



# Integrating Network Digital Twinning into

## Future AI-based 6G Systems

SNS-JU Stream B Project (January 1, 2024)

Project website: [www.6g-twin.eu](http://www.6g-twin.eu)

LinkedIn: <https://www.linkedin.com/company/6g-twin/>



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## 6G-TWIN Telemetry Framework

### 6G-TWIN Vision: AI-Native Architecture & Network Digital Twins for 6G

6G-TWIN pioneers a transformative 6G vision by combining **Network Digital Twins (NDTs)** with an **AI-native, closed-loop architecture**. This enables real-time decision-making and predictive control across highly dynamic, complex network environments.

#### Key Innovations:

##### ◆ New General Architecture:

A modular, AI-native architecture integrates the physical and digital layers of the network. It supports automation, multi-domain orchestration, and advanced control via continuous feedback loops between the real network and its digital twin.

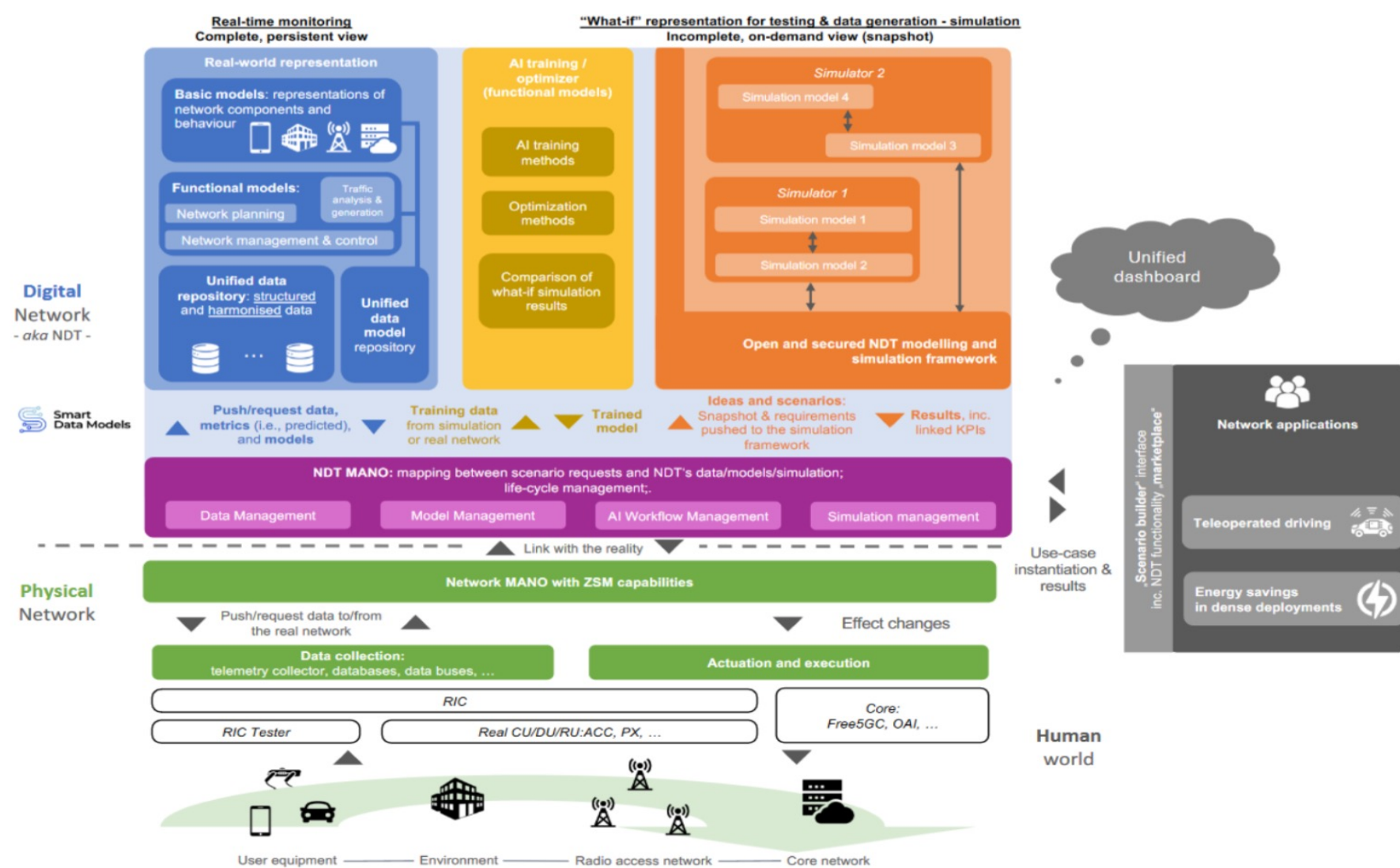
##### ◆ Evolved Telemetry Architecture:

A next-generation telemetry framework ensures real-time, standardised data collection and analytics across diverse interfaces (E2, O1, F1, A1). It empowers xApps/rApps with high-fidelity insights to drive energy-efficient, low-latency, and adaptive operations.

#### Validated through demonstrators in:

- 🚗 Teleoperated Driving
- ⚡ Energy-Saving RAN Management

### 6G-TWIN Functional Architecture



### Demo Workflow

- The demo simulates **two days of symmetric UL/DL traffic** (1 hour = 5 minutes). KPMs are exposed via the **Telemetry Gateway**. This is in collaboration with the RAN configuration of the BeGREEN PoC 1 Demo.
- Telemetry data is collected in the **Telemetry Gateway (TWG)**, which covers the functions of **Collection, Harmonization and Management** for the provided data.
- RSRP** data is then used to model the locations of the UEs via an **rApp** with Weighted Least Squared (WLS) algorithms based on RAN telemetry.
- Based on this modelling a visual representation of the UE locations is presented for graphical purposes.

### Initial Results

- Telemetry collected from the RAN is harmonized in 3GPP standards via the TWG with in a 1 sec granularity
- Location modelling rApp is extract dynamically number of Cells, number of UEs and its Over the Air Metrics.
- Location modelling xApp WLS algorithm provides accuracy up to 50m independent of indoor or outdoor location of UEs.
- Integration of future data sources is needed to improve accuracy of the model.

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