ACROSS

ACROSS is a HORIZON-JU-SNS-2022 funded research project that 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.

Scan here!

TC4: Holistic zero-touch orchestration

Summary of the TC4 Approach

TC4 demonstrates how ACROSS automatically expands to new domains—such as telecom sites or enterprise networks—without manual setup. TC4's holistic approach makes it easier for operators to grow their networks, connect distributed infrastructures, and enable agile, cross-domain service delivery at scale. Through a secure, zero-trust connectivity fabric, TC4 chains multiple automation processes to simplify the onboarding of new infrastructures. From secure domain registration to orchestration agent deployment, everything happens through guided automation; SLA compliance is maintained via telemetry, smart Analytics, and automated service updates.

Key Innovations & Business Value

- TC4 pioneers end-to-end automation of platform expansion, allowing new infrastructure domains to onboard securely and seamlessly, while also enabling proactive management of SLAs in a fully automated manner.
- TC4 reduces manual overhead and risk while accelerating multi-domain growth, enhancing business agility and enabling operators to scale services efficiently, support new customers quickly, and extend coverage across diverse geographies.

Architecture & Core Technologies

TC4 spans three domains: a central orchestrator domain in Athens, an edge domain in Patras, and an offline training domain of the AI/Analytics models in Madrid. Upon a request from a stakeholder in the Athens domain, the ACROSS platform expands automatically to the Patras domain, deploying a domain orchestrator, compute, and 5G services. This domain also hosts telemetry, analytics, and automation tools to enable closed-loop SLA assurance. This federated setup supports dynamic, zero-touch service expansion and proactive performance management.

Key Innovations

- East-west expansion of the ACROSS platform into a new edge domain in the city of Patras with minimum manual effort (One-Touch).
- Zero-Touch east-west expansion of compute and network services to accommodate 5G-ready end user applications.
- Zero-Touch onboarding and provisioning of 5G-ready end-user applications.
- Proactive Zero-Touch preservation of end user's SLA using a closed loop chain of Telemetry, Analytics, and Automation platform services.

Implementation & Validation

TC4 uses open platforms integrated via Maestro (AMSO), OpenSlice (ACDO), and OpenZiti for secure expansion. OSM handles 5G orchestration; TeraFlowSDN manages transport; Kubernetes governs compute resources. Security services integrate with ETSI TFS; telemetry is collected via Prometheus. AI and automation tools enable SLA forecasting and automated updates that proactively perform service updates via the ACROSS orchestrators' APIs.

Important KPIs for TC4 include:

- TC4 achieved high automation levels, reaching up to 100% in fully automated scenarios, while partial automation was intentionally demonstrated in selected cases to ensure security, trust, and controlled operation.
- SLA violation forecasting achieved 84% prediction accuracy against a target of >80%, based on evaluation over a 2-minute monitoring window in TC4.6.
- Fast expansion of service orchestration to new domains with processing new domain and setting up secure connection in ~20 seconds and instantiating a new orchestrator instance in ~75 seconds, greatly exceeding targets of 30 seconds and 10 minutes respectively.
- Rapid service onboarding on the multi-domain service orchestrator in ~200ms, against a target of <=3 seconds.

Overview of the ACROSS Test Case 4
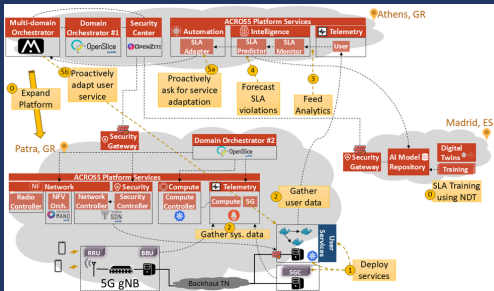
Expected Impact & Market Potential

TC4 addresses a key market need: secure, scalable, and automated onboarding of distributed network domains. As telecom providers, hyperscalers, and enterprises deploy increasingly complex hybrid infrastructures, TC4's automation framework reduces friction in onboarding and expands service reach.

TC4 holds particular value for operators aiming to build scalable 5G networks, private campus solutions, or cross-border digital infrastructure. TC4's standards-aligned, open architecture supports vendor neutrality and collaboration with open-source ecosystems—positioning the ACROSS platform as a powerful enabler of future telecom models where services are dynamically deployed and scaled across trusted, interconnected domains.

Technical Benefits

TC4 automates every layer of domain integration—from secure onboarding using a Zero-Trust Connectivity Fabric to deploying new orchestration and infrastructure services. It enables seamless communication between domains and intelligent delegation of orchestration tasks across them. This architecture supports scalable, federated orchestration across edge, cloud, and core environments. TC4 also leverages standardized APIs and open-source components, ensuring interoperability and simplifying cross-domain lifecycle management.

Business & Industry Value

TC4 transforms how telecom operators and infrastructure providers scale their services. Eliminating the complexity of onboarding new domains, it speeds up expansion and reduces operational costs. It provides a strategic advantage in multi-vendor, multi-cloud environments, enabling faster service delivery, improved customer reach, and streamlined cross-domain collaboration. Its open, standards-based foundation fosters ecosystem innovation and aligns with industry shifts toward automation, decentralization, and platform-driven service delivery models.