Taking Information Into Accounts

The Data Projection Model

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Contents

- There is a lot of information.
- Information is a mess.
- There are multiple ways to consider the same information.
- To be trusted, information needs to be accounted for.

... Introducing the Data Projection Model
What's New York?

- New York is a state, a city, and a county. Plus a multi-faceted fantasy.

- **New York City** is the same as the **City of New York**.

  In Brooklyn, which is in New York City, “The City” means “Manhattan”.

- Brooklyn is a borough of New York City. But there are other **Brooklyn** in Indiana, in Maryland, in Alabama, in Connecticut, etc.

- For Brooklyn in New York State, the postal addresses are: “Brooklyn NY”, like all other cities in the state. In the postal address **New York, New York**, the first New York means Manhattan. It is the county in which Manhattan is located. But this rule is not extensible. Otherwise, addresses in Brooklyn would be “Kings, NY” and in Queens: “Queens, NY”. But you don't live officially in Queens, you live in a village in the New York State, which happens to be located in a county called Queens: Long Island City, Astoria, Flushing, etc.

- The borough of Bronx has two official names: “Bronx” and “The Bronx”. (County of Bronx, the Borough of The Bronx)
Ontologies, Taxonomies, Databases, Semantic Web, Linked Data...

- Let's all agree about the meaning of everything.
- Let's organize it and have computers handle it.
- Let's build systems that will help us reason and tell us what we want.
- It ... works, but ...
Multiple Perspectives

• Perspective is a mathematical method to flatten the world, so that 3 dimensional objects can be represented on a flat surface.

• It has been studied and created by artists.

• One reality, multiple points of view.
Flattening the world

- Perspectives are defined according to projections.
- 3-d into 2-d
Luca Pacioli

Worked on Perspective with Leonardo da Vinci.
"Invented" Double Entry Bookkeeping.
Wrote on Accounting Ethics and Cost Accounting.
Proportions as a Semantic Network

The tree of proportion and proportionality, by Luca Pacioli.
Information made accountable

• Accounting is based on a method called “Double Entry Bookkeeping” where each amount of money is involved in a transaction.

• Money doesn't come from nowhere. It flows between accounts.

• Credit / Debit
Data Projection

• Each information unit is connected to at least another one.
• Thus it's possible where it comes from.
• Multidimensional information is “flattened” into bidirectional relationships.
• Perspective is the way to look at it.
Content & Processes

- Information systems are made of units of meaning and processes.
- Triples everywhere. Actually: Quads

Ora Lassila is the author of RDF

<table>
<thead>
<tr>
<th>subject</th>
<th>predicate</th>
<th>object</th>
</tr>
</thead>
<tbody>
<tr>
<td>operand</td>
<td>operator</td>
<td>operand</td>
</tr>
<tr>
<td>2</td>
<td>+</td>
<td>3</td>
</tr>
</tbody>
</table>

\[
2 + 3 = 5
\]
A “perspector” is notated:

\[ \langle x \mid o \mid y \rangle \]

\(x\) and \(y\) are operands (order matters).

\(o\) is an operator.

A perspector can represent a semantic relation, for example:

\[ \langle \text{New York} \mid \text{is a} \mid \text{city} \rangle \]

(This is an instance/class relationship)

\[ \langle \text{city} \mid \text{added by} \mid \text{MB} \rangle \]

(This is usually considered metadata).
The limitations of RDF (as it is used)

The problem
Subject – Predicate – Object: A single view on things
Not contextual: Who said what?
Operates in a closed world
First order logic works if everything known

The fix
Derive meaning from multiple triples
Every node is an “account”.
Multiple perspectives are enabled.
Logic is not built-in, multiple logics can be super-imposed.
Example: Name versus Subject

A Name does not identify a Subject

- Variant names may be used to designate the same subject.
  - Synonyms
  - Typographical variations
- One name may identify several subjects.
Names

- Wash. DC
- Washington, DC
- General Washington
- Washington
- George Washington
- Wa
- Denzel Washington
- Washington State
Emerging Subjects

Wash. DC
Washington, DC
General Washington
George Washington
Washington
Wa
Denzel Washington
Washington State
Washington State
Strings Become Subjects
Generalization

- Wash D.C.
- Washington, DC
- General Washington
- George Washington
- Washington State
- Washington
- Denzel Washington
Names and Subjects

< Washington | is a name for | _city_of_Washington >
< Washington DC | is a name for | _city_of_Washington >
< Wash. D.C. | is a name for | _city_of_Washington >
< Washington | is a name for | _General_G_Washington >
< General Washington | is a name for | _General_G_Washington >
< George Washington | is a name for | _General_G_Washington >
< Washington | is a name for | _Washington_State >
< Wa | is a name for | _Washington_State >
< Washington State | is a name for | _Washington_State >
< Washington | is a name for | _Denzel_Washington >
< Denzel Washington | is a name for | _Denzel_Washington >
Strings as Subjects

< Washington | is in character set | UTF-8 >
< Washington | is a name for | _city_of_Washington >
< Washington | is a name in the language | English >
Integration

- Washington abbreviates Wash D.C.
- Washington, DC is usually called Washington, D.C.
- Washington State also known as Wash is a name for Washington, D.C.
- Washington, DC indicates Washington, D.C. is a name for Washington, D.C.
- Washington, D.C. designates Washington, D.C. is the last name of Washington, D.C.
- Washington, D.C. represents Washington, D.C.
- George Washington is the last name of Washington, D.C.
- Washington, D.C. is a code name for Washington, D.C.
- Denzel Washington is a name for Washington, D.C.
- Washington, D.C. is a code name for Washington, D.C.
<table>
<thead>
<tr>
<th><strong>city_of_Washington</strong></th>
<th>is usually called</th>
<th><strong>Washington</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington DC</td>
<td>indicates</td>
<td><strong>city_of_Washington</strong></td>
</tr>
<tr>
<td>Wash. D.C.</td>
<td>abbreviates</td>
<td><strong>city_of_Washington</strong></td>
</tr>
<tr>
<td>Washington</td>
<td>is a name for</td>
<td><strong>General_G_Washington</strong></td>
</tr>
<tr>
<td>General_G_Washington</td>
<td>also_known_as</td>
<td>General Washington</td>
</tr>
<tr>
<td>George Washington</td>
<td>represents</td>
<td><strong>General_G_Washington</strong></td>
</tr>
<tr>
<td>Washington</td>
<td>stands for</td>
<td>Washington State</td>
</tr>
<tr>
<td>Wa</td>
<td>is a code name for</td>
<td>Washington State</td>
</tr>
<tr>
<td>Washington State</td>
<td>is a name for</td>
<td>Washington State</td>
</tr>
<tr>
<td>Washington</td>
<td>is last name of</td>
<td>Denzel Washington</td>
</tr>
<tr>
<td>Denzel Washington</td>
<td>designates</td>
<td>Denzel_Washington</td>
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Perspective on Naming

< _city_of_Washington
< Washington DC
< Wash. D.C.
< Washington
< _General_G_Washington
< _George_Washington
< Washington
< Wa
< Washington State
< Washington
< Denzel Washington

is named

is a name for

Washington >
< _city_of_Washington >
< _city_of_Washington >
< _General_G_Washington >
< _General_G_Washington >
< _Washington_State >
< _Washington_State >
< _Washington_State >
< _Denzel_Washington >
< _Denzel_Washington >
<table>
<thead>
<tr>
<th>English</th>
<th>is a name for</th>
<th>New York City</th>
</tr>
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<tbody>
<tr>
<td>New York</td>
<td>is a name for</td>
<td>New York State</td>
</tr>
<tr>
<td>New York</td>
<td>is a name for</td>
<td>New York County</td>
</tr>
<tr>
<td>New York</td>
<td>is a name for</td>
<td>Manhattan</td>
</tr>
<tr>
<td>New York</td>
<td>is an old name for</td>
<td>Wall Street</td>
</tr>
<tr>
<td>Nueva York</td>
<td>is a name for</td>
<td>Manhattan</td>
</tr>
<tr>
<td>ניו יורק</td>
<td>is a name for</td>
<td>New York City</td>
</tr>
<tr>
<td>New York</td>
<td>is a name in the language</td>
<td>English</td>
</tr>
<tr>
<td>Nueva York</td>
<td>is a name in the language</td>
<td>Spanish</td>
</tr>
<tr>
<td>New York</td>
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<td>French</td>
</tr>
<tr>
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<td>Anglais</td>
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<td>Inglés</td>
<td>is a name in the language</td>
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More Information

Demos, other presentations available at: https://www.infoloom.com

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