

Bottlenecks and Workarounds

Defining Levels of Connectivity
and Ensuring Public Access To
Framework Data.

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Bottlenecks and Framework Data

It is postulated that the most serious challenges to be encountered in the development of a spatial data infrastructure will be the bottlenecks associated with access to framework data.

CGDI Framework Data

- includes roads, rivers, municipalities
- gathered closest to source
- exists in a highly distributed and networked environment
- is accessed by many, many users

Two classes of users

- Value adders: scientist, urban planner, policy specialist, geomatics industry.
 - Build information products using framework data; use GIS systems.
- End-users:
 - need finished products from public frameworks; don't have GIS systems.

Related views of the Framework

- Value-Adders: want framework geometry and attributes.
- End Users: want information product derived from the framework (eg graphic, report).
- Value-adders must be GIS specialists today. Tomorrow, the infrastructure will enable non-GIS value-adders to develop products.

Levels of Integration

- Three different types of integration could be achieved:
 - integration of spatial data in the horizontal and vertical dimensions;
 - acceptance of standard spatial units; and
 - sharing of attribute information.

Integration of spatial data in the horizontal and vertical dimensions

- Alignment of geometries by using the Data Alignment Layer
- Alignment of geometries by using the same base maps
- Shared use of common geometries
- Shared use of common linked geometries at multiple framework scales, with sharing of attributes between scales

Integration of spatial data maintenance

- Non-collaborative maintenance of infrastructure datasets
- Multi-agency maintenance of infrastructure datasets
- Distributed maintenance of
- Distributed in real time
- ... in real time with dynamically generated interpretations

Integration of spatial data access

- Single point access to common geometries and attributes
- Multi-point access to common geometries and attributes

Bottlenecks and Framework Data

It is postulated that the most serious challenges to be encountered in the development of a spatial data infrastructure will be the bottlenecks associated with access to framework data.

- What are the bottlenecks?
- What are the workarounds?

Types of Bottlenecks

- Access
- Integration
- Versioning
- Delivery

ACCESS: desired situation

- Quick access
- Quick propagation of updates
- Reliable access
- Easy to find

ACCESS - physical

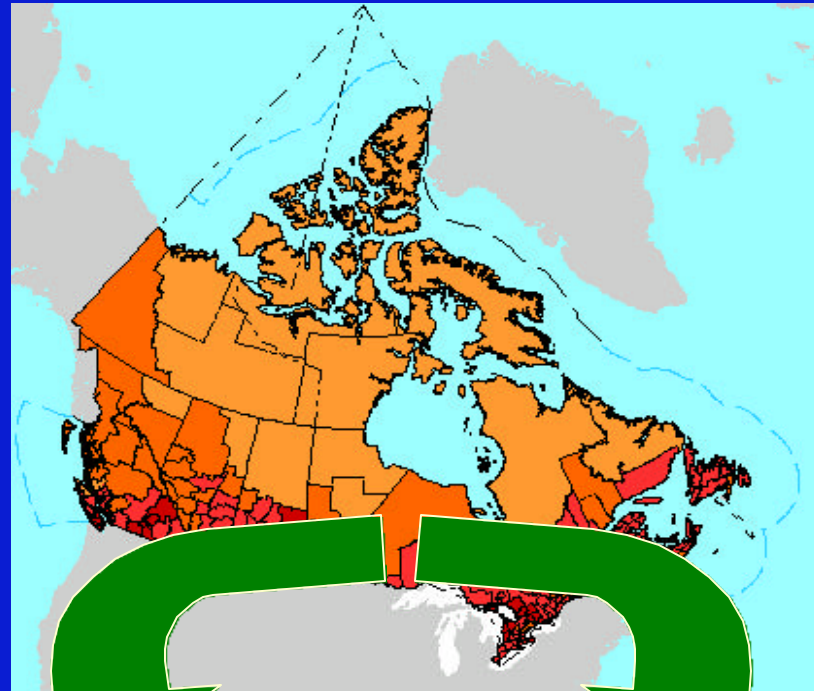
Bottlenecks

- Bandwidth and 24/7 access to definitive server
 - Volume of access
 - Peak Periods

Workarounds

- Mirror sites
- Caching services
- generalizations / intersections and standard views
- separate attributes from geometry

Attribute Tables from the Same Framework



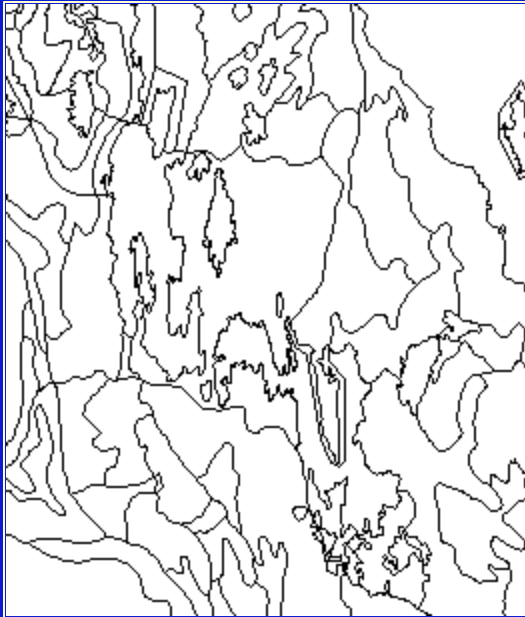
Language Spoken

<u>UKey</u>	<u>Census Division</u>	<u>% Eng / Fr</u>
1	<u>Cochrane</u>	52.4
2	<u>Algoma</u>	14.3
3	<u>Timiskaming</u>	30.4
4	<u>Sudbury</u>	39.8

Aging Population

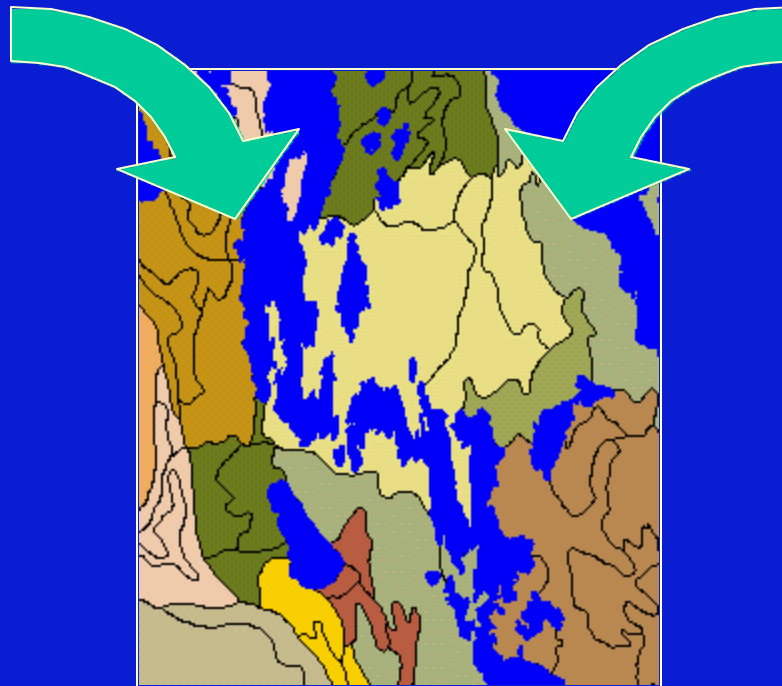
<u>UKey</u>	<u>Census Division</u>	<u>Popn (96)</u>	<u>% Age 65+</u>
1	<u>Cochrane</u>	93240	6.5
2	<u>Algoma</u>	125455	8.6
3	<u>Timiskaming</u>	37807	8.3
4	<u>Sudbury</u>	164049	7.4

Vectors
from a GIS server



Attributes
from a data server

<i>Polygon</i>	<i>Ecodistrict</i>
460360	272
460357	272
460315	272
460312	270
460316	271
460300	276
460318	276
460359	270
460428	270
460319	276
460348	276
460362	276
460365	276
460366	276
460310	270
460429	183
460350	276



Web map
on a client screen

ACCESS - Navigation

Bottlenecks

- Single window access (Atlas, CEOnet) is never ideal for anyone

Workarounds

- “Frequently Used Data”
- Metadata - Dynamic searches
- specialized portals

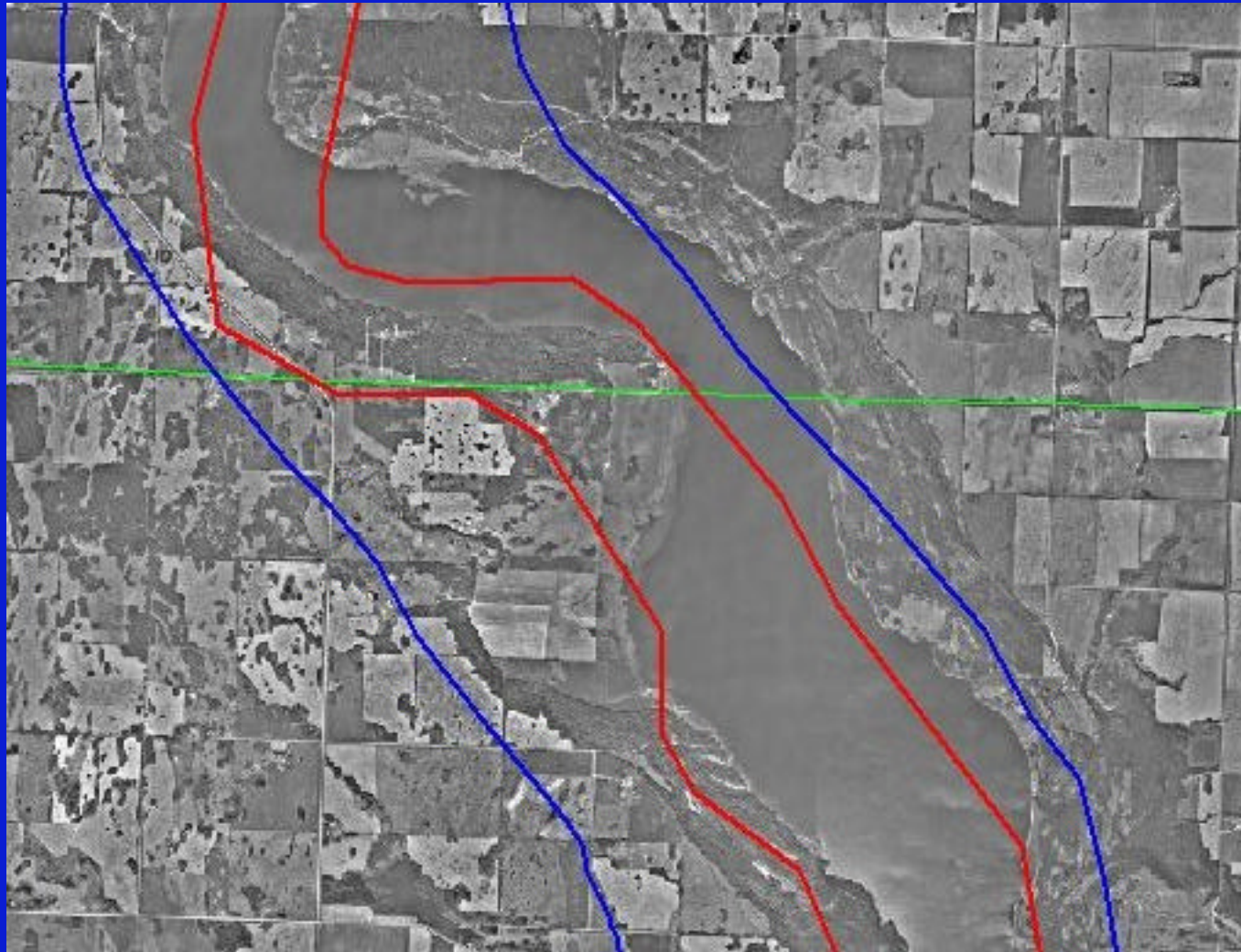
INTEGRATION: Types

- Geometric:
 - same map projection / co-ordinate units?
 - same type of spatial units?
- Attribute:
 - are the attributes compatible?
 - syntax, currency, methodology

Desired Situation

- Tight integration
- Reliable integration

INTEGRATION - Generalization



INTEGRATION - Generalization

Bottlenecks

- 1:1M too coarse for some, too detailed for others.

Workarounds

- Pre-generalized at selected scales
- on-line generalization tools/services

INTEGRATION - Formats

Bottlenecks

- proprietary formats and projections

Workarounds

- Standard projections and formats
- On-line translation services
- OGC/ISO standards

INTEGRATION - Conflation

Bottlenecks

- common features have multiple representations

Workarounds

- Data Alignment Layer
- on-line conflation toolset/service
- Adoption of Framework data
- Allow people to link their data to a framework feature using gazetteers

INTEGRATION - Semantics

Bottlenecks

- your “ruisseau” is my “stream”

Workarounds

- Use Semantic translators, gazetteers and geoparsers to create links to geospatial representations
- Standardized codes

VERSIONING - notification

Bottlenecks

- How will I know when framework changes have occurred?

Workarounds

- Version numbering
- Push technology
- Get technology
- Newsgroups / newsletters
- Maintenance agreements

VERSIONING - dependencies

Bottlenecks

- Do the changes mean I have to redo my work?
- GIS data is not “write-protected” and dependencies involve human interaction.

Workarounds

- Partial solutions from the Software world (eg “Diff”, “Make”)
- Explanation of impact
- Version numbering

VERSIONING - frequency

Bottlenecks

- Too many updates lead to bandwidth access problems
- Too few updates lead to obsolete data

Workarounds

- Decision based on volume and frequency of changes
- up-to-the-minute vs. named releases

DELIVERY - Visual Maps

Bottlenecks

- many users just want a precanned image

Workarounds

- Lightweight graphics tied to efficient discovery tools (metadata)

DELIVERY - Support

Bottlenecks

- agencies overwhelmed by requests for information and help

Workarounds

- FAQs
- 1-900 charge-back
- Service Agreements

Conclusion

- Presently, there are serious challenges to the practical use of on-line framework data.
- A number of incremental work-arounds will assist in the short-term.
- In the longer term, we will need to create some significant new infrastructure services to address these anticipated bottlenecks.

