

# A Digital Twin for GEOphysical Extremes

**Ignacio Blanquer**

Universitat Politècnica de València



**DT**  **GEO**



This project has received funding from the European Union's Horizon research and innovation programme under the grant agreement No 101058129

# DT-GEO general objectives

01

Deploy a pre-operational prototype of **Digital Twin (DT) on geophysical extremes** (potential integration in the Destination Earth flagship initiative)

02

Implement 12 **Digital Twin Components (DTCs)** addressing specific hazardous phenomena from **volcanoes, tsunamis, earthquakes**, and anthropogenically-induced extremes in order to conduct data-informed:

1. Early Warning Systems (EWS)
2. Short-term forecasts
3. Long-term hazard assessments

03

Provide a flexible framework for **automated FAIR-validation** of Digital Assets (DAs) and its integration in 2 Research Infrastructures (RIs)

04

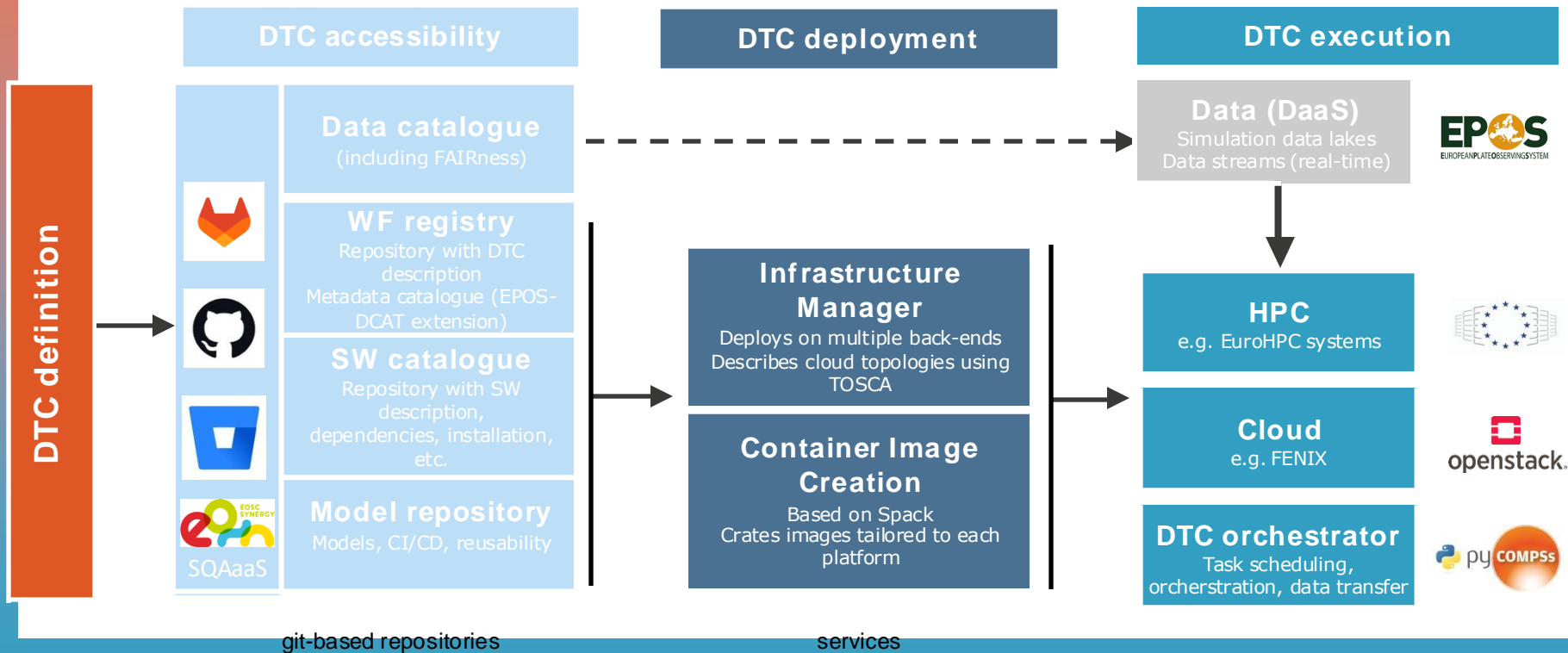
Verify the DTCs in operational environments at 13 **Site Demonstrators** (SDs) of particular relevance located in Europe and beyond



DTC	Hazard	Name
1	Volcano	Volcanic unrest
2		Volcanic ash clouds
3		Lava flows
4		Volcanic gas dispersal
5	Tsunami	Tsunami Forecasting
6	Earthquake	Seismic Hazard
7		Earthquake forecasting
8		Tomography
9		Fault rupture
10		Shaking simulation
11	Aftershocks	
12	Anthropogenic	Anthropogenic seismicity

# DT-GEO blueprint architecture

<https://gitlab.com/dtgeo>



# Relation of DT-GEO and EOSC

DT-GEO is deeply engaged with the compliance to the FAIR principles and the EOSC vision.

- Public registry of assets (<https://gitlab.com/dtgeo>)
- Assessment of the FAIR principles through FAIR Eva
- Adoption of the EPOS DCAT-AP, extending it to support DT-GEO specific metadata
- Adoption of standard specification for the deployment of the DT (Git repository, containers, spack specifications, TOSCA blueprints)
- Software Quality Assessment through EOSC-Synergy SQAaaS
- Integration with existing e-Infrastructures
- Services for DTC reusability (catalogues, registries, and repositories), including the creation of a Workflows Hub Registry, using the RO-Crate specification.

