Variations: Implementing an Open Source Digital Music Library System

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Outline

- What is the Variations system? – overview & demo
- How is it used currently, at IU and other institutions?
- What is the open source release and how can it be deployed?
  - technical and library staffing
  - hardware and software requirements
  - what's included in the release
- Sustainability plans & possibilities
- How can I try out Variations?
- Q & A
Variations Overview

**Collection Metadata**

**Access Control, Bookmarks**

**content**
- digitized audio
- scanned scores

**user interface**

**users**
- faculty
- students
- librarians
What is the Variations System?

- Online access to streaming audio and scanned score images
- Analysis and annotation tools useful in music teaching, learning, and research
- Flexible access control framework respects intellectual property rights
- Sources of content:
  - Your own collections – Variations provides ingest tools and access management
  - Licensed third party content – current finishing up DRAM integration for release this summer
What is the Variations System?

- Album-based, not track based: users see tracks in their album context
- Access limited to authenticated login based on IP address and/or authorized group membership, such as a class roster
- Content delivered via streaming; does not use embedded Digital Rights Management (DRM)
- Search function requires additional manual cataloging and so it is not being used apart from metadata research projects such as Jenn Riley’s current IMLS-funded Variations/FRBR project
Demonstration of Variations
Variations at Indiana

- Digital library of sound recordings and scores in IU Cook Music Library and born-digital IU performances
- Online since April 1996
- Current technology online since 2005
- 16,000+ complete recordings; 300+ scores
- Access to course reserves, general collection, and special collections
- Full collection available at Music Library computers
- Outside Music Library, users must be enrolled in a class requiring Variations use and have installed Variations client
Funded by Institute of Museum and Library Services (IMLS) National Leadership Grant

October 2005 - September 2008 (extended through September 2009)

Extends Variations beyond IU & explores sustainability models

Test sites have each deployed full Variations system:
- New England Conservatory
- The Ohio State University
- Tri-College Consortium: Haverford, Swarthmore, Bryn Mawr
- University of Maryland

Also exploring application- (not content-) hosting with University of Miami and others.
What is the Open Source Release?

- Variations system release includes
  - Server software
  - Client software
  - Source code
  - Sample content for testing—two recordings and two scores
  - Web services for browser-based player and access manager (Summer 2009)
- Documentation available on the web
- Everything you need to set up and operate your own Variations system! Except….

Free Puppy!
What’s not free?

- Server hardware
- Necessary IT expertise to install, configure, and support Variations server software and streaming server
- Digitizing/scanning hardware/software
- Digitizing/scanning staffing & expertise
- Computer workstations in library and/or client software distribution mechanism
- Staffing & expertise for user support
- Intellectual property / copyright policy
Server Requirements

- Linux operating system
  - Tested on RedHat Enterprise Linux 4 and 5
- RAM and disk space dependent on load and amount of audio and score content
- Third-party software
  - Java Runtime Environment 1.4.2
  - Apache HTTP Server
  - Apple Darwin Streaming Server
  - Perl
  - MySQL
- Cost: $0-25,000, depending on IT resources and ambitions (amount of content, user load)
IT Expertise

- Critical success factor!
- Initial server config, installation, software config, network troubleshooting, etc., is demanding
- Requires good partnership between library and IT
- Initial configuration is only a day or so of work, but that day can easily take weeks of communication between different parties, with extra time for troubleshooting
IT Staff Requirements

- Linux system administrator
- Database administrator
- Windows/Mac desktop support
  - Library desktops
  - Student computing lab desktops
  - Faculty desktops
  - Faculty/student home use
- Student information system staff
  - If basing access on course enrollment
- Network engineering staff
  - Troubleshooting firewall/bandwidth issues
Variations Architecture

Variations cataloging server

MySQL cataloging database

MySQL access ctrl database

MySQL production database

Variations production server

Variations score and audio Lease Managers

Apache HTTP Server

Darwin Streaming Server

Variations Java client (Mac or Windows)

Variations browser-based Web player

Single physical server

RMI

HTTP

RTSP/HTTP
Variations Architecture

- Variations cataloging server
- Variations production server
- Variations score and audio Lease Managers
- Apache HTTP Server
- Darwin Streaming Server

MySQL cataloging database
MySQL access ctrl database
MySQL production database

Variations Access Manager (Browser)
Variations Digitizer/Cataloging Java client (Windows)

Single physical server
Digitizer Staffing & Expertise

- Work can be done by student hourly employees
- Workflow needs to be defined and documented
- Need basic skill with moving files around
- Audio skill level depends on whether you are ingesting only CDs or analog media
- Scanning skill level can be low if workflow well documented
- Ingesting a CD can take 10-20 minutes, beginning to end (compression takes the most time)
Access Policy Options

- All authenticated users can access all content
- Users can only access content on reserve for classes in which they are enrolled
- Users who are enrolled in a class with reserve items can access all library content; “Personal reserves” can only be accessed by class members
- Others…
Planned Additions for Summer Open Source Release

- Web browser-based player
  - Flash and AJAX versions
- Web-based access management tool
  - Currently done via command line
- DRAM support
  - Database of Recorded American Music
Interest in Variations

- Webinar on March 4 - over 90 participants
- Post-webinar survey
  - Two-thirds of respondents plan to evaluate within the next year

- Chicken and egg problem
  - Institutions want to be confident of future and governance before they adopt
Support Options

- Self-support via open source
  - IU will continue to update open source distribution
  - IU will participate actively in the variations-discuss mailing list on SourceForge
- If enough institutions adopt Variations, 3rd party support or even hosting options could emerge; chicken & egg problem again
- We are exploring options for paid support—you can help us figure out that equation!
More Information

- Variations Open Source Site: http://variations.sourceforge.net/
- Variations Documentation Site: http://wiki.dlib.indiana.edu/confluence/display/V3/
- Variations 3 project info: http://www.dlib.indiana.edu/projects/variations3/