

A 3D visualization of a grid or data structure, rendered in a light gray, semi-transparent style. It consists of a grid of rectangular blocks arranged in a perspective view, suggesting a spatial or data grid.

# Discussion on WCS Application Profile for MetOcean

**5th Workshop on the use of GIS/OGC standards in meteorology  
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**Peter Baumann & all the good people discussing with him**

Jacobs University | rasdaman GmbH

[baumann@rasdaman.com](mailto:baumann@rasdaman.com)

# Discussion items

- (8) Status of testing, implementations, reference servers
  - WCS, MetOcean-WCS
- (7) Use cases
- (7) Organizations [planning on ] running WCS
- (7) Relation between WCS and WPS
- (7) Implementation alternatives, in particular affecting c/s workload distribution
- (4) Collaboration needs / interests
- (2) Naming of Weather/ClimateCube

# Status of testing, implementations, reference servers

- Implementations WCS 2:
  - FOSS: rasdaman, MapServer, GeoServer, GDAL, Thredds, OPeNDAP, Trellis, George Mason U, EOxServer;
  - closed-source: IBL, ESRI 10.6x, Intergraph/Hexagon?
  - Testbeds: ETSs done for Core + most extensions, uploaded to OGC in 2014
- Implementations MetOcean-WCS:
  - IBL, (rasdaman)
- See also: <http://www.ogcnetwork.net/node/1673>

# Use cases

- Aviation: curtain / corridor subsetting
- Routing:
  - Vessels: finding „good“ paths based on weather conditions
  - Cars: searching for route; find time when icing is minimal
  - Air traffic: route over Atlantic with minimal turbulence
- sitting at location X, barbecue when?
- Ocean
  - Waves, currents
  - Bathymetry:
    - *Acoustic propagation (eg, hiding a submarine behind a thermocline)*
    - *Submarine routing*
    - *Tracking conditions of tagged fish*
- Observation collections (eg, point clouds)

## Use cases / contd.

- On-demand processing & filtering
    - Window-of-opportunity queries
    - Finding monster waves on the ocean (atmospheric conditions + sea surface radar)
- Added a posteriori  
from WMS discussion
- WMS BP draft, Section 1.3: „probability of more than 75% that minimum temperature overnight in area X will be less than 4°C“
    - *...with ad-hoc modification of parameters and criteria (predicates)*
  - WMS BP draft, Section 1.3: Deployment of an expensive deep sea oil rig which can only be shipped and deployed from a barge under good weather: „propability that the combined wave and swell height in area X, for a daylight time window of 12 hous, will be less than 1.5m, is 90%“
    - *...again, with parameter variation*

# Organizations [planning on ] running WCS

- MetOcean-WCS
  - Running: UK MetOffice, USAF,
  - Considering: FAB (EuroControl / SESAR), FAA (NextGen), US Navy, DWD, ...
- WCS:
  - Running: Plymouth Marine Lab, DWD, MEEO / ESA, NASA Ames, British Geological Survey, ...

# Relation between WCS and WPS

WCS	WCPS	WPS
data access	ad-hoc analytics	predefined process

- **Web Coverage Service (WCS):**  
*easy data access & extraction*
- **Web Coverage Processing Service (WCPS):**  
*agile analytics, enabling automatic parallelization*
- **Web Processing Service (WPS):**  
*predefined processes of arbitrary complexity as „black boxes“*

# Implementation alternatives, in particular affecting c/s workload distribution

- „there will be much more clients than servers“ -> keep clients simple
- Online vs offline processing: both should be possible
- Minimize c/s data transfer
- Scalability issues
  - volumes addressed
  - number of simultaneous queries
  - complexity of queries
  - variety of queries



# WMS with URI-Valued Layers

- <http://acme.com/wms?request=GetMap>  
 & layers= BORDERS,  
 STDDEV(TEMP, {day(time), reference\_time}, {}),TEMP,  
<http://bcme.com/wps?request=ExecuteProcess>  
 &... ,  
<http://bcme.com/wcs?request=GetCoverage>  
 &subset=time("2014-09-14T00:00:00Z")  
 &rangesubset=humidity&format=image/png,  
<http://bcme.com/wcs?request=ProcessCoverages>  
 &query=for \$c in (C) return encode(\$c, "image/png")  
 & time=2014-09-14T00:00:00Z  
 & dim\_reference\_time=2014-09-12T00:00:00Z
- <layer> ::= <layername> | <agg-fct> "(" ... ")" | URI

General problem with LAYERS syntax: interpretation of comma -> syntax is ambiguous!