Efficient Confluent Edge NETworks (ECO-eNET)

Project Overview

SNS Webinar – Introducing the Call 2 SNS projects
March 7, 2024

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Chalmers University of Technology

General Info

Duration: 36 months

Starting date: 01/01/2023

Total budget: 3,769,981.00 €

EC funding: 3,592,544.78 €

Total PMs: 530

Project Coordinator: Paolo Monti (Chalmers)

Technical Coordinator: Daniel Kilper (TCD)

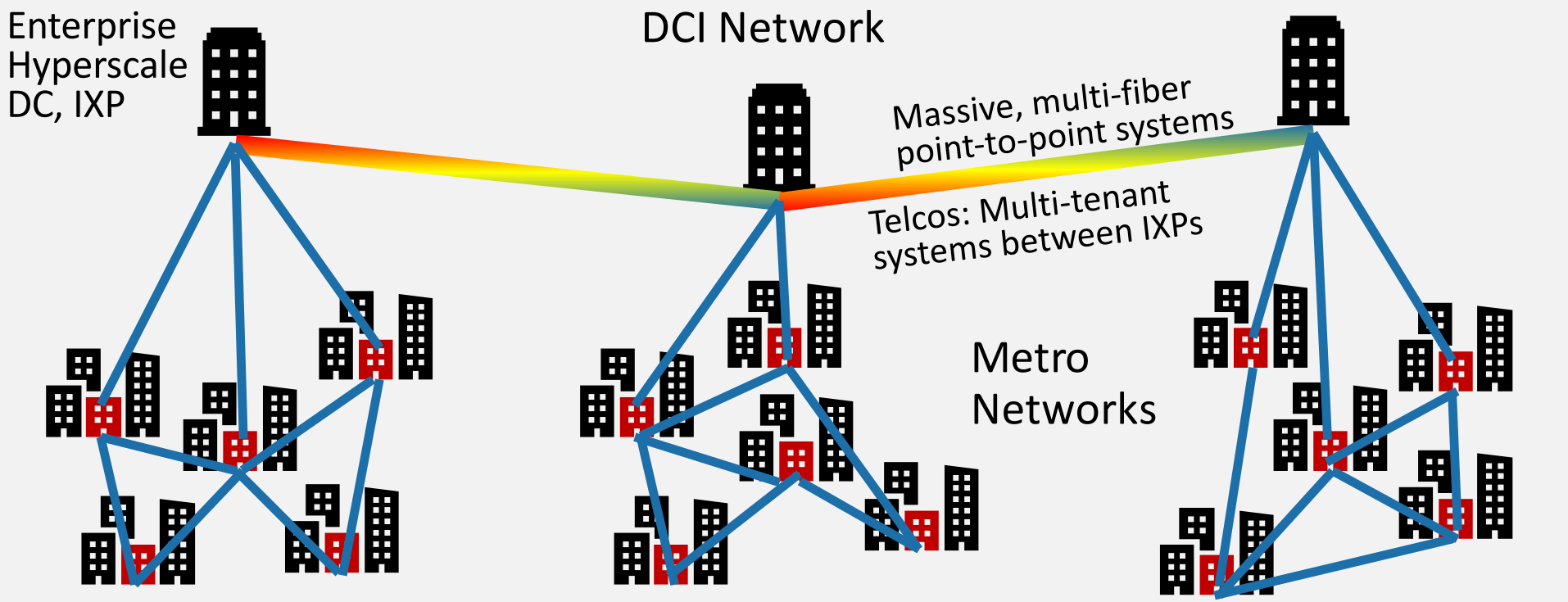
URL: www.eco-enet.eu

Project Officer: Claudio Scalese

Consortium

- 11 Partners
- 8 Countries (Belgium, Estonia, Germany, Greece, Ireland, Sweden, Switzerland, UK)

New Paradigm: DCI Backbone + Mesh Edge



ECO-eNET vision

Envision 6G fixed networks based on flexible and scalable high-capacity transmission technologies that form mesh edge networks

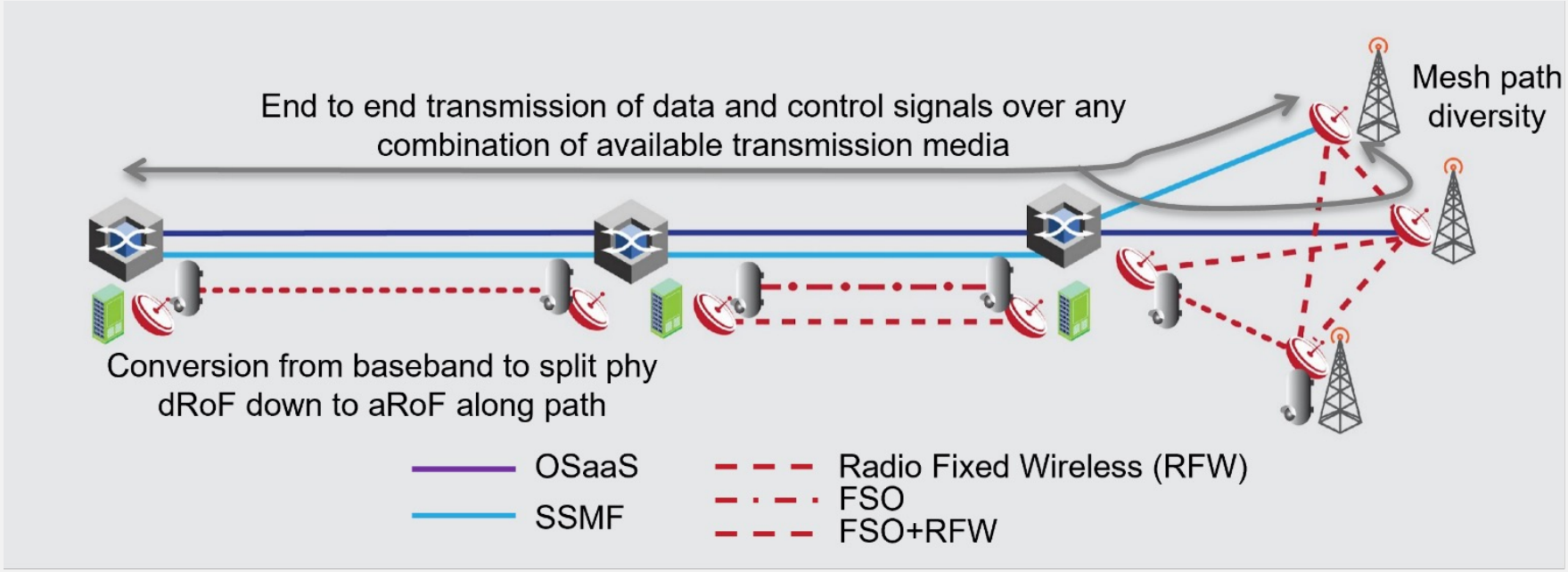
- highly available networks
- low latency
- ultra energy-efficiency
- AI-native orchestration across mobile, fixed, and compute domains

Mesh networking at the edge enabled by a seamless “confluence” of

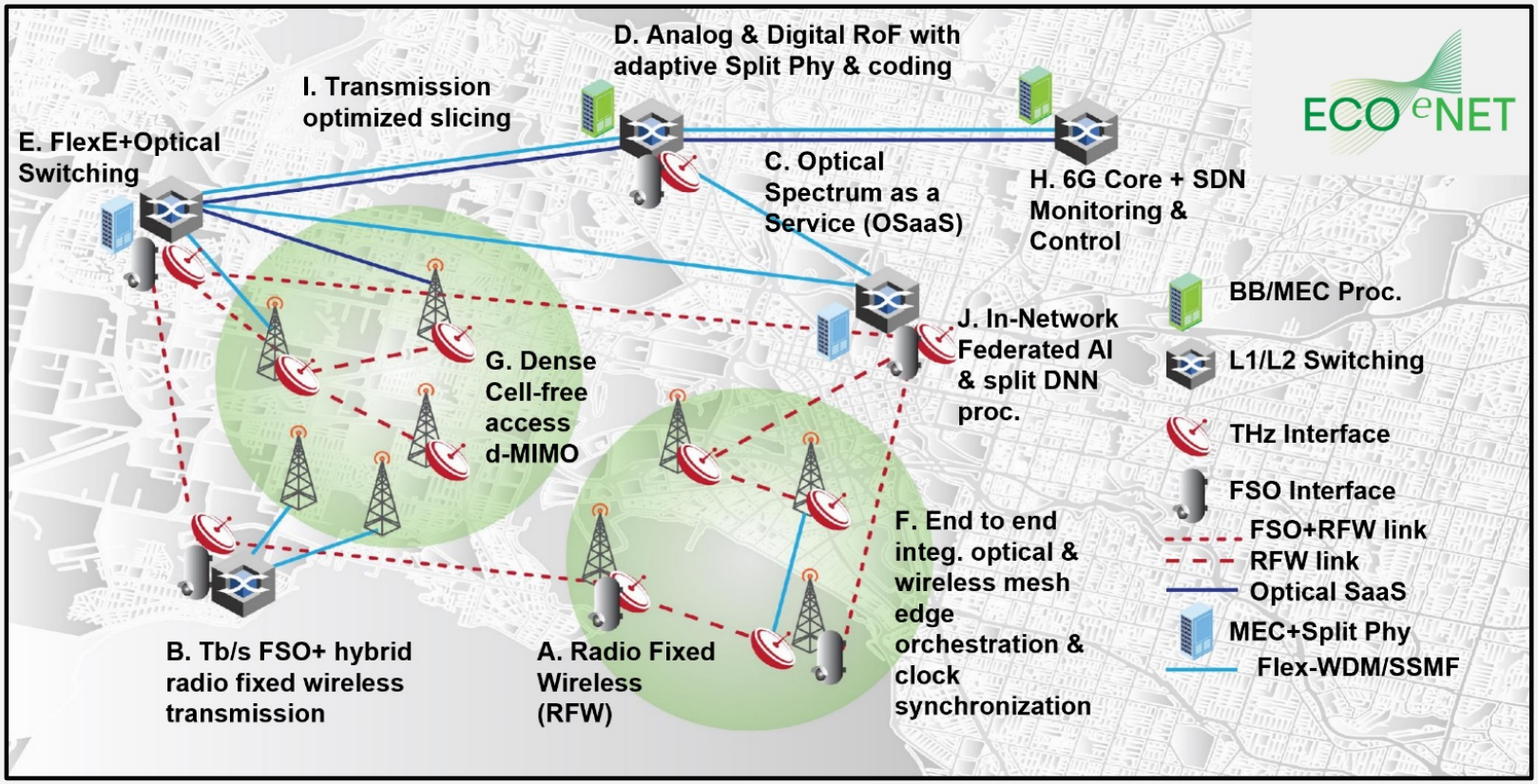
- Radio fixed wireless (RFW) – mmWave / (sub-) THz
- Free space optical (FSO)
- Flex-WDM transport using optical-spectrum-as-a-service (OSaaS) and integrated sensing and communication capabilities

From convergence to confluent

- **Confluent transmission** refers to a system that natively supports multiple transmission media and their signals as opposed to just a convergence of the enabling technologies

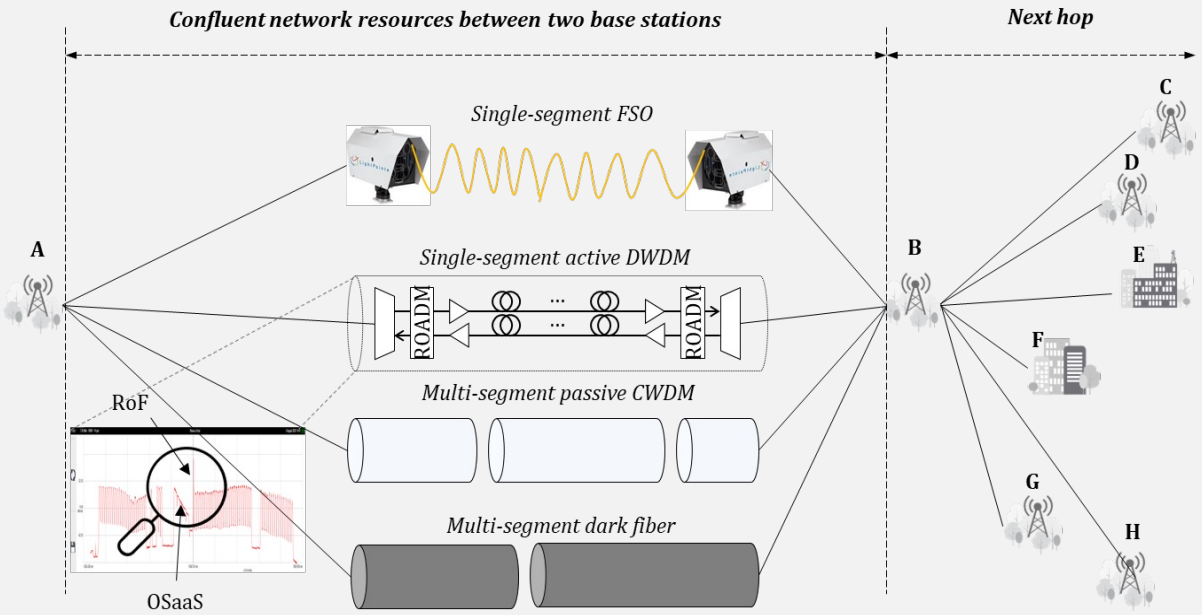


ECO-eNET key innovations

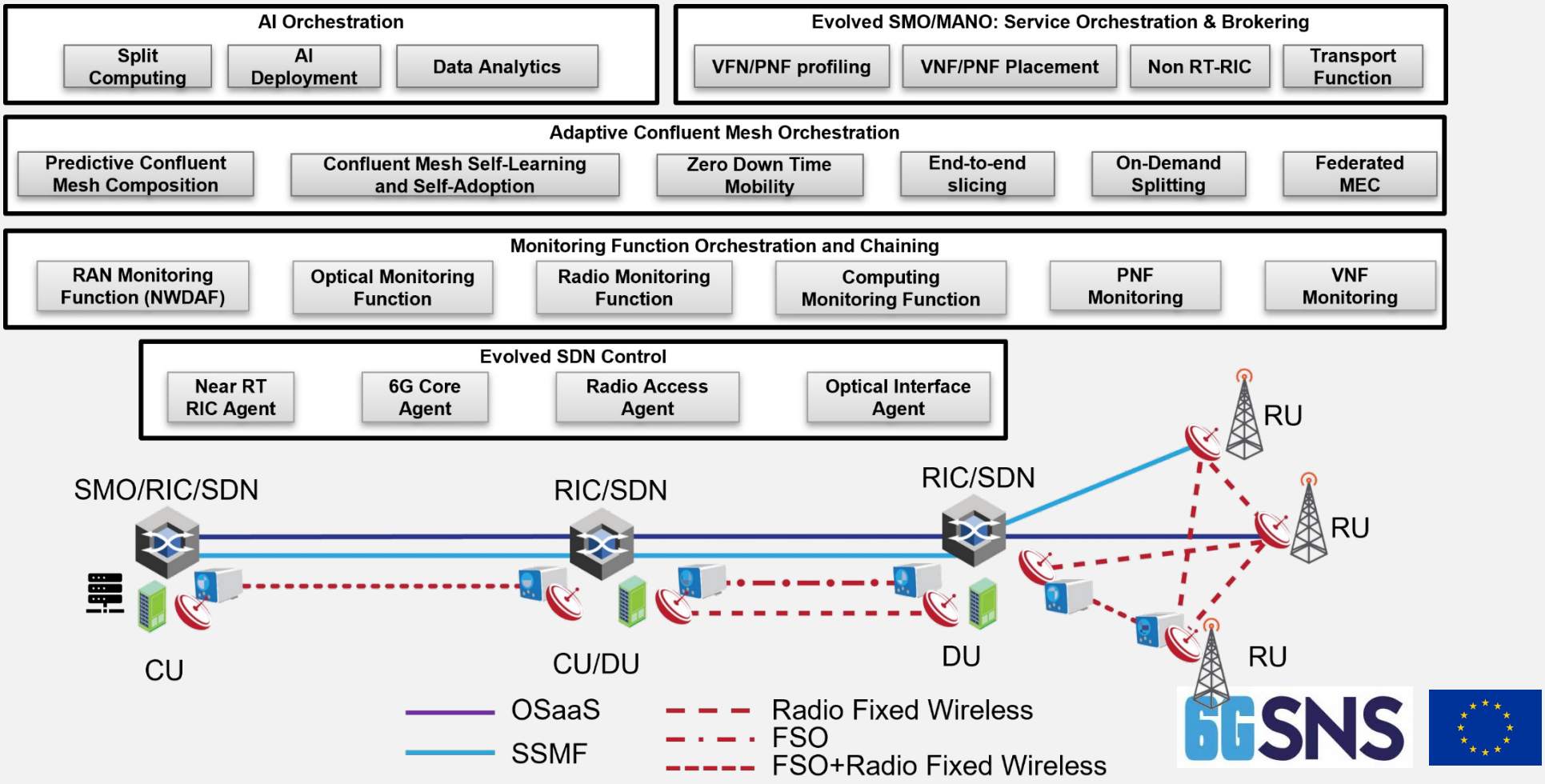


Confluent transmission technologies

- Plasmonic RFW link
  - Doubling data rate - 190-350 GHz
- FSO fixed wireless
  - 1 Tb/s @ 1 km
- Hybrid RFW/FSO
  - Compensating atmospheric effects
- Fibre Spectrum Services (OSaaS)
  - Power compatibility
- Fiber sensing
  - Network condition (e.g., failure) – weather conditions predictions
- DWDM Optical X-Haul
  - Control & management



Evolving controller functions



Objectives

O1: Confluent transmission Technologies: THz, FSO, sensing, x-haul

- Plasmonic radio-fixed wireless links
- Low-latency optical fixed wireless links
- Fibre sensing for seamless resource allocation and rerouting
- Confluent xhaul transmission

O2: Control and orchestration of confluent networks

- New monitoring functions and AI-based mobile, confluent, and compute resource orchestration
- End-to-end AI-enhanced slicing methods
- Federated and orchestrated AI processing

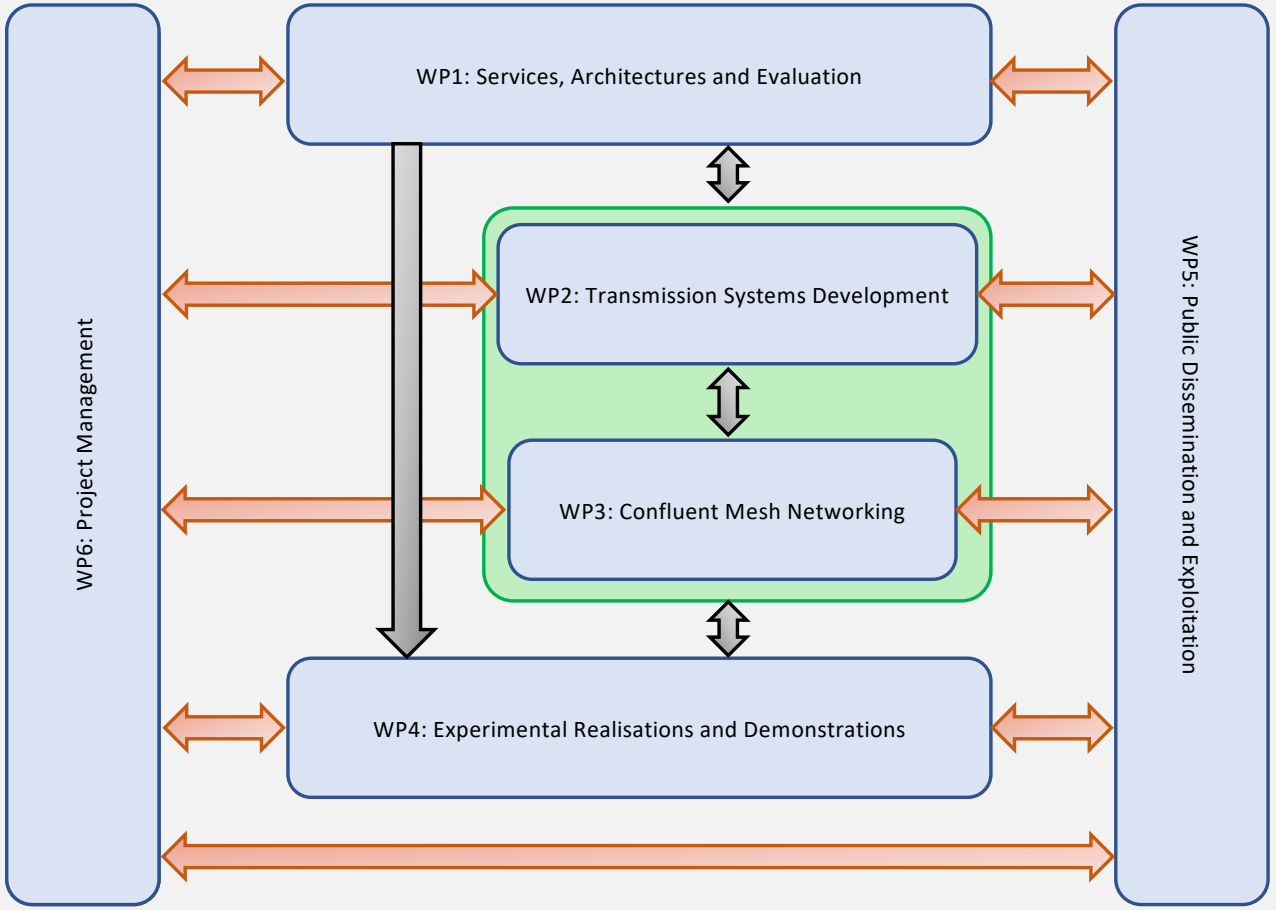
O3: Demonstration of key ECO-eNET technologies & network concepts

- Joint Radio Fixed Wireless and Free Space Optic transmission
- Demonstration of fiber sensing used for resource allocation in confluent edge networks
- Demonstration of energy and latency optimized confluent mesh networking

O4: Impact and standardization

- Communication and dissemination of ECO-eNET results to appropriate stakeholders
- Promote and actively drive standardization

Project structure



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