Towards an Interoperability Manifesto

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Outlines

- Some thoughts and observations regarding interoperability
- Lessons learned from the OO Database Manifesto
- Towards an Interoperability Manifest to foster international scientific and technical interoperability
Interoperability: Definition

The ability to collaborate and to exchange information seamlessly and without barriers.

- often restricted to technical aspects.

But: Interoperability should be extended.
Interoperability: OGC’s Definition

„...software components operating reciprocally (working with each other) to overcome tedious batch conversion tasks, import/export obstacles, and distributed resource access barriers imposed by heterogeneous processing environments and heterogeneous data.

[McKee and Buehler, 1998 ; Sondheim, Gardels and Buehler 1999]
Interoperability: IEEE’s Definition

„Ability of two or more systems or components to exchange information and to use the information that has been exchanged.“

[IEEE 1990]
Interoperability: IEEE’s Definition

"The capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units".

[ISO/IEC 2382-36:2008]
Interoperability: a stack of means and contributions

- Technical Interoperability
- Personal Interoperability
- Semantical Interoperability
- Institutional Interoperability
- Political Interoperability

- Standards, scientific work
- Challenges & Activities
- Common Scientific Activities
Technical Interoperability: between IT systems

- Technical Interoperability
- International Standards
- OGC, W3C, ISO & others

- Standards evolved in many years, often in consensus driven processes
- Well established
- Keynotes, presentations, workshops

1. Awareness,
2. Capacity building,
3. Education,
4. Contribution
Interoperability Manifesto

Establish definition and terms of engagement in *SDI

ISO
TC 211
TC 204
JTC-1
National Standards Organizations

OpenGeospatial Consortium (OGC)
OGC: Web Map Server, Web Feature Server, GML, Web Coverage Server, Style Layer Descriptor, Catalog Service

Internet Engineering Task Force (IETF)
XML Protocol (XMLP), XML Signature, I18N

World Wide Web Consortium (W3C)
W3C: HTTP, PNG, RDF, SOAP/XMLP (Web Services Activity), XML, Xlink, Xpath, Xpointer, XSL/XSLT, XML Schema

Facilitation Bodies
• GSDI
• ANZLIC
• PCGIAP
• FGDC
• PC-IDEA
• INSPIRE
• GeoConnections
• AdV
• AGI
• ...


ISO: Ref Model, Terminology, Conformance testing, Profiles, Spatial Schema, Temporal Schema, Feature Cataloguing Methodology, Spatial Ref by Coords and Ids, Quality, Metadata, WMS, GML, LBS, Registration of Geo-information Items

We

ISO: Ref Model, Terminology, Conformance testing, Profiles, Spatial Schema, Temporal Schema, Feature Cataloguing Methodology, Spatial Ref by Coords and Ids, Quality, Metadata, WMS, GML, LBS, Registration of Geo-information Items

Metadata Profile, Data Content Standards, etc.
Personal Interoperability: between people

- Technical Interoperability
- Personal Interoperability
- Relationships
- Interpersonal Standards

- Communication skills, personal relationships, social networking, cultural understanding, foreign languages
- Presentations, Tea breaks, Meetings...

- Sharing our data sharing through web services student / staff / academic exchange common research common publications

- evolving over years,
- Based on trust
- and on scientific ethics
Semantical Interoperability: between knowledge islands

- Technical Interoperability
- Personal Interoperability
- Vocabularies, Ontologies
- Political Interoperability
- Keynotes, presentations, workshops, tea breaks, sharing time

Collaboration between groups and extreme different disciplines

- Transcending the barriers
t- communication
- evolving over years,
- based on knowledge
- still part of scientific research
Semantics

- Part of the linguistics (study of language) and semiotics (study of signs)
- According to Wikipedia:
  - From the ancient Greek: σημαντικός sēmantikós; important),
  - the study of meaning
  - focuses on the relation between signifiers, like words, phrases, signs, and symbols, and what they stand for, their denotation.
Ontology

- In philosophy: "metaphysical science or study of being" [1] study of the nature of being, becoming, existence, or reality, as well as the basic categories of being and their relations
- In computer science and information science, an ontology formally represents knowledge as a hierarchy of concepts within a domain, using a shared vocabulary to denote the types, properties and interrelationships of those concepts
- "The hierarchical structuring of knowledge about things by subcategorising them according to their essential (or at least relevant and/or cognitive) qualities." [2]

Institutional Interoperability: between organisations

- Technical Interoperability
- Personal Interoperability
- Semantical Interoperability
- Institutional Interoperability
- Personal Interoperability

Common publications
common undertakings
Memorandum of Understand (MoU),
dual education

- dependencies
- evolving over years,
- based on decision, shaped by communicated convictions

How can we learn to extend collaboration?
Political Interoperability: between communities

- Technical Interoperability
- Personal Interoperability
- Semantical Interoperability
- Institutional Interoperability

• political interests, economical interests
• Long term process
"We all learn if we share what we know."

Robert R. DiBlasi
Lessons learned from the OO Database Manifesto


The Object-Oriented Database System

Manifesto

Malcolm Atkinson
University of Glasgow

François Bancilhon
Altair

David DeWitt
University of Wisconsin

Klaus Dittrich
University of Zurich

David Maier
Oregon Graduate Center

Stanley Zdonik
Brown University

August 19, 1989

Abstract

This paper attempts to define an object-oriented database system. It describes the main features and characteristics that a system must have to qualify as an object-oriented database system.

We have separated these characteristics into three groups:

1. Mandatory, the ones the system must satisfy in order to be termed an object-oriented database system. These are complex objects, object identity, encapsulation, types or classes, inheritance, overriding combined with late binding, extensibility, computational completeness, persistence, secondary storage management, concurrency, recovery and an ad-hoc query facility.

2. Optional, the ones that can be added to make the system better, but which are not mandatory. These are multiple inheritance, type checking and inheritance, distribution, transactions and views.

3. Open, the points where the designer can make a number of choices. These are the programming language, the representation system, the type system, and uniformity.

We have taken a position: not so much expecting it to be the final word as to exact a provisional had much to select further debate.

1 Introduction

Currently, object-oriented database systems (OODBS) are receiving a lot of attention from both experimental and theoretical standpoints, and there has been considerable debate about the definition of such systems.
THE basic recognized paper in this field of Computer Science

Core set of rules – “Commandments”

- Mandatory, "golden" rules
- optional characteristics
- open characteristics

Influencing further IT developments
Steps towards Interoperability Manifesto
Our manifesto...

- can assemble research results from various fields together
- can bundle our forces and disseminate them,
- can be attractive to the scientific community worldwide (for support, for collaboration and dissemination),
- can be used to influence stakeholders in the political and technical arena
- can extend our impact as ICA commission
- ...

Interoperability Manifesto
Some basic rules...

• Just as a starter - to be discussed and extended:
  
  – Thou shalt support open standards!
  – Thou shalt provide appropriate licences!
  – Thou shalt support a reasonable amount of meta data!
  – Thou shalt not charge for public data.
  – Thine data shalt be reliable and complete
  – ...
Some steps

1. Setting up a working group with mailing list (30/09/2016)
2. Thorough scientific work on the different fields of interoperability
3. Searching für liaisons to other bodies
4. Development of a draft (until February 2017)
5. Further discussion and refinement (ICA 2017, Washington)
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References
