



PREDICT 6G

PREDICT-6G

Determinism and Robustness as pillars of future production sites

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DataWeek'23: AI-native data management for robustness and sustainability



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The vision

Building a deterministic 6G network



RELIABLE

Availability
Low packet
Failure resilient



TIME SENSITIVE

Bounded latency
Low jitter



PREDICTABLE

Use of AI to predict events,
states, demands, resources
Autonomous proactive actions
based on predictions

The mission

PREDICT-6G aims to design, create and validate end-to-end (E2E) 6G solutions providing deterministic services over multiple interconnected domains and technologies (incl. wired and wireless).

3 pillars

- To **extend the reliability and time sensitiveness features** of IEEE 802.11 and 3GPP networks, including APIs for the monitoring and control of such capabilities, enabling predictability.
- To **develop a multi-technology multi-domain Data-Plane** jointly with an AI-driven multi-stakeholder inter-domain Control-Plane (AICP)
- To **enhance the predictability** of the network through artificial intelligence, enabling the forecasting of the occupancy of network resources and the effect of accepting a new flow into the network

3 use cases

1. **Smart manufacturing**
2. **Multi-domain deterministic communications**
3. **Critical communications**



Innovations

Specific innovations

- 1 Improvement of L2 deterministic capabilities of IEEE 802.11 and 3GPP
- 2 Emulate deterministic network capabilities on top of non-deterministic network segments
- 3 Data-plane integration of multiple deterministic and non-deterministic domains
- 4 User, resource, and function mobility under deterministic constraints
- 5 Highly configurable monitoring platform for multi-technology deterministic networks
- 6 Cross-domain E2E deterministic service management automation
- 7 Predictability through Network Digital Twinning

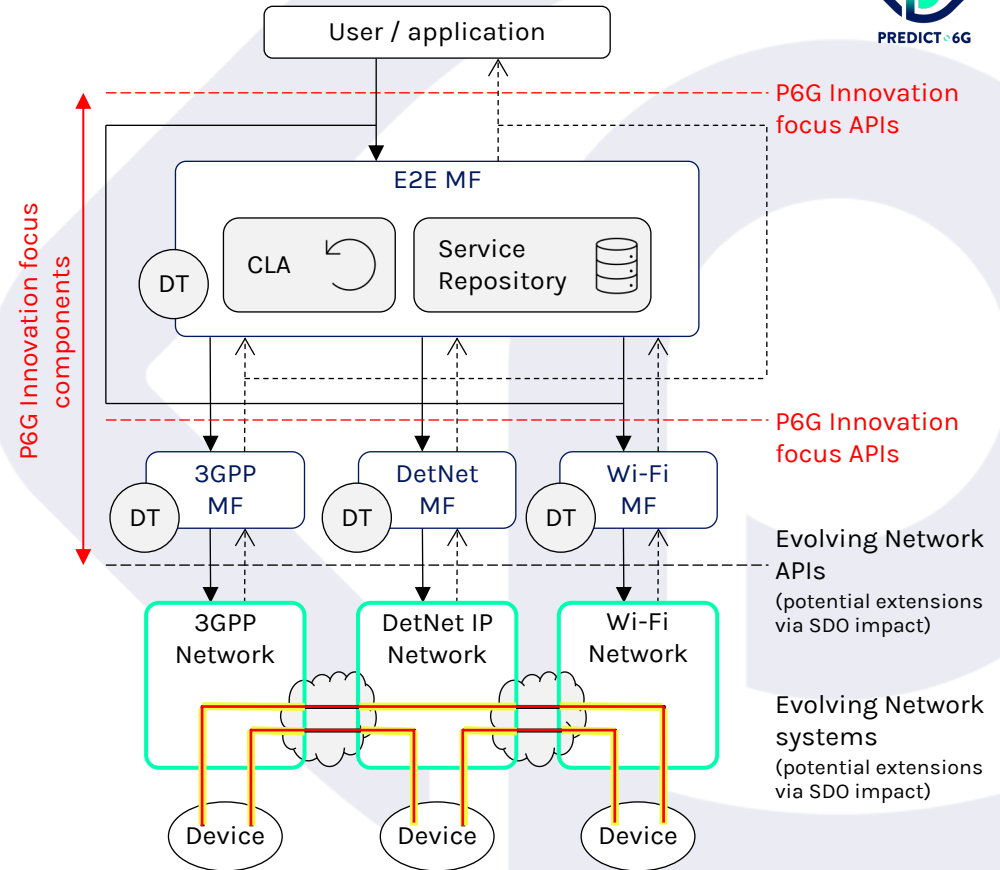
Architecture overview

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)

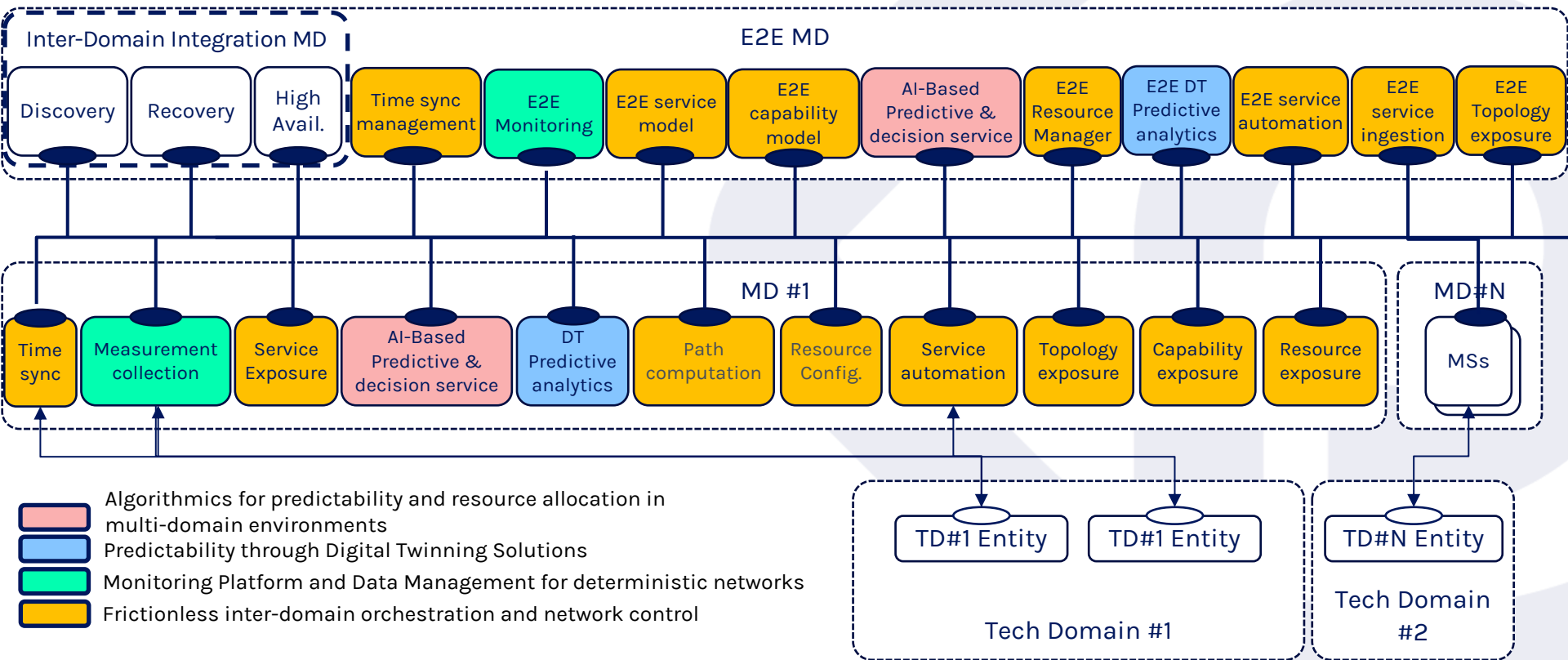
These are **Managed Entities (ME)** for the PREDICT-6G framework.

- E2E deterministic service flow (MDP)
- ▶ Request / configuration (AICP)
- Measurement / status / insight (AICP)



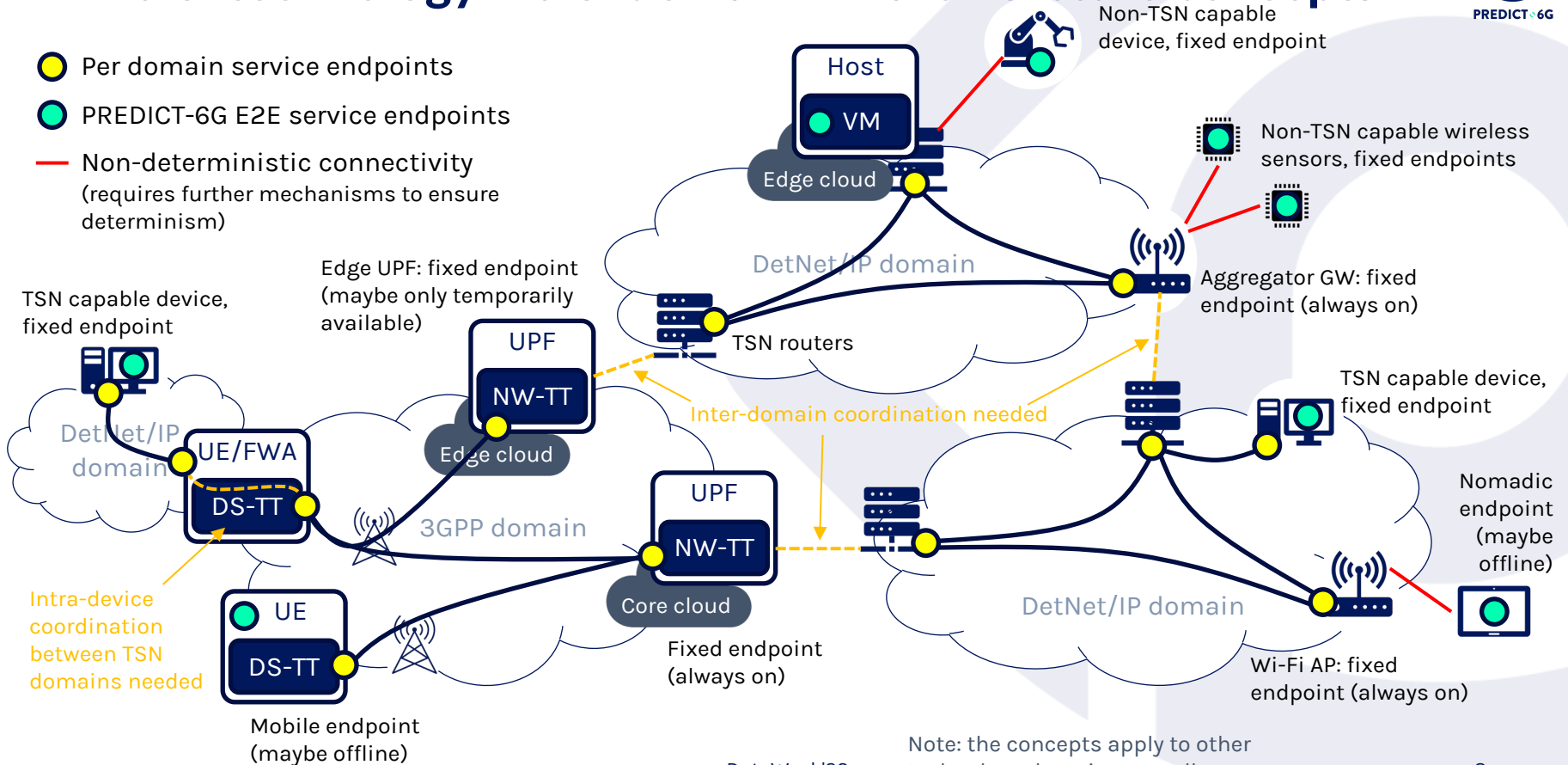
AICP Architecture

● Represents all management capabilities of the corresponding MS 



Multi-technology multi-domain DP architecture concepts

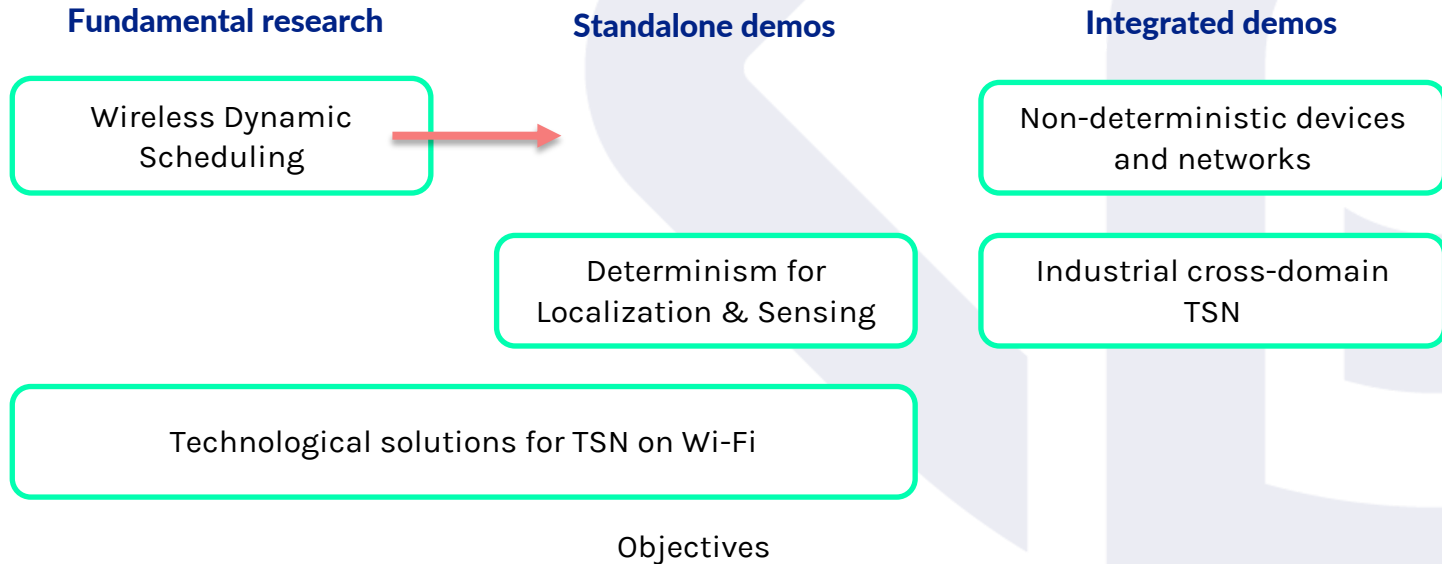
- Per domain service endpoints
- PREDICT-6G E2E service endpoints
- Non-deterministic connectivity (requires further mechanisms to ensure determinism)



Note: the concepts apply to other technology domains as well.

The integration concept within PREDICT-6G

- PREDICT-6G Integrates multi-domain layer-2 islands of deterministic technologies through layer-3 mechanisms (DetNet, RAW).

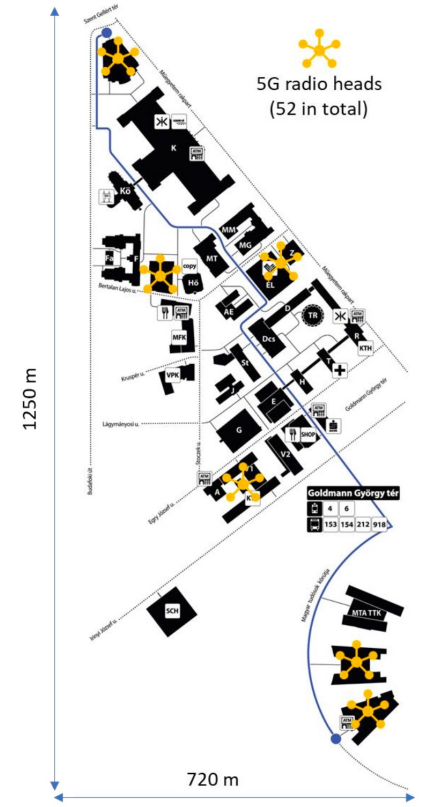


Experimentation plans and testbeds

- 3 key use cases
 - Deterministic services for critical communications
 - Multi-domain deterministic communication
 - Smart Manufacturing
- 2 main testsites
 - Budapest Open Lab
 - Madrid Open Lab (5TONIC)



ek'23



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Summary



- PREDICT-6G considers networks need to be enhanced to become more deterministic (i.e., predictable, reliable and time sensitive) to cope with emerging use cases
- The 6G network will be composed of multiple heterogeneous networks merged together
 - Not a single L2 solution will solve the problem
- PREDICT-6G proposes two main innovations in this area:
 - Multi-technology multi-domain Data-Plane (MDP)
 - Enhance L2 technologies
 - Integrate them into a single E2E data plane
 - Expose APIs for control and monitoring
 - AI-driven Multi-stakeholder Inter-domain Control-Plane (AICP)
 - AI-based network control plane framework
 - Network digital twins for predictability
 - Monitoring platform

Meet our team



17 partners from seven EU countries have joined forces





PREDICT 6G

Thank you!



[@Predict6G](https://twitter.com/Predict6G)



predict-6g.eu



[PREDICT-6G Project](https://www.linkedin.com/company/predict-6g-project)



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