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# What Is Hydra?

- A robust repository fronted by feature-rich, tailored applications and workflows (“heads”)
  - ⇒ *One body, many heads*
- Collaboratively built “solution bundles” that can be adapted and modified to suit local needs.
- A community of developers and adopters extending and enhancing the core
  - ⇒ *If you want to go fast, go alone. If you want to go far, go together.*

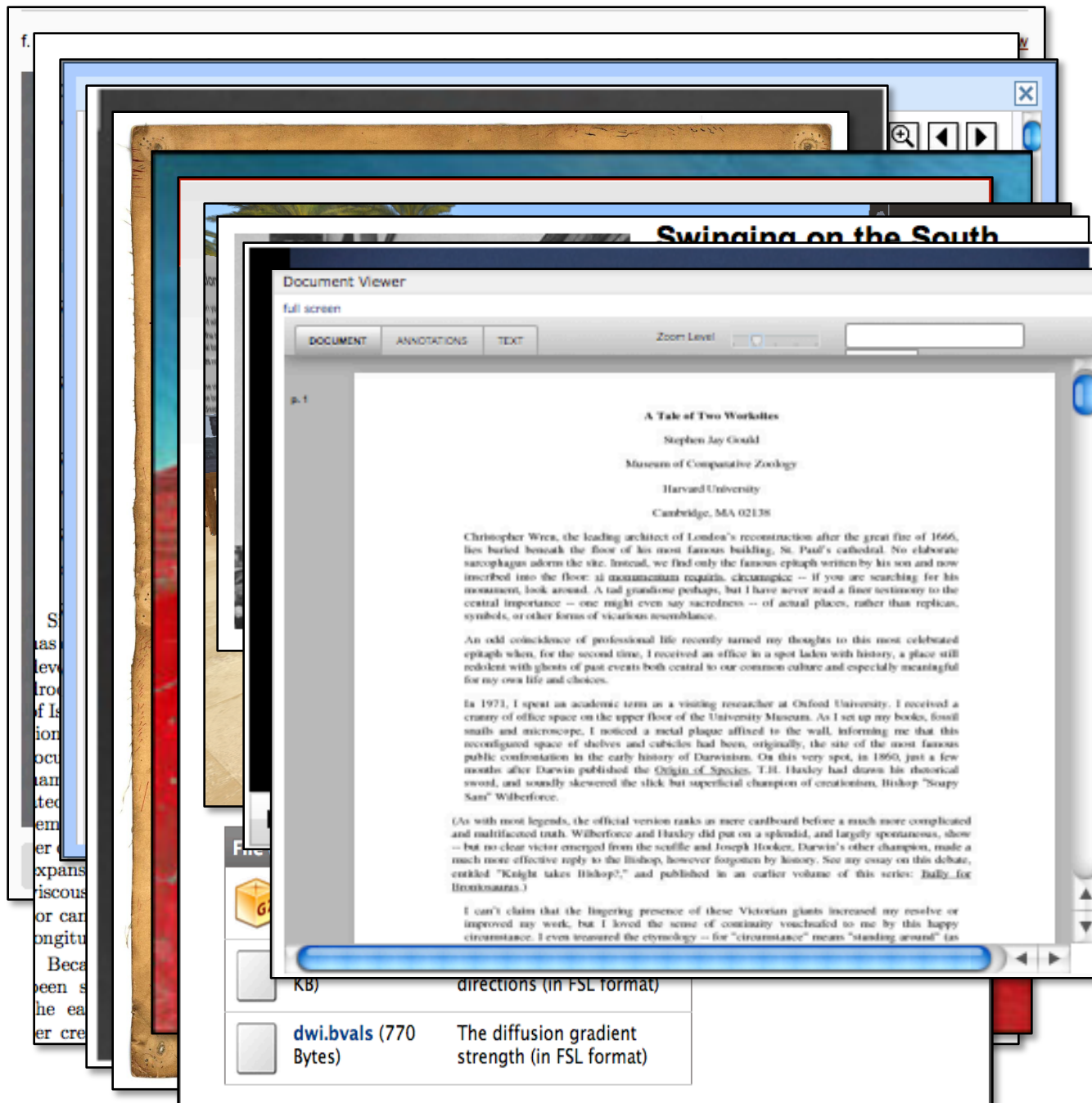


# **Fundamental Assumption #1**

**No single system can provide the full range of repository-based solutions for a given institution's needs,**

**...yet sustainable solutions require a common repository infrastructure.**





Books  
Articles  
Theses  
Images  
Maps  
Data (Raster)  
Data (Comp.)  
Data (Observ.)  
Audio  
Video  
Documents

# Point Solution Approach ...Welcome to Siloville

ETDs  
(Theses)

Books,  
Articles

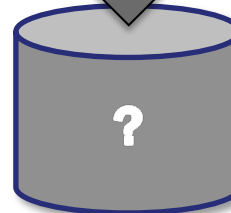
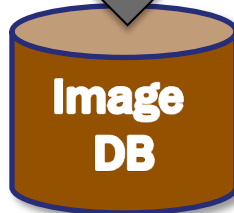
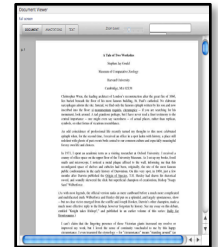
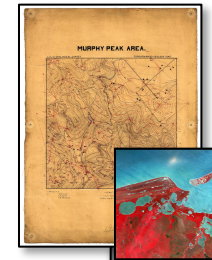
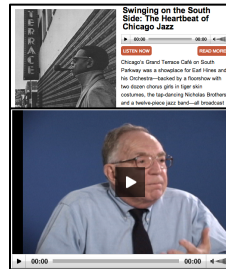
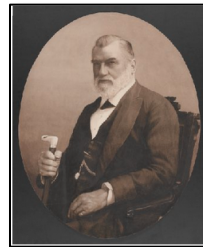
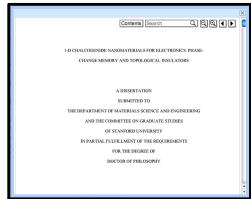
Images

Audio-  
Visual

Research  
Data

Maps  
& GIS

Docu-  
ments



Management

Access

Preservation(?)

Effective?

Sustainable?



# Repository-Powered Approach

ETDs  
(Theses)

Books,  
Articles

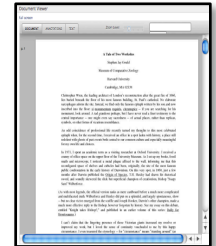
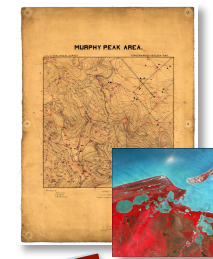
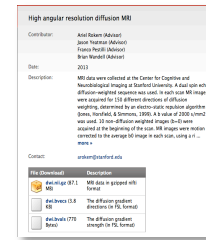
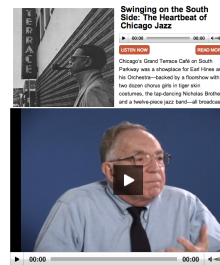
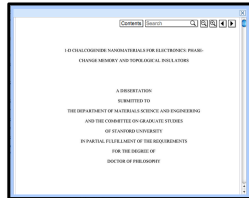
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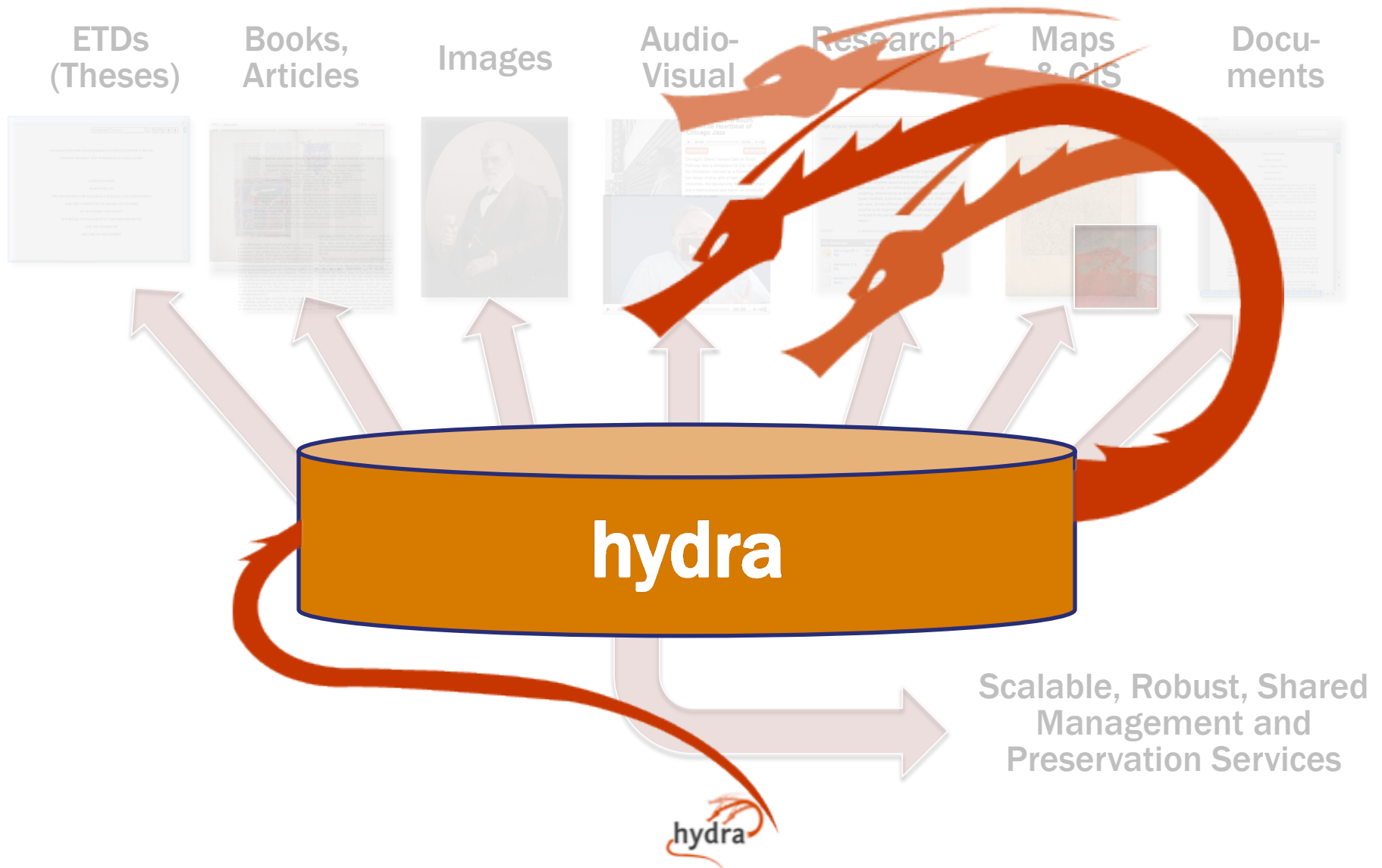


**Digital Repository**

**Scalable, Robust, Shared  
Management and  
Preservation Services**



# One Body, Many Heads...



# Hydra Technical Framework



# CRUD in Repositories

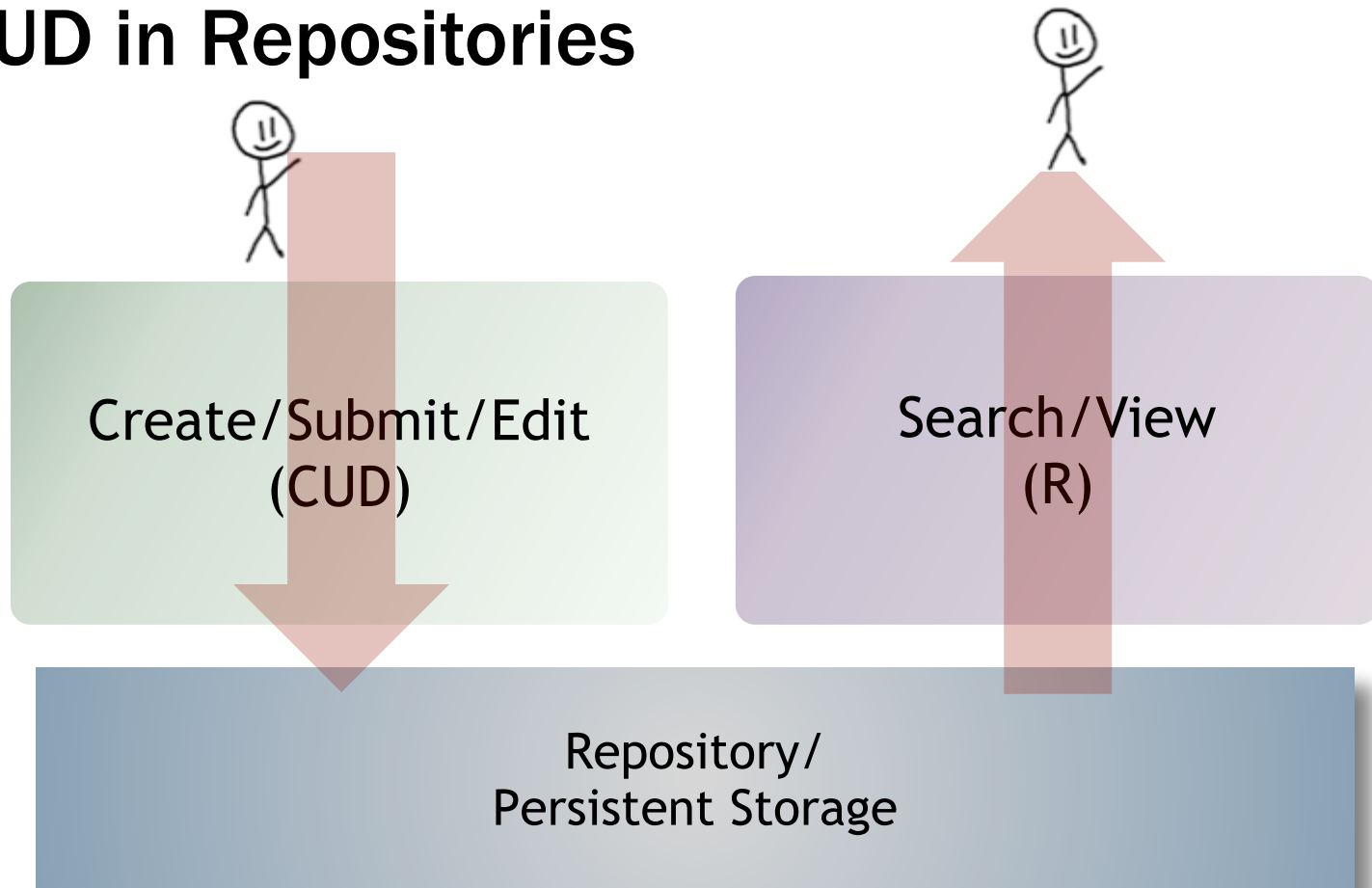
Create/Submit/Edit  
(CUD)

Search/View  
(R)

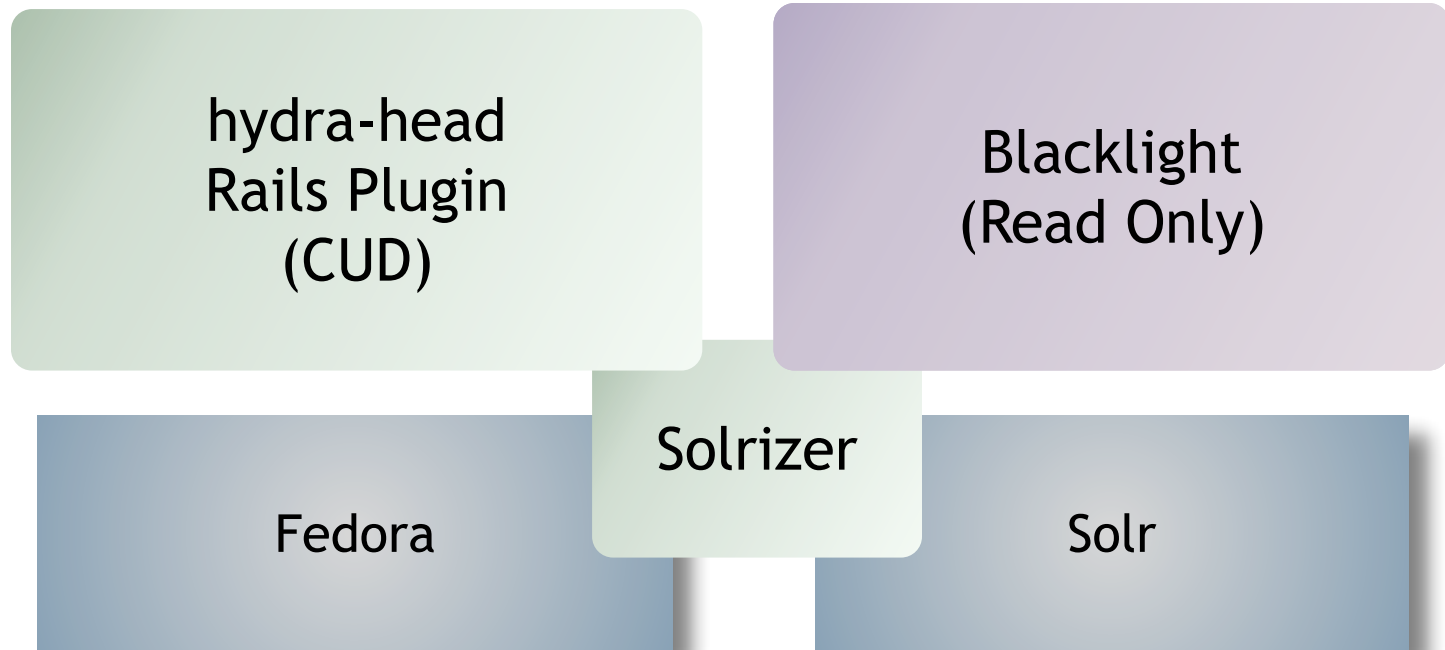
Repository/  
Persistent Storage



# CRUD in Repositories



# Major Hydra Components



# A Note on Fedora

- **Flexible, Extensible, *Durable* Object Repository Architecture**
  - Flexible: model and store any content types
  - Extensible: easy to augment with apps and services
  - Durable: foundation of preservation repository
- **Proven, sustained and successful digital repository**
  - 100's of adopters; 13 years of development, 4 releases
  - Vibrant community & funding under DuraSpace
- **Fedora 4.0 released in Dec '14; co-evolving with Hydra**



# A Note on Ruby on Rails

- ***Rapid*** application development for web applications: “Convention over configuration”
  - 10x productivity
- **Supportable:** MVC (Model-View-Controller) and Rails framework make code well-structured, predictable
- **Testable:** Rspec and Cucumber give powerful, automatable, testing tools
- **Learnable:** Stanford went from 1 to 8 Ruby savvy developers in one year (no new hires)
  - 1 week learning curve to basic proficiency



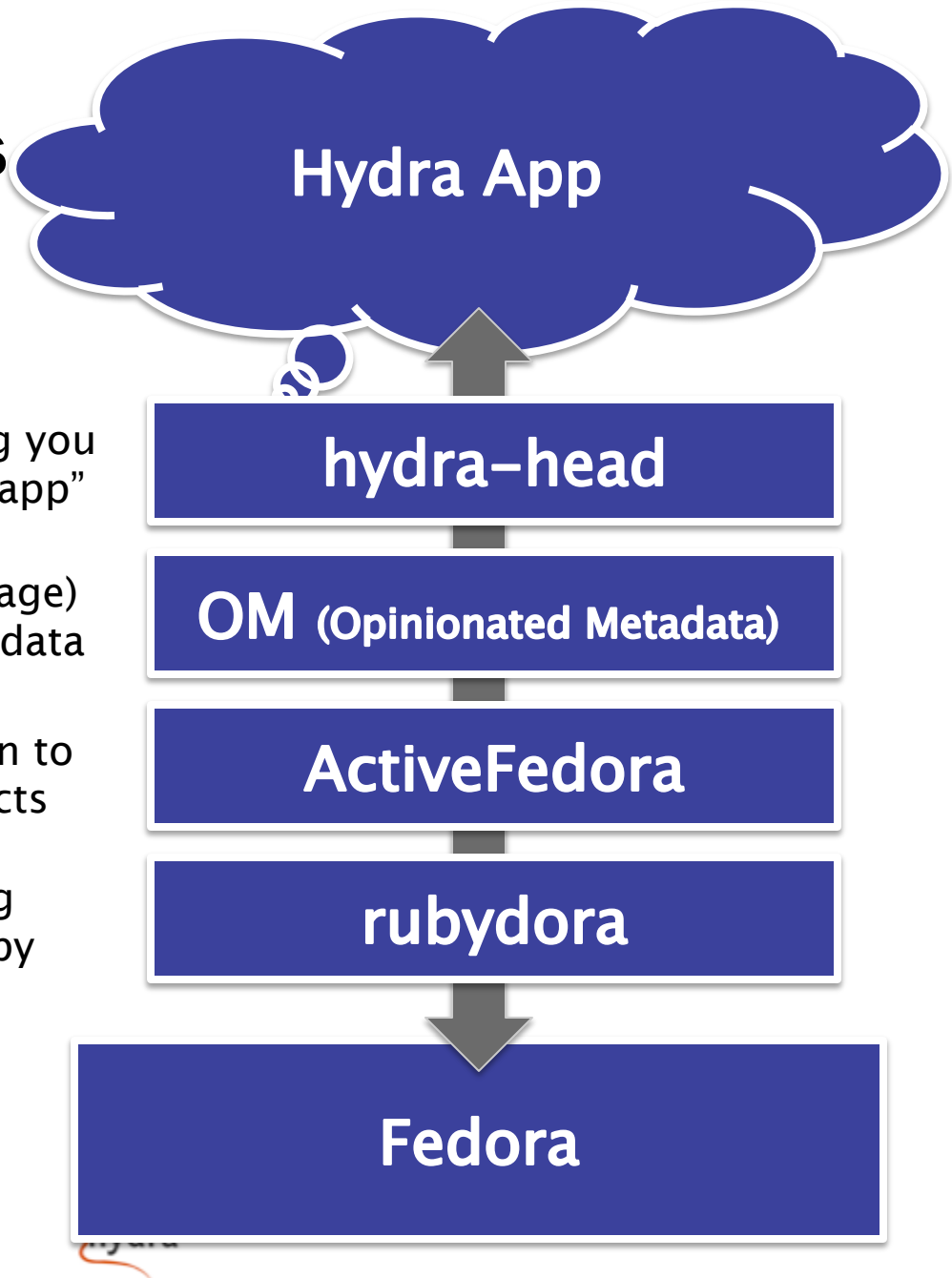
# Hydra's Core Gems

Rails engine with “everything you need to build a user-facing app”

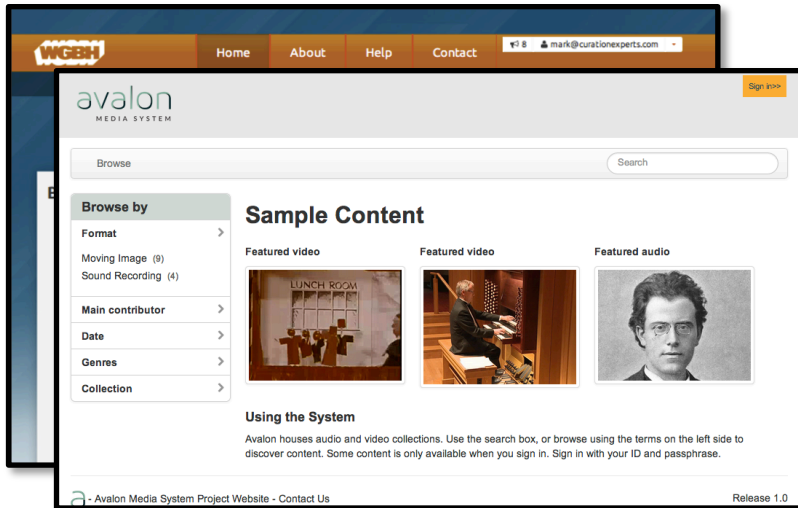
DSL (domain specific language) for easy mgmt of XML metadata

Applies ActiveModel pattern to working with Fedora objects

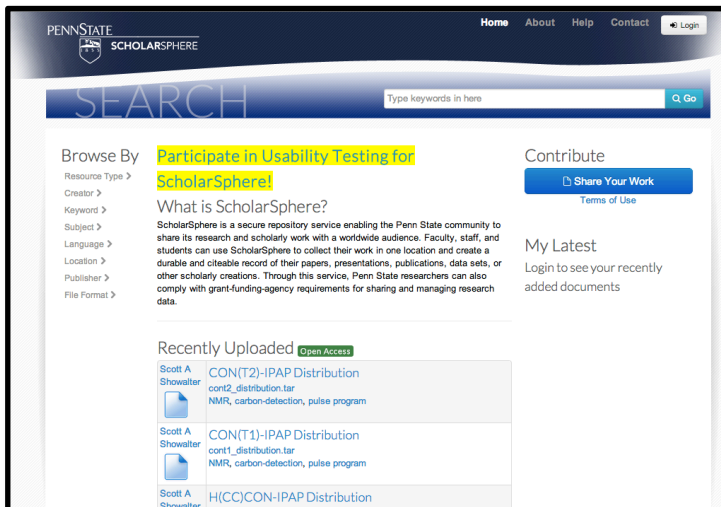
Client API for consuming Fedora's REST API via Ruby



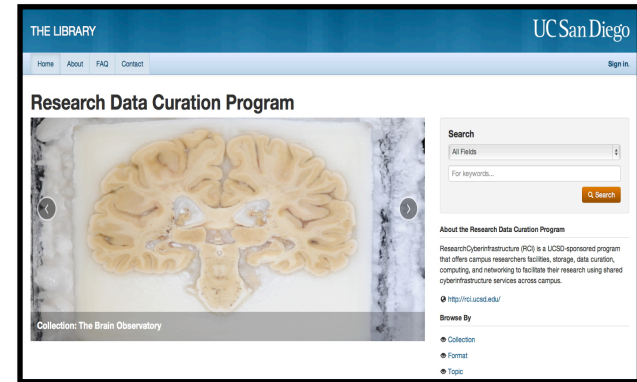
# Hydra Heads of Note



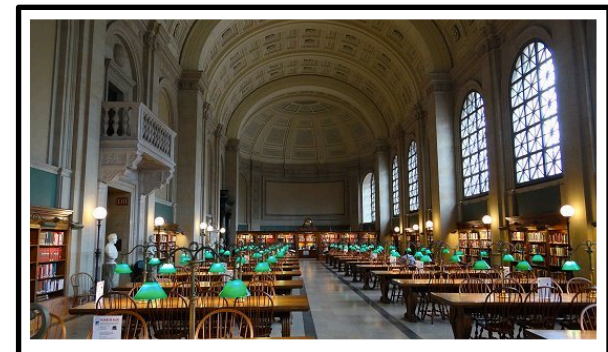
## Avalon & HydraDAM for Media



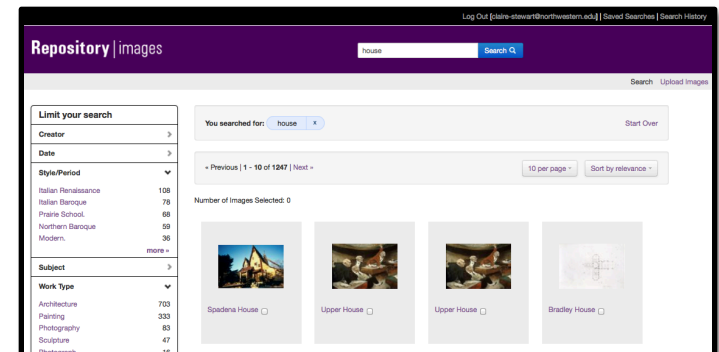
## Sufia



## UCSD DAMS

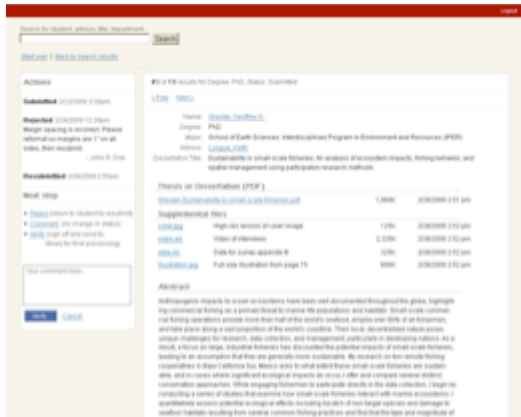


## BPL Digital Commonwealth



## Northwestern Digital Image Lib.

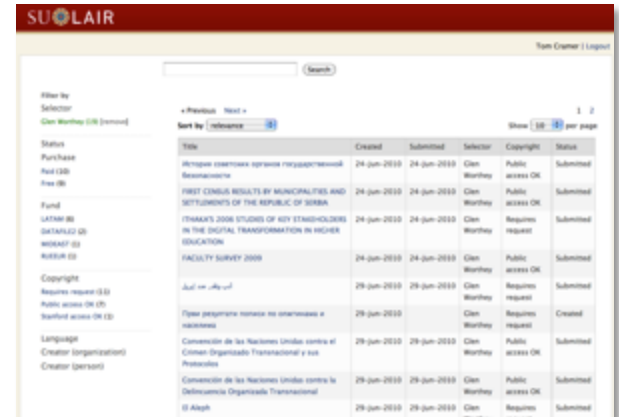
# Hydra-based Applications at Stanford



ETD's – Electronic Theses & Dissertations



SALT – Self-Archiving Legacy Toolkit



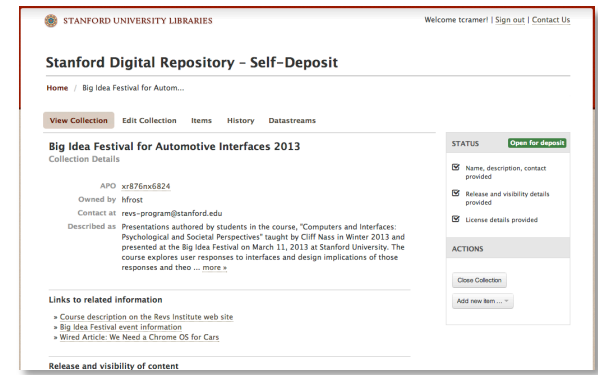
EEMs – Everyday Electronic Materials



Argo – Repository Reporting and Management

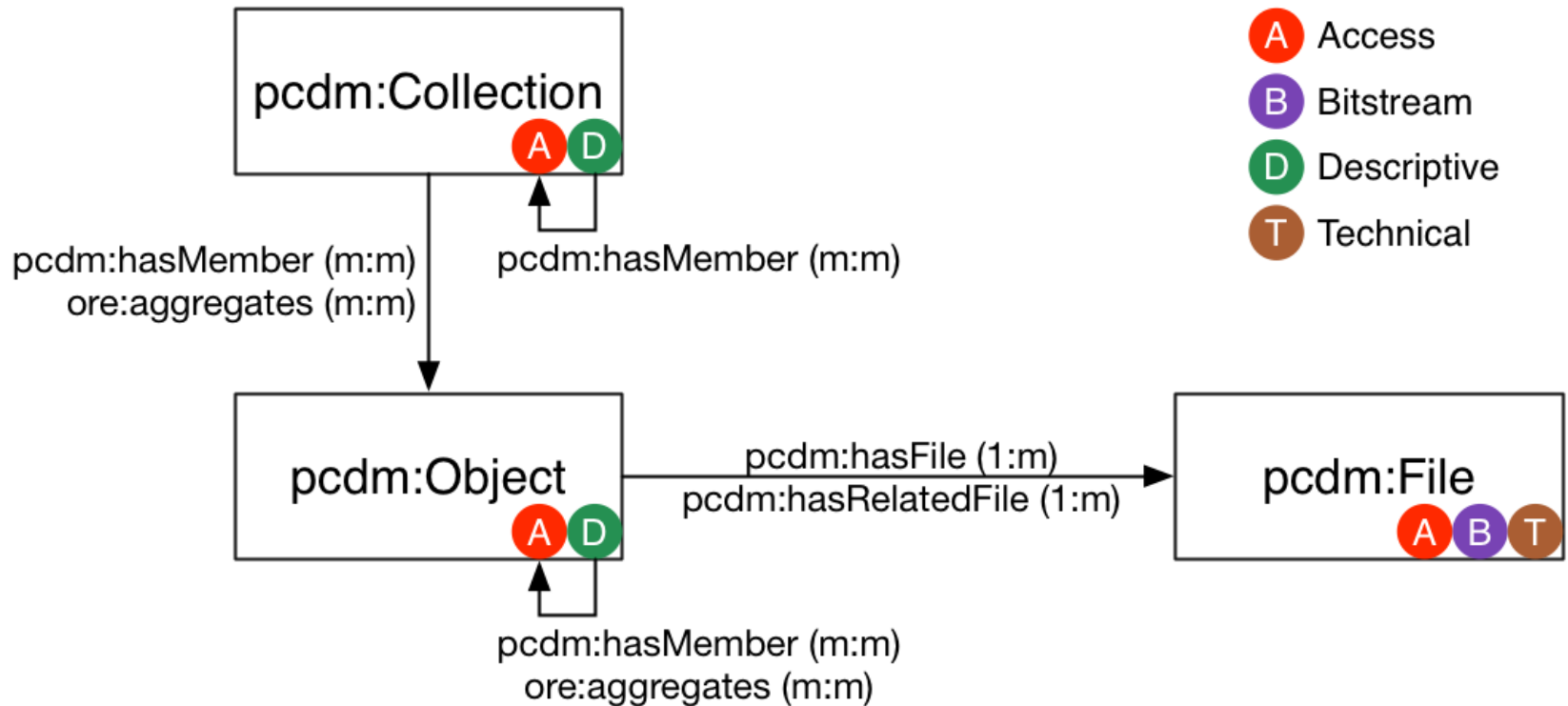


Hypatia – Archives & Special Collections

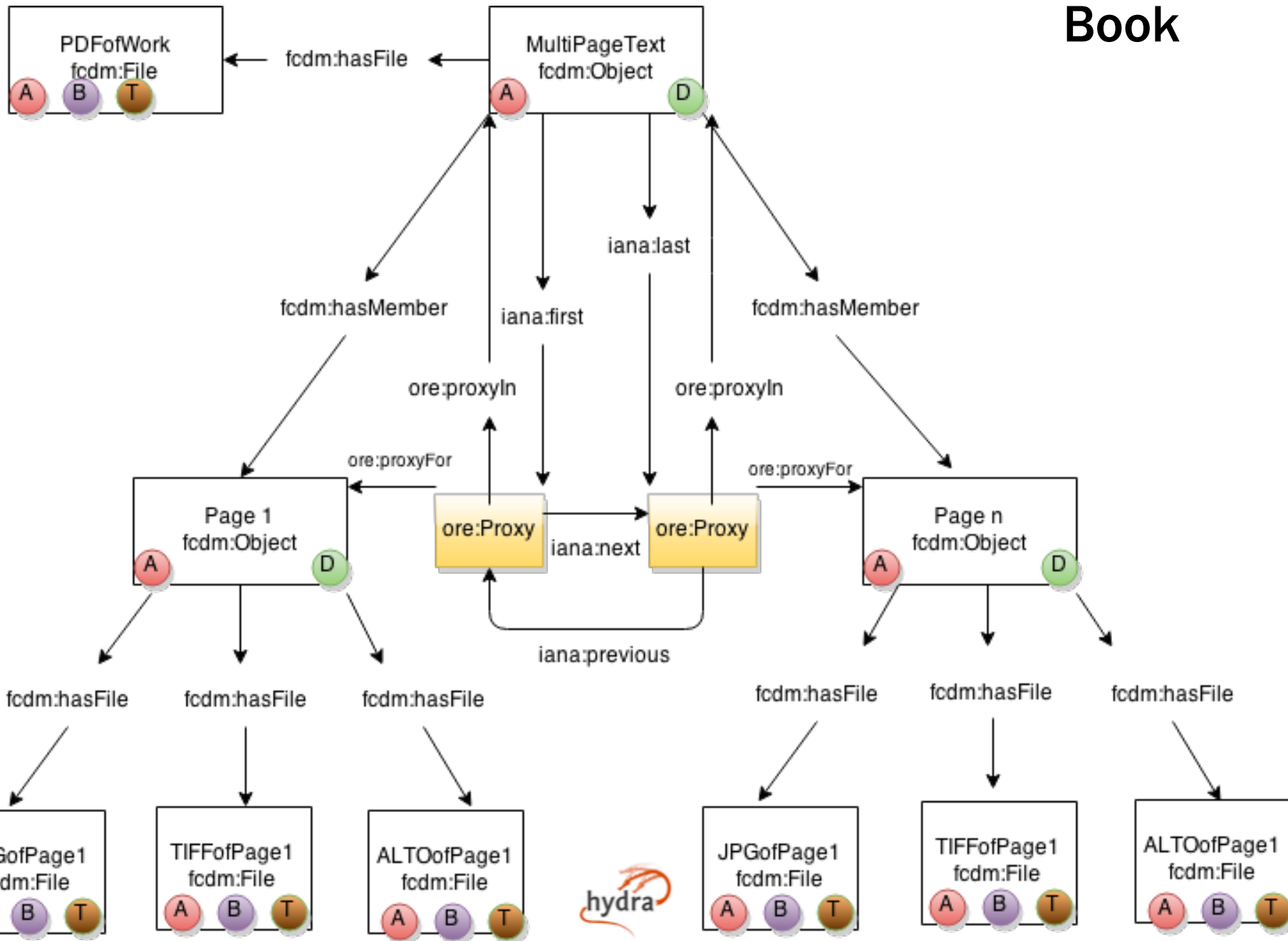


SDR – Web UI (aka Hydrus)

# Portland Common Data Model



# Book



# Why PCDM?

- 1.) Best practices in data modeling
- 2.) Code interoperability
- 3.) Data interoperability

# Getting Started

<https://wiki.duraspace.org/display/hydra/Developers>

## On-line Resources and Tutorials

### For New and Potential Adopters:

- new adopters and potential adopters may find the pages here useful: <http://projecthydra.org/>
- See [Hydra Heads \(Known Implementations\)](#) for more information about each of the Hydra Heads.
- A Hydra Head interactive tutorial has been developed - see under the 'For developers' section below.

### For Architecture Level:

- See the Duraspace projecthydra wikis for information at the architecture level:  
<http://wiki.duraspace.org/display/hydra/>

### For Developers:

- Code is hosted on Github: <https://github.com/projecthydra>
- Github's wikis for projecthydra git repositories are targeted to developers: <https://github.com/projecthydra/hydra-head/wiki>

# Hydra Community Framework



## **Fundamental Assumption #2**

**No single institution can resource the development of a full range of solutions on its own,**

**...yet each needs the flexibility to tailor solutions to local demands and workflows.**



# Hydra Philosophy – Community

- An open architecture, with many contributors to a common core
- Collaboratively built “solution bundles” that can be adapted and modified to suit local needs
- A community of developers and adopters extending and enhancing the core
- “If you want to go fast, go alone. If you want to go far, go together.”

*One body, many heads*



# Community

- **Conceived & executed as a distributed, collaborative, open source effort from the start**
- **Initially a joint development project between Stanford, Univ of Virginia, and Univ of Hull**
- **Hydra Partners are the backbone of the project**
  - Coalition of the willing
  - No fees or dues
  - Apache-style consensus and governance
- **Steering Group provides administration, continuity, and serves as backstop when needed**
  - But no central planning, no Project Director, no “one” architect



# Hydra Partners

- Stanford University
- DuraSpace
- Columbia University
- London School of Economics
- Data Curation Experts
- Duke University
- University of Cincinnati
- University of Oregon (Oregon Digital)
- Tufts University
- Digital Public Library of America
- University of Hull
- University of Notre Dame
- Penn State University
- Rock and Roll Hall of Fame
- WGBH
- Yale University
- Princeton University Library
- Oregon State University (Oregon Digital)
- Duoc UC
- University of Virginia
- Northwestern University
- Indiana University
- The Royal Library of Denmark
- Boston Public Library
- Virginia Tech
- Cornell University
- Case Western Reserve University
- University of Alberta

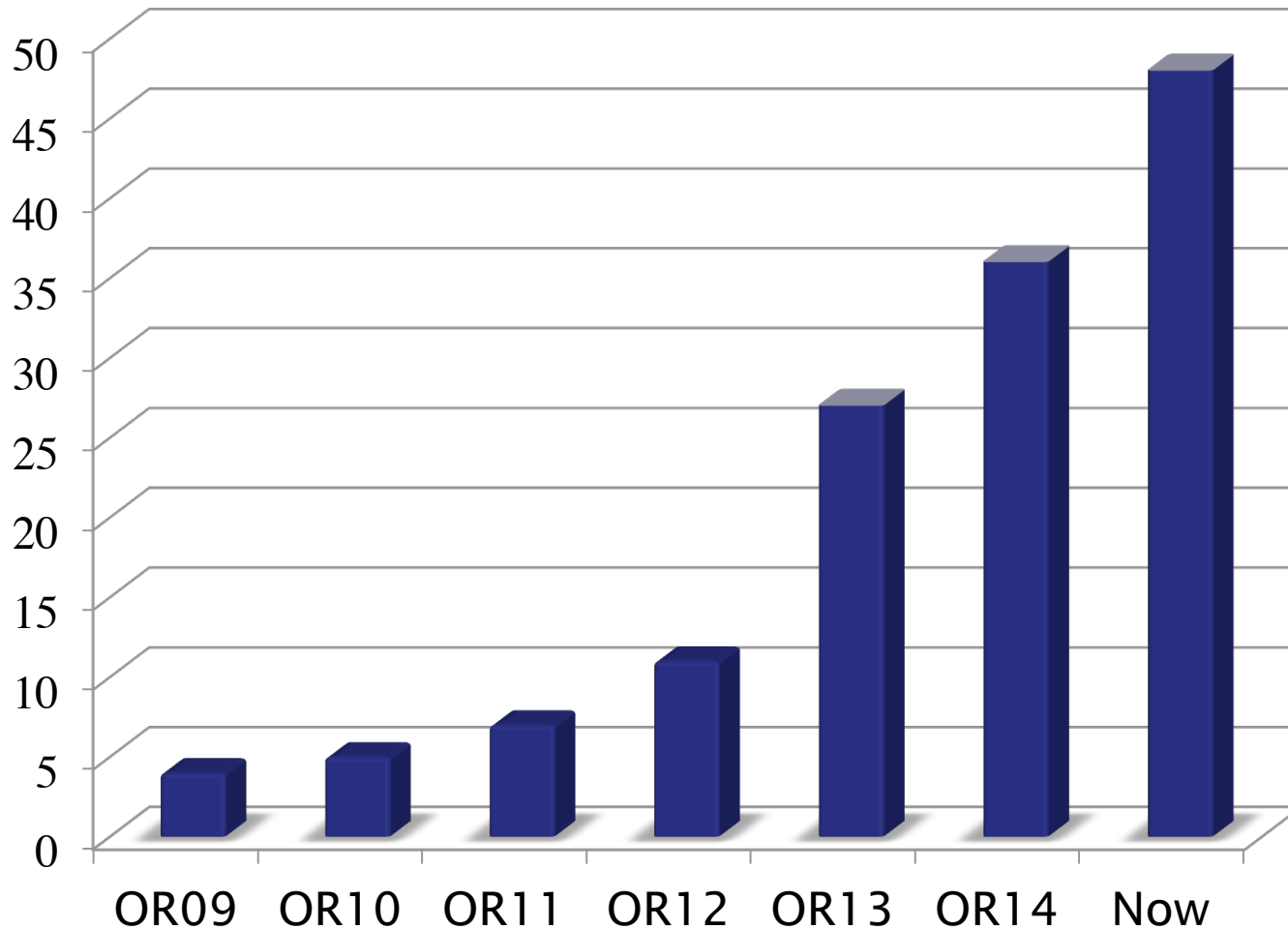


# Code Licensing

- All Hydra code is available under Apache License, Version 2.0
- All code commitments are being managed through Contributor License Agreements
  - Individual – so each developer is clear about what they are contributing
  - Corporate – so each institution is clear about what it is contributing
- Code contributors maintain ownership of their IP
  - ...and grant a non-exclusive license to the project and its users



# Hydra Partners *and Known Users*



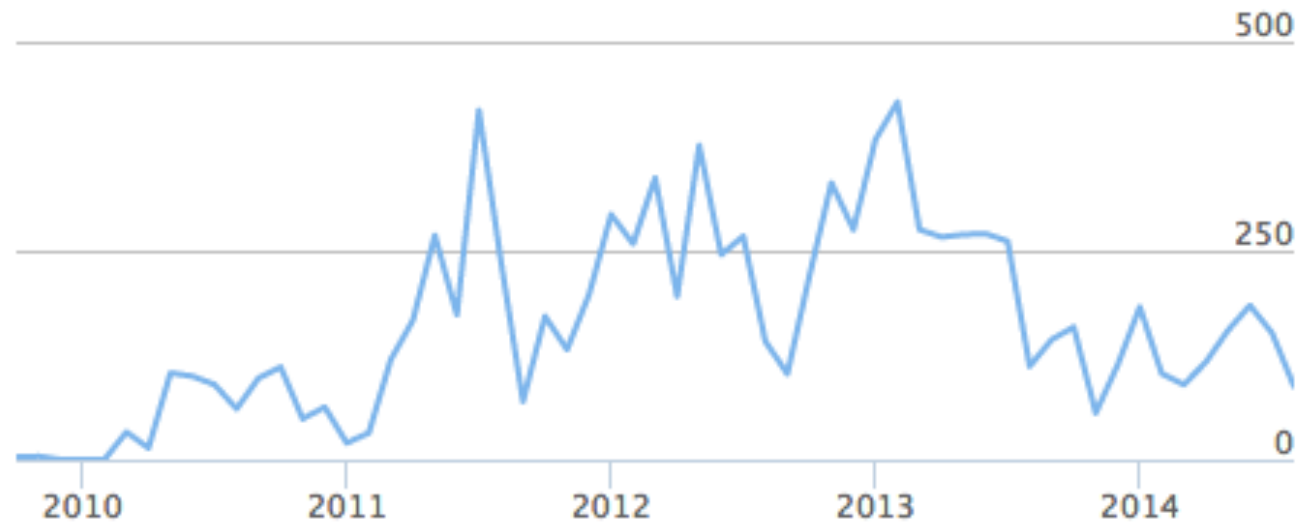
**OR = Open Repositories Conference**

## A Growing Worldwide Presence

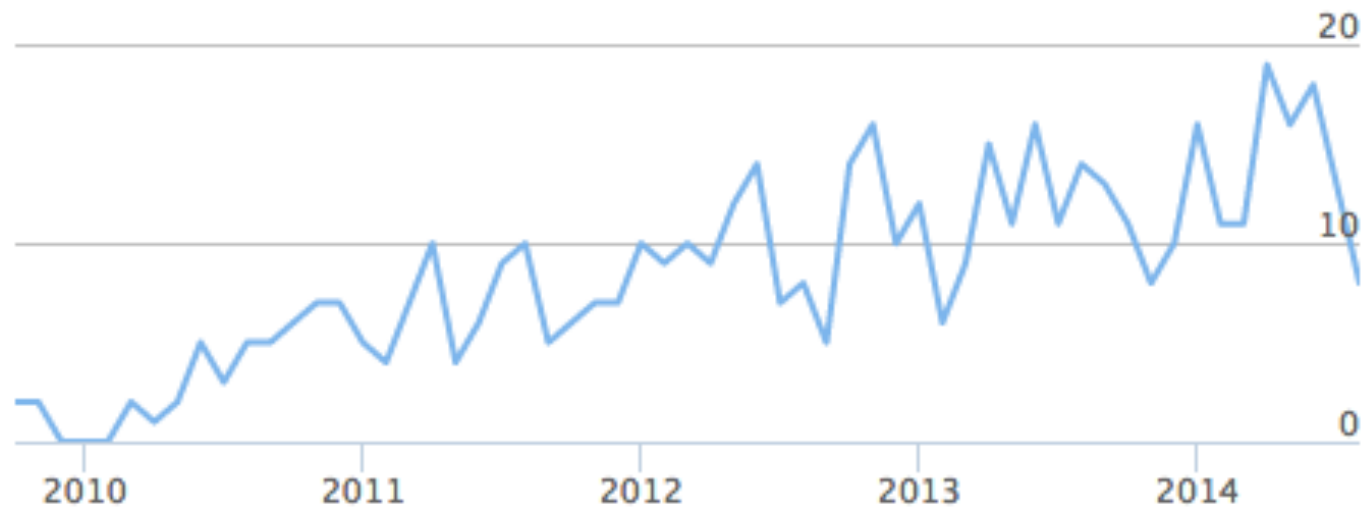


# Trending

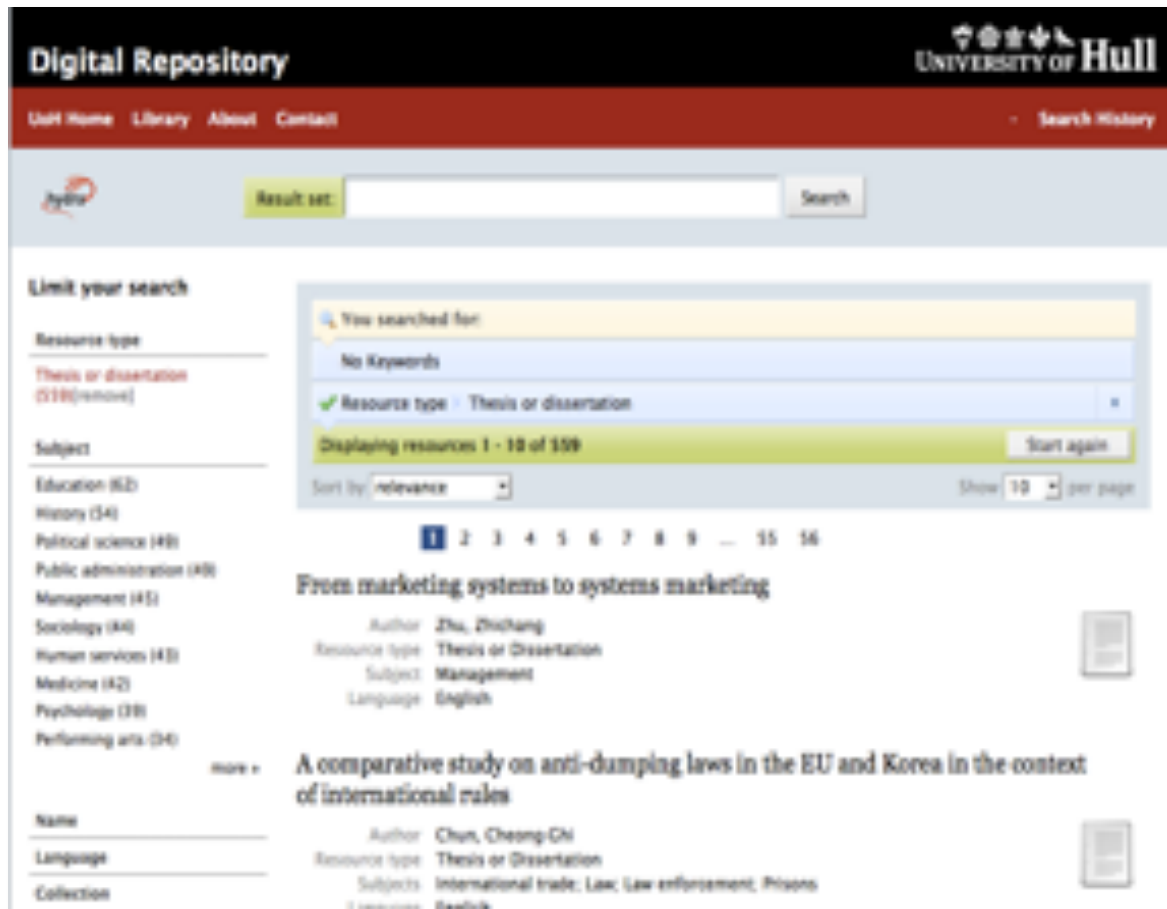
Commits per Month



Contributors per Month



# Hydra Heads: Institutional Repositories



The screenshot displays the 'Digital Repository' interface of the University of Hull. At the top, a black header contains the university's name and logo. Below it, a red navigation bar includes links for 'UoH Home', 'Library', 'About', 'Contact', and 'Search History'. The main content area features a search bar with a 'Result set:' label and a 'Search' button. To the left, a 'Limit your search' sidebar lists various categories like 'Resource type', 'Subject', 'Name', 'Language', and 'Collection'. The central search results section shows a summary of the search: 'You searched for: No Keywords', 'Resource type: Thesis or dissertation', and 'Displaying resources 1 - 10 of 159'. It includes a 'Sort by: relevance' dropdown and a 'Show 10 per page' option. Two search results are visible, each with a title, author, resource type, subject, and language, accompanied by a document icon.

**Digital Repository** UNIVERSITY OF Hull

UoH Home Library About Contact - Search History

Result set: Search

**Limit your search**

**Resource type**

Thesis or dissertation (519) [remove]

**Subject**

Education (62)  
History (34)  
Political science (49)  
Public administration (49)  
Management (41)  
Sociology (34)  
Human services (43)  
Medicine (42)  
Psychology (38)  
Performing arts (24)

more »

**Name**  
**Language**  
**Collection**

You searched for:  
No Keywords  
✓ Resource type: Thesis or dissertation  
Displaying resources 1 - 10 of 159 Start again  
Sort by: relevance Show 10 per page

1 2 3 4 5 6 7 8 9 ... 15 16

**From marketing systems to systems marketing**  
Author: Zhu, Zhiqiang  
Resource type: Thesis or Dissertation  
Subject: Management  
Language: English

**A comparative study on anti-dumping laws in the EU and Korea in the context of international rules**  
Author: Chun, Cheong-Gil  
Resource type: Thesis or Dissertation  
Subjects: International trade; Law; Law enforcement; Prisons  
Language: English

University of Hull



# Hydra Heads: Institutional Repositories

The screenshot shows the Penn State ScholarSphere website. At the top is a dark blue header with the Penn State logo and 'SCHOLARSphere' text on the left, and navigation links 'Home', 'About', 'Help', 'Contact', and a 'Login' button on the right. Below the header is a large blue search bar with the word 'SEARCH' in large letters and a search input field with the placeholder 'Type keywords in here' and a 'Go' button. The main content area has a breadcrumb trail 'Home / Animal Assisted Therapy' and a title 'Animal Assisted Therapy'. Below the title is a thumbnail image of a person with a dog and a brief description. To the right of the thumbnail is a 'Download the full-sized PDF' link. The right side of the page features an 'Actions' section with a 'Download' link, an 'Export to:' section with links for 'EndNote', 'Zotero', and 'Mendeley', and a social media share section with icons for Facebook, Twitter, YouTube, and a plus sign, followed by a '0' count. Below this is a 'Descriptions' section with a table-like layout showing metadata: Title (Animal Assisted Therapy), Creator (Jill Buchle, BSN, RN, CCRN; Erica Conti, BSN, RN; Julie Werner, BSN, RN), Contributor, Abstract or Summary (Among RN and patient populations, does the use of pet therapy improve RN satisfaction and speed patient recovery after illness/surgery?), Keyword (Penn State Hershey Nursing Pet Therapy), Rights (All rights reserved), Publisher, Date (2013), and Created.

PENNSTATE  
SCHOLARSphere

Home About Help Contact Login

SEARCH  
Type keywords in here Go

Home / Animal Assisted Therapy  
**Animal Assisted Therapy**

Animal Assisted Therapy  
Jill Buchle BSN, RN, CCRN, Erica Conti BSN, RN and Julie Werner BSN, RN  
Millersville University Nursing Research K18

Download the full-sized PDF

**Actions**  
Download  
Export to: EndNote | Zotero | Mendeley  
f t y + 0

**Descriptions**

<b>Title</b>	Animal Assisted Therapy
<b>Creator</b>	Jill Buchle, BSN, RN, CCRN Erica Conti, BSN, RN Julie Werner, BSN, RN
<b>Contributor</b>	
<b>Abstract or Summary</b>	Among RN and patient populations, does the use of pet therapy improve RN satisfaction and speed patient recovery after illness/surgery?
<b>Keyword</b>	Penn State Hershey Nursing Pet Therapy
<b>Rights</b>	All rights reserved
<b>Publisher</b>	
<b>Date</b>	2013
<b>Created</b>	

ScholarSphere / Sufia @ Penn State



# Partners & Implementations

<https://wiki.duraspace.org/display/hydra/Partners+and+Implementations>



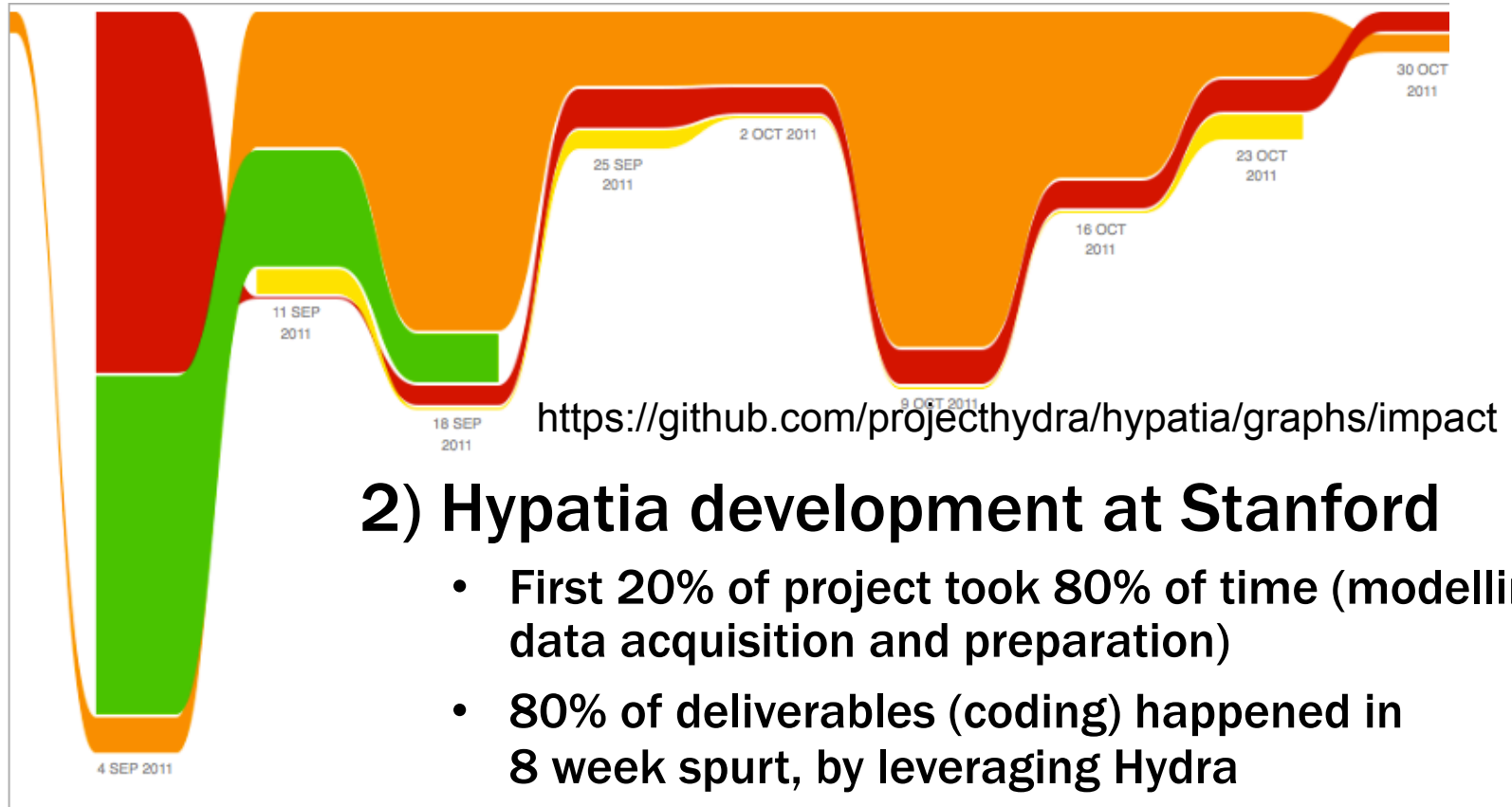
# Sustainability

*grants* *abused*  
**No animals were harmed  
in the making of this film.**  
*project / community*



If You Want To Go Fast ~~...go alone.~~  
*...use Hydra*

1) Notre Dame deployed a video cataloging head in 6 weeks, from scratch



## 2) Hypatia development at Stanford

- First 20% of project took 80% of time (modelling, data acquisition and preparation)
- 80% of deliverables (coding) happened in 8 week spurt, by leveraging Hydra

# Hydra Heads: Institutional Repositories

## Hydra-in-a-Box

- \$2M grant from IMLS, Institute for Museum & Library Services
- Goals:
  - Turnkey solution for institutions large and small
  - Metadata enrichment
  - Hosted service



# Sustainability...



- **For institutions**  
*Partners help shoulder the load*
- **For other projects**  
*Post-project maintenance & governance*
- **For leveraging funders' investments**  
*Adoption by growing user community*



<http://projecthydra.org>