European Cloud Initiative

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PURPOSE: to present a European Cloud Initiative with a view to securing Europe's place in the global data-driven economy.

BACKGROUND: the world is witnessing a dramatic increase in the amount and variety of data being produced. This "**Big Data**" phenomenon creates new possibilities to share knowledge, to carry out research and to develop and implement public policies. It is also becoming easier to exploit this data thanks to the Cloud. As Europe is the largest producer of scientific knowledge in the world, **it is well placed to take the global lead in the developing of a science cloud**.

However, **Europe is not yet fully tapping into the potential of data**:

- many European businesses, research communities and public bodies are yet to tap into the full potential of data and of its potentially transformative effect on traditional sectors and on the way research is conducted. **Data coming from publicly funded research is not always open**; likewise data generated or collected by businesses is often not shared, and not always for commercial reasons;
- **lack of interoperability** prevents addressing grand societal challenges that require efficient data sharing and a multidisciplinary, multi-actor approach, e.g. climate change);
- **fragmentation** hampers data-driven science. Access policies for networking, data storage and computing differ;
- there is surging demand in Europe for a world-class **High Performance Computing** (HPC) infrastructure to process data in science and engineering. However, Europe is not participating in the HPC race in line with its economic and knowledge potential; it is lagging behind in comparison to the USA, China, Japan, Russia and India.

The European Cloud Initiative will **allow the EU to fully exploit the potential of data as a key driver of Open Science and the 4th industrial revolution**. It is designed to help science, industry and public authorities in Europe access world-class data infrastructures and cloud-based services as they become the decisive factors for success in the digital economy.

CONTENT: the European Cloud Initiative builds on the Digital Single Market Strategy, which aims, inter alia, to maximise the growth potential of the European digital economy. It aims to develop a trusted, open environment for the scientific community for storing, sharing and reusing scientific data and results, the European Open Science Cloud. It aims to deploy the underpinning super-computing capacity, the fast connectivity and the high-capacity cloud solutions needed via a European Data Infrastructure.

1) European Open Science Cloud: the European Open Science Cloud aims to give Europe a global lead in scientific data infrastructures. Practically, it will offer **1.7 million European researchers and 70 million professionals in science and technology a virtual environment** for storage, management, analysis and re-use of research data, across borders and scientific disciplines.

- **As of 2016**, the Commission will use the Horizon 2020 Work Programmes to: (i) provide funding to integrate and consolidate e-infrastructure platforms, (ii) **federate existing research infrastructures and scientific clouds** and (iii) support the development of cloud-based services for Open Science.
- **As of 2017**, the Commission will make **open research data the default option**, while ensuring opt-outs, for all new projects of the Horizon 2020 programme. It will encourage scientific data sharing and the creation of incentive schemes for researchers and businesses to share data

2) European Data Infrastructure: the European Data Infrastructure, once fully implemented, will underpin the European Open Science Cloud. It will also support the EU to rank among the world's top supercomputing powers **by realising exascale supercomputers around 2022, based on EU technology.**

- **From now until 2020**, the Commission and participating Member States should develop and deploy **a large scale European HPC, data and network infrastructure**, including the following: (i) the acquisition of two co-designed, prototype exascale supercomputers and two operational systems which will rank in the top three of the world; (ii) the establishment of a European Big Data centre; (iii) the upgrade of the backbone network for research and innovation (GEANT) and the integration of European public services networks.

3) Exploiting the potential of quantum technologies: the European Data Infrastructure should be complemented by an ambitious, long-term and large-scale flagship initiative to unlock the full potential of quantum technologies, accelerate their development and bring commercial products to public and private users.

- The Commission will start the preparatory steps for the flagship, with the aim of launching **the ramp up phase in 2018**.

4) Financial implications: various sources of EU financing can be identified for the European Cloud Initiative: (i) Horizon 2020 Framework Programme for Research and Innovation; (ii) Connecting Europe Facility (CEF); (iii) European Structural and Investment Funds (ESIF); (iv) European Fund for Strategic Investments (EFSI).

In cooperation with Member States and stakeholders, the Commission will explore appropriate governance and financing mechanisms for the Open Science Cloud and the European Data Infrastructure and define an implementation roadmap.