WMS Working Group

Group makeup

- 15 from operational met agencies
- 4 commercial
- 2 University/research institute
- 7 using WMS in “real operations”
  - Used by people who haven’t developed it
  - Revenue stream depends on WMS
- Everyone planning to use WMS in next 12 months

Interests

- Mostly service providers
- 13ish tools developers
- 2 standards developers

- All in “met business” except 1 EO, 1 ocean

Why do we care about WMS?

- (technical) Interop with other met agencies (and other communities)
  - Sharing imagery is valuable
  - (esp sharing best current available data)
- *Potential* to present harmonized data products
  - Need to harmonize styling (WMO don't guide this) and symbology (WMO do guide this)
- Overlaying different products
  - E.g. decision support systems
- INSPIRE says we have to!
- It basically works!
  - Clients are (relatively) easy to build
  - And it's the only option…
- Makes data accessible to outside world
  - GetCapabilities more useful than list of files
- Decouples viz from data, so simplifies tasks

(Potential) Users of WMS

- Forecasters
- Scientists
- Policymakers
- Decision support

- Some need real-time data
- Some need all data, some need summaries

What do people want from this group?

- Convergence on best practice for use of WMS in metocean
- Identify issues leading to divergence
  - Standards ambiguity
  - Gaps in standards
- Recommendations to WMO and OGC for modifications to standards
- Publish recommendations to wider communities of interest
- Converge with other related communities (e.g. EO, hydrology, oceanography)

Outputs

- “Met profile for WMS”
  - Probably a Type II profile (interprets and extends WMS)
  - Validation criteria for compliance
- Roadmap towards adoption
- Community
  - Developed in the open, should be able to cross-validate in development stage
  - Learning and publishing lessons learned from development
- Audience:
  - INSPIRE (interop community) – need to be quick!
  - (audience is world-wide of course)
  - GIS vendors, application suppliers, instrument suppliers
  - Other communities (aeronautical)

Source data

- Forecast models
  - 3d Grids (2d time)
  - Ensembles
  - Lagrangian
- Climatologies
- In situ data/point information
- Radar
- Remote sensing (EO, Level 2/3)
- Context data (mapping, topography)
- (essentially models + obs + context)

Features of interest

- Weather objects
  - Fronts, jet stream
- (Sometimes these are accessed as if they were raw data)

Current problems with WMS

- No agreement on styling (or how best to do this)
  - Predefined styles?
  - Client-specified style (via SLD)?
- Vertical and temporal dimensions (Trond's talk yesterday)
  - Only a problem for forecast data?
- Ensemble dimension?
- Coordinate Ref Systems
  - Need parameterized CRS (e.g. specify standard parallel for a polar stereographic projection)
  - EPSG database don't cover all the projections we need
- Non-map outputs (e.g. vertical sections)
- Monolithic Capabilities document

Styling

- &STYLES=wmo
  - Stylesheet approach
  - Requires agreement in advance
- Support sophisticated client-controlled styling
  - E.g. SLD
  - Requires more sophisticated servers (and clients)
- Prefer first option, at least to get started
  - But let’s not reject SLD yet
  - Could have standard WMO SLD document
- Also naming of layers
  - CF standard name (this is not enough)
  - Other options (OneGeology)
- (Both large areas with wider implications)
  - E.g. KML services
- Raster styles + vector styles

Vertical and temporal dimensions

- WMS models world as {x,y}*z*t
  - Could model as nD cube cf. WCS
  - Would this be an interpretation of spec or modification?
- 2d TIME (model run time and forecast time)
  - Not all combinations are valid (not orthogonal)
- Time instants vs averages/sums over time
  - (can specify time range in request)
  - Climatologies
- Time range could be interpreted differently
  - Animation
  - Accumulate
  - Average, max, min
- Bespoke time interpretations
  - Cutoff time, retards, many more…
  - Could be modelled as separate
- A Layer might have many vertical coordinates
  - Pressure, height, isentrope
  - Hybrid, sigma
  - Cloud base, tropopause, etc…
  - Mutually exclusive
  - (options should reflect GRIB level types)

Flexible CRSs

- PROJ.4 string/WKT is more flexible than CRS string (e.g. “EPSG:41001”)

Non-map outputs (1)

- Tephigram
  - non-geospatial
  - CRS=IBL:TEPHIGRAM
  - DIM_STATION (specifies station ID)
  - Image rendered by GetMap, reference by <img> tag in HTML from GetFeatureInfo
  - Still overlayable (can get context layer, then overlay data)

Non-map outputs (2)

- Vertical sections
  - Z vs horizontal
  - How pass series of points to server?
- Distinguish between overlayable and non-overlayable plot types
  - GetMap for overlayable image
  - GetFeatureInfo for non-overlayable plots
    - But GFI only references a pixel on the map
- DIM_PLACE=CRS:84[17:28]

Extra metadata required

- Units of measure

Output formats

- PNG, GIF, JPEG
  - Web formats
- GeoTIFF, JPEG2000
  - Special clients
- Movie formats
  - MPEG, AVI, animated GIFs
- Transparency
  - (PNG is only web format that does this properly)
- PNG compression is slow
- Performance + bandwidth + interoperability issues

Input formats

- GRIB, BUFR, CF-NetCDF…
- Problem for implementors
- (Not all formats have the same kind of data and metadata)
- Translation services + tools are under development
  - E.g. GRIB id to standard name

Summary

- WMS appears only candidate for interoperable met visualization
  - (in which images are rendered on server)
  - Hence strong commitment from group
- Lots of potential audiences with different needs
- Many issues identified
  - Some require interpretation of spec, some might require modification
  - Group has practical experience with solving problems
- Working towards a “met(ocean) profile” of WMS
- Identified need to be agile in development
  - Keep people engaged, test solutions in reality