



Get ahead

on your repository.

Multi-Purpose Repository Solutions
Flexible User Interfaces
Durable Digital Asset Management

Scenario

Repositories have proven themselves as powerful tools for managing digital content in many different contexts. But experience has also shown that there are real, practical limits in trying to extend a single repository solution to meet the manifold needs of most institutions for their full range of digital content and use cases. Relatively narrow and inflexible application front ends can be used to create single-purpose repository-powered solutions, but they do not lend themselves to being quickly and easily repurposed to meet variations in content type or user interactions. There is a need to investigate how a repository can support the lifecycle of digital content for different purposes, from creation through to deletion or preservation, using workflows built with web services

Therefore, there is a clear business need for a flexible, reusable application framework that can support the rapid development of multiple systems tailored to distinct needs, but powered by a common underlying repository. Recognizing this common need, Stanford University, the University of Hull and the University of Virginia started a collaborating on “Project Hydra”, to create an application and middleware framework that, in combination with an underlying Fedora repository, will create a reusable environment for running multifunction, multipurpose repository-powered solutions.

I. What is Hydra?

Hydra is an open source, multi-institutional project that gives institutions a framework to build and deploy robust and durable digital repositories (the “body”) supporting multiple “heads”: feature-rich, digital asset management applications with tailored workflows. Hydra provides both a technical solution and software as well as a vibrant community infrastructure, giving like-minded institutions the ability to collaborate and realize the benefits of pooled development.

As a *Repository solution* Hydra provides a versatile and feature-rich environment for end-users and repository administrators alike. As a *technical framework*, it provides a toolkit of reusable components that can be combined and configured in different arrays to meet a diversity of content management needs. As a *community framework*, Hydra provides like-minded institutions with the mechanism to combine their individual development efforts, resources and priorities into a collective solution with breadth and depth that exceeds the capacity of any single institution to create, maintain or enhance on its own. Hydra software is free and open source, available under Apache 2 license.

See <http://projecthydra.org> for more information on "What is Hydra", and <http://projecthydra.org/apps-demos-2-2/> for a showcase of applications built in the Hydra framework.

2. How does it work?

Hydra technical philosophy is based on the following principles:

- Tailored applications and workflows for different content types, contexts and user interactions
- A common repository infrastructure
- Flexible, atomistic data models
- Modular, “Lego brick” services
- Library of user interaction widgets

As a technical framework, Hydra’s major components are Fedora, solr, Blacklight and Ruby on Rails.

- Fedora provides a durable repository layer to support object management and persistence
- Solr, provides fast access to indexed information
- Blacklight, a Ruby on Rails plugin that sits atop solr and provides faceted search & tailored views on objects
- Hydra Plugin, a Ruby on Rails library that provides create, update and delete actions against Fedora objects
- Easily skinned UI

One body, many heads

Combined together, they produce applications for managers to *create, read, update and delete* content in their repository. Many institutions have opted to begin their use of the Hydra stack with Blacklight & solr; these two components provide repository managers with a fast, performant environment for searching, browsing and viewing repository content.

See <http://projecthydra.org/technical-2/building-blocks/> for more information on Hydra's technology stack.

3. Who's doing it?

From its founding by the universities of Hull, Stanford and Virginia, the project has quadrupled in size and is growing rapidly. Current partners include Northwestern, Indiana, Columbia, London School of Economics, Notre Dame, the Rock and Roll Hall of Fame, and Penn State University. More than another dozen institutions, including the Digital Repository of Ireland and the Royal Library of Denmark, have adopted the software and are working towards becoming partners.

See <http://projecthydra.org/community-2-2/partners-and-more/> for details on the latest extent of users and Partners.

4. Why is it significant?

Hydra complements Fedora by taking a powerful, flexible digital repository and adding a rich application framework for building user-facing applications. Hydra makes Fedora easier to use, quicker to produce value, and more rewarding by providing a full range of application functionalities.

Hydra is distinctive in that it was designed as a collaborative, distributed project from its start; it does not rely on grants nor any single institution/contributor for its health. Its sustainability and significant rate of progress hinges on each adopter's recognition of the benefits of working with each other to satisfy both their own and common goals.

Hydra also has an outstanding and tightly knit pool of developers that models best practices in software development. Many institutions end up finding and adopting the project through their developers, who are excited by the prospect of collaborating with excellent developers at other institutions while using test driven development, continuous integration and agile practices.

5. What are the downsides?

Hydra is still a relatively young and, at this point, is a framework more than a turn-key application. For an institution to make the most of Hydra, it will need to be willing to invest its own developer resources. For many institutions, adopting Ruby on Rails can also be a learning process; while developers can quickly and easily pick up the language, provisioning an enterprise-level server environment will be growth exercise

6. Where is it going?

Hydra is growing rapidly at this stage. The project is developing the beginning of a robust European user community, and we anticipate dozens of adopters in the next 2 years. The project is also developing a number of "solution bundles"--pre-packaged Hydra heads dealing with specific content types (such as media) or functions (such as institutional repositories).

7. What are the implications for Institutional repositories?

Hydra philosophy stands for a fundamental assumption:

*“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”*

Five principles

- A repository should be content agnostic
- A repository should be (open) standards-based
- A repository should be scalable
- A repository should understand how pieces of content relate to each other
- A repository should be manageable with limited resource

Hydra adopts a multipurpose, multi-institutional approach:

A repository should be an enabler, not a constraint. Repositories have been put forward as potential solutions for a variety of use cases. Hydra recognizes that repositories can be used in the management of digital content at different states in the lifecycle of that content. It is therefore useful to consider how to enable multiple interactions with a repository for different purposes.

Hydra is about developing flexible interfaces over a repository that allow for the management of different types of content in the same repository. It supports embedding by allowing a single repository to serve multiple needs, and supports take-up through the flexible development of end user and management interfaces, designed for use according to content type (Hydra “heads”)

Hydra's architecture and code base gives institutional repositories the promise of an elegant and simple solution for end users that provides all the traditional IR functionality, but that can scale and evolve over time to accommodate the increasingly diverse types of content (audio, video, data) and integrate with other nodes in an institution's IT infrastructure.

8. Why use Hydra?

- Why Hydra at Stanford?

“We recognized the need for a suite of digital asset management solutions that transcended what any contemporary “institutional repository” system offered. We have needs ranging from ETD submission and approval to image management; from digitization workflow to digital preservation. Fedora fit our architecture and offered the flexibility and extensibility to serve as a common layer in our digital library infrastructure, but by itself didn’t offer a total solution. When combined with what grew into Hydra, it did–giving us a “one body, many heads” solution that meets the full scope of our requirements”

<http://projecthydra.org/about-hydra-2/why-use-hydra/#Stanford>

- Why Hydra at the University of Virginia?

“UVa was not looking for easy, canned solutions then and that holds true today. Instead, the goal was to maximize choice within a flexible framework that would afford a sustainable solution for the preservation and access of both library managed content and scholarly work.

Forces such as innovative technology and economics are constantly challenging us to redefine our business objectives and our course of action. What we have achieved so far is supporting our ability to meet that challenge” <http://projecthydra.org/about-hydra-2/why-use-hydra/#Virginia>

References

1. Hydra <http://projecthydra.org>
2. <http://ukcorr.org/files/2012/11/UKCoRR-Hydra-presentation-121109.pdf>
3. Chris Awre. "Hydra UK: Flexible Repository Solutions to Meet Varied Needs". November 2012, *Ariadne* Issue 70 <http://www.ariadne.ac.uk/issue70/hydra-2012-11-rpt>

Thanks to:

Tom Cramer

Chief Technology Strategist and Associate Director of Digital Library Systems and Services at Stanford University

He oversees the development and delivery of Stanford’s digital library services for digitization, discovery, delivery, preservation and management of digital resources that support teaching, learning and research. He is also a founder of the Hydra Project, and an active contributor to Blacklight. He serves as the Chair and Co-Director of PASIG, the Preservation and Archiving Special Interest Group, and is an Open Repositories Conference Steering Committee member.

Chris Awre

Head of Information Management within Library and Learning Innovation at the University of Hull.

He oversees the teams responsible for the acquisition, processing and cataloguing of all materials managed through the Library from both external and internal sources, the latter focusing on the development of the digital repository and local digital collections. Chris has a background as a systems librarian and advocates the value of a broad approach to digital repository collection development.