

Earth Observation Data Centre

A Cooperation to Master Big Data in Earth Sciences

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Earth Observation Data Centre for Water
Resources Monitoring (EODC)

EODC Mission

- EODC will work together with its partners from **science**, the **public**- and the **private** sectors in order to foster the use of EO data for monitoring of water and land
- EODC acts as a **community facilitator**
- Joint developments
 - Cloud infrastructure
 - Operational data services
 - Software
 - Open Source
- Processing of Big Data
 - From satellite raw data over EO data products up to model forecasts
 - Focus on European Satellites with high temporal coverage
 - Sentinel-1, Sentinel-2, etc.

Implements a New Paradigm in earth science data processing to master big data volumes and increasing complexity

Cooperation Model



- Work is done within the “Communities”
- Strategic decisions taken by
 - EODC Executives
 - Advisory Board
 - Shareholder Assembly
- Democratic voting principles
 - No Veto

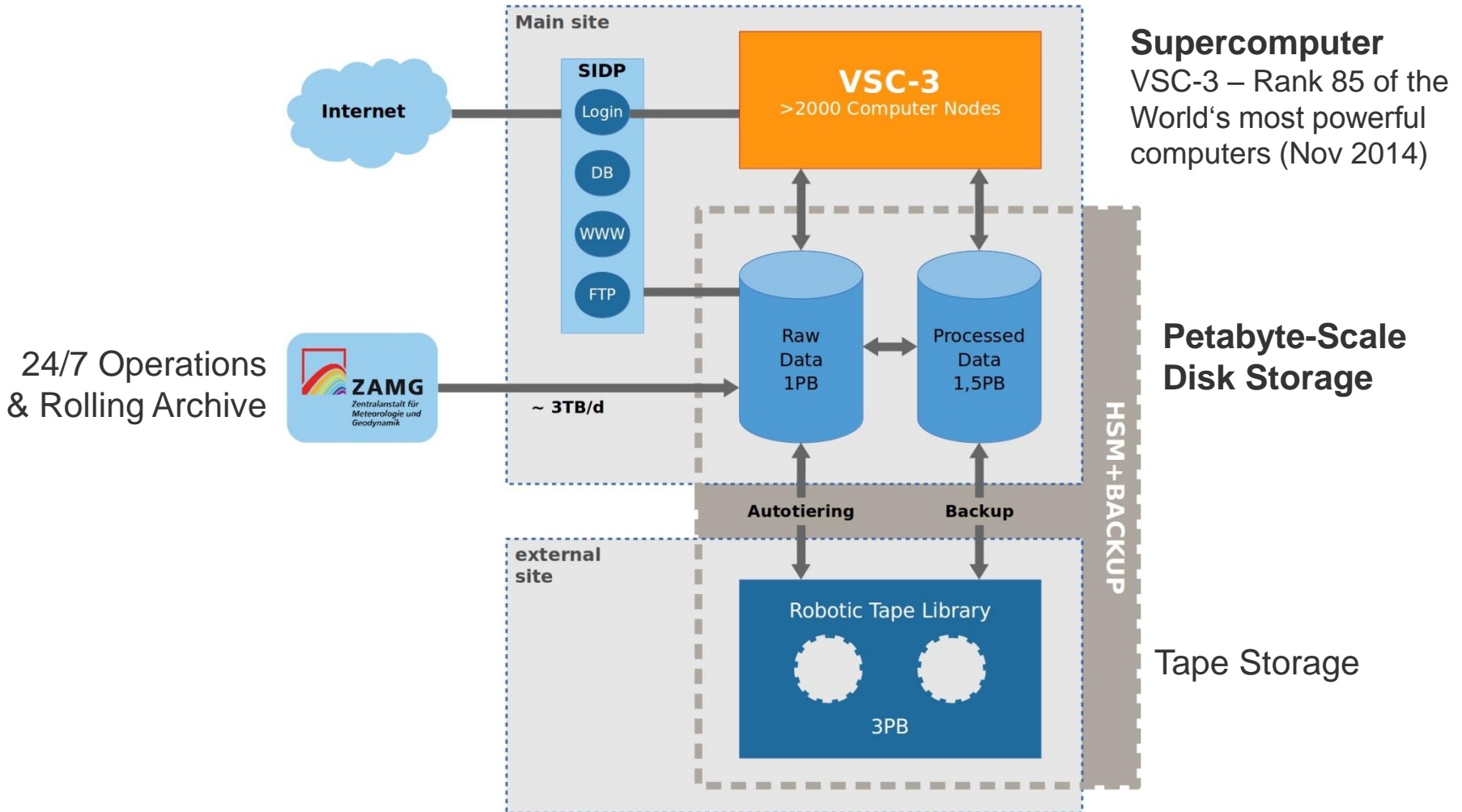
EODC Cooperation Partners

- Already 10 partners from 5 countries
 - With background in ICT, earth observation and earth science applications



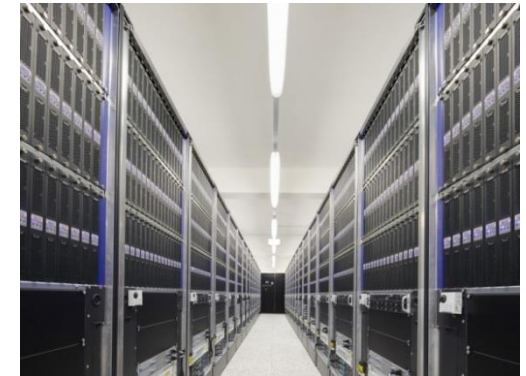
Petabyte Storage & Supercomputing @ TU Wien

Virtual Machines (VMs)



Vienna Scientific Cluster 3

- Hosted by Science Center of TU Wien
- Cooperation of 8 Austrian Universities
- >32.000 cores with >600 Teraflops
- Cooling with mineral-oil in 35 tanks
- Power 540 Kilowatt
 - Matches the needs of ~1400 Austrian households



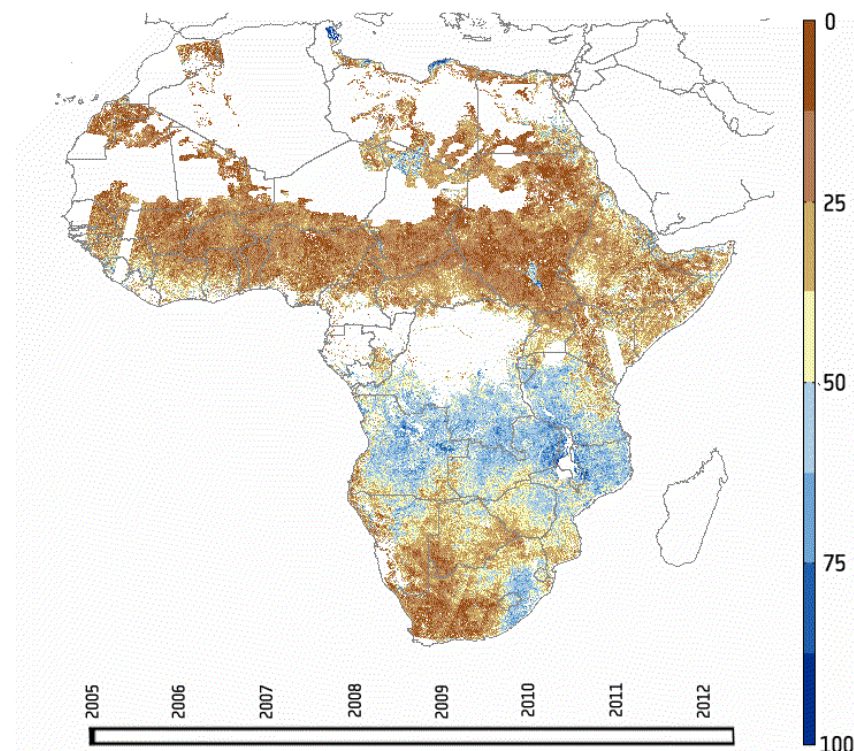
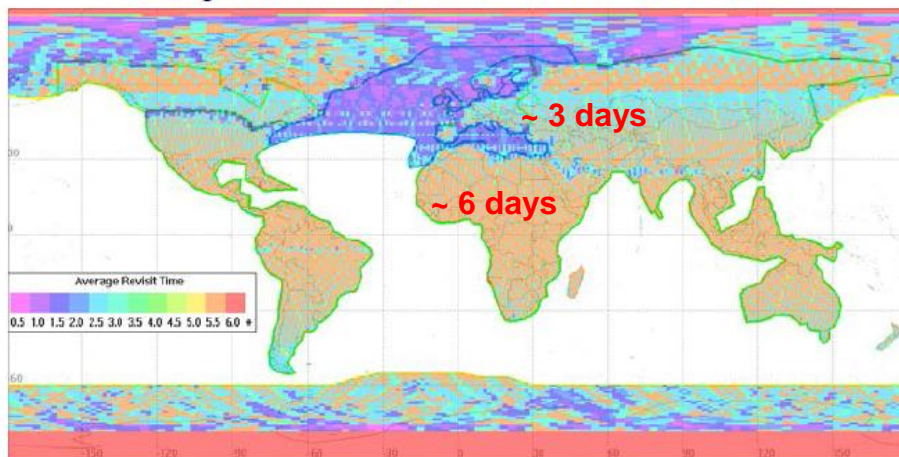
VSC-2

VSC-3 - Rank 85 of the World's most powerful computers (Nov 2014)

Sentinel-1 for Global Hydrologic Monitoring

- Sentinel-1 is the first SAR satellite to provide frequent temporal coverage at high spatial resolution
 - Suitable to monitor dynamic variables such as soil moisture, water bodies or soil freezing
- High data volumes (just over land)
 - ~25 TB p.a. at 80 m resolution
 - ~156 TB p.a. at 20 m resolution

Average Revisit Time with S-1A + S-1B Satellites



1km ENVISAT ASAR soil moisture over Africa produced by TU Wien in the ESA funded SHARE & Tigernet projects

EODC – An Open & International Cooperation

- The challenges to extract useful information from Big Data from multiple and very diverse sources (satellites, in situ, crowd sourcing, etc.) are truly significant. Many open science questions, e.g.
 - Earth observation scientists are used to work with data and models where the physical/causal relationship is known. But what if there is no causal relationship between data, just statistical correlations?
- EODC welcomes new Partners who are interested to cooperate with the existing partners in an atmosphere of open-mindedness, willingness to share, transparency, and participatory decision making
- Topics where additional expertise is e.g. welcome
 - Big Data analytics, IT-Security, data visualisation, automated testing of scientific software, state of health monitoring, reliability of service provision, crowd sourcing, data assimilation, in situ networks, data & software policies, accounting models, etc.