



ACROSS

Automated zero-touch cross-layer provisioning
framework for 5G and beyond vertical services

Newsletter #6

September 2024

Pioneering the Future of 5G and Beyond

Discover the world of cloud computing and networking with ACROSS – *Newsletter Edition #6*

Welcome to the **Sixth Edition** of our Newsletter, featuring all the latest news from **ACROSS (Automated zero-touch cross-layer provisioning framework for 5G and beyond vertical services)**. This Research and Innovation Action, funded by the Horizon Europe framework Programme, designs and implements an end-to-end service deployment and management platform for next generation networks and services, aiming at unprecedented levels of automation, performance, scalability, and energy efficiency.





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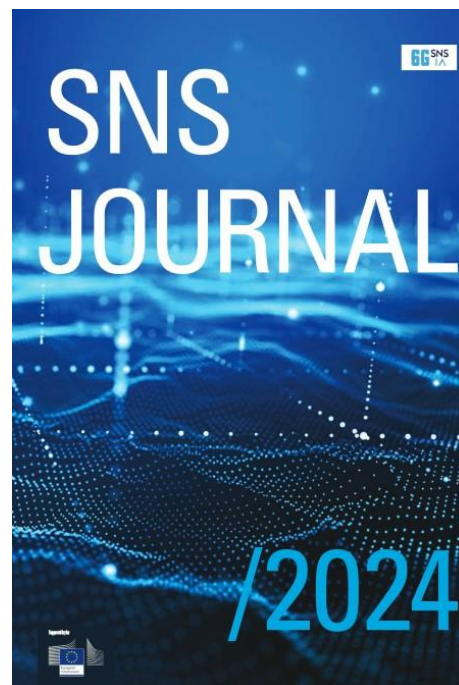
Press Releases

ACROSS Selected as Stream A Project in SNS

Journal 2024

The SNS Journal 2024, prepared by the SNS OPS project, has been released. This second issue aims to showcase the Call#2 projects launched in early 2024 and highlight the initial achievements of the Call#1 projects after their first year of operation. ACROSS, our leading research and innovation project, is being featured in the SNS Journal 2024 as one of the projects in Stream A (*Smart communication components, systems, and networks for 5G Evolution systems*), which trace an evolutionary path towards the development of 6G networks. Discover our concept, delve into our proposed system architecture, explore our test cases and find out project's first results on pages [24-25](#).

ACROSS proudly stands as one of the seven Stream A projects, committed to paving the way for the development of 6G networks. Within Stream A, ACROSS conducts research on energy-efficient radio networks, adaptive Open RAN, integrated 5G-Non-Terrestrial Networks (NTN), AI-based edge platforms, and intelligent resource management to ensure security, privacy, and trustworthiness.





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Video Clips

ACROSS Orchestrations demonstration “TC4.5”

ACROSS is poised to become a 6G-ready orchestration platform with unprecedented intelligence, automation, security, and trust capabilities compared to today’s state-of-the-art orchestration platforms. These capabilities are gradually developed and integrated around two main components of the ACROSS orchestration platform: (i) the Maestro end-to-end service orchestrator integrated with (ii) a distributed grid of ETSI OpenSlice domain orchestrator instances to cover geo-distributed deployments across multi-tenant network domains.

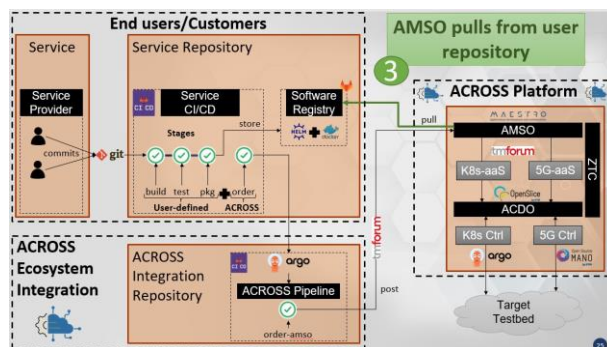
Use Case on “Zero-Touch End-to-End Service Provisioning”

Going from source code to deployed service instances (from zero-to-hero) in a *fully-automated* manner is a feature that modern service providers would love to be offered by an orchestration platform. Doing so for 5G-enabled services is even more desirable, as it also abstracts the complexity of the underlying network, leaving service providers to worry only about their code.

ACROSS materializes this important feature through a promising use case on “Zero-Touch End-to-End Service Provisioning”

(<https://www.youtube.com/watch?v=0Bw62zdl2dE>), which entails the following *zero-touch* operations upon an automated end-user service order request:

- Zero-Touch Compute Cluster Provisioning to host the end-user’s service
- Zero-Touch End-to-end 5G Provisioning to provision a 5G slice for the end-user’s service and interconnect it with 5G user equipment
- Zero-Touch Compute Cluster Telemetry and Visualization to observe the health of the cluster that hosts the end-user’s service
- Zero-Touch 5G System Telemetry and Visualization to monitor the state of the 5G slice associated with the end-user’s service
- Zero-Touch End-user Service Instantiation atop compute and 5G slices, and
- Zero-Touch End-user Service Telemetry and Visualization to observe key runtime metrics of the deployed end-user’s service instance





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Video Clips

ACROSS Orchestrations demonstration “TC1. 1a”

Use Case on “Northbound-driven ZT Secure Compute Onboarding”

The dynamic extensibility of network resources is a well-sought feature in contemporary orchestration platforms. The infrastructure should be able not only to scale within the original provider’s premises, but also incorporate private resources and/or combinations of both. Naturally, this can alleviate even the demanding endeavour to support hardware-specific deployments with a more seamless manner. ACROSS address this issue holistically by enabling the extension of in-premises resources (Kubernetes-as-a-Service), but most importantly it qualifies the external stakeholder with the capability to provide and incorporate its own compute node(s) within the platform’s infrastructure, which is captured through a compressive use case on “Northbound-driven ZT Secure Compute Onboarding”

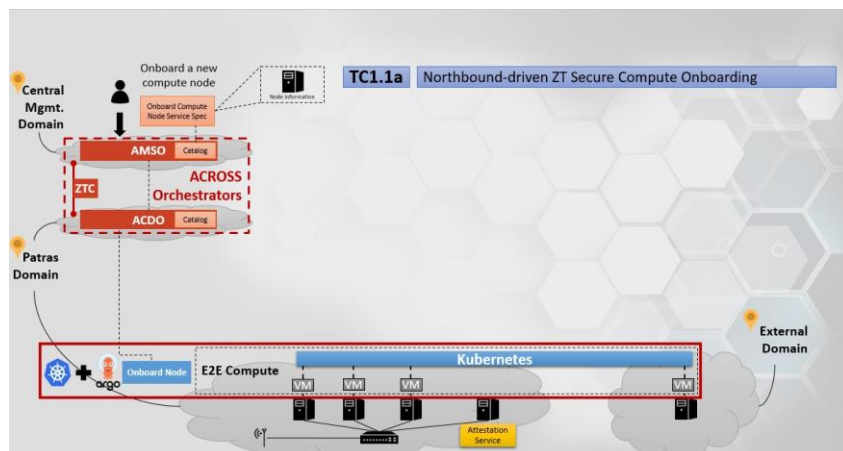
(<https://youtu.be/EAwVz2ote2I>).

Specifically, the respective stakeholder is able to:

- Select the “Join an external node” platform service from the ACROSS catalog
- Provide the node’s information
- Overview the overall zero-touch onboarding, as it is fulfilled

These fully-automated use cases were demonstrated during the ACROSS intermediate review on September 17, 2024 (half-way to the end of the project), leaving a great promise for the remaining part of the project where the intelligence, automation, security, and trust capabilities of the ACROSS orchestration platform are expected to thrive further, while contributing to open and standardized community projects.

Credits to the partners who participated in these demonstrations: [UBITECH](#), [UoP](#), [pNET](#), [NOVA](#), [NEC](#)





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Conferences

IEEE Network Operations and Management

Symposium (NOMS)

(Seoul, South Korea, 6-10 May 2024)

Our project partners from TID and UPM presented two research paper in the 2024 edition of the IEEE Network Operations and Management Symposium (NOMS), which is ranked in the B class in the CORE ranking.

1. The first one titled *“Framework for the Development of a Network Digital Twin”*. The publication (DOI: 10.1109/NOMS59830.2024.10575882) is available online, and you may access it by following this link: <https://ieeexplore.ieee.org/document/10575882/>
2. The second paper titled *“Design of an AI-driven Network Digital Twin for advanced 5G-6G network management”*. The publication (DOI: 10.1109/NOMS59830.2024.10575106) is available online, and you may access it by following this link: <https://ieeexplore.ieee.org/document/10575106/>

IEEE/IFIP NETWORK OPERATIONS AND MANAGEMENT SYMPOSIUM

6–10 May 2024
Seoul, South Korea

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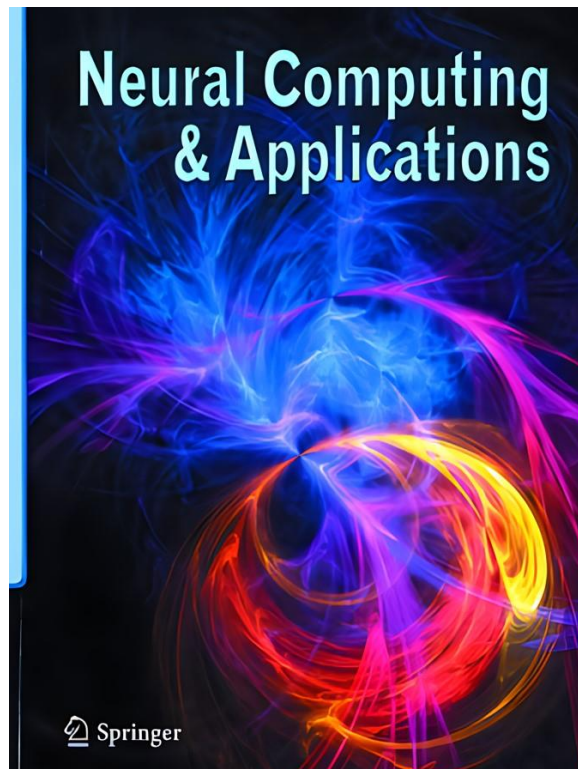
Publications

Neural Computing and Applications Journal

(Volume 36, Issue 17, June 2024)

Our project partners from UPM and TID have successfully submitted a paper titled "*A Methodological Framework for Optimizing the Energy Consumption of Deep Neural Networks: A Case Study of a Cyber Threat Detector*". This paper has been accepted for publication in the prestigious, peer-reviewed journal Neural Computing and Applications, published by Springer. The journal is indexed in the Journal Citation Reports and was ranked in the Q2 category under Computer Science, Artificial Intelligence with a Journal Impact Factor of 6.0 (2022) at the time of publication.

The publication (DOI: 10.1007/s00521-024-09588-z) is available online, and you may access it by following this link: <https://doi.org/10.1007/s00521-024-09588-z>



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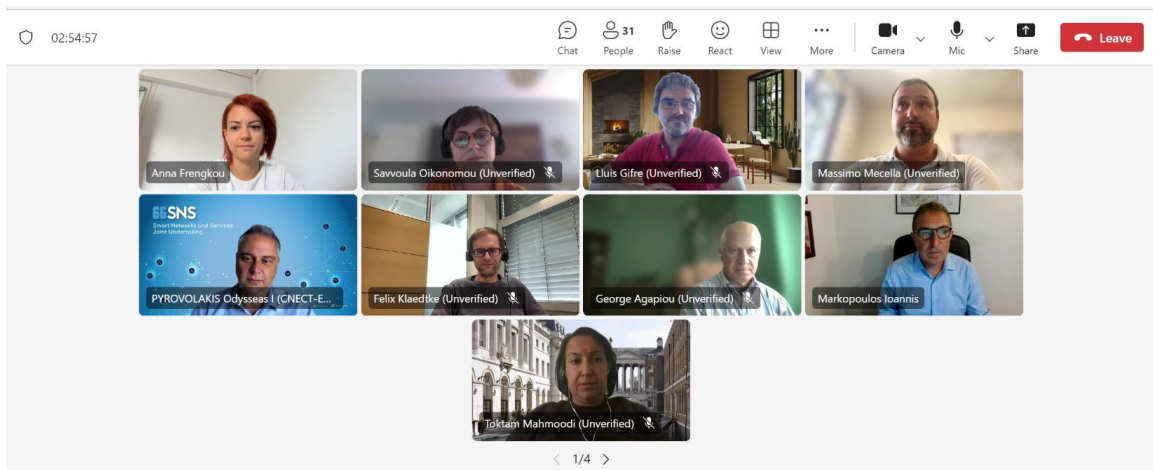
Meetings

1st Review Meeting

(17 September 2024)

ACROSS project took a significant step forward with a review meeting of experts and project partners, held on September 17th. The meeting provided a platform for comprehensive discussions and an evaluation of our progress during the first 18 months.

Our WP leaders presented their innovative solution and methodologies, highlighting a strong dedication to advancing knowledge in this pioneering field. The panel of reviewers provided valuable insights and guidance that will help shape our next steps.





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