

Inter-Agency Committee on Geomatics
and the
Canadian Council on Geomatics

Canadian Geospatial Data Infrastructure

Report

On the

CGDI Workshop

Data Integration and Tools for Framework Data

Center for Topographic Information
Sherbrooke
November 3 and 4, 1998

Timothy V. Evangelatos
CGDI National Secretariat
Ottawa

December 21, 1998

CGDI Workshop

Data Integration and Tools for Framework Data

**Center for Topographic Data
Sherbrooke
November 3 and 4, 1998**

Participants¹:

Name	Organization	E-Mail
Sylvain Latour	CTI	Slatour@nrcan.gc.ca
Paul Morin	DND J2 Geomatics	Pmorin@host-194.j2geo.ndhq.dnd.ca
Bill Lalonde	CubeWerx	Wlalonde@CubeWerx.com
Tim Evangelatos	CGDI Secretariat	Evangelatost@dfo-mpo.gc.ca
C. Douglas O'Brien	IDON Technologies	Dobrien@idon.com
Rick Nyarady	Universal Systems Ltd.	Nyarady@universal.ca
Marc LeMaire	CTI	Mlemaire@nrcan.gc.ca
Paula Rojas	CGDI Secretariat	Projas@nrcan.gc.ca
Sandra Mackie	CGDI Secretariat	Smackie@nrcan.gc.ca
Ron Gauthier	Knowledge Integration Branch, DOE	Ron.Gauthier@ec.gc.ca
Joseph McIlhenney	Knowledge Integration Branch, DOE	Joseph.mcilhenney@ec.gc.ca
Richard Post	Knowledge Integration Branch, DOE	Richard.Post@ec.gc.ca
Dale Swan	Knowledge Integration Branch, DOE	Dale.Swan@ec.gc.ca
Peter Paul	CCRS	Peter.Paul@geocan.nrcan.gc.ca
Denis Boutin	CTI	Dboutin@nrcan.gc.ca
Rupert Brooks	CCRS	Brooks@nrcan.gc.ca
Jacob Sasson	OMNR	Jsasson@esri.ca
Peter Schut	AAFC	Schutp@em.agr.ca
Cathy Caldwell	STC	Caldcat@statcan.ca
André Verville	DMR	Andre_Verville@dmr.ca
Dianne Richardson	CCRS	Dianne.Richardson@ccrs.nrcan.gc.ca
Salvatore Carboni	Global Geomatics Inc	Sc@globalgeo.com
Christine Parent	CTI	Chparent@nrcan.gc.ca
Pierre Lermusieux	Elections Canada	Pierre.Lermusieux@electc.x400.gc.ca
Boyan Brodaric	GSC	Brodaric@gsc.nrcan.gc.ca

Background:

A Workshop on Core Data held in Ottawa on October 15th, 1998 (Reference 1), re-examined some of the IACG's earlier conclusions on framework data and then modified the proposed framework data so that the thrust would be more compatible with provincial efforts to build regional geospatial data infrastructures. One of the goals of that workshop was to move from a limited, federal perspective on framework data, to a more national perspective. Part of the workshop discussion had focused on how framework data would be used, and this raised a number of issues of integrating data from different sources and levels in a geospatial data infrastructure. It was concluded that many of the data integration issues are independent of data itself and it was decided to organize a separate workshop to deal with the technical aspects of data integration and the tools needed to support that task. Denis De Gagné offered to host such a workshop at the Center for

¹ Sylvain Latour, "Outcome of the CGDI Workshop on Data Integration and Tools" (Attachment 2).

Topographical Information in Sherbrooke which was subsequently held on November 4th and 5th, 1998. This report summarizes the discussion and conclusions of the workshop.

Introduction:

The Chair, Sylvain Latour, introduced the agenda (Attachment 1) and goals of the workshop. The objective was to look at tools to support the use of CGDI framework data and the integration of jurisdictional datasets that form part of that data framework. Sylvain suggested that on the first day the workshop should focus on the developing the vision, identifying the precepts, and defining the problems we wish to solve. On the second day the focus would be on developing a consensus on a common vision of what is required, how will it be done and who will do it. The workshop would conclude with identifying the priorities, summarizing the conclusions, and agreeing on future actions.

Before asking the workshop participants to introduce themselves and what they expected from the workshop, Sylvain proposed a vision for the CGDI. In his view CGDI would deliver “The Digital Canada” which would eventually provide a transparently seamless and scaleless web-based access to geospatial data with navigation capabilities to move horizontally across the country and to vertically drill down in any area for more detailed information.

Roundtable: When the workshop was advertised it was hoped to draw participants from areas such as spatial data suppliers (public and private), users, academia, software vendors, data integrators, as well as any interested parties who deal with related data issues. Based upon the organizations represented, the make up of the participants was roughly: Data Producers – 16, Tools – 6 and Software Vendor – 3. Of course many of the data producers are also tool developers and users of other data. The following table summarizes some of the participants interests and hopes:

Boyan Brodaric: The Geological Survey of Canada is working on framework data with geologists in the provinces and other federal agencies provide to provide seamless coverage of geological data for Canada.
Pierre Lermusieux: Elections Canada is also working with other federal and provincial agencies. The focus is for a national road network that will support the enumeration and census processes at both levels of government. Besides having their data fit into the overall process there are efforts to reduces duplication of effort in collecting and maintaining this road data.
Paul Morin: With National Defence, Paul is involved with the development of tools and technology to support spatial data warehousing and he is heavily involved with international standards activities.
Bill Lalonde: His company CubeWerx Inc is developing new RDBMS components that make it easy to manage and integrate spatial data with other data in one database. Bill is interested in the tools and technology to support such activities.
C. Douglas O’Brien: With IDON Technologies, he works closely with various geomatics standards groups including TC211 and is interested in the standards required to support Framework Data.
Rick Nyarady: An application specialist with Universal Systems Ltd., he is interested in the tools needed to support Framework Data.
Marc LeMaire: With CTI, he is interested in the infrastructure needed to support the CGDI
Paula Rojas: A member of the CGDI Secretariat, she is interested in the tools and technology needed to build the CGDI
Sandra Mackie: A member of the CGDI Secretariat, she has a focus on Communications and would like to hear from the stakeholders of the CGDI
Tim Evangelatos: A member of the CGDI Secretariat, he has been leading some of the discussions on Data Framework and is interested in the strategies needed to create the CGDI
Richard Post: With the Knowledge Integration Branch of DOE, his agency is working to improve its management of information and make it more accessible.
Ron Gauthier: With the Knowledge Integration Branch of DOE, Ron is working to on a Data Management Framework and associated standards and protocols needed to support the infrastructure in DOE. Climate change is of special interest.
Joseph McIlhenny: With the Knowledge Integration Branch, DOE, Joe is an Information Resource Specialist and member of the team.

Dale Swan: With the Knowledge Integration Branch, DOE, Dale is a senior systems analyst and member of the Knowledge Integration Team.
Peter Paul: With GeoAccess, NRCan, he heads up the National Atlas development. Being made available through CEONet, the National Atlas is being integrated with DCW.
Denis Boutin: With CTI, NRCan, he has been involved with building a database to manage the NTDB data.
Rupert Brooks: With Geo Access, NRCan, he is working on the generalization of National Atlas data and he would like to see data sets become more compatible and easier to integrate.
Jacob Sasson: A Consultant working with the Ontario Ministry of Natural Resources who are leading a project to assemble the provinces geospatial data into one system called NRVIS.
Peter Schut: Agriculture Canada proposed the Data Alignment Layer because it assists them in georegistering their agriculture data. Peter is particularly interested in the integration of various types of data.
Cathy Caldwell: Many years ago Statistics Canada (SC) initiated the development of a street network file to help collect census data. It has evolved and grown to meet a number of related applications. SC has partnerships with other departments such as Elections Canada and NRCan for the extensions and maintenance of this data.
André Verville: A Consultant with DMR, he is involved in a project to disseminate geospatial data over the Internet and is interested in how this may be accomplished with the CGDI.
Dianne Richardson: A scientist with CCRS, NRCan, she is in integrating satellite and vector data. She is also investigating the generalization of geospatial data.
Salvatore Carboni: With Global Geomatics, a software vendor who worked with National Defence to develop the Open Geospatial Datastore Interface (OGDI), a public domain specification. In an on-going partnership with National Defence they are continuing to enhance OGDI as well as incorporating into their software tools.
Christine Parent: With CTI, Christine has been working on the Data Alignment Layer

Presentations:

1. CGDI and Framework Data: Tim Evangelatos gave a short introduction on CGDI and its approach to framework data (Attachment 3). He discussed the importance of framework data and illustrated how the ideas for it, developed by the IACG in 1997 and which has a federal agency focus, have been broadened to encompass provincial geospatial infrastructure requirements (Reference 1).

2. CEONet: Peter Paul provided an overview of CEONet² which is endeavoring to provide a window for the discovery and access to geospatial data in Canada and internationally. Standardized searches of catalogues and databases either incorporated or linked to CEONet are possible. As of November 30, 1998, 101 products can be reached and the number is growing. CEONet also provides a number of on-line tools that are listed below:

- **GeoCommerce** - On-line Electronic Commerce; Includes sub-components for check-out, order-baskets, reporting, catalogues and store-fronts;
- **GeoGratis** - Hosting of freely available geospatial data sets to provide on-line discovery, visualisation and download;
- **MetaManager** - Toolkit to enable RDBMS's for FGDC/GEO distributed search and retrieval without need to modify the database;
- **Simple Search Toolkit** - Allows suppliers to make their catalogue/database searchable through their existing web server;
- **Earthscape** - Pop-up map and reference system tool that is available for reuse by suppliers as part of their own web based search interfaces.
- **WebAPI** - Capability for external web sites to invoke any CEONet service (e.g., list advertisements, search remote databases) or content through a web URL.

CEONet is not static and major efforts are in progress to improve access to data. Some of the future developments are:

² For more information, see the web site at "http://cgdi.gc.ca/ceonet."

Short to Mid Term Plans

- Total overhaul of user-interface
- Callable client-side interface
- Unified distributed search
- Initial International gateways
- Initial/custom GeoCommerce Services
- Initial data access capabilities including GeoGratis

Mid to Long Term Plans

- ISO TC211 support
- Unified external gateways
- Common GeoCommerce Services
- Integrated data warehousing
- operational end-to-end applications

Sylvan Latour noted the role that standards and guidelines are playing in the success of CEONet and what works there can also be applied to other data sets. Also for the workshop discussions he suggested the CGDI “Service Architecture” shown in Figure 1. Users, buyers, and value adders would be able to find data using standardized searches, extract what they want, if necessary pay for it, and then use competing services to align it, bring to common scales, projections, formats as well as conducting other processing to generalize and integrate it.

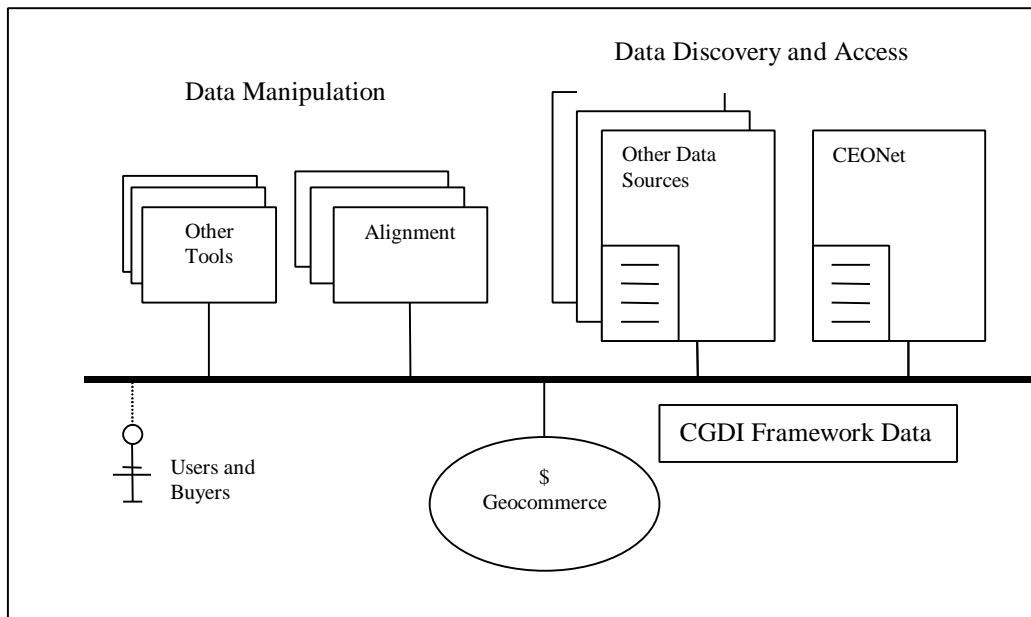


Figure 1: Suggested Service Architecture

3. Mercator Alliance - A Partnership to Deliver Enterprise Level Systems: Bill Lalonde has been involved in the Mercator alliance since its inception several years ago. His slide presentation (Attachment 4) covered the history, thrusts, accomplishments and plans of the Mercator I, II, and III Projects which all dealt with creating tools and services for geospatial data infrastructure. Bill mentioned several important technological advances made by members of the Mercator Alliance. This included standardized tools enabling RDBMS' to effectively manage multi-key information such as geospatial data and the Open Geospatial Datastore Interface (OGDI) which is providing the keys to access and read data in native and proprietary formats. One of Bill's slides, reproduced in Figure 2, illustrated how the various international standards are related.

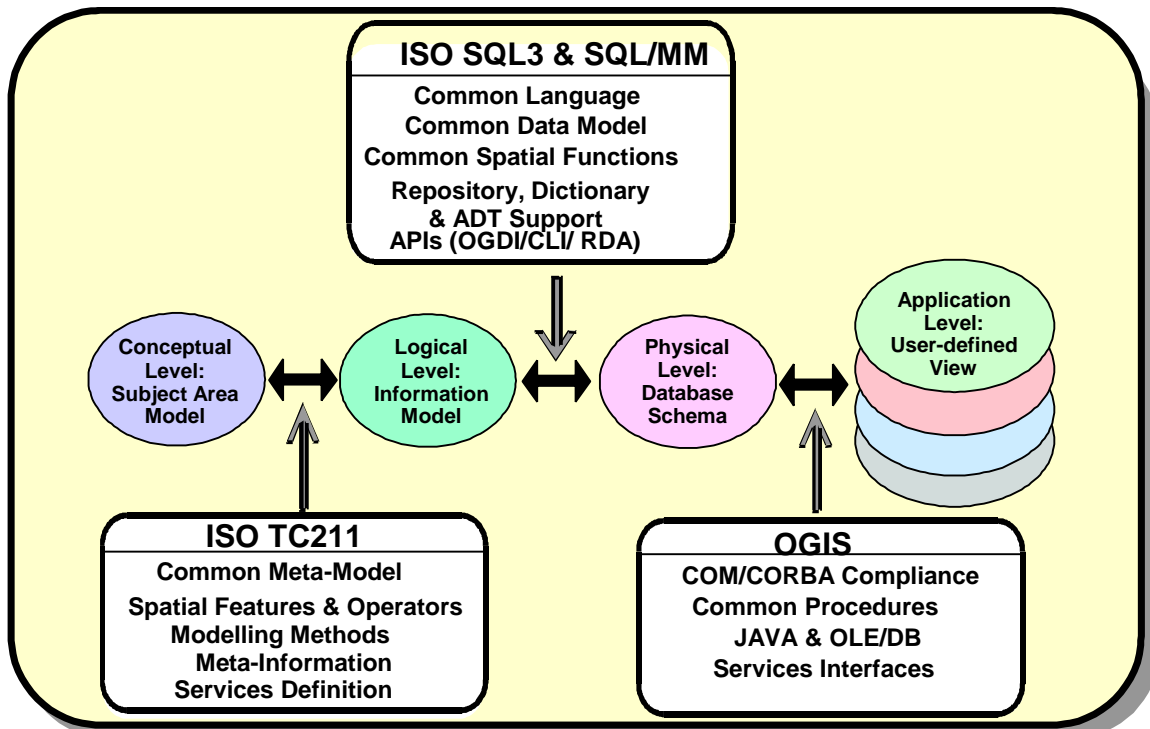


Figure 2: Relationship of the two ISO standards efforts (TC211 and SQL) and OGIS (Attachment 4)

Sylvain Latour recognized the importance of government and industry cooperating to solve problems of data dissemination and interoperability but argued that the workshop should not endorse any particular solution.

4. Data Interoperability Research Institute (DIRI): The Open Geospatial Datastore Interface (OGDI) was developed under the auspices of the Mercator I project mentioned in the previous presentation. The success of this “Application Program Interface (API)” has led to a public domain specification and an initiative to create a non-profit organization to support its implementation and enhancement. Paul Morin, who chairs this organization gave a presentation (Attachment 5) on the evolution, status, and plans for OGDI. Of particular interest is the cooperation and integration of OGDI, RDA, and CLI³ that could provide users with similar, transparent access to all types of data whether or not it is geospatial. Figure 3 illustrates how these three specifications provide interoperability for different platforms.

Workshop Precepts:

1. Data Alignment Layer: For the development of CGDI there are some fundamental assumptions. One of these is the Data Alignment Layer. Many agencies, particularly at the federal level have existing data that is not registered to NAD83, the national geodetic standard and it is difficult to use the data with other geospatial data sets. To alleviate this problem the IACG proposed the construction of a data base of visually identifiable points. This data base has been built from the NTDB and is now available on the web at no charge or restrictions.⁴

Figure 3: Merging functionality of OGDI, CLI and RDA (From Attachment 3)

³ CLI: Call Level Interface; RDA – Remote Data Access; Both are ISO/JTC1 data access standards.

⁴ For information and specification on the Data Alignment Layer see the Web site at “<http://www.ctis.nrcan.gc.ca/~cdal/main-e.html>”.

Sylvain gave a quick summary of the Data Alignment Layer. It currently consists of over 6 million points. The current version consists of an ASCII file but in 1999 they will be added to a database which will make it easier to find and extract points of interest. Sylvain suggested that there are several ways in which they should be accessed:

1. Standard interface using NTS Sheets
 2. Centroid and radius
 3. User defined areas
 - C. Douglas O'Brien suggested a 4th option:
 4. A calculation based upon a point in a rectangle.
- Other suggestions were:
5. Query by Attribute
 6. Query by selected "frames of reference" or "reference set"

This initiated a discussion for the need of a flexible system, with a quick response. It was felt that there is a need for users to agree on a standardized set of points and they should be identified as such in the database. Dianne Richardson noted the importance of a seamless, scaleless site of coordinates and the requirement for different generalization rules for different data sets. Further, a validation check must be done on the source data prior to generalization. In addition, as coordinates change due to the availability of more accurate data, or because the road is moved, information on the lineage of the points must be kept. Questions were raised on the attributes of the DAL points. For roads intersections in this version of the DAL, the road numbers are included but names are not. From Peter Schut's suggestion that a value adder could provide more detailed information around the DAL points., it was recognized that the NTDB would be brought on-line as one of the CGDI layers and there would be many opportunities for industry to provide new tools.

Other tools for visualizing the DAL points that were suggested by Peter Schut:

- Link the points on a given highway via splined arc to assist in visualization road intersections
- Raster image of the NTS topographic map area surrounding the identified point, by single points or as a batch process for selected points, all viewable in a local viewer.

The next topic to be discussed was raised by Peter Schut. He asked "how does the user insert the DAL points into his/her data sets?" Two of his suggestions were:

- Manual assistance using either web or local tools to add points as a layer; then to click on the alignment point to bring up the raster context image, and then click on the correct intersection to tie user point to and to delete all non-tied points.
- Automated routine to assign points along a given highway arc.
- When using commercial software use the two coverages where the alignment points have been identified and rubber sheet them giving the RMS errors and allow users to drop the worst points.

2. Standards: There is broad agreement that international standards must be used whenever possible. Furthermore standards need to be adopted and supported by the commercial sector or else they won't get broad acceptance. The following summary is extracted from the Sylvain Latour's Report (Attachment 2):

"All the efforts dedicated in Canada towards a sound Data Framework should be based on existing standards and practices that are relevant to our work. Funding should be allocated accordingly. These standards and practices are (but not limited to):

- The work of the ISO TC-211 <http://www.statkart.no/isotc211/> (items in Bold are viewed as particularly relevant for this group)
 - Part 1: Reference model
 - Part 2: Overview
 - Part 3: Conceptual schema language
 - **Part 4: Terminology**
 - Part 5: Conformance and testing
 - Part 6: Profiles
 - **Part 7: Spatial subschema and Spatial Operators**

- Part 8: Temporal subschema
- Part 9: Rules for application schema
- Part 10: Cataloguing
- Part 11: Geodetic reference systems
- Part 12: Indirect reference systems
- **Part 13: Quality**
- **Part 14: Quality evaluation procedures**
- **Part 15: Metadata**
- Part 16: Positioning services
- Part 17: Portrayal of geographic information
- Part 18: Encoding
- **Part 19: Services**
- Functional standards
- Imagery and gridded data
- The work of the OpenGIS Consortium (OGC) <http://www.opengis.org/>
 - **Feature Geometry (Topic 1)**
 - Spatial Reference Systems (Topic 2)
 - Locational Geometry (Topic 3)
 - Stored Functions and Interpolation (Topic 4)
 - Features and Feature Collections (Topic 5)
 - The Coverage Type (Topic 6)
 - Earth Imagery (Topic 7)
 - Relations Between Features (Topic 8)
 - Quality (Topic 9)
 - Transfer Technology (Topic 10)
 - Metadata (Topic 11)
 - **The OpenGIS Service Architecture (Topic 12)**
 - Catalogs (Topic 13)
 - Semantics and Information Communities (Topic 14)
- ISO/TC-204 Transport information and control systems
<http://www.iso.ch/meme/TC204.html>⁵
- ISO/IEC JTC1/SC32/WG4 SQL/MM⁵

C. Douglas O'Brien noted that TC211 is not conducting or planning any work to create standard feature catalogues. Some individuals feel that they are important and will be needed to build the CGDI while others feel that the task is too difficult. Similarly, the data quality model proposed by TC211 is not very mature. The list of items in the metadata specification is very long and it is important to ensure that all those providing information on the web are using harmonized specifications. The ISO TC-204 Committee is close to producing a final standard. Unfortunately they are no longer harmonizing their efforts with that of ISO TC-211 but C. Douglas believes that the two solutions seem to fit at the spatial sub-schema level but the metadata and catalogue services specifications are different, however he is confident they will be aligned in due course. Doug also noted that support for general spatial database queries are provided in SQL/MM but the actual queries have not been set up.

3. Services: The part of the discussion dealing with the services required to support framework data was developed through an interactive process with the participants. The following summary of this discussion is also extracted from the Sylvain Latour's Report (Attachment 2) with minor modifications:

“Both ISO and OGC, as well as the CEOnet developers, are proposing a service architecture for the deployment of technology. The following are high level services that the workshop decided need to be detailed but are seen as the set of tools for data integration.

Horizontal Alignment (Done with the Data Alignment Layer (DAL)):

- **Access**
 - By NTS Number

⁵ Added by the author

- Centroid with Radius
- Using different projection system, Datum, Scale
- Define best points
- By sending a cluster of points
- **Visualization**
 - NTS Maplet
 - Satellite image chip
- **Insertion in User's Data set**
- **Alignment**
 - Document Technologies
 - Document Issues
 - Point Picker (based in IDs)
 - Optimizing approach
- **Maintenance**
 - Projection conversion
 - Frequently used points
- **Align Horizontal**
- **Match Semantic**
- **Align Scale**
- **Conflate**
- **Translate Format**
- **Evaluate Quality**
- **Establish Link (permanent)**

Many of the proposed services may be satisfied by tools that will be straightforward to develop but one area that led to a major discussion was data quality. Discussion on how to specify and measure it did not lead to any fruitful conclusions. It was also unclear how useful the ISO TC211 quality standards may be or how this critical aspect of CGDI should be dealt with. Boyan Brodaric correctly concluded the discussion by describing the topic of data quality as a “quagmire.”

Pierre Lermusieaux suggested that some of the issues will gradually be resolved as geospatial data warehouse are built. He envisions an evolution to common practices from which standards for quality will emerge.

Vision of CGDI Evolution:

The second day of the workshop began with a review of the vision for CGDI. Sylvain suggested we develop a focus for further work by identifying areas where groups can be formed to study the specific issues and propose solutions to resolve them. However, it quickly became clear that the topics for study were dependent on what particular vision was considered. As it had been agreed that CGDI would evolve through several stages before reaching the simple, ideal solutions that have been broadly expressed and therefore a time-line illustrating this evolution would be useful for determining priorities and deciding upon further effort. The group foresaw that there were five distinct phases for CGDI and these are described below:

1998-2002 - Version I: Discovery and Access: Covers activities to describe data through standardized metadata, the availability of tools and technology for interfacing to proprietary and native formats (e.g. OGD⁶) and basic tools for bringing data together in common datums and projections.

- Format Interfaces
- Transformations, Common Datums, Projections
- Alignment Layer

⁶ OGD – The Open Geospatial Datastore Interface – a public domain standard for linking to a larger and growing variety of data formats

- Common Terminology
- Standards

2002 – 2005 - Version II: Basic Data Integration: By this time a preliminary data framework would be established and accepted. Basic or national core data sets are available and key data sets can be readily integrated. The specifications for a new, more comprehensive data alignment layer would be defined.

- CDAL Version 2.0 Specified
- Basic Core data Implemented
- Basic Conflagration tools available
- Advanced provincial infrastructures
- Generalization tools being implemented

2005 – 2008 -Version III: National Framework: A national data architecture for CGDI would be defined, broadly accepted and financed. National implementation of this framework would be well advanced.

- National Data Framework defined and accepted
- Implementations started, move towards virtual data at smaller scales

2008 – 2012 - Version IV: Interoperability: Data from all levels of government available and readily integratable

- Substantial data interoperability
- National/International Standards implemented
- National Framework implemented.

2012 - Version V: National CGDI: The beginning of a new “era.”

- Full Data Integration
- Simple, transparent access
- National harmonization on data policies

Next Steps:

A number of individuals were tasked with the following actions”

1. Peter Schut to prepare a list of frequently asked questions (FAQ) on using the Data Alignment Layer to supplement a summary description to be prepared by Christine Parent
2. Sylvain Latour and Tim Evangelatos to work with the CGDI Web site team to prepare a description of the Framework Data concept and of the Tools needed to support that aspect of the CGDI.
3. Valerie Hume and her colleagues to work with the CGDI Web site team to provide more up-to-date information on geomatics standards progress and issues. This is to include information and links to the standards specifications and to terminology.
4. Paul Jolicoeur to make information available on the CGDI Web site on the uses, users, partnerships and funding available to use, extend and support the Data Alignment Layer.
5. The CGDI Secretariat to make information available on the CGDI Web site on various related activities including development opportunities and funding.
6. Diane Richardson to organize a meeting between CCRS and CTI to discuss evolving relationships.

Sylvain proposed that this group avoid endorsing any commercial or public domain software. As no one objected this policy was accepted. However, as C. Douglas O’Brien suggested, there is a complementary need to deal with other aspects of CGDI such as the relations of the Open Geospatial Datastore Interface (OGDI) but it could be dealt with under some other group (e.g. The Mercator Alliance)

Conclusions:

Twenty-four individuals with a diverse range of backgrounds from federal and provincial government agencies met with engineers and scientists from industry and had a very successful workshop. In this and in other related workshops the idea of creating a national geospatial data infrastructure has had complete acceptance. Although the economic benefits of such an infrastructure is well recognized by the geospatial community, major investments and commitments are required. One of the more significant contributions of

this workshop was the identification of five phases and a proposed timetable for their evolution. Hopefully this will help the community to focus on realistic objectives that will eventually lead to an optimal solution.

CGDI is a complex project but building in stages will help ensure that the community moves collectively in a constructive direction. The workshop covered many topics and agreed upon a set of actions that are described later. Only one topic was not adequately dealt with and that was geospatial data quality, a complex, not very well understood issue that is of fundamental importance. It is recommended that in 1999 a workshop be convened to raise awareness, understand its place in CGDI and define, as much as possible, the step needed to adequately deal with it.

References:

1. Evangelatos, T., IACG/CCOG Workshop on Core Data, Ottawa, October 15th, 1998.

Attachments:

1. Proposed Workshop Agenda
2. Sylvain Latour, "Outcome of the CGDI Workshop on Data Integration and Tools, Sherbrooke, November 4 and 5th, 1998.", Sherbrooke, November 25, 1998.
3. Presentation by Tim Evangelatos, " The Canadian Geospatial Data Infrastructure (CGDI)."
4. Presentation by Wiliam Lalonde, "Mercator Alliance: A Partnership to Deliver Enterprise Level Systems."
5. Presentation By Paul Morin, "Data Interoperability Research Institute (DIRI)."
6. Sylvain Latour, "Data Integration Services." Sherbrooke, January 5, 1999.

Attachment #1

CANADIAN GEOSPATIAL DATA INFRASTRUCTURE
Sponsored by the IACG and CCOG

CGDI WORKSHOP: **Data Integration and Tools for Framework Data**

Objective:

A strategic workshop to address and resolve technical issues. The objective will be to look at tools to support the use of CGDI framework data and the integration of jurisdictional datasets. The intended participants include spatial data suppliers (public and private), users, academia, software vendors, data integrators, and any interested parties who deal with these types of issues.

Location:

Centre for Topographic Information, Natural Resources Canada.
2144 King Street West, Suite 010
Sherbrooke, Quebec.

Date and Time:

Wednesday and Thursday, November 4th and 5th - 9 am to 4 pm

Contact:

Please confirm your attendance by October 30th, 1998.

Sylvain Latour

Phone: (819) 564-4851

Fax: (819) 564-5698

Email: slatour@nrcan.gc.ca

For more Information:

The results of the workshop will be posted on the CGDI website: <http://cgdi.gc.ca>

Proposed Agenda:

The workshop will focus on these main activities:

DAY 1: Problem Definition

1. Introduction and workshop goals. (S. Latour)
2. CGDI/framework data background and issues (T. Evangelatos)
3. Discussion on short and long term vision for data use, sharing and maintenance. (All)
4. Identify categories of tools and individual tools. (P.Schut, D.Boutin)
 - identify typical uses, problems addressed
 - identify existing tools and solutions
 - set priorities and time frames
5. Determine rules by which tools should be built. (S. Latour)
 - which standards, technologies, etc..
6. Discussions (All)
7. Conclusions and plans for Day 2. (S. Latour)

DAY 2: Conclusions and Future Actions

5. Review of Day 1 conclusions. (S. Latour)
6. Discussion. (All)
7. Conclusions and recommendations. (All)
8. Set priorities for funding. (P.Rojas)

Attachment #2

Outcome of the CGDI Workshop on Data Integration and Tools Held in Sherbrooke November 4th and 5th, 1998

During the very successful two days workshop, the participants reached a consensus on the following issues:

- The “Framework: Integration and Tools” Vision
“In today’s Geospatial projects which involve data from a multitude of sources the work required to bring all the data together into one system and to integrate the data so that it can be used for in depth analysis accounts for up to 80% of the overall project’s effort. We envision that by the year 2012 this effort will account for less than 1%”
- The Precepts
 - Standards
“All the efforts dedicated in Canada towards a sound Data Framework should be based on existing standards and practices that are relevant to our work. Funding should be allocated accordingly. These standards and practices are (but not limited to):”
 - The work of the ISO TC-211 <http://www.statkart.no/isotc211/> (items in Bold are viewed as particularly relevant for this group)
 - Part 1: Reference model
 - Part 2: Overview
 - Part 3: Conceptual schema language
 - **Part 4: Terminology**
 - Part 5: Conformance and testing
 - Part 6: Profiles
 - **Part 7: Spatial subschema and Spatial Operators**
 - Part 8: Temporal subschema
 - Part 9: Rules for application schema
 - Part 10: Cataloguing
 - Part 11: Geodetic reference systems
 - Part 12: Indirect reference systems
 - **Part 13: Quality**
 - **Part 14: Quality evaluation procedures**
 - **Part 15: Metadata**
 - Part 16: Positioning services
 - Part 17: Portrayal of geographic information
 - Part 18: Encoding
 - **Part 19: Services**
 - Functional standards
 - Imagery and gridded data
 - The work of the OpenGIS Consortium (OGC) <http://www.opengis.org/>
 - **Feature Geometry (Topic 1)**
 - Spatial Reference Systems (Topic 2)
 - Locational Geometry (Topic 3)
 - Stored Functions and Interpolation (Topic 4)
 - Features and Feature Collections (Topic 5)
 - The Coverage Type (Topic 6)
 - Earth Imagery (Topic 7)
 - Relations Between Features (Topic 8)
 - Quality (Topic 9)
 - Transfer Technology (Topic 10)
 - Metadata (Topic 11)
 - **The OpenGIS Service Architecture (Topic 12)**
 - Catalogs (Topic 13)

- Semantics and Information Communities (Topic 14)
 - ISO/TC-204 Transport information and control systems
<http://www.iso.ch/meme/TC204.html>
- The services we envision
Both the ISO and the OGC as well as the CEOnet are proposing a service architecture for the deployment of technology. The following are high level services that need to be detailed but are seen as the complete set of tools for total data integration.
 - Align Vertical (This is the Data Alignment Layer (<http://www.ctis.nrcan.gc.ca/~cdal/main-e.html>))
 - Access
 - By NTS Number
 - Centroid with Radius
 - Using different projection system, Datum, Scale
 - Define best points
 - By sending a cluster of points
 - Visualization
 - NTS Maplet
 - Satellite image chip
 - Insertion in User's Data set
 - Alignment
 - Document Technologies
 - Document Issues
 - Point Picker (based in Ids)
 - Optimizing approach
 - Maintenance
 - Projection conversion
 - Frequently used points
 - Align Horizontal
 - Match Semantic
 - Align Scale
 - Conflate
 - Translate Format
 - Evaluate Quality
 - Establish Link (permanent)
- The eras of GeoSpatial Data Integration
Throughout the evolution of the CGDI Framework, activities will mature through different stage of maturity; vision, consultative Process, Engineering, Technology, Use. The following describes the time line for the Use. A more complete time line for all stage of maturity will be compiled.
 - -0.1 (Yesterday)
 - Discovery & Access
 - Version 1.0 (Now until - 2002)
 - Format – Interface
 - Transformation
 - Format
 - Datum
 - Projection
 - Coding Scheme
 - Understanding
 - Terminology
 - Standards
 - Version 2.0 (2002 – 2005)

- Basic Semantic Integration
 - Basic Conflation
 - Vertical and Horizontal Integration
 - Basic Scale transformation/Realignment
 - Basic Core Data Interoperability
 - CDAL version 2.0 of Specifications
- Version 3.0 (2005 – 2008)
 - Complete Definition and Understanding of National Framework with partial implementation
- Version 4.0 (2008 – 2012)
 - Substantial Interoperability
- Version 5.0 (2012)
 - Full Data Integration (The Vision is Reality)
- An Action List
 - Write FAQ for CDAL -P.Schut
 - 5 pages on CDAL for the Web Site -C.Parent
 - Better description on the CGDI Web Site for the Framework Data concepts and Tools -S.Latour, T.Evangelatos
 - Explain to Canadians the Terminology and the standards -All
 - Create a section on Standards for the Web Site -V.Hume
 - Document uses and methods for CDAL -P.Jolicoeur, P.Paul
 - Create a section on partnership for the Web Site that would contain information about Development Opportunities and Funding -S.Mackie, T.Evangelatos
- Varia
 - A policy statement
 - The member of this workshop do not support the endorsement of any software (public or commercial).

Participants:

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Attachment #3

The Canadian Geospatial Data Infrastructure (CGDI)

Timothy V. Evangelatos
CGDI Secretariat

**IACG/CCOG
Data Integration and Tools Workshop
CTI, Sherbrooke
Nov. 4th, 1998**

Discovering a New World

- Geospatial Data underlies, or is part of all Human Activities (“Dead or Alive”).
- (“X, Y, Z, & **Time**”)
- The need to find, get, and be able to use geospatial data is much more important than many realize.
- It is also much too difficult get and use.
- which leads to need for the CGDI.

The CGDI: Presentation Overview

- Basically this presentation is about:
- Why, What, Where, Who, When
- and
- How is the CGDI being created?

The Canadian Geospatial Data Infrastructure (CGDI)

CGDI will:

- *build the geographic information part of the information highway*
- *build a national infrastructure of geographic information and public access to it*
- *provide one stop shopping to seamless geographic data (Corey, 1998)*

CGDI will be built using a “shared leadership” style model

- no one “lead agency”
 - consortium approach to all decision making
 - federal, provincial, territorial agencies
 - private sector and academia
 - collective leadership among the participants
- an innovative approach to dealing with cross-cutting, horizontal issues
- provides a new model for government services

CGDI - The plan

- Five key thrusts:
 - access to government information,
 - which is built on a common national framework
 - using international standards,
 - collected by agencies in partnership, and
 - distributed within a supportive policy environment
- by improving access, the other four thrusts follow necessarily
 - (view of the Centre de développement de la géomatique, Québec)

Canadian Geospatial Data Infrastructure

1) Access

- Data clearinghouse, access:
 - locate datasets
 - metadata describing what's there
 - information on how to obtain it
 - links to similar information
- Internet-based
- Increasingly sophisticated searches
- CEONet: CGDI "Window"

2) Framework Data

- Upon which all datasets will be based:
 - Underlying Data
 - Geodetic Positioning Framework
 - Visual Referencing - Data Alignment Layer
 - Core Datasets
 - skeleton subset - topographic data, hydrography
 - high precision base to build upon
 - no copyright restrictions, freely available
 - Secondary Datasets
 - Detailed topographic, thematic datasets, etc.

Applications

**Detailed
NTDB - Type
Information**

Agr.

Census

Env.

Geo.

For.

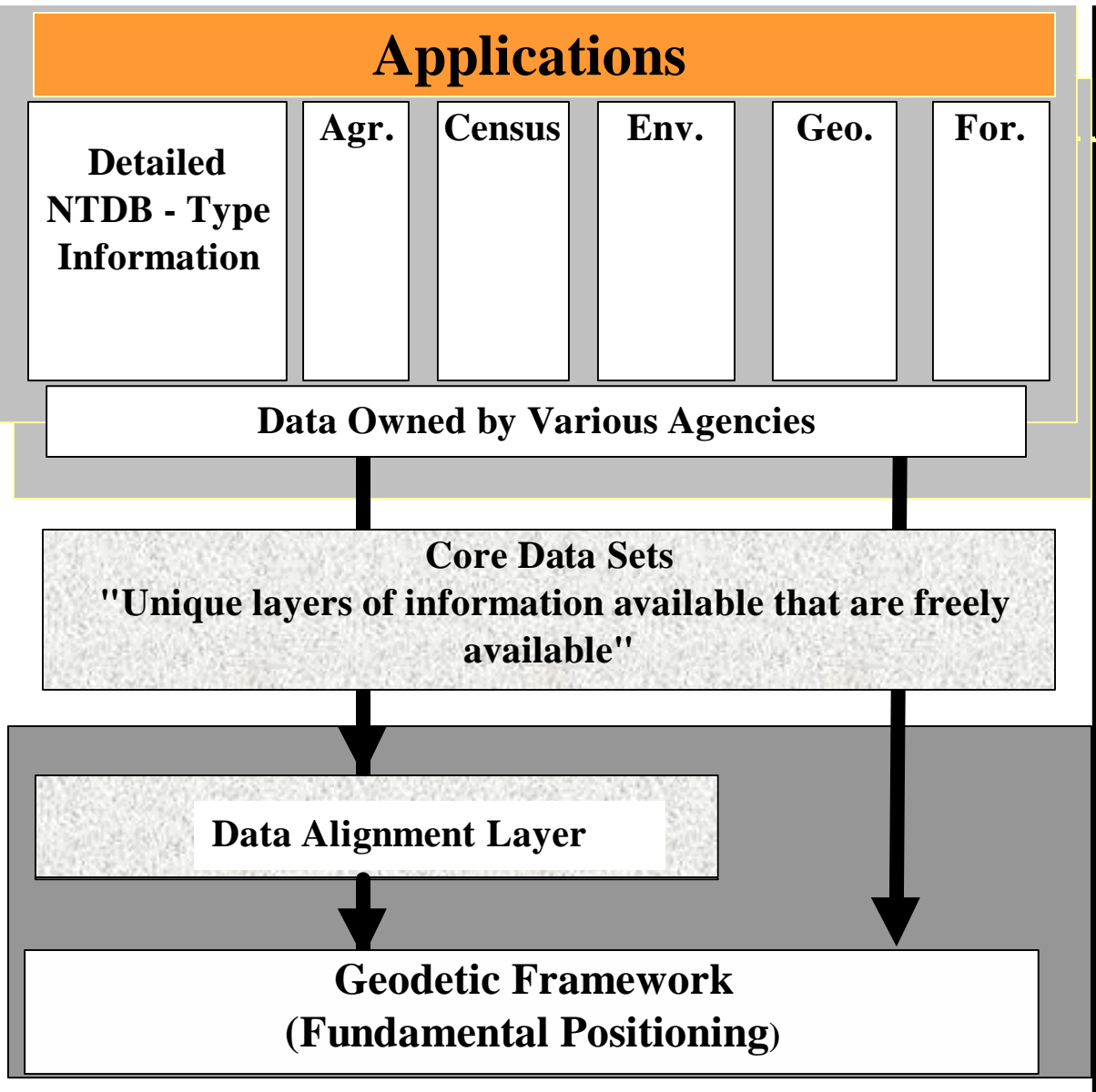
Data Owned by Various Agencies

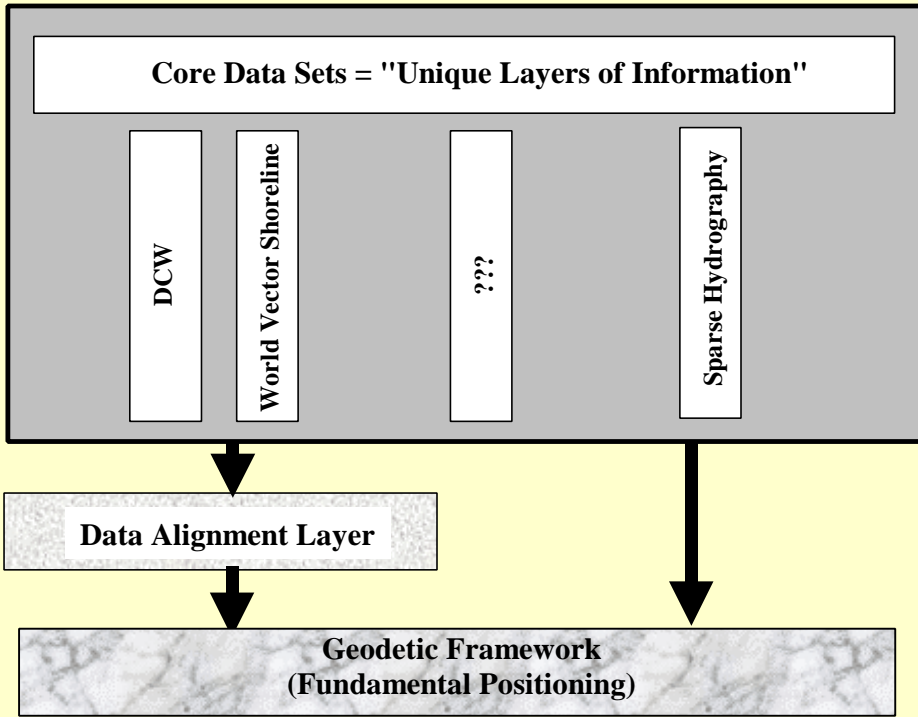
Core Data Sets

"Unique layers of information available that are freely available"

Data Alignment Layer

**Geodetic Framework
(Fundamental Positioning)**



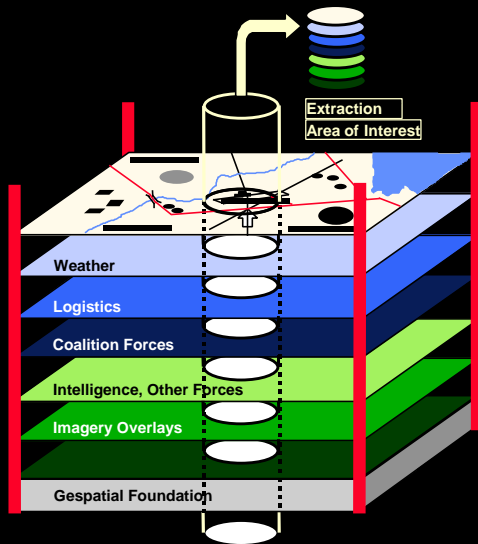


CGDI - Data Alignment Layer

- Centre for Topographic Information
- Visual Reference Points:
 - Extracted from the National Topographic Data Base (NTDB)
 - Road Intersections
 - Center of Mass of Lakes
 - Freely Available on the Internet by the end of 1998.

GGII - Key Elements

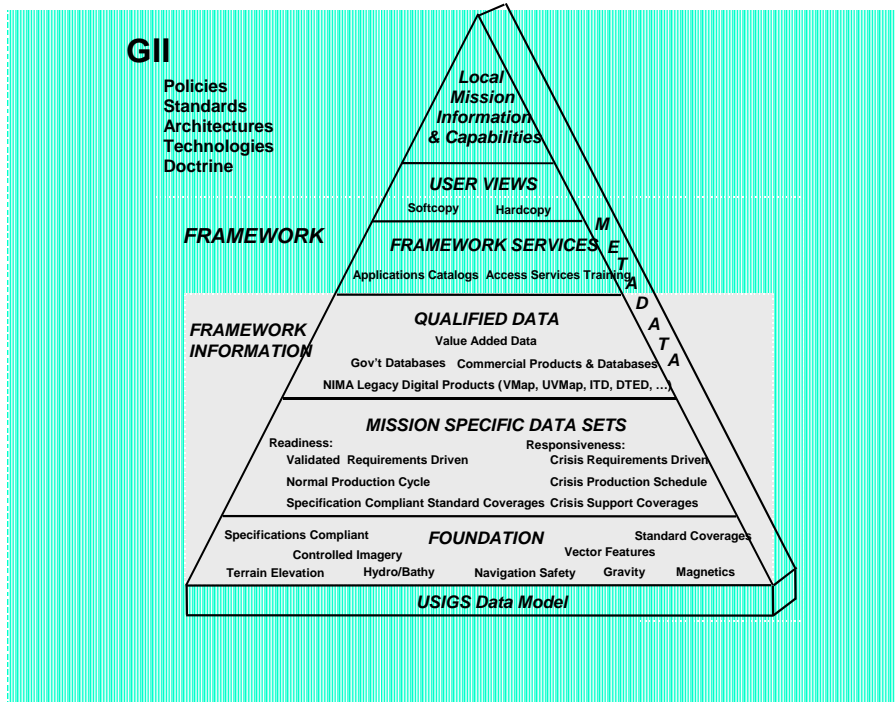
- Integrated View of the Mission Space

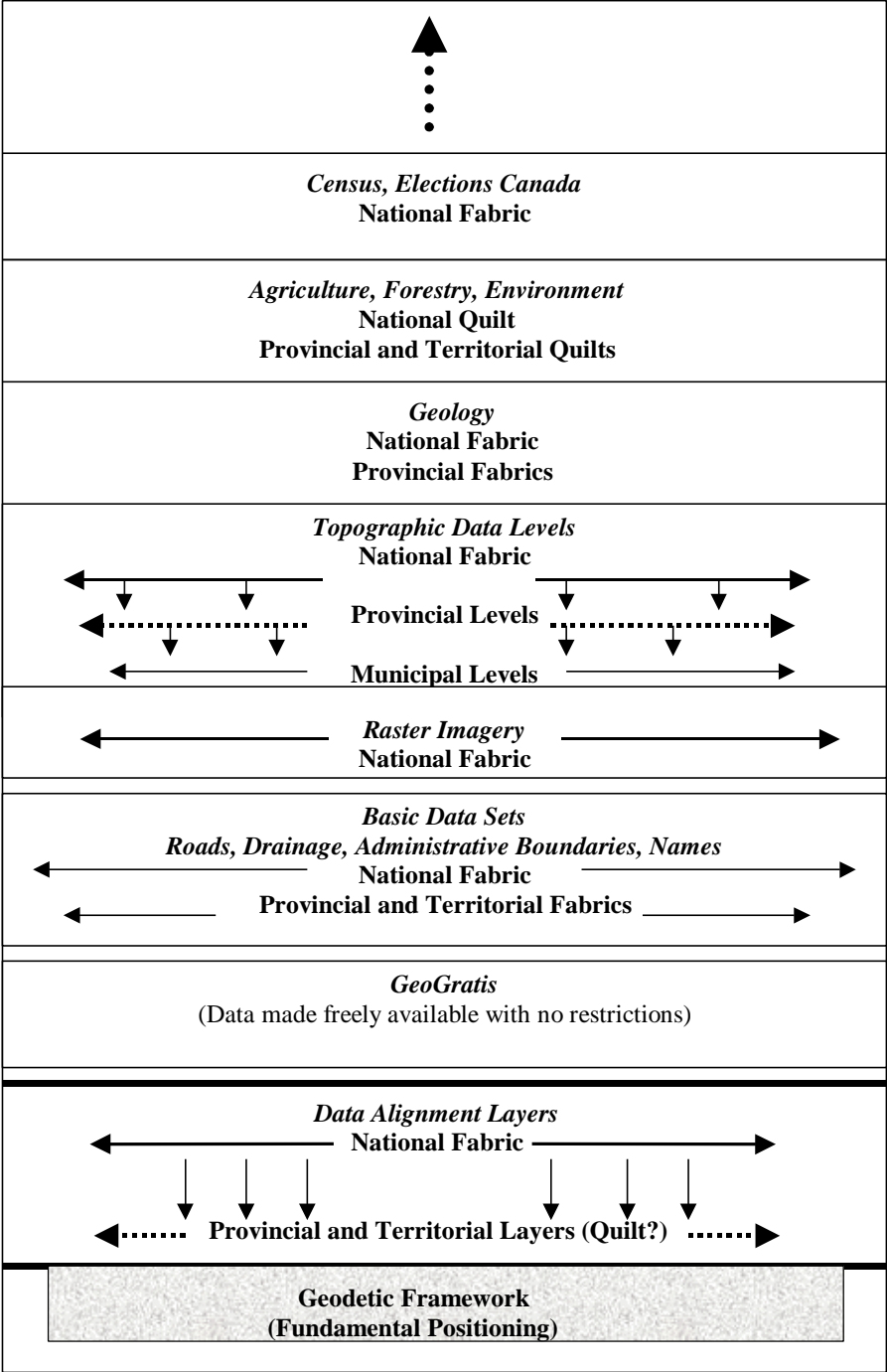


- Fusion of information from many domains
- Known characteristics
- Common reference systems
- Standard feature ID & attribution
- Standard symbology
- Standard exchange format(s)
- Shared set of Framework Information and Services
- Doctrine, training & tools to produce consistent results

GGII - Key Elements

- GGII Framework





...data framework actions

- Fundamental part of the CGDI
- Must be national in scope
- Closer work with provinces
- Working with existing resources
- Workshops followed by a national conference under consideration
- Led by Tim Evangelatos (DFO)

3) Geospatial Standards

- International Participation:
 - International Organization for Standards (ISO)
 - Geomatics/Geographic Information (TC211)
 - Open GIS Consortium
- Objectives:
 - participate in evolving world standards
 - ensure Canadian needs are met
 - help Canadians anticipate, and use standards
- Led by Valerie Hume (DIAND)

4) Partnerships

- Gather data in partnerships:
 - only once, closest to source
 - cost-share collection, & share data
- Concentrate on:
 - updating road networks, admin boundaries
 - other joint updates or data generating
- Result:
 - statement of principles
 - bilateral agreements and joint work
- Led by Mark Corey (NRCan)

5) Supportive Policy Environment

- All agencies - more standard:
 - sales agreements?
 - terms and conditions of use?
 - licensing provisions?
 - royalty structures?
- Objective:
 - easy to buy from various agencies
 - easy to package and resell their data together
 - common and simple terms and conditions
- Led by Tim Davis (StatCan)

*...and a corresponding range
of possible initiatives*

- GeoWindows - to promote access
- GeoPartners - to promote data sharing
- National Framework - to promote a standard framework of geographic information
- GeoInnovations - to promote the use of data by innovative tools and technology
- Community Atlas - to present national geographic information on the web
- Pilots - to demonstrate the technology in rural and remote community projects