



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

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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



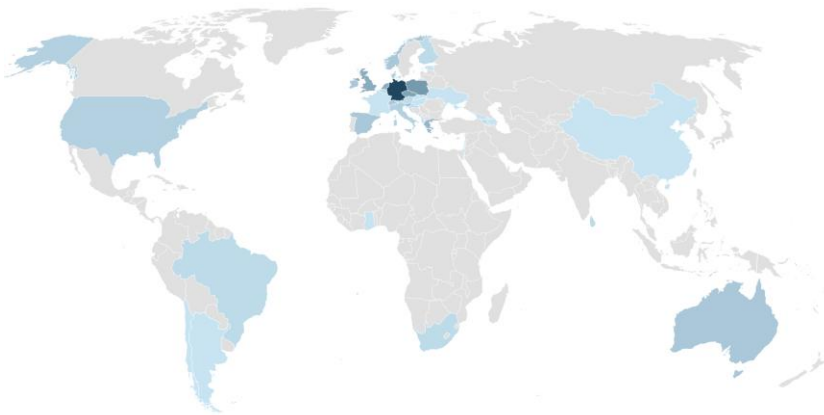
Engagement on AI

NRENs, users and external engagement

AI for NRENs: Collaborative AI Exploration

Special Interest Group on AI SIG-AI for NRENs

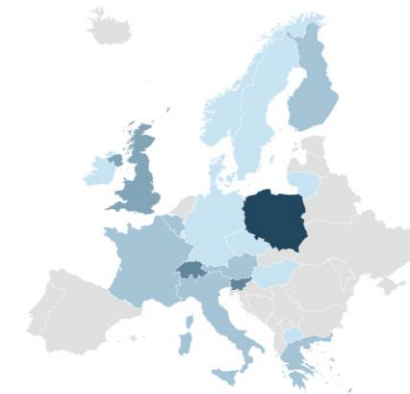
- 146 participants, 39 countries
- Exploring the potential applications of AI within the context of NRENs
 - Knowledge Exchange
 - Use Case development
 - Global community Hub (NRENs, vendors, universities, researchers,...)



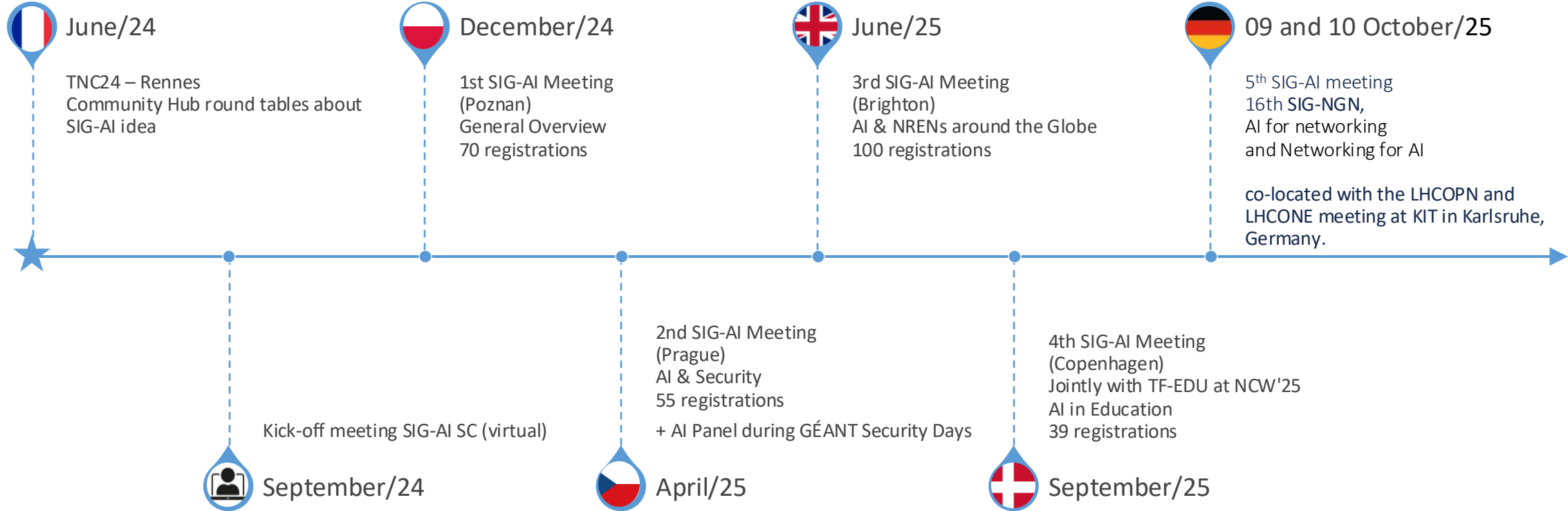
EU-NRENs for AI: Collaborative AI Support

AI NREN Coordination Group

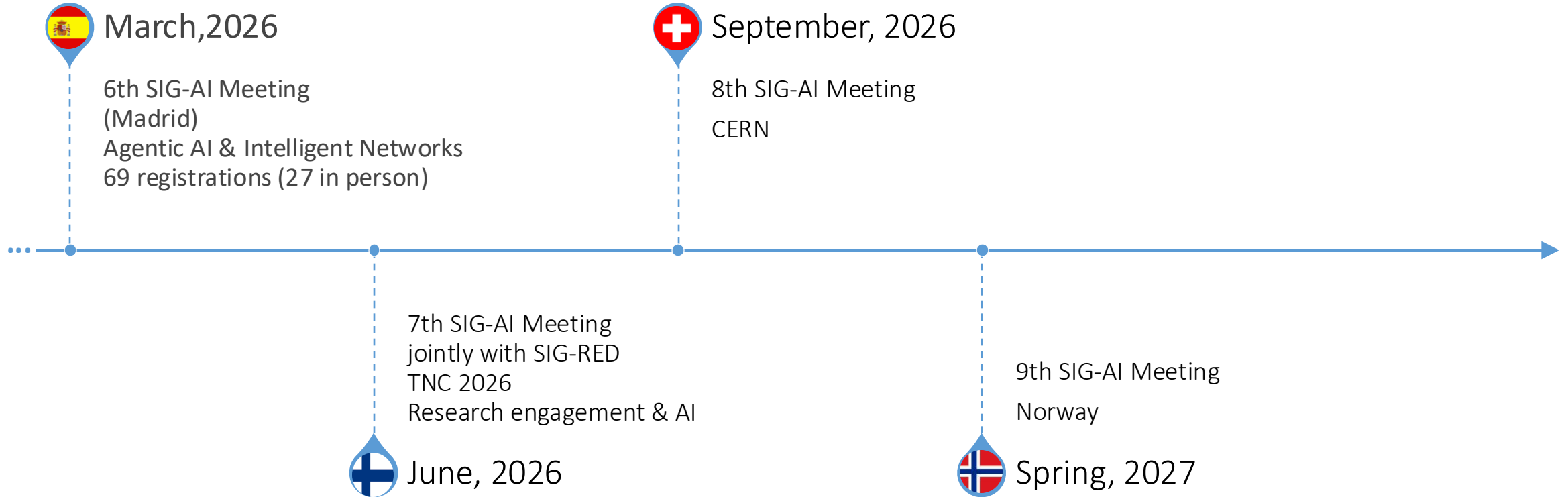
- 43 participants, 20 European countries
- To support the European NREN community in sharing opportunities and best practices in AI
 - Safe, trusted space for open discussions and collaboration
 - Accelerate innovation and align efforts
 - Strong collaboration with SIG-AI to discover and showcase European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



SIG-AI Roadmap



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)• Aleksi Kallio (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 Mishev (UKIM) – Vezilka, North Macedonia AIF Antenna (15 min)• Venkatesh Kannan (ICHEC) - AIF Antenna in Ireland (15 min)• Closing remarks (5min)
14/04/2026 - 14:00 CET	4th Meeting – EuroHPC Connectivity and AI Factories – EU AI Timeline



AI Products and Services

Some examples of innovation projects developed by NRENs

Cybersecurity/Network security:

- Unsupervised ML for PerfSONAR 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)

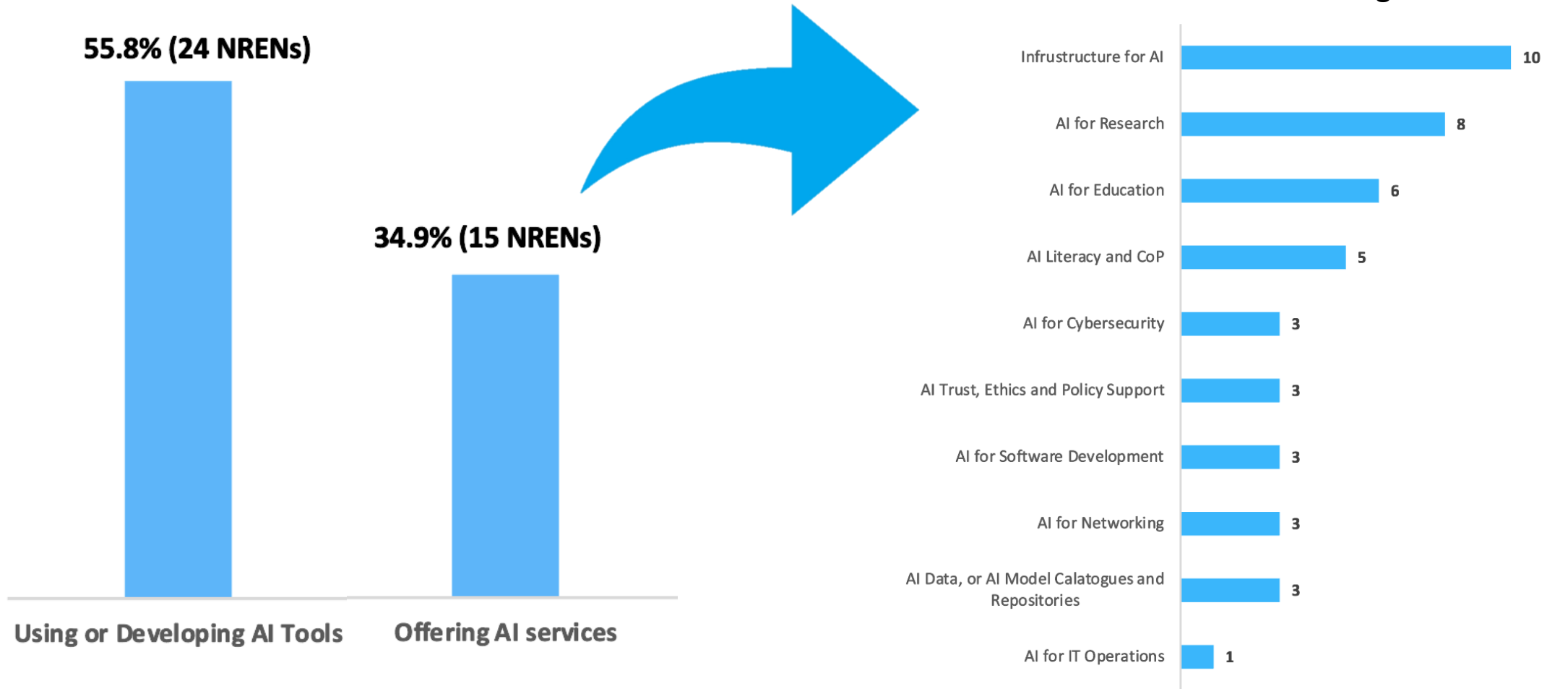
AI in Education:

- 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:

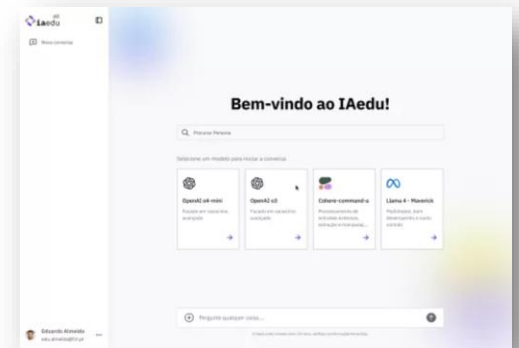
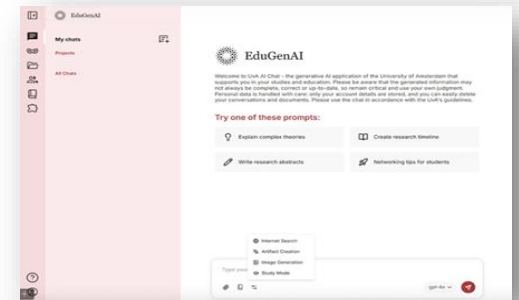
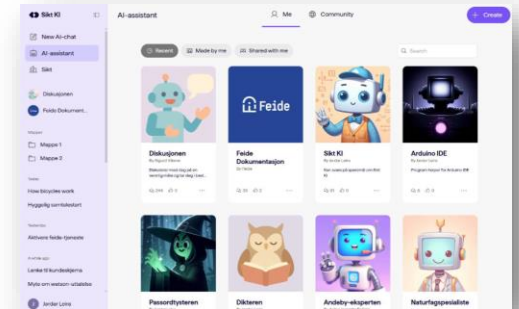
- Active Learning Framework to re-train models (data drifts) - CESNET
- Federated learning for DNS Security and AI Explainability – ICCS-NTUA/GÉANT
- AI Security – auditing LLM, detecting malicious executable code in ML – PCSS

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

OCRE 2024
Framework
is being
used in
29
countries.

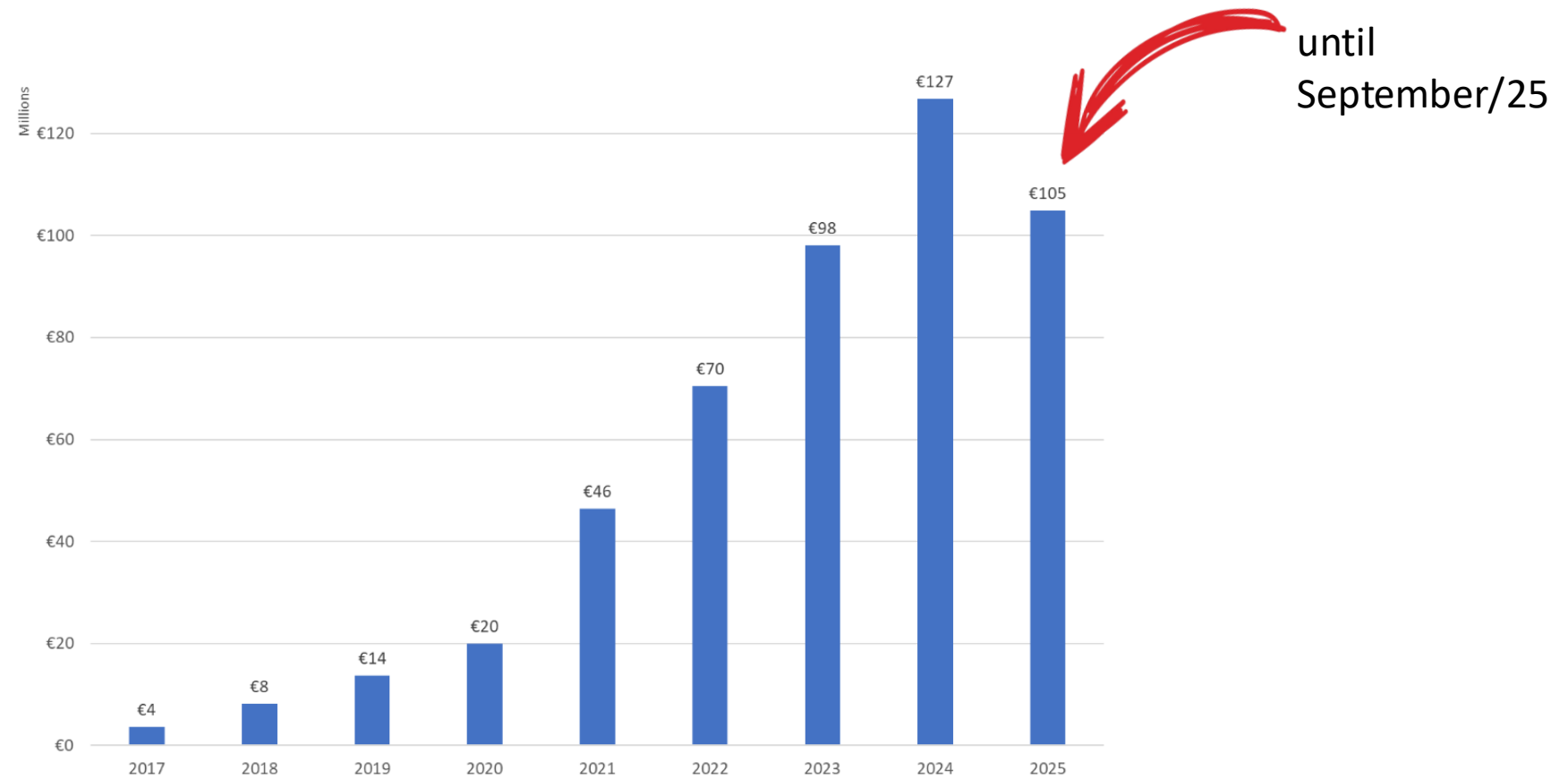


Figure 2.8: Annual cloud service consumption through the OCRE Frameworks (current and previous). The 2025 value of €105M covers January–September 2025 (Q1-Q3 2025) due to quarterly data collection cycles



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

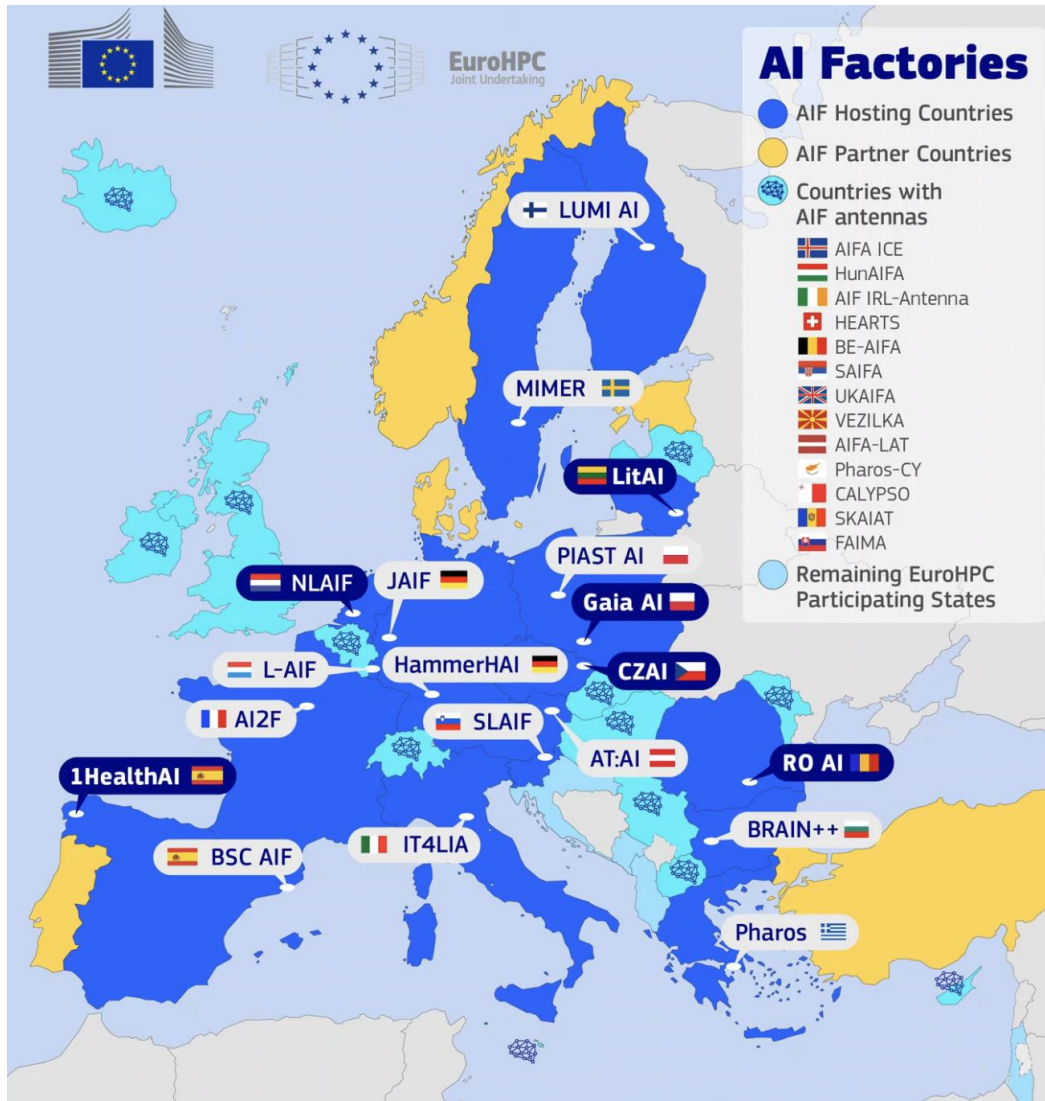


LUMI AI Factory (CSC - Finland)

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



EuroHPC
Joint Undertaking



EuroHPC JU AI Ecosystem

19 AI Factories

- Austria – AT:AI
- Bulgaria – Brain++
- Czechia - CZAI
- Finland – Lumi AI - CSC, DeIC
- France –AI2F
- Germany – HammerHAI
- Germany – JAIF
- Greece - Pharos - GRNET
- Italy – IT4IA
- Lithuania – LitAI
- Luxembourg – LAIF
- Netherlands – NLAIF - SURF
- Poland – Gaia AI
- Poland – PIAST AI - PCSS
- Romania – RO AI
- Slovenia - SLAIF - ARNES
- Spain – BSC AIF
- Spain - HealthAI
- Sweden – Mimer AI

13 AI Antennas

- Belgium – BE-AIFA
- Cyprus – Pharos CY
- Hungary - HunAIFA
- Iceland – AIFA ICE
- Ireland – AIF-IRE-Antenna
- Lativa – AIFA-LAT
- Malta – Calypso
- Moldova - FAIMA
- North Macedonia – VEZILKA
- Serbia - SAIFA
- Slovakia - SKAIAT
- Switzerland – HEARTS
- United Kingdom – UKAIFA

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



EuroHPC
Joint Undertaking

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 **EuropeanQuantum 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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