Welcome to Dyamond@Moguntia

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esiwace
CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE

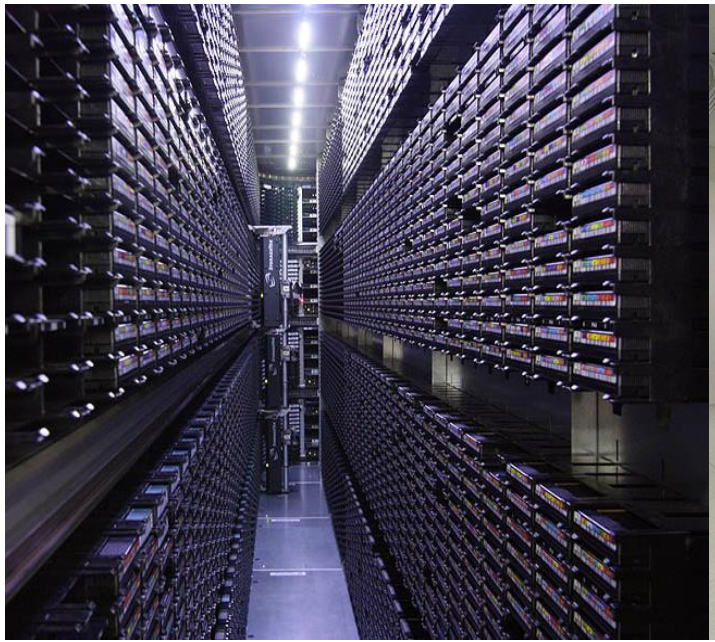
"Climate is part of Hamburg's DNA" (Olaf Scholz, former Hamburg's Prime Minister)

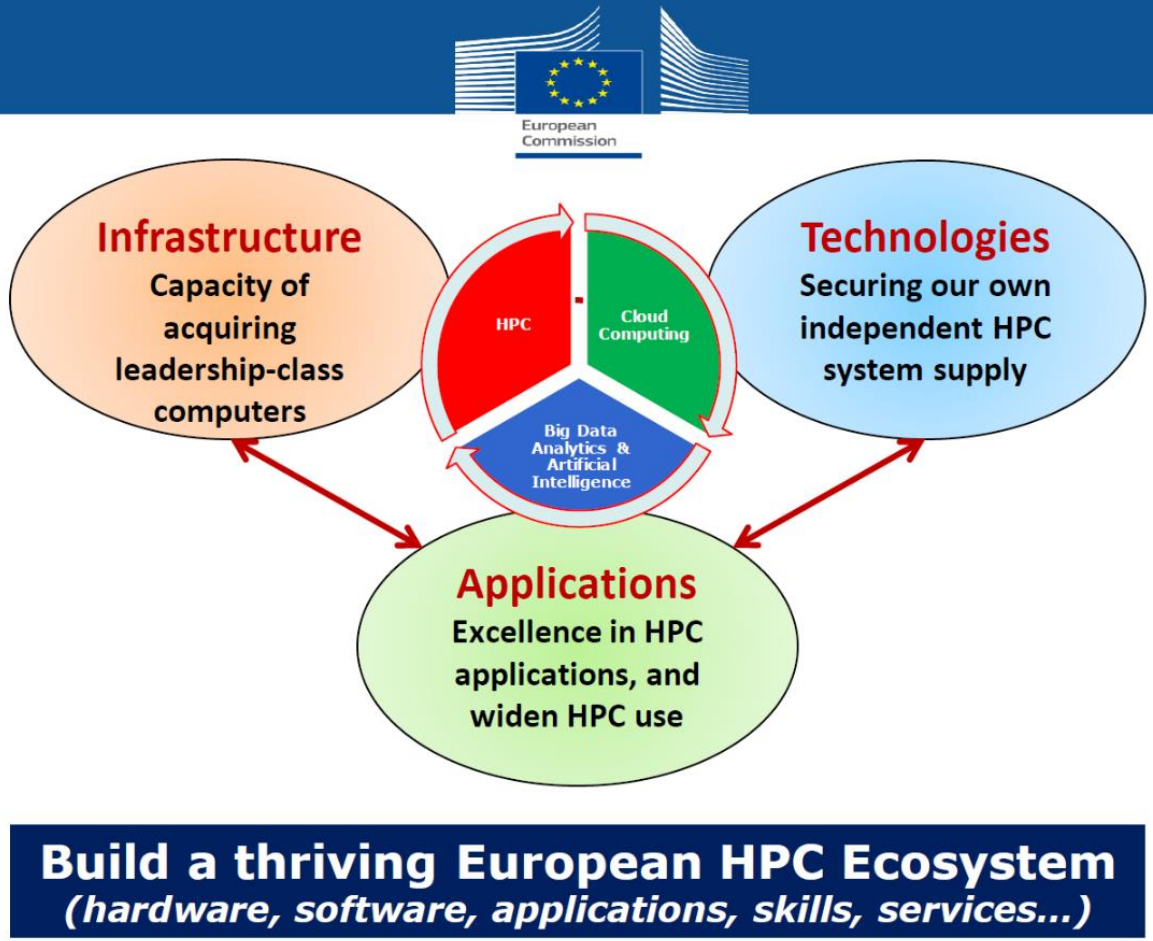
Mistral @ DKRZ (German Climate Computer Center)

bullx DLC 720, 3,500+ nodes, 100,000+ cores, Haswell/Broadwell, 3.6 PFLOPS
240 TB main memory, 54 PB disk storage, 450 GB/s mem-disk rate, FDR network
21 GPU nodes for visualization
hot liquid cooling with high efficiency

High Volume Data Archive

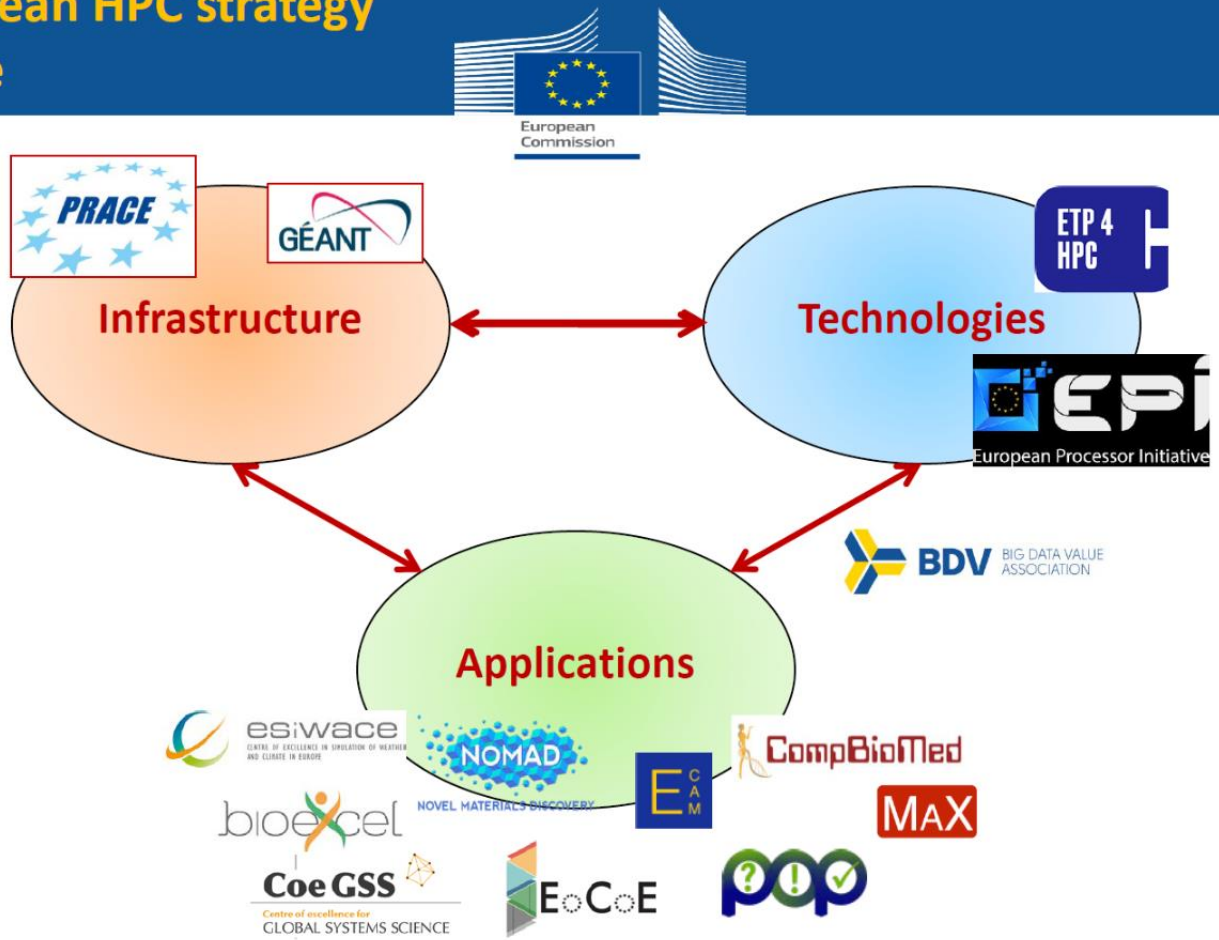
- 65,000 slots for tapes in Hamburg (10,000 remote)
- 100 PB of climate data, increase 40 PB in 2018
- 500 PB capacity until 2020





Slide Courtesy **Juan Pelegrin**; (HPC and Quantum technologies ; DG CONNECT ; European Commission (Supercomputing Conference ; November 14, 2018 ; Dallas, US)

The European HPC strategy Landscape



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CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE

Funded from European Union; Horizon 2020;
Research agreement No 675191
Duration Oct. 2016 – Sept. 2019
Funding: ca 5Mio €

DWD
allinea

DKRZ DEUTSCHES KLIMARECHENZENTRUM
ECMWF
Institut Pierre Simon Laplace
Max-Planck-Institut für Meteorologie
BSC
SMHI
Met Office
ICHEC
Bull atos technologies
cmcc
SEAGATE
National Centre for Atmospheric Science NATURAL ENVIRONMENT RESEARCH COUNCIL
Science & Technology Facilities Council
CERFACS

esiwace2
CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE

Funded from European Union; Horizon 2020;
Research agreement No 823988
Duration Jan. 2019 – Dec. 2022
Funding: ca 8 Mio €

New Partners:
eScience center
MeteoSwiss
CSCS
University of Reading
DDN STORAGE
MERCATOR OCEAN INTERNATIONAL

Challenges:

Scalability

of codes and also of software development

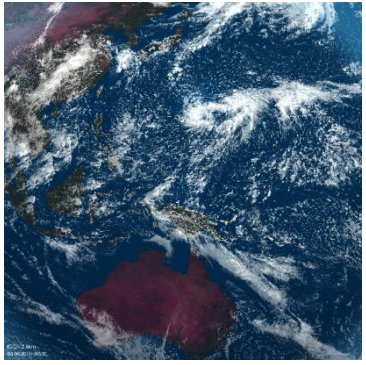
Usability

of end-to-end workflow in HPC environment

Exploitability

of huge amount of complex data

Scaling



ESiWACE has shown that **global simulations of the atmosphere at 1 km** resolution are feasible.
However, simulations were *uncoupled, model output was minimal or switched off, and execution times were much too slow for operational use*.

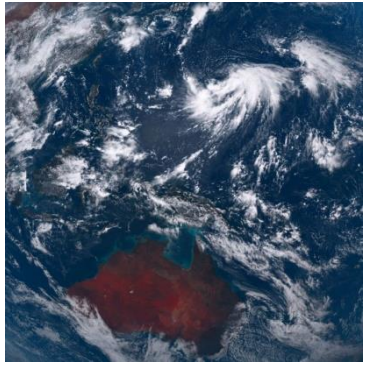
ESiWACE2 will

- **push resolution** towards unprecedented levels for coupled simulations in **production mode.**
- improve coupling and IO efficiency.
- develop infrastructure to compare results.
- port model configurations to the European pre-exascale EuroHPC systems planned for 2021.

Production mode:

- Performance of at least 1 SYPD.
- Realistic model output.
- Coupled model simulations (at

DYAMOND ff



Models configurations

- **EC-Earth:** 16 km (TL1279) atmosphere couple 8 km) ocean
- **ECMWF:** 5 km (TCo1999) atmosphere coupled to km) ocean
- **ICON-ESM**: 5 km atmosphere coupled to a 5 km ocean, aiming at higher resolutions for the ocean
- **The IPSL model**: 10 km atmosphere coupled to a 1/12 degree (~8 km) ocean

- **Plus prototype service activity to support further models and tools**