PREDICT 6G

The PREDICT6G Case

6G Architecture for enabling Predictable, Reliable and Deterministic Networks.

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Funded by the European Union

This project was awarded funding by the European Union's Horizon Europe Research and Innovation programme under grant agreement N° 1101095890.

Goals of PREDICT-6G

Reliable Performance

Predictable & Repeatable

Time Sensitive network

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Overview

- **Concepts**
  Reliability, Time Sensitiveness & Predictability
- **System Architecture Principles**
  E2E determinism, Multidomain, Scalability…
- **PREDICT-6G Architecture**
  High level overview
- **Multidomain Operation**
  - AICP, MS, MD & MF
  - Domain specific MDs
  - End-to-end MS
  - Inter-Domain Integration MS
- **Discussion and Conclusions**

Concepts

Reliability

- Essential for consistent, uninterrupted service across the 6G network.
- Robust mechanisms like PREOF and FRER ensure network integrity even during failures.
- Advanced error correction and resilient routing protocols should be placed to maintain seamless service under any stress.

Time Sensitiveness

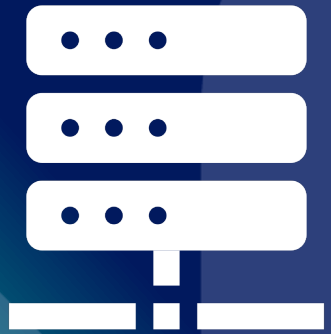
- Critical for the reliable, timely exchange of data across various domains.
- Enables coordination of multi-domain services with strict timing requirements, essential for technologies like autonomous vehicles.

Predictability

- Ensures consistent network performance, crucial for user experience.
- Help to anticipate and resolve potential network issues before they affect services, ensuring a reliable, user-centric network environment.

System Architecture Principles

- **Principle 1:** End-to-End (E2E) Deterministic Services
- **Principle 2:** Multi-Domain Service Composition and Management Automation
- **Principle 3:** Modularity
- **Principle 4:** Extensibility to Multiple/New Technologies
- **Principle 5:** Scalability
- **Principle 6:** Model-Driven Open Interfaces



PREDICT-6G Architecture

PREDICT-6G management scope

Networks (e.g., PM/CM)

Network services within one network (e.g., connectivity, det. SLA)

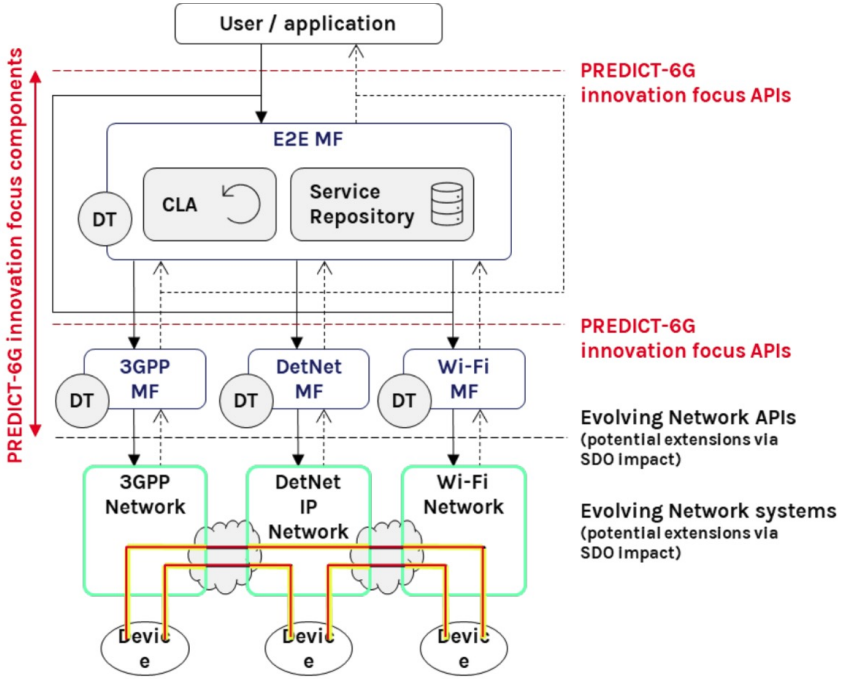
E2E services over multiple networks (e.g., between devices attached to different networks)

These are Managed Entities (ME) for the PREDICT-6G framework.

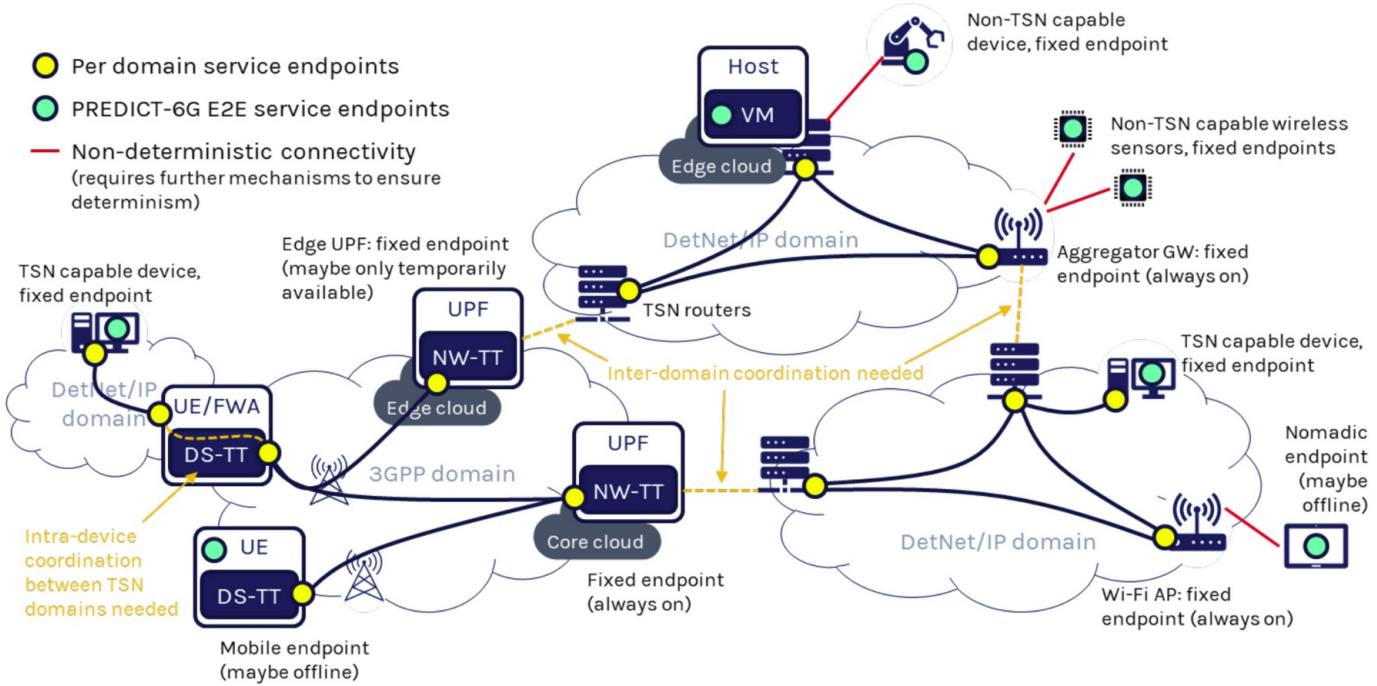
E2E deterministic service flow (MDP)

Request / configuration (AICP)

Measurement / status / insight (AICP)



Multidomain approach



Multidomain Operation

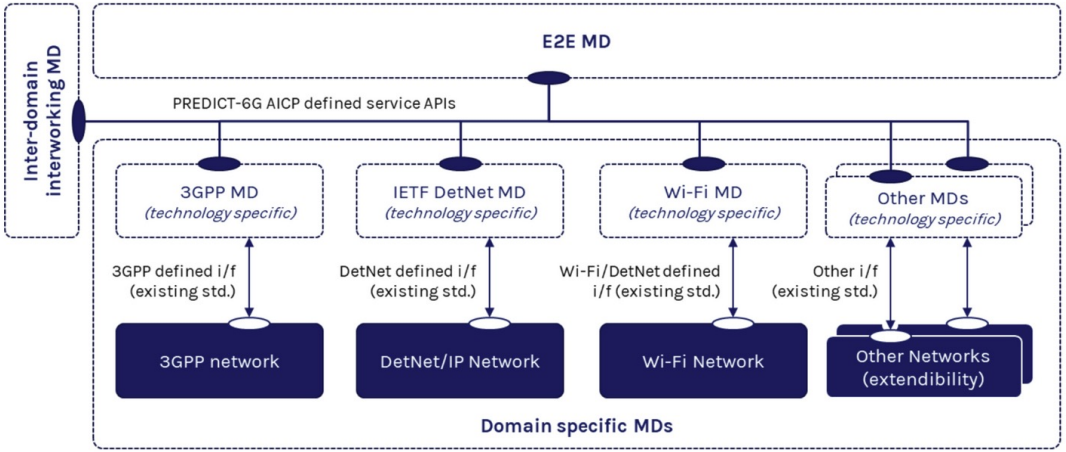


Figure 5-3 Management Domains of the PREDICT-6G AICP architecture

AICP: AI-driven Inter-domain Control-Plane

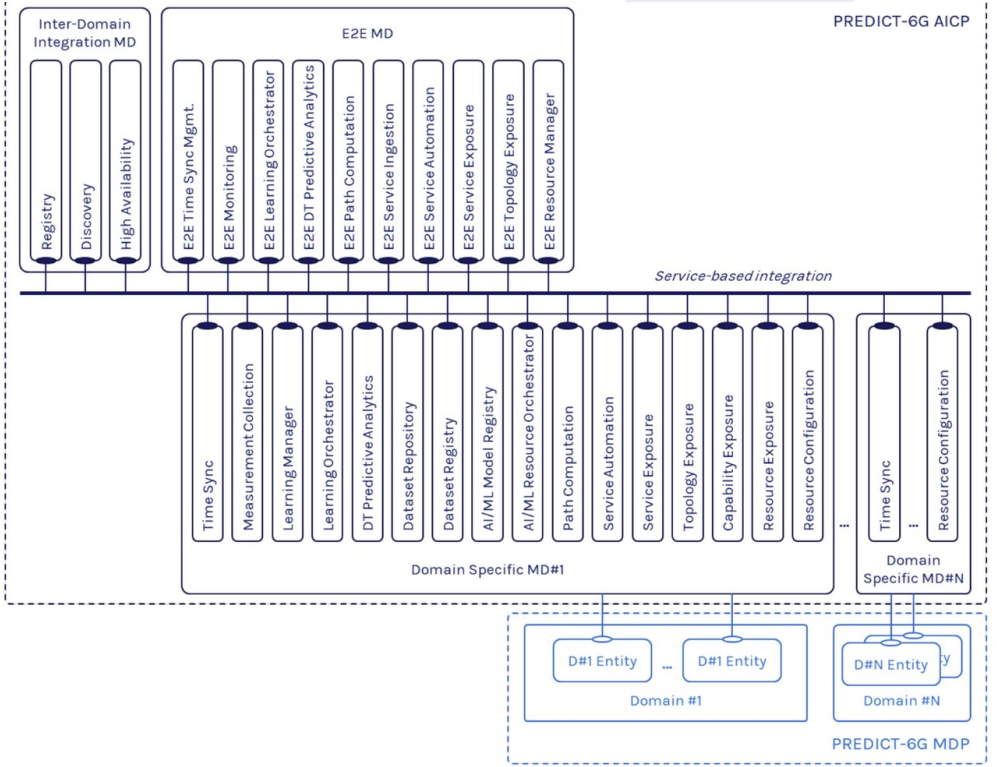
MDP: Multi-domain Data-Plane

MS: Management Service

MF: Management Functions

MD: Management Domain

Multidomain Operation



Multidomain Operation: MSs

Time Synchronization

Measurement Collection

Path Computation

Service Automation

Service Exposure

Topology Exposure

Capability Exposure

Resource Exposure

Resource Configuration

Learning Manager

Learning Orchestrator

DT Predictive Analytics

Dataset Repository

Dataset Registry

AI/ML Model Registry

AI/ML Resource Orchestrator

Discussion and conclusions

- **PREDICT-6G architecture is anchored by the Multi-Domain Data Plane (MDP) and AI-driven Inter-domain Control-Plane (AICP).**
- **MDP's Role:** Deterministic services with cross-domain integration, synchronizing time and reliability E2E.
- **AICP's Functionality:** Automation of MDP, service-based hierarchy
- **E2E MSs:** Technology-agnostic services, assure E2E deterministic services, addressing possible conflicts between domains
- **Scalability and Extension:** Separation of E2E and technology-specific duties

PREDICT-6G

Thank you!

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