



An Executive Overview of the CGNS Initiative.

The Canadian Geographical Names Service – Serving Toponyms into the CGDI

This document outlines the architecture and development strategy for the Canadian Geographical Names Service, a Toponymic Data Service for the CGDI. It is written for a client in the CGDI community who is interested in what the Canadian Geographical Names Service can provide in the short term and in the future. To get access documents detailing this initiative, contact Barbara MacIntosh, Geographical Names Section, Mapping and Services Branch, Earth Sciences Sector, Natural Resources Canada (bmacinto@nrcan.gc.ca).

Toponymy is an integral part of our national heritage and an aspect of our culture that must be preserved. The responsibility and authority for approving geographical names in Canada is shared by the provinces, territories and the federal government. Established in 1897, the Geographical Names Board of Canada (GNBC) is the national body that coordinates toponymy in Canada, establishes general principles and standards for geographical naming and provides authoritative toponymic information and advice to institutions and individuals both inside and outside Canada. In support of this mandate, a Canadian Geographical Names Data Base has been maintained using available technologies. In its current form the CGNDB is built on relational database technology, supplies its data to various mapping and charting initiatives using file exchange mechanisms and database links, and makes Names available to the public via a web application interface. The CGNS initiative is the next generation of technology for the distribution of Canadian Geographical Names.

Canadians create and use spatial data to manage natural resources, physical infrastructure, our populace and our sovereignty. The CGDI is being developed to leverage our investment in this information by enabling the access and interchange of geospatial data. This new data management paradigm employs concepts such as “custodianship”, “ownership”, “open standards architecture”, and “framework data” and uses enabling technology to provide a data and service infrastructure free of the limitations of older proprietary systems.

Geographical Names have been characterized as an intuitive spatial reference system and as such, are considered a fundamental layer of framework data. The purpose of the CGNS is to deliver a National view of Canada’s Geographical Names into the standards and technology framework of the CGDI. Names data flows from province/territory to the CGNS to the CGDI.

The Canadian Geographical Names Service will be a distributed Names service operated by the Geographical Names Section, Mapping Services Branch, NRCan and will likely be run hosted on a server in Ottawa. The CGNS is compliant with the OGC Web Map Server (WMS) and Web Feature Server (WFS) specifications. The WFS will deliver Geographical Names as data records formatted in XML/GML. The WMS will deliver an image of geo-referenced labels (Geographical Names) that can be used to overlay other map layers in the construction of a web map. The CGNS WMS can serve this layer (image) to viewer applications or to other map servers, or, by cascading to other web map servers, the CGNS can service complete map requests. Styled layer descriptors will color and symbolize the returned map to the requestor’s specifications.

The Toponymic data delivered into the CGNS is spatially enabled - presently as points, later to be lines and areas. This blend of spatial and non-spatial data will support a variety of query techniques for finding and filtering the Names data. Users can query on properties such as name, CGNDB_KEY, Concise_code . and/or they can specify a spatial area such as a bounding box (min latlong / max latlong), a proximity (lat/log, 5 km), or as a spatial feature such as an administrative boundary (the Island of Montreal).

The implementation strategy is an evolutionary approach that supports the development of the CGNS with minimum impact on existing systems. It also accommodates uncertainty in a number



of areas; data providers will come on board on their own timetables, CGDI users and their requirements have not all been identified, OGC technologies continue to mature offering new and improved capability every 3 to 6 months, and finally, the CGDI is very young and will take some time to find its final form. This leading edge initiative will influence and will be influenced by the direction and progress of others. In order to succeed, the CGNS must have the flexibility to find and the strength to keep its place in this sea of change.

The implementation strategy includes; a phased development of core capability, prototypes, workshops, pilots, integration support for data provider and data user communities, and promotion of the CGNS within the CGDI development community.

Core capabilities have been organized and prioritized under 5 headings. 'Names' supports Geographical Names record transactions into and out of the CGNS. 'Maps' is the generation of a map layer by the WFS. 'Geometry' will support advanced spatial operations. 'Syndication' describes the fully distributed environment in which Names are served directly by the provincial/territorial authority. 'Collaboration' develops the web applications and processes for provinces that want to replace their current systems or wish to enable participation of external agencies in the Geographical Names Process. A schedule of continuous delivery over 16 months will allow users to plan connecting required functionality as early as possible, thus enabling the feedback mechanisms required to guide the CGNS into its final form.

In its final state, the CGNS will be a distribution center for a cascading network of provincial / territorial Geographical Names Services. Given the differences in technology and readiness seen across the country, this will take time to achieve. To satisfy the immediate requirements of the CGDI community, a flexible approach for data uptake has been proposed. A CGNS warehouse has been created as a central data store which each province can use until their Names Service is installed. We will define a web transaction process through which each province can load their Names into the warehouse. Provincial systems will need to be extended with a capability to write records of new and changed data into a XML/GML message format and post this as a web transaction to the CGNS WFS. In advance of this, the CGNS development team will develop this capability for the CGNDB. This will allow an immediate flow of all Names from the CGNDB to the CGNS. Using a combination of these three dataflows (Province to CGNDB to CGNS Warehouse to CGNS; Province to CGNS Warehouse to CGNS; and Province to CGNS) the CGNS can provide a national view of Names right now, and support the transition timetable of each province as we work towards the end state of the CGNS.

The implementation strategy identifies education and support as keys to the integration of the CGNS. Data providers and data users alike will require help in understanding what the CGNS is and how to connect to it. Prototypes will be developed and used to demonstrate CGNS technology and capability. Workshops are being organized to educate these communities and to leverage their collective experience to develop CGNS policies and procedures. A pilot project to develop a warehouse loading process has been started with Manitoba. Support time has been budgeted to work with new groups connecting to the CGNS. Finally, a communication strategy that includes the CeoNet, GeoConnections, and the CGDI Development Networks will be developed to advance the visibility of the CGNS.

Where are we now? The Architecture and Implementation Strategy documents have recently been accepted as Phase I deliverables. A Data Provider workshop has been scheduled for December 3 and 4th, 2001 in Ottawa. Agreement in principle for a development and demonstration space in the CGDI development environment has been negotiated with GeoAccess Division (Brian McLeod). A pilot kickoff meeting established the framework and expectations for a Data Provider Pilot with Manitoba. Prototypes development has started at the Holonics site. Peter Williams (Geographical Names Section/Mapping Services Branch) has started to investigate data quality and connectivity issues. Discussions have started for a Data Users workshop, a data users pilot with GeoAccess Division. CGDI resources are being called in



to help address areas such as data distribution policy, metadata standards, and CGDI development progress. Existing agreements will likely support the data sharing requirements of the CGNS. With the interest shown by the provincial toponymists, and their 100 year history of working together, the CGNS initiative is starting out from a position of strength and is well on its way to success.

CGDI documents have presented a scenario of how Canadian geospatial data will be accessed and maintained in the year 2004. Expanding on this story to showcase the CGNS ...

- A history student at U of X is using Canada's Geographical Names to research the settlement of Irish immigrants in Ontario and Quebec. He does his work using a "Canadian History" portal that provides a connection and a search interface for the CGNS. The site also supports the generation of a historical map with a layer of Names appropriate for that period.
- During a production run, a GIS/mapping system connects to the CGNS and requests all Names within the area bounded by (-125.00, 40.00) and (-126.00, 41.00). The returned XML file is opened and current Names are applied to the map based on a number of linkages including; the CGNDB_KEY value and the spatial extent of the named place.
- A customer in the Ottawa area requests allocation based services for a 'Smiths Falls' within 40 miles of his GPS location. The service provider submits a query to the CGNS then uses the result in processing the request.
- A health researcher is investigating incidents involving animal bites and rabies for the Ottawa valley. Using the Google+ web search interface he enters "Ottawa, 30 KM" (the placename center and the distance radius) as his spatial search criteria. He also enters "rabies or animal bites" in the text search criteria. Google+ first executes a spatial query against the CGNS, then uses the returned list of Names as additional criteria in the execution of its text search. The 'Hits' return documents with "rabies" or "animal bites" and one of the set of Place Names found in the search area. The Google+ Map-it facility offers additional service by generating a map of the Place Names and allowing the client to link into the documents by clicking on the map.
- An Elections Canada field agent is updating the electoral list by going door to door to register voters. He discovers that all the families living in homes at the corner of RR#8 and Albion Road (South of Ottawa) are receiving their mail addressed as "Manotick Corner". Using a GPS/wireless PDA he confirms that this location does not have a official name in the CGNS. Through collaborative agreements with the GNBC and its member provinces, the agent is able to access a web application that allows him to create an Unofficial Name record and submit it for processing by a toponymist. He completes his elections information gathering using the proposed name. If the proposed name is not accepted, the correct name for that location will be fed back to the Elections Canada who in turn will update their records.

Further thinking has explored the role that Canada can take in providing technology in support of a United Nations global naming initiative, and participating in a Global Geospatial Data Infrastructure.

Background reading and other sources of information surrounding this initiative can be found at:
http://www.geoconnections.org/architecture/architecture_description.pdf
http://geoconnections.org/english/technical/CGDI-Access-Tech_Svcs_Man-V1.pdf

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