04-12-2024

Deliverable D4.5

WP4 Summary Report

Contractual Date:	30-11-2024
Actual Date:	04-12-2024
Grant Agreement No.:	101100680
Work Package:	WP4
Task Item:	Task 0
Nature of Deliverable:	R
Dissemination Level:	PU (Public)
Lead Partner:	DFN, Haridus- ja Teadusministeerium
Document ID:	GN5-1-24-d218a5
Authors:	Maria Ristkok (Haridus- ja Teadusministeerium); Jakob Tendel (DFN)

Abstract

This report summarises the progress and achievements of the GÉANT Above-the-Net Services Work Package (WP4) within GN5-1 at the end of M22 of the project (October 2024), focusing on key objectives, milestones, and strategic developments in cloud services for the research and education community. It highlights successes such as the OCRE 2024 Framework re-procurement, strategic planning of Above-the-Net services, the growth of community-driven services such as eduMEET, and the Service Incubator's role in fostering innovation. The report also addresses challenges faced and lessons learned and outlines the next steps for ensuring continued sustainability and impact as the project approaches its conclusion in December 2024.

Table of Contents

Table of Figures

Table of Tables

Executive Summary

This report summarises WP4's progress in the GN5-1 project over 22 months, outlining objectives, key achievements, strategic developments, and milestones in cloud frameworks, community services such as [eduMEET], and collaborative efforts, while addressing challenges and remaining tasks as GN5-1 draws to a close.

WP4's objectives include enhancing GÉANT's cloud capabilities through the GÉANT Cloud Framework (OCRE) 2024, unifying cloud service strategies, enabling National Research and Education (NREN) service delivery chains, ensuring eduMEET's sustainability, and fostering collaboration with Special Interest Groups (SIGs), the European Open Science Cloud (EOSC), and global NREN networks.

The WP4 team successfully met all its Key Performance Indicators (KPIs), with key achievements including the completion of the OCRE 2024 tender evaluation, surpassing engagement targets in cloud strategy, and establishing a sustainable governance framework for eduMEET. The Language Learning Intelligence for Students and Academic Organisations (L.I.S.A.) and Scalable JupyterHub incubator projects were piloted, while strategic collaborations and forums enabled expansion of international cloud cooperation. Nearly all deliverables were completed on schedule, maintaining strong momentum within the team.

The Above-the-Net Services portfolio has optimised cloud access and procurement for NRENs. Collective public procurement for the Cloud Framework OCRE 2024 has once again leveraged greater community bargaining power to enhance commercial terms, compliance, and cost savings on behalf of the European Research and Education (R&E) community. The cumulative spend on the OCRE 2020 and IaaS 2016 Frameworks since 2017 totalled €307 million in Q2 2024, with 39 NRENs signed up for OCRE 2024, 960 institutions using OCRE 2020, and 469 frameworks and suppliers under OCRE 2020 [GÉANT Cloud OCRE]. Any remaining consumption under the IaaS 2016 Framework had to have ceased before 1 October 2024.

The Strategic Planning activity has developed some guidance recommendations for the digital transformation of the R&E sector by promoting collaboration to optimise cloud service delivery. The team developed a shared cloud sourcing strategy proposal and contributed to the OCRE 2024 procurement, laying the groundwork for scalable, sustainable solutions across Europe.

Service development has begun to transition key offerings from project funding towards sustainable models, with successful pilots underway in eduMEET, L.I.S.A., and Scalable JupyterHub. Despite eduMEET's challenges in transitioning its funding model away from 100% project-reliance, the organisational spin-out from the GN5-1 project is progressing, with milestones in governance and partnerships, towards establishing a foundation for its long-term sustainability.

Community support and collaboration have been central to WP4's success. Through streamlined procurement, comprehensive support systems, and strong supplier relationships, WP4 has ensured seamless cloud adoption for R&E institutions. Ongoing engagement through forums, workshops, and international collaborations has strengthened the GÉANT network, promoting best practices and shared solutions.

Challenges for the Work Package have included staffing shortages, procurement complexities, and difficulties securing sustainable funding for eduMEET. Additionally, fluctuating NREN engagement posed risks to service uptake and resource planning.

Key lessons learned highlighted the need for broader NREN commitment to sustainable initiatives and the uncertainty of parallel initiatives like EOSC, which may present both challenges and opportunities for alignment.

Remaining tasks include finalising the OCRE 2024 Framework agreements after the standstill phase ends on 20 November 2024, developing a business plan for eduMEET's spin-out, documenting the spin-out process, compiling lessons learned from the Incubator initiative, and completing a project closure session by December 2024.

In summary, WP4 has made significant progress during GN5-1, expanding cloud services for the R&E community through OCRE 2024 and fostering innovation via the Service Incubator. Despite challenges, strategic partnerships and ongoing funding have set a solid foundation for future growth, ensuring the long-term impact of its activities for European NRENs and cloud service initiatives.

1 Introduction

The objective of the WP4 Summary Report is to consolidate all GN5-1 WP4 outcomes and achievements into a single document, as previous information has been dispersed across various documents and different Work Packages and deliverables.

The Above-the-Net Services Work Package in GN5-1 (WP4) covers a number of activities, all aimed at enabling NRENs to assume a strong role as trusted partners to their R&E communities for the delivery of digital online services that address R&E end-users. WP4's activities focus on generating service offerings for the portfolio (procured commercial Framework, e.g. OCRE, as well as community developed, e.g. eduMEET), resourcing of some ongoing operation and development to maintain service offerings, delivering and promoting services to the NREN community, and development of forward-looking strategic guidance for shaping future NREN service portfolios, as well as providing incubator resources to support community proofs of concept around services.

As part of the activity that generates service offerings for delivery, WP4 coordinates the collective procurement of cloud services for the European R&E community in the form of the GÉANT Cloud Framework OCRE. By leveraging GÉANT's extensive network and legal capabilities, WP4 aggregates demand across thousands of institutions to procure compliant cloud services under optimal business and technical conditions. This collaborative procurement approach not only saves time and costs but also strengthens the community's influence with major suppliers. Additionally, WP4 capitalises on NRENs' national relationships to streamline cloud service adoption across Europe, aiming to create a unified strategy for both commercial and community cloud offerings. Beyond procurement and strategic planning, WP4 also pilots an Above-the-Net Incubator to explore new service concepts and facilitate the spin-out of jointly developed community offerings, such as eduMEET.

This report begins with an overview of WP4's activities (Section 2), including the objectives and ambitions of the GÉANT Above-the-Net Services activity within GN5-1, and its key goals and aspirations and key achievements, summarising its main milestones and successes, particularly in the management of cloud frameworks and community-driven services like eduMEET. Section 3 then presents the GÉANT Above-the-Net Services, including the Service Portfolio, covering the management of cloud frameworks, preferential quotations, and the eduMEET spin-out, Above-the-Net Services strategic planning, and service developments, including the Service Incubator and eduMEET spin-out development. Section 4 covers Community Support, highlighting support provided to NRENs and suppliers, and collaboration efforts across the community. Challenges and lessons learned throughout the project are discussed in Section 5, while conclusions and next steps are given in Section 6.

As deliverable D4.3 'GÉANT Community Strategy for Above-the-Net Services' was delayed and is not yet completed at the time of writing, the current report does not reflect the finalised results in this area.

2   Overview of WP4 Activities

2.1   Objectives and Ambitions

WP4 helps the GÉANT community work together to provide commercial and community cloud services, called Above-the-Net Services. By combining purchasing efforts, WP4 uses GÉANT's unique legal reach and community bargaining power to make commercial cloud services more affordable and quicker to access for NRENs, at better terms. WP4 also builds on NREN partnerships across different countries to create a coordinated European approach to cloud services, gaining stronger influence with major providers.

Key outcomes during GN5-1 include:

- Re-procurement of the IaaS+ frameworks (OCRE 2024 Framework).
- Enhanced NREN delivery chain and a unified community strategy for cloud services.
- New developments and documented learnings from the incubator.
- Framework for a holistic community/commercial services portfolio.
- Sustainable support for eduMEET, with lessons applicable to similar cases.

WP4 engages with GÉANT Special Interest Groups, the European Open Science Cloud, and global NRENs to foster European and international collaboration in cloud services.

2.2   WP4 Deliverables and Milestones

WP4 GN5-1 deliverables and milestones and their status at the time of this report at the end of October 2024 are listed in the tables below.

#	Name	Due date (Project month)	Status (at M22)
D4.1	Procurement Strategy: IaaS+ Renewal	30/09/23 (M9)	Completed
D4.2	Spin-Out Development Report	30/11/23 (M11)	Completed
D4.3	GÉANT Community Strategy for Above-the-Net Services	31/10/24 (M22)	Delayed (due to unforeseen illness-related absence of a key task member). In progress.
D4.4	Updated Above-the-Net Service Portfolio	30/11/24 (M23)	In progress
D4.5	WP4 Summary Report	30/11/24 (M23)	In progress

Table 2.1: WP4 Deliverables

#	Name	Due date (Project month)	Status (at M22)
M4 (M4.1)	Legal-Administrative Framework for eduMEET Spin-out PoC Established	30/04/23 (M4)	Completed
M18 (M4.2)	IaaS Renewal Procurement Published in TED	30/11/23 (M11)	Completed
M23 (M4.3)	Draft Version of GÉANT Community Strategy for Above-the-Net Services	31/12/23 (M12)	Completed
M41 (M4.4)	2024 IaaS Framework Agreements Signed	31/12/24 (M24)	Not started

Table 2.2: WP4 Milestones

2.3 Key Achievements

- **Service Delivery**
  - Supported NRENs in uptake of OCRE 2020 Framework and facilitated record growth in number of institutions and total transacted volume.
  - Supported OCRE 2020 Framework Suppliers through contract management and guidance in fulfilling their reporting obligations.
  - Supported eduMEET development to the launch of version 4.0 and secured the interest of several new NRENs in seriously evaluating eduMEET for operational deployment.
- **OCRE 2024 Tender**
  - Completed bid evaluation, with outcome letters sent to 437 bidders, initiating the standstill period until 20 November 2024, after which the Frameworks will be signed.
  - CONNECT magazine published an article on the tender in October 2024 [CONNECT_OCRE24].
- **Cloud Strategy**
  - Exceeded KPI targets (12) for NREN engagement in strategy processes.
  - Positive feedback received on key strategy aspects at events, including SIG-MSP, EOSC Symposium, Forums, and the Roadmap Update Workshop in November 2024.
- **Spin-out: eduMEET**
  - Established governance framework and expanded collaborations for future sustainability and funding opportunities.
  - Launched eduMEET version 4 in January 2024, with the GÉANT instance updated.
  - Strong NREN engagement in deployments and international partnerships, including with WACREN and UbuntuNet Alliance.
- **WP4 Incubator**
  - Awarded Incubator projects L.I.S.A. (Language Learning Intelligence for Students and Academic Organisations) and Scalable JupyterHub, and piloted eduMEETime project; presented results at Cloud Forum in October 2024.
- **Collaboration**
  - Provided extensive support to NRENs through tailored forums and roadmap sessions, including Above-the-Net Strategy Interviews.
  - Held collaborative meetings with partners including EUNIS and NII/SINET, fostering international research cloud collaboration.

○ Achieved record Cloud Forum attendance, with highest-ever participation in joint online forums, notably the GÉANT-EUNIS cloud security workshop in April 2024.

- **Deliverables & Project Management**
    ○ Achieved all KPIs and nearly all WP4 deliverables on schedule (except D4.3); remaining deliverables due after the end of the reporting period for this document are in progress and set to be also completed on time.
    ○ Significant project management efforts completed, including a thorough PAIR Review and Change Request submissions.

2.4 KPIs

Target KPI	KPI by M22	Comments
Top 8 IaaS+ providers from 2020 to confirm intent for 2024	8	Completed. 18 market parties showed interest in the GÉANT market consultation via PIN, including some providers that represent up to three of the most well-known platforms, Google, AWS, Azure, Oracle, OVH and VMWare.
At least 12 NRENs participating in strategy	17	Completed. Although this KPI has been met and exceeded, it has been monitored throughout the project and efforts made to maintain engagement at or above the minimum level.
Completion and reporting of one incubator project	3	Completed. eduMEETime project completed by M8. L.I.S.A and Scalable JupyterHub completed in M22.
60% eduMEET funding from non-GN5-1 sources	77%	Completed. Manpower, including open-source volunteers

Table 2.3: KPIs against set targets

Additional metrics include NREN participation, institutional service consumption, and the financial impact of the frameworks, which is reported in Table 3.1.

2.5 Open Work Items

At the time of writing at the end of October 2024 (M22), a number of work items remain to be completed before the end of the GN5-1 project in December 2024 (M24):

- **Sign OCRE 2024 Framework Agreements:** Following the standstill phase ending on 20 November 2024, the team will proceed with finalising and signing the Framework agreements.
- **Develop eduMEET Business Plan:** The business plan for eduMEET will be completed to outline sustainable funding models and future growth strategies.
- **Document eduMEET Spin-Out Process:** A comprehensive record of the eduMEET spin-out process will be produced, highlighting what aligned with the plan and any deviations encountered.
- **Compile Incubator Lessons Learned:** The team will create a "Lessons Learned" document to summarise insights and best practices from the Incubator initiative.
- **Team Wrap-Up and Project Closure:** A final wrap-up session will be held to ensure all tasks are completed and documented as the project concludes in December 2024.

3 Above-the-Net Services

3.1 GÉANT Above-the-Net Services Portfolio

3.1.1 Management of GÉANT Cloud Frameworks

GÉANT's cloud frameworks play a vital role in centralising the associated public procurement effort across Europe, enabling National Research and Education Networks to confidently offer their institutions efficient access to cloud and other Above-the-Net services that fulfil the public procurement requirements. By consolidating procurement activities, GÉANT not only reduces resource requirements but also leverages collective bargaining power to secure significant discounts and favourable terms from global providers. This coordinated approach ensures the research and education (R&E) community remains competitive, with tailored, compliant cloud services that enhance interoperability and meet unique research needs.

The latest OCRE 2020 Framework, launched by a consortium led by GÉANT, brought a wide range of cloud services and a strong focus on compliance. Now, as that framework nears its end, GÉANT is preparing the OCRE 2024 Framework, availability scheduled for February 2025, which will offer improved commercial terms, expanded services, and streamlined procurement for institutions in 39 countries.

Through robust management, collaboration, and a focus on sustainability, GÉANT's frameworks continue to address vital issues of digital autonomy and data sovereignty, enhancing the value of cloud services for Europe's R&E landscape.

Metrics	Measured by M22	Comments
Number of NRENs signing up for the OCRE 2024 Framework	39	This metric covers the second half of 2024.
Number of institutions consuming the services	960	This figure indicates the services provided under the OCRE 2020 Framework.
Framework contract service consumption in euros	€307M	Annual spend in 1st half of 2024 for all FWs was €48M. Cumulative spend for the FWs since 2017 by M18 of GN5-1 was €307M. As of 1st October 2024, the 2016 FW is fully expired and no longer part of ongoing operational support activities.
Number of Framework platforms and suppliers in contract management	469	This figure indicates OCRE 2020 FW platforms and suppliers.

Table 3.1: 2016 and 2020 Frameworks metrics at M22.

3.1.1.1   OCRE 2024

GÉANT's new cloud framework, OCRE 2024, is progressing towards the launch phase, with the evaluation phase now completed. On 30 October 2024, GÉANT sent preliminary outcome letters to 437 bidders, and the framework has now entered a standstill period ending on 20 November 2024, after which contracts will be finalised.

Set to commence on 3 February 2025, the OCRE 2024 Framework will offer R&E institutions in 39 countries a simplified, compliant way to procure cloud services. The new framework will span five years and bring enhanced compliance features, improved commercial terms, and a broad range of IaaS, PaaS, and SaaS solutions tailored to the needs of the research and education sector.

3.1.1.2   OCRE 2020

The OCRE 2020 IaaS+ Framework, launched in December 2020, expanded the range of cloud services available to the European research and education (R&E) community. Building on the success of the 2016 IaaS Framework, it has driven a substantial increase in cloud service uptake. In the first half of 2024, spending across the 2016 and 2020 Frameworks reached €48M, with cumulative spending since 2017 totalling €307M by M18 (June 2024) of GN5-1.

The Framework now serves 39 NRENs, 28 of which are fully compliant with EU procurement directives, achieving 100% coverage of the directly addressable market. This growth highlights the success of cloud procurement aggregation, providing institutions with cost savings, negotiated discounts, and simplified procurement processes.

The OCRE 2020 Framework, which includes IaaS, PaaS, and SaaS services, offers R&E institutions improved access to cloud services, enhanced by aggregated procurement, peering through the GÉANT network, and economies of scale. All services comply with EU regulations, including VAT, procurement, and GDPR, with local support provided by NRENs. At the time of writing in November 2024, there are 469 platforms and suppliers under contract management.

The OCRE 2020 Framework will expire on 30 November 2024, with no new call-offs accepted after this date.

3.1.1.3   2016 IaaS Framework

The 2016 GÉANT IaaS Framework was groundbreaking, providing the first large-scale, centralised procurement of cloud services for R&E across Europe—and likely worldwide—by aggregating demand from a vast network of institutions across multiple countries. Led by GÉANT in full compliance with EU procurement rules, this pioneering framework connected commercial cloud providers with National Research and Education Networks and ran successfully from 2017 to 2020, driving steady annual growth and fully meeting NRENs' needs.

The framework enabled institutions across Europe to access high-quality, tailored cloud services through a reliable, structured procurement channel. Its success led to broader participation, enhanced collaboration, and increased annual turnover in the European R&E sector, paving the way for the OCRE 2020 Framework, which expanded service offerings and further strengthened procurement for the R&E community.

As of 1st October 2024, the 2016 Framework has expired and is no longer operationally supported.

3.1.2   Preferential Quotations

The GÉANT community has in the past had access to exclusive Preferential Quotations (PQs) from various providers, offering discounts and benefits tailored to meet the needs of research and educational institutions across Europe. Unlike standard procurements, these offers are available directly to GÉANT members but require compliance with local procurement regulations.

For example, Nextcloud GmbH offers the GÉANT Educational Quotation, allowing institutions and their users to securely manage data, collaborate, and share files, while retaining control over privacy; Paldesk provides a discounted customer service platform, with additional EU-based data management and cumulative discounts for high usage; and Lamaro's Inteligo platform offers a cloud-based e-library solution that allows institutions to store and manage ePub-compatible educational content with Digital Rights Management protection, also benefiting from EU-specific data handling and further discounts for collective usage.

Given the challenges of maintaining both PQs and Framework offerings simultaneously, the decision has been made to discontinue the PQs. These offers, while sometimes beneficial, have not gone through the formal procurement process, which limits their alignment with compliance standards, and in most cases deliver no additional actual value beyond normal education discounts readily available elsewhere. Moving forward, the focus will shift entirely towards enhancing solid framework agreements to ensure robust and streamlined cloud service offerings, as it has been found to not be feasible to sustain both approaches effectively in parallel.

3.1.3   Community-Developed Service Offerings (eduMEET)

GÉANT's community-focused services support the distinct needs of the R&E sector by providing open-source, independent solutions to meet their requirements. At the forefront of these solutions is eduMEET, a secure, reliable web-based videoconferencing platform designed for the R&E community. Developed within GÉANT projects, eduMEET offers an accessible and cost-effective alternative to commercial videoconferencing tools. This platform enables institutions to self-deploy customisable video services with a modern, browser-based interface, eliminating the need for client software installation and enhancing user accessibility.

eduMEET's advantages include local hosting, full control over data, secure communication within trusted networks, and low costs, positioning it as a robust tool for R&E collaboration. Key user groups for eduMEET span across the broader R&E community, media and arts sectors, NRENs, and integrators who incorporate videoconferencing into platforms like Moodle. Through its open-source, community-supported model, eduMEET maintains an agile, resilient infrastructure that benefits from collaborative development and regular updates.

Recent updates to eduMEET include the release of version 4.0, a significant overhaul with features including configurable federation, enhanced scalability, improved background blur, and a streamlined user interface. These changes support interoperability, ease of implementation, and global adoption, with eduMEET now seeing a growing presence among NRENs both within and beyond Europe. Collaborations on eduMEET also include regular security audits, promotional efforts, and ongoing discussions about sustainability within The Commons Conservancy [TCC].
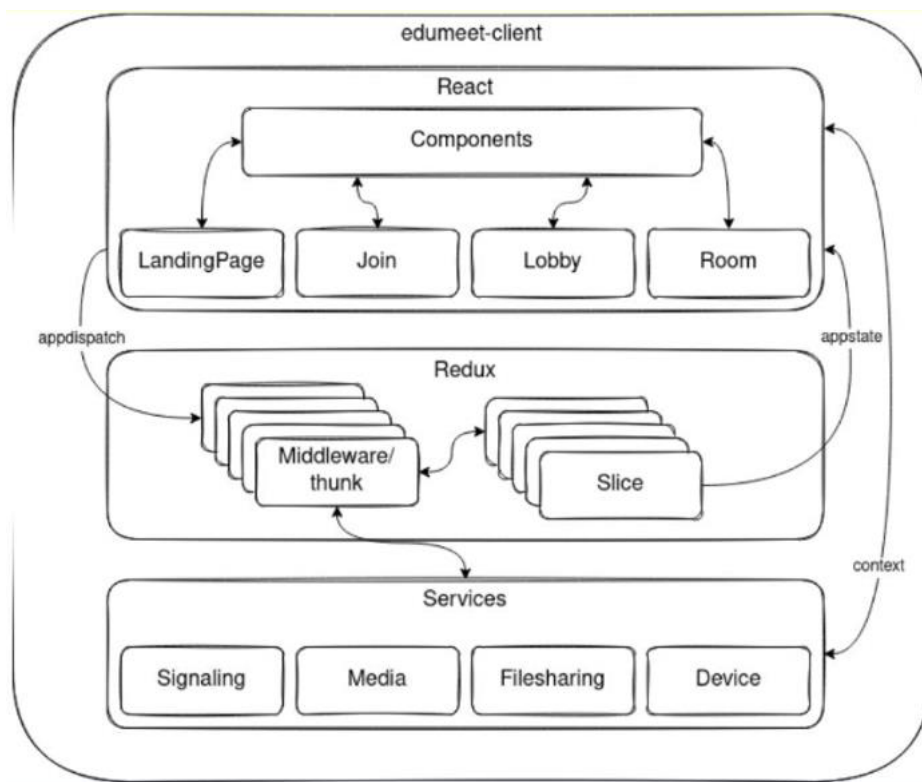
Figure 3.1: New eduMEET client architecture

A key part of the GN5-1 project, eduMEET aims to mature into a self-sustaining community project. This involves refining its business model, developing consistent outreach, and ensuring the service's reliability and security. Frequent presentations at international conferences, articles in industry publications, and active community engagement help expand eduMEET's adoption and help it grow as an open, collaborative videoconferencing solution that aligns with the values of the GÉANT community.

Metrics	Measured at M22	Comments
Number of eduMEET sponsors (in-kind and financial)	4	In-kind sponsors
Metric: Number of significant eduMEET deployments with NRENs		

Table 3.2: eduMEET Metrics at M22

3.2 Above-the-Net Services Strategic Planning

The strategy team has focused on addressing the challenges of digital transformation for R&E by fostering collaboration among NRENs to reduce the digital divide across Europe. By pooling efforts, NRENs can leverage both community-driven and commercial cloud resources, ensuring broader and easier access to critical digital services. WP4 Task 4 has been engaged in developing proposals toward a shared strategy for managing a mix of cloud services, aiming to balance digital sovereignty with the need for high-quality data processing capabilities.

Throughout 2023 and early 2024, the team provided strategic input into the OCRE 2024 joint procurement and engaged in crafting a comprehensive "cloud sourcing" strategy proposal. This included analysing the current landscape through NREN interviews and supporting future planning for GÉANT Above-the-Net services by identifying high-impact investment areas. The strategy emphasises creating a sustainable, scalable portfolio of cloud services tailored to the evolving needs of the European R&E sector, particularly under the influence of EOSC. A key objective here is to identify areas where NRENs can work together to combine resources towards widening and improving the portfolio of services available to them, while minimising wasteful duplication of effort.

Key strategic directions include three primary options:

- Enhancing national-level NREN capabilities.
- Establishing a unified pan-European service model.
- Exploring a cross-border service-sharing marketplace.

These efforts aim to overcome challenges such as limited economies of scale, shifting expectations from stakeholders, and the need for concerted collective action across Europe. By aligning these strategies, GÉANT seeks to empower NRENs to provide above-the-net services more efficiently, contributing to the long-term digital sovereignty and autonomy of the European R&E community.

3.3 Above-the-Net Service Developments

This activity focused on managing the development process for new products and services within the GÉANT Above-the-Net Services portfolio. It successfully piloted the transition of existing services away from project funding, ensuring their sustainability and ongoing support for the community. This effort has not only expanded the range of services available to the research and education community but also reinforced the operational stability of these offerings. Through collaborative engagement and strategic planning, WP4 has laid a strong foundation for future service delivery and continued value for NRENs and their connected institutions.

3.3.1 Service Incubator

The GN5-1 WP4 Service Incubator fosters innovation by supporting the development of proofs of concept (PoCs) for digital services in European research and education. It allows GÉANT to test new ideas, managing risk by trialling them in real-world environments before committing to large-scale projects.

The incubator also pilots the "ideas lab" activity within WP4, a new initiative aimed at refining the process of nurturing service concepts for future cycles.

Three key projects were selected in GN5-1:

- **eduMEETime** – A test project in the incubator, eduMEETime is an extension to the eduMEET platform that tracks student participation in online sessions. This tool helps educators boost engagement,

identify students needing support, and enhance teaching strategies. Developed using eduMEET's open architecture, it integrates with Single Sign-On (SSO) services for privacy and accessibility.

- **Language Learning Intelligence for Students and Academic Organisations (L.I.S.A.)** – Managed by ACOnet, this project integrates AI-driven language learning tools into university networks, focusing on refining algorithms and user interfaces.
- **Scalable JupyterHub** – Led by SUNET, this project builds scalable infrastructure for data-intensive research, enabling cross-platform compatibility and wider community adoption.

The incubator process is continuously evaluated, and feedback is used to optimise future initiatives. In October 2024, the incubator projects were presented at the GÉANT Cloud Forum, contributing their insights to the section of the GÉANT community interested in services for research and education.

3.3.2 Spin-Out Development: eduMEET

The eduMEET spin-out has made significant progress towards establishing an independent, open-source project, although the target of securing 100% external funding by M24 has not been met. The project has laid a solid foundation for future sustainability and visibility, achieving key milestones in governance, funding exploration, and partnership development:

- **Foundational Milestones:** The eduMEET spin-out established crucial structures, including a statute and a governance board under The Commons Conservancy, setting the stage for long-term independence and funding opportunities.
- **Funding Exploration:** While external funding remains a challenge, applications have been submitted to organisations such as NLnet and RIPE, and other potential funding avenues are being explored, including SIDN, Vietsch Foundation, and PosEmo.
- **Strategic Engagement:** eduMEET has initiated collaborations with NRENs, including DFN in Germany, as well as regional and international partners including NORDUnet, WACREN, and UbuntuNet Alliance. These partnerships are expanding eduMEET's user base and securing long-term community support.

Despite challenges in securing full external funding, eduMEET will continue to receive project funding for maintenance and support in the next GÉANT Project phase, ensuring its viability and fostering further community-driven contributions. While this means the KPI for external funding will be lower than the 100% initially planned for a full spin-out by M24, ongoing efforts to build a sustainable business model and collaborations with NRENs and external sponsors position eduMEET for long-term success and operational independence.

4   Community Support and Collaboration

Efforts have been made to enhance community support for the delivery of WP4's Above-the-Net services to NRENs and their connected research and education institutions. This includes mechanisms to coordinate demand, streamline procurement processes, and empower NRENs to effectively implement these services. By fostering collaboration within the GÉANT community, this activity aims to bolster service uptake and ensure resources are readily available for institutions as they transition to cloud-based solutions.

4.1   Support to NRENs and Suppliers

To enable NRENs to deliver Above-the-Net services, comprehensive support systems have been implemented, including a helpdesk, centralized documentation, and ongoing training. This support facilitates cloud service adoption from the WP4 portfolio. Close collaboration with the GÉANT procurement team and vendor engagement further strengthens supplier relationships, supports reporting on service consumption, and ensures resource availability for NRENs and their institutions.

4.1.1   Community Engagement and Resource Support

Task 1 plays a crucial role in overseeing the NREN Cloud community by managing the NREN Cloud Database, mailing lists, and communication tools, while actively collecting insights to refine Framework documentation and support materials. The task also supports the onboarding and engagement of Cloud Service Delivery Managers (CSDMs) and promotes their active participation within the NREN community. This is part of a broader community framework designed to foster ongoing collaboration among CSDMs and Cloud Strategy Group members.

The framework includes bi-weekly forums, where members share insights and align on strategic objectives. Key events such as the annual Above-the-Net CTO workshops focus on strategic alignment and innovation, while joint events with the [EUNIS] Special Interest Group on Cloud Management provide opportunities for university cloud contacts to explore technical and operational aspects.

In addition, specialised webinars and infoshares are regularly held, covering essential topics like Framework adoption, eduMEET, and cloud security, with a focus on NRENs, suppliers, and Research and Education institutions. To further support NRENs in delivering Above-the-Net services, the GÉANT Clouds website offers a wealth of resources, including service catalogues, tools (such as data classification tool and IaaS Framework guide), success stories, and news. These resources are regularly updated to ensure that CSDMs and Strategy Group members have access to the most current information and tools for effective service delivery.

4.1.2   Vendor Engagement and Contract Management

WP4 Task 2 plays a vital role in supporting vendor management by overseeing the entire procurement process and managing contracts. This includes running a business desk to assist in procurement operations and maintaining communication with over 469 OCRE Framework contracts. To enhance reporting accuracy, Task 2 has developed tools such as a validator to streamline consumption reporting.

Through close collaboration with GÉANT's procurement team, the Task fosters strong supplier relationships that ensure continuous availability of cloud services. This support framework not only strengthens NREN capabilities

but also promotes effective resource management and consistent reporting, ultimately ensuring the efficient operation of cloud services across the community.

4.2 Collaboration

WP4 actively collaborates with other GÉANT teams, SIGs, Task Forces (TFs), and global partners to broaden the reach of services like eduMEET and address shared challenges in cloud management. Through regular engagement with SIGs such as SIG-CISS, SIG-Multimedia, SIG-MSP, and SIG-Marcomms, WP4 fosters a collaborative environment for knowledge sharing and project alignment. Additionally, WP4 partners with EUNIS's SIG Cloud Management to co-host annual or bi-annual workshops that focus on innovations in cloud and above-the-net services management.

Beyond Europe, WP4 extends its collaboration efforts globally, through quarterly meetings with international NRENs such as Japan's NII/SINET and Internet2 in the US. These international partnerships enable the exchange of best practices in the adoption of cloud services worldwide as well as to collaboratively address shared challenges. Through GÉANT's unique authority to represent thousands of European institutions, WP4 maximises its collaborative potential and strengthens its international influence. This collaboration also includes regular discussions with partners such as EOSC, and other initiatives and projects (such as [CS3MESH4EOSC] in 2023), ensuring alignment and shared progress in the field of cloud services.

5 Challenges and Lessons Learned

The project encountered several challenges, including staffing delays due to absences, skill shortages, and procurement complexities under the OCRE 2024 Framework. These issues were mitigated through strategic planning and extended project funding. More specifically, these challenges included:

- **Resource and Team Availability**
  - **Staff Availability:** Absences due to reprioritisation, personal factors, and team members leaving their organisations have impacted multiple tasks (T1-T5.2), causing delays in high-priority areas. Ongoing restructuring and recruitment aim to mitigate these issues.
  - **Skills Shortage:** Limited availability of specialised staff and challenges in replacing lost expertise have led to delays and increased risk of extended timelines. Efforts are underway to strengthen resources through restructuring, recruitment, and external hires if necessary.
- **Funding and Spin-Out Stability**
  - **eduMEET Spin-Out:** Challenges in securing 100% external funding create risks for eduMEET's independence, especially after the departure of a key developer. Project funding has been extended to ensure basic support while efforts to develop external funding options for long-term sustainability continue.
- **Managing Risks**
  - **Typical project risks:** A number of risks are inherent in multi-year project activities involving part-time team members and are encountered by all Work Packages in some form. These relate to challenges with availability of planned NREN members' resources as and when they are needed, through national responsibilities taking priority, roles changing, or medical reasons.
  - **Unique Procurement Risks:** Some unique risks associated with the OCRE procurement, that needed to be anticipated, mitigated and monitored include:
    — NREN community engagement (needed to be high enough)
    — Market engagement (high enough, but not too high for team resources to manage)
    — Legal action (tender execution needed to be of highest standard to prevent legal disputes)
    — Tender threshold (need to ensure tender financial threshold will not be breached prematurely)
    — Team member participation (the planned manpower and specialist expertise for tender execution had to be available when needed)
    — Unexpected additional bidder review requirements (additional EC regulation came into force during tender execution, requiring additional engagement and legal enquiries by the team)

The OCRE 2024 Framework in particular, brought unexpected challenges primarily due to its larger scope compared to the previous 2020 iteration. While there were concerns about the volume of bids potentially overwhelming the TED portal, the number of bids turned out to be lower than the worst-case scenarios envisaged, so this issue did not occur. Most bidders submitted their bids in a more targeted manner than in previous Frameworks, bidding for countries where they would realistically get business and be able deliver. This should result in a reduction in the number of dormant framework contracts that nonetheless need to be managed and supervised over their lifetime.

A further unanticipated complication arose from European Union legislation under the Financial Subsidies Regulation (FSR), which introduced a new layer of complexity. Fortunately, proactive engagement with EC reviewers allowed the team to overcome these hurdles swiftly, so that this risk was ultimately mitigated.

Regarding eduMEET, the goal of achieving 100% external funding proved unrealistic. While the project team recognises the immense value of the developers working on eduMEET, as their efforts contribute to a tool that benefits not only their own NRENs but the entire European research and education community, the lack of local recognition for collective efforts across Europe, coupled with the lack of any existing blueprints for governance and funding frameworks outside of the GÉANT project, hindered progress. To address this, eduMEET's maintenance will now be funded through the GÉANT project to ensure its continued operation, while the governance and board continue to solidify the eduMEET organisation and resourcing..

However, new developments are largely reliant on in-kind contributions from NRENs and external open-source volunteers, which continues to be a challenge given the growing competition for skilled developers, particularly from commercial companies. The team remains committed to finding additional external resources to support the software's future development. This experience highlighted the difficulty in sustaining such initiatives without a broader commitment from the NREN community, despite the wider European value that they bring.

Additionally, the emergence of initiatives such as EOSC has widened the playing field for NREN service development and delivery, introducing more dependencies and interactions with new stakeholders. Together with the acceleration of technological advances, this new context requires greater agility to react and change course, which makes it challenging to deliver project outcomes with currency and relevance while considering planning horizons spanning several years. The emergence of incubator functions in most GÉANT Project service WPs are one tool to allow faster reaction to emerging situations during ongoing project phases.

6 Conclusions and Next Steps

WP4 has made significant strides in advancing the GÉANT Above-the-Net Services initiative, expanding the range of cloud services available to the research and education community. The OCRE 2024 Framework re-procurement is closing in on successfully ensuring the continued provision of enhanced cloud services across Europe. Furthermore, the Service Incubator has played a key role in fostering innovation, successfully piloting several projects, including eduMEETime, L.I.S.A., and Scalable JupyterHub, which provide valuable tools to the sector.

The eduMEET spin-out, though facing challenges in securing full external funding, has established a solid foundation for future sustainability, with strategic partnerships and continued project funding in the next phase ensuring its ongoing viability. Additionally, WP4 has placed a strong emphasis on community support and collaboration, particularly in aiding NRENs with the adoption and implementation of cloud-based services. These efforts have reinforced the long-term impact and relevance of the GÉANT project to the European research and education community.

This progress was achieved while ensuring the safe and reliable delivery of existing services (mainly the Cloud Framework OCRE 2020), maintaining the required contractual obligations with suppliers and providing adoption support to NRENs.

The project encountered several challenges, including staffing delays due to absences, skill shortages, and procurement complexities under the OCRE 2024 Framework. These issues were mitigated through strategic planning and extended project funding. Fluctuations in service demand and difficulties in securing sufficient developer resources within NRENs posed additional challenges, especially for maintaining initiatives such as eduMEET. The difficulties in securing 100% external funding for eduMEET underscored the need for broad, community-driven support for such open-source projects.

Future collective procurement should continuously monitor solutions for non-EU participation and evolving legislation to better anticipate external challenges. Further development of flexible procurement models will help to overcome barriers and ensure the continued effectiveness of GÉANT's initiatives across borders.

Further research on sustainable, community-driven open-source models, similar to eduMEET, should be conducted to identify strategies that balance innovation with resource limitations, ensuring long-term sustainability for such projects. There is a need for a framework of support for community-developed services or other products that should no longer rely on 100% GÉANT project funding, and which works for NREN coalitions outside of the GÉANT project governance. To ensure eduMEET's long-term success, it is crucial to diversify funding streams through strategic partnerships and external sponsorships. Engaging more external developers and open-source communities will also be key to ensuring its continued development and scalability.

In final months of GN5-1, the team will focus on finalising the OCRE 2024 Framework agreements to ensure EU compliance, completing the eduMEET business plan to help identify sustainable funding, and documenting lessons learned from the incubator process for future initiatives. Additionally, efforts will be made to wrap up the project smoothly by December 2024, capturing key successes and challenges to lay a strong foundation for future service delivery.

References

[CS3MESH4EOSC]	https://cs3mesh4eosc.eu/
[CONNECT_OCRE24]	https://connect.geant.org/2024/03/21/geant-announces-publication-of-ocre-2024-tender-for-pan-european-cloud-services-procurement
[eduMEET]	https://edumeet.org/
[EUNIS]	https://eunis.eea.europa.eu/
[GÉANT Cloud OCRE]	https://clouds.geant.org/geant-cloud-catalogue/geant-cloud-catalogue-ocre/
[TCC]	https://commonsconservancy.org/

Glossary

CSDM	Cloud Service Delivery Manager
EOSC	European Open Science Cloud
GDPR	General Data Protection Regulation
KPI	Key Performance Indicator
L.I.S.A.	Language Learning Intelligence for Students and Academic Organisations
NREN	National Research and Education Network
OCRE	Open Clouds for Research Environments
PoC	Proof of concept
PQ	Preferential Quotation
R&E	Research and Education
SIG	Special Interest Group
SIG-CISS	Special Interest Group – Cloudy Interoperable Software Stacks
SIG-Marcomms	Special Interest Group – Marketing Communications
SIG-MSP	Special Interest Group – Management of Service Portfolios
SIG-Multimedia	Special Interest Group – Multimedia Applications
SSO	Single Sign-On
TF	Task Force