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Evolution of System Architectures: Where Do We Need to Fail Next?

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Innovation requires testing and failing. Thomas Edison was right when he said "I have not failed. I've just found 10,000 ways that won't work". For innovation and improvement of standards to happen, service Architectures have to be tested and tested. Within the Open Geospatial Consortium (OGC), testing of service architectures has occurred for the last 15 years. This talk will present an evolution of these service architectures and a possible future path.

OGC is a global forum for the collaboration of developers and users of spatial data products and services, and for the advancement and development of international standards for geospatial interoperability. The OGC Interoperability Program is a series of hands-on, fast paced, engineering initiatives to accelerate the development and acceptance of OGC standards. Each initiative is organized in threads that provide focus under a particular theme.

The first testbed, OGC Web Services phase 1, completed in 2003 had four threads: Common Architecture, Web Mapping, Sensor Web and Web Imagery Enablement. The Common Architecture was a cross-thread theme, to ensure that the Web Mapping and Sensor Web experiments built on a base common architecture. The architecture was based on the three main SOA components: Broker, Requestor and Provider. It proposed a general service model defining service interactions and dependencies; categorization of service types; registries to allow discovery and access of services; data models and encodings; and common services (WMS, WFS, WCS). For the latter, there was a clear distinction on the different services: Data Services (e.g. WMS), Application services (e.g. Coordinate transformation) and server-side client applications (e.g. image exploitation).

The latest testbed, OGC Web Service phase 9, completed in 2012 had 5 threads: Aviation, Cross-Community Interoperability (CCI), Security and Services Interoperability (SSI), OWS Innovations and Compliance & Interoperability Testing & Evaluation (CITE). Compared to the first testbed, OWS-9 did not have a separate common architecture thread. Instead the emphasis was on brokering information models, securing them and making data available efficiently on mobile devices. The outcome is an architecture based on usability and non-intrusiveness while leveraging mediation of information models from different communities.

This talk will use lessons learned from the evolution from OGC Testbed phase 1 to phase 9 to better understand how global and complex infrastructures evolve to support many communities including the Earth System Science Community.