Working Together In Communities of Practice with Metadata Standards

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Data Dissemination Challenges:
The Role for Metadata and Standards

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The views expressed are those of the author and do not indicate concurrence by the Board of Governors of the Federal Reserve System.

Challenge #1: Quantity

- **Data are everywhere – and no longer just results of surveys or carefully calculated statistics**

- **The audience is broader than in the past, and data uses cannot always be foreseen**

- **Demand has increased for mixing data sources – for example, linked data**

Challenge #2: Quality

- **More is only better if you know what the data are – and how to use them**

- **New data types and new users make things more complicated**

- **Search and discovery are challenging – and going beyond Google**

Metadata and standards can help!

- **Different types of metadata can be used to address different things:**
  - **Discovery – help people find the data**
  - **Understanding – help them know what they found**
- **Standards can provide guidance**
  - **Improve comparability**
  - **Provide a fixed point of reference**
  - **Can be domain specific**

Challenge #3: Pictures

- *Computerworld*: "[A graphic] tells a more powerful story than raw data alone"

- It is not enough to just have a few line charts anymore

- We now need maps, timelines, dashboards, bubble charts … and interactive is cooler

- Graphics are seen as necessary for decision making

Challenge #4: Portability

- **Presentation : Pictures and pretty HTML are great – but try reading them on a cell phone**
  - – You may not be the provider of the app for that
- **Content : Repurposing of content is out of your control**
  - – Licensing and redistribution rights can be addressed

Metadata and standards can help!

- **Metadata for applications**

  – **encourage mashups and other user development**

- **Using standard data representations means other people develop for you**

- **Tightly pairing metadata with data makes it "harder to get wrong"**

Conclusions

- **There will be more of the same – LOTS more**

- **There are no easy solutions; technology cannot fix everything**

- **Dissemination of "best practices", increasing use of metadata and reliance on standards, will become even more important as the amount of data and diversity of users continue to increase**
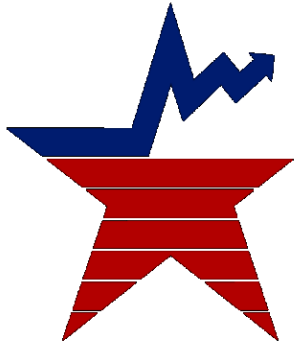
Questions?

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Standards, Conformity, and Interoperability

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Outline

- Standards
- Conformity
- Interoperability

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Standards

- ISO/IEC Guide 2 – General Vocabulary
  - ▶ For standards development
- Standard –
  - ▶ Normative document
  - ▶ Consensus
  - ▶ Recognized body
- Normative document –
  - ▶ Containing provisions
  - ▶ Activities or results

Standards

- **Provisions –**
  - ▶ Requirement – criteria to be fulfilled
    - – E.g., Must or shall
  - ▶ Recommendation – advice or guidance
    - – E.g., May or should
  - ▶ Instruction – action to be performed
    - – E.g., Algorithm
  - ▶ Statement – information
    - – E.g., Definition

Simple "Standard"

- **Simple Metadata Standard**
- **Catalog for Vocabularies**
  - ▶ A- Title
    - – Required
  - ▶ B- Subject Area
    - – Required
  - ▶ C- Maintenance Agency
    - – Optional
  - ▶ D- Maintenance Agency Contact
    - – Required, if Maintenance Agency provided

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Conformity

- Simple definition
  - Satisfy requirements
- Example
  - Title: North American Industrial Classification System (NAICS)
  - Subject Area: US industries
- This conforms
  - Satisfies all requirements

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Conformity

- Another example
  - A- Title: Standard Occupational Classification (SOC)
  - B- Subject Area: US occupations
  - C- Maintenance Agency – US Bureau of Labor Statistics
  - D- Maintenance Agency Contact – Dan Gillman
- This also conforms
  - Satisfies (additional) requirements
  - Depends on
    - Optional provision C
    - Conditional provision D

Conformity

- Conformity
  - Requirements depend on choices
  - Variation in sets of requirements
- However, there are levels of conformity
  - Instance
  - Writer
  - Reader
  - Repository

Conformity

- Instance level
  - Previous examples
- Writer level conformity - transmission
  - Requires instance conformity each time
  - Straightforward
  - Writer transmits conforming instances

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Conformity

- Reader level conformity - receiver
  - ▶ Any conforming instances
  - ▶ Must account for variety
  - ▶ Therefore, harder to implement
- Repository – persistence
  - ▶ Writer
  - ▶ Reader
  - ▶ Ability to write what is read

Interoperability

- ISO/IEC 2382-1 – General vocabulary
  - ▶ For information technology
- Definition
  - ▶ Capability to
    - – Communicate
    - – Execute programs
    - – Transfer data
  - ▶ Among functional units, where user
    - – Little
    - – No knowledge
  - ▶ Of those units

Interoperability

- Kinds of interoperability
  - ▶ Signifier (representation)
  - ▶ Semantic (meaning)
  - ▶ Data (both)
- Depends on
  - ▶ Authoritative sources
    - – Standards
    - – Technical specifications

Interoperability

- Depends on (cont'd)
  - ▶ Faithful usage of those sources
    - – Conformity
- Avoids
  - ▶ Pair-wise negotiations
- Promotes
  - ▶ Scalability
- Example – for Data.Gov
  - ▶ Sharing/Comparing descriptions of data

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