Consensus Building and Prioritizing <Metadata> Development for Project DRIADE: A Case Study

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Overview

- Introduce DRIADE
  - Motivation
- Consensus building
- Functional requirements
- Metadata framework
- Conclusions and next steps
- Implications for digital curation education

DRIADE: Digital Repository of Information and Data for Evolution

http://www.caffedriade.com/

- Internet impact / “small science”
  - Knowledge Network for Biocomplexity (KNB)
  - Marine Metadata Initiative (MMI)
- Evolutionary biology
  - Ecology, genomics, paleontology, population genetics, physiology, systematics, …genomics
  - Data deposition (Genbank, TreeBase)
  - Supplementary data
    Molecular Biology and Evolution

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DRIADE's goals

- One-stop shopping for scientific data objects supporting published research
- Support data acquisition, preservation, resource discovery, data sharing, and data reuse of heterogeneous digital datasets
- Balance a need for low barriers, with higher-level … data synthesis

DRIADE Team

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- Todd Vision, Director of Informatics and Assistant Professor, Biology, UNC-CH
- Hilmar Lapp, Assistant Director of Informatics

UNC-CH/SILS/MRC

- Jane Greenberg, Associate Professor
- Jed Dube, MRC Doctoral Fellow
- Sarah Carrier, MRC Research Assistant
- Amy Bouck, UNC/Duke Biology Postdoc

Consensus building: Stakeholders' workshop

1. Unanimous support for DRIADE
   - Advance science, cultural change, policing
2. Challenges
   - Scope, representation, quality control, security, cultural change, sustainability
3. Priorities and next steps
   - Preservation – access – synthesis
     - Maslow's hierarchy of life needs!
   - Cultural change: editorials, publicizing at conferences, requirements

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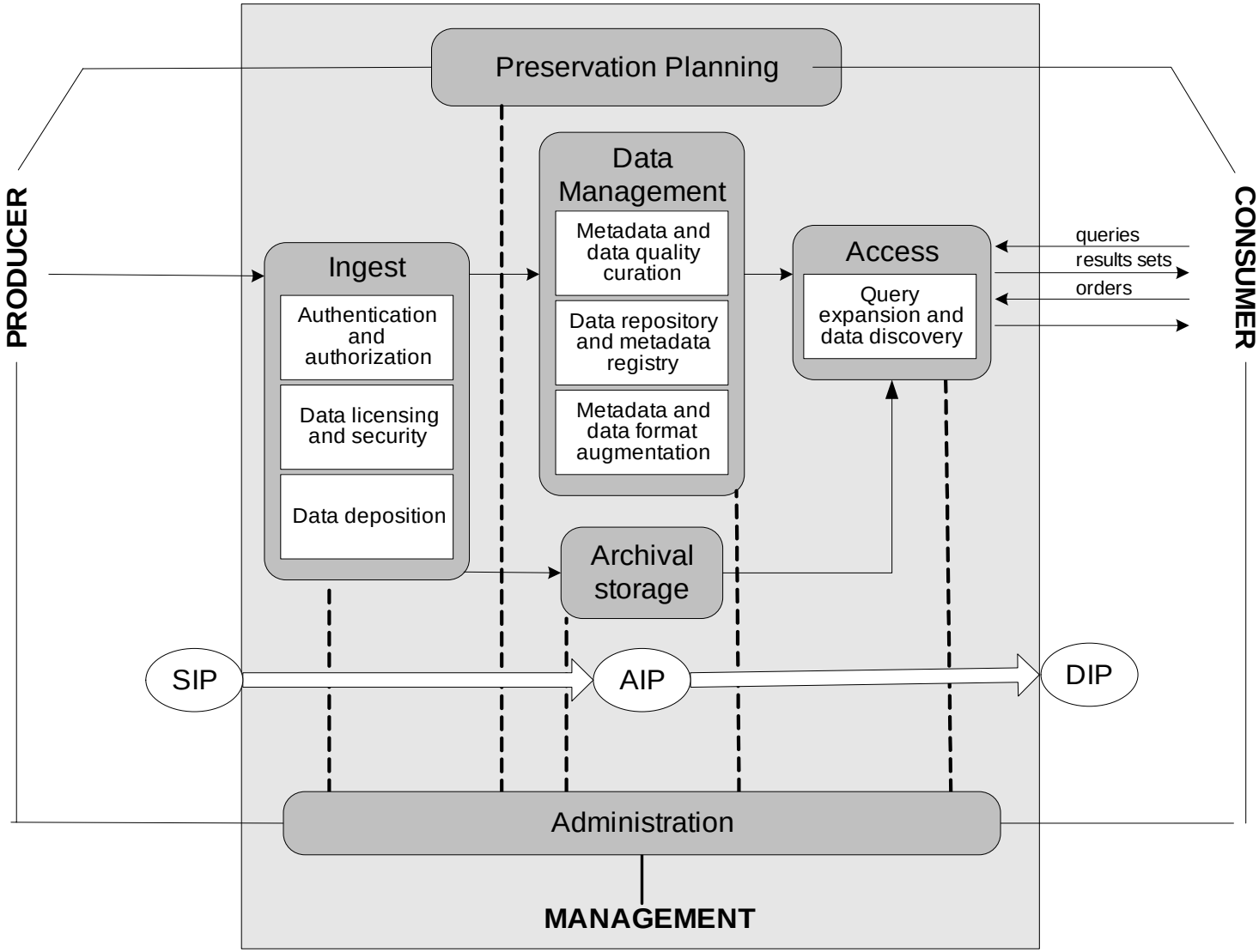
Functional requirements

	GBIF	KNB/ SEEK	NSDL	ICPSR	MMI
Heterogeneous digital datasets	▪	▪	▪	▪	▪
Long-term data stewardship	▪		▪		
Tools and incentives to researchers	▪	▪	▪	▪	▪
Minimize technical expertise and time required	▪	▪		▪	▪
Intellectual property rights	▪	▪		▪	
Published Datasets					

Functional requirements

- Support:
  - Computer-aided metadata generation / augmentation
  - Specialized modules linking data submission and manuscript review
  - Data and metadata quality control by integrating human and automatic techniques
  - Data security
  - Basic metadata repository functions, such as resource discovery, sharing, and interoperability

DRIADE's functional model based on OAIS



DRIADE metadata framework

- Level 1 – initial repository implementation
  - Preservation, access, and basic usage of data, (limited use of CVs)
- Level 2 – full repository implementation
  - Level 1 plus expanded usage, interoperability, preservation, administration, etc., greater use of CV and authority control
- Level 3 – “next generation” implementation
  - Considering Web 2.0 functionalities

Application profiles

- "…consist of data elements drawn from one or more namespace schemas combined together by implementors and optimised for a particular local application." (Heery& Patel, 2000)
  - Data Elements: Title, Name, Coverage, Identifier, etc.
  - Namespace schemas:
    - Dublin Core
    - Data Documentation Initiative (DDI)
    - Ecological Metadata Language (EML)
    - PREMIS
    - Darwin Core

Why create an Application Profile?

- Single existing schemes are often not sufficient
  - Dublin Core scheme doesn't meet all of DRIADE needs
  - Do not need all elements in a single scheme (e.g. in DDI or EML)
- Don't want to re-invent the wheel
- Interoperability

Why DRIADE needs an application profile?

- Evolutionary biology data requires a range of metadata to effectively support:
  - Unstructured datasets, non-standard formats
  - Varied data relationships, methods, software
  - Varied data object relationships (i.e. part of larger studies, linkages to publications, etc.)
  - Immediate and future dataset preservation

Level 1+ Application Profile

Module 1: Bibliographic Citation

- dc:title / Title*
- dc:creator / Author*
- dc:subject / Subject*
- dc:publisher / Publisher*
- dcterms:issued / Year*
- dcterms:bibliographicCitation / Citation information*
- dc:identifier / Digital Object Identifier*

Level 1+ Application Profile

Module 2: Data Object

- dc:creator / Name
- dc:title / Data set title
- dc:identifier / Data set identifier♦
- fixity (PREMIS) / (*hidden*)♦
- dc:relation / Digital Object Identifier of published article
- DDI: <depositr> /Depositor or submitter name*
- DDI: <contact> / Contact information for <depositr>*
- dc:rights / Rights statement♦
- dc:description / Description of the data set *
- dc:subject / Keywords describing the data set *
- dc:date / Date modified ♦
- dc:date / (*hidden*) ♦
- dc:format / File format ♦
- dc:format / File size ♦
- dc:software / Software
- dc:coverage / Locality
- dc:coverage /Date range

Level 3, *brainstorm…*

- Personalization, query results, workflow "macros", user interface
- Virtual societies utilizing "social tagging"
- Integration and extension of existing ontologies
  - Implementation of emerging standards
    - Minimal Information About a Phylogenetic Analysis (MIAPA)
- Harvesting metadata (pull) / Exposing metadata (push)
- Visualizations: topic clustering data relationship maps

Conclusions and next steps

- Conclusions
  - Team work required
    - stakeholders (scientists and journal representatives), metadata experts, and sustainability partner
  - Late to the game, benefit from what's been accomplished (e.g., application profile, models)
  - Need to understand DRIADE's unique goals
- Next steps:
  - Survey and use-case/life-cycle studies
  - Metadata application profile experiment

Implications for digital curation education

- Students participation, service learning
- Curriculum needs to address the whole picture –
  - Digital resource life-cycle
  - Metadata life cycle
  - IA components
  - Human factors
- Language barriers and communication skills
  - Metadata facets… woo woo???
- Conferences like DigCCur

References

- Application profiles: mixing and matching metadata schemas http://www.ariadne.ac.uk/issue25/app-profiles/
- Application Profiles, or how to Mix and Match Metadata Schemas http://www.cultivate-int.org/issue3/schemas/
- Dublin Core Element Set: http://dublincore.org/documents/dces/
- Data Documentation Initiative (DDI) http://www.icpsr.umich.edu/DDI/
- Ecological Metadata Language (EML) http://knb.ecoinformatics.org/software/eml/
- PREMIS http://www.oclc.org/research/projects/pmwg/
- Darwin Core Wiki: http://wiki.tdwg.org/twiki/bin/view/DarwinCore/WebHome