Verein für datenintensive
Radioastronomie

At the Heart of Future Computing Centers: Research on Algorithms

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EGI Conference 2022

Together for Tomorrow – Innovating Computing for Research

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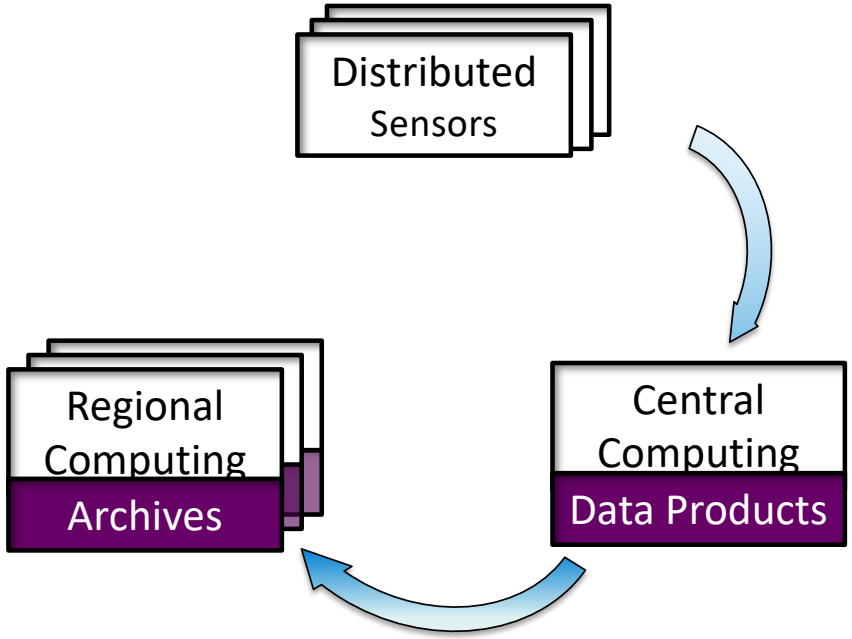
EGI 2020: Data Challenges at the Square Kilometre Array

Data Irreversibility

- Soon: only a tiny part of the data can be archived
- Decisions on what to keep are based on incomplete information



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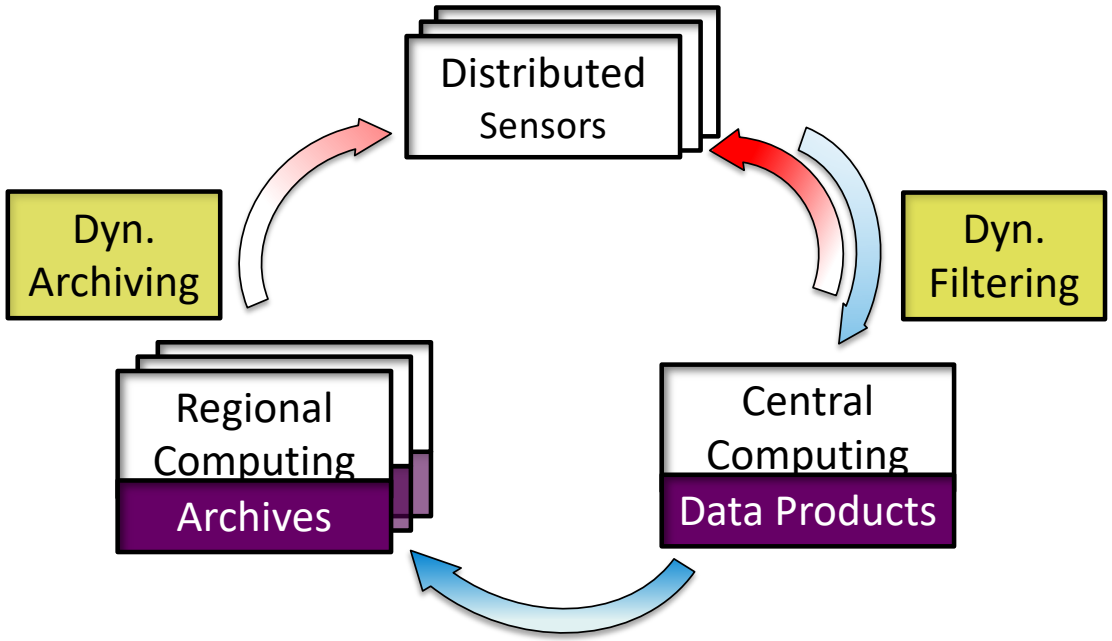
Strategies

- Dynamic filtering
  - Sensor control in realtime
- Dynamic archiving
  - Feedback from offline workflows to sensor control in near-realtime

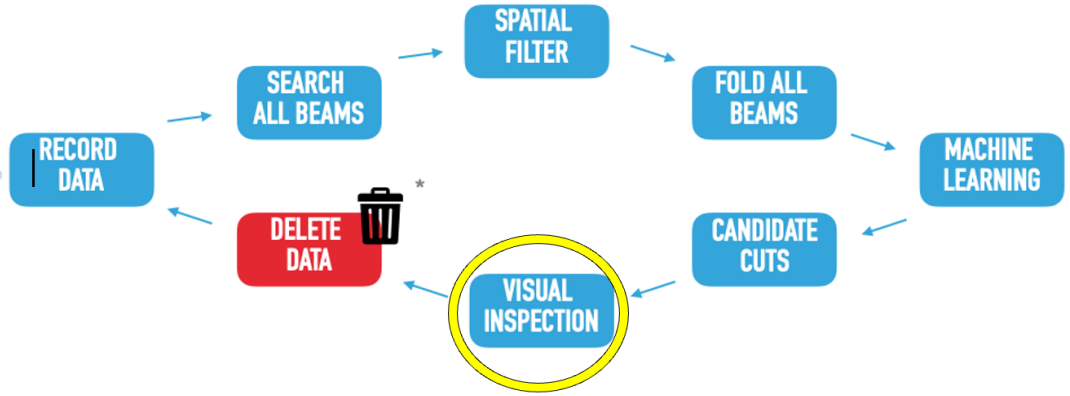


Dynamic Life Cycle Model

EGI 2021: Next-generation Green Computing

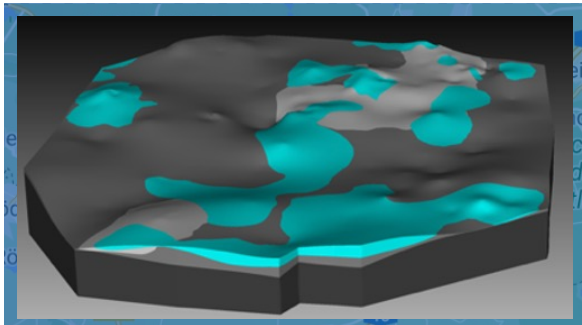
- Challenge: extracting ”rare events” out of huge data streams in realtime.
  - External interferences: uncontrollable, unknown, complex

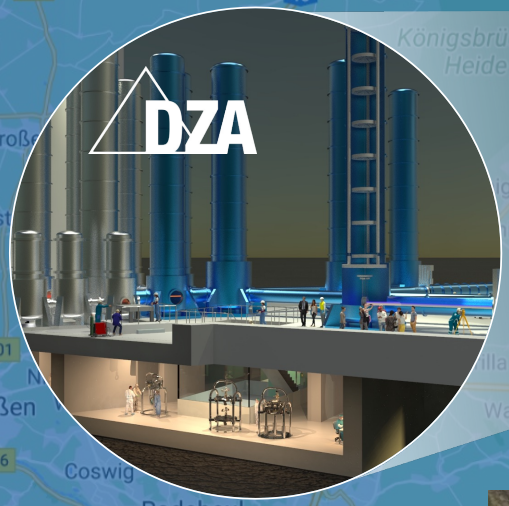
- Challenge: scaling of workflows
  - MeerKAT („TRAPUM“): 3 PB/d



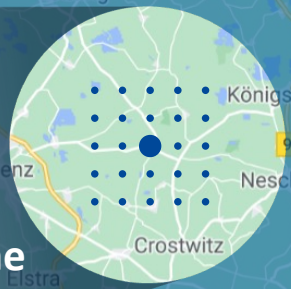
- Conclusion: Data challenges @ SKA = prototype for **Smart Green Computing**

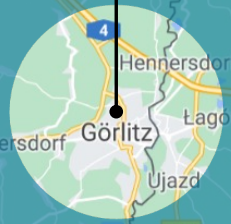
Deutsches Zentrum für Astrophysik (DZA)





Location for the
Low Seismic Lab





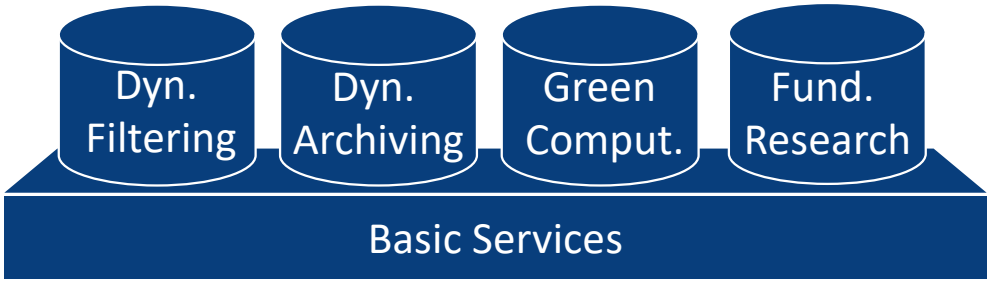
A center for astrophysics with advanced data intensive computing and technology development

TECHNISCHE UNIVERSITÄT DRESDEN

www.DeutschesZentrumAstrophysik.de

DZA

At the Heart of DZA: Research on Algorithms



Basic Services

- HPC
- Storage
- Networking
- User support

Dynamic Filtering

- Real-time computing
  - SpiNNacker2 (TU Dresden)
- Real-time Machine Learning
  - Unknown, rare signals

Smart Green Computing

- Energy-efficient architectures
- Smart Sensors

Dynamic Archiving

- Memory-based computing
- Machine Learning on Big Data
- Simulation

Fundamental Research

- Quantum Computing
- Theoretical Informatics
- Mathematics

Thank you !