



# BigDataCube:

## Towards Private/Public Datacube Analytics Federations

Symposium "Neue Perspektiven der Erdbeobachtung"

Köln, 2018-jun-24

Supported by:



Federal Ministry  
for Economic Affairs  
and Energy

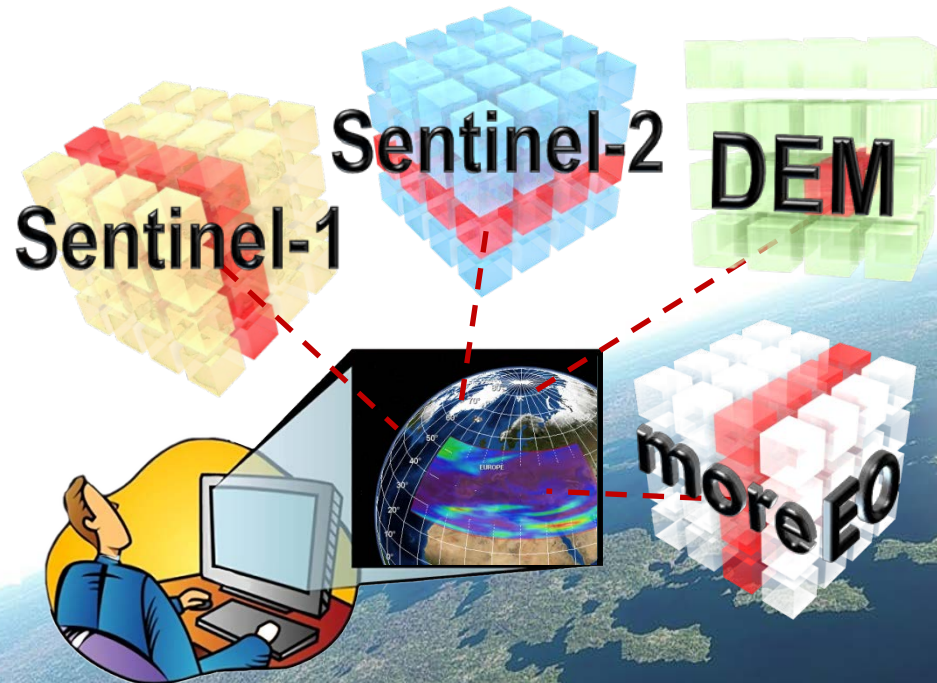
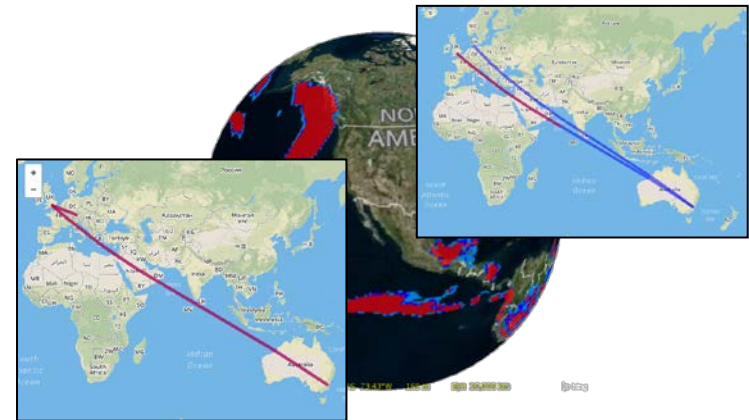
BigDataCube Team

on the basis of a decision  
by the German Bundestag



# BigDataCube: Mission & Goals

- Interactive **spatio-temporal datacubes** for analysis-ready data
  - Sample service: maritime wind & sea state
- Public/private datacube federation
  - CODE-DE + cloudeo; open
  - security & billing
- Status:
  - CODE-DE datacube precursor + cloudeo operational
  - [www.bigdatacube.org](http://www.bigdatacube.org), [code-de.bigdatacube.org](http://code-de.bigdatacube.org)





# Partners & Tasks

- Jacobs University (project coordinator) & rasdaman GmbH
  - European Datacube engine, rasdaman
  - adding billing & authorization down to single pixel level
  - Interactive datacube services @ CODE-DE
- cloudeo
  - commercial scalable geo-infrastructure
  - enhancing GeoMarketplace with datacubes
- DLR Maritime Safety and Security Lab
  - EO-based near real-time ocean condition assessment
  - maritime wind & sea state products derived from Sentinel-1

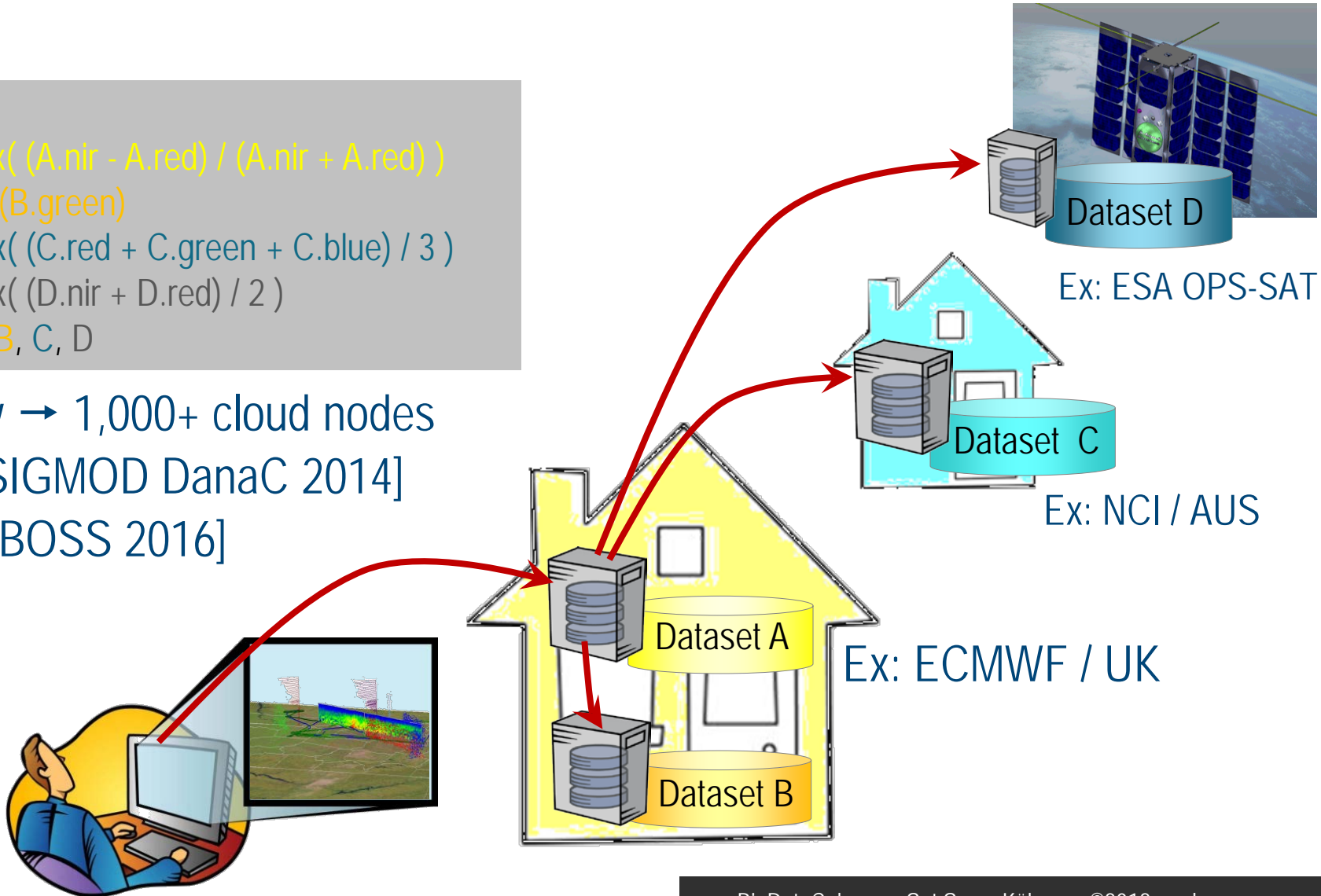




# Parallel, Distributed Processing

```
select
  max( (A.nir - A.red) / (A.nir + A.red) )
+ avg(B.green)
+ max( (C.red + C.green + C.blue) / 3 )
+ max( (D.nir + D.red) / 2 )
from A, B, C, D
```

1 query → 1,000+ cloud nodes  
[ACM SIGMOD DanaC 2014]  
[VLDB BOSS 2016]

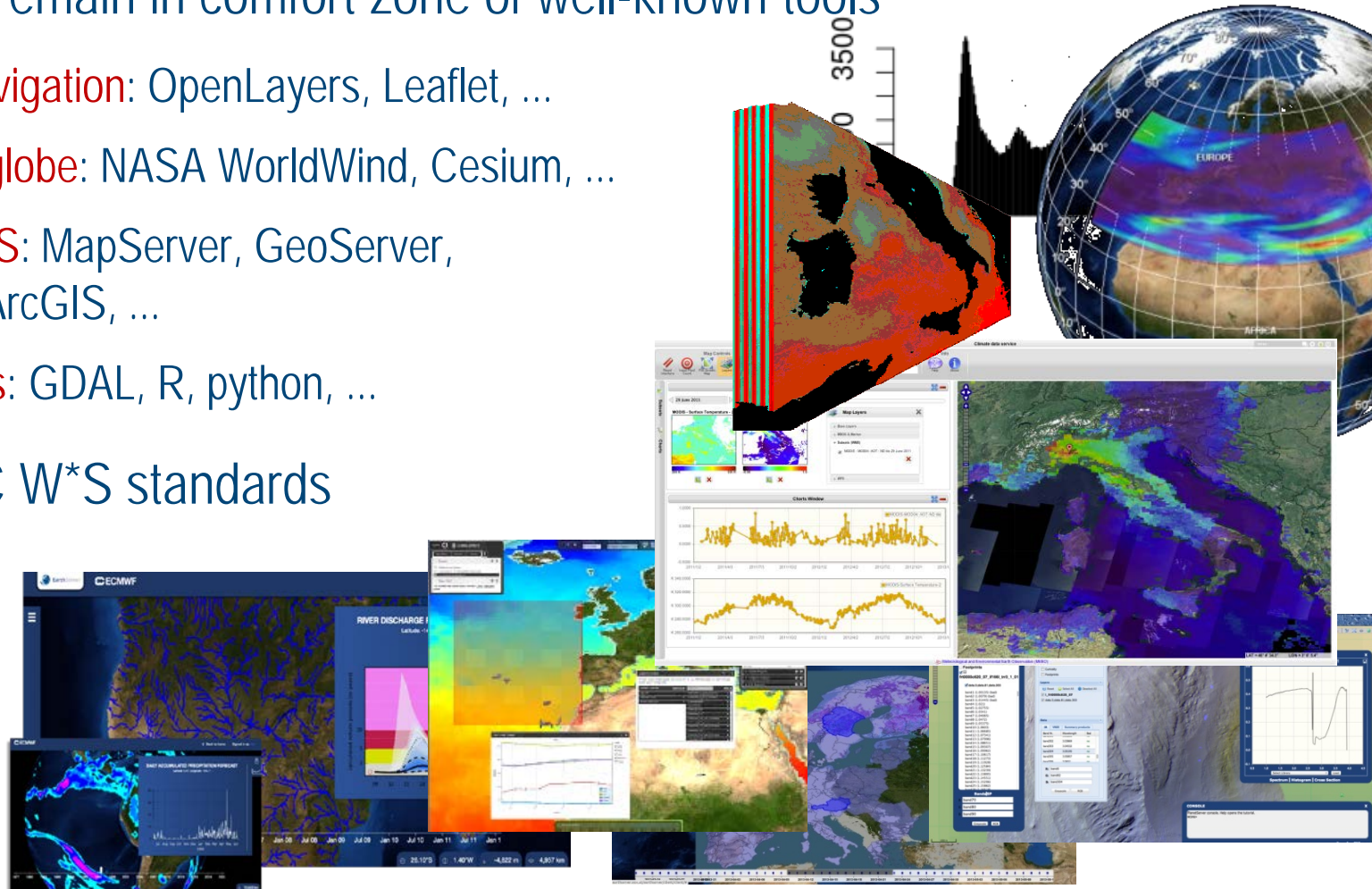




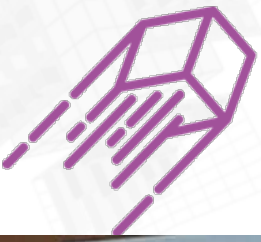


# ...But That's Not What You Want to See

- Let users remain in comfort zone of well-known tools
  - **Map navigation:** OpenLayers, Leaflet, ...
  - **Virtual globe:** NASA WorldWind, Cesium, ...
  - **Web GIS:** MapServer, GeoServer, QGIS, ArcGIS, ...
  - **Analysis:** GDAL, R, python, ...
- ...via OGC W\*S standards



[screenshots: diverse clients accessing rasdaman]



# ESA Tech Harm Strat Meetg, 2017-feb-21

## German recommendations for Roadmap

### EO Big Data

- Establish „European Datacube Federation“ as a strategic goal
  - Advancing user service quality, specifically: timeseries analytics
  - Enable flexible framework for value-adding services, through open standards
  - Maintain European technology lead
  - EarthServer as reference example to be enlarged
- Foster and Organize joint activities with platform developers and operators in member states
  - Analyse existing EO Exploitation Platforms with respect to common functions and interoperable interfaces
  - Define federation requirements including IT security aspects on appropriate levels
  - Support harmonization and standardization on interfaces of federated platforms
  - Develop components and work flows supporting harmonized scenarios and interfaces





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[code-de.bigdatacube.org](http://code-de.bigdatacube.org)

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