

AGILE – EuroSDR – OGC Persistent Test-Bed Project (PTB)

Background to the PTB Initiative:

On the 8th May 2007 an AGILE-EuroSDR-OGC Workshop on Persistent Geospatial Test-beds was held in Aalborg as part of the annual AGILE Conference. At this Workshop the consensus view was that a persistent geospatial test-bed should be established within the European research community. The objectives proposed for this initiative were:

- To provide a research platform for collaborative European research in geospatial interoperability,
- To aid the assessment of the current standards for geospatial interoperability in terms of research compatibility, completeness, consistency, ease of use and extensibility
- To provide an environment for teaching standards and techniques for geospatial interoperability
- To provide a resource to AGILE/EuroSDR/OGC for the coordination of research requirements as well as definition, testing, validation and development of open standards

It was further proposed that the test-bed:

- should be distributed and comprise data, web services, hardware, software, tools and human resources, and
- be based upon both ISO/OGC geospatial standards and other appropriate IT standards (e.g. from W3C and OASIS).

A consultation programme was also recommended to address issues such as:

- o What purposes should a test-bed serve?
- o What does it need to comprise of?
- o How should it be governed and administered?
- o How should it be constructed?
- o How might it be funded?
- o How may it be sustained so that it is available in the long term?
- o What would the relationship of the test-bed be to other data/service infrastructures, (national SDIs, INSPIRE, UNSDI, GEOSS, etc)?

Subsequent to the Workshop a Steering Committee was formed with one representative from each of the three sponsor organisations – Mike Jackson<EuroSDR>, Michael Gould<AGILE>, Chris Higgins<OGC> and a call for contributions to a persistent test-bed programme sent-out. This programme has since become known as the “AGILE-EuroSDR-OGC PTB” or PTB for short. A discussion paper describing the call and the PTB objectives was presented by Eva Klien at the 13th EC GI & GIS Workshop in Porto, Portugal¹

PTB activity and progress in 2008:

The response to the call was strong. Over 30 organisations from across Europe indicated that they wished to participate. The responding organisations included National Mapping and research agencies and local/regional government bodies as well as academic institutions. The positive response also included the EU Joint Research Centre at Ispra. This call was not open to commercial organisations.

Neither the magnitude or institutional breadth of response had been anticipated and a pragmatic approach forward was needed in the absence of funding. At a December 2007

meeting in Stresa, Italy, (in conjunction with the OGC Technical Meeting) it was agreed that the first phase of the test-bed should be progressed through the development of a small number of discrete Use Case implementations. The services developed in these Use Cases would be published and made remotely accessible to participating members. The first phase was to successfully implement and demonstrate interoperability between selected member laboratories. The next phase would then start to link these with further Use Cases (i) to facilitate collaboration across organisations on SDI / INSPIRE related research challenges and (ii) to demonstrate increasingly rich application scenarios through the chaining of the Use Case services. These Use Cases would also be developed to provide exemplars for teaching of students.

The formal consultation exercise was not carried-out but feed-back was received from several Workshops and meetings where the project was discussed. This feed-back indicated that the focus on a standards-based persistent interoperability test-bed and software platform for research, teaching and demonstration was relevant to the European SDI as defined by INSPIRE as well as to other European and international programmes such as GMES and GEOSS. As a standards-based platform adopting a service-oriented and web-services based architecture, the PTB potentially offered a powerful basis for research group collaboration. By encouraging harmonisation and sharing of data and services it could also aid innovation and productivity in research and efficiency in the knowledge transfer process.

The Use Cases:

Following the Stresa Meeting development on the following Use Cases were agreed:

UC08-001: "Unified portrayal of geospatial cross-border information" by the Universität der Bundeswehr München and EDINA, University of Edinburgh

Contact Person: Chris Higgins chris.higgins@ed.ac.uk

UC08-002: "Discovery and Invocation of Schematization Services" by the Centre for Geospatial Science (CGS), University of Nottingham and the International Institute for Geo-Information Science and Earth Observation (ITC)

Contact Person: Dr Jerry Swan jerry.swan@nottingham.ac.uk

UC08-003: "Fog Monitoring and Information Service" by Newcastle University and Universität Rostock

Contact Person: Dr Edward Nash edward.nash@uni-rostock.de

UC08-004: "Semantic Web Service Discovery and Execution" by the University of Muenster

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A Wiki was established for publishing of the Use cases and for general communication.

Dr Gobe Hobona from the Centre for Geospatial Science, University of Nottingham, was appointed as the PTB Project Manager and development of these Use Cases took place through 2008. The results of the University of Nottingham and ITC test-bed were described in the November 2008 GEOconnexion International Magazine². Results from the EDINA led Use Case were presented at various Working Group meetings during the Valencia December 2008 OGC Technical Committee meeting and a discussion of all four use cases in the context of other test-bed activity will be presented at the AGILE 2009 Conference in June³.

PTB Project Plans for 2009 onwards:

A joint EuroSDR Commissions 4 and 5 and AGILE Workshop is to be held 2 June 2009 preceding the main AGILE 2009 conference at which the results of the PTB Use Cases will be further discussed together with subsequent progress and next steps.

A key objective in 2008 was the goal of integrating the PTB activity more closely with European national and EU programmes and especially INSPIRE. Linked to this objective is the need to secure adequate financial under-pinning for the PTB initiative so as to support project-management and coordination of the current Use Cases and to allow future sustainable development. A significant development in the context of these objectives is the establishment of cross-linkages with two major new EU funded projects: -

(i) In July 2008, an EU FP7 Coordination and Support Action project "GEOSS, INSPIRE and GMES, an Action in Support" (GIGAS) commenced, led by the Fraunhofer Institute for Computer Graphics at Darmstadt. GIGAS⁴ promotes the coherent and interoperable development of the GMES, INSPIRE and GEOSS initiatives through their concerted adoption of standards, protocols and open architectures. At the December 2008 PTB Management Meeting in Valencia, Professor Lars Bernard, University of Dresden, took over responsibility as the AGILE PTB representative from Professor Michael Gould. Professor Bernard/University of Dresden is also a partner in GIGAS which will investigate the role and contribution of test-beds in aiding the harmonisation of INSPIRE, GMES and GEOSS. In a further strengthening of these links Johannes Brauner, University of Dresden, took on the PTB Project Management responsibility as of December 2008.

(ii) 2008 also saw the commencement of the EuroGeographics led European Spatial Data Infrastructure Network (ESDIN) EU eContent^{plus} project⁵. ESDIN aims to provide a bridge between the theory and the practice of the INSPIRE Directive towards implementation and usage of interoperable geographical data by "Spatially enabled Societies". EDINA is a member of the ESDIN consortium and through Chris Higgins (the OGC PTB Steering Committee representative) the potential role of the PTB to assist the ESDIN objectives will be examined.

As the importance of the European INSPIRE⁶ activities grow the relevance of the PTB also increases to the EuroSDR research programme. Commission 4 – Data Specifications (Chair: Ulf Sandgren) and Commission 5 – Network Services (Chair: Mike Jackson)⁷, will jointly co-sponsor with AGILE the PTB Workshop in Hanover, June 2009 at which progress to-date and the future directions of the PTB will be discussed.

PTB – the Way Forward:

The current implementations of the four use cases have been successful as examples of interoperability research undertaken between collaborating academic institutions. They do not, however, yet represent a stable testing platform which would allow other researchers to discover and access the test-bed services in order to use them in their own client applications linked to their own and/or other third-party services as is the aim of the PTB.

This service-chaining ability requires the Use Case developers to publish the services; e.g. by providing a suitable catalogue and a PTB web portal. The number and range of services also need to be enriched before meaningful applications may be built from the

test-bed services or before it provides the community with the opportunity to test client functionality, test work-flow chains, assess standards/applications performance or do detailed evaluations between alternative algorithms and service components. The goal is that the PTB shall also offer reliable and/or mutually interchangeable services to offer service instances that are stable enough to serve as a basis for various research projects.

The gap between the above objectives and current PTB status requires a significant commitment from participating PTB partners and good coordination. This gap is most likely to be filled by taking modest incremental steps. To ensure focus, it is also best carried-out within the framework of collaboration with major initiatives and programmes such as GIGAS, ESDIN and the EuroSDR Commission structure.

This leaves open the full scoping of the next steps until the planned June Workshop but it would be beneficial to make progress now with some targeted preparatory activities: -

(i) Opening of a discussion by the original respondents to the call to match needs with resources that can be made available. This discussion could be minimally undertaken by email between now and May co-ordinated by the PTB Project Manager (Johannes Brauner) with conclusions presented at the planned June Workshop. More substantial progress could be made in this context if the structure, focus and resources of one or more of GIGAS, ESDIN and the EuroSDR Commissions could be marshalled to support this effort.

(ii) Design of the next step of platform development, including the creation of a use-case that is largely achievable through the chaining of the existing use case implementations. This might look to incorporate some of the outputs from the phase 1 EDINA led Use Case relating to data and services security. This exemplar demonstrates access control around OGC Web Services on top of pan-European data. The widely used Single Sign On standards based Shibboleth approach to federating access control was integrated with GeoXACML to demonstrate access to WMS without changing the OGC interface. As uptake of Shibboleth is widespread within the European academic sector, the idea would be to build on this and work towards the objective of major content providers being prepared to make their data available into the PTB on the basis of production strength security being available. Service discovery and chaining scenarios could be used to drive development. This activity would need commitment from the original use case players plus one or two new entrants. The activities agreed would be supported by Johannes Brauner, TUD, as the design and implementation co-ordinator.

(iii) Consideration of the above mentioned catalogue service and a web portal which would also act as a form of central infrastructure measurement.

(iv) a re-issue of the call for participation inviting research contributions in supporting areas such as sensor webs, service orchestration and semantic enrichment.

Interested parties to the PTB initiative are now invited to: -

1. submit comments on the proposals outlined in this document.
2. offer contributions to the proposed short-term specific activities discussed above
3. participate in the 2nd June Workshop
4. Indicate their potential willingness to be involved in post Workshop PTB activity
5. Join the PTB mailing list

Responses or questions should be emailed to: johannes.brauner@tu-dresden.de

Lars Bernard for AGILE
Chris Higgins for OGC
Mike Jackson for EuroSDR

15/3/2009

¹ Gould, M., Jackson, M., Klien, E. and Lemmens, R., (2007). Design and implementation of persistent testbed for geo-web services. Proceedings of the 13th EC-GI & GIS Workshop 2007, Porto, Portugal.

² Swan, J., Foerster, T., Lemmens, R., Hobona, G., Anand, S., and Jackson, M. (2008). "Discovery and Invocation of Schematisation Services: A Use Case for the OGC-EuroSDR-AGILE Persistent Test-Bed for Europe", GEOconnexion International Magazine, November 2008, pp24-27.

³ Hobona, G. et al (2009). Establishing a Persistent Interoperability Testbed for European Geospatial Research". AGILE 2009, Hanover, June 2-6.

⁴ <http://www.thegigasforum.eu/gigasweb.html>

⁵ <http://www.esdin.eu/>

⁶ <http://www.inspire-geoportal.eu/>

⁷ <http://bono.hostireland.com/~euroedr/start>