Enabling Information Sharing thru Common Services

Weather sensor and data access service information management using an ebXML registry

Presented To: Information Management Session

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Date: September 1, 2011

This work was sponsored by the Federal Aviation Administration under Air Force Contract No. FA8721-05-C-0002. Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the United States Government.

Introduction

- This talk covers
  - Metadata standards used in the Next Generation Network Enhanced Weather (NNEW) program
  - The use of an ebXML Registry/Repository to manage and provide flexible query-based access to the metadata

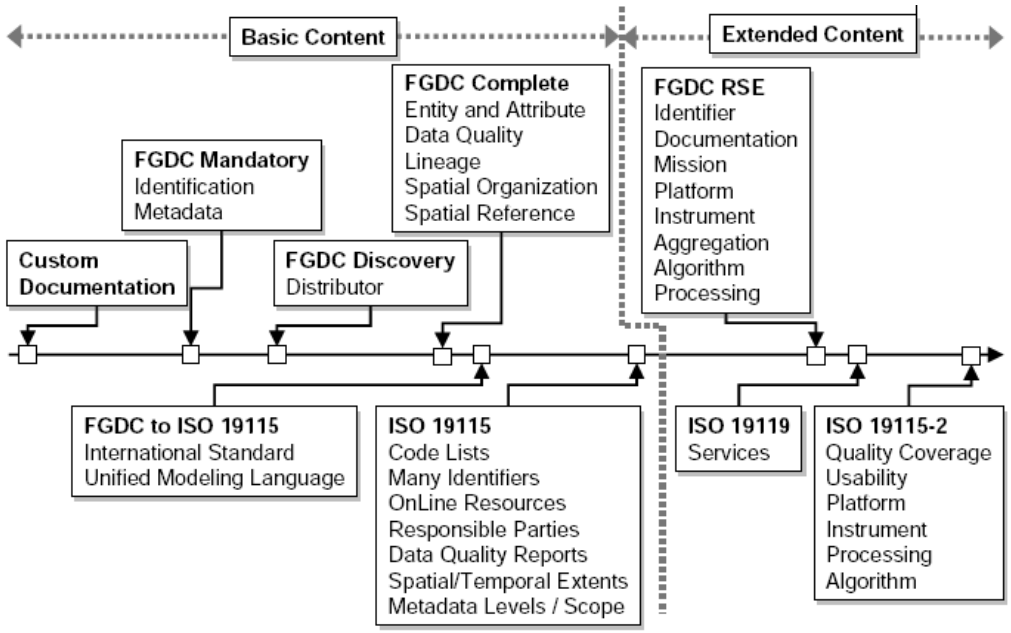
Agenda

- Metadata overview
- Motivation for use of ebXML
- Sample usage scenarios
- SensorML profile
- Domain registry as compared with the NAS service registry
- Summary

Weather Domain Metadata

- Weather data is the information that is of interest to consumers
- Weather metadata is information that allows the user to discover, access, understand and interpret weather data
- Types of metadata include time and location of observations and/or forecasts, sensor capabilities, data processing steps used, etc…

Evolution of Metadata Standards in U.S.



- **Worldwide earth science community in the process of adopting ISO metadata standards**
- **The ISO standards are very wide-ranging - different countries and/or communities-of-interest (COI's) typically develop *profiles* of the standards to match their requirements.**

NNEW Metadata Profile

Project Report
ATC-354
Revision 2

NextGen Network-Enabled Weather Metadata
Guidelines for the 4-D Weather Data Cube

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April 2, 2010

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Washington, DC 20591

This document is available to the public through
the National Technical Information Service,
Springfield Virginia 22161.

- **Dataset Metadata: ISO 19115, NetCDF Climate & Forecast Conventions (CF)**
- **Sensor Metadata: SensorML**
- **Service Metadata: ISO 19119 / WSDL**
- **Registry Information Model mapping guidance for above types**
- **NOAA also aligned with many of these standards (and contributed to this profile)**

https://wiki.ucar.edu/download/attachments/23364539/ATC-354-Version2.pdf?version=1&modificationDate=1279902030000

NNEW and ebXML

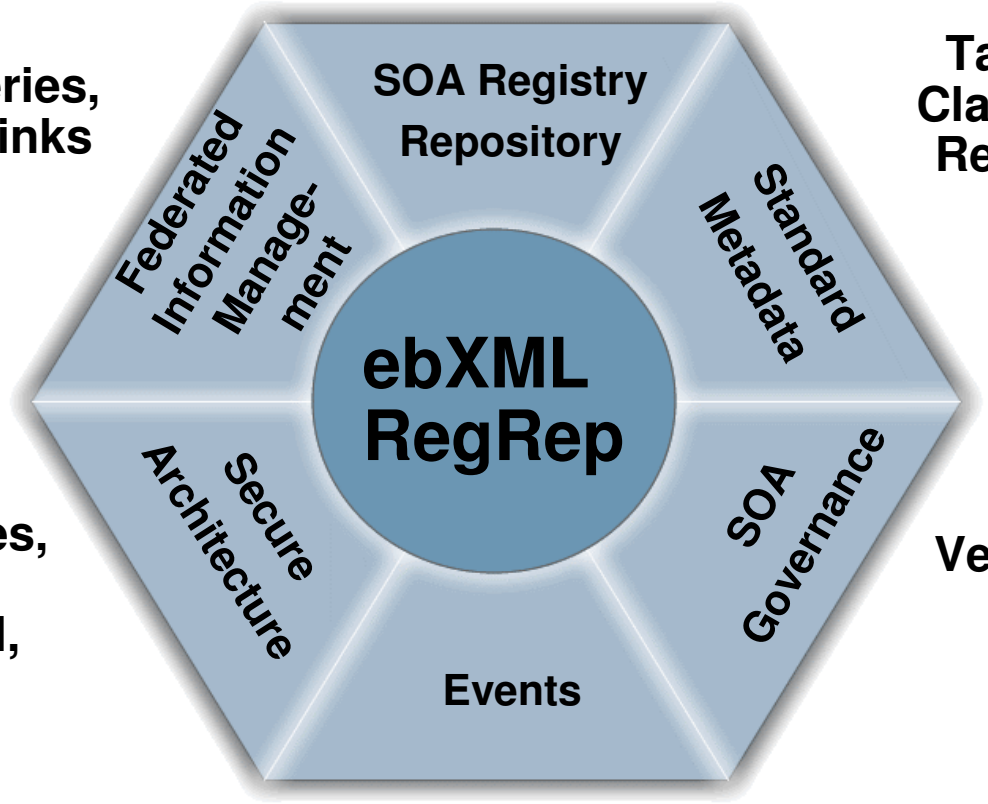
- Goal is to manage a variety of metadata types
- Requirements will likely change over time – flexibility of metadata management mechanism is important
- UDDI registry interface not particularly flexible
  - Most recent version is 3.0.2 from 2005
  - OASIS Technical Committee closed in 2008
- ebXML information model is more general and extensible
  - Adopted by OGC for use in their specifications

ebXML Registry/Repository

Registration, Discovery, Queries

Federated Queries, Inter-registry links

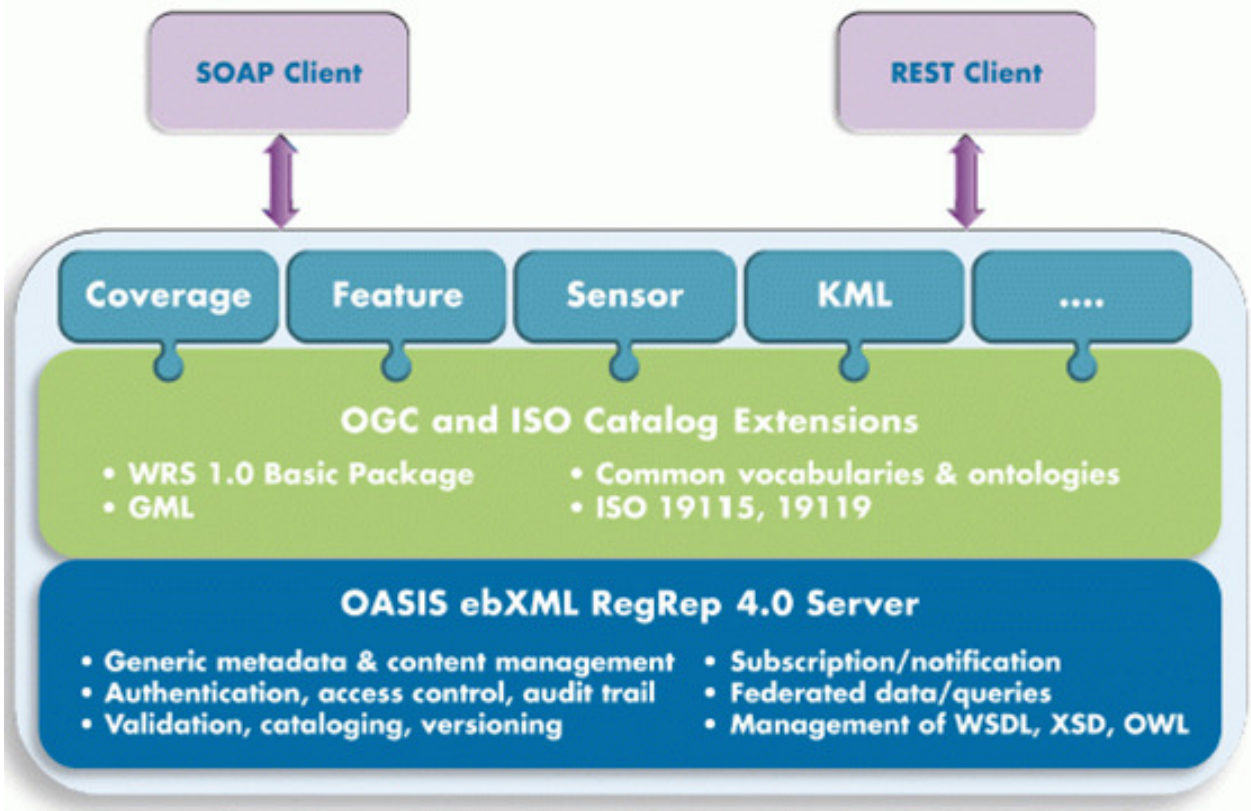
Taxonomies, Classifications, Relationships



Digital Signatures, Audit Trail, Access Control, SAML SSO

Cataloging, Validation, Version Control, Lifecycle Support, Extensible Info Model

ebXML Registry/Repository is modular, extensible



Well-aligned with OGC 'Core + Extensions' specification model

Sample Usage: Dataset & Service Metadata Access

- Registry/Repository stores metadata files in the repository and creates registry objects to represent the content
- The metadata from the dataset, service and WSDL files is cataloged at insert time
  - Datasets are associated with the services that provide them
  - Services are associated with their WSDL files

ebXML in NNEW

Registry stores data in the repository and catalogs entries in the registry

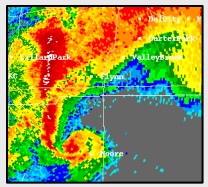
Web Coverage Service

Service publishes metadata to the registry

Clients search for datasets and finds the services that provide them

Registry

- Dataset Metadata



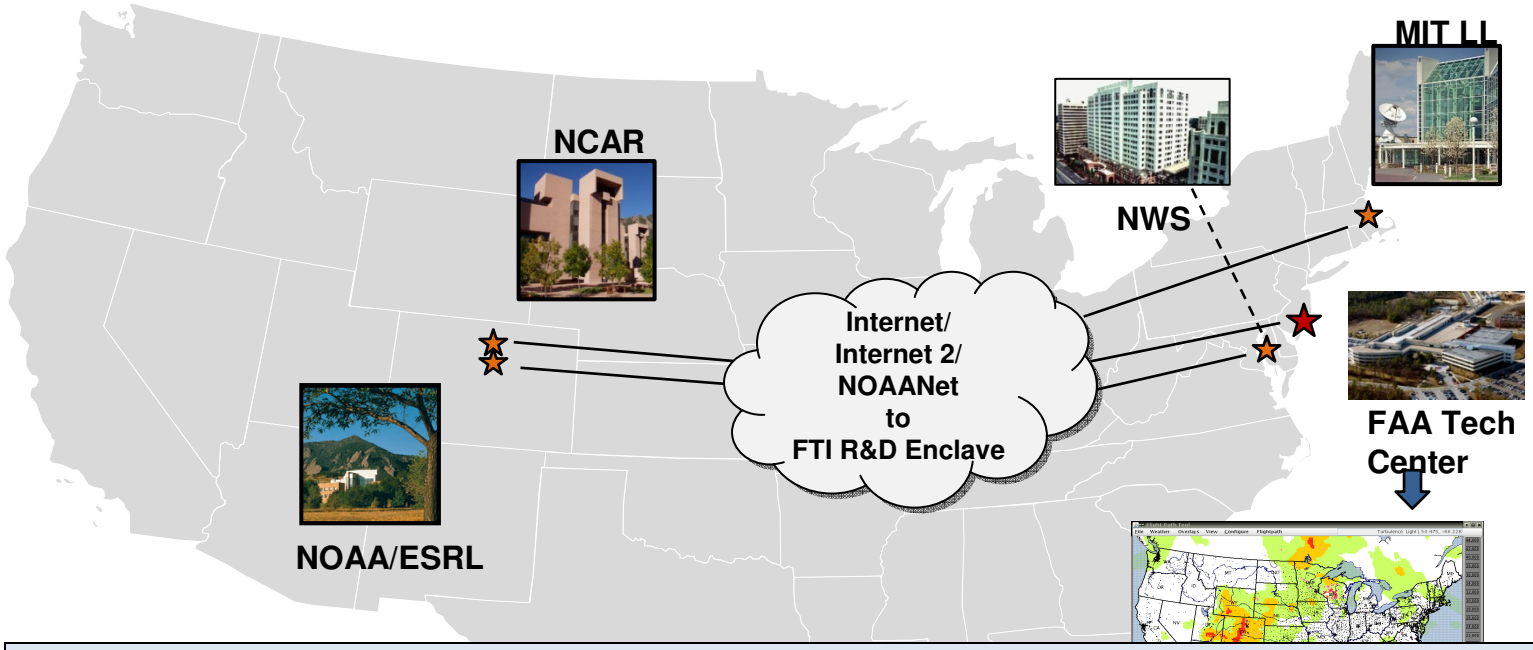
- ISO 19119 Service Metadata
- WSDL Service Metadata

Repository

- ISO 19139 XML
- WSDL

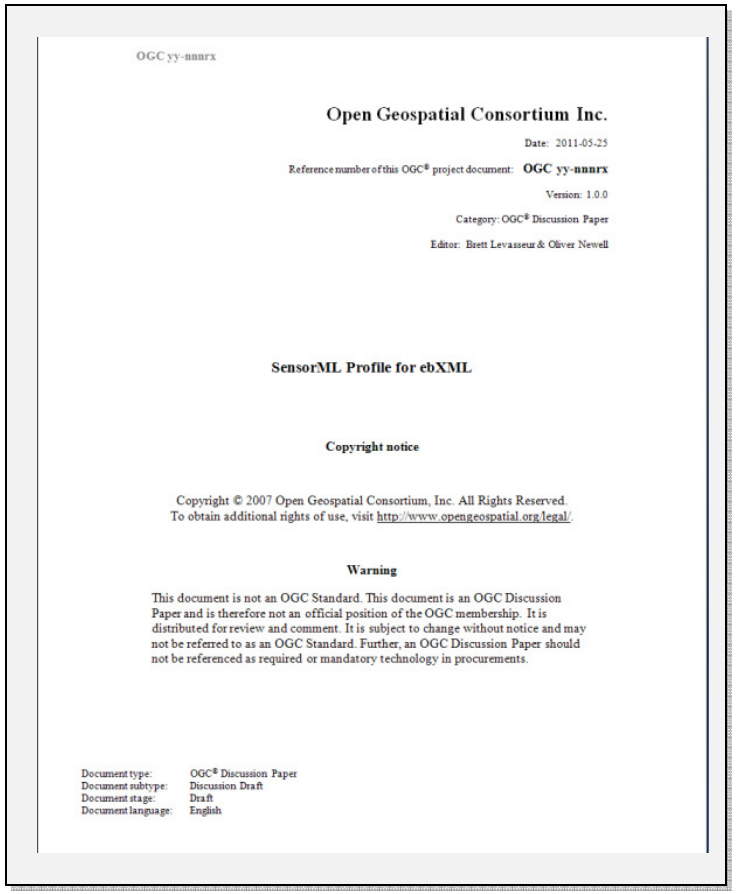
Associations made based on repository data

NNEW Metadata Usage Demonstration



- Registry nodes at MIT LL, NWS, NOAA/ESRL, FAA Tech Center
- 200+ weather data products provided via OGC data access services (WFS, WCS) by 4 organizations at 4 locations (MIT LL, NCAR, NOAA/ESRL, NWS, FAA)
- OGC – enabled display clients
  - Discover and access data using *What, When, Where* semantics

Recent work – ebXML SensorML profile



OGC yy-nnnrx

Open Geospatial Consortium Inc.

Date: 2011-05-25

Reference number of this OGC® project document: **OGC yy-nnnrx**

Version: 1.0.0

Category: OGC® Discussion Paper

Editor: Brett Levasseur & Oliver Newell

SensorML Profile for ebXML

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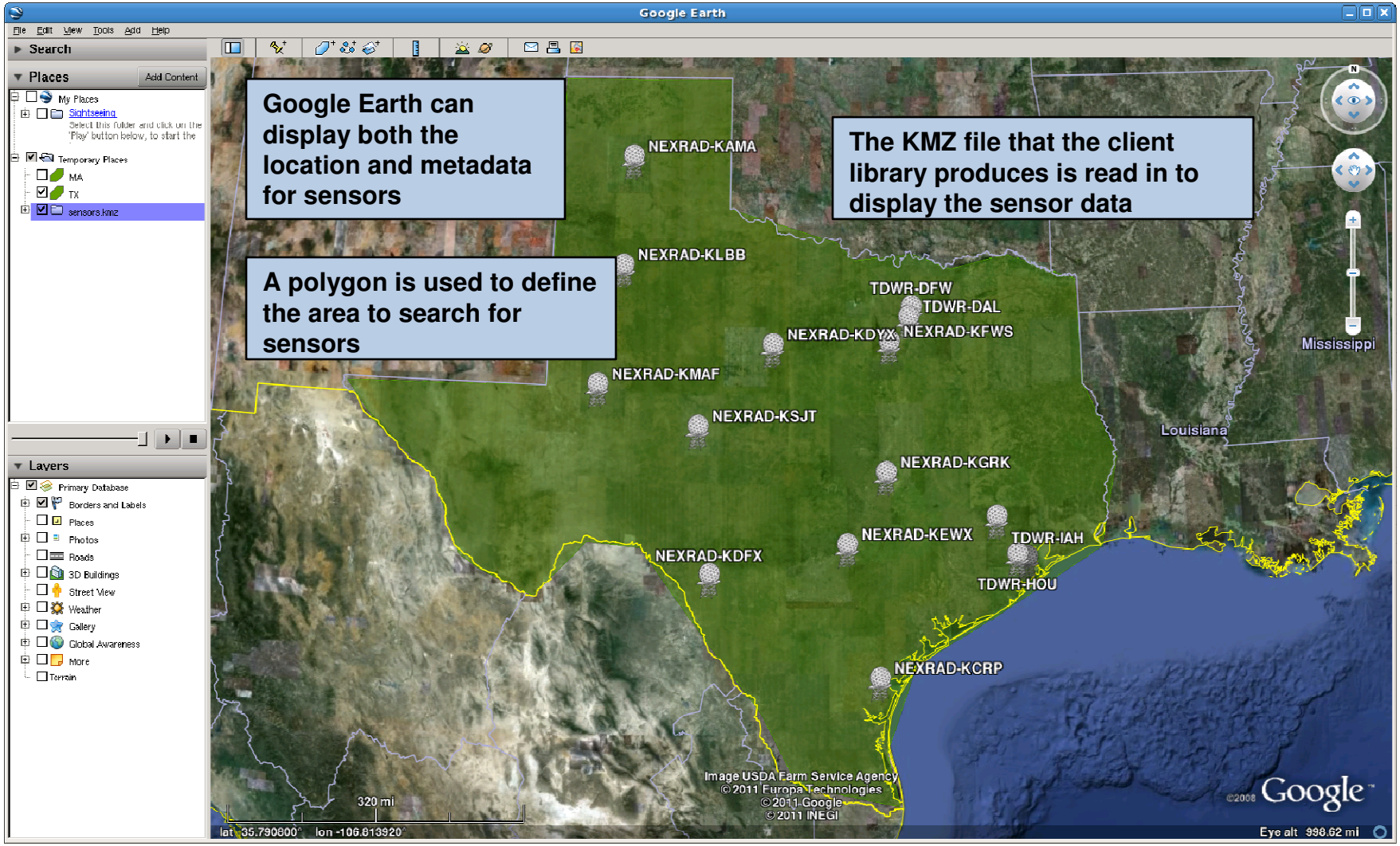
Document type:	OGC® Discussion Paper
Document subtype:	Discussion Draft
Document stage:	Draft
Document language:	English

- **Cataloged sensor information includes position of the sensor in latitude/longitude coordinates**
- **The ISO extensions to the ebXML registry include geospatial search capabilities**
- **Registries with both the ISO and SensorML extensions can perform geographic searches for sensors**

Goal is to work towards standardization of an ebXML 4.0 SensorML profile within OGC

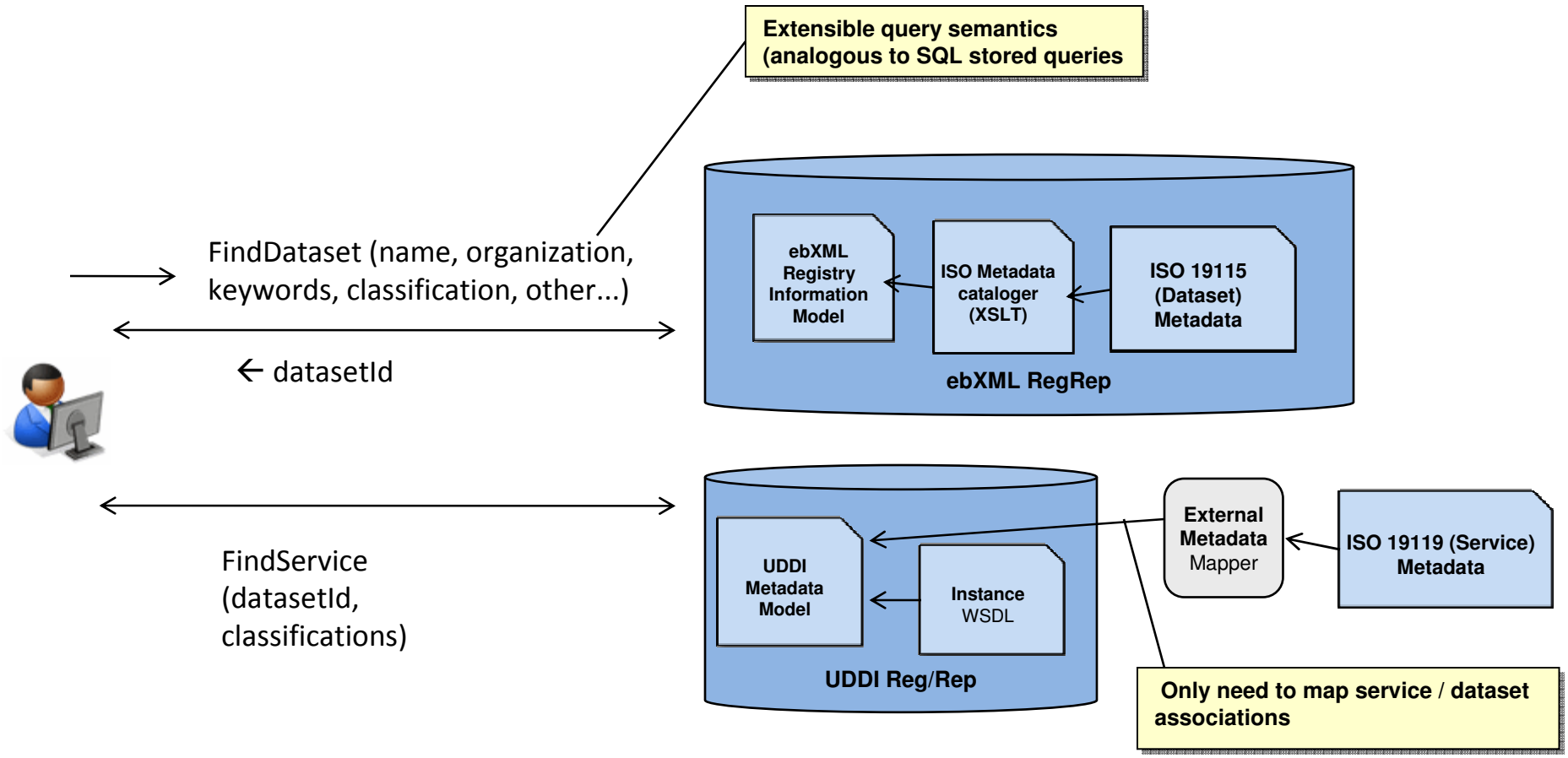
SensorML-based discovery



Registry Roles

- The NNEW domain registry is focused on content discovery (datasets, sensor information)
  - ebXML capable of supporting runtime and/or design-time use cases
- The SWIM registry/repository is a design time *service* registry
  - More specific role
  - Focus on governance

Coordinated use of domain and SWIM registries



Summary / Conclusion

- NNEW uses ISO 19115 and SensorML profiles to extend ebXML servers to support storage, management, classification and searching of NNEW metadata
- The ebXML specification has proven to be flexible enough to meet a variety of needs in the NNEW R&D effort
- Version 4.0 of the OASIS ebXML specification currently in public review phase

Future Work

- In current R&D effort, metadata files have been manually created and published via a registry web interface
- Will be exploring automated metadata synchronization based on OGC GetCapabilities (and a possible future GetMetadata operation)

Questions & Answers / Feedback

More Information / Contacts

- International Organization for Standardization. *Geographic information – Metadata*. 2003. ISO 19115
- International Organization for Standardization. *Geographic information – Metadata – XML schema implementation*. 2007. ISO 19139
- Najmi, Farrukh and Stojanovic, Nikola. *OASIS ebXML RegRep Version 4.0 Part 0: Overview Document.* s.l. : OASIS, 2011. Working Draft 01-8.

More Information / Contacts

- Newell, Oliver et all. *NextGen Network-Enabled Weather Metadata Guidelines for the 4-D Weather Data Cube*. Lincoln Laboratory, 2010. Project Report ATC-354 Revision 2
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