



Keywords:

#GWDG, #TrustedResearchEnvironment, #TRE, #AWS, #ResearchCollaboration, #IaC, #Sustainability, #EOSCinPractice, #OCRE

# GWDG Trusted Research Environment (TRE): Empowering European Research through AWS Cloud Services

Overcoming Challenges and Enhancing Collaboration in the European Research and Education Community

## Background

As part of an adoption funding programme supported by the EU and building on experience gained through the GÉANT-led OCRE project, the EOSC Future project allotted a total of €4.8 million across three calls, aimed at bridging the gap between commercial service providers and researchers through the EOSC ecosystem.

Specifically, the first call in the series awarded five projects for making commercial services more accessible to Research & Education communities via the EOSC Marketplace, to digital service aggregators (e.g. non-profit entities, NREs, RIs and e-Infrastructures, HPC centres, etc.) teaming up with OCRE cloud service providers.

## The digital service aggregator



The GWDG is a well known IT service provider and computing center not only for both the University of Göttingen and the Max Planck Society, but also for the broader R&E community in Germany. It is a national HPC centre, a national AI service centre, and a core player in the national German Research Data Initiative (NFDI). The project "GWDG Trusted Research Environment (TRE)" has been funded under "EOSC Future Call 1: European Research E-Infrastructures – Distribution of Commercial Cloud Services" (Grant Agreement number 101017536).

## The user Community

The service is being offered to a wide range of research communities supported by GWDG, with particular emphasis on the Life Sciences community with its often stringent data security and regulatory compliance requirements. Within this community, there are already two prominent use cases that have emerged as flagships. Furthermore, use cases from the astronomy community are being evaluated for deployment on the platform, and there is an expectation that additional communities will embrace this infrastructure in the future, given its broad applicability and appeal.

## Piotr Kasprzak

Cloud Engineer at GWDG -  
Gesellschaft für wissenschaftliche  
Datenverarbeitung mbH Göttingen



*"By lowering the entrance barrier, our vision is to make High Performance Computing accessible, usable and approachable by scientists across disciplines, students and the general public. Sharing insights across fields is necessary for truly advancing rather than constantly reinventing the wheel."*

## Why do I need EOSC?

By providing a single point of entry for accessing data and services EOSC streamlines the discovery and utilization of pertinent resources and contributes to the essential visibility and recognition required to draw users from various European research communities to the offered service. Furthermore, the funding provided has been critical for the development of this service and onboarding first research projects.

## The Challenge

The adoption of commercial cloud services in the European R&E community faces numerous challenges related to operations, security and accessibility. These issues currently prevent researchers from enjoying the well-documented advantages of these cloud services including rapid scalability, flexibility and cost savings. Researchers typically lack the technical expertise required to set up and manage multiple interconnected cloud services to address their research needs. Data security and compliance concerns are particularly difficult to address and are often preventing the use of cloud services in the first place. What researchers require are preconfigured, user-friendly environments with clearly defined workflows that take governance and regulatory processes into consideration. These environments would simplify the consumption of cloud services immensely and thus, in turn, would enable researchers to focus on their research instead of grappling with technical intricacies.

## The solution & the commercial cloud service

The GWDG TRE project tackles the previously mentioned challenges by offering secure and user-friendly environments on the AWS Cloud, specifically designed for collaborative scientists conducting data analysis. These environments comprehensively integrate necessary AWS services, abstracting away technical complexities.





Keywords:

#GWDG, #TrustedResearchEnvironment, #TRE, #AWS, #ResearchCollaboration, #IaC, #Sustainability, #EOSCinPractice, #OCRE

To facilitate easy utilization, they feature a customized web-based interface built on AWS Service Workbench as the primary entry point. Addressing data security and complex compliance needs, including those spanning multiple legal jurisdictions, is achieved through the implementation of a governance process with various roles and rigorous control over data ingress and egress, whenever necessary. The project relies on an AWS Landing Zone design as its foundational technical framework, which is extended by an AWS Trusted Research Environment (TRE) implementation tailored to the specific requirements of the R&E community. In addition to these technical components, the project also conducts outreach activities such as AWS Research Immersion Days, complementing the overall target to facilitate the distribution of cloud services in the R&E communities.

## In depth

The service has been developed using the latest Infrastructure-as-Code (IaC) frameworks for AWS, notably AWS CloudFormation and the AWS Cloud Development Kit (CDK). The latter enables the use of widely-used programming languages for modeling, with automatically generated AWS CloudFormation templates for deployment. The standard GitOps workflow is employed for both development and deployment, which seamlessly aligns with the mentioned technologies and the broader automation capabilities offered by AWS.

## The impact on society

Reducing the obstacles that hinder the adoption of commercial cloud services within the R&E communities holds the promise of expediting crucial research endeavors. It opens the door to vast, scalable, elastic, and cost-effective computing resources, which have the potential to accelerate essential research and provide solutions to a wide array of contemporary societal challenges. These challenges span from the discovery of new or enhanced vaccines and treatments for diseases to addressing the complex demands of transitioning towards a more environmentally sustainable economy and mitigating the climate crisis. The impact of synergizing the brilliant minds in diverse research communities with the nearly limitless processing and analytical capabilities, as well as the innovative services offered by commercial cloud providers like AWS, is indeed difficult to overstate.

## Useful material related to this story

[GWDG](#)

## Across disciplines

The TRE environment provides a complete set of tools and procedures for seamless integration and accessibility of data analysis tools, catering to researchers from various research fields. This ensures that interdisciplinary research collaborations benefit from a robust technical underpinning to collectively address research challenges. TRE also enables the establishment of workflows tailored to discipline-specific regulatory or operational standards. These principles hold true for cross-national research initiatives as well.

## Sustainability for an EOSC in practice

GWDG TRE is being implemented on top of a preexisting AWS Landing Zone, which has been funded and supplied by GWDG. GWDG views TRE as an essential component of its AWS service offering for the R&E community. Consequently, GWDG plans to maintain funding for the required AWS infrastructural resources, as well as invest in further development internally thereby guaranteeing sustainability.

## Future developments & funding scenarios

The project's funding and relatively short timeline allow for the initial implementation of essential features within the TRE environments, primarily focusing on critical AWS services for data analytics. Future development of the TRE environments will progress along three main avenues:

- Expansion of Plugins: The list of additional plugins to support diverse requirements, special customisations or certain functional expansions is continually growing as the AWS TRE toolkit evolves and expands further. These can be integrated into the GWDG TRE environment depending on concrete requirements and available funding.
- Tailored Services and Workflows: For specific scientific use cases more customized, pre-configured services can be offered within the environment. This can also involve the development of corresponding supplementary workflows.
- Integration of more specialised AWS Services: The general capabilities of the environment can be further expanded by the integration of additional, more specific AWS services. This will become more important in the future with the expected advent of specialized AI services. In essence, the current project marks only the beginning, with extensive ongoing development and expansion planned along these mentioned paths in the future.

Liked this  
[#EOSCinPractice](#)  
story?

Follow  
[@EOSCFuture](#)  
for more!



Share your own [#EOSCinPractice](#) story here