

Using Visual Weather to redefine the weather forecasting in web-enabled environment

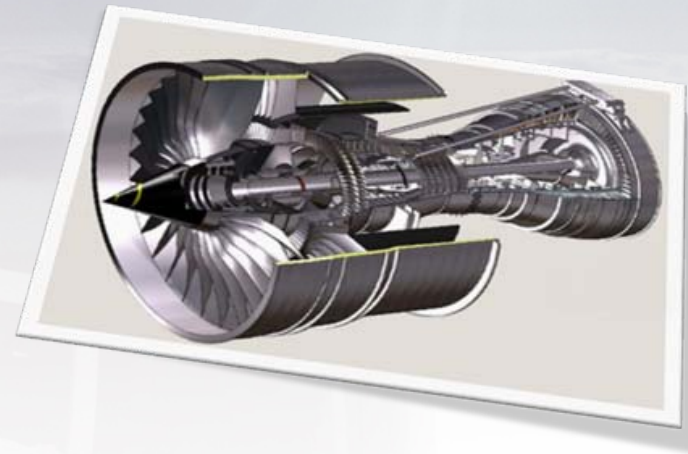
Michal Weis

Visual Weather

Outline

1. What is behind?
2. Desktop: already well mature
3. Web-Service oriented achievements
4. Problems faced
5. Preparing Rich client

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Context on where we are coming from:

WHAT IS BEHIND VISUAL WEATHER?

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What is Visual Weather/SWIFT?

- Strategic Weather Information Forecasting Tool - UK Met Office project for workstation upgrade
- Meteorological Workstation SW providing:
 - Met. data processing and visualisation
 - Interactive forecasting tools
 - Forecast production and workflow management
 - Batch production
 - Extensibility with Python API
 - Web services (WMS, WCS, WFS, JMBL)
- Everything in one box or Client-Server
- Highly configurable and integration-capable

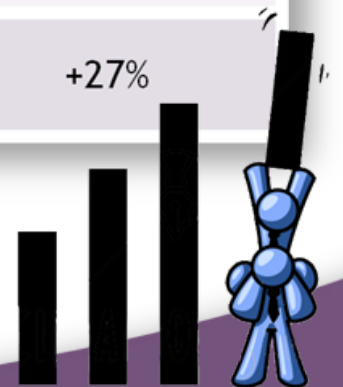


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Current statistics...

- Written in C++/Python, designed for high portability, now became a development platform on its own!

(lines)	Oct 2007	Oct 2008	Oct 2009	Change 2008 to 2009
Source Code C++	1112183	1167252	1282198	+10%
Python Code	23000	83596	156191	+87%
XML & Schemas	29238	28225	63467	+125%
Configuration	500529	298274	379342	+27%



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“Traditional” environment

DESKTOP: WELL-ESTABLISHED AREA

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Desktop: been there for a while...

- Visualisation of standard data formats including GRIB2 (+EPS) and BUFR with customizable styling - via *internal* data-model
- Powerful computation engine: in-built equation editing, pre-processing & field diagnostics
- Outstanding graphical and processing customisation possibilities open to user - thus had to introduce not just presets, but also their inheritance and version management



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Consistent Field Modification

METMORPH*

* MetMorph is technology developed by UK Met Office and is Crown Copyright

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MetMorph - Main Features

Model merging

- Various models e.g. global and mesoscale can be merged into desired projection and resolution.

Dynamical field change

- (quasigeostrophic potential vorticity change) - a change in Potential Vorticity, MSLP, Precipitation, Surface Temperature implies change in almost all parameters.

Time Linking

- Any change can be performed to vary.
- Geospatially - shape and change-vector morphing.
- In time - variable of change-strength in time.

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MetMorph - Other Features

Editing of wind.

Precipitation enhancing, reduction, wind advection.

Precipitation orographic modulation.

Clouds wind advection.

Merging and wind advection of precipitation from radar.

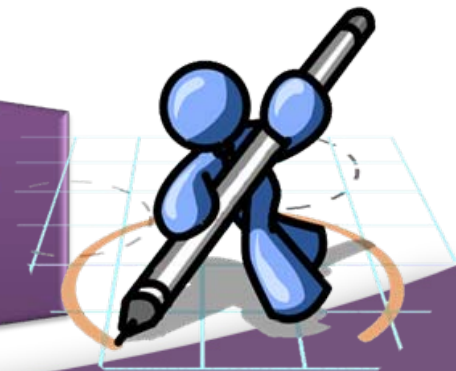
Field spatial and time smoothing and interpolation.

Comparing to UKMO Horace 4 MetMorph:

Facelifted
and
integrated

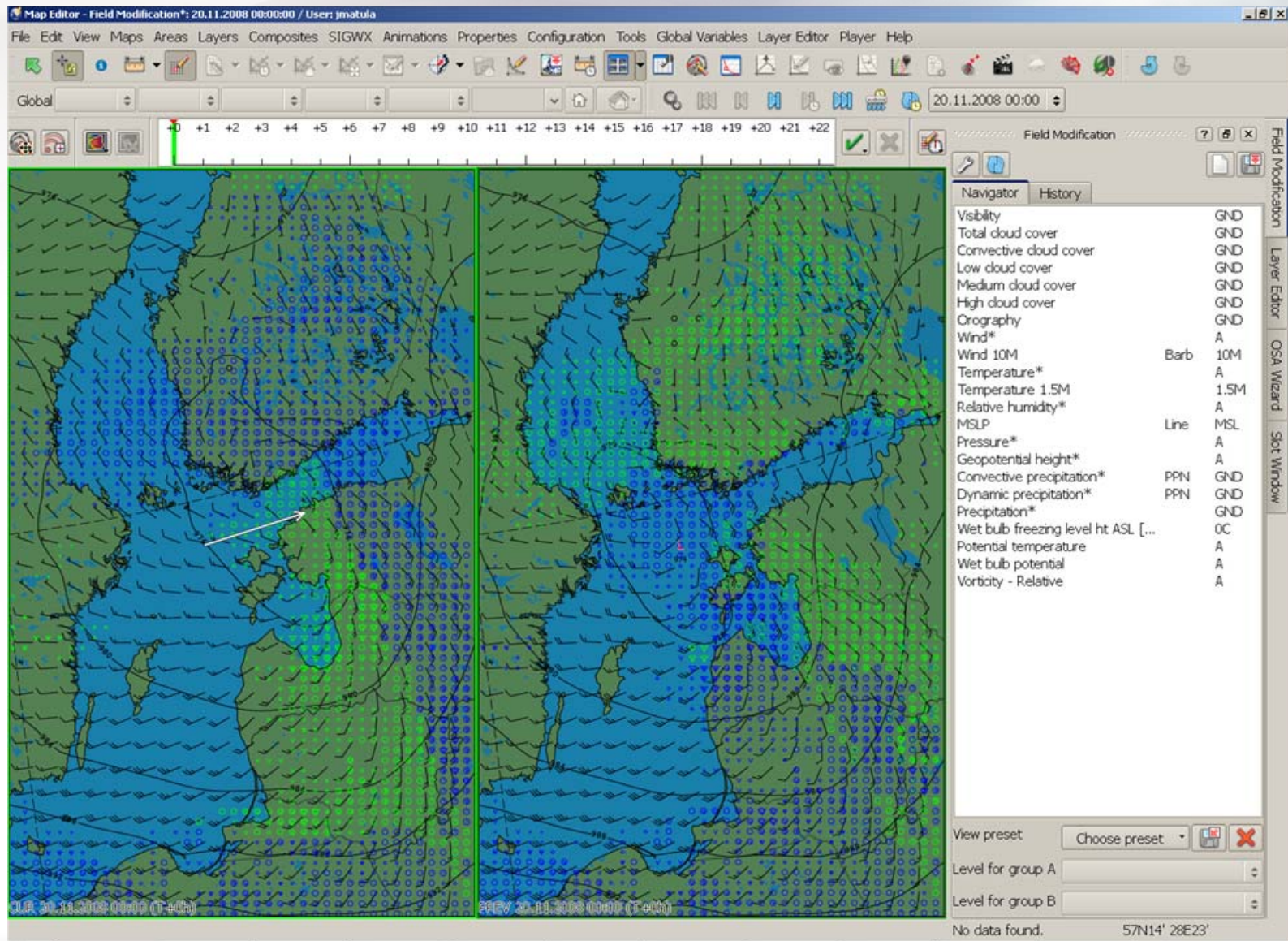
Removed
some original
limitations

Access to
history of
changes



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Met Morph - Dynamical MSLP change



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Walked through Area 51 (not just once)

WEB-SERVICE ORIENTED ACHIEVEMENTS

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Why (OGC) Web-Services

Need for SOA approach has been manifested several times in different parts of project.

Standardized protocol is a key for success of system interconnection, therefore OGC family was utilized.

For real world applications, not just “wrapper” but powerful web-service has to be present.

VW now contains native web service with SSL and Auth support, dynamic capabilities, multi-threaded, server-optimized.



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Services Up & Operational



1.1.0-1.3.0 dynamic support

User configurable dimensions, dynamically populated

Access to all data types and visualisation methods

Supports styles, GetFeatureInfo, GeoTIFF, JPEG2000



1.1 support

GRIB1 and GRIB2 NWP data including Ensemble Prediction Systems

Exposing also radar and satellite imagery (raster data)

Supports all field pre-processing and diagnostics of server



1.1.0 support

Retrieval of observations

Access to "feature" database - authored forecast objects

Transactions allow storing objects back to server



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(When trespassing)

PROBLEMS FACED

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OGC WS implementation dilemmas

- The challenge for building web applications is to find the proper border between server and client, and to choose the proper protocol
- Also there are some technical problems:

Rotated WAFC
Compression vs. transparency
Depending dimensions
Non-geospatial projections
MIME types
Dimension capabilities
Date line
2D time
Elevation capabilities
CRSs vs. GRIB clients
Dynamic carting
Lack of "good" GeoTIFF
Dyn units
Absence of GML schemas

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We need to progress, so what now?

Need to go forward

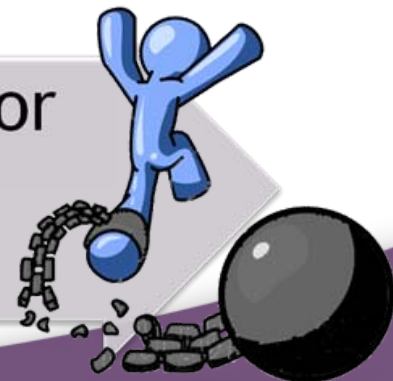
- End users already require service, and can't wait.
- Standardization is way behind

Problems seen and solved

- Problems were analyzed and interpretations made already

MetOcean DWG

- Good step for creating floor for discussion
- **But** faster progress needed



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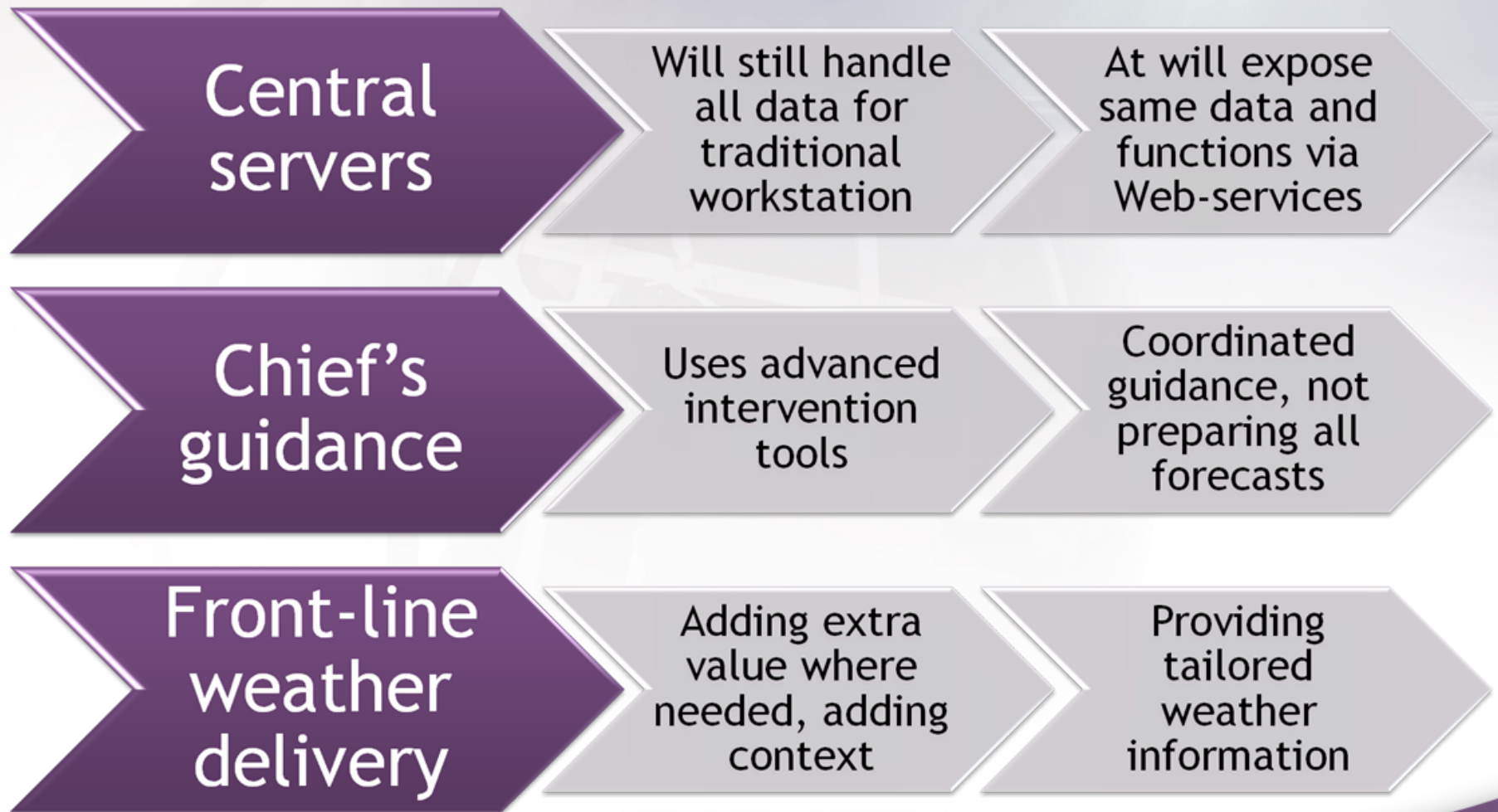


Web 2.0 is already here:

PREPARING RICH INTERNET CLIENT

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New workflow?



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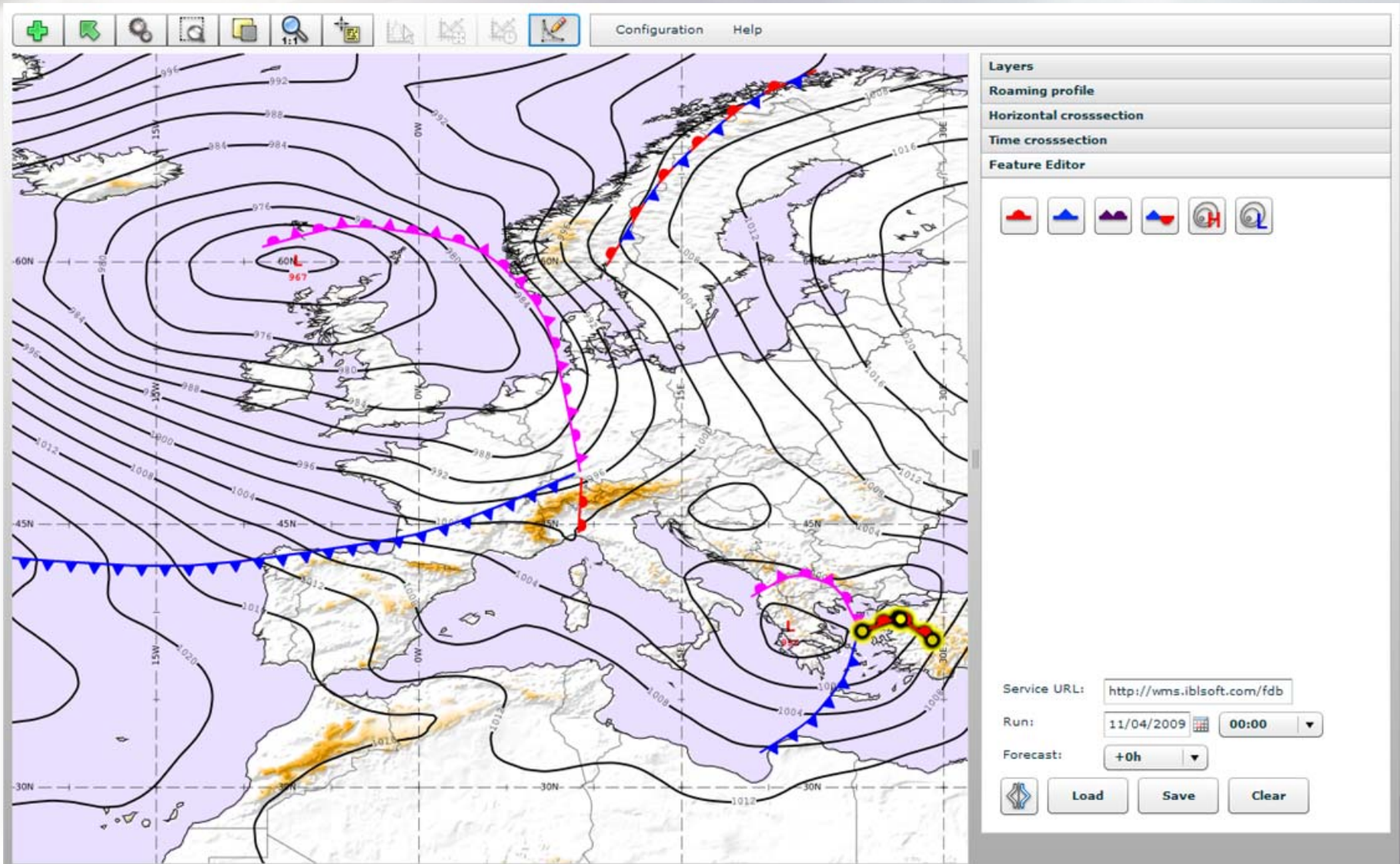
Decisions made:

- Adobe Flex as platform, runs in Flash VM in variety of systems
- Let the server do the hard job (client will be simpler)
- Scales with server
- Secure operation with HTTPS and Authentication
- Provide range of specific meteorological tools for exploring and editing (resulted in exploiting W*S protocols to the limits)



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So how RIA Client works?



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Thank you
for your attention!

Questions?

(Hands-on possible this afternoon 17:00 UTC)

