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Global Observatory

Towards Inter-jurisdictional Interoperability for a Sustainable Management of the St. Lawrence Ecosystem

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GeoCod Workshop
The Battery Hotel
St. John's, NF
May 14, 2007

Presentation outline

- St. Lawrence Observatory (OSL)
  OSL Internet Portal: overview, products, services, clients
- Service-Oriented Architecture (SOA) & Interoperability
  DFO national pilot project, Web data services, data accessibility
- St. Lawrence Global Observatory (SLGO)
  Inter-jurisdictional cooperation

OSL Internet Portal ◆ products & services

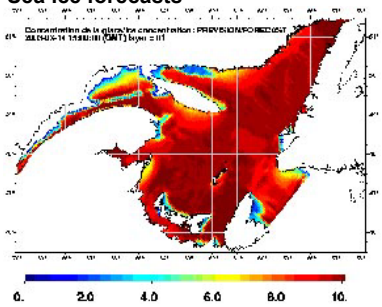
St. Lawrence Observatory

http://www.osl.gc.ca

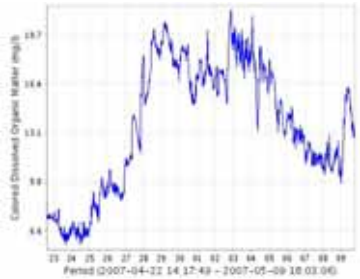
On-line since January 2000

- **Data Access**: real-time data, databases, information systems,…;
- **Dynamic products**: ocean forecasts, sea surface temperature maps, modelling, georeferenced image collections, …;
- **Thematic Web sites**;
- **Collaborative projects**: governments, universities, industry;
- **On-line resources**: reports, glossary, search engine, …

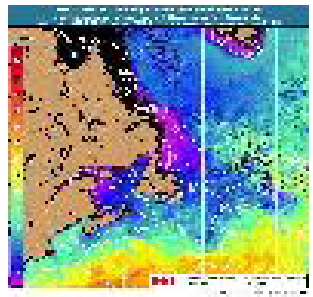
Sea ice forecasts



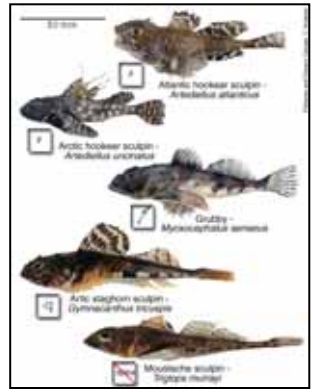
Buoy network



Remote sensing - SST

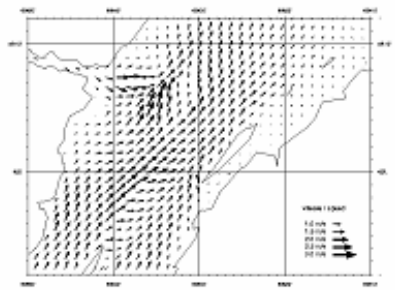


Marine species identification guide

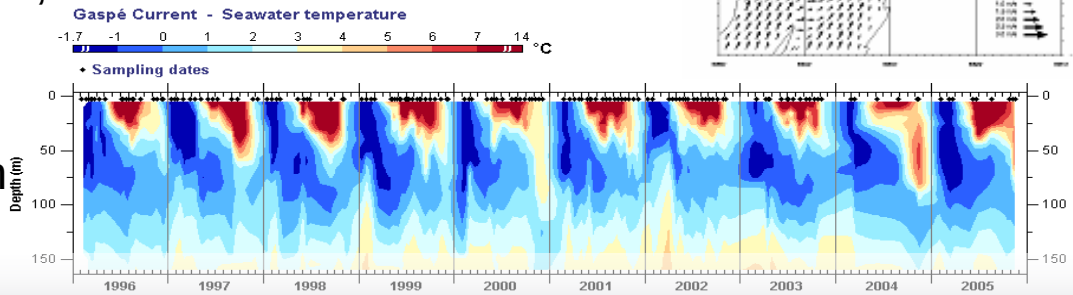


Ecosystem modelling

Surface current forecasts

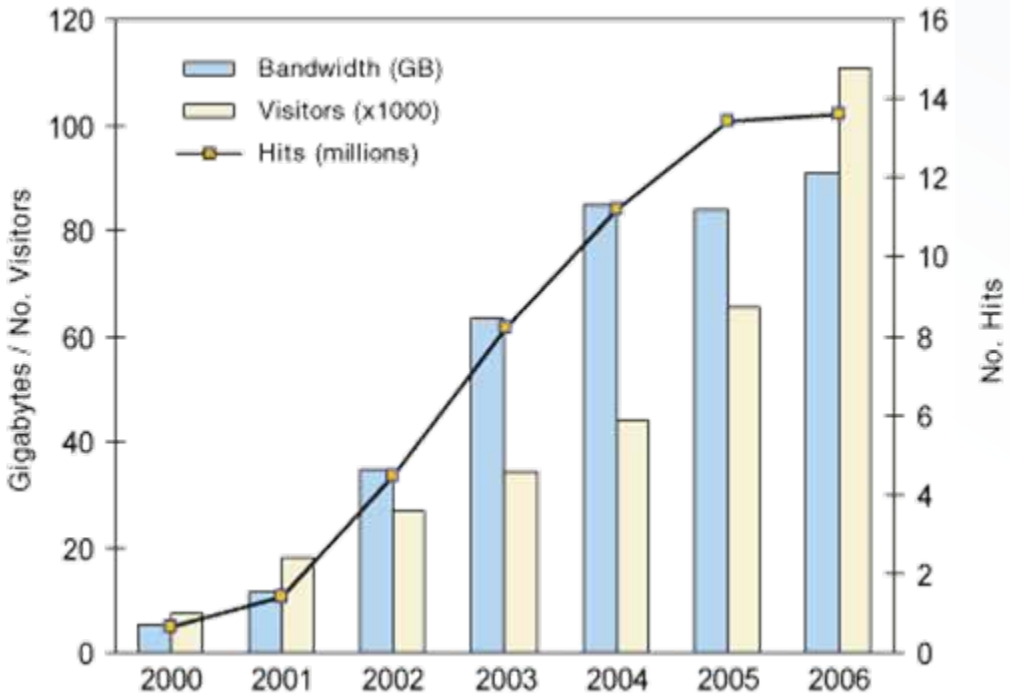


Gaspé Current - Seawater temperature



OSL Internet Portal ◆ usage & clienteles

OSL Portal launched January 2000



Multiplatform accessibility to reflect the diversity of client environments:

- Internet Explorer, Firefox, Opera, Netscape…
- Windows 95, 98, NT, 2000, XP…
- Macintosh, Linux, SunOS, UNIX…

Client groups/sectors of activity:
governments,
research organisations,
universities & colleges,
industry (navigation, ecotourism,
coastal zone management,
fisheries, consultants, etc.),
interest groups,
communities
and general public.

Most popular themes and data types:

1. Ocean Forecasts (sea ice, surface currents)
2. Ecosystem Modelling
3. Remote Sensing (sea surface temperature)
4. Real-Time/On-Line Buoy Data
5. Marine Mammal Research
6. Sentinel Fisheries
7. Tides & Water Levels
8. Oceanographic Data Management System
9. Georeferenced Images
10. Marine Species Identification Guide.

- St. Lawrence Observatory (OSL)
  OSL Internet Portal: overview, products, services, clients

- **Service-Oriented Architecture (SOA) & Interoperability**
  DFO national pilot project, Web data services, data accessibility

- St. Lawrence Global Observatory (SLGO)
  Inter-jurisdictional cooperation

SOA & Interoperability ◆ concept

in (very) brief:
Service-Oriented Architecture is about

- **decoupling** business **processes from technology** to
  - ↳ reduce technological dependency
  - ↳ increase operational efficiency & adaptability
- **flexible access** to information **across platforms and languages**
  - ↳ respecting existing technological choices and areas of expertise in a distributed infrastructure
- the use of **recognized standards** & technologies
  - ↳ SOAP, XML, WSDL… W3C®
  - ↳ SOA is part of OGC Geospatial Portal Reference Architecture (OGC 04-039, Open Geospatial Consortium, 2004)

WSDL : Web Service Description Language

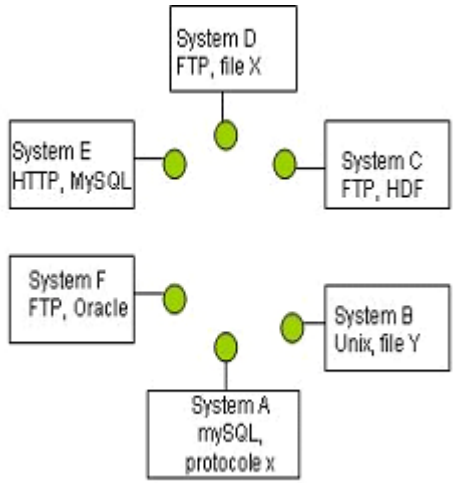
SOAP : protocol for exchanging XML-based messages over a network

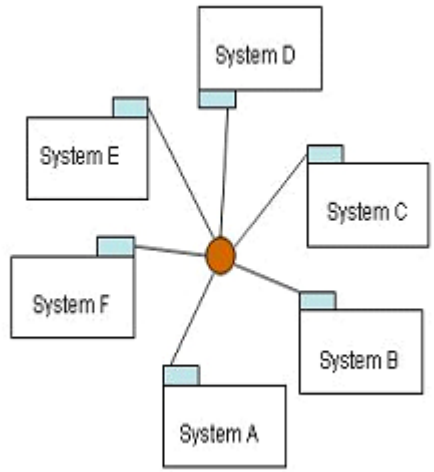
Current status: silo effect

- **heterogeneous** business solutions with specific computer environments, formats, protocols, etc
- **multiple access points** with own query mechanisms and conditions
- requires **locating** sources, **knowledge** of data structure, access methods at the user end

Desired status: interoperability

- **heterogeneous** business solutions with specific computer environments, formats, protocols, etc
- **integrated access** to distributed data sources keeping own business solutions
- **gateways** / interface allowing easier query mechanisms and efficient access
- **analogy**: **network of banks** using specific operating solutions but allowing transactions across organizations, branches, countries, currencies, etc.
- **set of common standards** to achieve interoperability. Banking analogy:
  - ISO standard defining exact size of bank cards
  - communication & security standard protocols





SOA & Interoperability ◆ DFO national pilot project

Objectives:

To develop a strategy for the implementation of a service-oriented architecture (SOA) to **enhance accessibility** of DFO scientific data assets by taking existing systems to a level of interoperability that will result in a **more efficient** management of DFO data holdings and an **improved capacity** to deliver our mandate and serve our clients.

Deliverables included:

- a **common framework** (specifications, guidelines)
- development of **data services** from various sources including:
  - On-line Scientific Buoy Network: real-time data + archives
  - CHS SINECO Water Level Information Network: real-time data + archives
  - BIO TS Climate Database: archives, 33 million records
  - ODMS – Oceanographic Data Management System: archives, 22 million records
- a **Web data service browser**
- a **client data access interface**
- a **national workshop**
  held March 28-30, 2006 @ IML
  Proceedings available → Canadian Science Advisory Secretariat (CSAS)
  http://www.dfo-mpo.gc.ca/csas/Csas/Proceedings/2006/PRO2006_024_e.pdf

Details including context, cookbook, developer's toolkit & documentation available at:

http://www.osl.gc.ca/services-web/en/

Web Data Services (WDS)

- allow systems to EXPLORE various heterogeneous data sets
  ↳ do not require uniformity of formats, data models and technologies on the systems side
- use SOAP technology for data transport
- use a set of specifications defined in the context of the pilot project
- accessible using most programming languages : .Net, Java, Python, etc. using SOAP client interface (API)
- accessible directly from an internet browser
- are described using WSDL – Web Service Description Language

ultimately WDS

- contribute to reducing the need for specialized technical knowledge of database structures and query mechanisms by the end-user

SOA & Interoperability ◆ WDS browser

WDS browser: a system to EXPLORE WDS services

- WDS General Information
- WDS Boundaries
- WDS Metadata and Data Description

Web Service Address: http://www.osl.gc.ca/wds_imlbuoys/services/imlbuoys

Date (YYYY-MM-DD hh:mm:ss (UTC)): 2007 - 05 - 01 00 : 00 : 01 Period: 7 days

Order (Date): Ascending

Data: water_temp

Maximum result per page (max:5000): 500 Respect service limits

Add Metadata

Depth (m): Min 0.5 Max 0.5

Spatial Boundary

Latitude: Min -26.78 Max 49.73

Longitude: Min -71.64 Max -60.06

Restrictions

View Data | Reset

Fisheries and Oceans Canada / Pêches et Océans Canada — Canada

Français

St. Lawrence Observatoire du Saint-Laurent Observatory

Web Data Service - WDS Browser

- On-Line Scientific Buoys
- CHS-Sineco Network
- BIO-TS Climate Database

Web Service Address: http://www.osl.gc.ca/wds_sineco/services/sineco

Login

Password

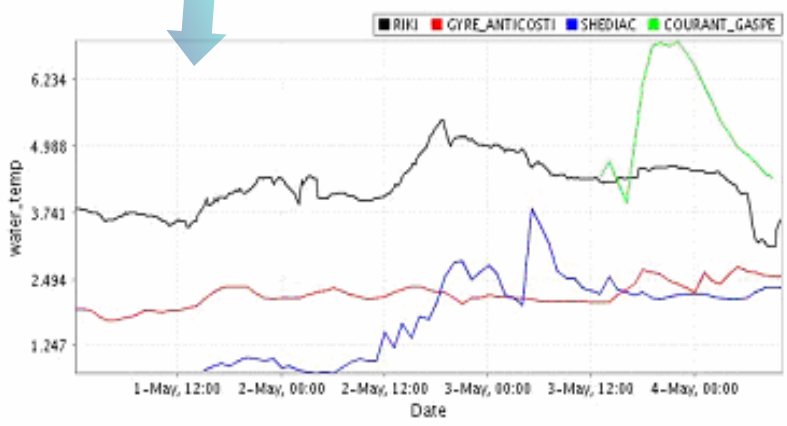
Enter

WDS Data Information

Data	Description
air_temp	Air Temperature (Celcius)
at_pres	Atmospheric pressure (hPa)
air_lumino	Air Luminosity (quanta/cm²/s)
air_humid	Air Humidity (%)
water_temp	Water Temperature (Celcius)
water_sal	Water Salinity
water_dens	Water Density (kg/m³)
water_fluo	Water In-situ Fluorescence (mg/l)
water_cdom	Water Colored Dissolved Organic Matter (mg/l)
wind_speed	Wind Speed (km/h)
wind_gust	Wind Gust (km/h)
wind_dir	Wind Direction (Degree)

Close window

Next Page



Group by station_name Refresh

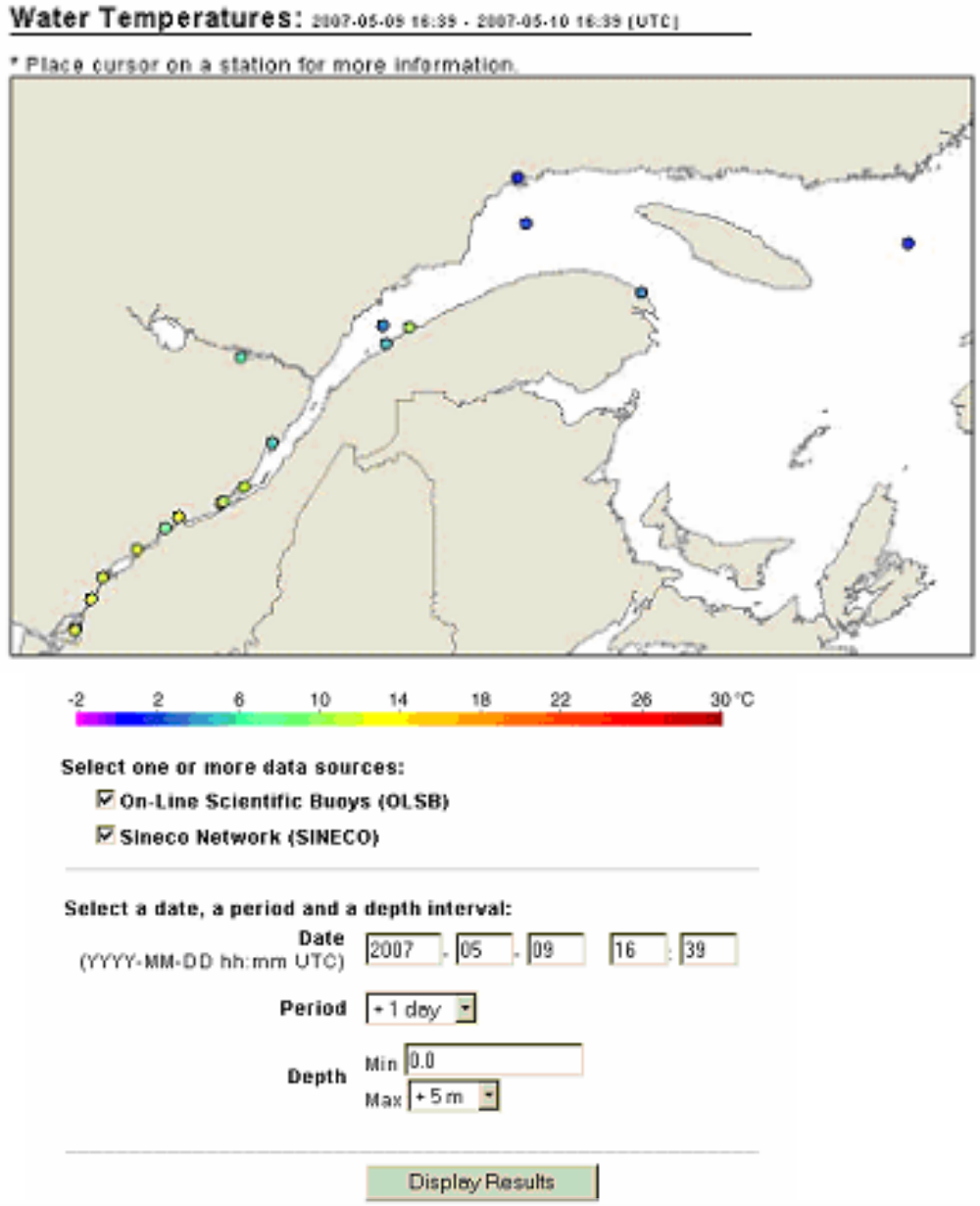
SOA & Interoperability ◆ client application (example)

end-user application exploiting Web Data Services

http://www.osl.gc.ca/obs/index.jsp?lg=en

Main objectives:

- to provide access to the most recent water temperature data for the St. Lawrence using SOAP Web Data Services developed for various distributed data sources
- to allow users to explore archives by selecting
  - ↳ time period
  - ↳ depth interval



SOA & Interoperability ◆ additional development

development also includes

- Web data services (WDS) including more complex data sources (national, other regions)
  - ex: electrofishing database (Moncton)
  - ex: BIOCHEM national database (Ottawa)
- a system allowing for WDS cascading (aggregation)
- a system for producing Web Map Services (WMS) from WDS
- WDS browser improvements: profile graphs, map view, WMS export
- WDS cataloguing approach
- other applications that exploit WDS

Coming up:

- National workshop @ IML, June 19-20, 2007
- Other pilots in Maritimes, Gulf, Quebec + Ottawa

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- St. Lawrence Global Observatory (SLGO)
  - Inter-jurisdictional cooperation
  - Joint initiative bringing together organizations involved in data collection, management and dissemination

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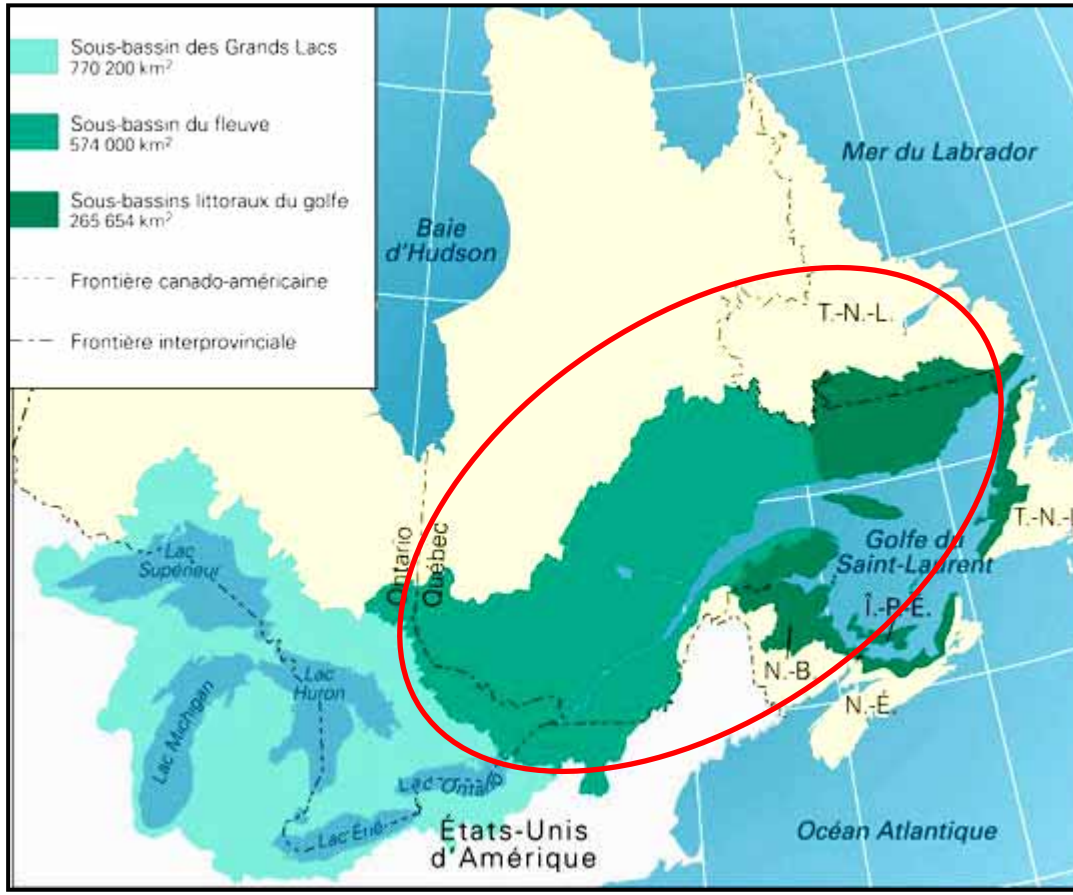
SLGO ◆ vision & objectives

To offer an **integrated Web access** to the **most accurate and complete data and information** about the **St. Lawrence ecosystem** by

fostering the **clustering and networking of data producers** (federal, provincial, academic, communities, etc)

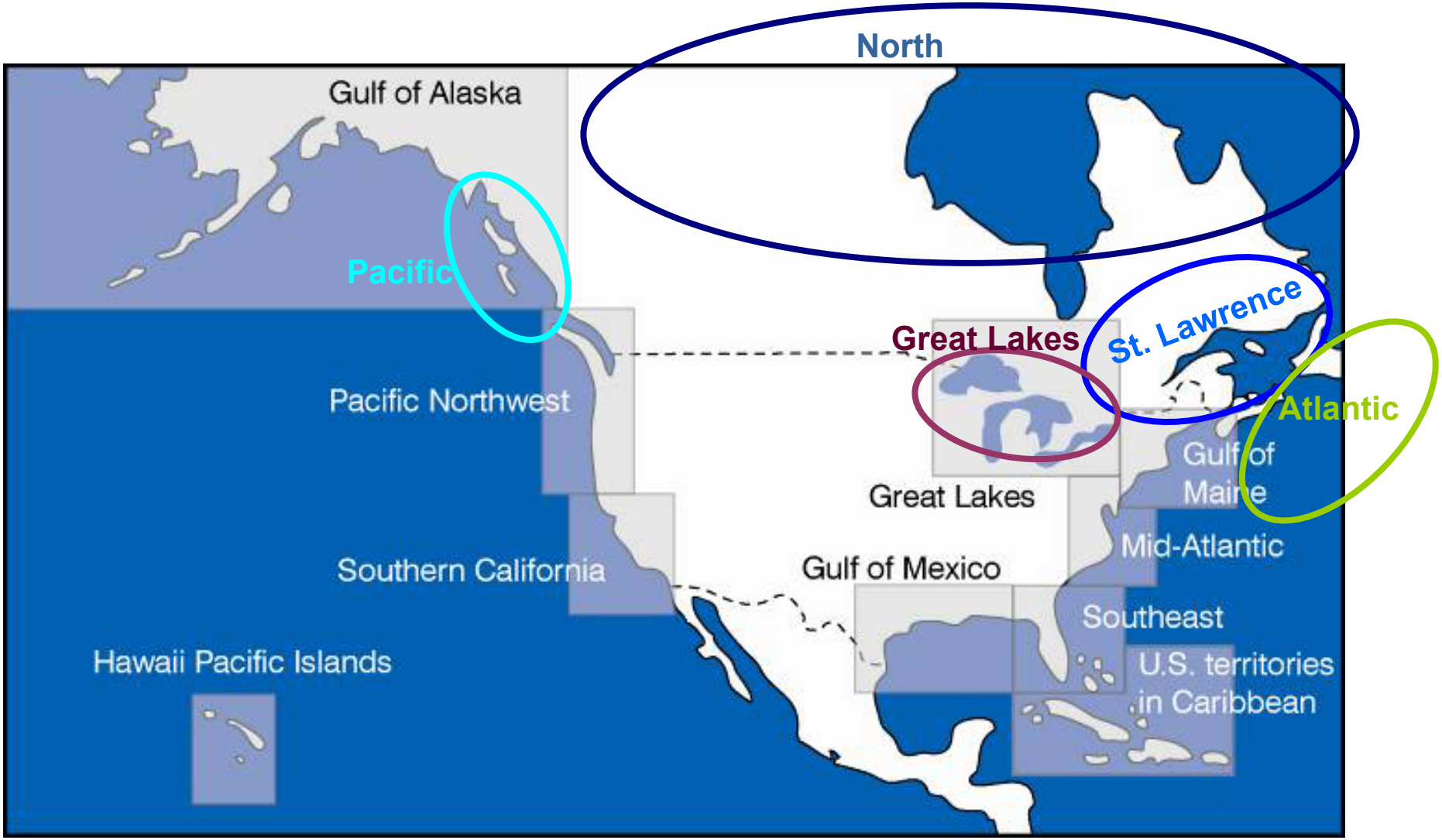
in **response to the needs** of member organizations and their client groups for a

sustainable management of the St. Lawrence global ecosystem
→ (marine, freshwater, watersheds).



integrated access ● distributed data ● networking ● quality ● efficiency

SLGO ◆ integration to a network of observatories



- Links with Great Lakes Observing System (GLOS) & Northwest Atlantic Ocean Observing System (NWAOOS)
- Positioned with north-american network: Integrated Ocean Observing System (IOOS)
- In line with international earth observation initiatives: CGEO /GEOSS

SLGO ◆ community of prospective members

universities ● R&D ● governments (fed. & prov.) ● community groups ● industry

Institut des sciences de la mer

Pêches et Océans Canada

Environnement Canada

Québec Océan
Le groupe interinstitutionnel de recherches océanographiques du Québec

Technopole Maritime du Québec

Développement durable, Environnement et Parcs Québec

Développement économique Canada pour les régions du Québec

Développement économique, Innovation et Exportation Québec

UQAR

Comité ZIP du Sud-de-l'Estuaire

Ressources naturelles et Faune Québec

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Agence spatiale canadienne

OURANOS

STRATÉGIES SAINT-LAURENT

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GEC3EG

L'Observatoire de l'environnement et du développement durable

La Financière agricole Québec

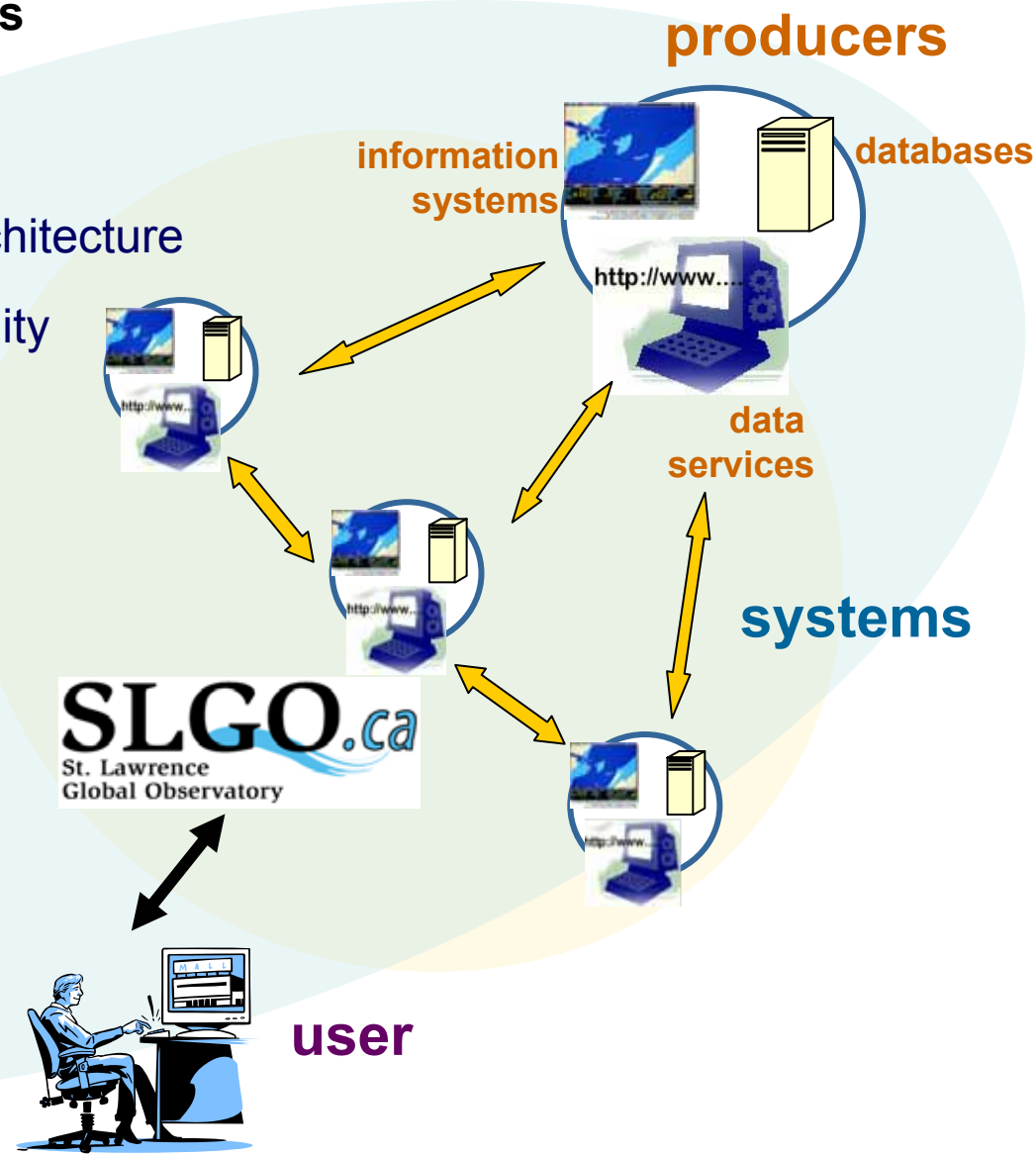
REGROUPEMENT DES ORGANISATIONS DE BASSIN VERSANT DU QUÉBEC
ROBVQ

SLGO ◆ components of a common solution

producers ◂ ▸ systems ◂ ▸ users

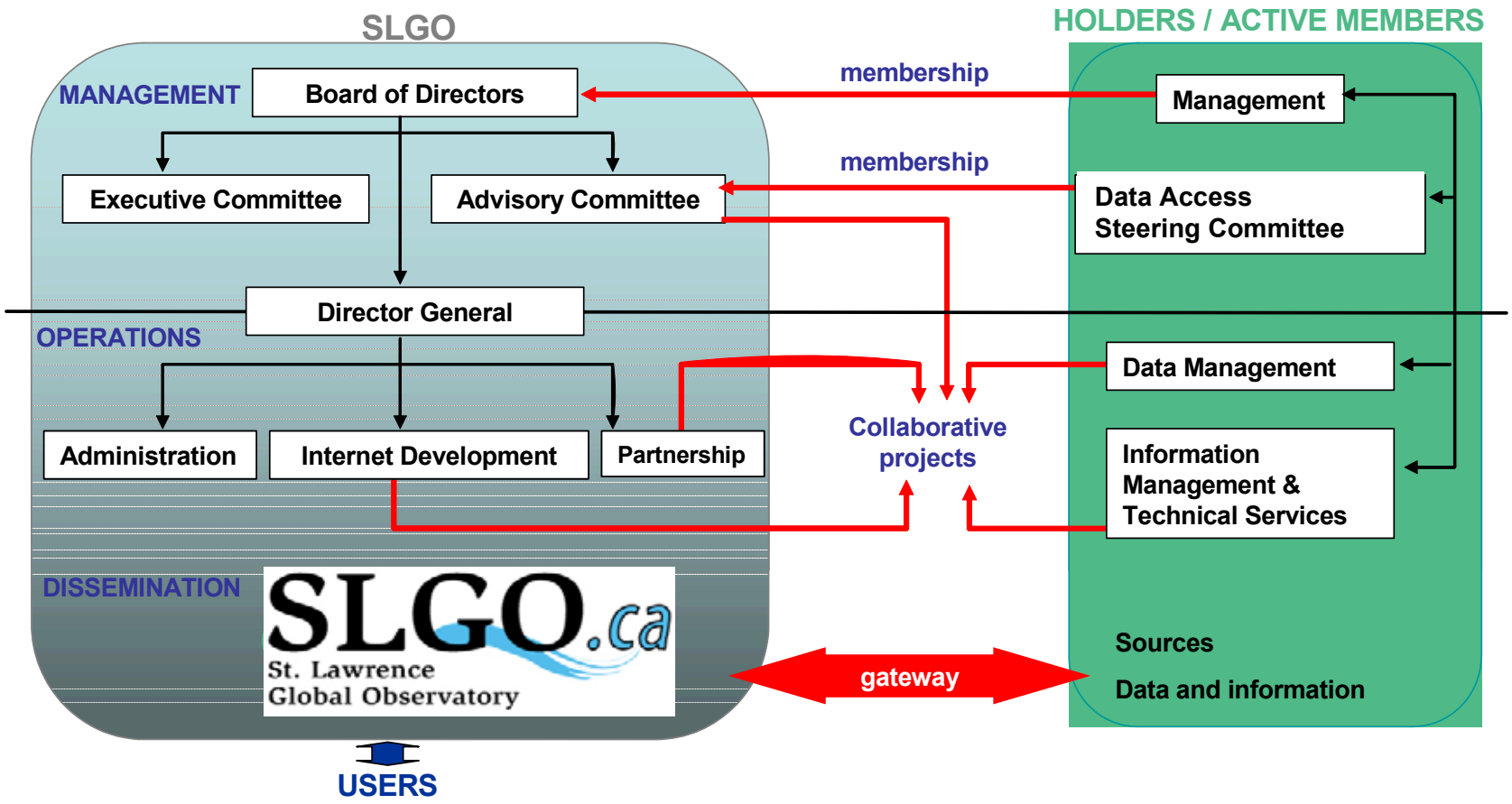
governance model

- distributed architecture
- systems interoperability
- common standards
  (data exchange protocols, metadata, security, etc...)
- discovery services, directories, catalogues
- increased accessibility of data and information assets
- more efficient access by users
- quality products and services
- secure architecture



SLGO ◆ governance

non-profit organization ● board of directors ● business plan ● membership agreement



- membership agreement:
  validated by legal experts (government of Canada & Quebec)
  and intellectual property specialists

SLGO ◆ 2007 timeline

April 20:	meeting of community of prospective member organizations
June 30:	letters of intent sent to SLGO, commitment from organizations
July-Sept:	signature of the SLGO Membership Agreements
October 15:	first Member's General Assembly
Nov-Dec:	start of SLGO operations

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...accessibility of data & information products

...interoperability, network of data producers

...common approach, governance model

...use of recognized standards
(data exchange protocols, metadata, security, etc.)

...Question Period