Defining Transit Informatics

5TH NATIONAL TRANSIT GIS CONFERENCE
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Overview

- Introductions
- Defining Discipline of Informatics
- Examples of Informatics
- Why this is important to transit
- Current environment
- Allowing Transit Informatics to help
Research Team

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What is *Transit Informatics*?

- The study of the development and use of information technologies in the field of transit

- Analogies: health informatics, community informatics, etc.

- Includes more than information systems, networks, hardware, and data – it also includes the procedures, practices and **data standards** needed to make transit informatics effective
What is a Data Standard?
- Implementation-independent specification of data concepts, definitions, and structure
- Use may be voluntary or mandatory

Data Standards Enable: (more on this later)
- Integration across systems within organizations
- Interoperability across proprietary and non-proprietary systems
- Eliminate redundancy of data collection
Examples of Data Standards

- **MARC Format in Library Science**
  - [http://www.loc.gov/marc/](http://www.loc.gov/marc/)
  - Now Marc 2, defines fixed fields
  - Idea of a *USABLE SUBSET*: not all libraries have the same data needs (like all transit organizations?)

- **SWIFT/ISO 20022 Data Standard for Financial Transactions**
  - [http://www.iso20022.org/](http://www.iso20022.org/)
  - XML tagged approach

*tranSpec – a Transit Data Standard*
Example of MARC 21 for Author

1XX - Main Entries-General Information

100 - Main Entry - Personal Name (NR) Full | Concise
110 - Main Entry - Corporate Name (NR) Full | Concise
111 - Main Entry - Meeting Name (NR) Full | Concise
130 - Main Entry - Uniform Title (NR) Full | Concise

DEFINITION AND SCOPE
Fields 100, 110, 111 and 130 contain a name or a uniform title heading used as main entry. For mixed material, this idea of authorship is not always clear-cut. The main entry may contain the name of the person, family, or entity responsible for bringing the materials together. Alternatively, the main entry may contain the name of the person, family, or entity for whom or which a collection is named.

Descriptions of the first indicator and all subfield codes, as well as input conventions for the 100, 110, 111, and 130 fields, are given in the following General Information sections: X00, X10, X11, and X30. The second indicator is described in the specific section for each field.
Data Type Details

- **Data Type:** CurrencyAndAmount
- **Representation:** Amount
- **XML Type:** decimal
- **Registration Status:** Registered

**Definition**

Number of monetary units specified in a currency, where the unit of currency is explicit and compliant with ISO 4217. The decimal separator is a dot. Note: A zero amount is considered a positive amount.

**XML Attribute:** Currency
**Data Type:** CurrencyCode

**XML Tag:** <Ccy>

<table>
<thead>
<tr>
<th>XML Facet</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>fractionDigits</td>
<td>5</td>
</tr>
<tr>
<td>minInclusive</td>
<td>0</td>
</tr>
<tr>
<td>totalDigits</td>
<td>18</td>
</tr>
</tbody>
</table>
Example of Need for SWIFT/ISO 20022

Without common building blocks:
- Point-to-point connection
- Data is mapped directly from one application to another
- Costly, unscalable and difficult to implement and maintain
- Process, routing, rules logic needs to be coded to specific message types

42 interfaces = n * (n-1)

Source: John Mersberg, IBM Corporation
Does Informatics Apply to Transit?

- Bus Stop Data
- Ridership data
- Performance data
- Vehicle Location
- Vehicle Maintenance
- Passenger Amenities
- Customer Information
Organizational Pillars of Activity

**Logistics**
- Run Cutting
- Block Assignments

**Planning**
- Ridership
- Stop Level Activity

**Asset Management**
- Vehicle Maintenance
- Stop Improvements
Multiple Users

Regulatory
- USDOT / FTA
- State DOT / MPO

Organizational
- Planning
- Operations

Public Consumers
- Transit Riders
- Stakeholders
Organizing Your Data

Departments
User Groups
Regulatory Bodies

Transit Informatics
What does it look like now

- **Current Standards**
  - Transit Communications Interface Profiles (TCIP) – APTA Standard
  - TransXchange – U.K standard exchanging bus schedules and related data
  - Google Transit Feed Specification – for distribution and use of bus schedule information

- **Few Implementations**
  - TCIP pilot program
  - GTFS only schedule data
What does it look like now?

- Smokestacks
  - Data models are for specific actions
    - Scheduling,
    - performance measures,
    - planning,
    - run cutting,
    - capital improvements and
    - maintenance
  - Little or no interoperability
### Problem with Smokestacks

<table>
<thead>
<tr>
<th>Inefficiency</th>
<th>Poor Data</th>
<th>Narrow Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplication of Effort</td>
<td>Multiple Incomplete Data</td>
<td>Single data user</td>
</tr>
<tr>
<td>Manual effort</td>
<td>Loss of Data Utility</td>
<td>No Interoperability</td>
</tr>
<tr>
<td>Isolated data</td>
<td>Out of date</td>
<td>Human Assets</td>
</tr>
</tbody>
</table>
Illustration of smokestacks

- **Bus Stop Inventory**
  - Scheduling
  - Customer Service
  - Planning
  - Capital improvements
  - Asset Management
Lack of Access

- Between Organizational User Groups
  - Little access
  - Stop Ridership
    - Planners
    - Capital improvement decisions
  - Stop Location
    - Customer Service
Consequences

- No integration
- Duplication of effort and data redundancy
  - Multiple Stop Inventories
- Incomplete data
  - Unknown attribute information
    - How many shelters, benches
    - How old stop sign and amenities
    - How many are ADA accessible
How to overcome

- Transit Informatics is a first step
  - Defining relationships and data standards
  - Identifying opportunities to remove data redundancy
  - Creating a dialog
- Embracing Web 2.0 environment and Collaboration
  - Wiki – developing a location for comment and debate
  - Open development – providing user communities to access all information
  - Recognizing the iterative nature of such endeavors
Mechanism

Decision Making Body

Standard Proposal

Revisions

Input Public Comment/Testing
Who should make this decision?
- APTA
- FTA
- Transit Agencies
Questions

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