6G-Trans Continental Edge Learning

6G-XCEL Introduction

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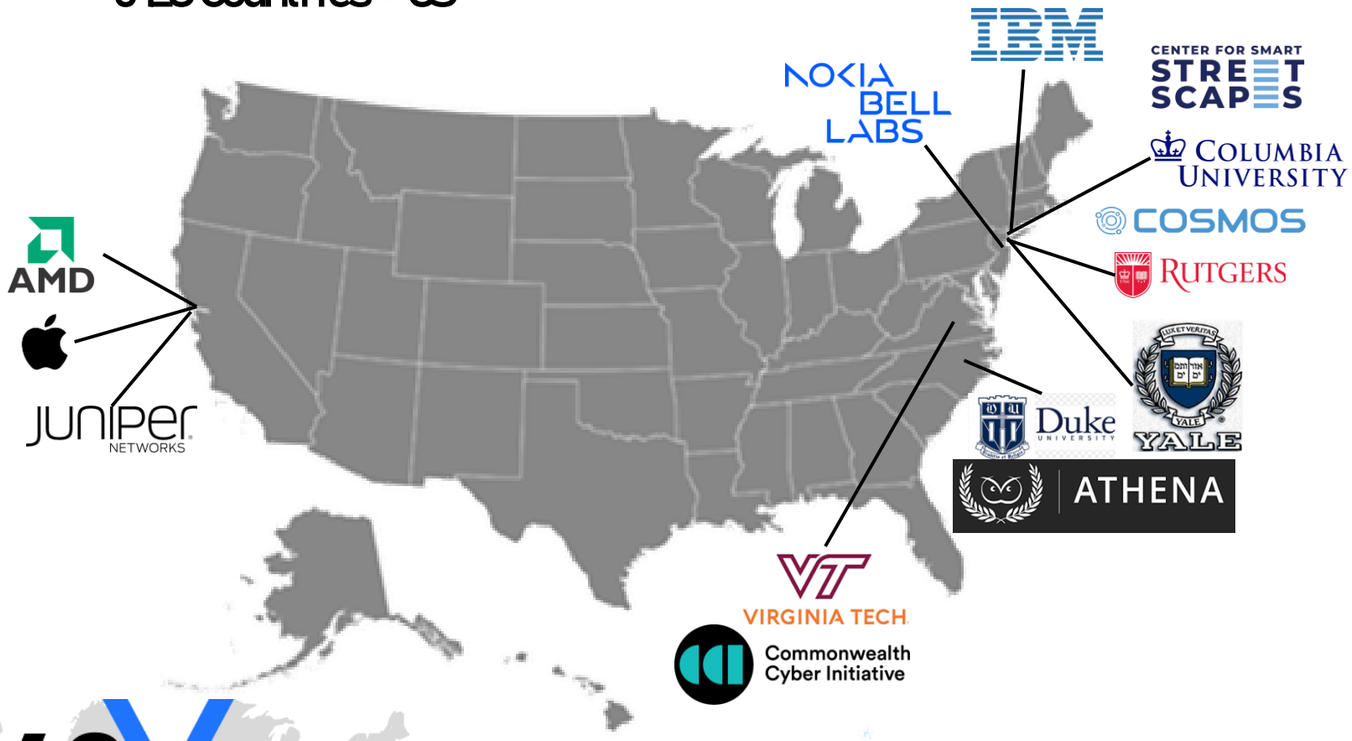
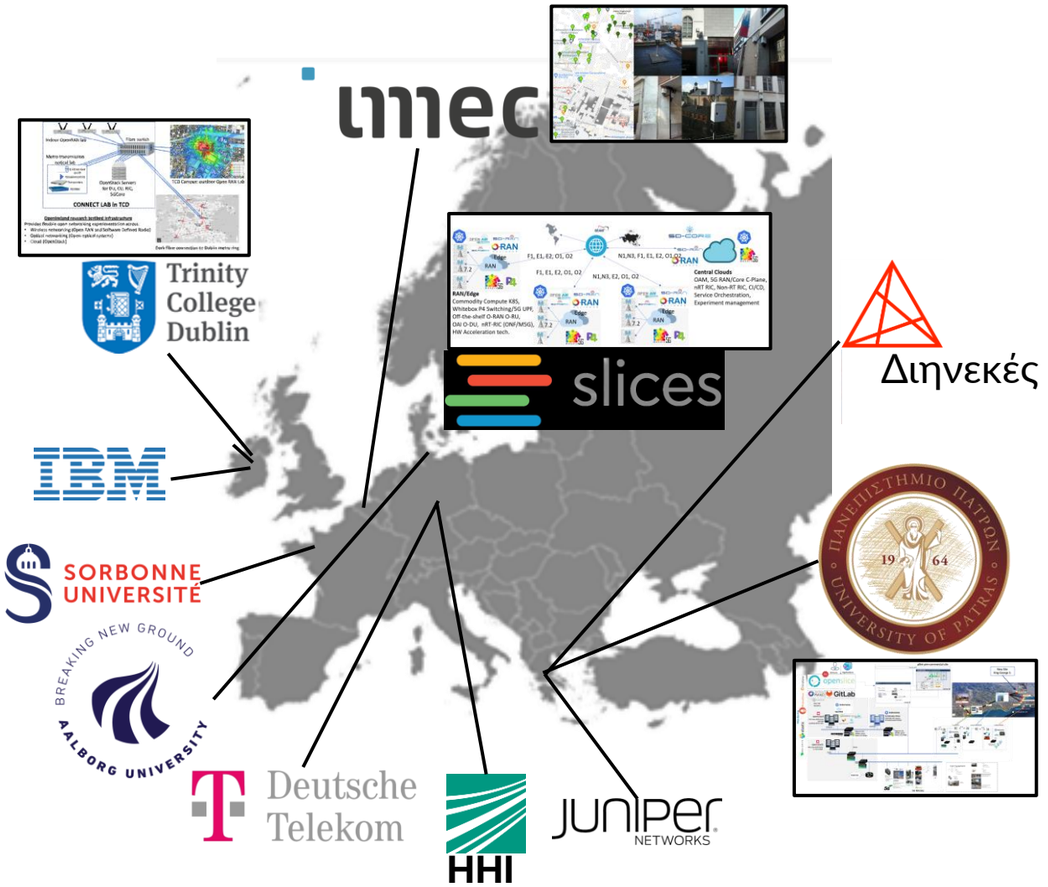
EU-US Cooperation

- HORIZON-JU-SNS-2023-STREAM-B-01-06 – EU-US 6G R&I Cooperation
- Project Budget: €3.1M
- Duration: 36 Months starting 1/1/24
- 10 EU Partners and 10 US Partners, 9 major initiatives
- 6 EU Countries + US

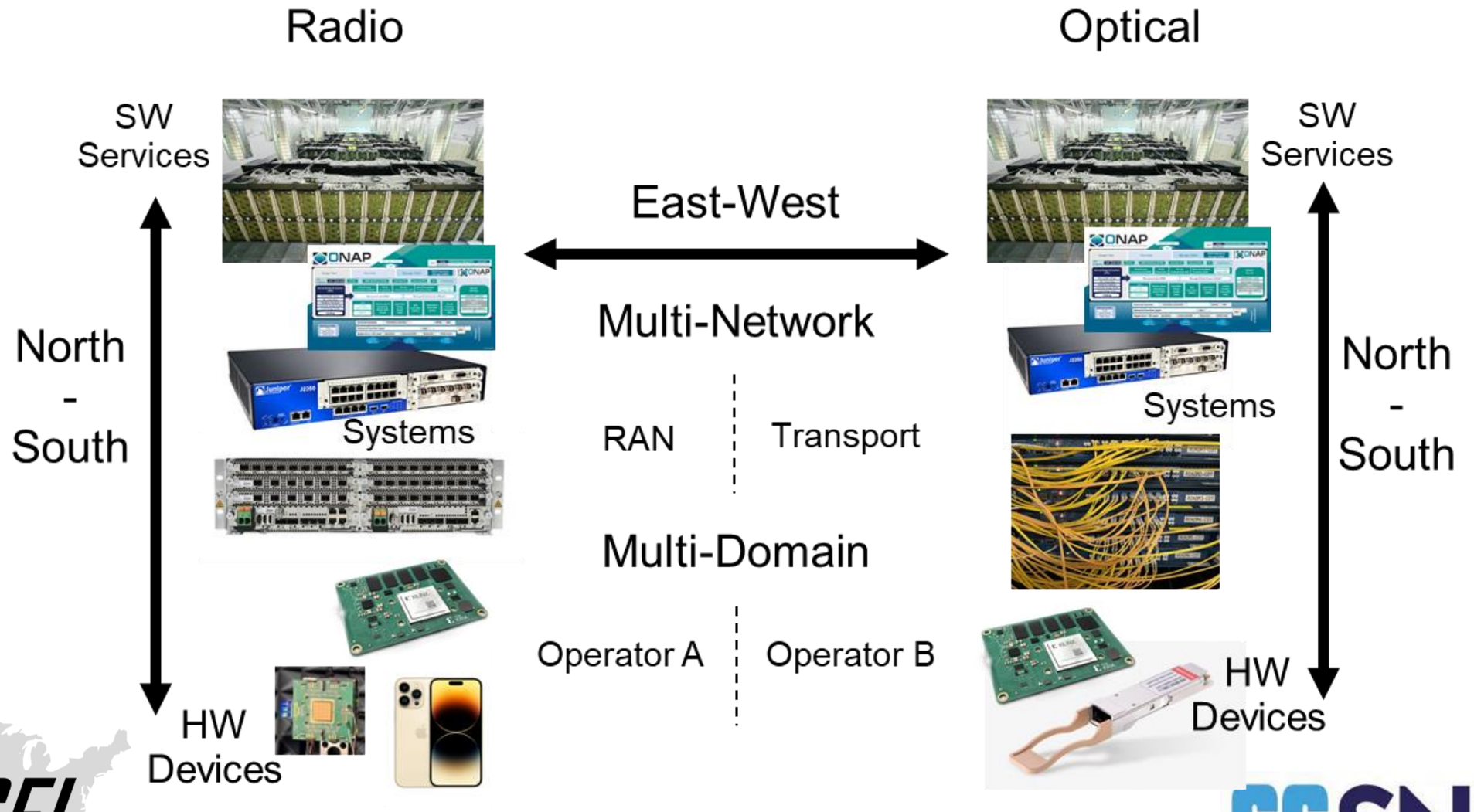




6G XCEL

6G SNS

Fragmented Network AI Environment



6G-XCEL Vision

- Research on edge network use cases that employ decentralised, multi-party AI controls running over edge compute accelerators to coordinate control across radio and optical networks.
- Development of a reference framework for AI in 6G that will pave the way towards global validation, adoption and standardisation of AI approaches: decentralised multi-party, multi-network AI (DMMAI) framework
  - enable the federation of AI-based network controls across network domains and physical layers, while promoting security and sustainable implementations
  - development of reference use cases, data acquisition and generation methods, data and model repositories, curated training and evaluation data
  - technologies and functionalities for its use as a benchmarking platform for future AI/ML solutions for 6G networks
- 6G-XCEL will bring together a large ecosystem of researchers from the EU and US to implement elements of the DMMAI framework in their testbeds and labs
  - integrating it into their research programs and validating the framework across platforms
  - working together openly across continents and closely with standardisation groups within each jurisdiction

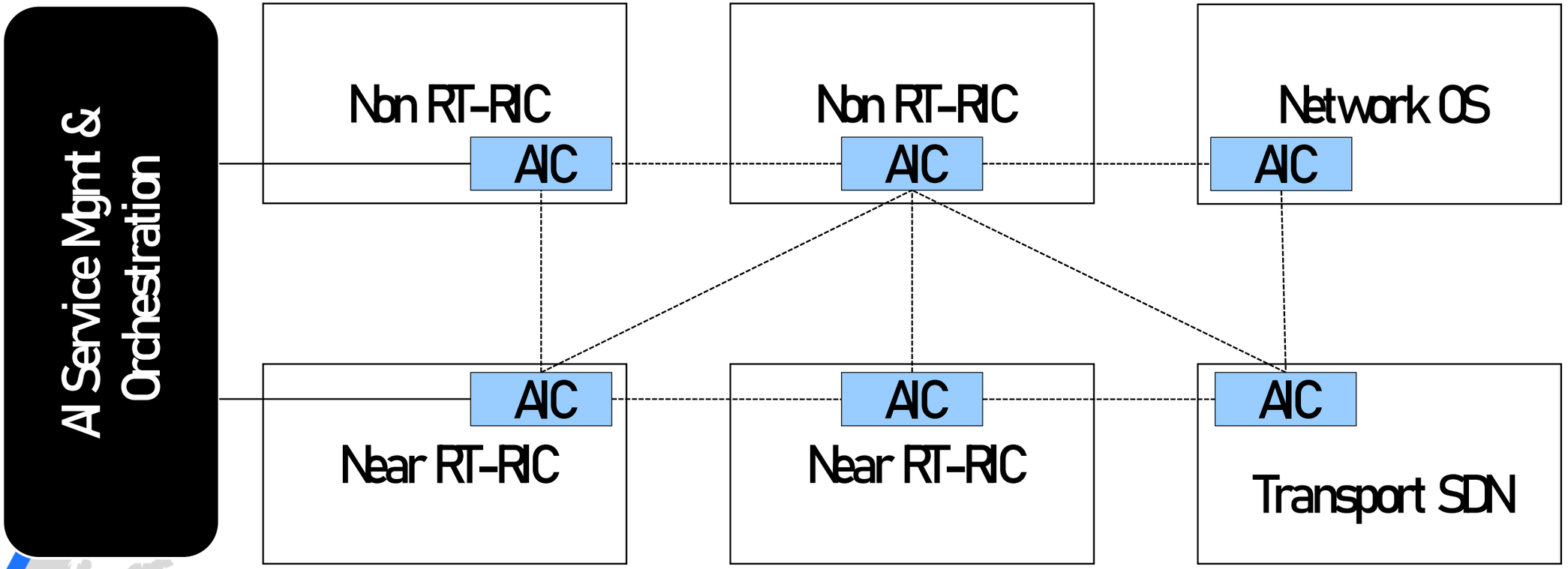
6G-XCEL Objectives

- Objective 1: Investigate and design a framework for decentralised, multi-party, multi-network AI for the control of 6G networks
- Objective 2: Determine achievable time scales for DMMAI in real time, near-RT, and non-RT control loops
- Objective 3: Develop efficient and scalable advanced AI methods for large scale time series data in decentralized multi-party, multi-network control
- Objective 4: Investigate methods to address the security and privacy of multi-party, multi-network AI network control for DMMAI in 6G
- Objective 5: Determine energy efficiency of DMMAI for 6G and methods for its study
- Objective 6: Create a flexible DMMAI framework that can be used with different AI orchestration platforms in the EU and US.
- Objective 7: Establish a community of excellence in research on Networks & AI spanning the EU and US to provide foundation for its use in 6G

AI Framework

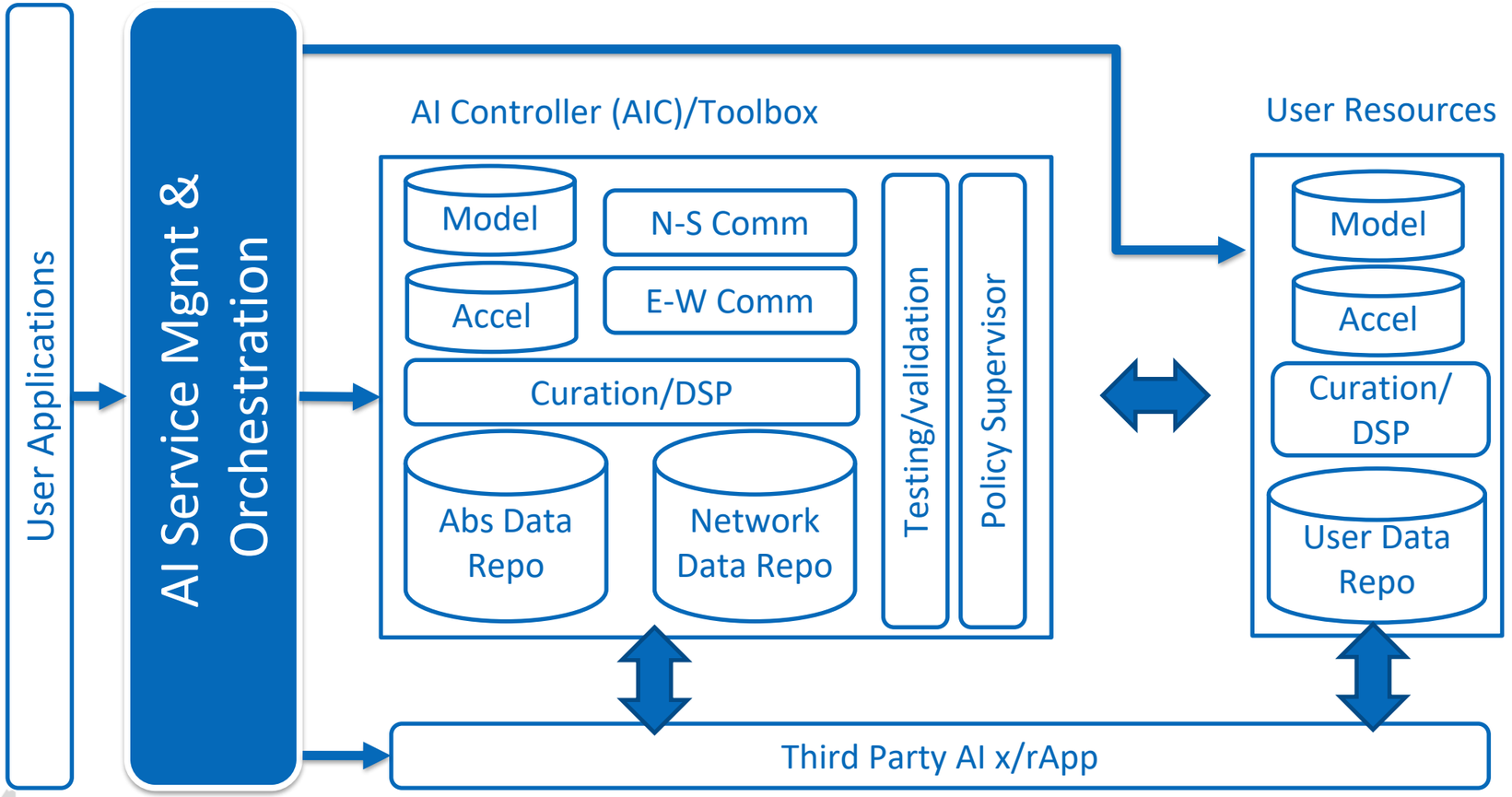
Explore common AI control elements (AIC) to work across technologies and domains

DMMAI Framework



AI Controller

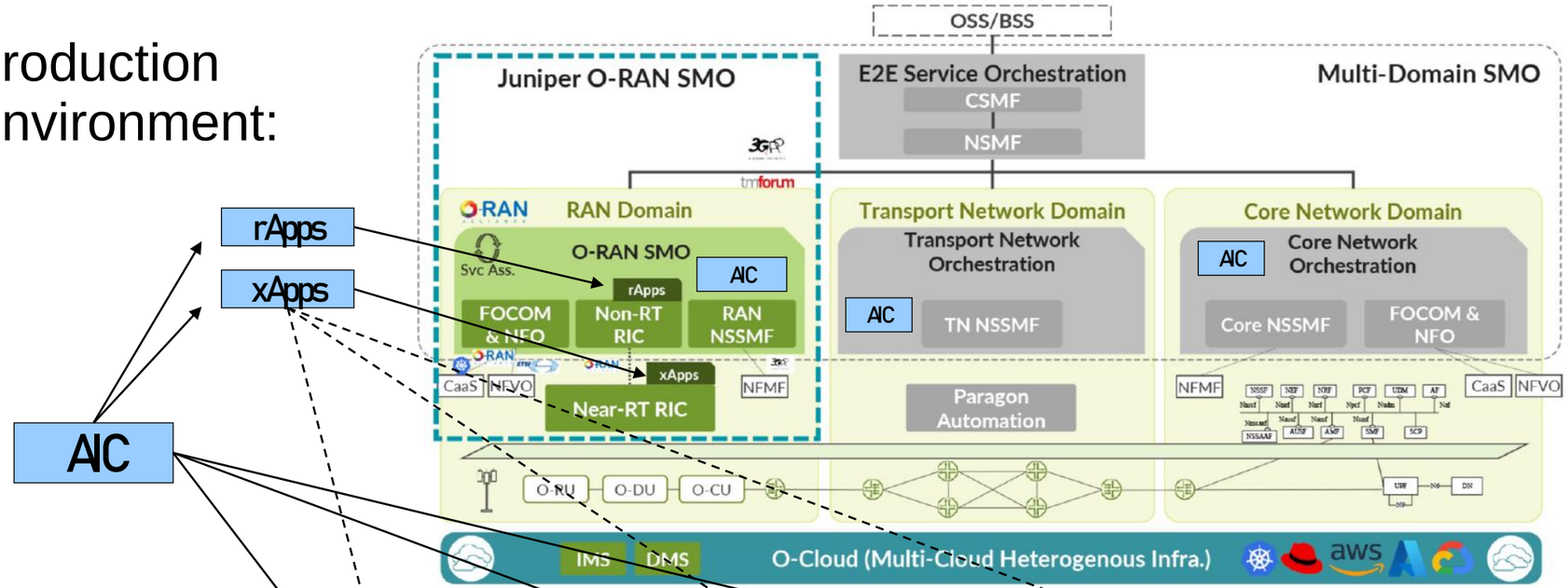
Breakdown AIC into key functional blocks to study their interactions and associated experimental testbed methods



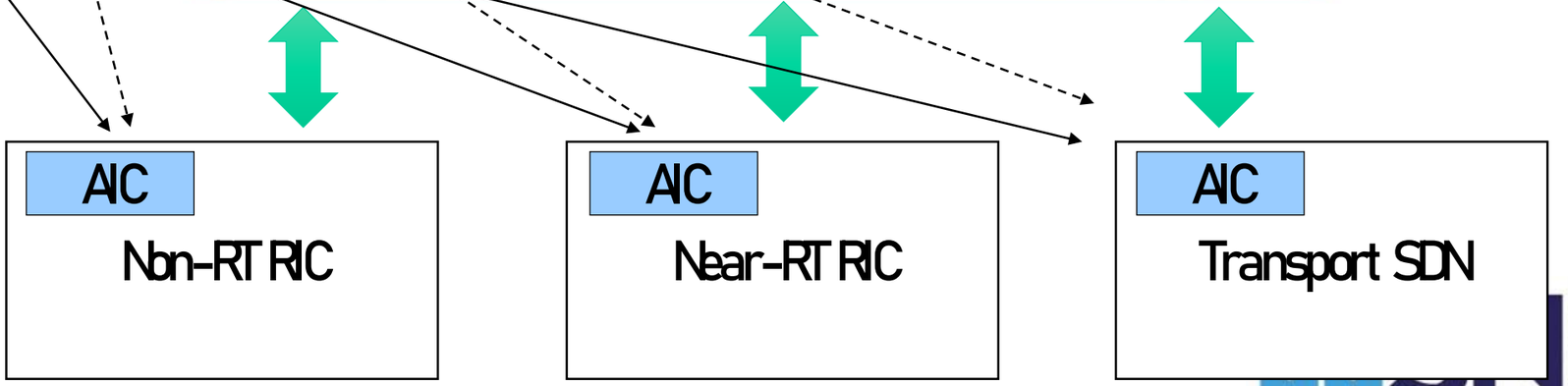
DMMAI Framework

Model on Juniper O-RAN Environment + open source implementations

Production Environment:



Open Source Environment:



Work Package Organization

WP2

Application and Orchestration Requirements

User Applications

AI Service Mgmt & Orchestration

User/Data Resources

Model

Accel

Curation/ DSP

User Data Repo

Requirements and Parameters

WP3

Design and Implementation

AI Controller (AIC)/Toolbox

Model

Accel

N-S Comm

E-W Comm

Curation/DSP

Abs Data Repo

Network Data Repo

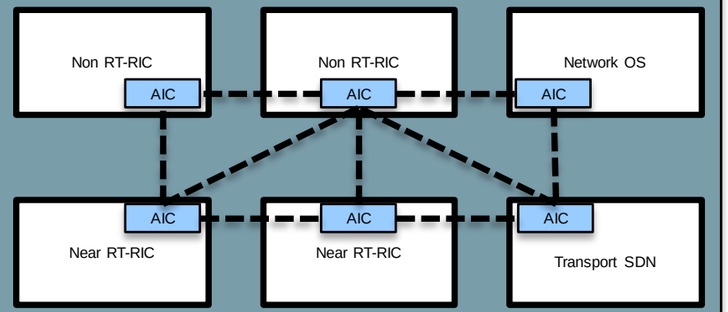
Testing/validation

Policy Supervisor

Development and Refinement

WP4

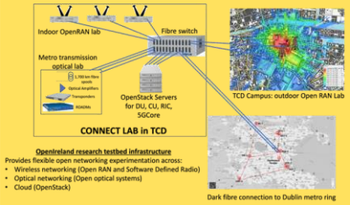
Performance and Security Analysis

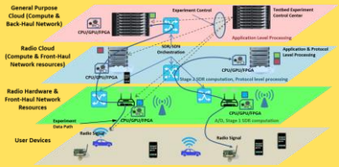


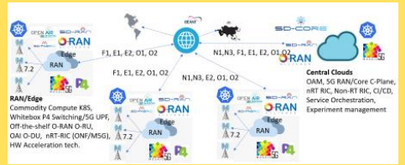
WP5

Experimentation, Validation and Benchmarking

OpenIreland (EU) | COSMOS (US) | Patras5G/P-NET (EU) | VT CCI (US) | CityLab (EU) | SLICES (EU)







Let's Cooperate!

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6G XCEL

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6G SNS