



# CLOUD COMPUTING:

a different way of using IT

*Cloud computing is essential to deploy technologies such as artificial intelligence, the Internet of Things, blockchain or data analytics.*





# A FUTURE-PROOF MODEL FOR IT

Cloud offers an alternative model of **data storage and processing on demand**. Users can access their data and applications on the device of their choice over the Internet. Many services such as web-based email use cloud computing technologies, as they are **faster, cheaper** and **more flexible** than conventional computing methods.

The real economic benefits come from the widespread use of cloud solutions by businesses and the public sector thanks to the significant reduction of IT costs. Cloud computing unlocks access to future and emerging technologies, such as **artificial intelligence**, the **Internet of Things** and **blockchain**. It plays a key role to foster a competitive and innovative European economy in the digital age.

The cloud provides:

- ➔ computing storage capacities on which all types of digital services can run, for all sectors of the economy
- ➔ on demand purchasing of necessary computing resources, without running the risk of no return on investment in hardware
- ➔ start-ups and SMEs using simple computing facilities to acquire new business models and flourish as a result

Today, only 1 in 4 businesses and **1 in 5 SMEs are using cloud computing** for their daily operations in Europe. If cloud take-up increases, this will also strengthen the European economy's competitiveness and its innovation potential.



# OBSTACLES TO DATA MOBILITY

Data localisation restrictions by Member States' public authorities



62% of surveyed respondents stated that data localisation restrictions should be removed

Obstacles to movement of data across IT systems (so-called vendor lock-in)



72% of surveyed SMEs that use cloud services intended to switch providers

57% of these experienced difficulties in doing so



Legal uncertainty leading to caution on the market regarding cross-border data storage and processing

Complex EU legal patchwork applicable in different sectors/situations, but lack of overarching principle of free flow of non-personal data

55% of surveyed respondents believe that legislative action was necessary

Lack of trust due to security risks and concerns about the cross-border availability of data for regulatory purposes



57% of large businesses

and 38% of SMEs

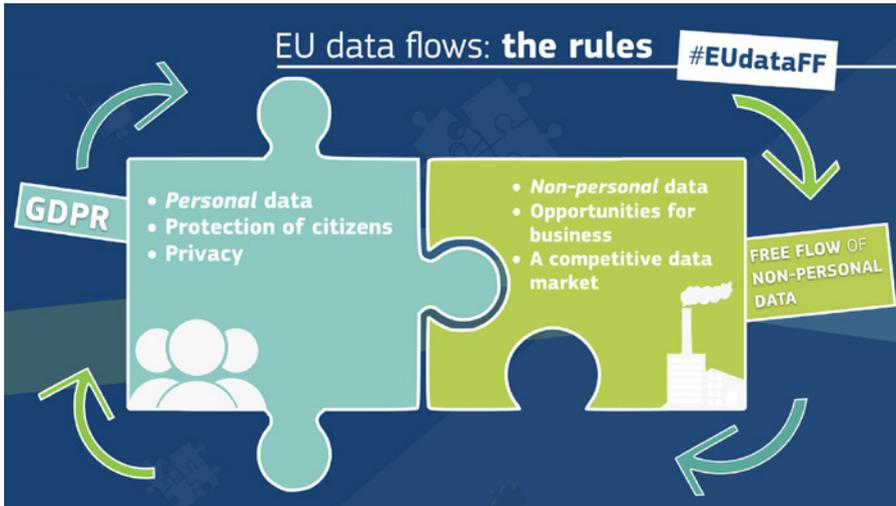


lack trust due to risks of security breaches



## GUIDANCE ON MIXED DATASETS

The Commission has published an informative guidance on the issue of mixed datasets, i.e. datasets containing both personal and non-personal data.



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The Free Flow of non-personal Data Regulation works together with the GDPR. As a result, all data can move freely within the Digital Single Market. The GDPR already provides for the principle of the free flow of personal data and the Free Flow of non-personal Data Regulation acts as an add-on to ensure that **companies will not have to treat the two different types of data differently**.

See practical guidance for businesses on how to process mixed datasets <https://ec.europa.eu/digital-single-market/en/news/practical-guidance-businesses-how-process-mixed-datasets>



## INTERNATIONAL DATA FLOWS

Data flows know no geographical borders. That is why the EU should work with **trusted third countries** to make sure that international data flows are subject to adequate **data protection** and **cybersecurity standards**. Data flows form an essential part of digital trade and they are covered by the bilateral Free Trade Agreements that the EU negotiates with its trade partners. On top of this, the Commission operationalises its international agreements through joint research on cloud computing with Japan and South Korea.

# SAFER, FAIRER AND MORE COMPETITIVE CLOUD SERVICES IN EUROPE

As more and more European businesses begin to depend on cloud services, it is important that these services comply with key European norms and standards regarding their security and data protection, as well as keeping in line with standard business practices.



It is important that the European cloud market remains competitive. This is why the European Commission is working towards a number of **self-regulatory initiatives**:

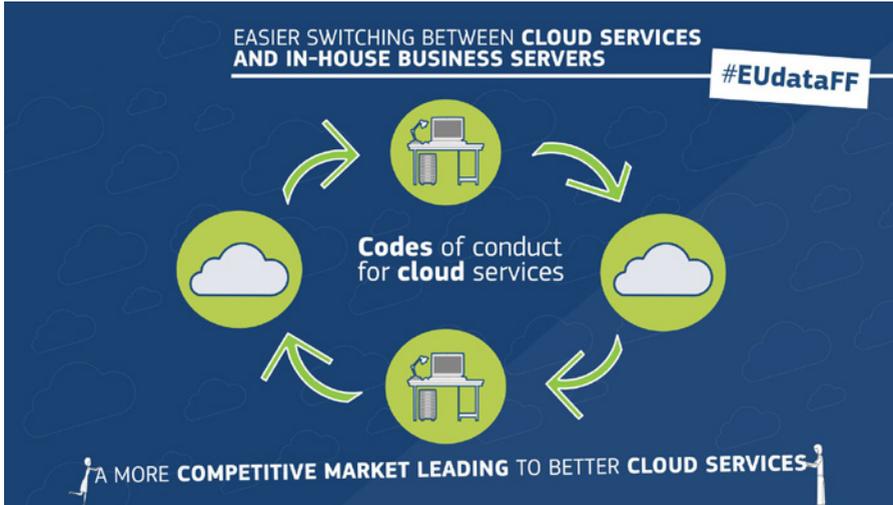
## **Fair and balanced contractual arrangements**

- ➔ ensuring high standards of quality of service by standardising Service Level Agreements
- ➔ countering 'vendor lock-in' by translating Codes of Conduct on data portability into model contract clauses
- ➔ guaranteeing that contracts between financial institutions and cloud providers comply with regulatory outsourcing requirements



## Easy data porting and smooth switching of cloud service provider

- ➔ Clients shall not feel obliged to stay with a certain cloud provider only because they fear that their data cannot be transferred to another provider (vendor lock-in). Industry Codes of Conduct will facilitate data porting.



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## An EU-wide Cloud cybersecurity certification scheme

- ➔ Businesses need a certain level of trust from their cloud provider. A single European scheme for cloud security certification will build trust in cloud computing and provide legal certainty with regards to the many different commercial schemes that exist today.



## Code of Conduct on energy efficiency of data centers

- ➔ This has shown to be effective when reducing the energy consumption of cloud providers. The corresponding criteria should be used in Green Public Procurement to enable a market-push for green clouds.



## Codes of Conduct on data protection in cloud computing

- ➔ Data protection is a fundamental right for EU citizens. Several Codes of Conduct have been developed by industry to ensure that cloud services on the European market comply with the GDPR.



# INVESTING IN CLOUD COMPUTING: BOOSTING INNOVATION POTENTIAL FOR BUSINESSES IN EUROPE

In the Horizon 2020 funding programme, the EU has invested around €300 million in projects related to cloud computing and software between 2014 and 2020.

## SOME SUCCESS STORIES:



### SUNFISH

Platforms for the federation of public sector clouds, using blockchain for sensitive data. The pioneering project received a wide level of interest among public administrations: 6 Member States collaborated closely by safely sharing sensitive information such as criminal records, taxpayer details and data on healthcare.



### BIGCLOUD (EU-Japan)

A smart city platform empowering citizens to use cloud technologies, the Internet of Things ('digitally connected objects') and big data analytics. A pilot of jointly developed platforms were rolled out in 4 European and 4 Japanese cities.



### COEMS

A platform for the non-disruptive online detection of software failures, e.g. real-time applications for aircrafts and trains.

## GREEN CLOUD SOLUTIONS: THE ENERGY EFFICIENCY OF CLOUD COMPUTING TECHNOLOGIES

An ongoing study to assess the current and future energy consumption and state-of-the-art aspects of cloud computing services in Europe. It will propose recommendations for energy-efficient cloud computing and adequate market policies; results are to be expected by early 2020.





# THE FUTURE OF CLOUD COMPUTING IN EUROPE

Europe needs cloud computing for the **digital transformation** of its economy. The cloud will increasingly underpin various services provided to consumers, from controlling train traffic and calculating the amount of bank credit that consumers receive to hosting online eCommerce platforms on which Europeans can do their shopping. In addition, the European public sector will be increasingly cloud-based, as it delivers the best value for taxpayer's money in terms of IT services.

This all-encompassing importance of cloud computing is why it is so important that **cloud services can be trusted, remain affordable, secure** and that they work in the best interest of our society. The Commission has been working to achieve this for nearly a decade; this is often done in collaboration with the industry through self-regulatory processes.



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