





# Topics for Discussion

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- NJVid, A Statewide Video Network – An IMLS Grant Funded Project based on RUcore and Fedora
- Overview of Fedora and the NJVid/RUcore Framework
- Unique NJVid Capabilities and Challenges



# NJVid – A Statewide Video Network

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- A digital video network supporting over 600 New Jersey institutions (academic, K12, & cultural heritage)
  
- Three types of video collections
  - Video Commons – publicly available videos
  - Commercial videos available through educational consortia
  - Lectures on demand – customized annotations of videos
  
- Technical platforms based on RUcore and Fedora



# Video Commons

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## Locally Owned Videos:

**NJVID** will provide access to a shared-by-all collection that can include such videos as Organizational events (lectures, speakers, Labor Day Parade), Re-enactments and historic events (constructing an historic bridge over the D&R canal), NJN videos, Oral Histories, etc.



# Commercial Videos

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## Commercial Videos:

**NJVID** will also provide a common platform for describing, storing and making commercial digital videos available for the participating institutions that purchase the rights. VALE, Virtual Academic Library Environment, will negotiate the rights for these videos and participating users can access these



# Lectures on Demand

## Lectures on Demand:

**NJVID** will provide a common platform for accessing Lectures-on-Demand. These are educational videos that will make course lectures available for faculty and students to segment (create “virtual clips”), annotate, and make available within each participating institution. Lectures on Demand will primarily be used in the K20 educational environment although other participants that host educational activities and courses may also find it useful.



# Fedora and Fedora Commons

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- Fedora Commons
  - a non-profit organization funded by a four year, \$4.9M grant from the [Gordon and Betty Moore Foundation](#)
  - to develop the organizational and technical frameworks necessary to effect revolutionary change in how scientists, scholars, museums, libraries, and educators collaborate to produce, share, and preserve their digital intellectual creations.
  
- The Fedora platform is logically divided into four major functional areas that reflect its first principles:
  - repository services
  - preservation services
  - semantic services
  - enterprise services



# Fedora Capabilities – A Snapshot

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- The Digital Object
  - An open model expressed as XML
  - Content Models for validation
  - XACML for authorization, using the Sun XACML engine
  - Encapsulation for management and preservation
  
- Repository Services
  - A service oriented architecture with APIs for access and management
  - Ontology services for expressing relationships
  - OAI, messaging, and journaling services
  
- Preservation Services
  - Audit trails
  - Versioning
  - Object integrity
  - Alerting





# A Service Oriented Architecture

## RUcore\* Objectives

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- To provide seamless, **perpetual access** to digital collections
- To develop a **flexible framework** of “core” capabilities providing the enabling infrastructure - interoperability, scalability, and sustainability.
- To create an **information architecture** which will support multidisciplinary, multi-format collections.

\*Rutgers COmmunity REpository - <http://rucore.libraries.rutgers.edu/>



# Some Questions to Think About

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- What is the “digital original”?
- What is the oldest digital object you know of?
- How can you tell if object A and object B are the same?
- How do you know if a digital object has been changed? What is the nature of the change?



# Should We Be Concerned?

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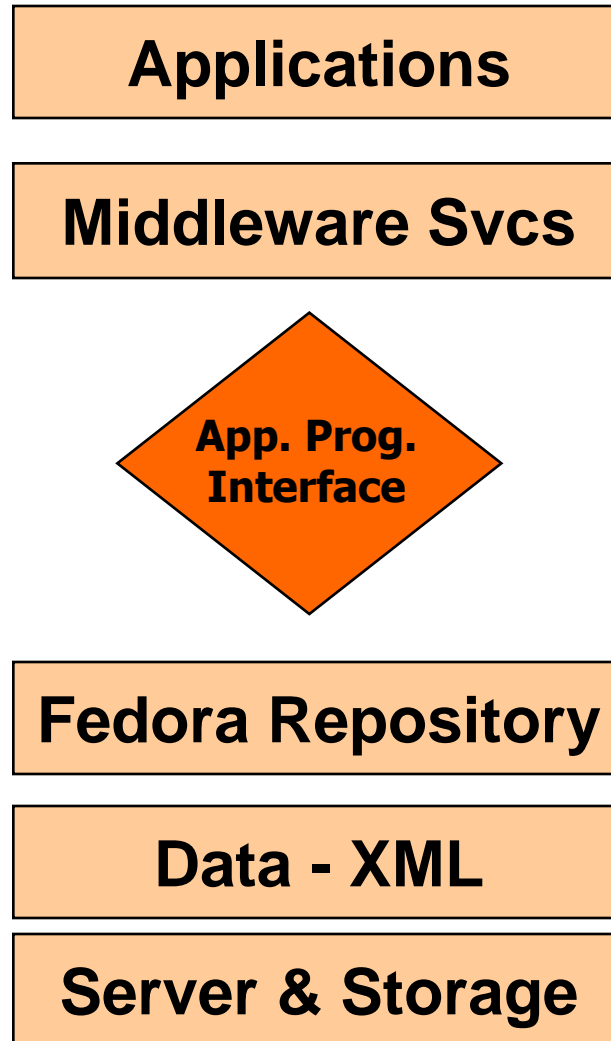
NASA said Tuesday it was launching an official search for more than 13,000 original tapes of the historic Apollo moon missions. The tapes aren't lost, insists the NASA official put in charge of the search. But he doesn't know where they are. Associated Press  
08.15.2006, 06:32 PM

## Integrity of the Object – the Enron email dataset

- Email collection from some 150 leaders at Enron
- Integrity issues were corrected by SRI
- Available: (<http://www.cs.cmu.edu/~enron/>)

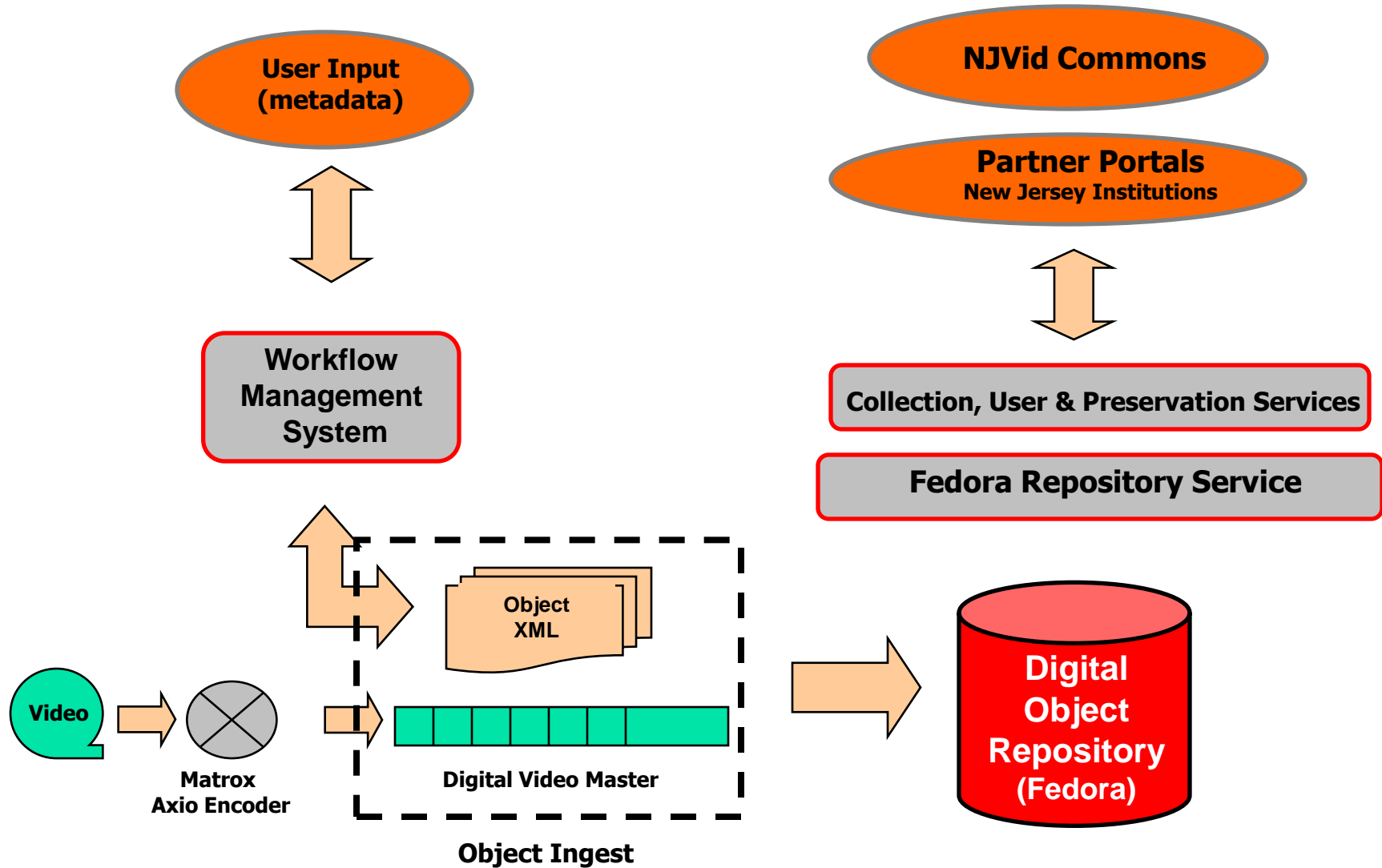
# RUcore/Fedora Layered Architecture

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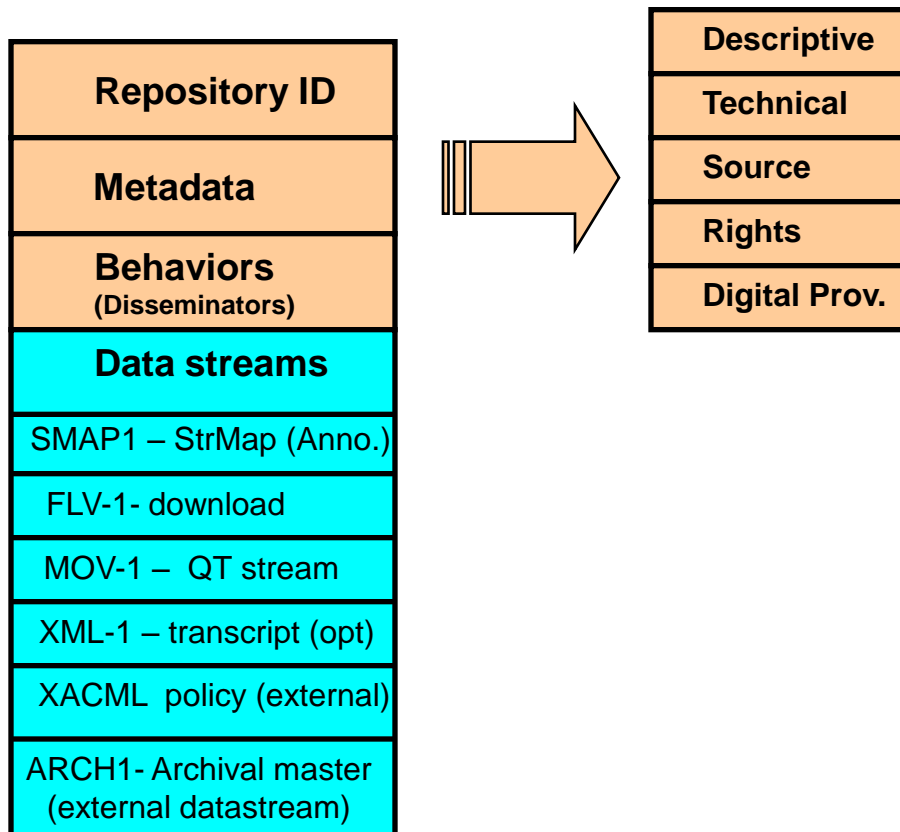
# NJVid Commons

## (How it Works)



# Large Files - the Video Digital Object

## Video Object



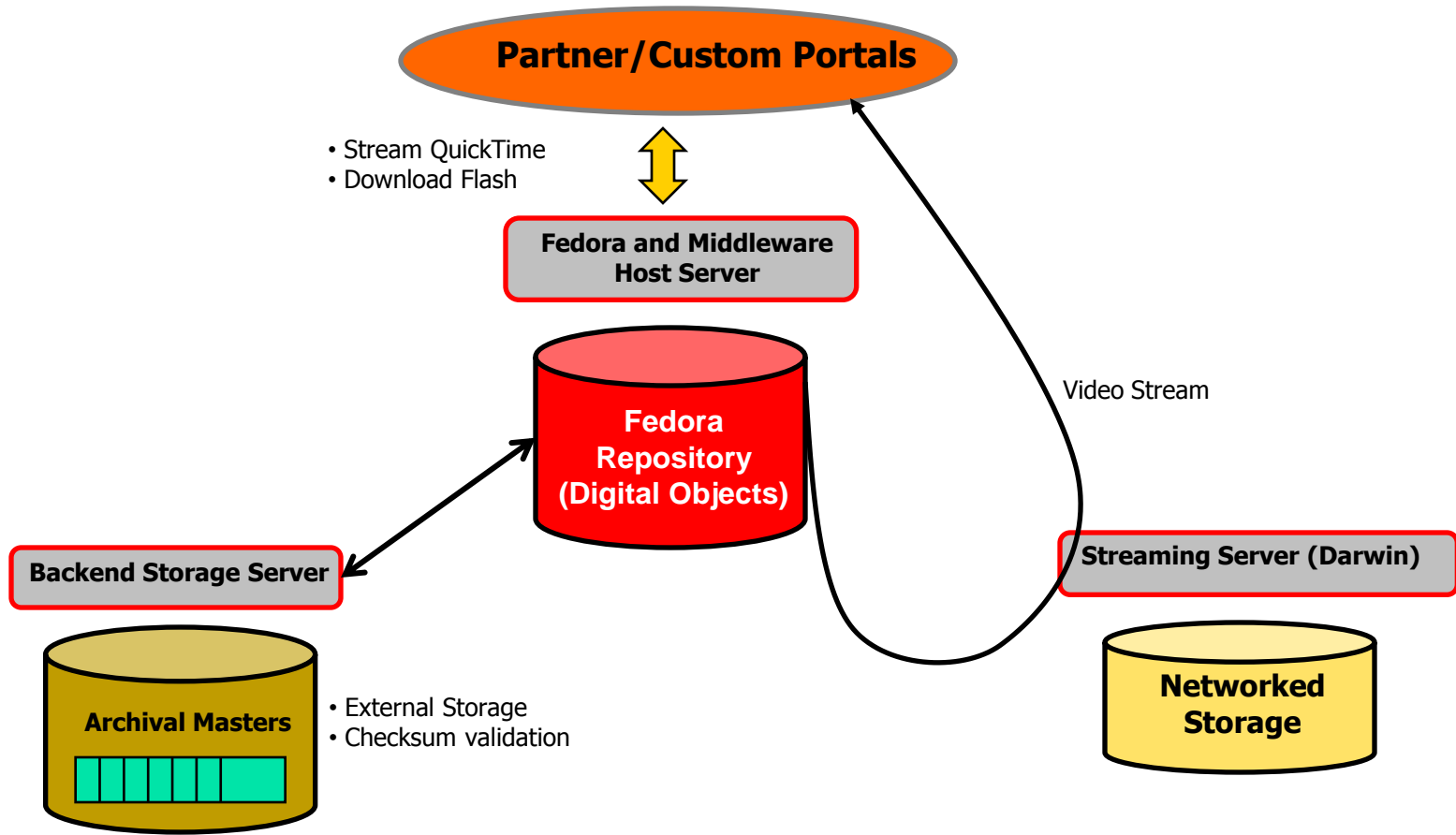


# NJVid Challenges

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- Managing Large Video Files – Ingest, Presentation, and Preservation
- Annotation of Videos for Lectures on Demand
- Authentication and Authorization

# NJVid Storage & Server Architecture







# Scenario – Lectures on Demand

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- Instructor Annotation for Lectures on Demand
- Student Access to Licensed Videos



# Annotations of Videos

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The basic concept is to allow an instructor, or student, to customize any video by selecting time segments and creating annotations to be played as part of a course offering. Additional descriptive metadata and access permissions can also be applied.

By playing the video via the annotation, the user can easily jump to any of the previously defined segments.



# Annotating and Segmenting a Video

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## ■ Instructor Annotation

- Instructor logs in to special “annotation” portal and is authenticated as “instructor” from ABC institution
- Instructor selects and previews video to determine time segments to be used for instruction
- Instructor creates annotation object and references video to be used
- A structure map with appropriate time segments of the source video is created
- Additional access restrictions may be applied

## ■ Student Access

- Logs in as “student” from institution ABC
- Student selects “course 101” on Faculty portal and plays video
- Disseminator/action script plays video according to time segments in structure map

# Selected Video

Search

My Content

Annotate

Go



**Title:** The Hidden Child  
**Description:** Of the 1,600,000 Jewish children who lived in Europe before World War II, only 100,000 survived the Holocaust.



**Title:** Ralph Golzio interview on Paterson Silk Strike of 1913  
**Description:** Ralph Golzio was a teenager at the time of the Paterson Silk Strike of 1913.



**Title:** Sondra Gash interview  
**Description:** Evelyn Hershey of the American Labor Museum interviews

# Search for and Select a Video for Annotation

Selection of video found through search

Annotate

Go



**Title:** The Hidden Child  
**Description:** Of the 1,600,000 Jewish children who lived in Europe before World War II, only 100,000 survived the Holocaust.



**Title:** Ralph Golzio interview on Paterson Silk Strike of 1913  
**Description:** Ralph Golzio was a teenager at the time of the Paterson Silk Strike of 1913.



**Title:** Sondra Gash interview  
**Description:** Evelyn Hershey of the American Labor Museum interviews

**Drag and Drop Thumbnails Here To Create an Annotation**

Once an annotation is saved it will appear in the videos timeline.



Start and stop markers can be placed.

Search My Content Annotate

Start Time: 5:01 End Time: 8:34

Title: Amsterdam, The Netherlands

Note: City street in Amsterdam.

Private  My Institution Only  NJVid Wide

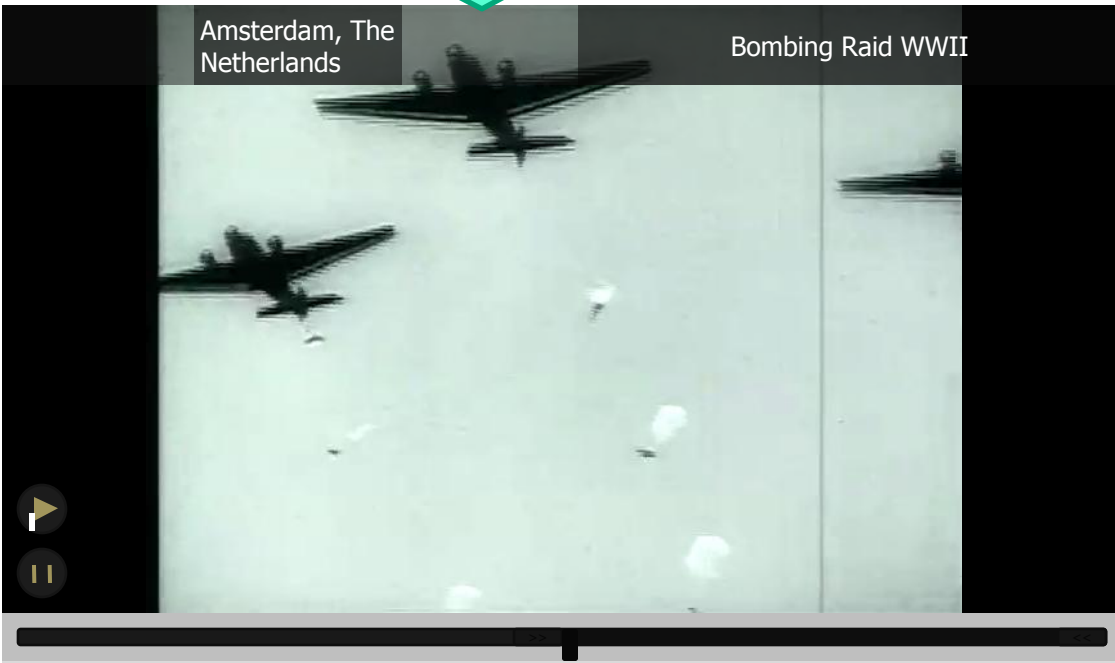
Indexed/Searchable:

Save

Metadata placed here.

# Annotate and Capture Start/End Times

Multiple annotations saved appearing in the timeline.



**Search** **My Content** **Annotate**

Start Time:  End Time:

Title:

Note:

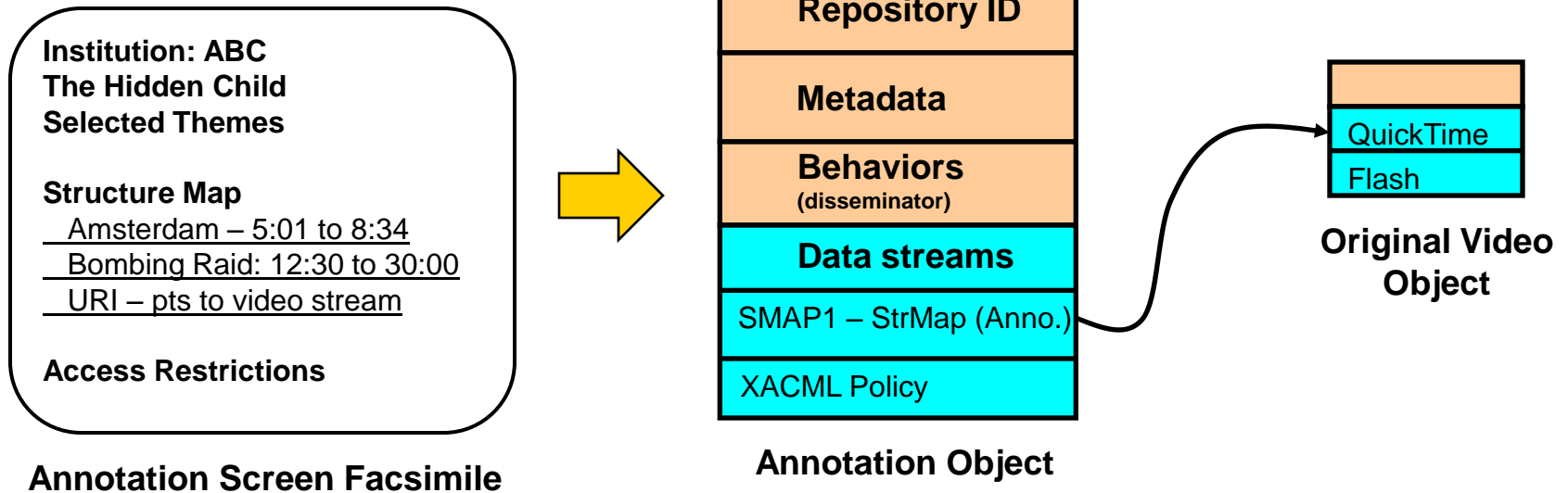
Private  My Institution Only  NJVid Wide

Indexed/Searchable:

**Save**

# Annotate and Capture Start/End Times

# The Annotation Object







# Authentication and Authorization

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- NJVid will support the full range of institutions
  - Participating institutions will need to provide LDAP directory information
  - Must establish agreement on shared attributes across institutions: person, department, role
  
- Authentication via Shibboleth
  - A service for managing users at cooperating institutions
  - Shibboleth securely transfers attributes (institution, roles, etc) from the users' site to the service provider (NJVid)
  
- Authorization through XACML
  - eXtensible Access Control Markup Language
  - For encoding access control policies

# An XACML Policy Example

```
<Subject>
<SubjectMatch MatchId="urn:oasis:names:tc:xacml:1.0:function:string-equal">
<AttributeValue
DataType="http://www.w3.org/2001/XMLSchema#string">student</AttributeValue>
<SubjectAttributeDesignator AttributeId="fedoraRole" MustBePresent="false"
DataType="http://www.w3.org/2001/XMLSchema#string"/>
</SubjectMatch>
</Subject>

<Resource>
<ResourceMatch MatchId="urn:oasis:names:tc:xacml:1.0:function:string-equal">
<AttributeValue DataType="http://www.w3.org/2001/XMLSchema#string">MOV-1
</AttributeValue>
.
.
</ResourceMatch>
</Resource>
```

# Certification as a Trusted Repository\*

Ultimately, we want to become certified as a trusted repository. There are three major areas:

## **A. Organization**

Repository has deposit agreements.

## **B. Repository Functions**

Repository has definition for each class of object.

## **C. Technologies, Technical Infrastructure & Security**

Repository has technologies to monitor security.

\* *Trustworthy Repositories Audit & Certification: Criteria and Checklist, Version 1.0.*  
Available at: <http://www.crl.edu/PDF/trac.pdf>

# Progress and Next Steps

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## ■ Progress

- An NJVid Commons collection object has been created in RUcore
- Beginning ingest of 30 to 50 videos
- Collection will be relocated later to NJVid/NJEDge installation

## ■ Releases

- Fall, 2008 – R5.0 to support Shibboleth and xacml.
- Early 2009 – R5.1 to support annotations

## ■ Continued R&D

- “Full text” searching of videos
- Digital signatures for authentic objects



# Video Specifications

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- Video source – analog and digital camcorder
- Archival master is uncompressed AVI (Audio Video Interleave)
- AVI file sizes are approximately 20GB per hour
- Streaming protocol is QuickTime H.264
- 29.9 frames/second, 640 x 480 resolution, data rate from 384 – 512 kb/sec
- Delivery to user as QuickTime or Flash