DDI’s Current Product Line: DDI Codebook, DDI Lifecycle and related products

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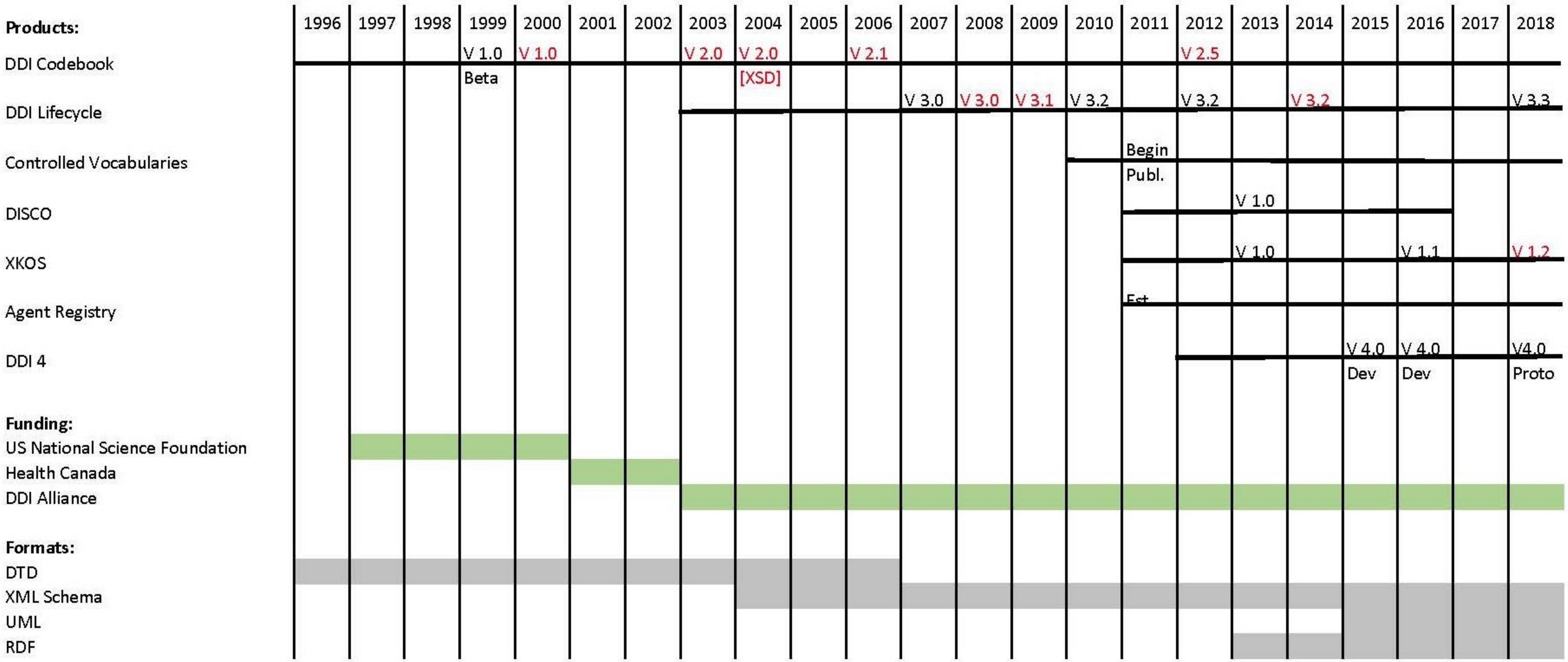
This is about DDI…

- …and how it has responded to:
  - Community changes
  - Expanding needs
  - Technical changes
  - Data changes
- DDI started in the late 1990's in response to the need for structured metadata by archives and producers in order to
  - Reuse a single source of metadata for different products
  - Provide a machine readable base of data to support search and retrieval of data
  - Encourage the creation of structured metadata by the data producer

What is DDI?

- A collection of products that supports the structured capture and use of metadata surrounding the creation, preservation, and dissemination of data in the social, behavioral, economic, and health sciences
    - The DDI Standard in various versions
    - Controlled Vocabularies
    - XKOS – an independent publication targeted to a specific community to support the management and publication of Statistical Classifications
    - DDI Agent Registry – to support the DDI Identification structure
- These products reflect the needs of the community as well as the technical environment in which they developed



Type of use

Archives/Preservation

Data Discovery Systems

Data Producers

Specialized Metadata Systems

User Community

Social Sciences

Economics

Comparative Surveys

Educational Testing

Statistical Systems

Health

DDI Codebook

- **Target:**
  - Human Reader
- **Perspective:**
  - Retrospective
  - Document
  - Descriptive
  - Discovery
- **Assumptions:**
  - Documents managed in XML
  - Codebook still the format
  - Content could be identified and used in different ways
  - XML was a version of another source
  - The data already existed

DDI Codebook coverage: 1996-2000

- Focus on unit data collected by surveys
- Core of information needed to inform the end user to support intelligent use of the related data
- Structure is focused on information that is presented in different formats for different uses (published codebook, set-up files for statistical software, programmer access)
- Background information on the development and implementation of the study is primarily found in external “Other” material

DDI Codebook development: 2000 - 2012

- Additional data types:
  - Expanded to cover statistical (tabular, aggregate, structured, dimensional) data
- Interaction with related communities:
  - Support for spatial search systems
  - Geographic information needed to integrate data into a GIS system
  - Addition of content to support additional GSBPM content
- Technical adaptation:
  - Ability to apply variable descriptions to more than data store by supporting recording of physical data location information outside of the variable
  - Support for broader use of Controlled Vocabularies
  - Content to support transition to DDI Lifecycle
  - Moved schema to GITHUB for development version control

First transformation period: 2003-2010

- Still things on the list to do:
    - Complex data files – formats other than archival formats
    - Repeated surveys
    - Questionnaire content and flow
- Added data producer needs:
    - Capture from the idea all the way through the data and metadata lifecycle
    - Content management
    - Quality control
    - Data capture and processing

DDI Lifecycle

- **Target:**
  - Human Reader, Computer Ingest
- **Perspective:**
  - Retrospective – but progressive
  - Document
  - Metadata driven statistics
- **Assumptions:**
  - Documents managed in XML
  - Reusability
  - Metadata as a product
  - Management of metadata
  - Grouping of studies
  - Focus on a slice – i.e. Questions
  - Same data stored in multiple structures

DDI Lifecycle coverage: 2003-2009

- Focus on capturing metadata at “point of origin” and building on it through the process resulting in a data set – content versioning
- To support the reuse of metadata particularly in repeated surveys
- Better support for structured conceptual data that could be reused and provide implicate comparability
- Support for the management of data files in archives supporting additional storage formats and archival information
- Clearer record descriptions and record linkages
- More background and development metadata brought into the structured content for potential reuse (data cleaning, recoding, derivation instructions, etc.)

DDI Lifecycle development: 2010 - 2018

- Additional depth in class types:
    - Expanded representations to cover scales, image based domains, direct use of geographic codes, etc.
    - Added question grids and blocks
    - Added non-question measures
- Interaction with related communities:
    - Addition of input / output parameters and binding (OWL-s) to track datum flow
    - Support for full ISO-11179 structure
    - Statistical Classification – XKOS content, GSIM structure
- Technical adaptation:
    - Consistency within types of groupings (Schemes, groups, etc.)
    - Unique element names within the set of schemes
    - Consistency for reference naming (adding abstract classes as needed)
    - Generation of documentation from schema and structured documents
    - Moved schemas to GITHUB for development version control

DDI 3.3 schema available at:
https://bitbucket.org/DDITC/ddi-l_3

Formal review period will begin in the next 2 weeks

Controlled Vocabularies coverage: 2010 -

- Controlled Vocabularies (CVs)are created by the DDI to support commonly used vocabularies among DDI users and CESSDA members
- CVs are published at
  - http://www.ddialliance.org/controlled-vocabularies
- Currently published in:
  - Customized Genericode format (XML)
  - XLS spreadsheet
  - HTML version for viewing
- CVs may be used by any version of DDI or other standard

Controlled Vocabularies development: 2016-

- Development of close ties with CESSDA development in this area
- Movement to a new development and management platform created within the CESSDA work plan
- Expansion of bindings to include:
    - SKOS
    - DDI Lifecycle CodeList
    - DDI 4 Custom Vocabulary

XKOS coverage: 2011-2016

- RDF Vocabulary
- XKOS standardizes the representation of statistical classifications as linked metadata
- Builds on the SKOS W3C Recommendation and implements the Neuchâtel and GSIM statistical models

XKOS development: 2017-2018

- Resolution of comments from the 2016 public draft review
- Refinements and documentation
- Publication of XKOS v1.2 in June 2018

Second Transformation

- Expanded User Community – new needs:
  - Metadata driven statistical production
  - Data integration
  - Mixed capture research
  - Automate DDI production process
- Technology was changing…even faster
  - RDF, Linked data
  - Metadata managed in data bases – still need to transfer
  - New data storage and access structures
  - Unstructured/undocumented data sources

DDI 4

- **Target:**
  - Human, Computer Understanding
- **Perspective:**
  - Prospective, Event, Retrospective
  - Descriptive + Computational
  - Data Linking
- **Assumptions:**
  - Metadata managed in databases
  - Multiple bindings
  - Transport and preservation medium
  - Metadata captured at origin
  - Access from the study/research area down and the datum up

DDI 4 development: 2012-2018

- Production process
    - UML to documentation content and multiple bindings
- Patterns
    - Structural consistency for collections
    - Expanded use of a process pattern
- Data description
    - Expanded to cover specific case identification and individual datum
- Portions of DDI 3.2 content
- Commonly used DDI 2.5 content

Development Summary

- Target
  - Expanded include Human to Computer understanding of the metadata
- Perspective
  - Move from retrospective to full range of viewpoints
  - From description to data linking
- Assumptions
  - Increasing demands from access from different directions and perspectives
  - Metadata as a requirement to meet the needs of producers and users of data
- Development changes
  - Automatic generation of documentation and related bindings from UML
  - Use of the binding that works for the job at hand (roundtripping of metadata)
  - Use the level of metadata that meets your needs
  - DDI production needs to be iterative in updating its content and automated in its production process
  - Version control in development (scheduled for 2018)

Infrastructure profiles: DDI Codebook

- Identification
  - Only requires instance identifier
  - Content is nested limiting the need for internal references
  - Uses standard ID and IDRef (supported by standard XML validation tools)
  - Supports capture of standard DDI URN
- XML only binding
- Current tools for creation of an instance, catalog of instances, and transformation to PDF document or web site
- Assumes XML instance is a publication in itself and will be managed as such

Infrastructure profiles: DDI Lifecycle

- Identification
  - Required by most classes
  - Registry of DDI Agent identification
  - Uses DDI structure for identification that resolves to a URN (requires secondary validation tool)
  - Allows and encourages reuse of metadata between instances
- XML only binding
- Current tools for creation of an instance, repository of DDI objects, transformation to PDF document or web site, and creation of questionnaires
- Assumes management of metadata content in XML – although this is loosening up in v3.3

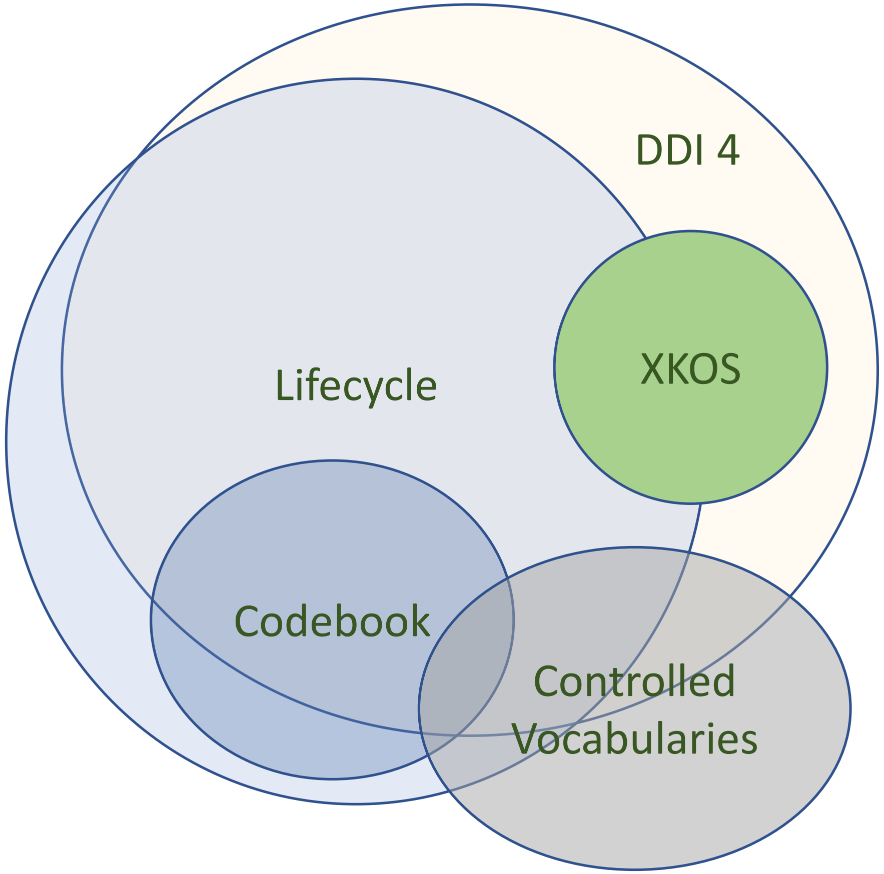
Infrastructure profiles: DDI 4

- Identification
  - Same as Lifestyle (across bindings)
- UML based
  - Currently testing canonical XMI (expression of UML) for portability across UML tools
- XML needs secondary validation for:
  - Identification
  - Cardinality enforcement
  - Support of internal continuity when needed
- RDF
  - Has not had external review
  - Cardinality and type enforcement by validation with ShEx
- Assumes management of metadata is some form of "DDI aware" data management system

What do I use?

- What is your technical infrastructure?
  - Codebook has the lowest infrastructure requirements and is very suitable for individual researchers or anyone with infrastructure constraints
- What does your data look like?
  - Codebook can describe
    - Unit and dimensional data
    - Basic capture information (questions, derivation codes, secondary use of source data)
    - Archival data file structures – limited relational information
    - Focus is on the individual study/data set
  - Lifecycle can describe
    - Questionnaire structure
    - Multi-wave studies and their internal relationships
    - Cross study relationships
    - Common conceptual material
  - XKOS describes formal, managed Statistical Classifications
  - DDI 4 is in the prototype stage and not ready for implementation

Current Content Coverage



Continuing development themes

- Ensure content is not lost as you move from earlier to later versions of the central standard
- Support for user communities in terms of both content and infrastructure needs and restrictions
- Clear lines of transition between versions
  - A repository should be able to take an earlier version and populate a newer version programmatically
  - A repository should be able to identify the content it supports (in the same or earlier version structure) and populate a different version to the extent of its capabilities
  - Flexibility of use over time – future use of metadata may require transformation into a different version

DDI Alliance http://ddialliance.org

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