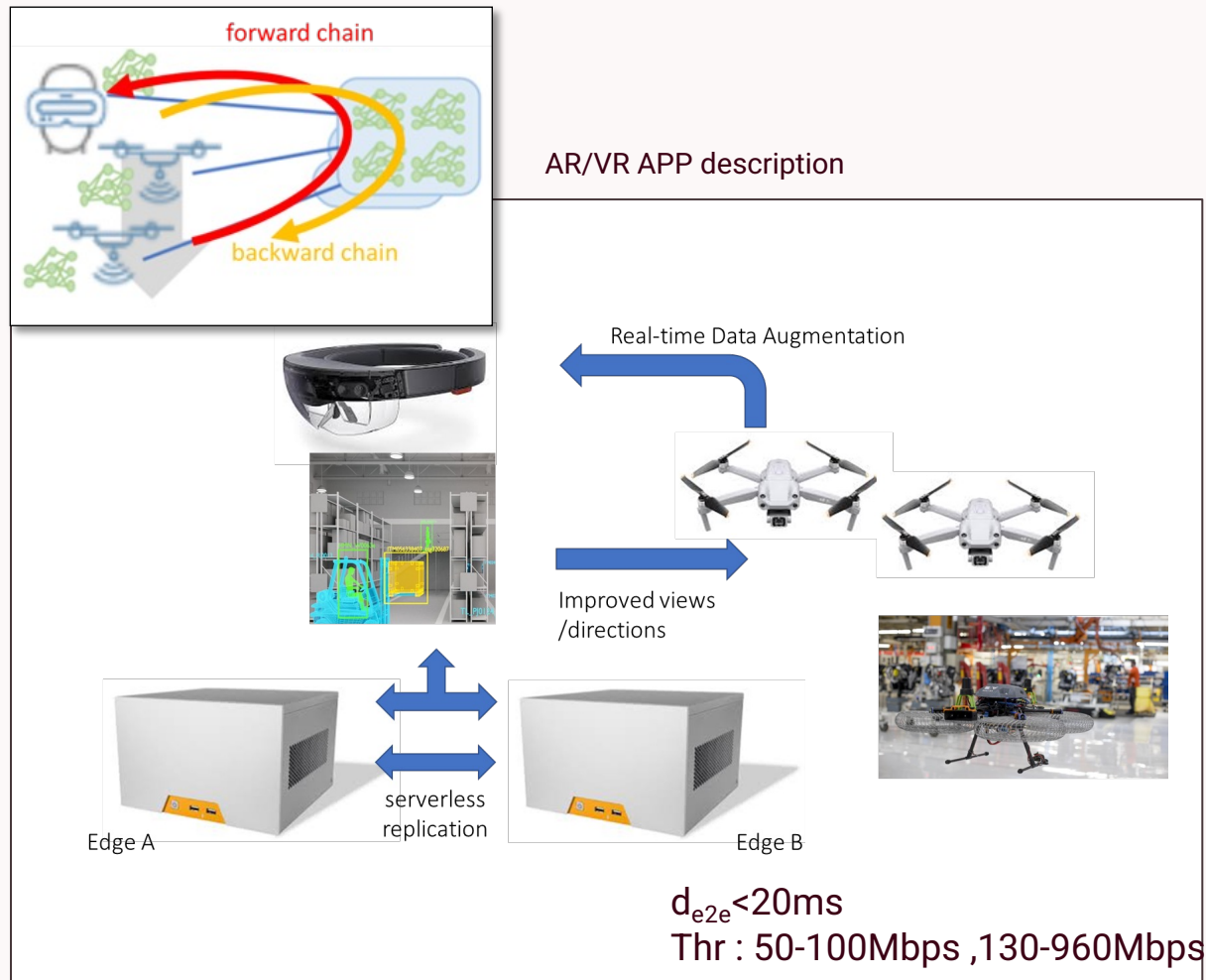


- Use AR to enable surveillance of a geographical zone
- Recreate the environment and highlight the target objects
- Detect specific objects identified by the drone with multiple cameras
- Allow user to zoom objects for live inspection



THE STORY SO FAR..

D6G USE CASES: AR APPLICATION @ ARNO TESTBED (IND.)



TAKE-AWAY

What is the difference between D6G and the other 6G projects?

We answer the following questions:

- How (i) deep programmability and (ii) Multi-agent-based service optimizers, help addressing challenging use cases / KPIs ?
- Can we address the inherent challenges posed by multiagent systems(dynamics, coordination and cooperation, security etc.)?
- How to support cloud-native behavior (also for the user plane)?
- How can we put this together as simply as possible with other innovative methods, like DLT-based federation?

Simplicity and high-performance: they are not necessarily enemies!
In 6G we'll need both.



THANKS!

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