



AI for NRENs and NRENs for AI, Are we surfing this wave?

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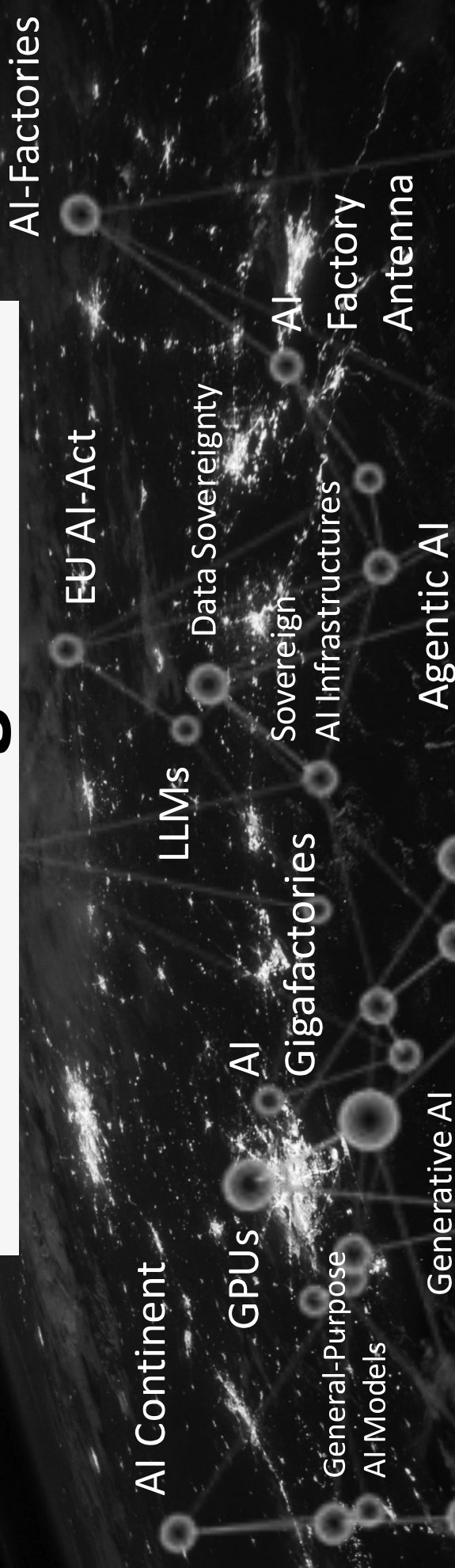


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What is AI for NRENs?

new opportunities and responsibilities.

AI is a strategic enabler



AI NREN activities mapped on the GN5-2 Project

- **Engagement on AI (NRENs, users and external stakeholders)**
 - SIG-AI and the GÉANT AI NREN Coordination Group
 - Many sessions and presentations on AI in different events: TNC, Security Days and Infoshare
 - CEO Track 2025 – “Impact of AI in NRENs”
- **AI Products and services (adoption and development)**
 - Several different applications presented on SIG meetings
 - Many AI projects on the incubators and innovation programme inside the project
- **Infrastructure for AI**
 - Several NRENs are offering AI Infrastructures
 - AI-enabled services on most of the cloud platforms available under the OCRE Cloud Framework
 - GÉANT EuroHPC Hyperconnectivity
- **White papers and reports including AI relevant topics**
 - GN5-2 Survey: Intelligent Networks: The Rise of Generative AI in Network Management
 - Orchestration, Automation and Virtualisation Terminology Version 3.0 including AI terms
- **AI Trainings**
 - AI track in the Network eAcademy
 - Secure Coding Training focusing on AI



Engagement on AI

NRENs, users and external engagement

AI for NRENs: Collaborative AI Exploration

Special Interest Group on AI SIG-AI for NRENs

- **146 participants, 39 countries**
- Exploring the potential applications of AI within the context of NRENs
 - Knowledge Exchange
 - Use Case development
 - Global community Hub (NRENs, vendors, universities, researchers,...)

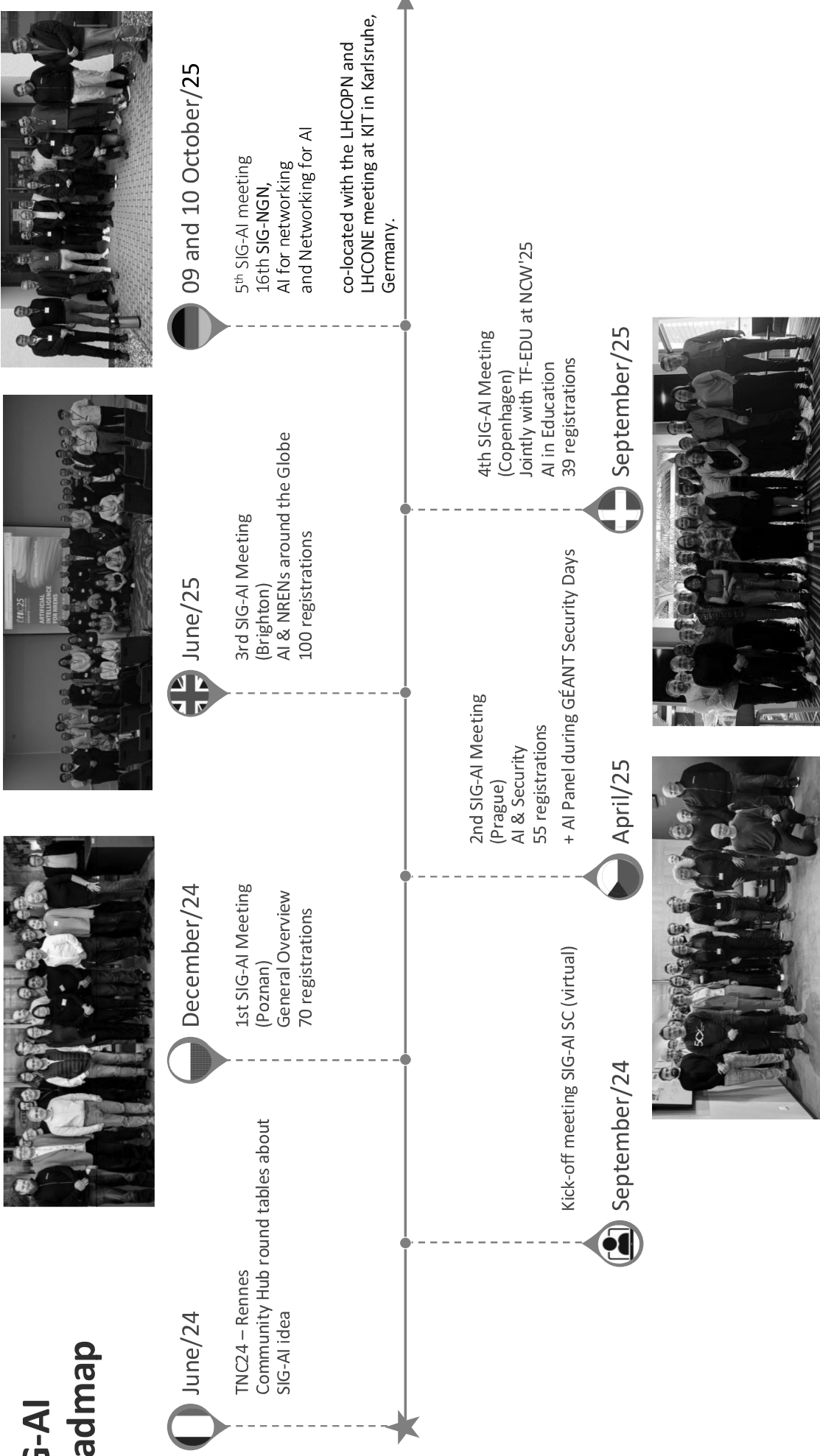


EU-NRENs for AI: Collaborative AI Support

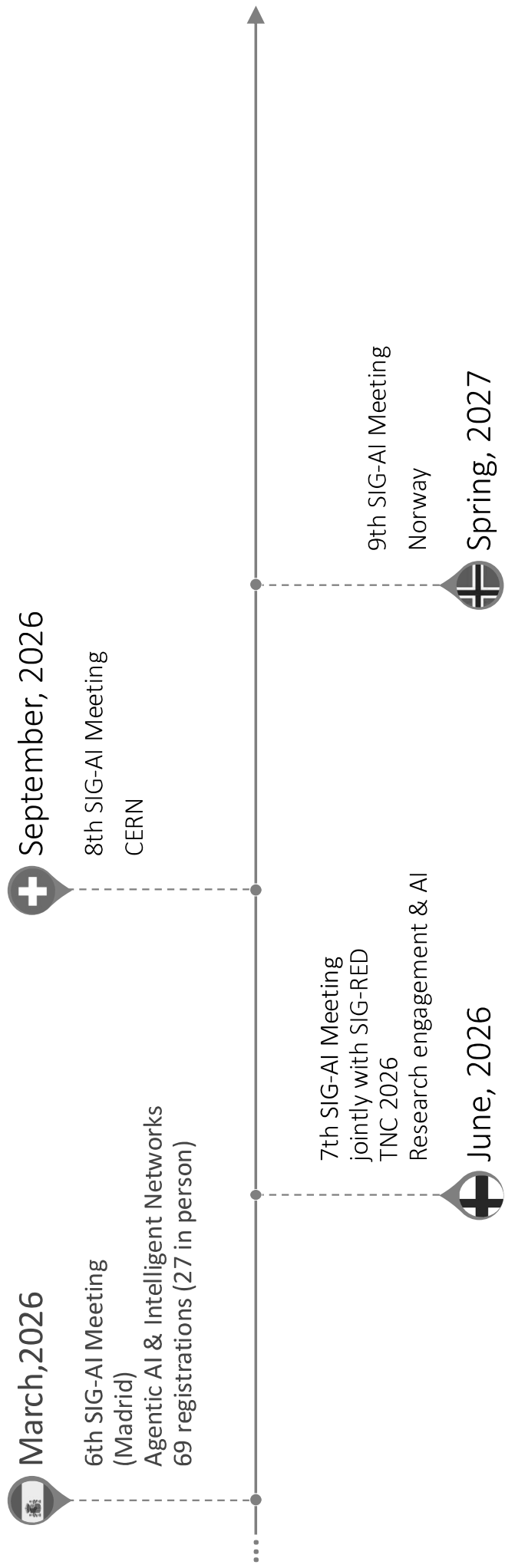
AI NREN Coordination Group

- **43 participants, 20 European countries**
- To support the European NREN community in sharing opportunities and best practices in AI
 - Safe, trusted space for open discussions and collaboration
 - Accelerate innovation and align efforts
 - Strong collaboration with SIG-AI to discover and showcase European initiatives





SIG-AI Roadmap



GÉANT AI NREN Group Meetings

Date	Topic
24/10/2025	<p>1st Meeting - AI Factory get-together 1 - https://events.geant.org/event/1970/ 61 registered</p> <ul style="list-style-type: none"> • Annabel Grant – Opening (5 min) • Daniela Brauner – GÉANT AI NRENs Group Motivation (10 min) • Jan Jona Javorsek and Lucija Ivanusa (ARNES) on the Slovenian AI factory (15 min) • Aleksii Kallo (CSC) on the LUMI AI factory (15 min) • Discussions and next meeting ideas (15 min)
14/11/2025	<p>2nd Meeting - AI Factory get-together 2 - https://events.geant.org/event/1971/ 70 registered</p> <ul style="list-style-type: none"> • Opening (10 min) • Raimundas and Marcin (PCSS) about AI factory in Poland (15 min) • Panos Laurindas (GRNET) about the AI factory in Greece (15 min) • Discussions and next meeting (20 min)
17/12/2025	<p>3rd Meeting - AI Antennas get together - https://events.geant.org/event/2007/ 51 registered</p> <ul style="list-style-type: none"> • Opening (5 min) • Chris De Loof (BELNET) - AIF Antenna in Belgium (15 min) • Anastas Mishiev (UKIM) – Vezlika, North Macedonia AIF Antenna (15 min) • Venkatesh Kannan (ICHEC) - AIF Antenna in Ireland (15 min) • Closing remarks (5min)
14/04/2026 - 14:00 CET	<p>4th Meeting – EuroHPC Connectivity and AI Factories – EU AI Timeline</p>



AI Products and Services

Some examples of innovation projects developed by NRENS

Cybersecurity/Network security:

- Unsupervised ML for PerfonAR data analysis – CARNET-GÉANT
- IP Blacklist creation using Neural Networks – CESNET
- Risk assessment using classification models – i2Cat
- DDoS Mitigation – CESNET, PCSS and RedIRIS
- Anomaly detection with Machine Learning – DDoS and DNS attacks – PCSS
- Detection of brute-force SSH attacks using Classification methods - CESNET
- Retrieval-Augmented Generation agent for Workflow Orchestration - SURF
- Domain classification (DGA) using Multi-Layer Perceptron (MLP) - ICCS-NTUA/GÉANT
- Vulnerabilities exploitation using a LLM judge (Giskard detectors) - PCSS

Network management/Monitoring & Systems Orchestration:

- Graph Neural Networks (GNNs) for Science Traffic Classification - University of Twente/GÉANT
- LLM for domain categorization – CESNET
- LogsLLM – Automated Log Analysis and Management based on LLMs – NTUA/GRNET/PCSS/CYNET
- AI ChatBot – PCSS and GÉANT
- Agentic AI Approach for Network Automation and Orchestration (UKIM)
- AI Agents for GARR Network Analysis and Troubleshooting (GARR)
- From Virtual Assistants to Smart Recommendations: Agentic AI (CARNET)
- LARA: Latent Representation for Adaptive Tasks (i2CAT)

AI in Education:

- LISA – Language learning Intelligence for Students and Academic organisations | ACOmarket (via ACOnet)
- eduGenAI from SURF (NL) + Npuls: supporting the use of genAI in education;
- Sikt KI – platform to create AI assistants based on LLMs developed by SIKT (NO);
- FCCN - IAedu.pt - supporting the use of GenAI in education based on open LLMs (PT)

AI Improvements:

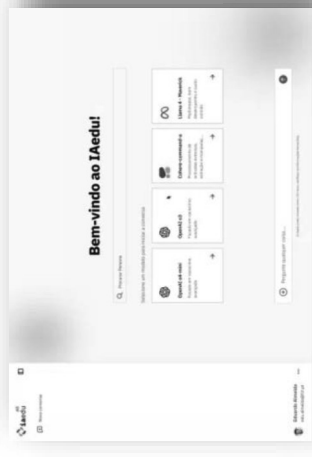
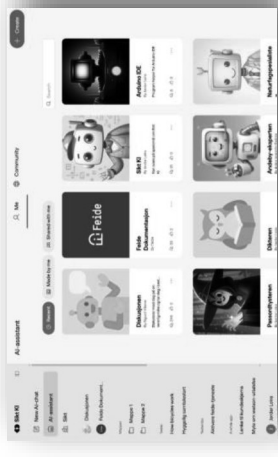
- Active Learning Framework to re-train models (data drifts) - CESNET
- Federated learning for DNS Security and AI Explainability – ICCS-NTUA/GÉANT
- AI Security – auditing LLM, detecting malicious executable code in ML – PCSS

AI Products, Services and Infrastructure



Examples of National Generative AI Chat Platforms developed and offered by NRENS

- SIKT - Norway - SIKT AI Chat
 - Secure GPT-based AI chat for research and education
 - Assistance and automate routine tasks preserving privacy and data security
 - <https://sikt.no/en/tjenester/sikt-ai-chat>
- SURF - Netherlands – eduGenAI - npuls
 - Safe and responsible generative AI platform for Dutch educational institutions
 - Commercial and open-source LLMs
 - <https://npuls.nl/en/edugenai>
- FCCN – Portugal – iaedu.pt
 - AI chat for education based on open LLM models
 - <https://iaedu.pt>



Some initiatives we saw in this meeting....

- **Agentic AI & Autonomous Operations** – multi-agent orchestration and AIOps for network automation and troubleshooting
 - GARR, UKIM-GEANT WP6
- **LLM + RAG Knowledge Systems** – institutional chatbots and knowledge retrieval from internal documentation
 - PCSS, RENATER
- **AI/ML Network Analytics** – traffic classification and security monitoring in encrypted environments
 - CESNET
- **AI Platforms & Infrastructure** – great examples of integration of ML services and local LLM infrastructure in NREN software stacks
 - GÉANT, GARR, RENATER, i2CAT
- **AI Skills & Capacity Building** – structured AI training and community capability development
 - GÉANT eAcademy AI track, LEARN initiatives (Sri Lanka)



AI Infrastructure

Cloud consumption is growing through OCRE

And we already have AI-enabled services on most of the cloud platforms available

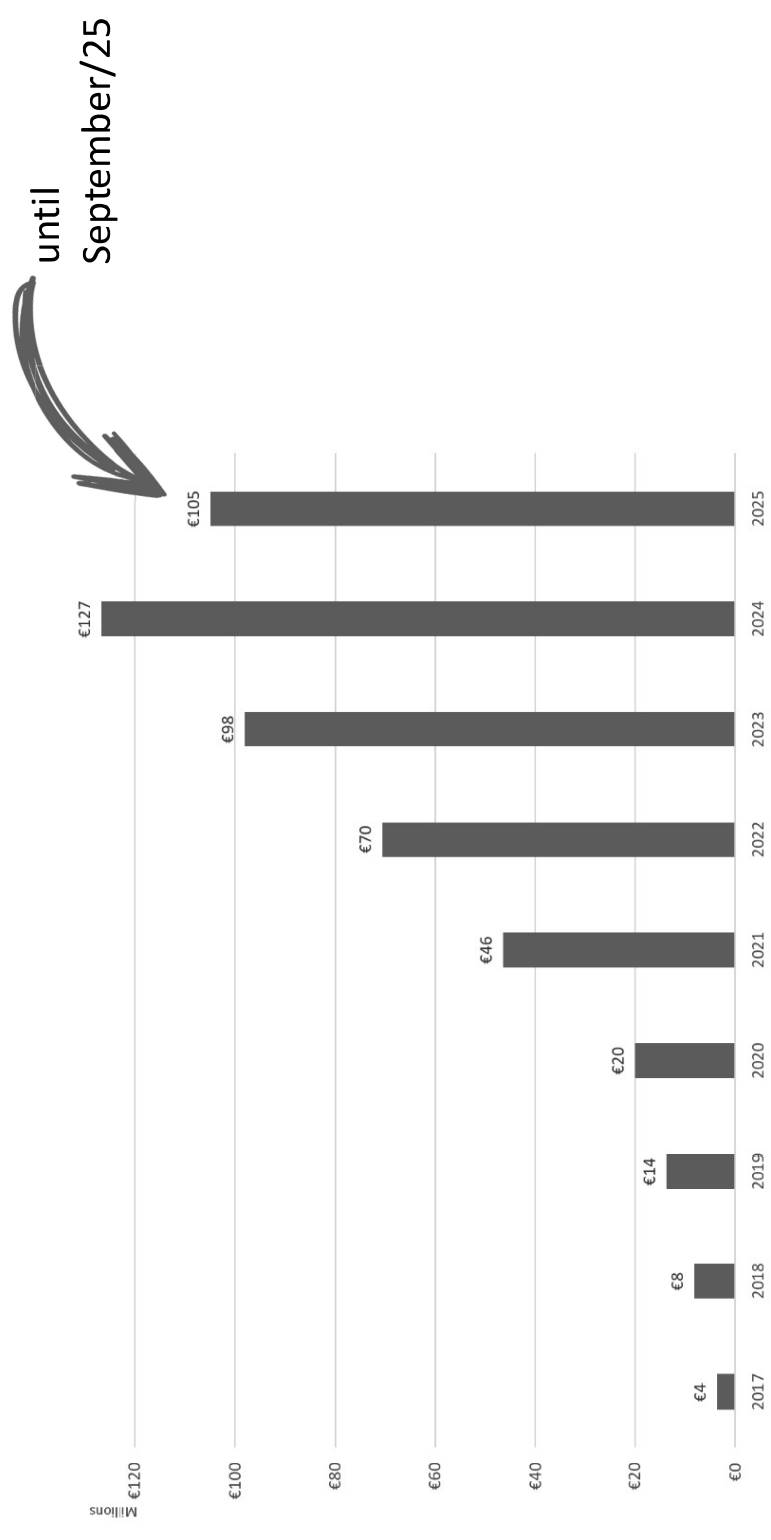


Figure 2.8: Annual cloud service consumption through the OCRE Frameworks (current and previous). The 2025 value of €105M covers January–September 2025 (Q1-Q3 2025) due to quarterly data collection cycles

OCRE 2024 Framework is being used in 29 countries.



46.5% of the GÉANT member NRENs (20) owns or are planning to own AI infrastructure

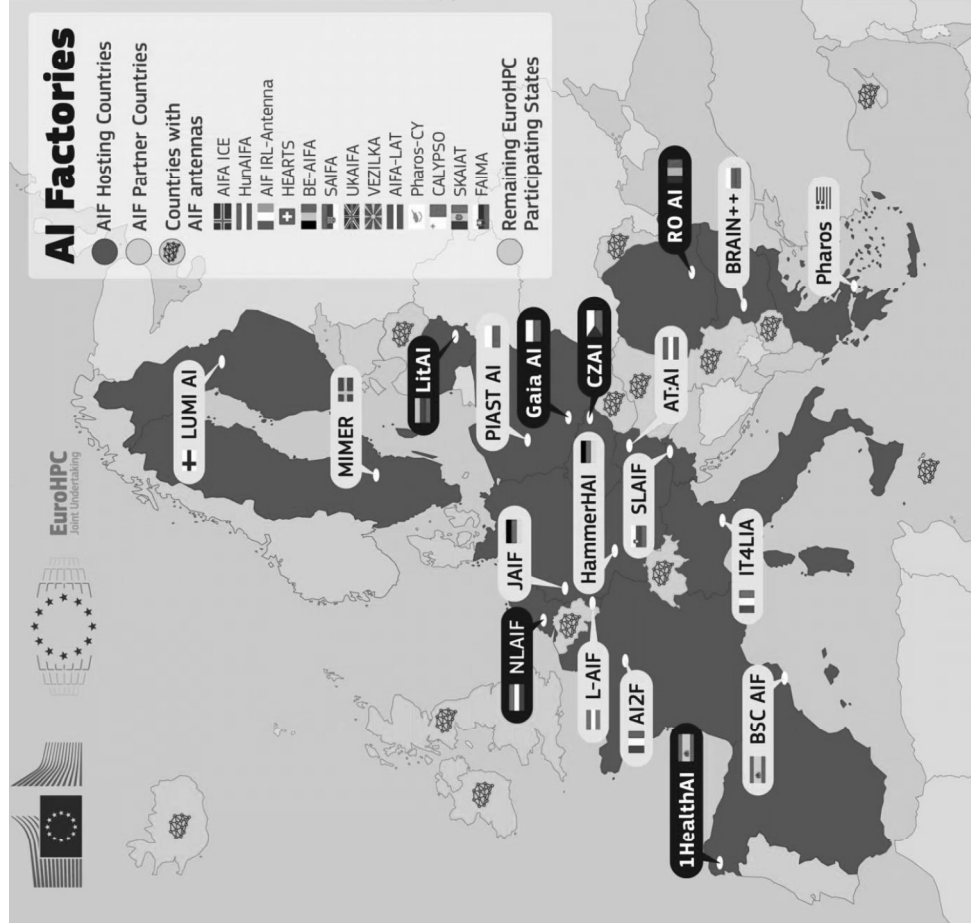


LUMI AI Factory (CSC - Finland)

By AI infrastructure:
HPC AI-ready systems, GPU clusters
and AI Factories.

Examples:
LUMI AI (CSC, DeiC),
Deucalion (FCCN),
Deadalus-Pharos (GRNET),
NLAIF (SURF),
PIAST AI (PCSS), SLAIF (ARNES),
TRUBA (ULAKBIM).

AI Factories and Antennas - with NREN participation in the consortia



19 AI Factories	13 AI Antennas
Austria – AT:AI	Belgium – BE-AIFA
Bulgaria – Brain++	Cyprus – Pharos CY
Czechia – CZAI	Hungary - HunAIFA
Finland – Lumi AI - CSC, DeIC	Iceland – AIFA ICE
France – AI2F	Ireland – AIF-IRE-Antenna
Germany – HammerHAI	Lativa – AIFA-LAT
Germany – JAIF	Malta – Calypso
Greece - Pharos - GRNET	Moldova - FAIMA
Italy – IT4IA	North Macedonia – VEZILKA
Lithuania – LitAI	Serbia - SAIFA
Luxembourg – LAIF	Slovakia - SKAIAT
Netherlands – NLAIF - SURF	Switzerland – HEARTS
Poland – Gaia AI	United Kingdom – UKAIFA
Poland – PIAST AI - PCSS	
Romania – RO AI	
Slovenia - SLAIF - ARNES	
Spain – BSC AIF	
Spain - HealthAI	
Sweden – Mimer AI	

<https://bit.ly/ai-factories-geant>



EuroHPC JU

The EuroHPC Joint Undertaking (JU) was created to enable the EU to coordinate their efforts and pool their resources to make **Europe a world leader in supercomputing**. And the implementation of **AI factories** across Europe and deploying a **European Quantum Computing infrastructure**.

The role of GÉANT (and NRENs) on EuroHPC

GÉANT will provide ultra-high bandwidth, secure, pan-European, interconnect services for the EuroHPC supercomputing infrastructure (expanding existing network).

- Contract value: **€60 million**. Duration: **48 months**.

Transmission speeds targeted in the terabits-per-second range.

Trusted & Secure architecture for sensitive, cross-border data.

Federated connectivity connecting European, national and HPC centres.

Flexible ecosystem with adaptable services and future-proof technology.



Future vision

NRENs CEO Track TNC 25 - Impact of AI on NRENs *Attendees from 47 countries*



What is needed for NRENs to success on AI?
clear mandates, aligned funding, and collaborative frameworks, ensuring they can bridge the gap between global AI developments and local R&E community needs.

- AI is no longer optional
- NRENs are playing a supportive role
- Clear and growing ambition to evolve into integrators and enablers of responsible, sovereign, and sustainable AI until 2030
- To meet this ambition, NRENs must:
 - Invest in foundational infrastructure (GPUs, HPC, networks, storage),
 - Develop new human capacities (AI-savvy engineers, data scientists),
 - Forge strong partnerships across academia, government, and industry, and
 - Actively participate in shaping national data-sharing and AI governance frameworks.



Thank You
Any questions?

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