OCRE

Open Clouds for Research Environments

WHAT DOES OCRE CLOUD FRAMEWORK OFFER?

A guide for the research community to access commercial cloud services

Table of Contents

About

In 2016 GÉANT led on a fully EU-rules-compliant tender process to seek commercial providers of cloud services on behalf of the European research and education community, supported by its member National Research and Education Networks (NRENs). Since the introduction in 2016, the Infrastructure as a Service (IaaS) Frameworks have shown a significant growth in annual turnover.

Well before the end of the GÉANT IaaS Framework (December 2020), it was decided to do a follow-on procurement to build on this success and extend the scope of the original Framework by accommodating other cloud services such as Platform as a Service (PaaS) and Software as a Service (SaaS). The number of eligible participants was to be increased by including many more countries, and by making the resulting services also available to the European research community via bodies such as the European Open Science Cloud (EOSC).

The 2020 IaaS+ Framework Agreement is the outcome of the OCRE project (OCRE), representing a consortium of partners which includes Trust-IT Services (Trust-IT), the RHEA Group (RHEA Group), and GÉANT (on behalf of the European NRENs) (GÉANT).

OCRE's mission

Europe is the largest producer of research data in the world. Nevertheless, there are still substantial bureaucratic barriers when it comes to connecting the research community to commercial cloud services.

The EU-funded OCRE (Open Cloud for Research Environments) project aims at facilitating the access to cloud services and EO data for researchers through several tendering processes, thereby supporting the development of cloud computing and innovation in Europe.

As a result, OCRE directly addresses one of the main challenges faced by research institutions: how to incorporate commercial digital services in their work, and how to find and acquire suitable services.

OCRE brings together

- European research community
- Cloud providers
- Earth Observation (EO) organizations through validated, ready-to-use service agreements.

What does OCRE offer?

OCRE Cloud Catalogue

The OCRE Catalogue displays the compliant Cloud-based digital service providers who have been contracted to supply the European Research and Academic communities by means of the OCRE framework.

The catalogue provides a vast choice of **commodity-type commercial digital services** necessary for interdisciplinary research activities. This includes:

- **Infrastructure as a Service (IaaS) and Platform as a Service (PaaS):** the provision of compute, storage, network and related services and/or a platform allowing customers to develop, run, and manage applications, as a public cloud service.

- **Software as a Service (SaaS),** on-demand software offerings: a software licensing and delivery model in which software is used by the customer on a subscription basis and is hosted by the supplier as a public cloud service, in the areas of file storage (sync and share), online collaboration, simulation and virtualisation tools.

Find the full list of Cloud services suppliers at www.ocre-project.eu/services/cloud-suppliers

OCRE Cloud Framework

OCRE Cloud Framework, also known as IaaS+ Framework, consists of **473 commercial cloud contracts** covering 40 European countries to ease access and provide volume discounts to research and education institutions.

OCRE's adoption funding is for purchases from the OCRE Cloud framework agreements:

- Infrastructure Cloud services IaaS, PaaS, SaaS and marketplace

- Consulting services in support of using these Infrastructure Cloud Services, On-boarding, assist with solution architecting etc.

How to use OCRE Cloud Framework?

1 Download your **INFOPACK HERE** www.ocre-project.eu/infopack%20

2 Define your **WORKLOAD REQUIREMENTS**

3 **SELECT YOUR PROCUREMENT OPTION** from

a. DIRECT AWARD is possible when:

- ✔ The desired service is not available on any other platforms on the Framework
- ✔ We have an existing cloud platform and switching to an entirely new platform is not economically feasible
- ✔ When it is technical not feasible to switch to another platform. Due to for example the licensing arrangements around the existing platform mean that due to intellectual property rights we cannot switch to another provider

b. MINI DESKTOP COMPETITION is possible when:

- ✔ The requirements can potentially be satisfied by multiple Suppliers / platforms and therefore a direct award cannot be made
- ✔ We need to select the most advantageous Supplier to satisfy the requirements by re-using the awarding criteria from the Framework tender 2020
- ✔ First, we need to collect the required information to make a supplier selection by using the tool in the infopack
- ✔ Next, we evaluate the Suppliers by using the award criteria (service and support, marketing and adoption solution, exit support, sustainability) from the 2020 OCRE Tender

c. MINI COMPETITION is always possible within the OCRE Framework:

- ✔ Provides the opportunity for full competition between the resellers in your lot, which enables tailor-made solutions
- ✔ First, we invite all OCRE Suppliers in our Lot to participate in the mini-competition to provide proposals based on our awarding criteria
- ✔ Next, we apply the award criteria and evaluate getting the best fitting solution

4 **Prepare the SERVICE ORDER and sign the Call of Contract**

5 **CONSUME THE SERVICE**

The role of your NREN

The National Research and Educational Networks (NRENs) play a crucial role in the OCRE Cloud Framework. Depending on which role it took in the agreement (Referrer or Underwriter), the NREN has specific functions for assuring the access to cloud resources for its connected institutions.

If your NREN is a Referrer, your institution can directly acquire and use the cloud services from the Suppliers.

The NREN as Referrer acts as the central gateway for the best deals, including commercial services. The Framework enables NRENs as a community to shape the commercial cloud market with AAI federation requirements, aggregation, pricing and peering. Central procurement delivers better economies of scale.

NREN as a Referrer:

- Acts as an intermediary by making the framework agreement available in the respective country
- Understands and consolidates the needs of the sector. When appropriate, improves the terms and conditions with the vendor
- The vendor makes the improved proposition and the NREN is paid a referral fee
- The NREN does not sit in the contracting line
- The NREN takes the Referrer income with benefits for both the sector and the NREN.

If your NREN is an Underwriter, your institution can use the cloud services made available through your NREN.

The NREN as an Underwriter takes responsibility and unburdens its customer institutions by taking care of their infrastructure services. This reduces financial risk of initial payment of the supplier carried by the NREN as underwriter, and provides the institution with IT expertise and support.

NREN as an Underwriter:

- Makes purchases from Suppliers and distributes the acquired resources through its community
- The NREN sits in the contracting line and is the only call-off Customer towards the Supplier
- GEANT may also act as an Underwriter and make purchases from Suppliers in case an NREN asks GEANT to fulfill its role.

Benefits of using OCRE Cloud Framework

- **European researchers**: The research communities' increased uptake of EO and cloud services from diverse providers supports the work of European researchers as it provides them with better tools to carry out their work

- **Research institutions**: Taking advantage of innovative commercial services became more streamlined for research institutions. Less time is needed to discover and acquire the services they need from the market.

- **Earth Observation companies**: Earth Observation data providers have been introduced to the catalogue, which provides them more exposure on the market for their niche solutions.

- **Service providers**: Legal, financial, and technical compliance barriers preventing service providers from offering services to the research community are minimized.

Through the Framework Agreement, the European NRENs deliver a digital single market for the consumption of cloud services offerings (IaaS, PaaS and SaaS) from selected Suppliers by the European research and education (R&E) community. The collective tender outcomes ensure these services are available for all participating NRENs and their institutions.

👉 Collective Expenditure and discounts
The European R&E institutions can negotiate better legal and financial conditions thanks through the collective pan-European tender led by GÉANT.

👉 Saving time
OCRE Cloud Framework saves time both for the institutions and suppliers. Institutions do not have to run separate tenders themselves. Suppliers reach a larger user base through one tender and Framework Agreement.

👉 Legal benefits
The Framework Agreement saves time and costs for individual institutions. GÉANT functions as a Central Purchasing Body compliant to the EC Procurement Directive (2014/24/EU) [EC_2014/24/EU], which enables cross- border procurement. Compliancy to this EC Directive ensures institutions can easily consume cloud solutions from the GÉANT Cloud Catalogue.

Federated login and AAI services

Single sign-on (SSO), federated login and authentication and authorization infrastructure (AAI) services enable fast and easy access to various online services in R&E institutions and provide assurance to economic operators.

SAML, the key enabler for the exchange

Security Assertion Markup Language (SAML), being the standard within the sector worldwide, adds an additional security layer for the data-sensitive users, while GÉANT and the NRENs provide authentication services based on the SAML2 protocol.

eduGAIN infrastructure – no need for individual configuration

Participation in the eduGAIN federation provides access to an authentication service for all participating vendors and institutions without the need for individual configuration and lets users access online services with their trusted institutional account.

Network connections

The cloud services Suppliers do not charge for data traffic costs. Some Suppliers apply a fair use policy. The Suppliers are required by GÉANT to connect their cloud infrastructure to the GÉANT and/or NRENs' networks.

High-capacity, low-latency network and direct peering

With an extensive GÉANT backbone, the national NREN network capabilities provide secure, high- capacity and low-latency network access to over 10,000 institutions across Europe. Direct peering between the NRENs, institutions and Suppliers helps to offer services without data-transport-related costs.

Success stories

Exploring new high potential 2D materials

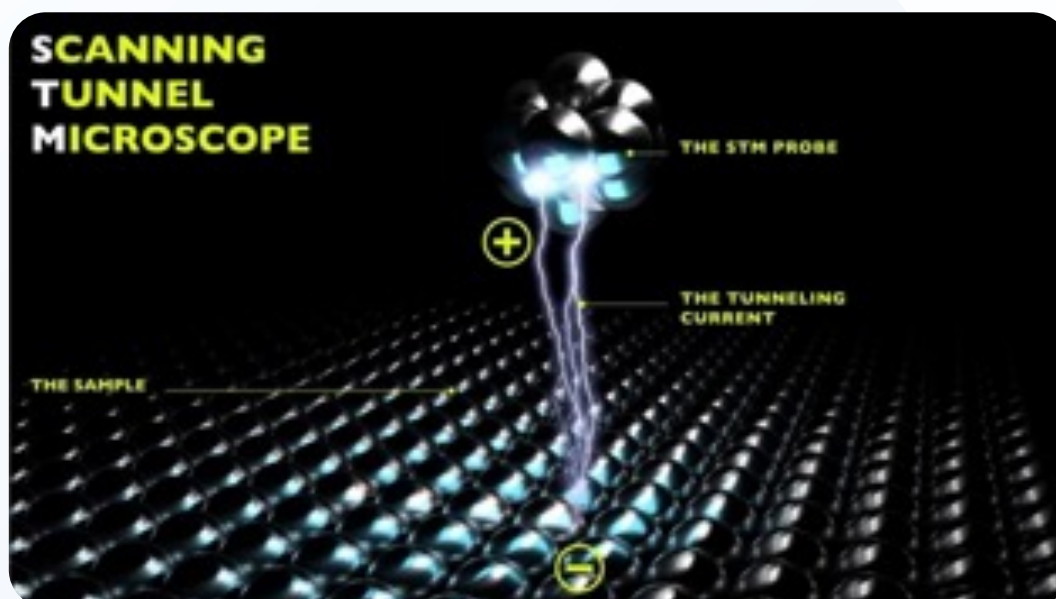Organisation: **University of Bath**

Field of study: **Natural Sciences**

OCRE Resources used: **Cloud Services**

2D materials only a few atoms thick are one of the hottest topics in Physics. Since the discovery of the supermaterial graphene, for which two scientists were awarded a Nobel prize in 2010, hundreds of other 2D materials have been identified.

Understanding the quantum properties of these new super thin materials with promising applications in electronics, healthcare, and new energy materials requires advanced scientific facilities and techniques. Exposing 2D materials to the powerful X-rays produced at a synchroton beam facility is one of the most effective ways of studying electron behavior in the materials. The process generates vast amounts of data that we have been able to analyze using sophisticated cloud computational modelling funded by OCRE.

Algorithms for decentralized Machine Learning Control

Organisation: **Univerzitet Singidunum (in collaboration with Univesidade Lusófona)**

Field of study: **Engineering & Technology**

OCRE Resources used: **Cloud Services**

The project is developing advanced methods and algorithms for decentralized Machine Learning Control (MLC) for Networked Cyber-Physical Systems, and complex, spatially distributed and networked autonomous multi-agent dynamical systems. The methodological solutions cross the traditional boundaries between (deep) machine learning, control systems (reinforcement learning), and decentralization of functions.

The project was awarded a grant in December 2020 for cloud vouchers of up to €100,000. A mini competition was run to find the best supplier under the Framework to fulfill these requirements. The project can now efficiently use the obtained cloud resources. The future research and exploitation plans are ambitious and foresee the need for further cloud resources as the project evolves.

Optimising complex processes using AI

Organisation: **TensorCell**

Field of study: **Engineering & Technology**

OCRE Resources used: **Cloud Services**

The independent research group TensorCell is working on optimizing complex processes using AI. Currently, the focus is on developing AI algorithms for optimal traffic signal control and optimizing cancer treatment using radiotherapy. Despite the fact that these processes are from different domains, they share many interesting properties and can be tackled using similar techniques. TensorCell's methods are mainly based on AI and multiagent simulations based on cellular automata and computational resources are vital to conduct the experiments and research. However, finding the necessary resources was challenging for an independent research group as TensorCell.

Thanks to OCRE's vouchers for CloudSigma's cloud resources, the research group was able to generate large training sets for their new experiments. The flexibility provided by the vouchers helped TensorCell to prepare the datasets on time.

Pushing the frontiers in housing market research

Organisation: **TensorCell**

Field of study: **EEconomics**

OCRE Resources used: **Cloud Services**

In recent years, the internet has come to play an important role in searching for houses. This has led to novel user-generated data that can be used to investigate housing search behavior. The novel data provide information on housing searches that until recently remained unobserved. Therefore, it is possible to analyze real search behavior of potential house buyers in more detail than ever before. However, 10 terabytes of data need to be processed and analyzed in order to study the dynamics of the buyer search processes. This creates important computational challenges.

The computational challenges, and storage issues, have been overcome by using a commercial cloud service provided through the OCRE funding.

GÉANT Contacts

Please contact us at
clouds@geant.org
for more information.

OCRE

Open Clouds for Research Environments

www.ocre-project.eu

in /company/ocre-project

🐦 @OCREproject

▶ @ocreproject6447