“ENVIROfying” the Future Internet

THE ENVIRONMENTAL OBSERVATION WEB AND ITS SERVICE APPLICATIONS WITHIN THE FUTURE INTERNET

ENVIROFI. FI-PPP AND THE BIG DATA

EGU 2013 Townhall session: “Big data and software architecture meet geophysics and crisis management” (08.04.2013)

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Relation of ENVIROFI, FI-Ware & FI-PPP.

Why would we need “big data” in environmental applications?

Where do FI-Ware enablers come in?
ENVIROFI vision within FI-PPP

ENVIROFI links the Future Internet Public Private Partnership programme and on-going activities in INSPIRE, GMES, SISE...

FI-Ware project
- Networking technology
- Infrastructure as a Service
- Internet of Things, Content, People

FI-PPP Environmental Usage Area
- FI Requirements
- Specific Enablers
- Enviropified cross-area Applications

INSPIRE, GMES, SISE
- Geospatial
- Environmental Observations
- Model Web, Sensor Web,
- Data Fusion, Uncertainty
1. Bringing Biodiversity into the Future Internet
   - Enables biodiversity surveys with advanced ontologies
   - Analysis, quality assurance and dissemination of biodiversity data

2. Personal Information System for Air Pollutants, allergens and meteorological conditions
   - Enhance human to environment interaction
   - Atmospheric conditions and pollution in “the palm of your hand”

3. Collaborative Usage of Marine Data Assets
   - Assess needs of key marine user communities
   - Selection of representative marine use cases for further trial: leisure and tourism, ocean energy devices, aquaculture, oil spill alert
“Observation Piles”
- growing bigger and messier…

Collect
- Sensors (in situ & remote, static & moving)
- “Human sensors”
- Models

Store
- Values
- Semantic
- Context (spatial, temporal, other)
- Uncertainty

Assess
- Indicators,
- Nowcasts,
- Forecasts

Access
- Numeric, e.g. time-series, 2D/D3 Coverage's
- Graphic, e.g. maps, x-t graphs, 3D

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Human sensors are tricky…

**View existing knowledge**
- Map view
- Table view
- Detailed View
- Areas of Interest

**Report observations**
- “New” things, e.g. “here and now I see a tree”
- Personal, e.g. “I have a headache”
- Obs. on existing thing, e.g. “this tree currently blossoms”

**Receive information (events!)**
- Requests for more observations,
- Warnings, e.g. “pollen warning”
- Interests, e.g. “monumental tree in vicinity”

**Server Backend** (or proxy)

Alert!

Inform
We need to sort it all out - on demand & inexpensively
With commodity FI-PPP enablers?

- **I2ND GEs**: Network reliability, Hardware abstraction,
  - **Security GEs**: user & right mgm.; legal compliance
  - **Marketplace GEs**: sales, revenue sharing
  - **Environmental SEs**: Meaning, Observations, Data Fusion, Forecasting, Harvestors, Connectors
  - **IoT GEs**: Smart sensors?
  - **Cloud mgm. GEs**: automated deployment, scaling
  - **Cloud Storage**: Storing of BLOBS (photos, videos)
  - **Pub/sub GE**: Events processing & dissemination
  - **Big data GEs**: Annotation & processing

"Cloud Edge“ GE: Field-deployment of observations server; (P2P?) information exchange over local WLAN

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Thank you for your attention

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FI-Ware “Generic Enablers” already fulfill several requirements common to many environmental application scenarios:

1. “Single sign on" and authorization (Identity Management GE)
2. Event handling (Complex Event Processing GE, Publish/Subscribe Context Broker GE)
3. On demand scaling (cloud hosting GEs)
4. BLOB storage and retrieval (cloud storage GE)
5. Ad-hoc applications for specific users (composition & Mashup GEs)