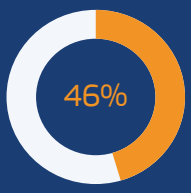
Advanced Technology Watch - Technology Focus on Cloud Computing

Cloud computing defines the storing, processing and use of data on remotely located computers accessed over the internet.

Cloud computing models have the capability to make advanced computing services and software accessible to SMEs and other consumers at reasonable cost, thereby accelerating digitalisation in society and the economy.

By 2025,
46% of the world's stored data will reside in public cloud environments



Key features of cloud computing:

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service, including monitoring and constantly optimising the use of computing resources

The public cloud market offers personal data storage, easy access and file sharing. Examples are:

- Software as a service (SaaS)
- Platform as a service (PaaS)
- Infrastructure as a service (IaaS)

Cloud demand

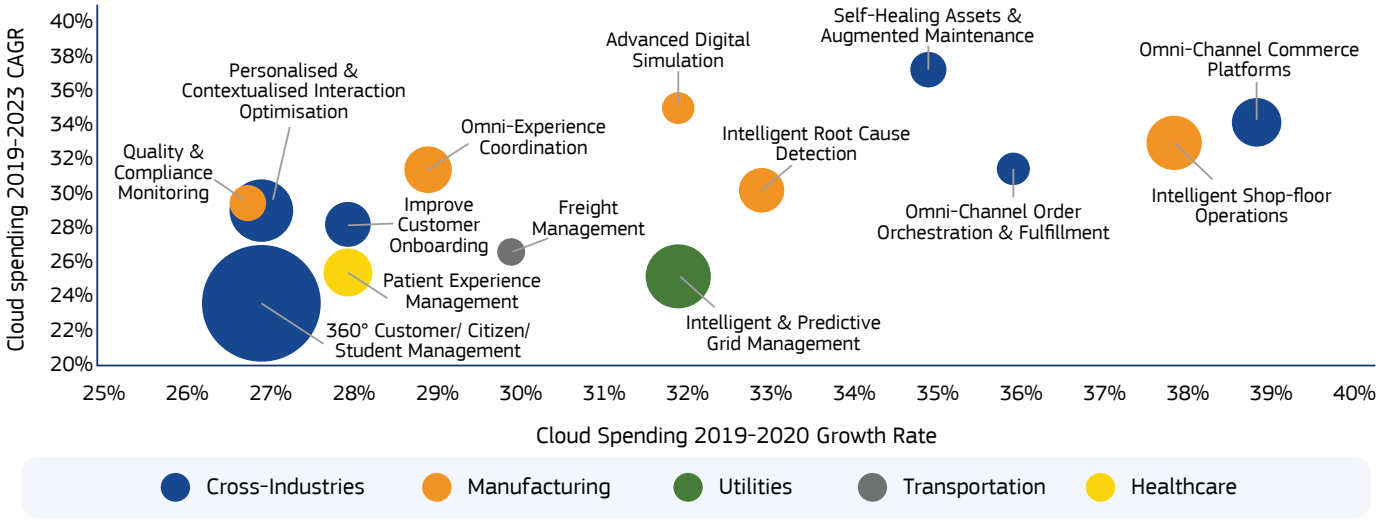
Public sector

European governments have adopted cloud computing deployment model types, from public cloud to on-premises private cloud, and have organically built more complex hybrid and multicloud environments.

Private sector

Companies' adoption of cloud technologies has varied across EU Member States. Cloud uptake is increasing, with quicker adoption from large companies and SMEs needing more action and assistance. Moreover, there is diversity in the comparative strengths of national industries, with certain industries moving much faster than others, such as the IT industry.

Use cases expanding most quickly and achieving the highest value are those that can be applied across industries



Several digital transformation use cases have been identified as interesting business opportunities enabled by the cloud based on current and forecast levels of cloud computing spending:

> The need for one use case to be applied across multiple locations
> The use of various types of data
> The need for real-time data sharing

For more information, read the full Advanced Technology Watch Report on Cloud Computing here:
https://ati.ec.europa.eu/reports/technology-watch/technology-focus-cloud-computing

The emergence of alternative cloud models, the development of edge computing and the need to deal with sustainability challenges are key topics which are shaping the evolving cloud market

Cloud models

Cloud federation brings locally available nodes together to solve a problem.

Edge computing

Infrastructure balance will go towards 80% in network edge and 20% in cloud-based infrastructure.

Environmental sustainability

The increase of capacity in data centres drives energy consumption. Distributed cloud services are less energy efficient than centralised data centres. Synergies need to be put in place to address these challenges.

European policy plays an important role in promoting the standardisation, interoperability, sustainability of cloud offerings and addressing key challenges

Cloud Management Challenges
The need to leverage edge and cloud resources from multiple cloud providers requires a common approach

Cloud Data Privacy and Security
Data security and protection requirements need to be addressed to protect stakeholders' interests

Standardisation, Interoperability, and Data Portability
To enable cross border data flow, offerings need to comply with standardisation, interoperability and non-personal data portability needs

Cloud Provider Management
To support switching cloud provider or moving towards multicloud environments

Regulatory Compliance
Uncertainty persists about the compliance of cloud service providers with important EU rules and standards

Skills and Organisational Challenges
Need for technical and supplier management skills necessary to develop, deploy, and manage cloud services

The Dominance of Non-EU Global Providers
A multitude of small local IT services and cloud software providers risks lagging behind in development and innovation

Sustainability and Energy Efficiency Requirements
Resource sharing, autoscaling and the greater efficiency of data centres improve substantiality. Software design inefficiencies must be addressed

About the Advanced Technologies for Industry (ATI) project

The ATI project - funded by the European Commission - supports the **implementation** of Europe's new growth strategy with a systematic monitoring of **technological trends** and reliable, **up-to-date data** on advanced technologies.

The **Advanced Technology Watch Reports** explore the futuristic, upcoming technologies that are on the horizon of technology development today and that are characterised by high speed of evolution and a significative.

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Publications Office of the European Union

PDF: ISBN 978-92-9460-414-9 doi: 10.2826/440184 EA-03-21-057-EN-N
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