

Interoperability ~ *An Introduction*

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Discussion Points

- What do we mean by “interoperability”?
- Why does it matter?
- How do we achieve interoperability?
 - What are some of the expected challenges and effective strategies?

- standards
- open source
- community-wide involvement
- + communication

INTRO to INTEROP ^{20 MIN} - keep other talks in mind ^{note who suggested}

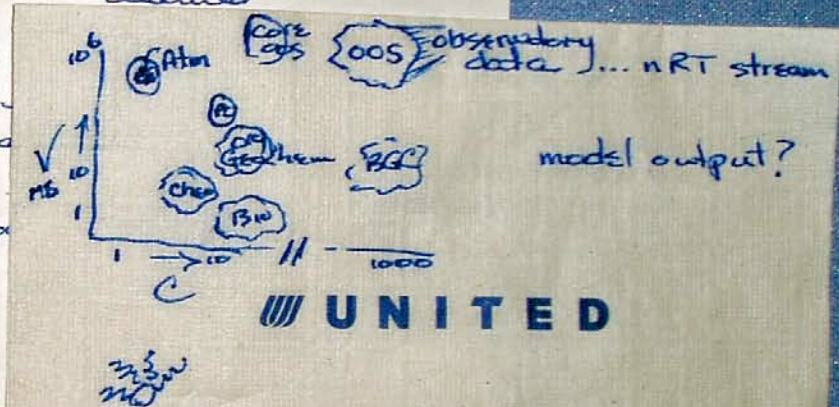
- what is it?
- why does it matter? ???
- how do we meet the challenge?
- what are ^{some expected} challenges & strategies?

B+C paper

not in "how?"
16 things I
learned

WHAT

- ability to exchange info/data between + systems ~~residing on different sys~~ ^{as recognized boundary}
- [check HMI & web] verify @ John to



WHY - gray not of question?

- ~~data~~ data access improved
- integration of results
- use JGOFS | GLOBEC | OCS | FS Synth
- temp, depth - water, core, target, det
- ↑ TSS, TAO, SST, temp, temporary
- use case examples - JGOFS → ECO-DINO

find it
- access v
accurate
(automated)

HOW P. Fox slides?

- common strategies & goals shared
- semantic interoperability
- well-ordered controlled vocabs
- std exchange protocols

- HMI
Community Bldg.

multi-site system in nRT
2 vol 1 2

Thank you for flying United.

What do we mean by “interoperability”?

- the ability to exchange data and information between two or more systems (separated by a recognized boundary) with minimal loss of information
 - clients of interoperable systems may be machines
- syntactic interoperability
 - file formats
 - data structures
 - exchange protocols
- semantic interoperability
 - term definitions (controlled vocabularies)

Interoperability . . . a wee bit more from MMI

- a client should not be required to possess in depth understanding of the data in order to access them
- interoperable systems should be designed to support machine access (not just people clients)
- interoperable metadata systems should be designed to support automated, accurate, lossless, machine-to-machine exchange of information

Why does interoperability matter?

- improved open access to public data
 - enabling data mining, cataloging systems, portals, mash-ups
- ecosystem researchers are asking global questions
- model developers need access to data from a variety of domains (biology, chemistry, etc and social and economic data too)
 - we must rise to the challenge of designing interoperable data systems that are up to these tasks

How do we achieve interoperability? What are some of the expected challenges?

- varied funding sources and governing agencies
- projects with different priorities and leadership
- distributed data systems
- large volume, heterogeneous data
- expectation of near real-time availability

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What are some of the effective strategies?

- adopt standards
- use controlled vocabularies



This is going to be difficult . . .

- best solutions will be found through community recognition of local implementations
- Baker & Chandler, in press. publication expected in DSR II before end of 2008.

Title: Enabling Long-Term Oceanographic Research:
Changing Data Practices, Information Management
Strategies and Informatics

online: <http://dx.doi.org/10.1016/j.dsr2.2008.05.009>
final draft complete: 9-JUL-2008

Semantic Web

- Semantic Web technologies offer one solution set

next slides are courtesy of
Peter Fox (HAO/ESSL/NCAR)
and are from an April 2008 presentation

Semantic Web Basics

- The *triple*: {**subject**-predicate-**object**}

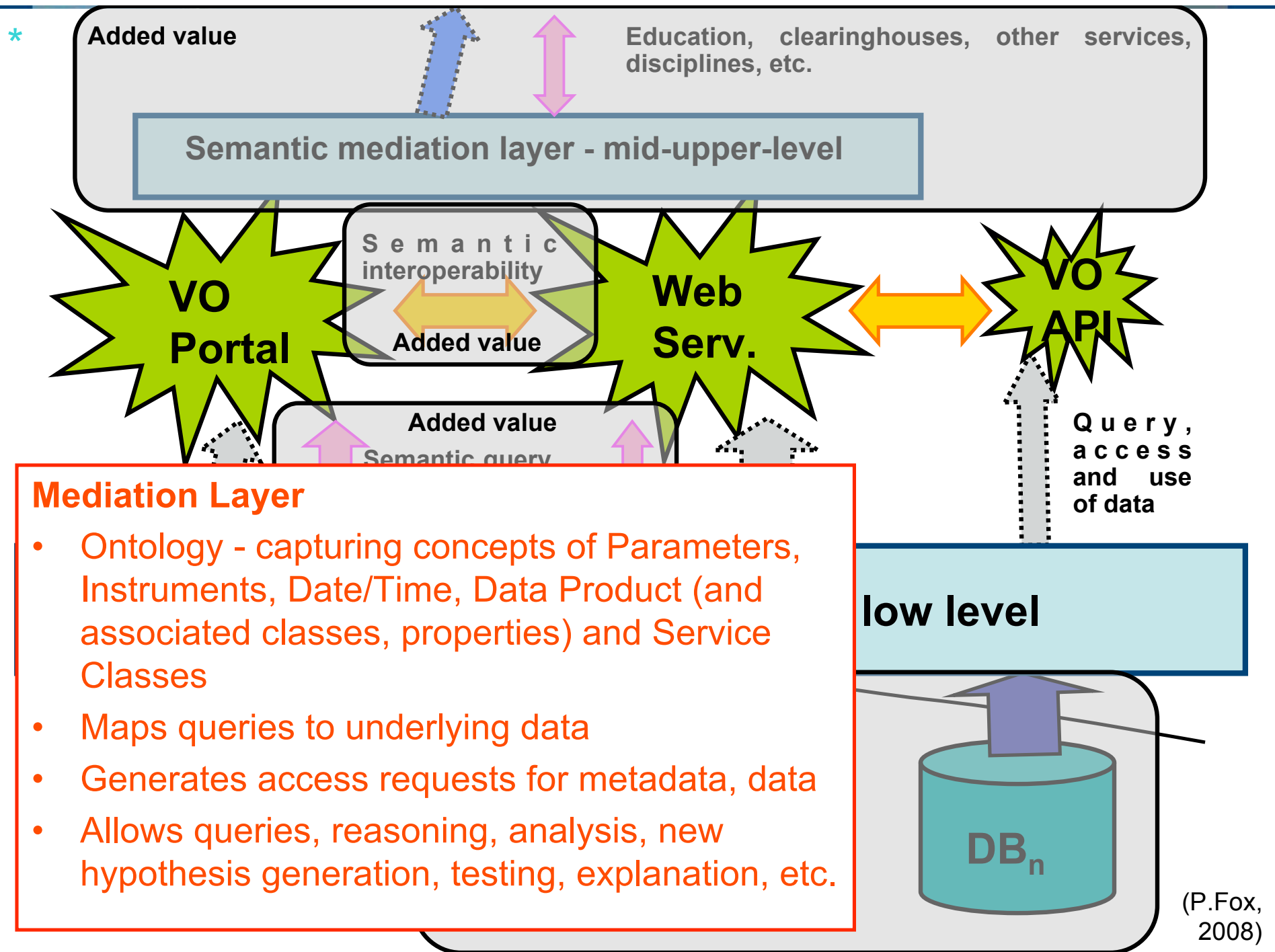
Interferometer is-a **optical instrument**

Optical instrument has **focal length**

An ontology is a representation of this knowledge

- W3C is the primary (but not sole) governing organization for languages, specifications, best practices, etc.
 - RDF - Resource Description Framework
 - OWL 1.0 - Ontology Web Language (OWL 1.1 on the way)
- Encode the knowledge in triples, in a triple-store, software is built to traverse the semantic network, it can be queried or reasoned upon
- Put semantics between/ in your interfaces, i.e. between layers and components in your architecture, i.e. between 'users' and 'information' to mediate the exchange

(P. Fox, 2008)

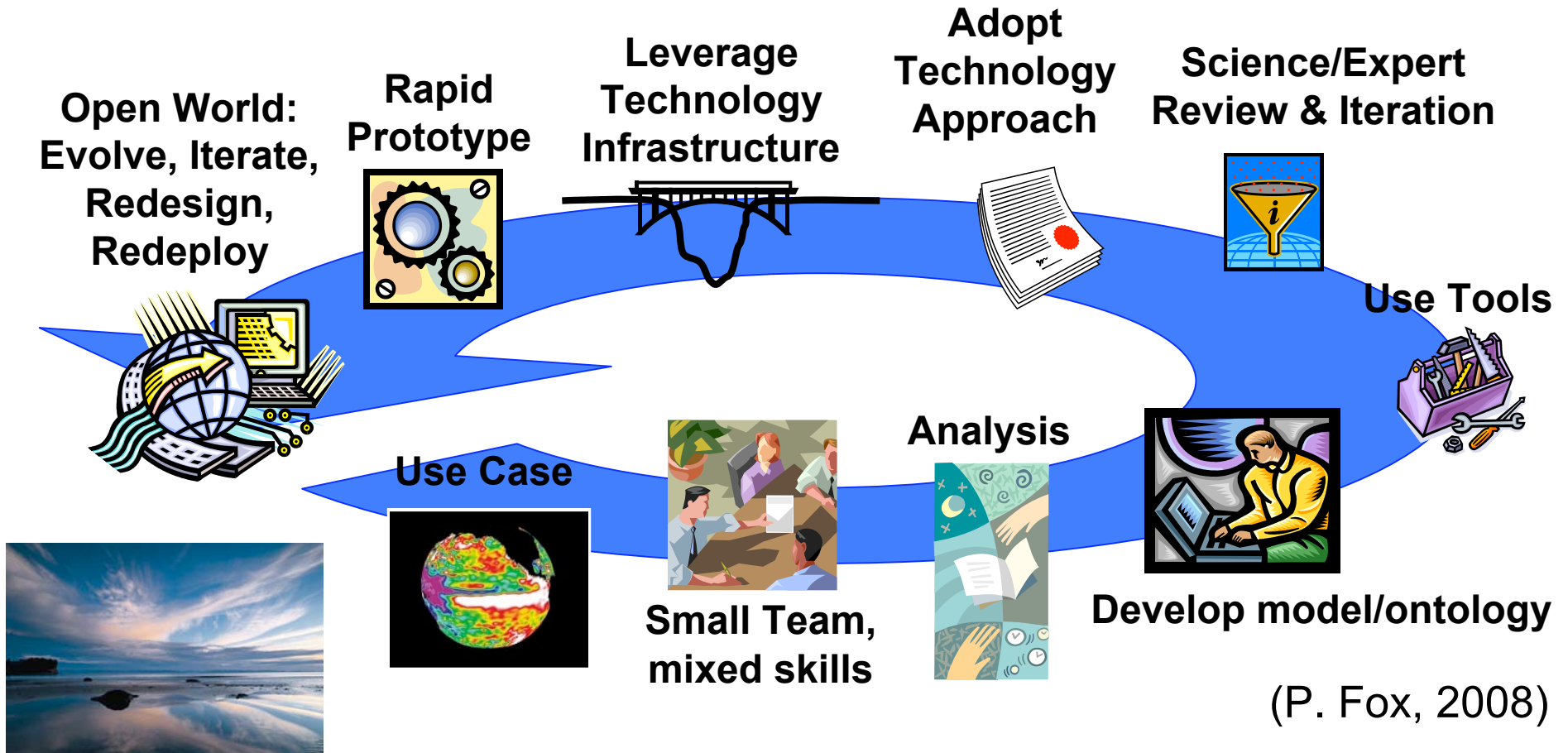


(P.Fox, 2008)



Semantic Web Methodology and Technology Development Process

- Establish and improve a well-defined methodology vision for Semantic Technology based application development
- Leverage controlled vocabularies, etc.

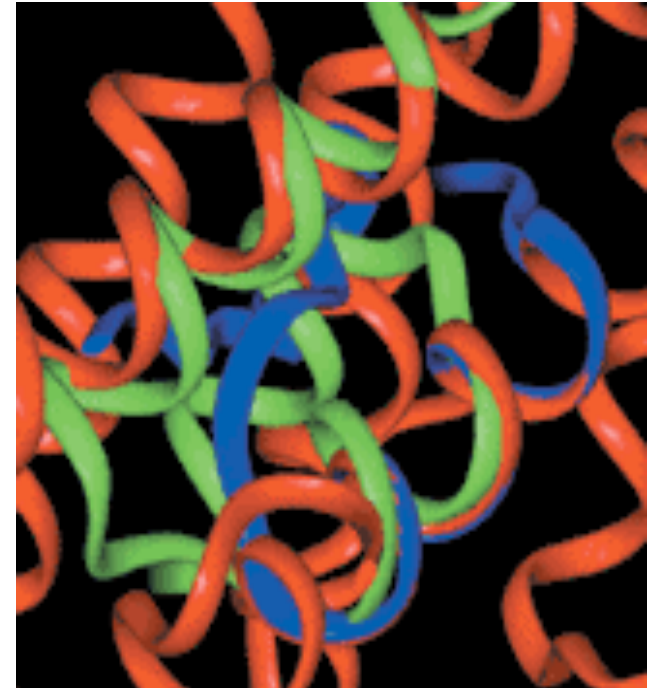


(P. Fox, 2008)

The Information Era: Interoperability

Modern information and communications technologies are creating an “interoperable” information era in which ready access to data and information can be truly universal. Open access to data and services enables us to meet the **new challenges** of understanding the Earth and its space environment as a complex system:

- managing and accessing large data sets
- higher space/time resolution capabilities
- rapid response requirements
- data assimilation into models
- crossing disciplinary boundaries.



(P. Fox, 2008)

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more challenges . . .

- reality check: insufficient metadata ...

researcher aboard R/V Oceanus, August 2008, talking about metadata for shipboard sampling

"I feel like I'm so busy with all the other little things in a cruise that I don't have time to worry about making up log sheets. But if someone puts an already made log sheet in front of me, I'll use it."

"When I see projects with good metadata, it just makes my heart go pitter patter."

Data originators recognize that recording metadata is a good idea, and they will even record metadata ~ if we make it easy for them to do so.

Community building

- Share knowledge gained doing implementation at the local level – participate in workshops and publish

Thank you . . . cchandler@whoi.edu