DESIRE6G – A 6G ARCHITECTURE BASED ON DEEPLY PROGRAMMABLE NETWORKS

Sándor Laki, assistant professor

Communication Networks Laboratory
Faculty of Informatics
ELTE Eötvös Loránd University
Budapest, Hungary

Co-funded by
the European Union

6GSNS

22/06/2023

WHAT IS 6G?

- No general globally-accepted vision on 6G
- European vision (6G-SNS)
  - Massive digitalization – Phy representation
  - Connected intelligence – Awareness, real-timeness
  - Network as Compute Fabric - Decisions, actions
- Key values
  - Sustainability
  - Inclusion
  - Trustworhiness
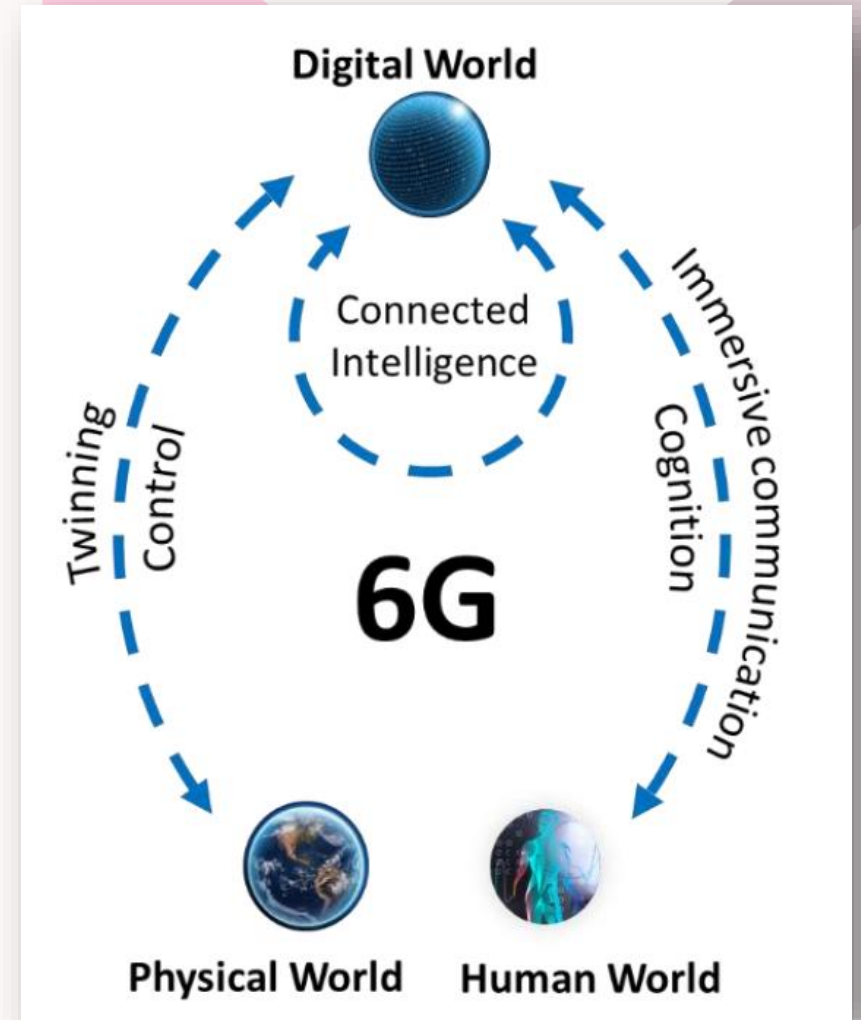
> D E S I R E 6 G ‹

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€

Follows us on: 🌐 desire6g.eu 🐦 @DESIRE6G_EU in @DESIRE6G

>DESIRE6G<

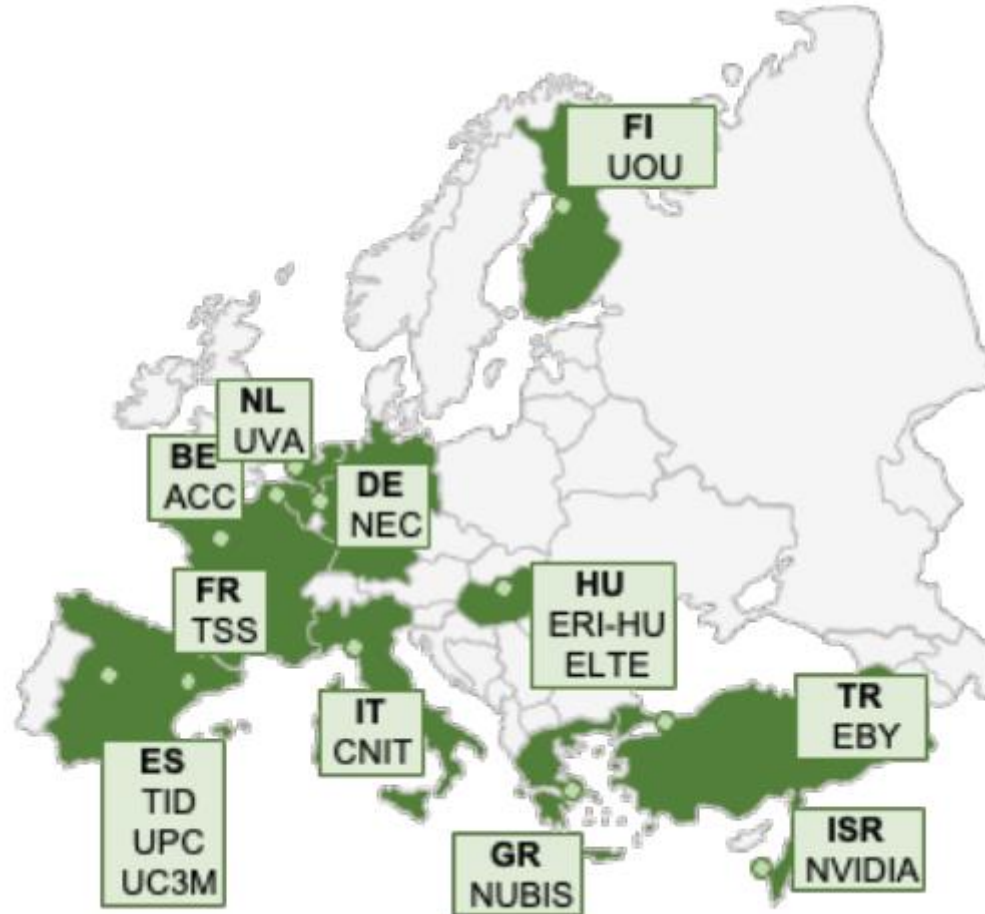# DEEP PROGRAMMABILITY & SECURE DISTRIBUTED INTELLIGENCE FOR REAL-TIME END-TO-END 6G NETWORKS

Project coor
University of

Technical co
Ericsson Hun

Duration:
01/01/2023 –

Total Cost:
6.227.919€

Follows

DESIRE6G

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

UNIVERSITY OF OULU

ELTE EÖTVÖS LORÁND UNIVERSITY

Acelleran

SHIELD

> DESIRE6G <

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

ARCHITECTURAL CHALLENGES FOR 6G

- Main questions of all architecture discussions:
  - How should the functions be grouped / split?
  - How should the interfaces and procedures look like?

- 5G was addressing complexity issues, but only with partial success:
  - "Service Based Architecture" (SBA) became heavier and less cloud-native than expected
  - User plane remained mainly node-based, no "cloud-native" evolution happened there
  - Too detailed standards, less room for vendor innovation
  - The standard does not really count on using IT frameworks/tools to simplify the architecture
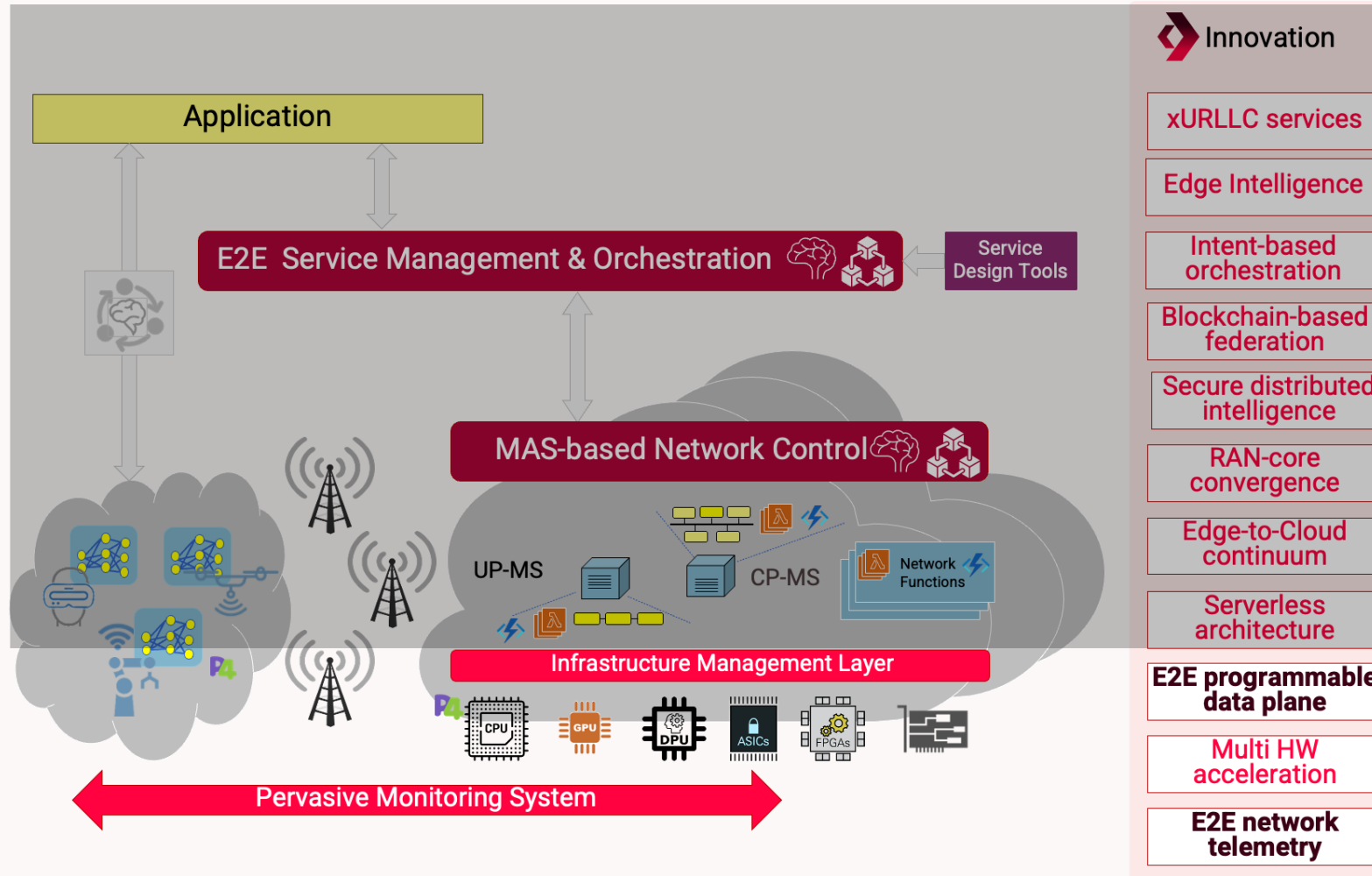

> D E S I R E 6 G <
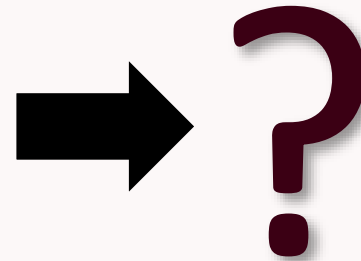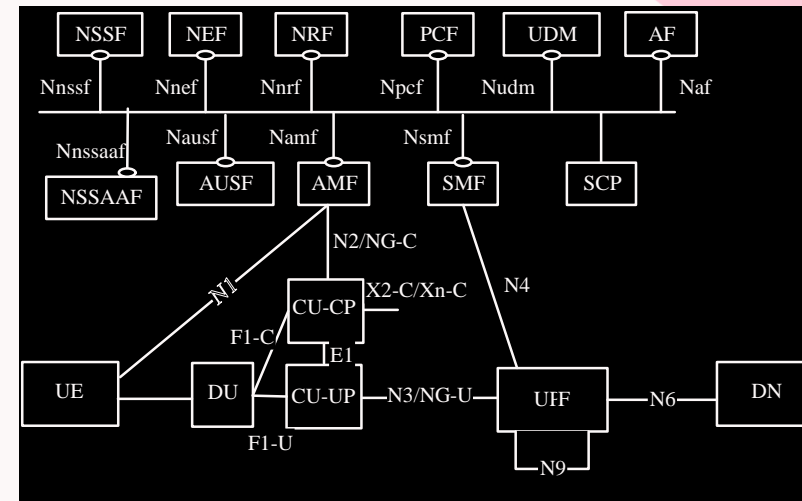
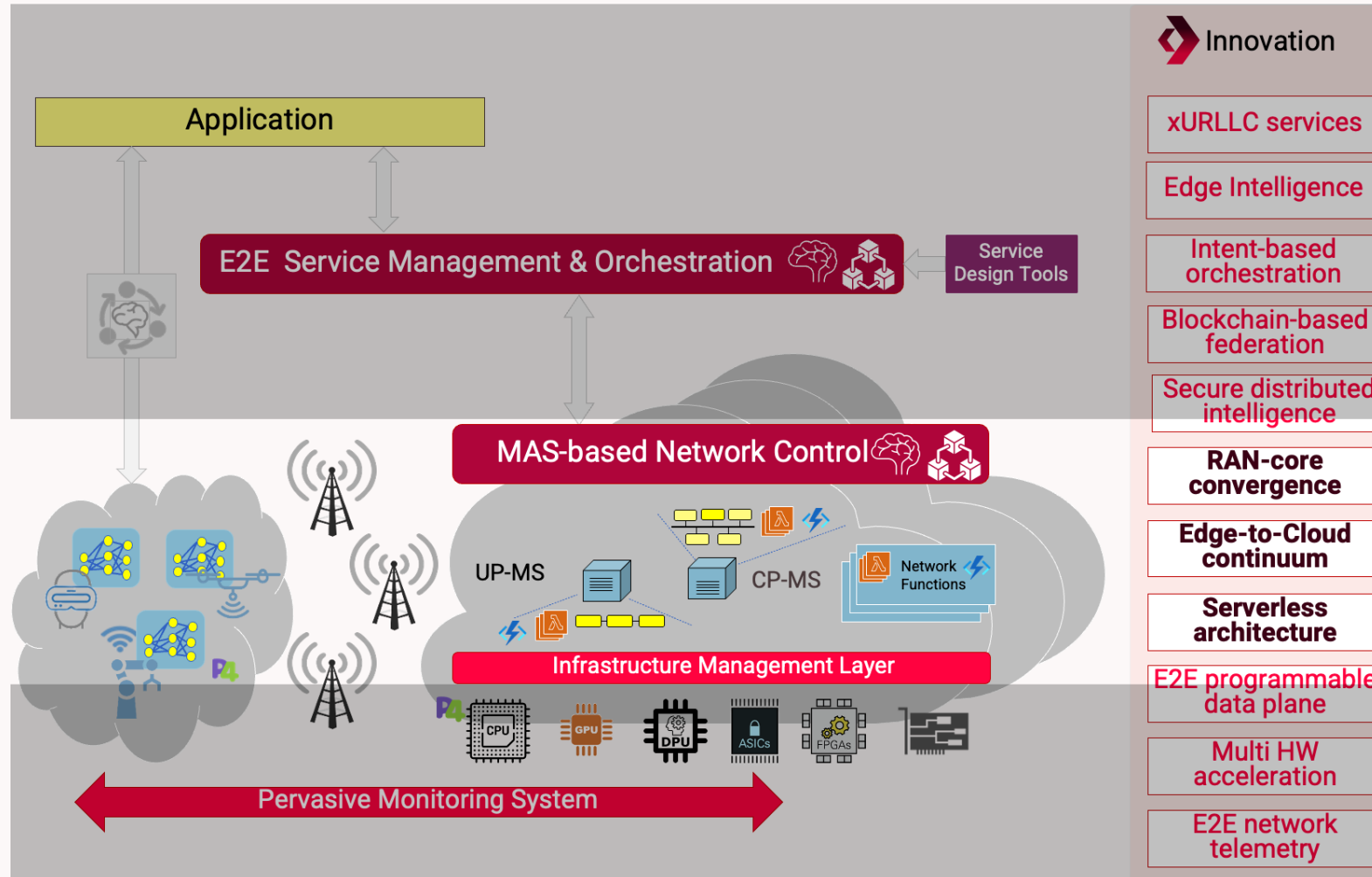# D6G ARCHITECTURE

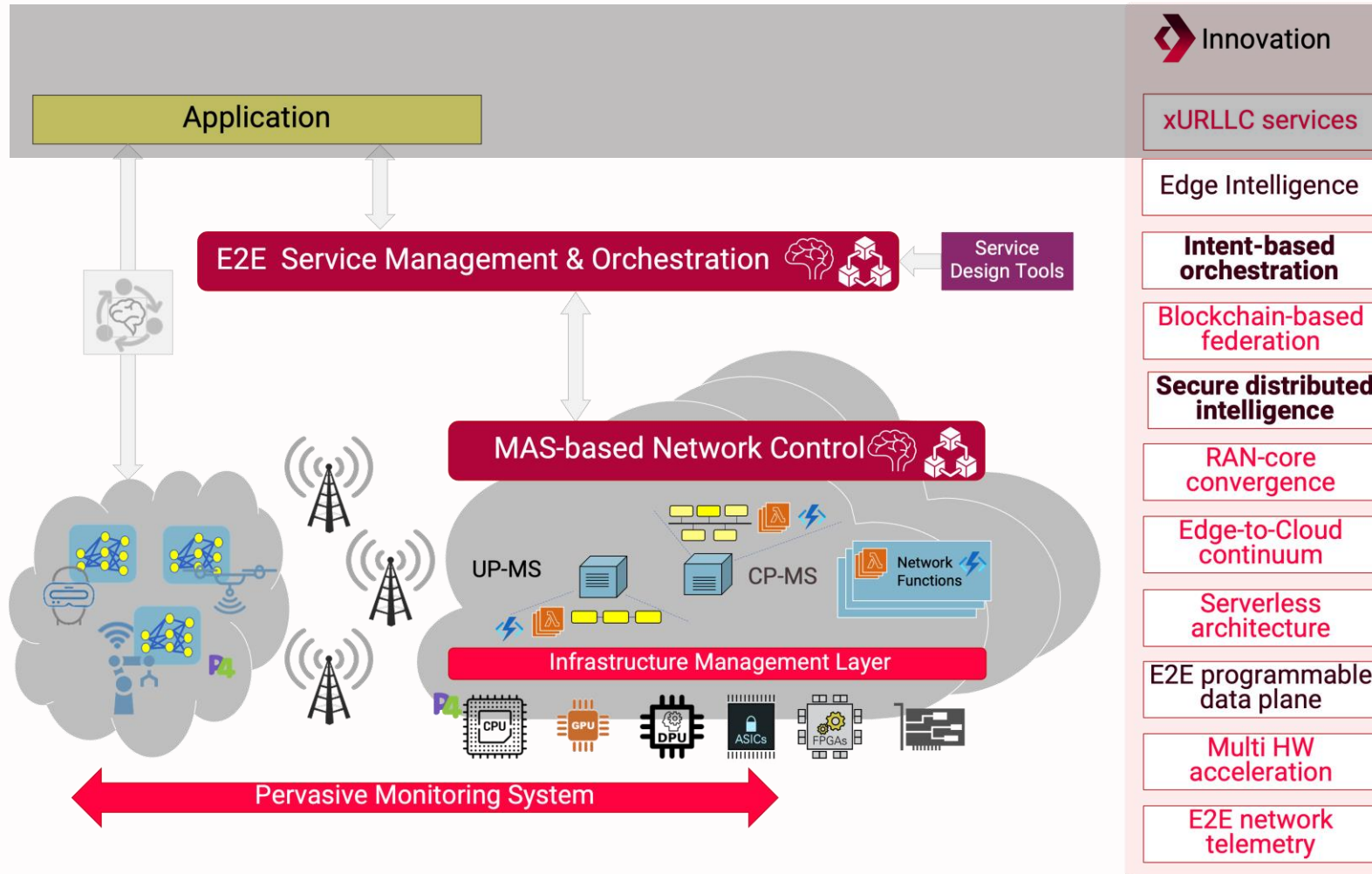
DESIRE6G
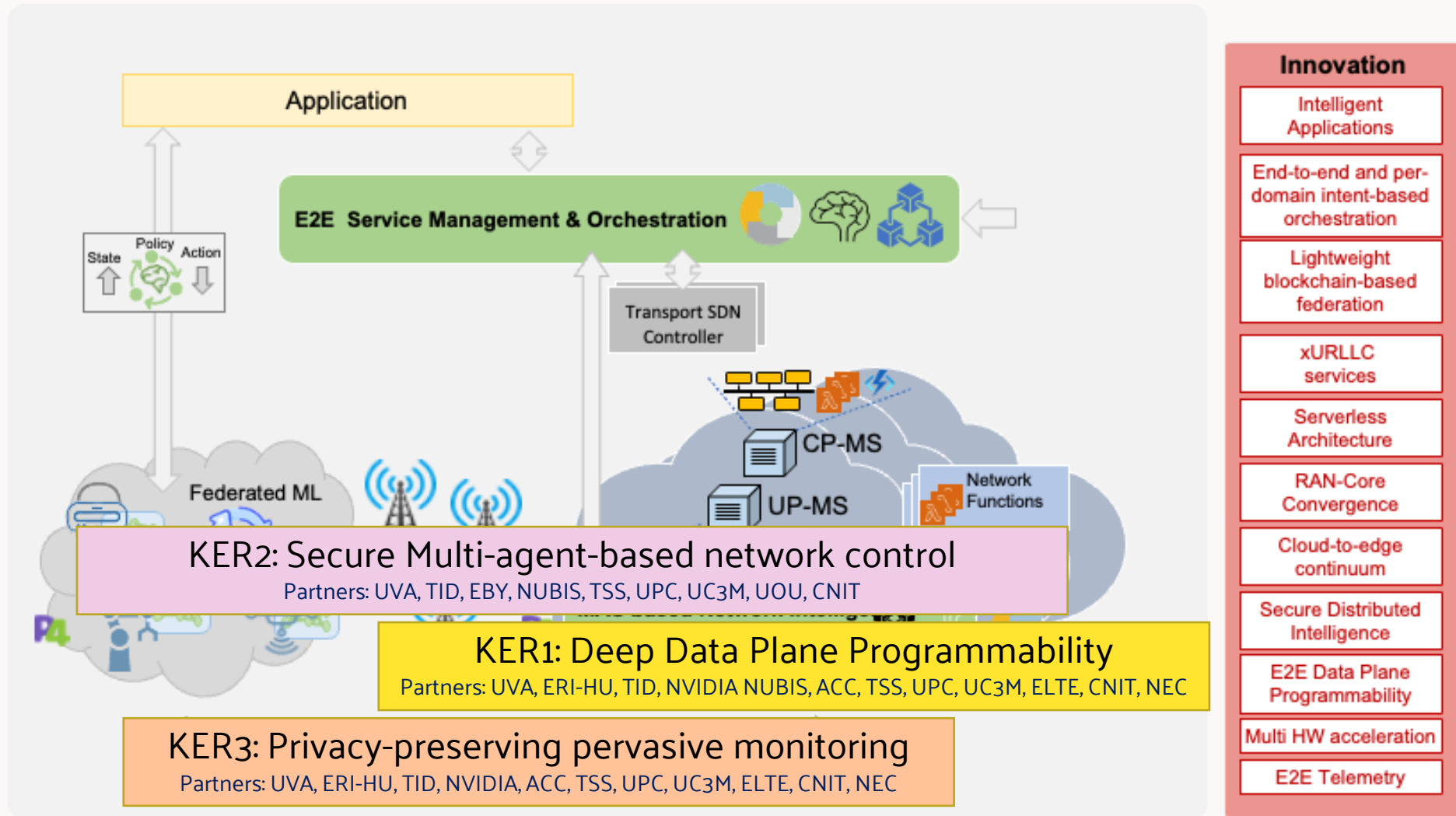
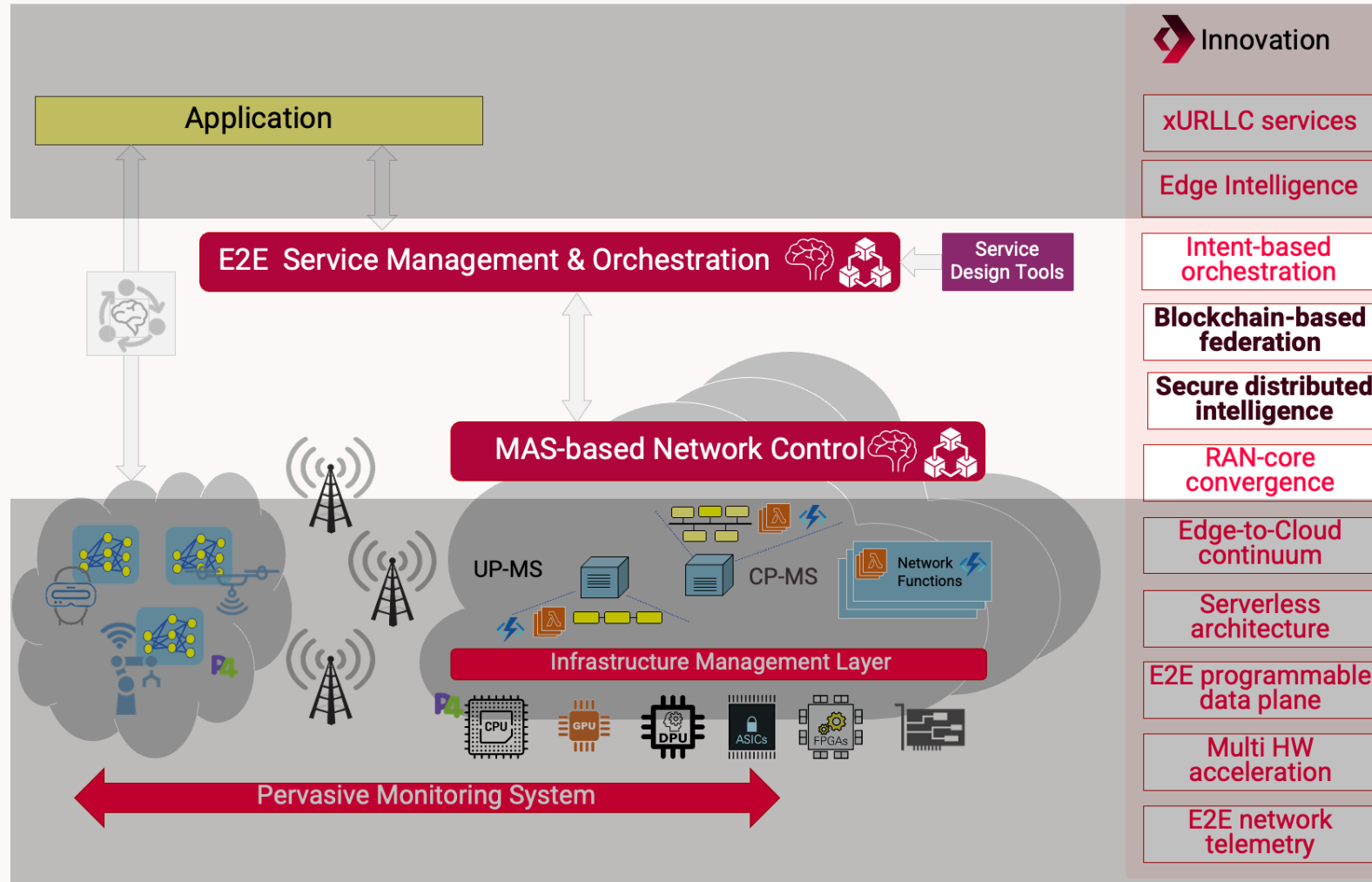# DEEP PROGRAMMABILITY
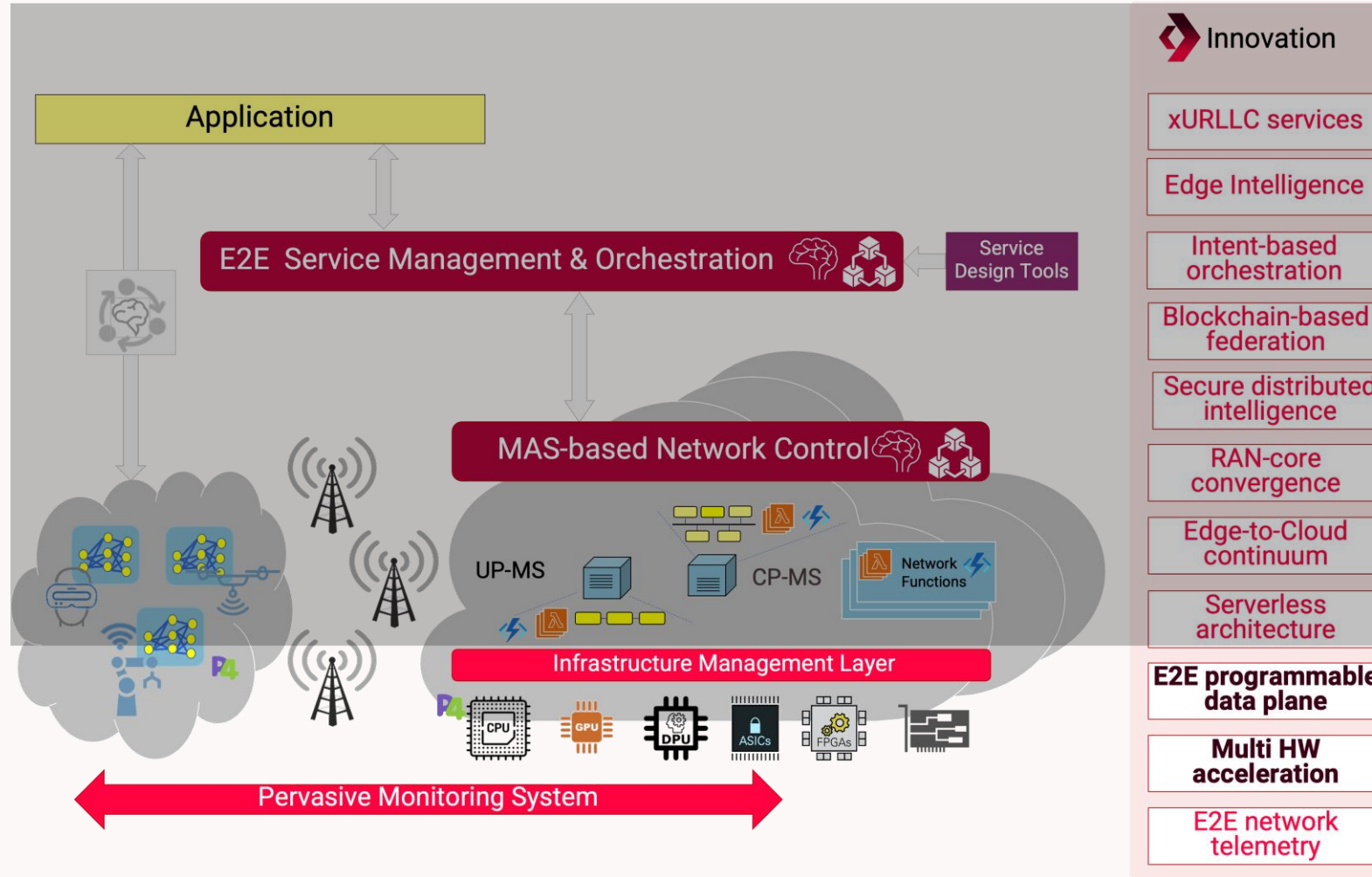
E2E NETWORK VISIBILITY

CLOUD NATIVE

AI-NATIVE

DLT FOR ZERO-TRUST ARCHITECTURE

TAKE-AWAY

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

We answer the following questions:

- **How to have cloud-native-like behavior also for user plane (PDP, IML)**
  - **Transparent acceleration**
  - **Automatic load balancing and heavy-hitter handling**
  - **These mechanisms are independent from the business logic / NF-CP**
- **How to maintain performance KPIs dynamically (MAS)**
  - **On-demand in-network telemetry**
  - **Multi-agent-based service optimizers**
- **How to offer simplicity towards users (SMO)**
  - **Intent-based, simple external APIs**
  - **Translation logic to create internal, more complex structures**

[2] D6G: "Pervasive monitoring and distributed intelligence for 6G near real time operation". EUCNC Post
[3] D6G: "Securing Multi-Agent Systems for Near Real-Time Control of 6G Services". EUCNC Post

DESIRE6G

THANKS!

Sandor Laki

lakis@inf.elte.hu