

Multiple Perspectives: From Wishful Thinking to Implementation

Introduction to the Data Projection Model

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Summary

What "light-weight" tools are needed to support emergent governance across intergovernmental communities?
How can these tools bootstrap open collaborative development with the agility needed by intergovernmental communities and their individual host institutions?

- Multiple perspectives: From Wishful Thinking to implementation: the Data Projection Model
- Illustrated with the Bird Flu Wiki.

Contributing Perspectives

- Generalized agreement on every level of semantics:
OK in a closed world. In an open world, forget it!
- Instead there is a multiplicity of contributing perspectives, each valid in its own right.

Dr. Anthony Fauci of the National Institute of Health

“It’s unlikely that if the H5N1 (flu strain) we see now in Asia develops the capability of efficiently spreading from human to human, which we don’t see now, it is unlikely to happen overnight. It is likely to develop over a period of months. It is not going to happen between Tuesday and Thursday. It is going to happen between February and April,” he said, using the time frame as an example rather than a prediction.

[News-Medical.Net, September 12, 2005](#)



Dr. Shigeru Omi WHO’s regional director for the Western Pacific

“As the new cases of human infection with the H5N1 virus in Turkey show, the situation is worsening with each passing month and the threat of an influenza pandemic is continuing to grow every day”

[MSNBC News, January 12, 2006](#)



Dr. S. Omi, Regional Director

Source: <http://www.fluwiki.com/index.php?n=Science.OpinionAboutAFluPandemic>

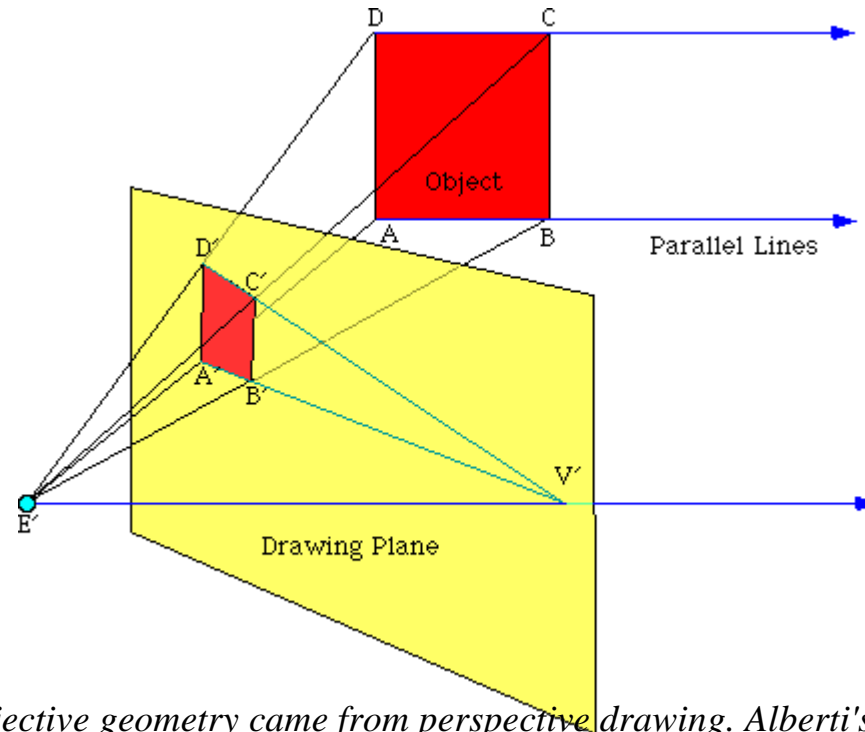
Perspective -- Art

- In art, perspective stands for methods to represent 3-dimensional space on a flat surface.



Gustave Caillebote, *Paris Street, A Rainy Day*

Perspective -- Geometry



*“The original impetus to projective geometry came from perspective drawing. Alberti's textbook *Della Pittura* (1435) formulated new questions that tempted mathematicians to study new questions beyond those addressed by the Greeks. If two artists make perspective drawings of the same object, their drawings will not be the same, for example because different parts of the object will be closer to each of the the two artists. But what properties of the drawings remain the same? (Diagram of Alberti's question.)*

*The **perspective projection**, which takes points X of the object which are in three space and plots them as points P on the drawing plane. “*

Perspective & Projection

3D is the reality,

2D is the information

(on a plane paper sheet, or a computer screen)

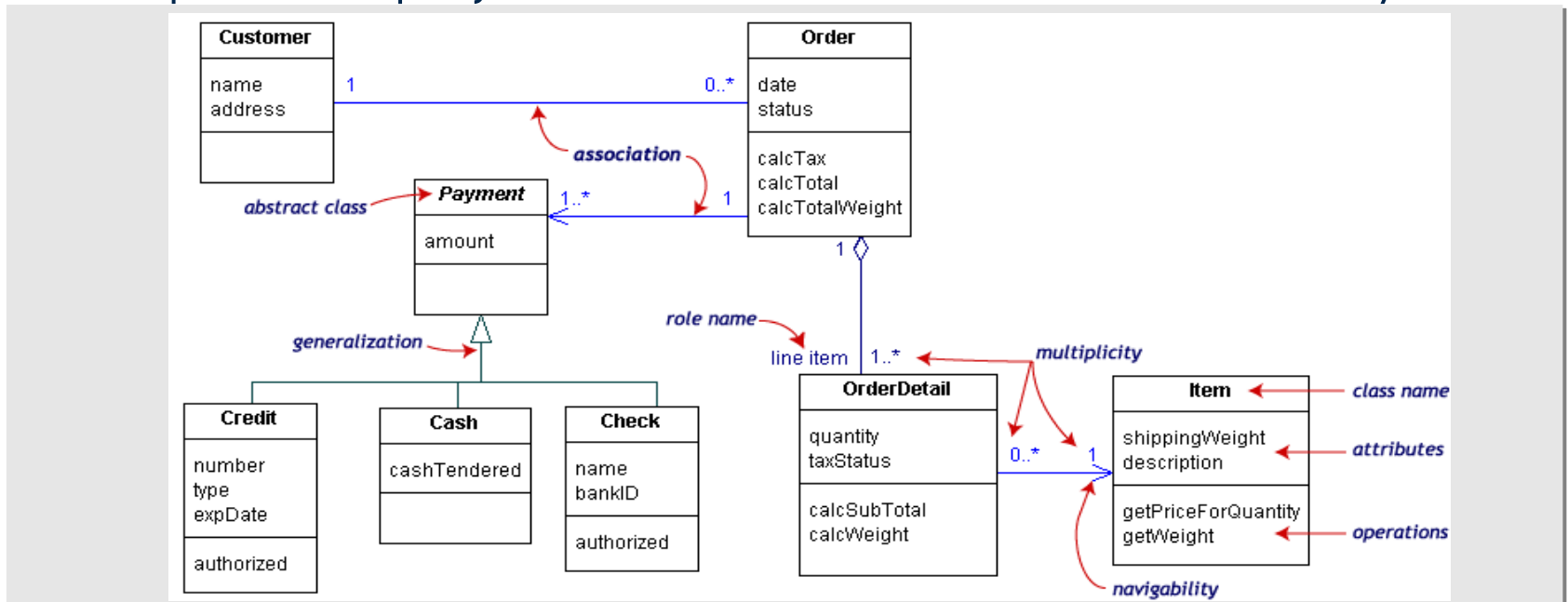
Perspective appears when projecting from 3D to 2D

Perspective--Information Models

- In Information Modeling:

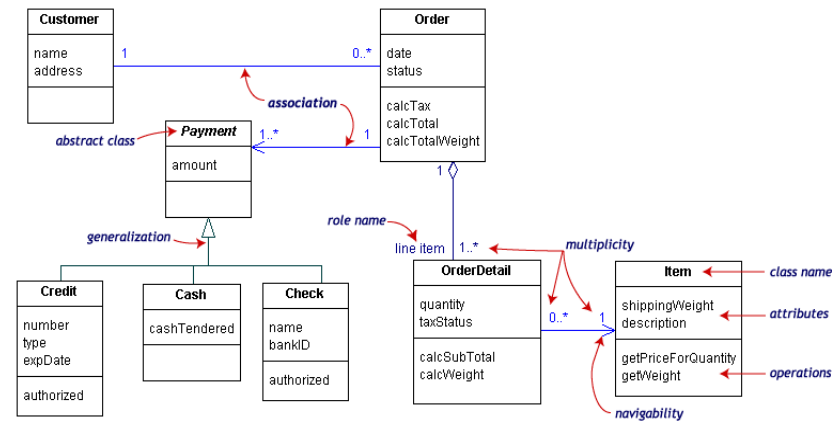
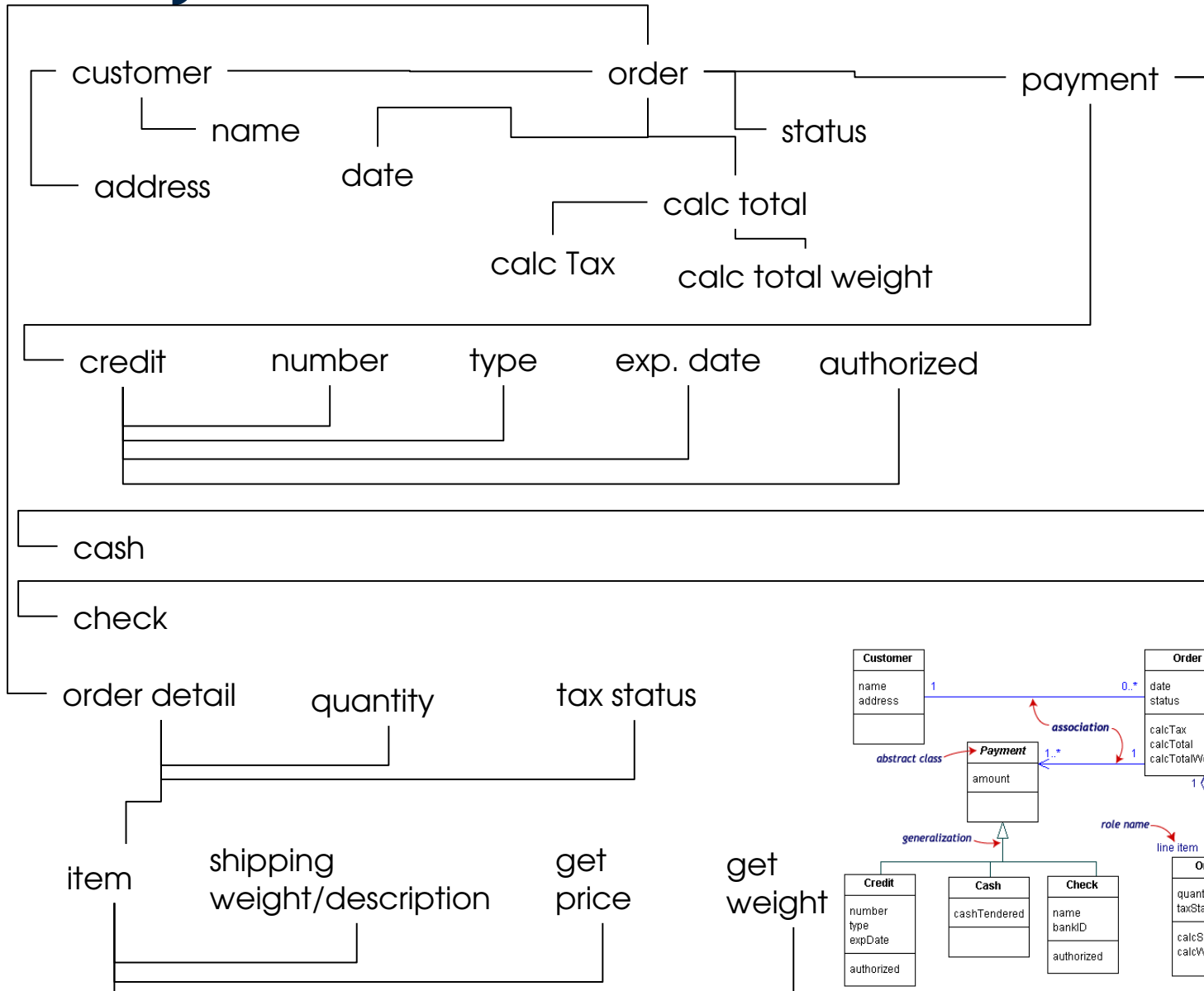
grouping, typing (class/instance), directionality, cardinality, relation semantics, etc. Multidimensional Modeling (MM)
Multidimensional Modeling can be expressed as a Binary relations-based model

Perspective : projection from Multidimensional to Binary



Practical UML: A Hands-On Introduction for Developers, by Randy Miller, <http://bdn.borland.com/article/0,1410,31863,00.html>

Projection of Processes



Declaration vs. Processing

2 + 3 vs. 5

declaration

2

x operand

+

operator

3

y operand

processing

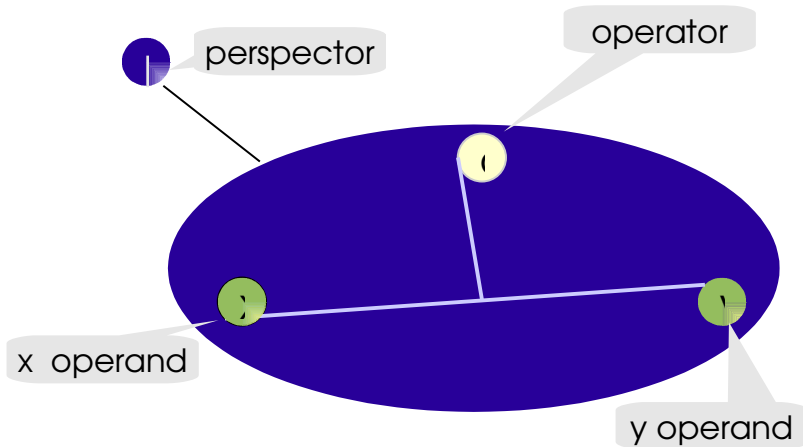
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Perspector

- A perspector declares a process.

- Graphic notation



- Formal notation

$$p = \langle x \mid o \mid y \rangle$$

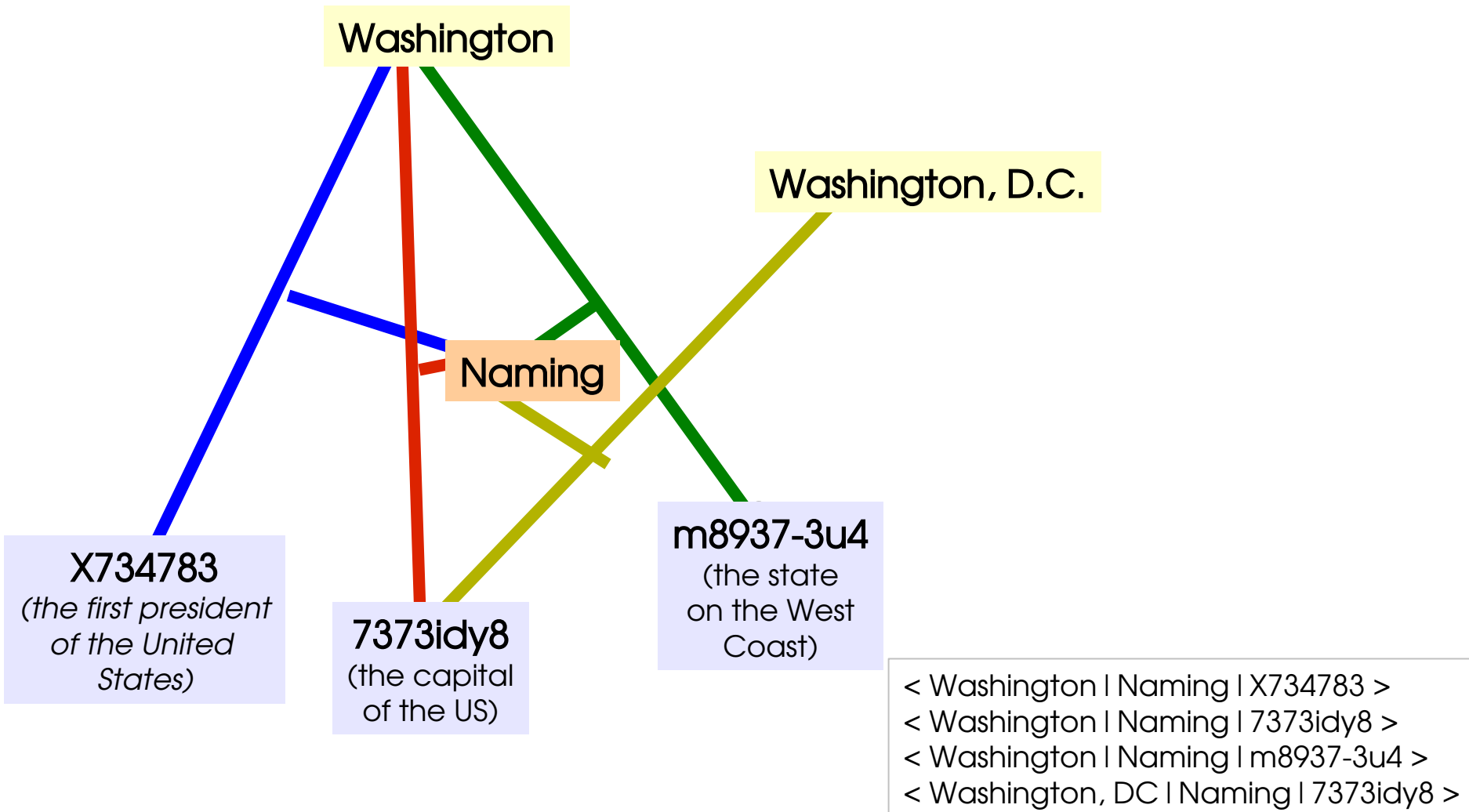
$$p_1 = \langle 2 \mid + \mid 3 \rangle$$

Binary relations everywhere

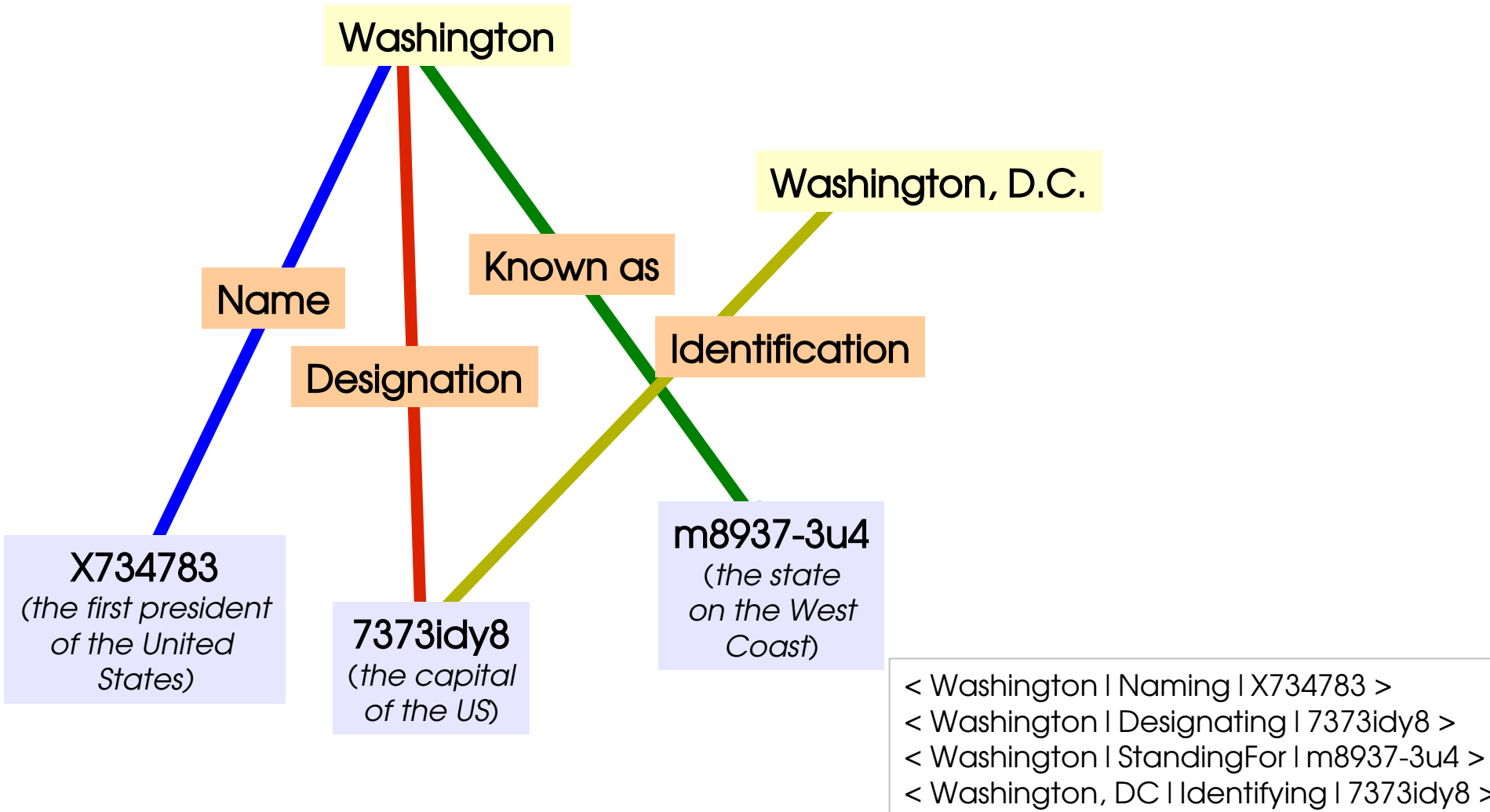
- The possibility to express anything as a set of binary relations is comparable to the plane on which a 3-dimensional space can be represented.
- The “plane of binary relations” is the common ground to express anything.
- Perspectives are visible on the plane of binary relations.
- Multiple views can be derived from the multiplicity of perspectives.

Names as Perspectives

Naming in Perspector



Names as Perspectives: Variant Naming in Perspectors



< Washington | Naming | X734783 >
< Washington | Designating | 7373idy8 >
< Washington | StandingFor | m8937-3u4 >
< Washington, DC | Identifying | 7373idy8 >

Applications

- Collaborative Environments
 - Diverse perspectives can contribute
 - Navigation possible across perspectives
 - Each perspective is disclosed
 - No master model involved
- Tracing origin of each information item
 - Authorship
 - Auditability
 - Transparency

Diversity of processes

- Many existing technologies contributing to the making of an information item
 - Search algorithms
 - Automated processes
 - Database schemas / tables
 - XML schemas / documents
 - Human/Expert input
- Multiplicity of perspectives used to describe, process and combine information items made explicit.

Classes and Instances

- The Data Projection Model uses the same mechanism to describe classes, instances, and relations between classes and instances.
- Schema:
 < html | contains | body >
- Instance:
 < paragraph14 | contained_in | section3 >
- Schema / instance
 < paragraph14 | is_element_of_type | p >

Semantic Depth

- Semantic Depth: Resolution level to which semantic is declared.
- The Data Projection Model makes the “semantic depth” of information items explicit.
- Example of shallow (RDF Statement):
< Washington | capital of | United States >
- Example of one level deeper (Topic Association):
< topic 1 | named | Washington >
< topic 2 | named | United States >
< topic1 | capital of | topic2 >

Audit Trail

- Each perspector can have its own audit trail.
 - < x | o | y >
 - Dates of Creation, Modification, Deletion
 - Processes through which it was created, modified or deleted.
 - Authors
 - Documentation
- Part or totality of audit trail can be inserted automatically.
- Audit trails can be stored and queried

Back to the Flu Wiki

- Why should anybody trust a source like this?
- "I'm working with some of the best scientists in the country on the subject of pandemic influenza," said Melanie Mattson, who maintains the site. "If I have a question about what's going on I ask them."
- And Flu Wiki, the Virginia resident said, is "probably the most complete authority in English on pandemic influenza on the internet."
- Even for a site with more than 1,200 pages of content, that's a bold claim. The field includes not only an official U.S. government site, but also others from the U.S. Centers for Disease Control and Prevention and the World Health Organization. There are also plenty of bloggers who focus on flu.
- But Flu Wiki also offers the wisdom of its expert contributors, Mattson said.

<http://www.wired.com/news/wireservice/0,70291-0.html>

Continued...

- Flu Wiki, which averages up to 5,000 hits a day, impressed some flu experts who examined it recently at the request of The Associated Press.
- Dr. Arnold S. Monto of the University of Michigan said he found the site's information reliable in general. Such sites can provide "a single place for people to go who want to get information which they may have to troll for in some of the official sites," he said.
- The site, launched last June, offers key facts about bird flu, updated news stories, a roundup of official flu plans, tips on preparedness and a discussion forum. Volunteers have translated critical information into French, Spanish and Turkish. Norwegian may be next.

<http://www.wired.com/news/wireservice/0,70291-0.html>

Transparency and Navigability

- Rich information, Hard to find.
Discussion with D. Ozonoff, the initiator of the Flu Wiki.
- Data Projection Model:
Various perspectives disclosed
Deeper level of analysis (decomposition)
Can be recombined in queries to enhance navigation.