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A Story of a Crashed Plane in US-Mexican border

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A plane has crashed on the US-Mexican border. The search and rescue command center planner needs to find information about the crash site, a mountain, nearby mountains for the establishment of a communications tower, as well as ranches for setting up a local incident center. Events like this one occur all over the world and exchanging information seamlessly is key to save lives and prevent further disasters. This abstract describes an interoperability testbed that applied this scenario using technologies based on Open Geospatial Consortium (OGC) standards.

The OGC, which has about 500 members, serves as a global forum for the collaboration of developers and users of spatial data products and services, and to advance the development of international standards for geospatial interoperability. The OGC Interoperability Program conducts international interoperability testbeds, such as the OGC Web Services Phase 9 (OWS-9), that encourages rapid development, testing, validation, demonstration and adoption of open, consensus based standards and best practices.

The Cross-Community Interoperability (CCI) thread in OWS-9 advanced the Web Feature Service for Gazetteers (WFS-G) by providing a Single Point of Entry Global Gazetteer (SPEGG), where a user can submit a single query and access global geographic names data across multiple Federal names databases. Currently users must make two queries with differing input parameters against two separate databases to obtain authoritative cross border geographic names data.

The gazetteers in this scenario included: GNIS and GNS. GNIS or Geographic Names Information System is managed by USGS. It was first developed in 1964 and contains information about domestic and Antarctic names. GNS or GeoNET Names Server provides the Geographic Names Data Base (GNDB) and it is managed by National Geospatial Intelligence Agency (NGA). GNS has been in service since 1994, and serves names for areas outside the United States and its dependent areas, as well as names for undersea features.

The following challenges were advanced: Cascaded WFS-G servers (allowing to query multiple WFSs with a “parent” WFS), implemented query names filters (e.g. fuzzy search, text search), implemented dealing with multilingualism and diacritics, implemented advanced spatial constraints (e.g. search by radial search and nearest neighbor) and semantically mediated feature types (e.g. mountain vs. hill).

To enable semantic mediation, a series of semantic mappings were defined between the NGA GNS, USGS GNIS and the Alexandria Digital Library (ADL) Gazetteer. The mappings were encoded in the Web Ontology Language (OWL) to enable them to be used by semantic web technologies. The semantic mappings were then published for ingestion into a semantic mediator that used the mappings to associate location types from one gazetteer with location types in another. The semantic mediator was then able to transform requests on the fly, providing a single point of entry WFS-G to multiple gazetteers.

The presentation will provide a live presentation of the work performed, highlight main developments, and discuss future development.