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European science cloud on the horizon

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The European open science cloud is part of a transformation happening in research, known as open science. Image credit: Shutterstock/ gashgeron

Europe's researchers have access to super-fast networks, common data storage facilities, and shared computing resources. The challenge now is to link them all together into a single science cloud.

That's why Carlos Moedas, European Commissioner for Research, Science and Innovation, has announced that the EU will fund research into the best way to set up a unified European open science cloud.

'We are preparing a call for a European science cloud project in order to identify the possibility of creating a cloud for our scientists,' he told a conference in June called *A New Start for Europe, Opening up to an ERA of Innovation*.

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'This will mean setting standards for the management, interoperability and quality of scientific data. I would like to see progress on this in the next 12 months.'

It's all part of a transformation that is happening in research, known as open science. Driven by the prevalence of high-speed broadband and sophisticated software that allows researchers to collaborate, there is a growing demand to open up access to research and encourage participation from researchers across different fields, and even from interested members of the public.

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It comes after research ministers from European Member States underlined the need for a European open science cloud and called for a European open science strategy during a meeting of the EU's Competitiveness Council on 28 and 29 May.

Europe already has some quite substantial cloud infrastructure for researchers, but they operate as largely separate entities.

That means that researchers need to access different online services if they want to crunch big datasets, store their results, and work on them collaboratively with colleagues, even when all of these services are operating out of the same location.

It includes GÉANT, which provides high-speed networks to universities, EGI, which offers distributed computing, EUDAT, a provider of services to handle large volumes of data from multiple research communities and cross-disciplinary users, PRACE, the European network of high-performance supercomputers, and OpenAIRE, which links research results and makes them accessible to researchers.

On top of that, Europe has some very large sector-specific computing clouds such as ELIXIR, which manages biological data, the European Plate Observing System, which monitors the earth's crust, and initiatives such as the Helix Nebula project, a computer cloud system run by research centres including the European Organization for Nuclear Research (CERN) and the European Space Agency (ESA).

'What we certainly need to come to is a kind of integrated perspective on these services, that they all fit together,' said Peter Wittenburg from the Research Data Alliance, a forum which is focused on sharing data globally. 'I think in this respect this new idea of a European open science cloud could change things.'

> 'I think, once we have the right people around the table, it shouldn't take too long.'
>
> *Damien Lecarpentier, Project Director, EUDAT*

The idea is to bring existing facilities together in a way that researchers can seamlessly access them without having to use multiple logins and different systems, as a single catalogue of services.

Long tail

However, the European science cloud would have to be powerful enough to cover both the needs of Europe's big science infrastructures, such as the Large Hadron Collider at CERN and the European Southern Observatory in Chile, and also serve ordinary students and researchers, the so-called 'long tail' of science.

'There are these very, very big initiatives, or institutions, projects that really need special facilities, and then there are all the many, many students and professors at all the European universities,' said Professor Dorte Olesen, chairwoman of the planning committee of GÉANT.

'GÉANT serves more than 50 million individual users. Most of them have normal IT needs, but still the vast number of them means that in the end it is a big task to supply this.'

The idea of a Europe-wide cloud isn't new. Europe's electronic infrastructures – or e-infrastructures – are already in a constant process of working out how to operate across different regions and systems. One example is the EU-funded EGI-Engage project, which is expanding the kinds of data which researchers

can access.

'We are working on an open data platform that would simplify the federation and processing of data from different sources and across different infrastructures,' explained EGI Director Yannick Legré.

A major part of it is also authentication – the method by which cloud services identify each user – as systems have to decide which privileges to give each person.

'Even if you are a researcher on a remote Island in the Greek sea, you can access the European Southern Observatory or the facilities at CERN,' said GÉANT's Prof. Olesen. 'But obviously you need to identify yourself, you can't let anybody go in and set parameters for the experiments at CERN.'

To solve this problem, GÉANT is coordinating AARC, an EU-funded research project which is working to link up authentication systems.

Duplication

Initiatives like this have helped lay the foundations for the European science cloud. However, until the European science cloud is up and running, jockeying between Europe's e-infrastructures and duplication of services are costing unnecessary money, project leaders say.

'There are several cloud initiatives starting in Europe and we can avoid duplication of effort by allowing, or even better by encouraging, data providers, research communities and e-infrastructures to work together,' said EGI's Legré. 'New business models can be developed and the open science cloud would become a natural accelerator of innovation.'

The first step is to get the right people around the table. That includes people who run the existing e-infrastructures, but also the users.

'Landscaping not only what exists, but what works and under which cases,' said Natalia Manola, the director of OpenAIRE. 'For me as a researcher this would be very important.'

If the right combination of people are brought together in the right way, the European science cloud could be operational very quickly. Damien Lecarpentier, project director of EUDAT, believes it could be little more than a year.

'I think, once we have the right people around the table, it shouldn't take too long,' he said. 'I would say you should be able to do it in a year or two.'

More info

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