



Destination Earth: AI/ML Capabilities of the DestinE Data Lake

Enabling scalable AI/ML development across cloud and HPC infrastructures

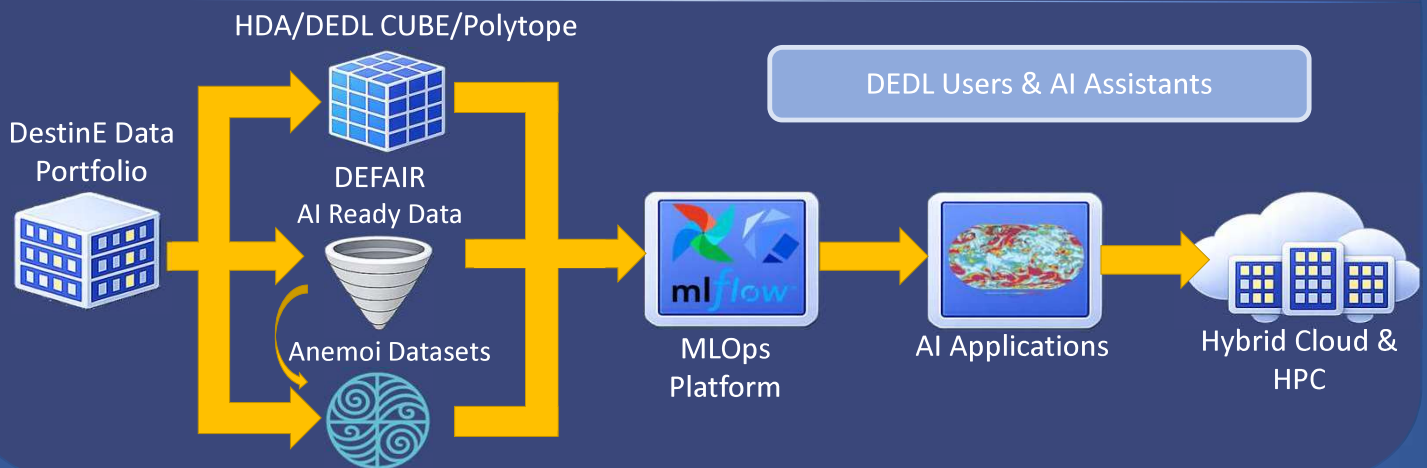
Destination Earth (DestinE)

A flagship EC initiative developing a highly accurate digital model of the Earth (digital twin of the Earth) to model, monitor and simulate natural phenomena, hazards and the related human activities. DestinE is implemented by EUMETSAT, ESA and ECMWF.

EUMETSAT's Role in DestinE

- Provision of DestinE Data Lake (DEDL)
- Data Hosting and Access (DestinE Data Portfolio)
- Harmonised Data Access to PBs of federated data
- Edge Services for Near-Data Processing including AI/ML for data preparation and inference

Envisioned Workflow Example for AI/ML Developments on DEDL



Summary of DEDL Capabilities in relation to the AI/ML Projects

AI/ML models based on Satellite Data for DestinE Users

Meteosat Third Generation Super Resolution

Enhancing spatial and temporal resolution of satellite imagery using Deep Learning

Cloud Forecasting

Improved Cloud forecasting using MSG and MTG products, ERA5 and Extreme Digital Twin data

DEDL Capabilities in Action

- Workflows orchestrated via Airflow
- Experiment tracking and model registry mlflow
- Access to object storage (s3)
- GPU-enabled development environment
- Support on seamless Cloud-HPC migration

Operational Validation

- Outputs evaluated by domain experts
- End user testing (NMHs, solar energy provider) to ensure real world usage
- Iterative refinement based on expert feedback

Build your AI/ML Applications on DEDL

- Access to PBs of data
- Analysis-ready data and tools for preparing AI-Ready data
- Computing Near Data with Edge Services
- GPU-powered infrastructure
- MLOps Platform for Operational Reproducible Workflows

Towards Agentic Data Access

- AI Assistant in the DEDL Web Portal
- MCP Server For Tool Aware Workflows
- Context Aware Discovery & Retrieval
- Documentation Smart Search

DestinE Platform



DestinE Data Lake

