



IPCEI on High Performance Computing & Big Data enabled Applications

A European initiative coordinated by the Luxembourg Ministry of the Economy

High Performance Computing (HPC) and Big Data (BD) applications are enabling technologies for all industrial sectors and are considered essential in the context of the digital economy. In the 21st century, digital data records have to be considered as economic and societal assets, similar to natural raw materials or financial means. Online services and user generated data are driving the digital economy. Smart technologies, such as the Internet of Things (IoT), will further boost this trend and are offering new fantastic business opportunities.

In recognition of the important societal and economic benefits that can be derived from HPC and Big Data enabled applications; France, Italy, Spain and Luxembourg launched an **“Important Project of Common European Interest” (IPCEI)** with the declared aim to develop and implement next-generation HPC and Big Data technologies and applications to improve Europe’s position in a global digital market. The objective is to make HPC and Big Data accessible to private companies, with a specific focus on Small and Medium sized Enterprises (SMEs).

This will be achieved by creating a pan-European HPC and Big Data ecosystem enabling seamless cross-border data transfers in a Digital Single Market (DSM) and the implementation of a set of innovative smart software applications. Large scale Test Beds will be deployed in the IPCEI participating countries for accelerating the digitalization of the European economy and to test secure cross-border data exchange mechanisms under real-life conditions.

Privacy and data protection are important issues in the context of a functioning Digital Single Market. The IPCEI initiative aims to close the gap between mandatory data protection requirements on one side, and creative business initiatives on the other side. **“Cybersecurity and Data Privacy by design”** concepts are integral parts of the planned pan-European HPC and Big Data ecosystem.

The IPCEI initiative will be a first concrete “lighthouse project” in the context of the implementation of a functioning Digital Single Market in Europe.

In Luxembourg, it is foreseen to develop innovative applications with a clear intention that HPC and Big Data capacities should be used to improve everyday life and to strengthen the national economy. The areas under consideration are: Space, Personalized Medicine, Industry 4.0, Fintech, Energy, Smart City and Smart Mobility applications, just to give some examples.

During the last decade, Luxembourg made important efforts for implementing state-of-the-art national and international ultra-fast fibre optic networks and world class data centres have been built to meet highest customer demands.

To complete Luxembourg's ICT landscape and to expand the national ICT value chain, preconfigured and easy-to-access High Performance Computing and Big Data applications will be added.

The objective is to reduce entry barriers. New business models, on a pay per use basis, will open the way for SME's to HPC and Big Data technologies and in particular start-ups will benefit from this new approach. Preconfigured, ready-to-use HPC-BD infrastructures will enable third parties to set-up quickly and in very flexible way new digital value chains. At the same time, the provision of open, transparent and equitable access to these essential digital resources will work as a stimulus for cooperation and a fruitful interaction among all implicated stakeholders: entrepreneurs, investors, customers, suppliers and researchers. The **"open access"** model should foster innovation in all domains and unlock the economic value of data driven services.

As the objective of the IPCEI initiative is to set-up a secure and trusted pan-European HPC and Big Data ecosystem, the following specific advantages for companies relying on advanced digital technologies can be highlighted:

- state-of-the-art High Performance Computer and Big Data enabled infrastructures,
- ultra-fast, low latency national and international connectivity,
- world-class datacentres,
- preinstalled storage and processing power,
- real-time computing systems for time-sensitive workloads,
- real-life Test Beds for validating new data driven applications and services,
- fully compliant e-infrastructures respecting the European General Data Protection Regulation (GDPR).

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