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raster data manager

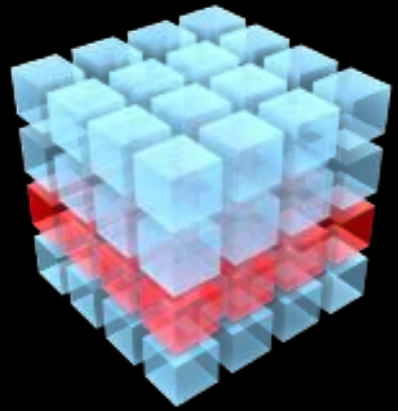
Scalable Spatio-Temporal Analysis through Open Standards: The European Datacube Engine

ESA Phi Week, Frascati, 2018-nov-16

Peter Baumann & the rasdaman team
Jacobs University | rasdaman GmbH

rasdaman: Big Datacube Analytics

= „raster data manager“: SQL + n-D datacubes
  - massively scalable Big Datacube Analytics engine
  - 2.5+ PB; 1000x parallelization
- „leading technology“ (ESA 2017)
  - Invented datacubes [Baumann 1992]
  - Research Data Alliance datacube report 2018:
    - 19 datacube tools inspected
    - „rasdaman can be 300x faster than other tools“
    - dx.doi.org/10.15497/RDA00024



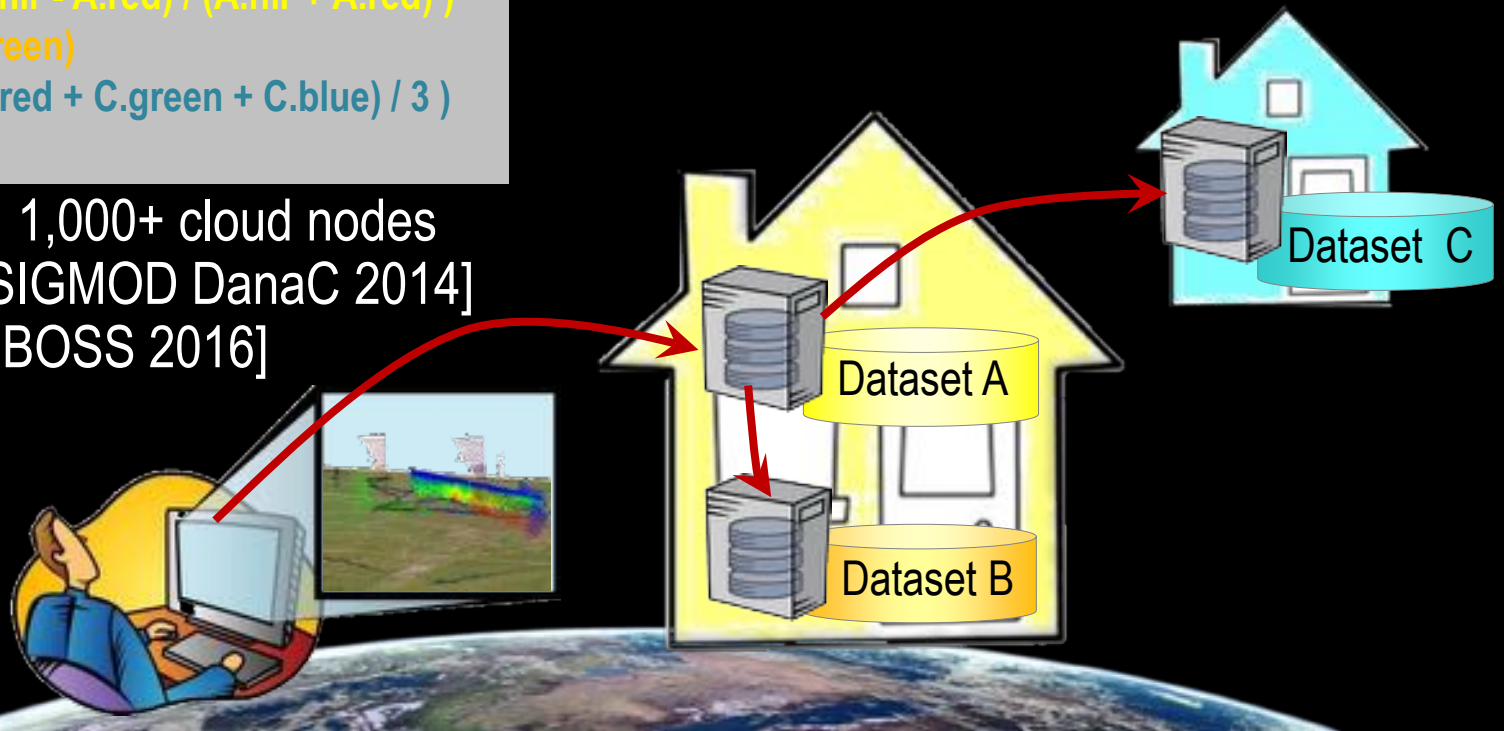
Federated Processing with rasdaman

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

1 query → 1,000+ cloud nodes

[ACM SIGMOD DanaC 2014]

[VLDB BOSS 2016]



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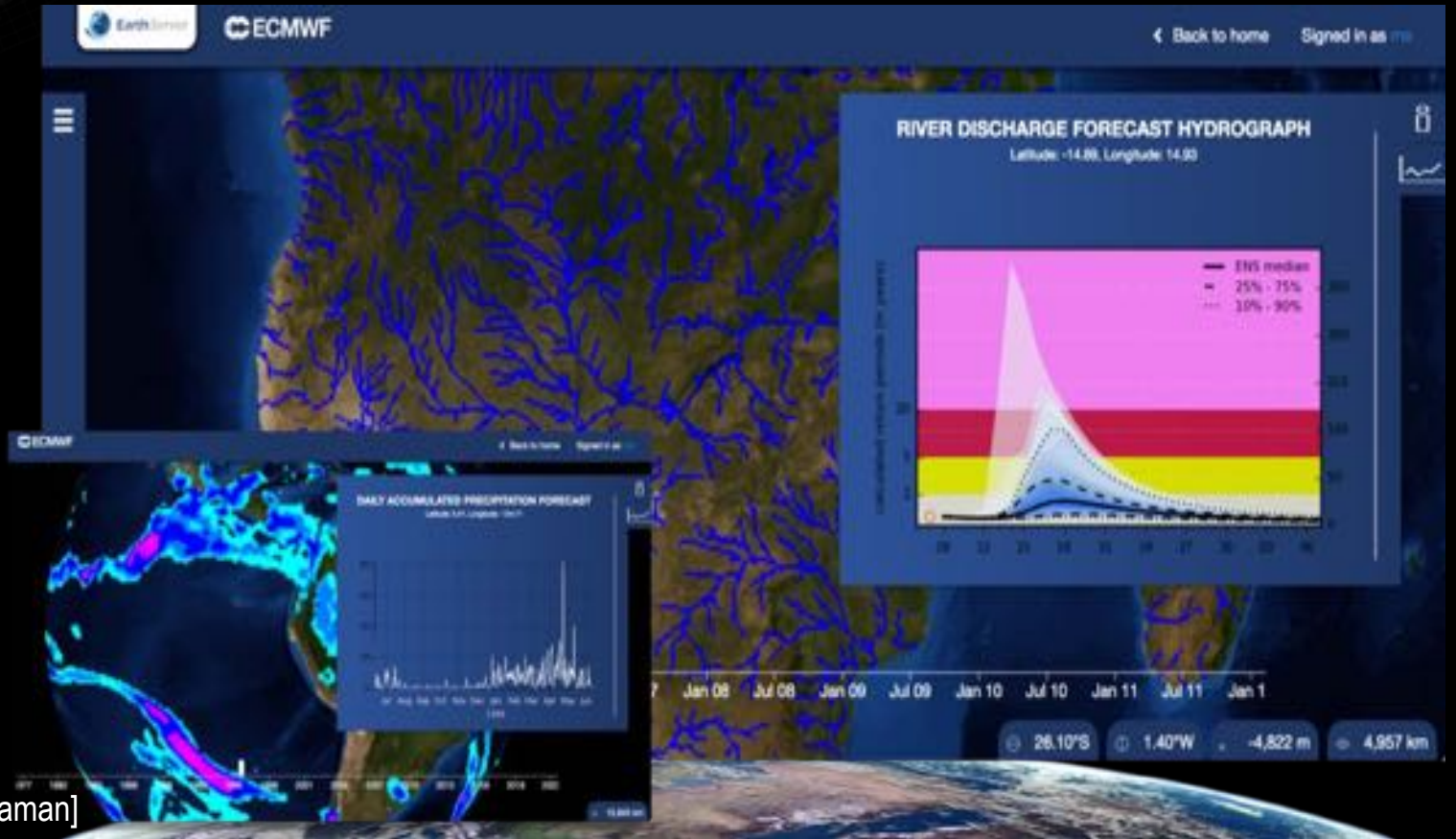
...But That's Not What You Want to See

- Open standards → users in comfort zone
  - Map navigation: OpenLayers, Leaflet, ...
  - Virtual globe: NASA WorldWind, Cesium, ...
  - Web GIS: QGIS, ArcGIS, ...
  - Analysis: GDAL, R, python, ...

ECMWF River Discharge Timeseries



[running rasdaman]

Datacubes on Virtual Globes

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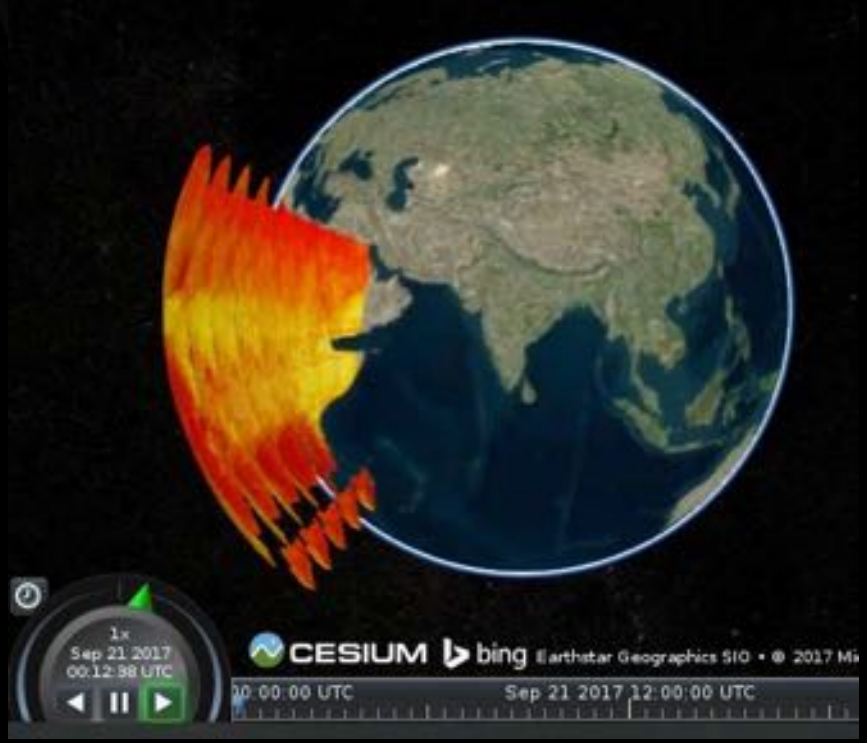

[running rasdaman]

NCI Australia: Landsat8 Datacubes

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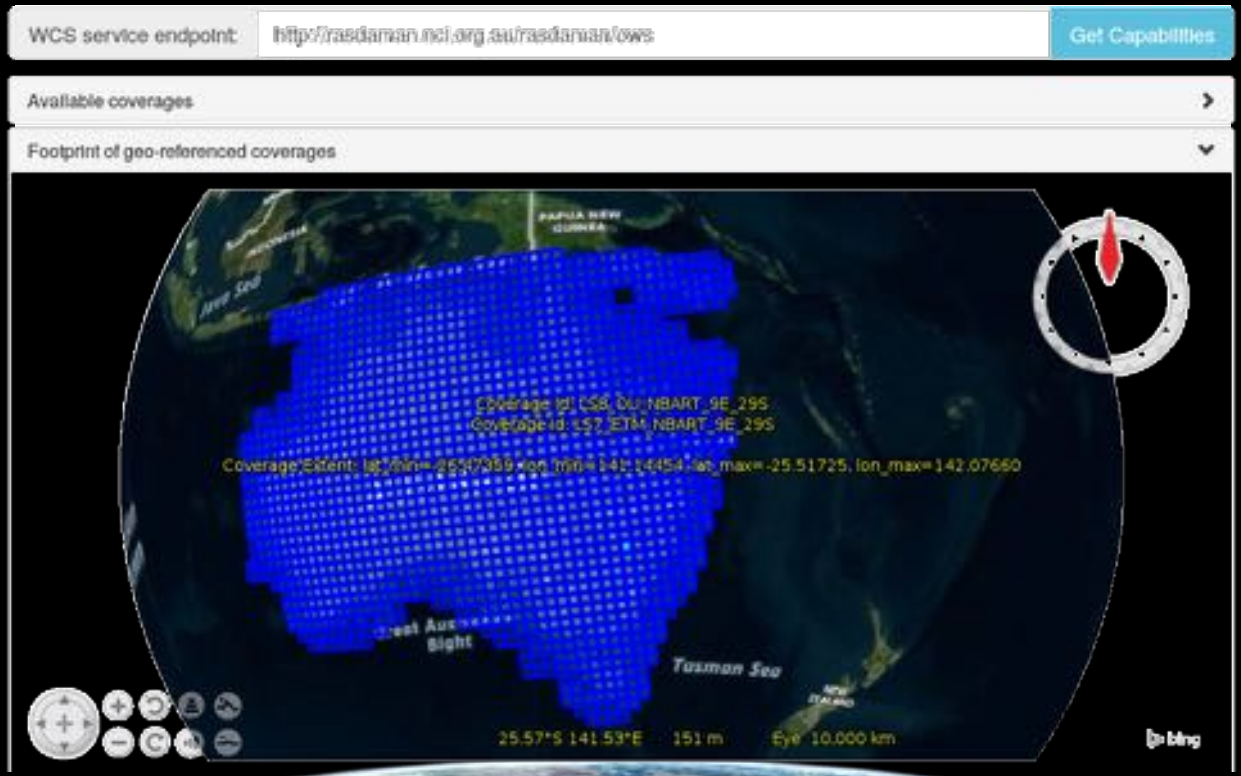

[data: NASA;
service: NCI;
running rasdaman]

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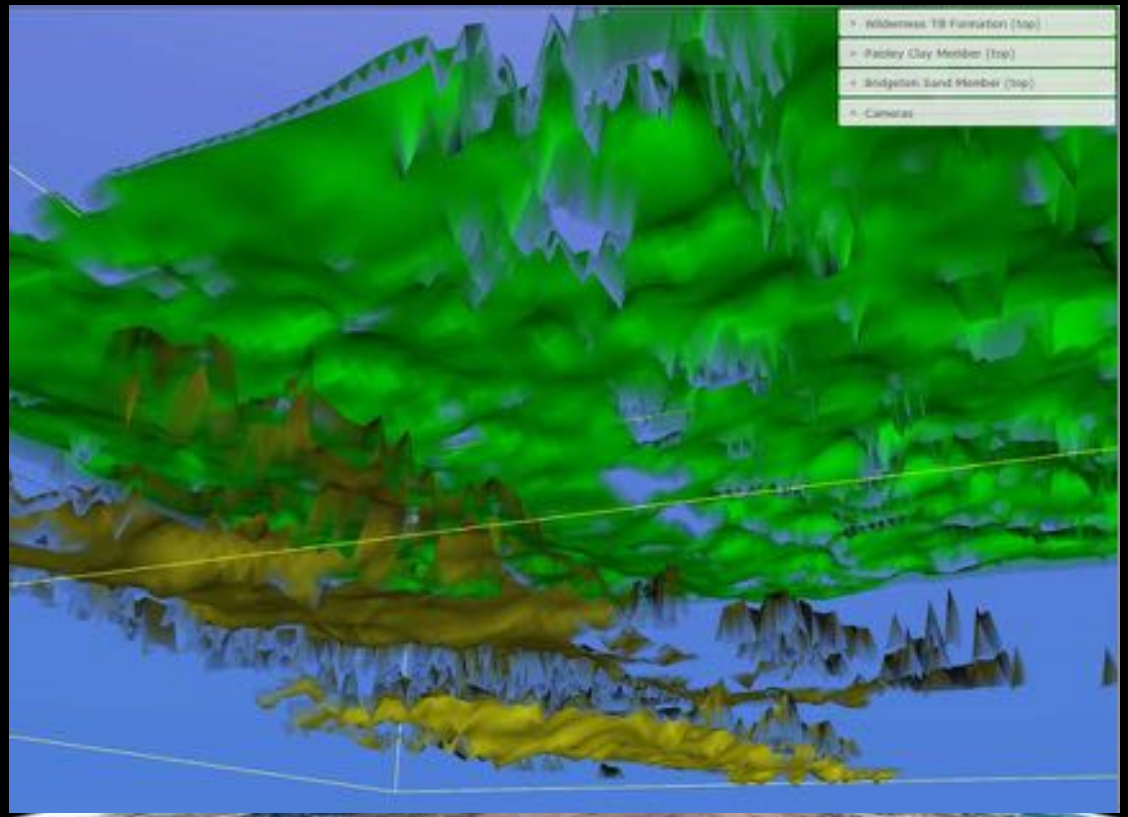
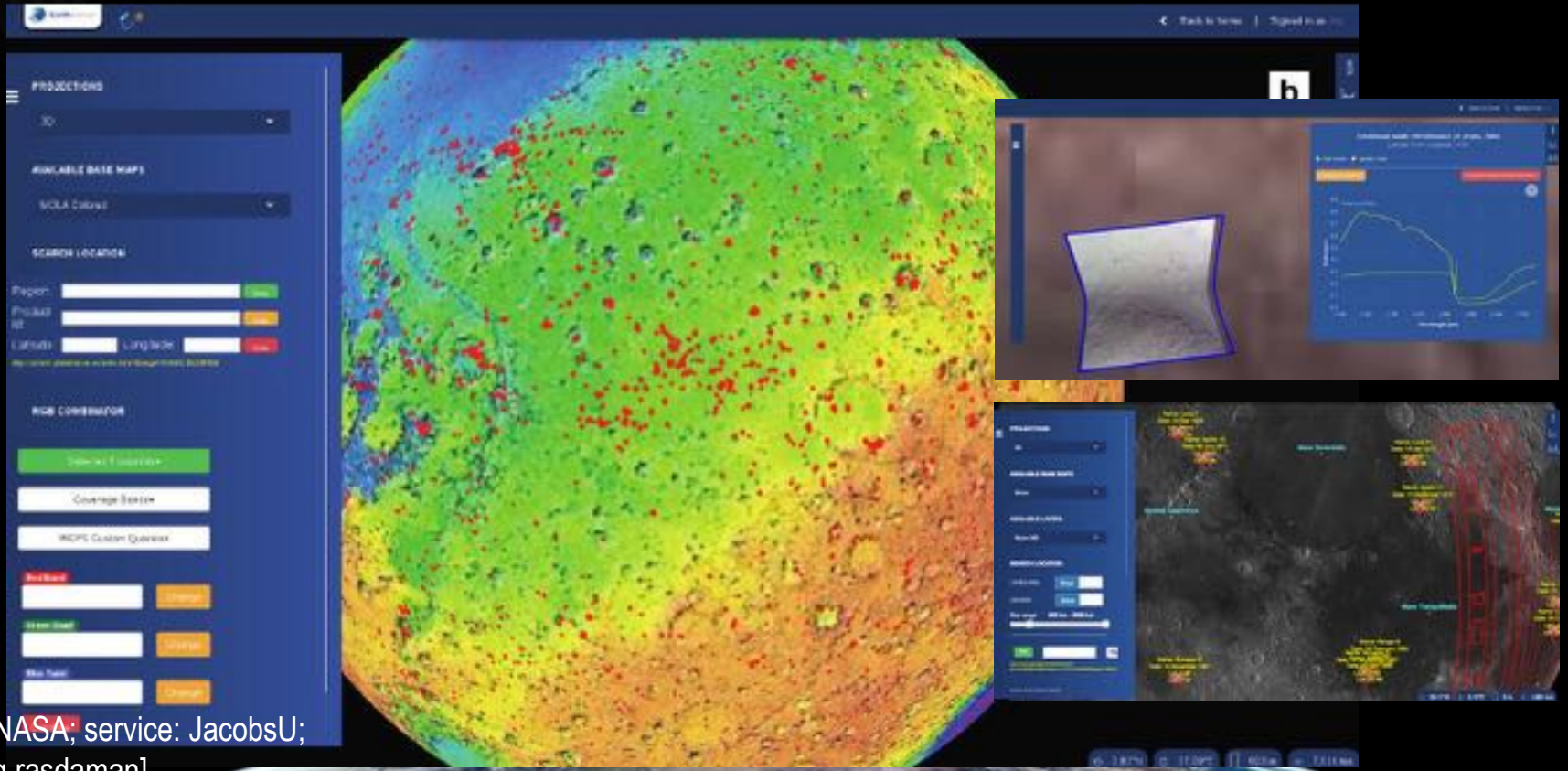
BGS: Geophysical Datacubes



[data & service: BGS; running rasdaman]

PlanetServer.eu



[data: NASA; service: JacobsU; running rasdaman]

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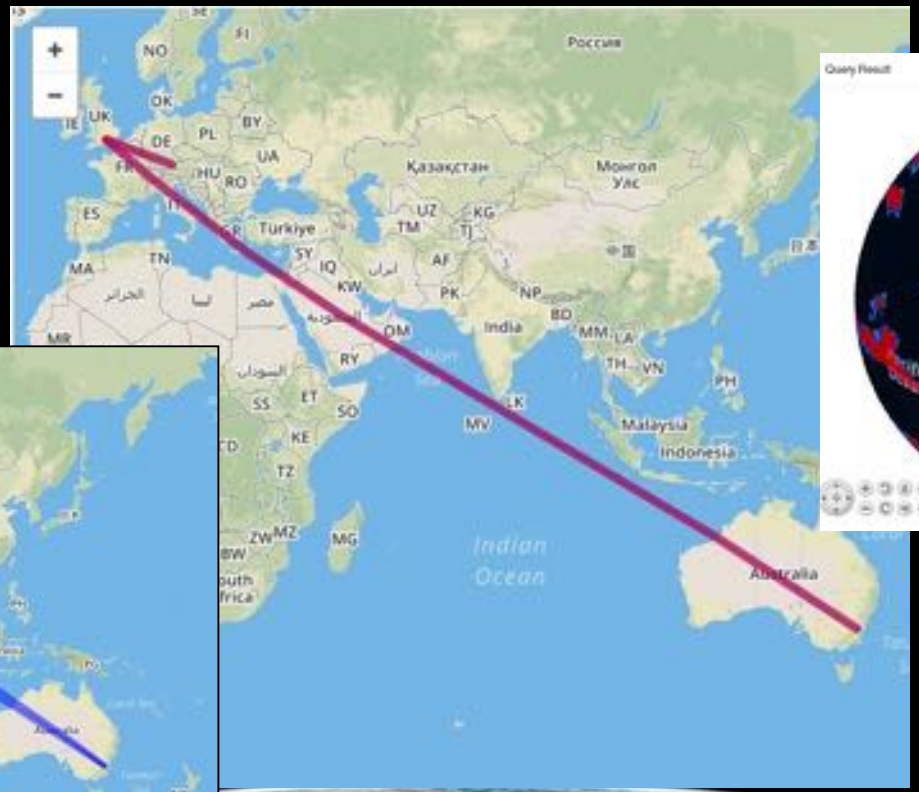
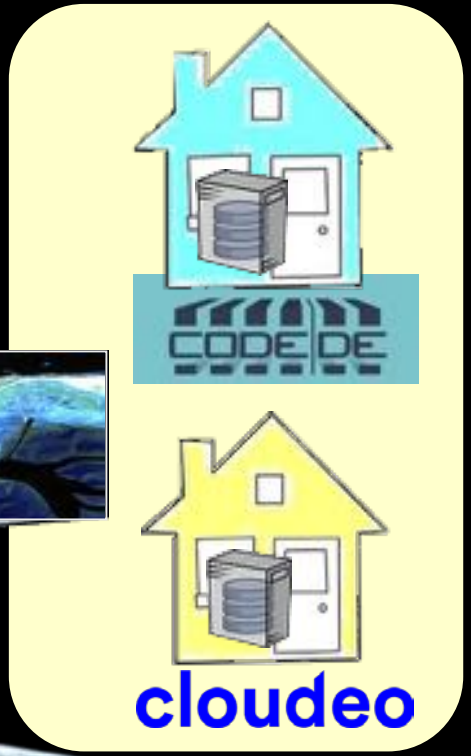
Intercontinental Federation with rasdaman



[running rasdaman]

BigDataCube: Public/Private Datacube Partnership

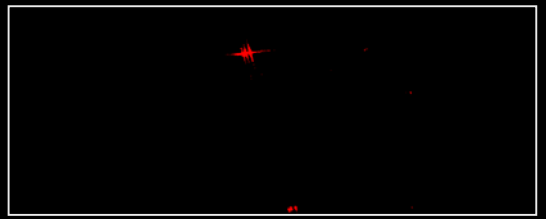
- Datacube Federation of
  - public CODE-DE
  - commercial cloudeo AG services
- Security + billing
  - configurable down to pixel level



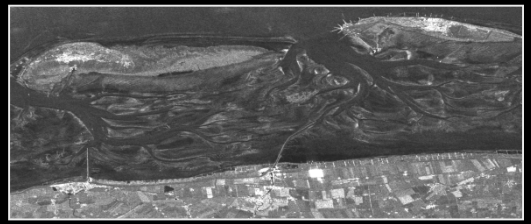
Supported by:
Federal Ministry
for Economic Affairs
and Energy

rasdaman @ CODE-DE

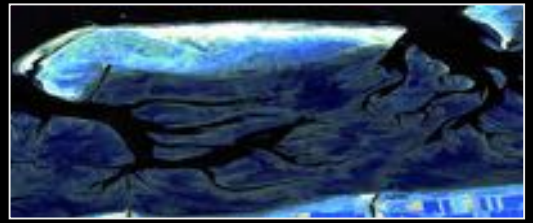
- Complement batch-oriented CODE-DE Hadoop interface with interactive spatio-temporal viewing, fusion, and analytics services on Sentinel EO imagery
  - Using European Datacube engine, rasdaman
- Examples:



ship detection

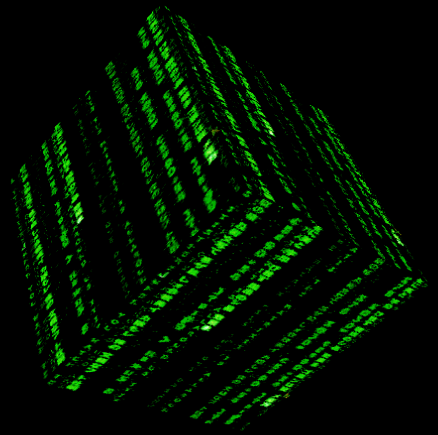


time-avg‘ed S1A timeseries



S2 atmospheric penetration

Summary



- Datacubes = next-gen spatio-temporal services
  - Analytics & visualization, flexibility, user-friendliness
- rasdaman team pioneered Datacubes, Array Databases
  - Now becoming mainstream, increasing number of epigons
  - Still new insights every other day
- SMEs pick rasdaman for ease-of-use, flexibility, ...and speed
  - EOfarm, CropMaps, SBI, ...
- Exciting perspectives – let‘s team up & put all our expertise together!

- *Visit our booth for live demos!*