1. Project Overview

- **Name:** PRogrammable AI-Enabled DeterminIstiC neTworking for 6G – Predict-6G (https://predict-6g.eu/)

- **Stream:** B-01-01 System Architecture

- **Members (16): DE(1):** Intel; **EE(1):** Australo; **ES(7):** ATOS IT, ATOS Spain, Ericsson, Gestamp, Univ. Carlos III De Madrid, Univ. Politecnica de Cataluña, Telefonica; **GR(1):** Cognitive Innovations; **HU(1):** Nokia; **IT(3):** Consiglio Nazionale delle Ricerche, Nextworks, Politecnico Di Torino; **RO(1):** SIMAVI; **UK(1):** InterDigital

- **Key use cases:** Smart manufacturing, Multi-domain deterministic communications, Critical communications

- **Validation in test sites**: Madrid Open Lab (5TONIC) and Nokia Budapest Open Lab (Budapest)

2. Technical Information

Key Objectives:

Design, create and validate **E2E 6G** solutions providing **deterministic services over multiple** inter-connected **domains** and **technologies** (incl. wired and wireless)

- Integration, abstraction and **programmable exposure of multiple U-plane mechanisms** (with different levels of intrinsic deterministic capabilities)

- **AI/DT based C/M-plane** mechanisms (autonomous orchestration and assurance of e2e deterministic services)

Key techn. used/investigated:

3GPP TSC Rel19, Wi-Fi 7/8, IEEE 802.1 TSN, IETF DetNet/RAW, AI, Digital Twin
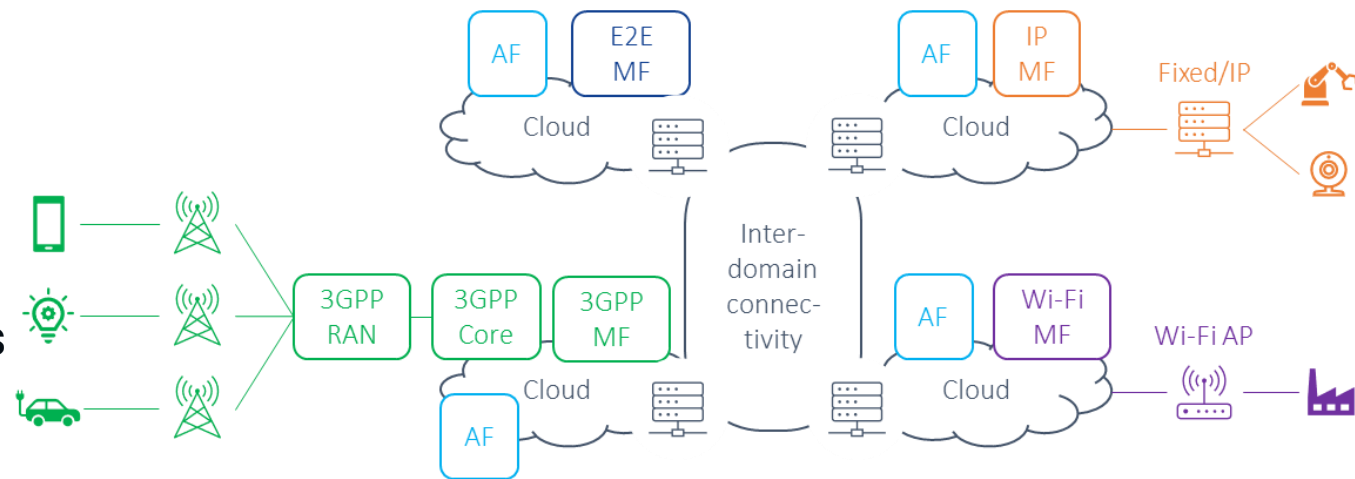
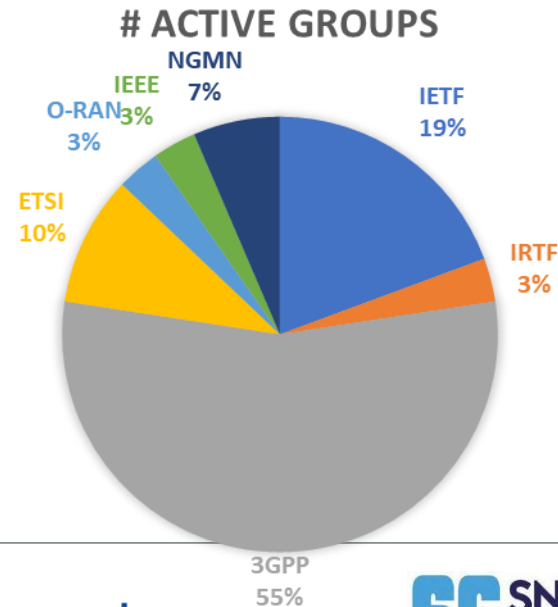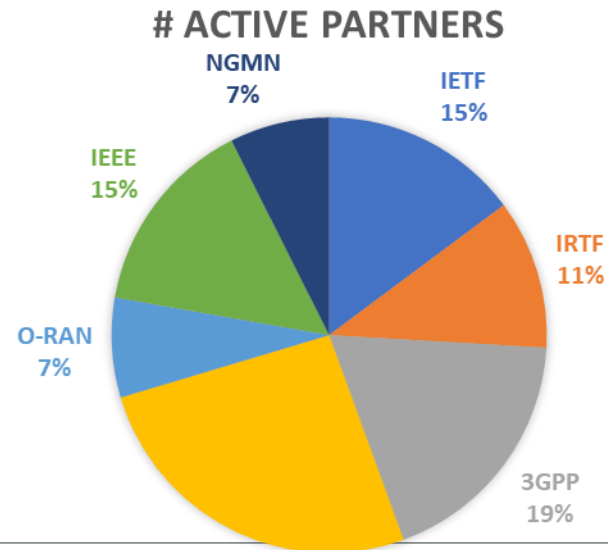MF – Management Function (e.g., network/domain controller)

☐☐☐ – Systems/Domains with different deterministic networking capabilities

AF – AI/Application Function (e.g., data analyzer, robot controller, X-as-a-Service)

3. Planned Standardization Activities (1/2)

Main tasks

- Formation and operation of a Standardization Advisory Committee

- Creation of a Standardization Roadmap based on continuous monitoring on SDO activities relevant to PREDICT-6G focus

- Impact SDOs with most relevant project findings

- Promote the project concept and solutions at standardization-related events

ACTIVE PARTNERS

NGMN 7%
IETF 15%
IEEE 15%
IRTF 11%
O-RAN 7%
3GPP 19%
ETSI 26%

ACTIVE GROUPS

NGMN 7%
IEEE 3%
O-RAN 3%
ETSI 10%
IETF 19%
IRTF 3%
3GPP 55%

SDO	Expected impact
3GPP	5G TSC (TS 23.501 architecture), 5G NPNs, 5G LAN-type services, and enhanced support for IIoT including further enhancements for integration with IEEE TSN systems. UC and requirement definitions to upcoming 3GPP releases, mainly in 3GPP R19/20 SA1 WG.
ETSI ZSM	Deterministic domain specific management architecture and AI based closed-loop automation for deterministic E2E networks and deterministic network domains.
ETSI ENI	Potential network automation PoCs with multi-technology domains incl. deterministic networks.
O-RAN	Enhancement of Near-RT/Non-RT RIC with TSN capabilities, reqs. for O1/E2 itf., xApps and rApps. Specification development for adaptation of Xhaul transport to deterministic behaviors.
IEEE 802.11	Contribution to the enhancement of IEEE 802.11be with deterministic capabilities, including the enhancement of the reliability through simultaneous replication of the frame in subchannels and mapping of TSpec to 3GPP QFI quality indicators.
IETF DetNet, RAW, TEAS	Extensions to current chartered items to support advanced deterministic services, contributions augmenting existing solutions on deterministic data paths over L2/L3 segments, where such paths provide bounds on latency, loss, and jitter, and high reliability for XR and similar applications.
IRTF NMRG	Elaboration of novel intent-based mechanisms for determinism, integration pathways with the AI/ML framework under definition. Extension of the DT concepts to support PREDICT-6G concept.