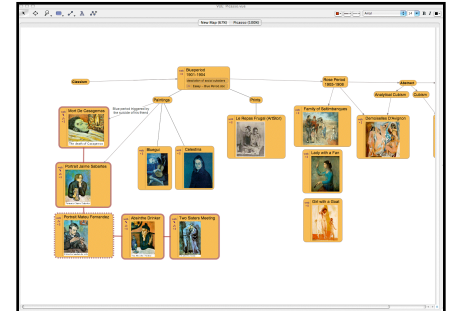


# LEVERAGING VISUAL COLLECTIONS

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## Finding and using visual content

Museums and other custodians of rich media content have a common need to effectively manage digital assets. A key challenge is enabling a broad spectrum of consumers to find and utilize relevant content. When considering federated search across institutions' collections and from a variety of client applications, this challenge is even more daunting -- *or it has been until recently*. A rapidly-growing community of content providers and consumers are discovering they can quickly and easily find and weave together material from disparate sources in a variety of tools. Reaching beyond a dedicated web site as the sole client for captive content, a marketplace is emerging where users work with the content they want, in the application they choose. What is fueling this revolution? A single, open, repository integration approach -- distinct from the several still vital access and data format agreements. The Open Knowledge Initiative (O.K.I.) has been maturing for more than five years, and now has the critical-mass of support to make this "network-effect" a reality.

## Repository Integration

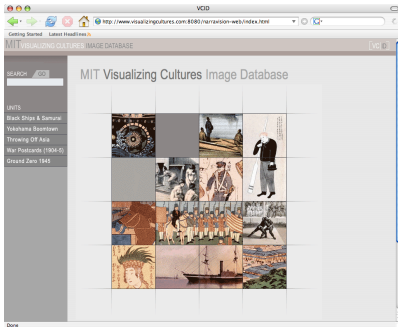
INSTANT INTEGRATION WITH A GROWING SET OF APPLICATIONS

FEDERATED SEARCH ACROSS VARIED COLLECTIONS

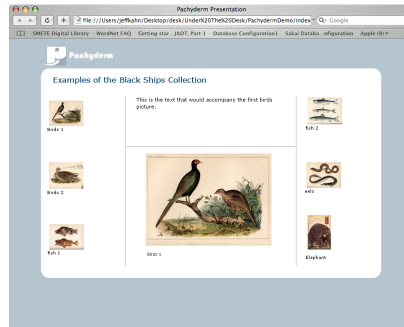
WORKS WITH STANDARD AND CUSTOM PROTOCOLS, SCHEMAS, AND ACCESS CONTROL

### Community Activity

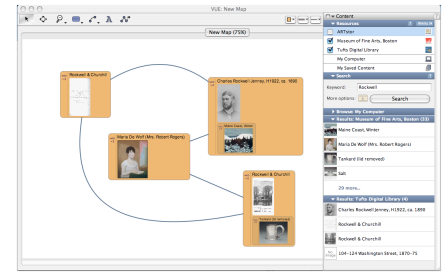
- Using a standard to access content
- Accommodates existing approaches
- Practical federated search
- Supports different metadata schemas
- Rapid integration
- Optional supplemental metadata
- Using content with an LMS
- Using content in pedagogical tools
- Leveraging online learning materials
- Presentation assembly in Pachyderm
- Integrating with Apple iTunes U
- At the inflection point in adoption



The Visualizing Cultures project at MIT had a three-part challenge: (1) how to **build, in parallel**, a discovery and display tool and employ a content management system and know they will integrate when both were ready; (2) how to seamlessly search across their **own collections and ones outside their control** (at the Museum of Fine Arts, Boston); and (3) how to offer faculty-created keywords for an external collection (**shadow metadata**). O.K.I. provided the answer. The standard integration interface, agreed to in advance, let development proceed concurrently without tying the hands of designers or programmers. Wrapping the existing MFA search web service underneath, changed the task from integrating apples and oranges to apple and apples -- with no change to the MFA service. The O.K.I. approach kept the MFA collection intact and under external control while allowing MIT faculty to include their value-added search keywords.



Pachyderm is a multimedia authoring tool created by a partnership lead by The New Media Consortium (NMC) and the San Francisco Museum of Modern Art (SFMOMA). Pachyderm needed a single, **standard way to integrate content from different kinds of collections**. Building the specific knowledge of “how to talk to all those systems” was a much heavier burden than the project could afford. Pachyderm spoke with O.K.I. and decided to give the Repository integration approach a try. The Pachyderm system, which is built using Web Objects, had no difficulty quickly adding support for O.K.I. Leveraging this one investment in technology, Pachyderm can connect to a growing collection of content. Broadening the network-effect, Pachyderm introduced Gallery Systems’ EmbARK team to the approach. Using O.K.I. as common-ground, Pachyderm and EmbARK’s Web Kiosk integrate without special knowledge built into either product.



The Visual Understanding Environment (VUE) was developed by Tufts University. VUE is a human-centered tool for managing digital content and integrating it into teaching and learning. VUE had a similar need to Pachyderm -- a single integration system for a heterogeneous world. Tufts has internal collections such as Artifact and the Tufts Digital Library. Any solution had to work with those, as well as general search targets such as Google, subscription content sources such as ARTstor, and more open-access content such as from the MFA. O.K.I. met all these needs, including the ability to discover and incorporate new content sources “on-the-fly” the moment they become available. VUE is about to use O.K.I. in another way -- **integration with learning management systems** such as Sakai. It turns out O.K.I. can help there too, and O.K.I. offers more than just Repository -- actually 17 different services including Authentication and Authorization, Course Management, Assessment, Workflow, and more.

**O.K.I. PROJECT MISSION** “To develop and promote standards that describe how the components of a software environment communicate with each other and with other enterprise systems through application of Service-Oriented Architecture. O.K.I. seeks to open new markets opportunities across a wide range of software application domains.” Originally funded through a grant from the Andrew W. Mellon Foundation and more recently growing through community activity and projects, O.K.I. is entering a new era of sustainability under The O.K.I. Consortium.



## iTunes U

Many schools, both K-12 and higher education, make use of online learning materials -- some of which come from museum content or similar institutional resources. The Learning Management System (LMS) is often the principal organizing structure for educational content. O.K.I. has worked closely with several LMS vendors, and the list is broadening. In general, these systems want to include high-quality content in federated searches for learning materials.

Once the LMS adopts the O.K.I. approach, the same mechanism is used to have a dialog which each external source, no matter the communication particulars. This makes the job of the LMS vendor an easy one and gives the industry a clear integration strategy that doesn't shift during or after development.

The LMS needs to work with user authentication and authorization. Access control policies and mechanisms vary widely across content management systems. Some are open, some use IP-address checking, some use username and password, some use license keys. O.K.I. is working with all these.

What constitutes a repository can include a broad range of systems. The Repository service from O.K.I. is not just for federated searching or reading content. It can be used to submit content as well.

Apple's iTunes U, the free, hosted services for colleges and universities, organizes and delivers rich media to desktops and iPods. O.K.I. has shown integration with iTunes U, whereby client applications use an implementation of the Repository service to place content into iTunes U -- without knowing how! The technical detail is hidden from the consumer.

One traditional challenge to federated searching is metadata differences. iTunes U uses a proprietary metadata standard, rather than say, Dublin Core. No problem; O.K.I. is neutral with regard to which metadata schemas are used. The service has a metadata abstraction which is working well across many schemas.

**Business Benefits:** The O.K.I. offers numerous technical benefits, but there are important business and marketing benefits as well:

**New Markets** Ease-of-integration enables new marketing and distribution channels.

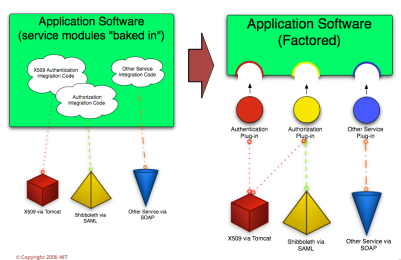
**Increasing ROI** The option for "passive integration" via O.K.I. means content can be used in new contexts for no additional development cost. This translates into increased ROI.

**Member Benefits / Cross Promotions** Federation under strict access control means content from more than one institution can be offered under a common umbrella --no matter whether one is searching digital collections or a gift catalog.

**New Offerings / Incremental Revenue** With a common integration mechanism settled, institutions can bring to market bundles of application and content. This can also help grow an institution's share of the total market.

**Risk Reduction / Time to Market** With a stable, well-known integration strategy in place; one that is friendly towards a wide range of implementation approaches, new collections can be brought online quickly and with low risk.

### Factored Application



A very brief architecture overview

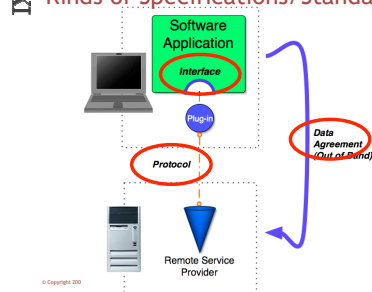
O.K.I. enables a service-oriented approach where applications are no longer rigid assemblies, rather they are **factored to make use of substitutable services**. This yields benefits in flexibility over which implementation technology to use, future-proofing, and choice.

O.K.I. defines standard interfaces for each service (OSIDs). Consumer and provider simply agree on a “contract”. How the interface is implemented is left to the software developer, e.g. web services or any other approach, without restriction. Note that OSIDs **focus on the service interface**, a separate integration element from protocol and data standards.

As the case studies on earlier pages show, O.K.I. makes **federated operations across disparate technologies** a reality, today. Service consumers and providers are well-insulated from each other.

**TO FIND OUT MORE** O.K.I. maintains a project website (address appears at the bottom of each page). For general inquires, contact Jeff Merriman, O.K.I. Project Director (contact information on page 1). To use something right away, a number of organizations that are using O.K.I. have placed their work in the domain of open-source. When an organization needs help, a growing number of independent consultants are available to demonstrate how O.K.I. can address specific needs. Look (or ask for) presentations on O.K.I. at industry events.

### Kinds of Specifications/Standards



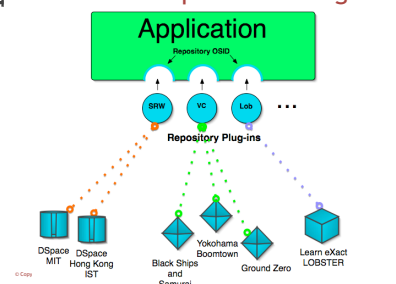
Although this document focuses on the repository service, there are many other services that offer a similar value:

- Course Management
- Assessment
- Grading
- Authentication
- Authorization
- Logging
- Filing
- Dictionary
- Hierarchy
- Agent and Group
- Id
- User Messaging
- Scheduling
- Workflow

..... and new areas are emerging

*Note there are several language bindings: Java, PHP, Objective-C, C#*

### Benefit: Multiple Technologies



### Adoption is Growing

#### Sample Content Repositories

ARIADNE, ARTstor, Bedford, Freeman, and Worth, Blackships and Samurai, Connexions, Edusource Canada, Google, Ground Zero 1945, JStor, MERLOT, Metamedia, Museum of Fine Arts, Boston, Tufts Artifact, Tufts Digital Library, UCLA Digital Library, Rotch Visual Collections, Yokohama Boomtown

#### Sample Technologies and Protocols

CeLeBraTe, Cisco VMS, DSpace, Fedora, Gallery Systems EmbARK, Giunti Lobster, HarvestRoad Hive, Apple iTunes U, Lionshare, Local Google, MySQL, OAI, SQL, SRU/W, Z39.50

#### Sample OSID-Aware Clients

Apple Education Marketing's SearchParty, Blackboard Building Block, HarvestRoad Hive Explorer, Giunti Learn eXact Package, Lionshare Peer-to-Peer, MIT Stellar Image Tool, Pachyderm, Middlebury College's Segue, Visualizing Cultures, VUE