



DATA NEXUS

Introducing the EU Cluster Harnessing Extreme Data using Advanced European Technologies

Seven EU projects collaborate around shared mission to extract meaningful insights from extreme data

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As part of the Horizon Europe funding programme, seven pioneering projects have received funding to address the challenges posed by extreme data generated by IoT, industrial, business, administration, environmental, scientific and societal sources. These projects are pursuing innovative approaches that integrate cutting-edge technologies, including Artificial Intelligence (AI), Internet of Things (IoT), High-Performance Computing (HPC) and Edge/Fog/Cloud Computing.

Under the 2022 Horizon Europe call for Digital and Space, topic “World Leading Data and Computing Technologies”, the EU recognises the intrinsic value of data for EU’s competitiveness. Projects funded under the cluster [HORIZON-CL4-2022-DATA-01-05 - Extreme data mining, aggregation and analytics technologies and solutions](#) seek to securely extract meaningful insights from raw data, facilitating advanced decision-making strategies.

Methodology and Novelty

Through unique methodologies and application cases, each of the seven projects contribute to strengthening European capacities for agile responses to urgent needs by developing and enabling the uptake of the next generation of computing and data technologies and infrastructures. Operating within the framework of European values, the projects emphasise human-centred and ethical development of digital and industrial technologies, promoting trustworthy technology that empowers end-users.



**Funded by
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The projects leverage innovative infrastructures, converging and working seamlessly across the compute continuum. With diverse application cases, ranging from crisis management, mobility, to food security, the projects aim to bring their innovative work closer to end-users, making it a reality for them.

The Cluster Objectives

The cluster is dedicated to fostering a vibrant community within the seven projects. By creating a space for exchange, knowledge-sharing and network-sharing the cluster aims to create a synergetic ecosystem. This collaborative effort maximises the impact of the projects by enhancing communication networks and facilitating exchange, with partners from across Europe, showcasing the effectiveness of Horizon Europe and laying the foundation for future collaborations.

DataNexus in summary

The seven projects in the DataNexus cluster are:

Graph-Massivizer: Extreme and Sustainable Graph Processing for Urgent Societal Challenges in Europe.

Use Cases: Massive graph representation of extreme data in:

- Data Center Digital Twin for Sustainable Exascale Computing
- Green AI for Sustainable Automotive Industry
- Global Foresight for Environment Protection
- Green and Sustainable Finance

NEARDATA: Extreme Near-Data Processing Platform.

Use Cases: A near-data platform for consumption, mining and processing of data in:

- Genomics
- Metabolics
- Surgery

EXA4MIND: EX4MIND platform for extreme data enables advanced data analytics on supercomputers and automated data management with support for integration by design with European data ecosystems.

Use Cases:

- Systematic improvement of molecular simulations and accuracy
- Massively automated annotation and evaluation of automotive camera recordings
- Smart farming/viticulture with sensors and satellite imagery
- Secure data mining in health data

EXTRACT: A distributed data-mining software platform for extreme data across the compute continuum.

Use Cases:

- Personalized evacuation route system (mobile app)
- Transient astrophysics for analyzing space weather

SYCLOPS: Scaling extreme analytics with cross-architecture acceleration based on open standards, and advancing AI/data mining by democratizing its acceleration through open standards.

EFRA: Extreme Food Risk Analytics.

Use Cases:

- Risk predictions for poultry pathogens
- Enhanced predictive capabilities for pest alarms
- Informing regulatory decisions with food risk intelligence

EMERALDS: Extreme-scale Urban Mobility Data Analytics as a Service. The MAaaS toolset will stand out by moving analytics and sensitive data analytics to edge computing, enhancing response times and safeguarding data privacy.

Use Cases:

- Mobility analytics as a service toolset
- Risk-assessment, prediction and forecasting during events
- Multi-modal integrated traffic management
- Trip characteristics inference and traffic flow data analytics



DATA NEXUS

By focusing on enabling technologies and their applications for Europe, the cluster contributes to advancing European technology and making extreme data useful for addressing economic, societal and industrial needs.

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