

DETERMINISTIC6G

Second Newsletter



Dear Reader,

This newsletter provides a periodic update on the activities and achievements of the DETERMINISTIC6G project during 2024. DETERMINISTIC6G is a SNS JU and Horizon Europe project that aims at developing architectures and algorithms for scalable and converged future network infrastructures to enable dependable end-to-end (E2E) time-critical communication across wired and 6G wireless domains. So far in 2024 (second year of the project), several milestones have been achieved. In this issue, you will find highlights on the following.

- Deliverables and milestones
- Dissemination activities
- Upcoming events

We hope you will find this newsletter informative and inspiring as we continue to embark on our journey towards the vision of the project.

For further information, we welcome you to visit our webpage www.deterministic6g.eu

Follow us on [LinkedIn](#), [X](#), and [YouTube](#) for the latest updates.

Face2Face meeting @ KTH



Face2Face meeting @ Ericsson



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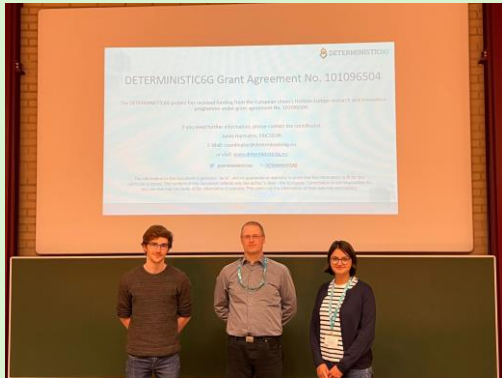
Technical highlights

The DETERMINISTIC6G architectural enhancements towards E2E communication correspond to the following

- Description of future time-critical applications operating in an end-to-end domain and their requirements in terms of key performance indicators (KPI) and value creation in terms of key value indicators (KVI) [D1.1]
- Novel dependable service design concepts, including domain-specific service specification, and enhanced information exchange between the application and network domains [D1.2][D1.3]
- Mechanism for mitigating timing uncertainties in 6G (PDC) and latency prediction methods to characterize 6G network capabilities [D2.1][D4.1]
- Data collection framework capable of conducting in-depth latency measurements that can capture the impact of various 5G mechanisms that contribute to the total E2E packet delay [D4.2]
- Robust time synchronization including hot standby support and data monitoring at the transport layer for security by design framework [D2.2][D3.2]
- Solution for tight integration of the edge domain with deterministic network to provide seamless E2E dependable communication and solution to gain situational awareness through interactions of 6G and cyber-physical systems digital twins [D3.3]
- Traffic engineering methods for robust and optimized network configuration, taking the stochastic characteristics of 6G wireless system into consideration to ensure E2E dependable services across various communication domains [D3.1] [D3.4]



Training day @ COST INTERACT



Participation @ TSN/A conference



Deliverables and milestones

DETERMINISTIC6G published several deliverables during 2024 to report the advancements towards architectural design of E2E dependable and time-critical communication. The deliverable [D4.2](#) is a latency measurement framework digest that offers an overview on the challenges of the existing measurement tools and outlines a methodology for accurate latency measurements in 5G/5G-advanced networks. An initial architectural description for E2E deterministic communication with 6G is furnished in deliverable [D1.2](#) that integrates robust time synchronization, packet-delay control to reduce large packet delay variations, supports data-driven latency prediction, integrates time-aware edge computing, and considers security-by-design principles for dependable time-critical services. The deliverable D3.3 is a report on the architectural and functional integration of edge computing capabilities with time-sensitive communication to ensure E2E time-aware communication. Moreover, initial concepts on obtaining situational awareness from 6G and operational digital twins to manage and configure 6G deterministic communication effectively are explored. Concepts and algorithms for optimizing and dynamically adapting end-to-end schedules with wired and wireless network elements to enable deterministic end-to-end guarantees in dynamic environments including mobility, dynamic packet delay, and dynamic stream sets are reported in deliverable [D3.4](#).

In March 2024, an intermediate project review meeting was scheduled. The project was highly positively assessed, and all submitted deliverables were accepted. As per the project plan, so far in 2024, further four project milestones have been reached. These milestones include intermediate project review, the first set of enablers for 6G convergence, first release of system architecture for E2E deterministic 6G communication, and the latency measurement framework.

Six face-to-face consortium meetings have taken place so far where the project partners brainstormed and exchanged valuable insights in shaping the outcomes of the project. The work carried out under the DETERMINISTIC6G project has significantly contributed towards standardizations and scientific outcomes with the aim to shape 6G architectural developments towards E2E dependable communication.

Dissemination activities

The deliverable [D5.2](#) reports on the communication, dissemination, and exploitation activities executed during the first 18 months of the project. The following is a summary of the activities conducted so far during the second year of the project.



Joint webinars

Episode 1: Architectural enhancements for 6G programmable and deterministic networks

Episode 2: Enhancements towards management of time-sensitive networks

6GPDN @ MobiCom 2024



- Five accepted publications (10 total). All [DETERMINISTIC6G publications](#) are accessible at the project webpage
- Thirteen contributions proposed for standardization in IETF, IEEE, and 3GPP (29 total). Contribution to [standardization](#) as an outcome of DETERMINISTIC6G activities are available at the project webpage
- Training day at COST INTERACT on “Wired and wireless time-sensitive networking for deterministic real-time systems: Concepts, technologies, and simulation tools”, videos available at DETERMINISTIC6G [YouTube](#) channel.
- Participation at the [TSNA conference](#) 2024 with four contributing presentations as developments from DETERMINISTIC6G
- 5G-ACIA white paper titled “[DetNet-Based Deterministic IP Communication Over a 5G Network for Industrial Applications](#)” led by Ericsson was published
- Two episodes of 6G programmable deterministic webinar series organized by DETERMINISTIC6G, PREDICT-6G, and DESIRE6G projects were conducted in June and October 2024. The videos of the webinar are available on the DETERMINISTIC6G [YouTube](#) channel.
- MobiCom 2024, [2nd workshop on 6G Programmable Deterministic Networking with AI \(6GPDN\)](#) jointly organized DETERMINISTIC6G, PREDICT-6G, and DESIRE6G projects was held on Nov. 18, 2024
- Contribution to SNS WG white paper on the topic of dependable communication with 6G
- [Research blogs](#): “Network Delay Emulator: Emulating the Characteristic 5G/6G Network Delay with Linux” and “TSN on the Edge: Software TSN Bridge for the Edge Cloud” provides insights on setting up emulations. The research blogs are available on DETERMINISTIC6G webpage
- Ten keynotes and talks at various conferences and workshops

Upcoming activities

DETERMINISTIC6G is creating impact through publications, tutorials, keynotes, and contribution to standards, highlighting the relevance of the project at international fora. The following are the upcoming activities that DETERMINISTIC6G is organizing or contributing to

- [6th workshop on Management for Industry 5.0 – MFI5.0](#) at IEEE/IFIP Network Operations and Management Symposium, 2025
- Participation at EuCNC 2025 with workshops and talks
- Several publications as outcomes of the research work from the project are under review and will be available on the project webpage soon
- Episode three of the 6G-programmable deterministic joint webinar series with PREDICT-6G and DESIRE6G projects is planned for May 2025

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