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A matter of perspectives

Talking About Talking About Topic Maps

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Extreme Markup Languages

August 1-5, 2005, Montreal

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Outline

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- Perspectives:
  - Introduction
  - Concepts
- Examples of Perspectives:
  - One territory seen in various perspectives
- Using Perspectives

The Problem with Ontologies

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- Ontology: “an exhaustive and rigorous conceptual schema within a given domain”... [Wiki Encyclopedia]
  - Misleading: there are several ways to describe information.
- Pragmatic attitude: regardless of how data was originally created, we need to see it a certain way for certain specific purposes.
  - And... there is a multitude of different ways to look at data.
- Consequently, an ontology is no more no less than one particular way to look at data...

Interoperability vs. Integration

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- Semantic Interoperability is the ability for systems to interchange certain kinds of data and incorporate them into processes.
  - Systems
- Semantic Integration is the ability to aggregate information around its meanings.
  - Humans
- Interoperability and Integration are different.

Interoperability: One World

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- When systems are set to interoperate, the (unique) ontology on which they operate must be well defined. This is a closed information island.
  - There can be an archipelago of information islands.
  - Interoperability presupposes that all discrepancies will be resolved,
- Apparent diversity, but one common way of thinking, imposed by technology.

Integration: Bridge between worlds

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- Integration supposes it's possible for every subject to have addresses in semantic spaces.
- What the subject is is a matter of perspective.
  - In one person’s perspective, two expressions may be considered to be about the same subject.
  - In another person’s perspective, the same two expressions may be considered to be about different subjects.

Semantic: Human and/or Artificial

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ARTIFICIAL INTELLIGENCE ARTIFICIAL SEMANTIC WEB
HUMAN INTELLIGENCE **HUMAN SEMANTIC** WEB

HUMAN SEMANTIC INTEGRATION
ARTIFICIAL SEMANTIC INTEROPERABILITY

MANUAL
AUTOMATED

Talking About Perspectives

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- Several layers:
  - Thing
  - Subject
  - Expression
  - Interpretation
  - Perspective
  - Pattern
  - View

Thing

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- A thing is considered to exist in the universe, independently of any observer.
- It has no name, no description. It simply is.
- We can't talk about it as such.

Subject

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- A subject is an understanding of a thing.
- It is pure meaning. It's where the semantic universe begins.

  This definition of subject is different from the one that is currently given by the Topic Maps Standard:

  "Any thing whatsoever, regardless of whether it exists or has any other specific characteristics, about which anything whatsoever may be asserted by any means whatsoever."

Expression

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- An expression expresses a subject.

  An expression can be a name, a text, an oral phrase, a picture, a file, a URI, a record, an object.

- There are rules for processing expressions.

  Various technologies can be used to manipulate expressions: linguistic analysis, computer processing, relational databases, topic map processing etc.

- A “topic map” can be seen as a given set of expressions. But other information objects sets as well.

Interpretation

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- Process of creating an expression for a subject.
- There are plenty of different ways to interpret a subject,

  therefore there are plenty of different ways to create an expression of a given subject.
- The context in which a subject is given an expression to represent it, is already defining a perspective.

  Subject interpretation is sometimes described as “reification”, “proxification”, or “representation”. All these terms have the same problem as ontologies. Interpretation conveys a more relative vision.

Perspective

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- A perspective is a bias that is reflected in the interpretations that describe it.
- Examples of perspectives include:
  - Classification schemas (taxonomies)
  - Database schemas/XML schemas
  - Topic Map Data Model
  - Ontology
- Within a perspective, the expression of subjects is naturally “subjective”.
  - It reflects a particular interpretation of the subjects.

Patterns

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- Patterns are the rules, if any, to which expressions must conform within a given perspective.
- Patterns for subjects express:
  - How subjects are **discriminated**.
  - How new subjects can be **inferred** from existing ones.
  - How expressions are **combined** when they are interpreted as expressions for the same subjects.

View

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- The motivation for using perspectives is to provide views.
- A view is a set of expressions selected for a given purpose.
  A document source is its author's view.
- Any user of information needs specific view(s) to fit his/her needs.
- One perspective can be rendered as several views.
  // One source, many outputs.

Lower Manhattan Perspectives

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- Multiple perspectives on the same territory
- Variety, Complexity
- You may consider each map as a metaphor of an XML structured document instance. (Caption = Schema)

Tourist Guide Perspective

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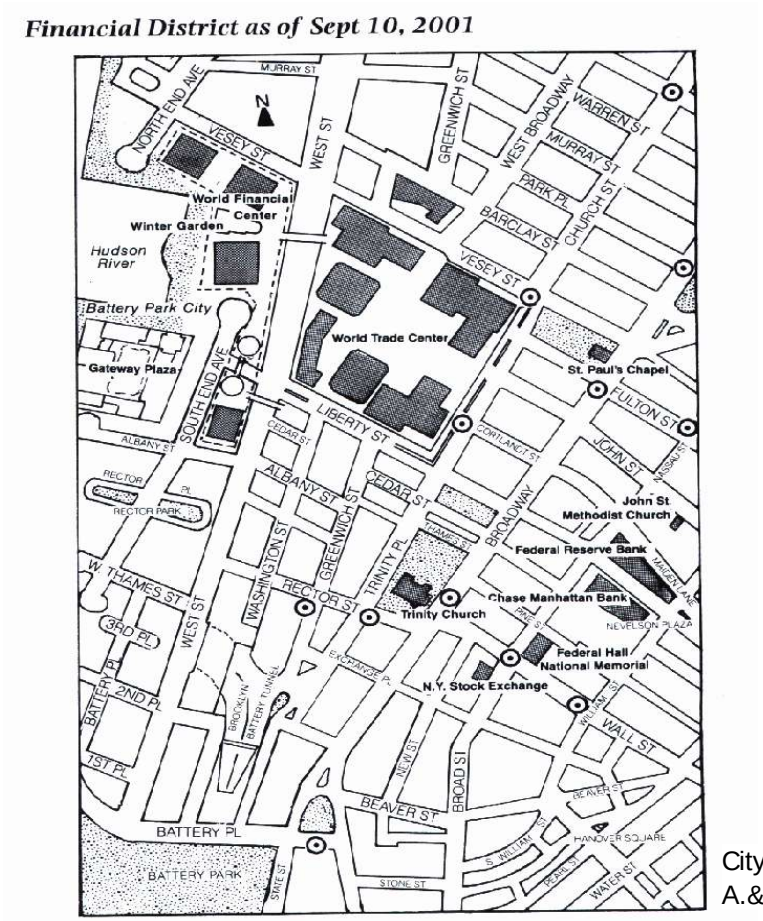
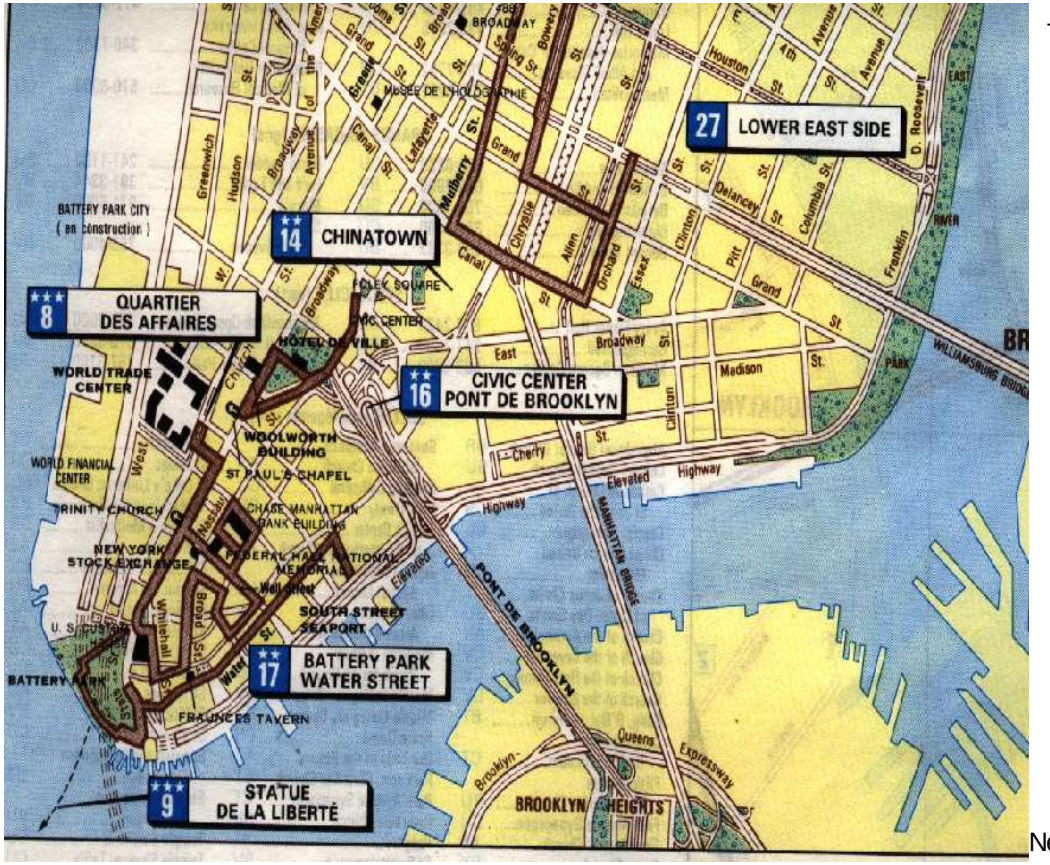


- Sightseeings
- Commented itineraries in tourist guide
- Was published a few days after Sept. 11, 2001
- Shows Subway stops

City Guide, New York, Carol von Pressentin Wrigh, Stuart Miller and Sharon Seitz, A.&C Black Limited/W.W. Norton & Co. Inc., 3rd ed., 2002

Tourist Overview Perspective (in French)

Infoloom



Usages

- Sightseeings: Commented walking itineraries
  - Rated by value.
- Overview (Table of Contents): Refers to Chapters.
- In French (sort of)

New York, Michelin, 8e ed., 1989

Web Map/Satellite Picture

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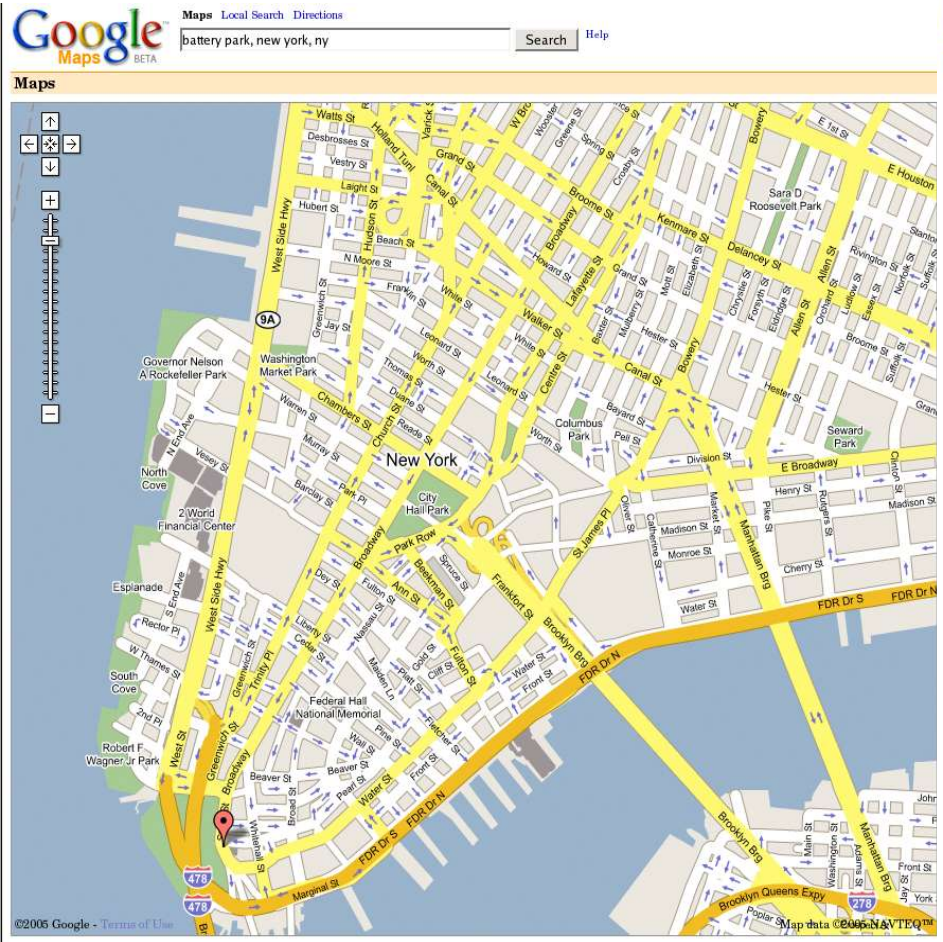

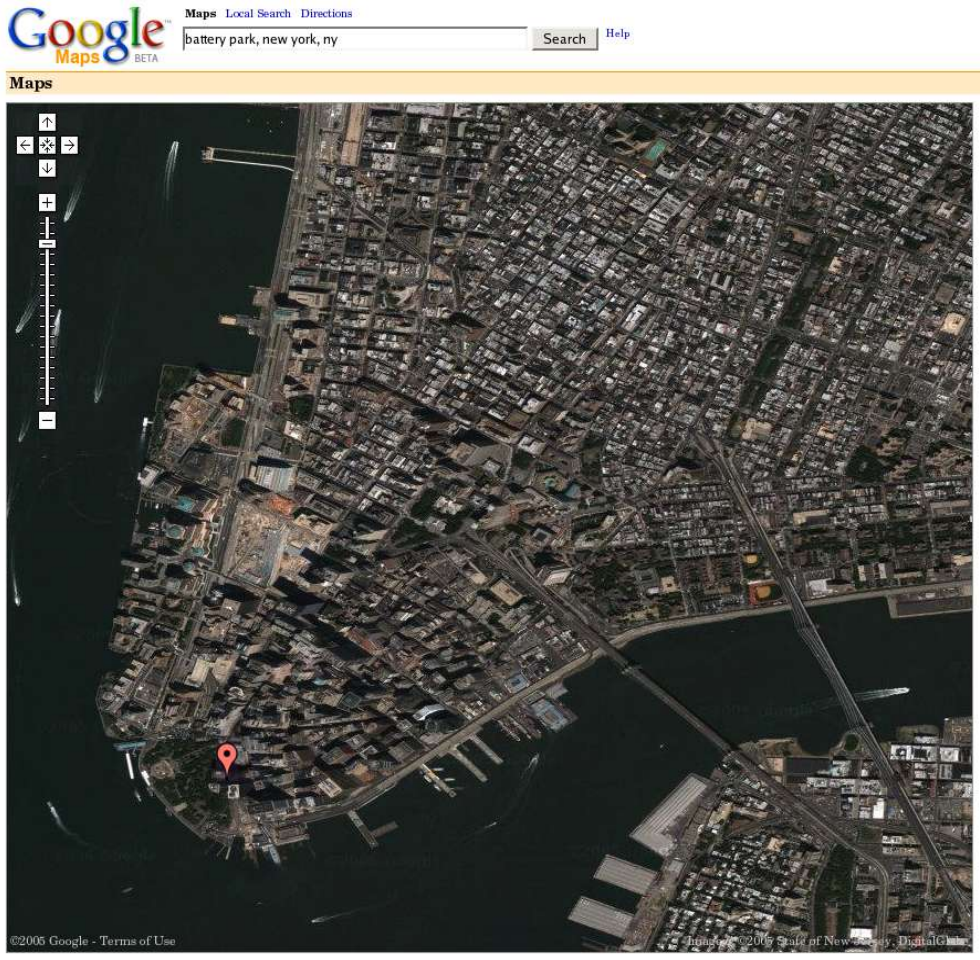

Downtown Tourist Map

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Usages

- Sightseeings: Commented walking itineraries
  - Rated by value.
- Overview (Table of Contents): Refers to Chapters.
- In French (sort of)

Driving/Addressing Perspective

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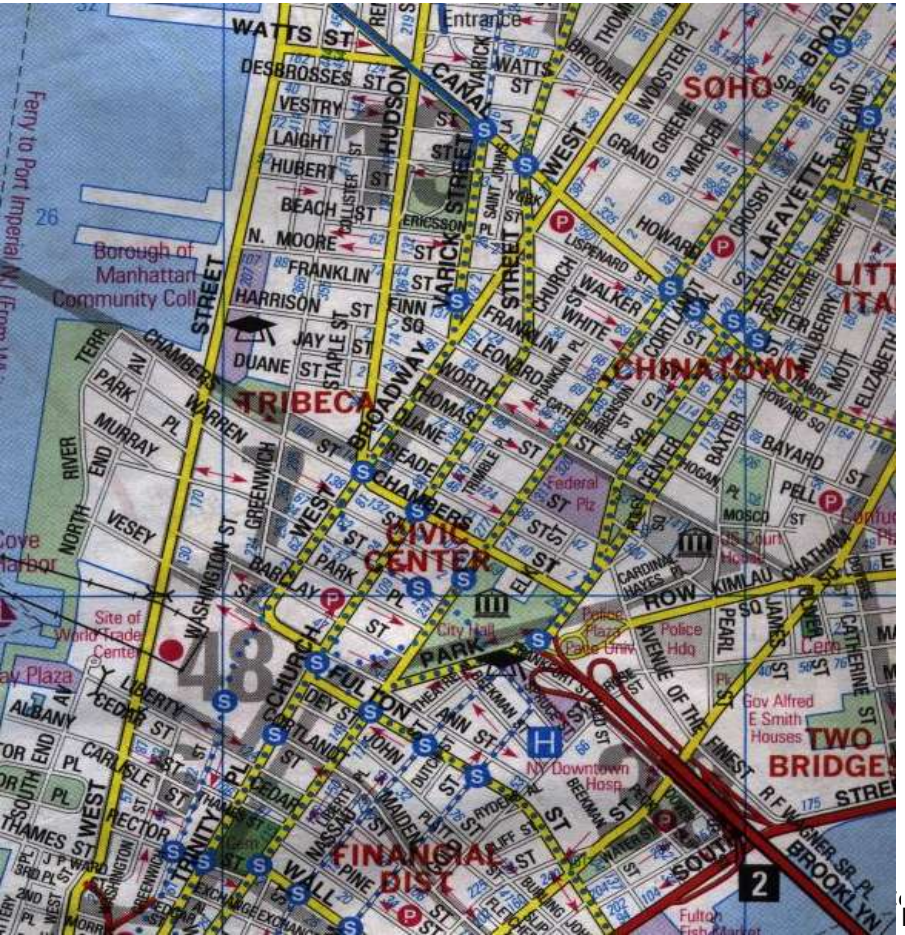

- Usages
  - **Driving** (Main thoroughfares, one-way streets, Parking garages)
  - **Address** (Street Names, Numbers, Zip Codes, Neighborhoods)
  - **Walking** (Blocks, Street Names, Parks, Official Buildings)
  - **Near Public Transportation?**

New York City 5 Borough Pocket Atlas, Hagstrom, 2001.

Buses

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- Should be simple: Street map with bus routes.
- Really is:
  - 3 different maps (there may be many more)
  - Implicit knowledge:
    - Map only shows New York City Transit buses
    - City buses don't go outside of the 5 NYC boroughs.
    - Two kinds of city buses: Local and Express
    - Outer Boroughs have express buses going to/from Manhattan
      - But some have also local buses to Manhattan.
    - Local buses are mainly for local travel ride. They are far too slow to be usable for long-distance travel.
    - Express buses can't be used for local travel. Cost more.

Manhattan Buses, Manhattan Perspective

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Buses in Manhattan
Local Buses only
Subway represented too.

(Manhattan Bus Map, MTA, New York City Transit, February 2004.

Manhattan Buses, Brooklyn Perspective

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Usages:

- Public Transportation to and from Brooklyn.
- Express/Local Buses
- Subway also represented.

Brooklyn Bus Map, MTA, New York City Transit, February 2004.

Manhattan Buses, Staten Island Perspective

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- To and From Staten Island

Staten Island Bus Map, MTA, New York City Transit, December 2002.

Subway Rider Perspective

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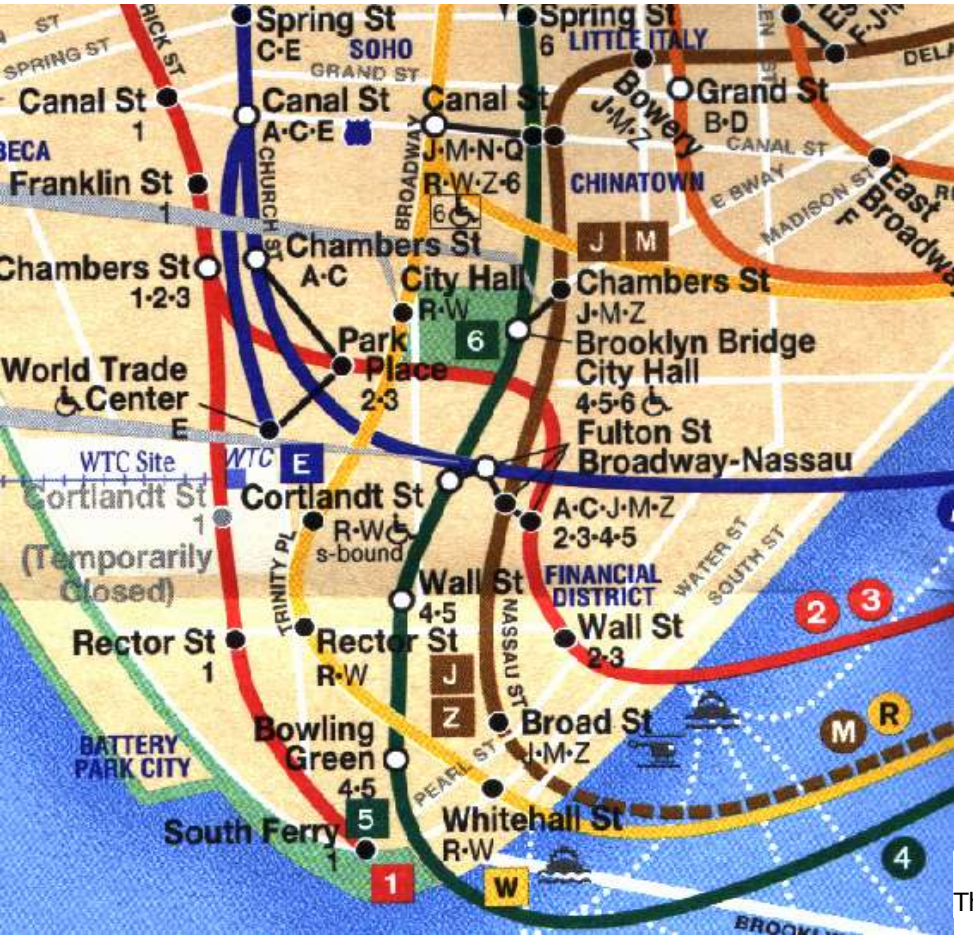

Usages: Riding Subway

- Routes
- Rush/Non-rush hours
- Transfers
- Express/Local
- Police Stations
- Elevators/Escalators
- Ferries

The Map, MTA Metropolitan Transportation Authority, May 2005 Edition

Subway, Historical Perspective

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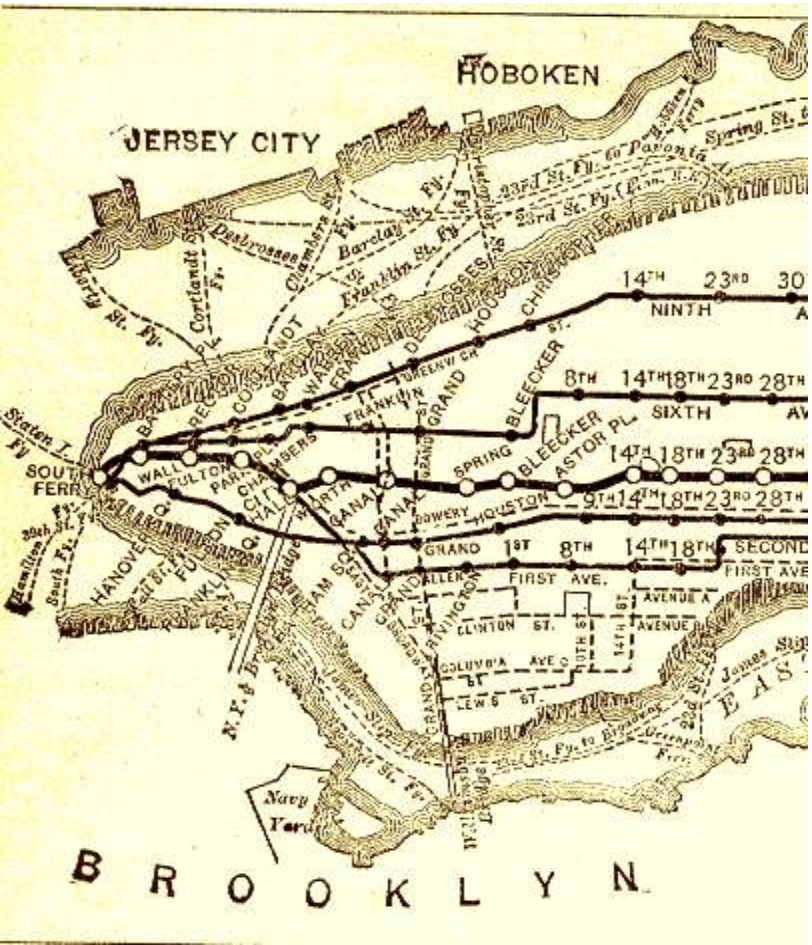

- 1906 IRT Subway Map
- Elevated & Subways
- Ferries to NJ
- Historical Value

Interborough Rapid Transit Company,
http://www.nycsubway.org/perl/caption.pl?/maps/historical/railways1906-54.gif

Subway, Railfan Perspective

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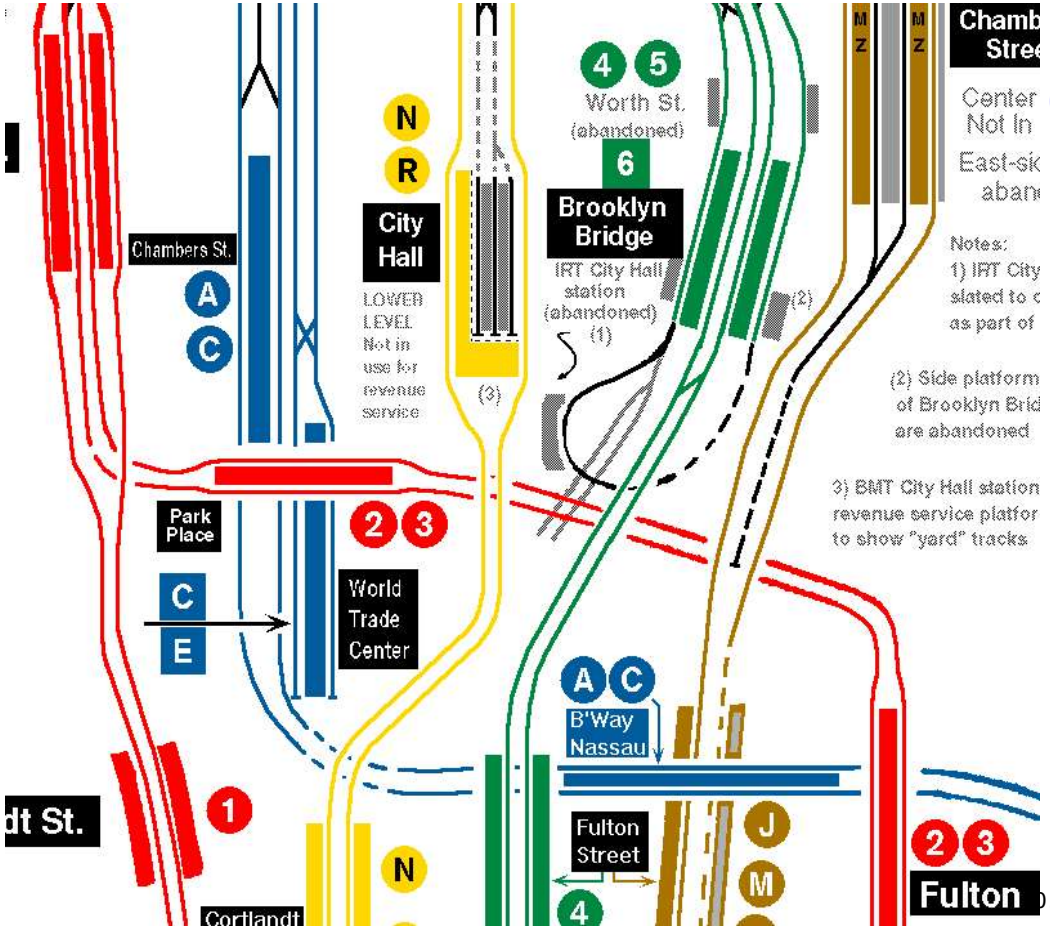
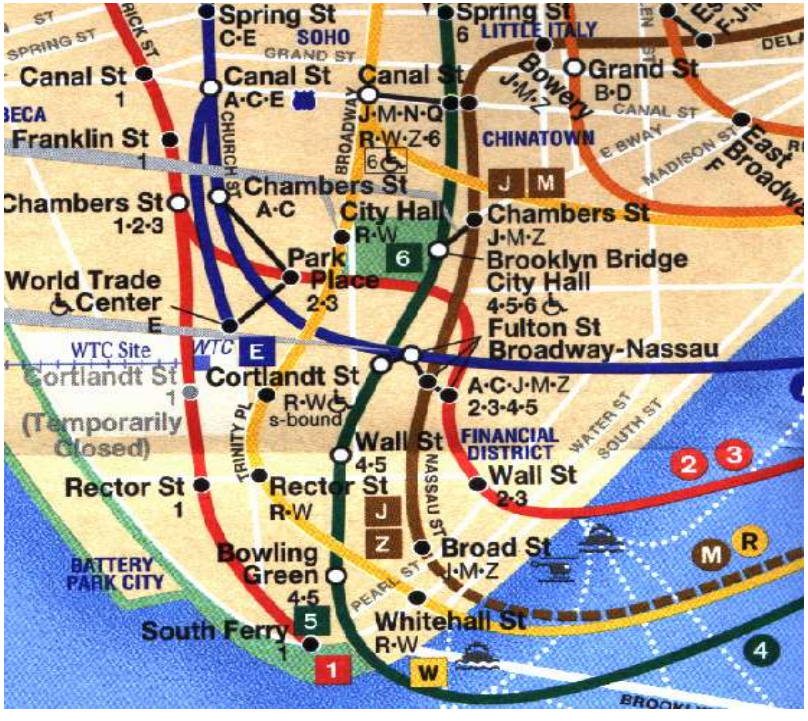


- Trackmap vs. subway map



http://www.nycsubway.org/maps/track/bigdowntown.png

Street/Subway Perspective

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Merged Perspective

Entrance to each subway station

Transfer available

Subway routes marked at each station

Explore Chinatown New York City. www.ExploreChinatown.com, 2005.

Reconstruction Perspective

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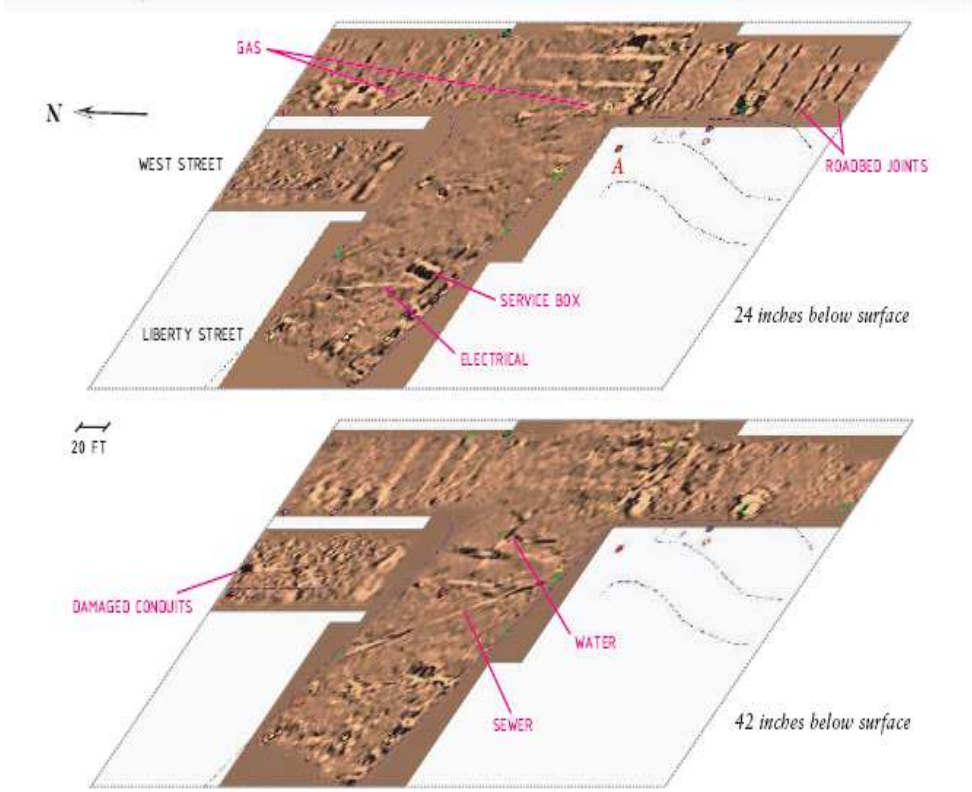

Underground Radar Tomography at Ground Zero

A hidden toll of the collapse of the World Trade Center on September 11 was extensive damage to the underground utility network that supports ower Manhattan. Sponsored by a grant from the Swedish government, a project using radar tomography to map below streets near ground zero has been underway since December to help with reconstruction of the network. In less than two months, a continuous 3D radar image down to a

- Usages:
  - Map Damage to the Underground Utility Network.
  - Help with Reconstruction

Lower Manhattan Underground Radar Project, http://www.lowermanhattan.info/construction/global/contact/

City Administration Perspectives

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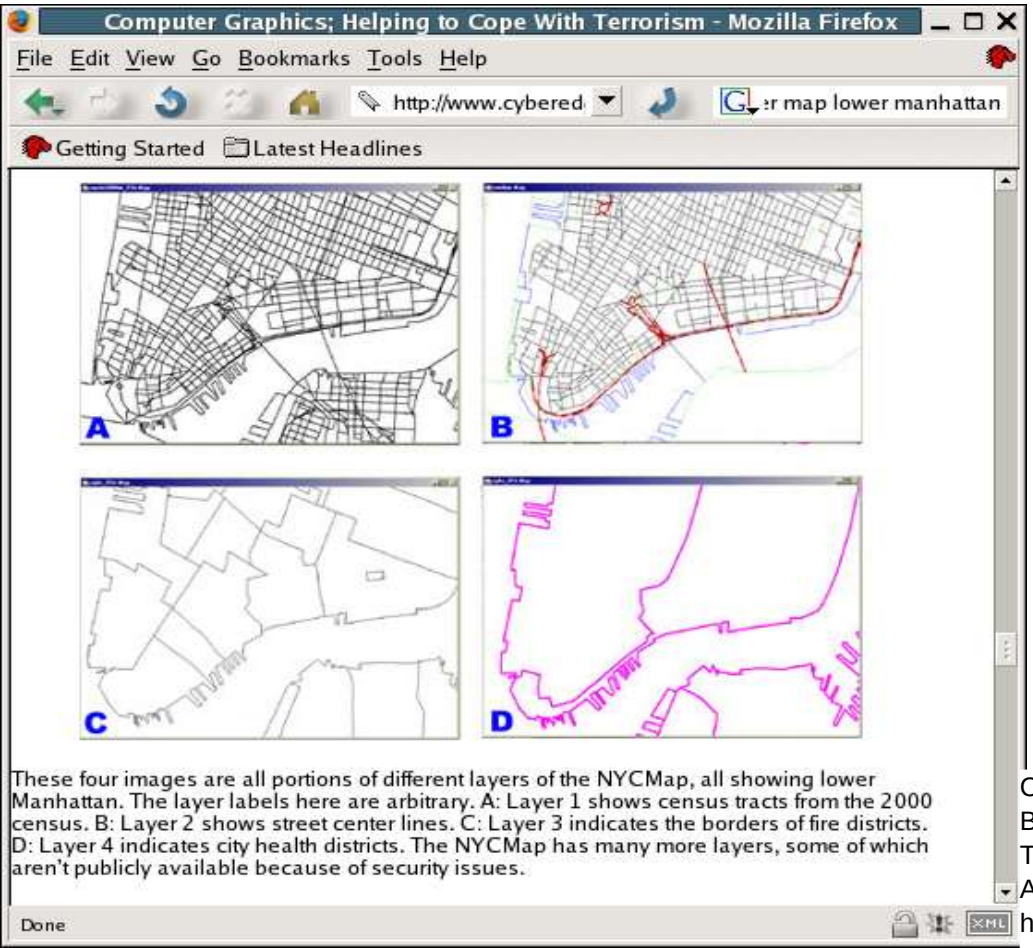

- 2000 Census tracts
- Street Center Lines
- Fire Districts
- City Health Districts

Computer Graphics: Helping to Cope With Terrorism
By Ben Delaney (C) 2002
This article originally appeared in IEEE Computer Graphics and Applications January/February 2002
http://www.cyberedge.com/3a1_020331_a.html

Common Perspective for All?

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- Pros
  - Nice to have everything in one place (Seems rational)
  - Layered Model
  - Management Tool
  - Discovery Tool
  - Harmonization: common model, common goals
- Cons
  - Information Overload
  - Loss of Focus
  - Increased Complexity
  - Difficult/Impossible to Maintain
  - Prerequisite: Agreements
  - Conflicting requirements

Bottom-Up versus Top-Down

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- Top-Down works for information islands.
- Interoperability requires top-down

- Integration using customized perspectives can be used for bottom-up approaches.

Semantic Integration and the Topic Maps Reference Model

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- Integrated views are made under pre-defined perspectives.
- The subject-centric approach proposed by the TMRM has the potential to become a technical solution for dealing with multiple information perspectives.

Maps Express Perspectives

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- Maps are views that result from perspectives.
  - Perspective can be explicit but is often implicit.
- Topic Maps are … maps.
- Disclosure, disclosure, disclosure
- Information Perspectives may be the new hot thing.

Questions

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