eNewsletter #2

Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks

December 2023

Co-funded by the European Union

6GSNS

ADROIT6G project has received funding from the Smart Networks and Services Joint Undertaking (SNS JU) under the European Union's Horizon Europe research and innovation programme under Grand Agreement No 101095363.

Welcome to the 2nd ADROIT6G's eNewsletter!

The ADROIT6G consortium would like to wish you all Happy New Year 2024, and wish all subscribers of the eNewsletter a happy, creative, and fruitful 2024!

The ADROIT6G partners are delighted for the release of our 2nd eNewsletter of the project, showcasing the major developments, milestones, as well as achievements of the ADROIT6G Project, during the last 6 months of 2023. Since the end of 2023 mark the successful compilation of the 1st year of the ADROIT6G project.

ADROIT6G (Distributed Artificial Intelligence-Driven Open & Programmable Architecture for 6G Networks) is a Smart Networks and Services Joint Undertaking (SNS JU) project supporting the European Commission's 6G policy by implementing the first phase of the 6G SNS roadmap towards the evolution of a 6G architecture. Briefly, ADROIT6G is an EU-funded project the world moves from the 5G towards the 6G era, 5G application types need to be redefined by morphing the classical service classes of URLLC, eMBB, and mMTC and introducing new services. ADROIT6G radical technological innovations, functionalities and performance will be validated through a set of representative extreme 6G use cases.

In particular, to evolve the existing service-based architectures of 5G mobile networks, and design, implement, and validate a fundamentally new approach for a future-proof, cognitive, next-generation 6G architecture by adopting a fully distributed AI-driven dynamic paradigm, with functional elements automatically deployed on-demand as virtual functions in cloud-native environments, across the far-edge, edge and cloud domains, operated by different stakeholders. This will ultimately lead to improved performance, a higher level of control, increased transparency in interactions with digital services, support of future-looking applications and social acceptance.

For more information about the project, please visit our website **adroit6g.eu**

ADROIT6G at IEEE GLOBECOM 2023

Dr. Christos Verikoukis, the ADROIT6G Project Coordinator, participated in the **IEEE Global Communications Conference (GLOBECOM) 2023**. **Dr. Verikoukis** had the honor of presenting a paper related to the ADROIT6G project in the workshop on 6G Innovations and Emerging Technologies. The research paper entitled "*ADROIT6G DAI-driven Open and Programmable Architecture for 6G Networks*" is open and available on the project's **website**.

The event is one of the IEEE Communications Society's flagship events dedicated to driving innovation in nearly every aspect of communications. For 2023 IEEE GLOBECOM hosted in Kuala Lumpur, Malaysia, from the 4th of December till the 8th, under the theme "**Intelligent Communications for Shared Prosperity**". The conference featured a comprehensive technical program, including 13 symposia, tutorials, and workshops, emphasizing advancements in technologies, systems, and infrastructure that continue to reshape the global telecommunications landscape.

All ADROIT6G's publications are openly accessible **here**!

ADROIT6G participated in the 1st SNS-JU Steering Board meeting

On September 5th, the first Steering Board (SB) meeting, comprised of the project coordinators from the initial 35 SNS-JU projects, took place in Athens, Greece.

The Coordinator of ADROIT6G project, Dr. Christos Verikoukis represented the project's consortium in the SB meeting, alongside the other SNS project´s coordinators.

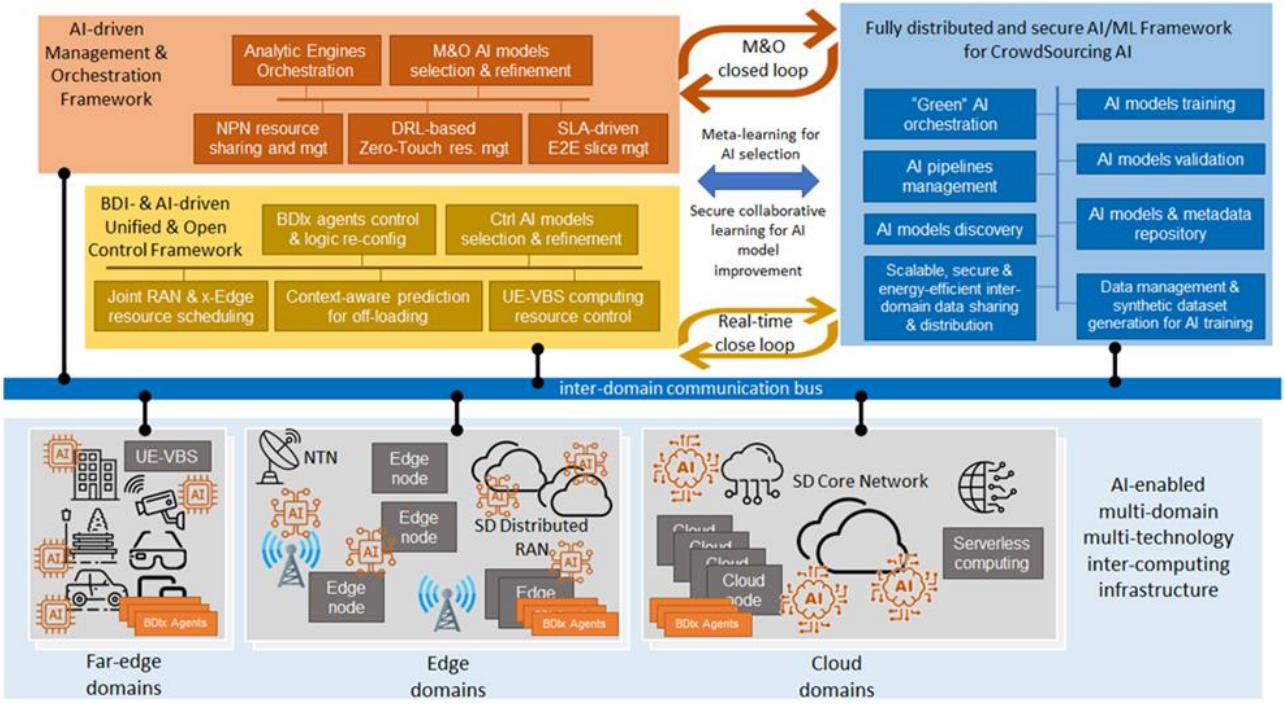
The initiation of the Steering Board meetings, established the foundations for future work and actions, while the responsibilities, as well as several propositions for the impactful contribution to the community, were discussed.

The coordination and agreement on shared actions and research directions among SNS-JU project coordinators are instrumental in achieving the EU objectives for advancing 6G networks. To this extent, the SB Meeting aims to coordinate all research efforts undertaken and sets the core guidelines.

For more information and updates about future activities stay tuned by subscribing our eNewsletter **here**!

ADROIT6G Conceptual Architecture

The public deliverable describing the initial requirements, use cases and system architecture of ADROIT6G has been released. The initial architecture evolves the existing Service-Based Architecture (SBA) and the Service-Based-Management Architecture (SBMA) of 5G networks by adopting a fully distributed and dynamic paradigm, with functional elements automatically deployed on-demand as virtual functions in cloud-native environments across far-edge, edge, and cloud domains operated by different stakeholders. As illustrated in the following figure, the ADROIT6G architecture consists of three cooperative inter-domain frameworks that operate over a programmable inter-computing and inter-network infrastructure. The distributed computing nodes at the far edge, edge, and cloud domains, each of them with their characteristics and capabilities, are used to deploy virtual functions of software-defined disaggregated RAN and core network, virtual applications, as well as AI agents, which are orchestrated dynamically as part of the overall network control and management strategies.



More information about the ADROIT6G's Architecture, can be found **here**.

ADROIT6G M6 Plenary meeting

The ADROI6G Consrtium held its first plenary meeting of the ADROIT6G project in Barcelona on July 11th. The meeting proved to be a resounding success as our dedicated project partners came together to engage in fruitful discussions and exchange invaluable insights. We discussed the progress made so far, as well as future actions and goals for the project, which focuses on 6G architecture.

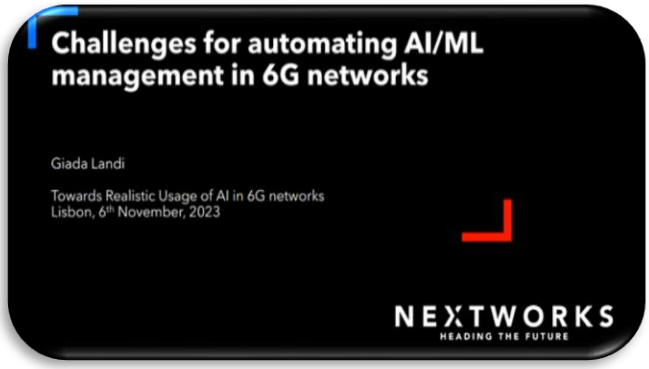
Stay tuned for our 2nd Plenary Meeting which will be held in Nicosia, Cyprus at the end of January 2024!

Project's News

ADROIT6G at IEEE GLOBECOM 2023
ADROIT6G presented during IEEE GLOBECOM 2023 in Malaysia, on December 4-8, 2023. Read more here.

ADROIT6G in Orange's Business Internet Security Report!
Orange's latest Business Internet Security report featuring our project, ADROIT6G. Read more **here**.

ADROIT6G Presented at SCEWC23
ADROIT6G participating in SCEWC23, in Barcelona, hosted by Iquadrat's booth from November 7-9, 2023. Read more **here**.



ADROIT6G at Networld Europe Workshop
Nextworks, ADRIT6G partner, participated in the 'Towards Realistic Usage of AI in 6G Networks' workshop. Read more **here**.

ADROIT6G participation in NET4us 2023
CNIT, ADRIT6G partner, presented in the 2nd Workshop on Networked Sensing Systems for a Sustainable Society (NET4us 2023). Read more **here**.

ADROIT6G participated in the 1st SNS-JU Steering Board meeting
Dr. Christos Verikoukis represented ADROIT6G project in the 1st SNS-JU Steering Board meeting. Read more **here**

Project's Scientific Publications

Please find below the latest papers submitted and accepted during the period January-December 2023, that acknowledge of ADROIT6G project. For the complete list of research papers, please visit our dedicated webpage **here**.

- Ch.Christophorou, I.Ioannou, V.Vassiliou, L.Christofi, J.Vardakas, E.E.Seder, C.Fabiana Chiasserini, M.Iordache, Ch.B.Issaid, I.Markopoulos, G.Franzese, T. Jarvet and Ch. Verikoukis, "ADROIT6G Distributed Artificial Intelligence-driven open and programmable architecture for 6G networks" in IEEE Globecom 2023 WSs. Forthcoming so stay tuned on our **webpage**.
- H.Xu, J.Wu, X.Liu and Ch.Verikoukis "Digital Twin and Meta RL Empowered Fast-Adaptation of Joint User Scheduling and Task Offloading for Mobile Industrial IoT" , in IEEE JSAC, Vol. 41, Issue 10, pp.3245-3266, October 2023, Available **here**.
- Tripathi, S., Puligheddu, C., Pramanik, S., Garcia-Saavedra, A., & Chiasserini, C. F. (2023). Fair and Scalable Orchestration of Network and Compute Resources for Virtual Edge Services. IEEE Transactions on Mobile Computing. Available **here**.
- Puligheddu, C., Ashdown, J., Chiasserini, C.F. and Restuccia, F., 2023, May. SEM-O-RAN: Semantic and flexible O-RAN slicing for NextG edge-assisted mobile systems. In IEEE INFOCOM 2023-IEEE Conference on Computer Communications (pp. 1-10). IEEE. Available **here**.
- Aziz, W.A., Ioannou, I., Lestas, M., Qureshi, H.K., Iqbal, A. and Vassiliou, V., 2023. Content-Aware Network Traffic Prediction Framework for Quality of Service-Aware Dynamic Network Resource Management. IEEE Access. Available **here**.

Project's Deliverables

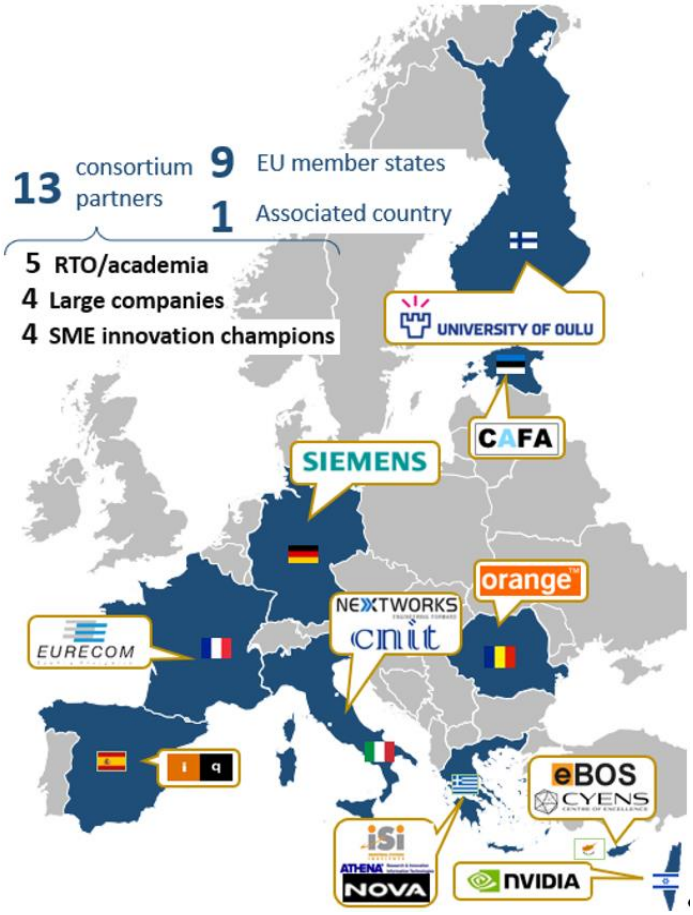
For the complete list of the published deliverables, please visit our dedicated webpage **here**.

Deliverable		Lead Partner
D6.1	**Project website and social media presence**	eBOS
D2.1	**Requirements, use cases and system architecture - Initial**	CAFA/ IQU

Meet ADROIT6G's Consortium

ADROIT6G is a Smart Networks and Services Joint Undertaking (SNS JU) project supporting the European Commission's 6G policy by implementing the first phase of the 6G SNS roadmap towards the evolution of a 6G architecture.

All 13 partners from 10 countries will join forces for 36 months, envisioning the built-up of the future architecture of mobile networks and services, the ADROIT6G project. The Consortium is composed by 13 partners: ISI/ATH (ATHINA Research Center) and NOVA from Greece, eBOS and CYENS from Cyprus, NETWORKS and CNIT from Italy, SIEMENS from Germany, EURECOM from France, IQUADRAT from Spain, OULUN YLIOPISTO from Finland, CAFA from Estonia, ORANGE from Romania and NVIDIA from Israel.



Meet Our ADROIT6G partners

ISI of ATHINA Research Center is a leading R&D institute of excellence conducting basic research and exploratory development on ICT for the EU industry. ISI focuses on edge technologies for industrial operations/enterprise environments, and prime concern towards innovation and the growth in competitiveness. The SMARTECH group joined ISI on December 2021 under the leadership of **Prof. Christos Verikoukis**, carrying out top-notch research in AI-aided solutions for Beyond 5G and 6G networks, owning also a well-established 5G and beyond experimentation platform. Its expertise includes: Network slicing, Network Automation, Zero-Touch, AI-Based Analytic and Decision Engines, Cell-free networking, Energy saving, Cloudification, softwarization and Statistical and time series data analysis. ISI currently coordinates four HE projects, two of them from the SNS-JU, and it participates in two more projects in the area of 6G networks.

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