

Get your content under control with CMIS and Apache Chemistry

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Agenda

- CMIS
- Apache Chemistry
- OpenCMIS Client coding
- OpenCMIS Server coding



Who am I?

- Florent Guillaume
 - fg@nuxeo.com
- Director of R&D at Nuxeo
 - <http://nuxeo.com>
 - <http://doc.nuxeo.com>
- Nuxeo Architect
- Apache Committer
- Member of JSR 283, OASIS CMIS TC



Glossary

- CMIS
 - Content Management Interop. Services
- CMS, DMS, DAM, WCM, ECM, RM...
 - content, document, asset, record...
- Content Stream
 - resource / file from a filesystem
- Document
 - self-contained, structured metadata
 - high-level operations



What is CMIS?

- Domain Model

- services

- objects, types, properties

- ~~lowest~~ greatest common denominator

- Transport Protocols

- HTTP-based

- No Language API

- ⇒ Apache Chemistry

- (although WSDL is actually a language)



Interoperability

- Application / Repository
 - Client / Server
- Application ↔ Repository
 - *e.g.* photo management
- Repository ↔ Repository
 - *e.g.* archival, publishing
- Repository federation
 - central access to heterogenous systems

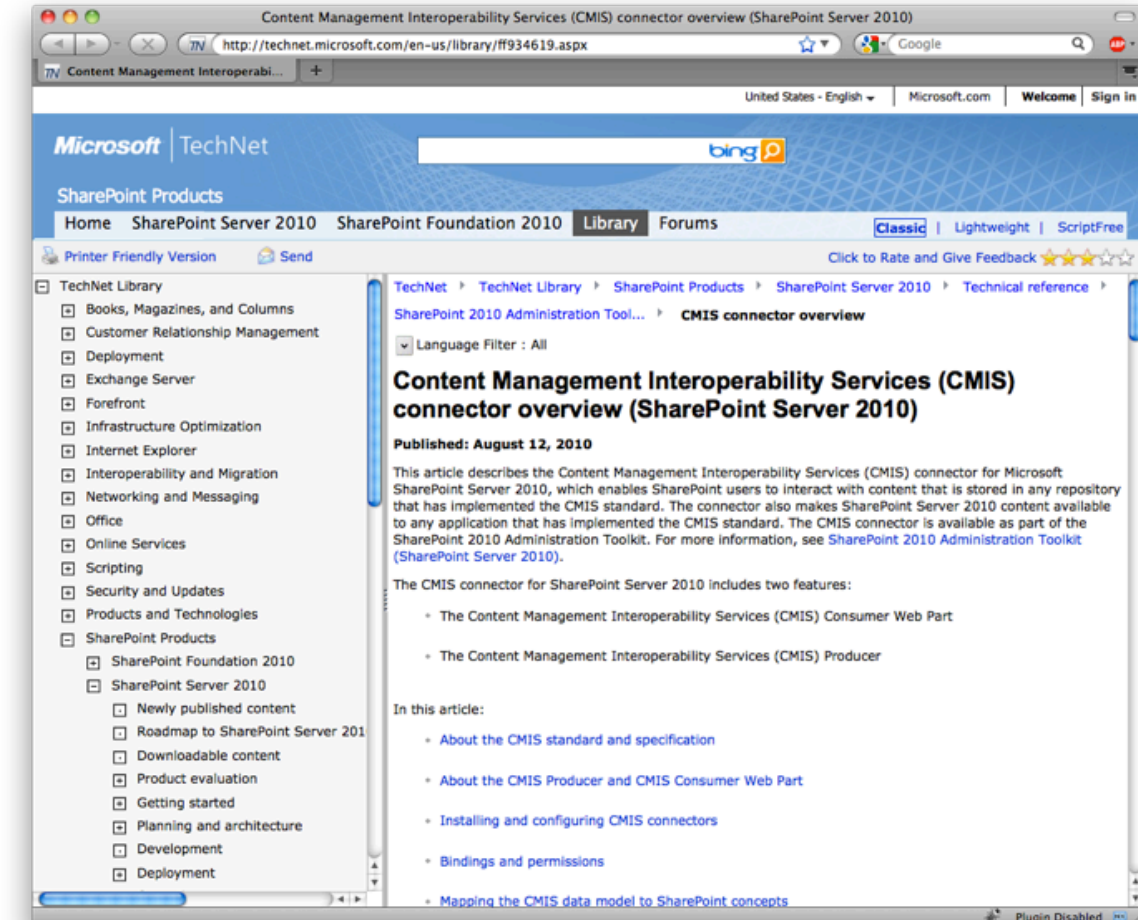


CMIS Implementations

- Product → Client / Repository
- Repositories
 - Alfresco, Nuxeo, Microsoft, IBM, SAP, eXo, Day, Jahia, KnowledgeTree, ...
- Clients
 - Adobe, IBM, Microsoft, eZ Publish, Plone, Drupal, Joomla, ...



SharePoint 2010 Connector



SharePoint 2010

Litware Home > Tasks

Tasks

Task list for workflow.

New ▾ Actions ▾ Settings ▾

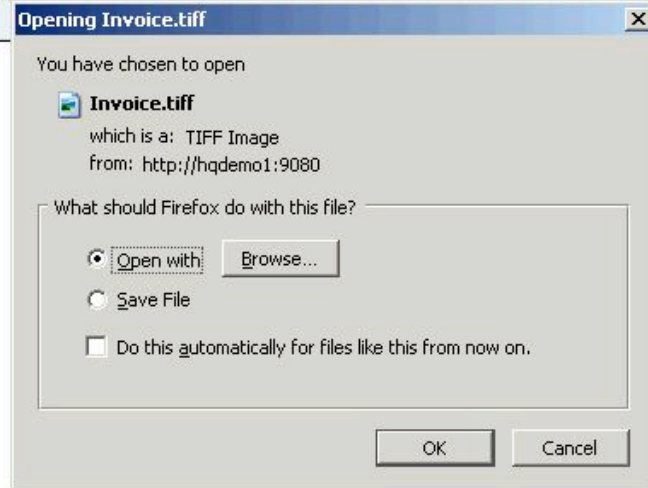
📄	Title	Assigned To	Status	Priority	Due Date	% Complete	Link
	New Task for Employee Outing.docx		Not Started	(2) Normal			
	Please approve Employee Outing	LitwareInc Administrator	Completed	(2) Normal		100%	Employee Outing
	New Task for Employee Outing.docx NEW		Not Started	(2) Normal			
	Please approve Laptop Computer NEW	LitwareInc Administrator	Not Started	(2) Normal			<u>Laptop Computer</u>



IBM FileNet P8

EVTFS > Applications > Accounts Payable

Type	Title	Published	Updated
Folder	<u>Forms</u>	18/03/2009 17:49:59	18/03/2009 17:49:59
Folder	<u>Processes</u>	18/03/2009 06:02:56	18/03/2009 06:02:56
Folder	<u>Entry Templates</u>	18/03/2009 05:52:12	18/03/2009 05:52:12
Folder	<u>Search Templates</u>	18/03/2009 05:46:06	18/03/2009 05:46:06
Document	<u>Purchase Order</u>	22/01/2009 11:01:38	22/01/2009 11:01:39
Document	<u>Invoice</u>		2009 11:01:03



Nuxeo

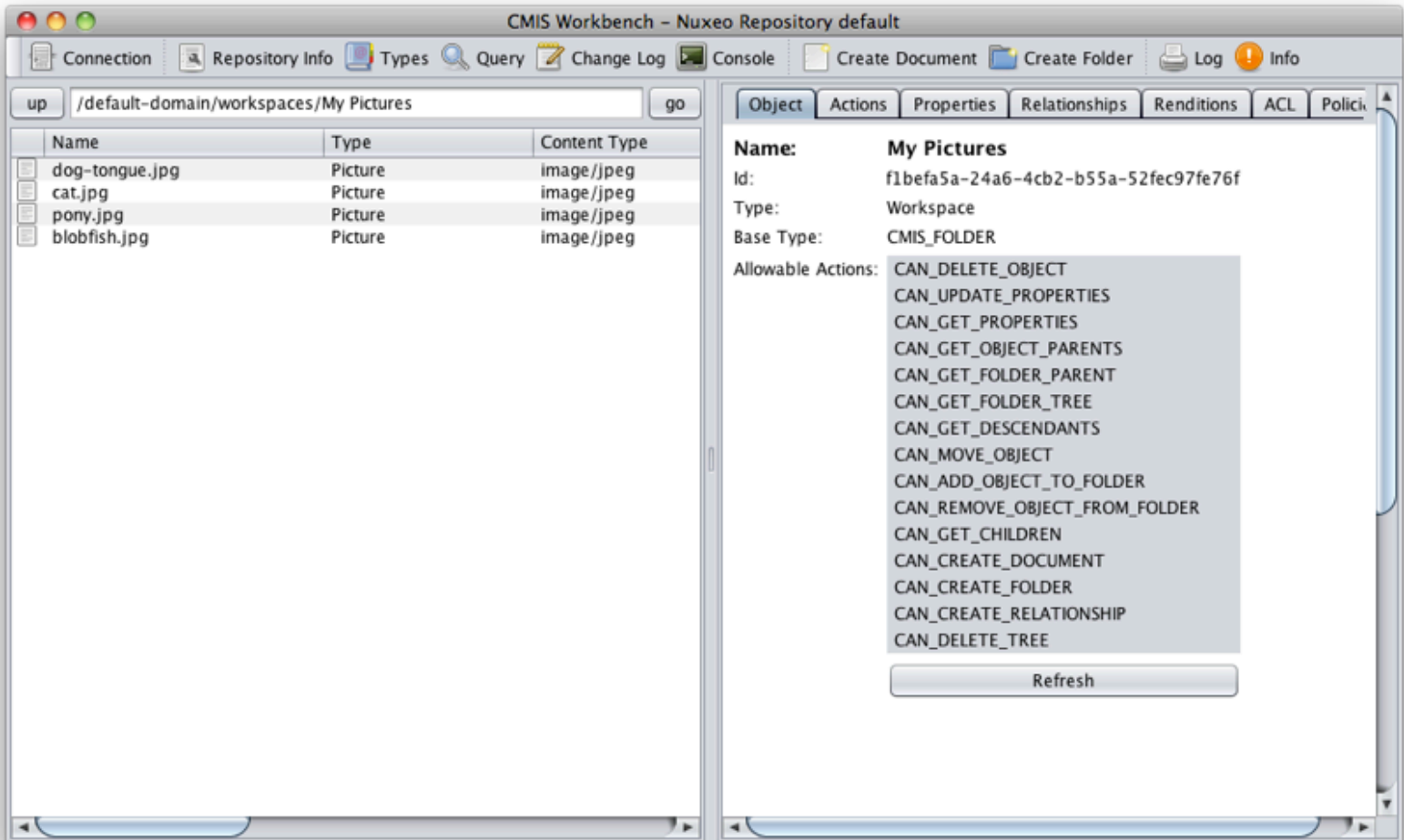
The screenshot shows the Nuxeo DM web interface. The browser address bar displays `http://localhost:8080/nuxeo/nxpath/default/default-domain/workspaces/My`. The page title is "Nuxeo DM - My Pictures". The user is logged in as Administrator. The interface includes a navigation menu on the left with "Default domain", "Sections", "Templates", "Workspaces", and "My Pictures". The main content area shows the "My Pictures" workspace with a table of files:

<input type="checkbox"/>	Title	Modified	Author	Version	State
<input type="checkbox"/>	blobfish.jpg	11/3/10 10:18 AM	Administrator	0.0	Project
<input type="checkbox"/>	cat.jpg	11/3/10 10:17 AM	Administrator	0.0	Project
<input type="checkbox"/>	dog-tongue.jpg	11/3/10 10:17 AM	Administrator	0.0	Project
<input type="checkbox"/>	pony.jpg	11/3/10 10:17 AM	Administrator	0.0	Project

At the bottom of the interface, there is a footer with "Copyright © 2006-2010 Nuxeo.Support | Forums | Documentation" and a "Nuxeo5 plugin ready" status indicator.



CMIS Workbench



CMIS Spaces

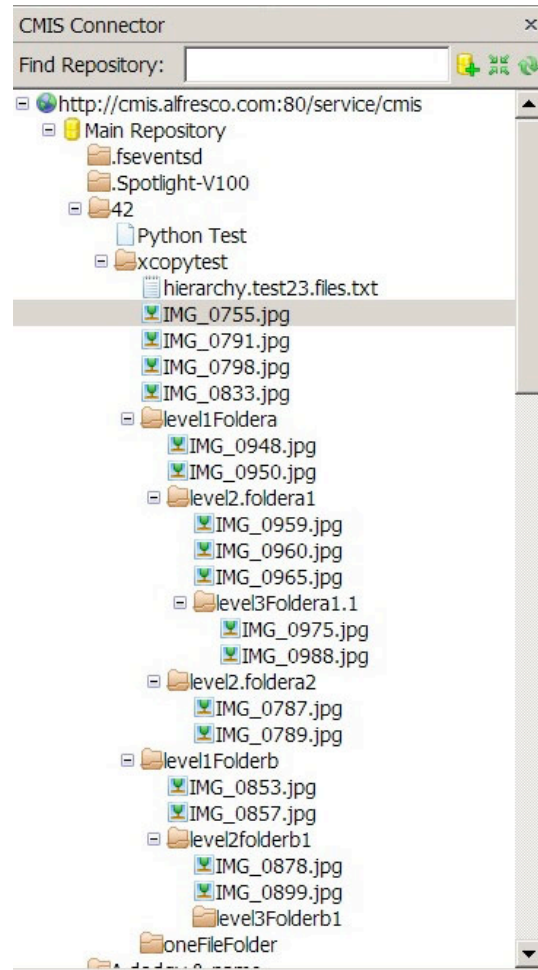
The screenshot displays the CMIS Spaces web interface. The top navigation bar includes 'File', 'Edit', 'View', and 'Tools' menus, along with a search bar and 'Advanced' and 'Logged in as: admin' indicators. A toolbar contains icons for 'New Folder', 'Upload', 'Cut', 'Copy', 'Paste', 'Delete', 'Edit', 'Update', 'Checkout', 'Cancel Checkout', 'Checkin', and 'Properties'. The left sidebar shows a tree view of the repository structure, with 'cmis test' selected. The main content area shows a file browser view of the '/Repository / cmis test' directory, containing a 'new folder', 'AlternativeSharePoi...', and 'hellocmis.txt'. Below the file browser is a table with columns for Name, Version, Author, Size, Created, and Modified. The table shows three versions of 'hellocmis.txt' with versions 1.2, 1.1, and 1.0, all authored by 'admin' and having a size of 5 bytes.

Name	Version	Author	Size	Created	Modified
hellocmis.txt	1.2	admin	5	2010-03-28T18:	2010-03-28T18:58:40.234-07
hellocmis.txt	1.1	admin	5	2010-03-28T18:	2010-03-28T18:57:25.125-07
hellocmis.txt	1.0	admin	5	2010-03-28T18:	2010-03-28T18:57:04.851-07





IBM Firefox Plugin





Plone

admin ▾

Search Site Search

only in current section

Home News Events Users **Alfresco Public Repository**

View Edit Sharing

Edit CMIS View

View of a remote CMIS repository

Default **Categorization** Dates Ownership Settings

Title

Description
Used in item listings and search results.

CMIS Repository URL

CMIS Repository Username

CMIS Repository Password

The Plone® Open Source Content Management System is © 2000-2010 by the Plone Foundation et al.
Plone® and the Plone logo are registered trademarks of the Plone Foundation. Distributed under the GNU GPL license.

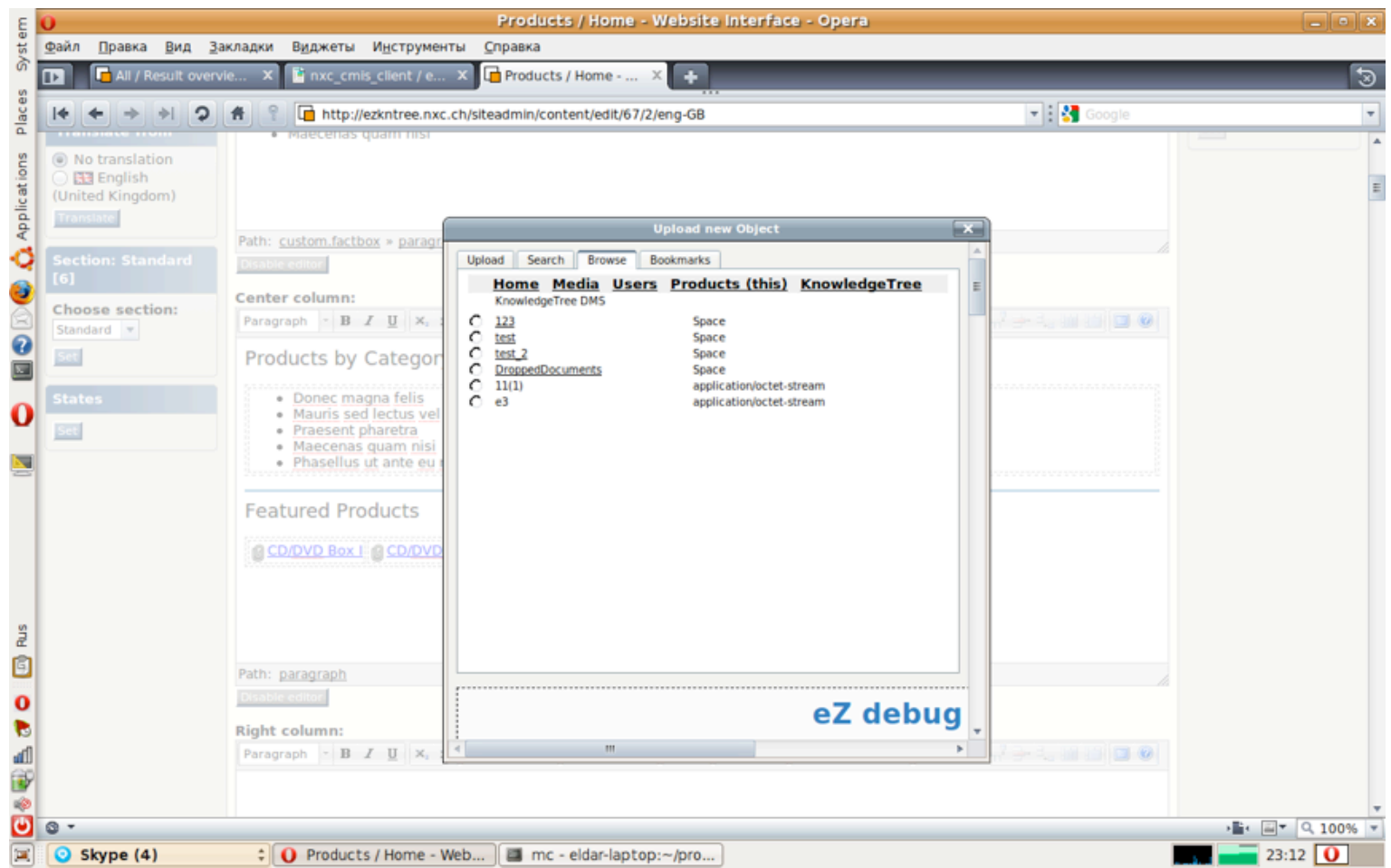
Drupal

The screenshot shows the Drupal administration interface for 'Integración Alfresco - Drupal'. The page title is 'Home' and the main content area is titled 'CMIS Repository'. There is a 'Path:' input field with a 'Browse' button and a 'Tree' radio button. Below this is an 'Actions' section and a 'Root' section. A table lists the repository contents:

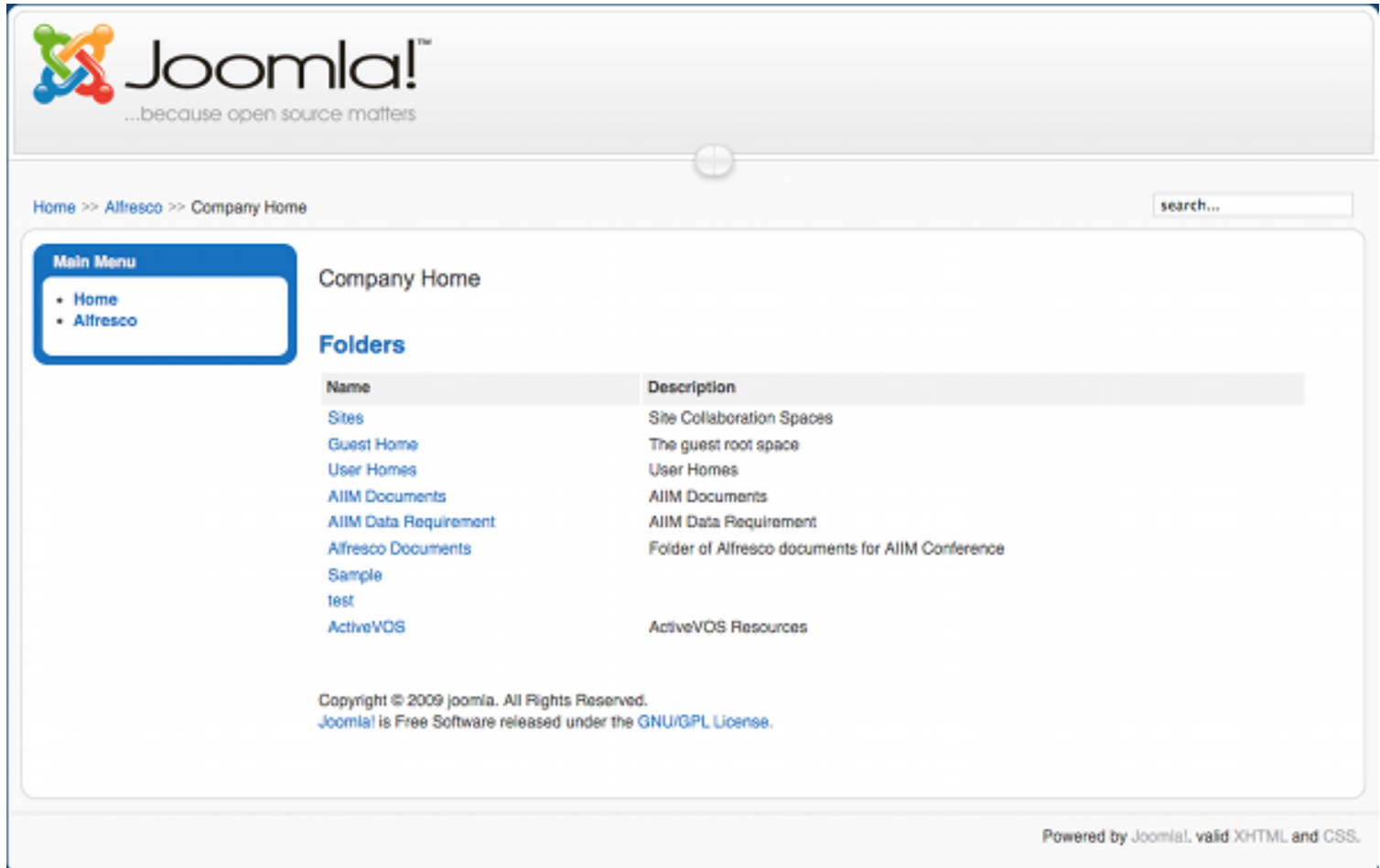
name	type	size	author	last modified	
Sites	Space		System	7/20/2010 1:21 PM	properties delete
Data Dictionary	Space		System	7/20/2010 1:01 PM	properties delete
Guest Home	Space		System	7/20/2010 1:01 PM	properties delete
User Homes	Space		System	7/20/2010 1:01 PM	properties delete
Web Projects	Space		System	7/20/2010 1:01 PM	properties delete
Web Deployed	Space		System	7/20/2010 1:01 PM	properties delete
ACME	Space		admin	7/22/2010 11:50 AM	properties delete



eZ Publish



Joomla



The screenshot shows the Joomla! website interface. At the top left is the Joomla! logo with the tagline "...because open source matters". Below the logo is a breadcrumb trail: "Home >> Alfresco >> Company Home". To the right of the breadcrumb is a search box labeled "search...". On the left side, there is a "Main Menu" box containing links for "Home" and "Alfresco". The main content area is titled "Company Home" and features a "Folders" section with a table listing various folders and their descriptions.

Name	Description
Sites	Site Collaboration Spaces
Guest Home	The guest root space
User Homes	User Homes
AIM Documents	AIM Documents
AIM Data Requirement	AIM Data Requirement
Alfresco Documents	Folder of Alfresco documents for AIM Conference
Sample test	
ActiveVOS	ActiveVOS Resources

Copyright © 2009 Joomla!. All Rights Reserved.
Joomla! is Free Software released under the GNU/GPL License.

Powered by Joomla!, valid XHTML and CSS.

CMIS Benefits

- Customer benefits
 - interoperability between vendors
 - common model
 - “desilofication”
 - “commoditization”
- Vendor benefits
 - repository vendors get more apps
 - applications vendors get more repos

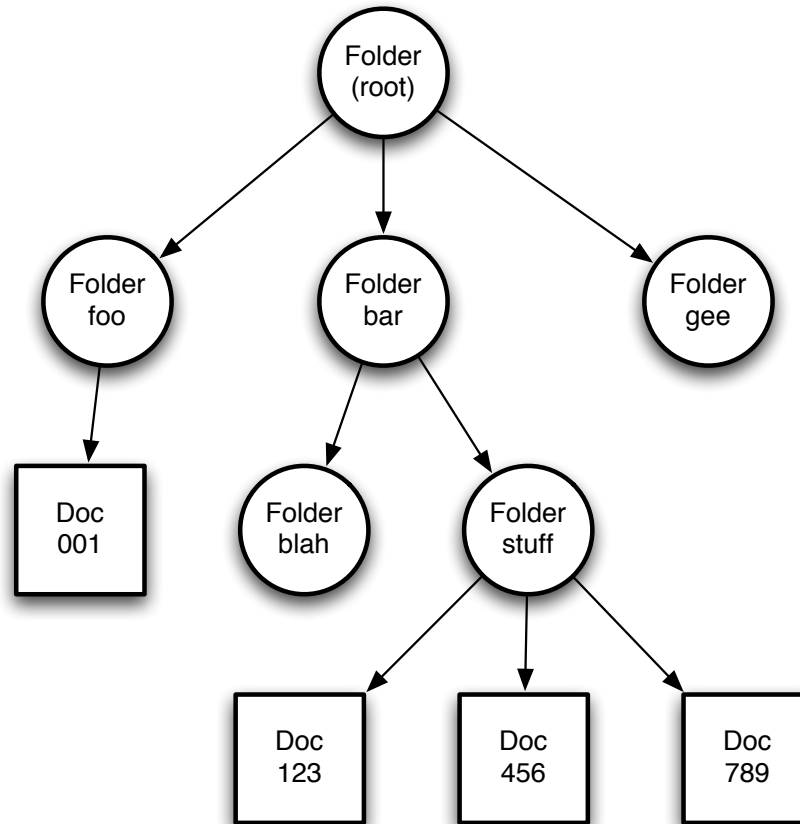


CMIS Domain Model

- Objects: Folders, Documents
- Properties
 - scalars, lists
 - string, boolean, decimal, integer, datetime, uri, id, html
 - binary content stream
- Types
 - inheritance, constraints
 - standard properties
 - id, name, creation, modification, version, ...



Folders and Documents



Document Properties

- 5ba79978-a87f-4146-9dd4-5197c5ac0962
 - cmis:objectId: 5ba79978-a87f-4146-9dd4-5197c5ac0962
 - cmis:objectTypeId: invoice
 - cmis:name: My Document
 - cmis:creationDate: 2010-01-25T10:15:07.155-08:00
 - cmis:createdBy: florent
 - cmis:lastModificationDate: 2010-01-25T10:20:53.286-08:00
 - cmis:lastModifiedBy: florent
 - cmis:contentStreamFileName: mydocument.pdf
 - cmis:contentStreamMimeType: application/pdf
 - cmis:isLatestVersion: true
 - cmis:versionLabel: v1.5
 - **keywords:** [example, sample, frobs]
 - **importance:** high



Type Definition Properties

- invoice
 - cmis:objectId: ID
 - cmis:objectTypeId: ID
 - cmis:name: String
 - cmis:creationDate: DateTime (read-only)
 - cmis:createdBy: String (read-only)
 - cmis:lastModificationDate: DateTime
 - cmis:isLatestVersion: Boolean
 - **keywords**: String (multi-valued, not required)
 - **importance**: String (choices: *low, medium, high*)



Type Definition

- invoice
 - id: invoice
 - localName: t-invoice
 - displayName: Invoice
 - baseId: cmis:document
 - parentId: record
 - fileable: true
 - queryable: true
 - fulltextIndexed: true
 - controllableACL: false



CMIS Services

- CRUD
- Queries
- Versioning
- Renditions
- Relationships
- Multi-Filing, ACLs, Change Log, Policies
- Repositories, Types





Retrieve

- By ID
- By Path
 - ID \neq name \neq path segment \neq file name
- Parent(s) / Children / Tree
- Properties
- Content Stream
- Allowable Actions
- Renditions

Retrieve Examples (I)

- By ID

```
ObjectId id = session.createObjectId(
    "5ba79978-a87f-4146-9dd4-5197c5ac0962");
CmisObject object = session.getObject(id);
```

- By Path

```
Folder folder = (Folder) session.getObjectByPath(
    "/corporate/invoices/foo");
```

- Children

```
for (CmisObject child : folder.getChildren()) {
    ...
}
```



Retrieve Examples (II)

- Properties

```
List<String> kw = doc.getPropertyValue("keywords");
```

- Content Stream

```
ContentStream cs = doc.getContentStream();  
String filename = cs.getFileName();  
InputStream stream = cs.getStream();
```



Query

- Retrieve by content
- SQL-like Language
 - Type → Table
 - Object → Row
 - Property → Column
 - Multi-Valued, Fulltext + Score, JOIN
- SELECT only
 - no UPDATE, DELETE



Query Examples

- Query

```
ItemIterable<QueryResult> list = session.query(
    "SELECT cmis:objectId FROM ...", true);
for (QueryResult qr : list) {
    qr.getPropertyById("cmis:name");
}
```

- CMISQL

```
SELECT cmis:objectId, cmis:name, SCORE() AS sc
FROM cmis:document
WHERE importance = 'high'
    AND 'frobs' = ANY keywords
    AND IN_TREE('5ba79978-a87f')
    AND CONTAINS('barack OR obama')
ORDER BY sc DESC
```



Create, Update, Delete

- Create
 - may need content stream
 - may check in
- Update
 - may verify a change token
 - may change ID (auto-versioning)
- Delete
 - may delete all versions



CRUD Examples

- Create

```
Map<String, Serializable> props =  
    new HashMap<String, Serializable>();  
props.put(PropertyIds.OBJECT_TYPE_ID, "Note");  
props.put(PropertyIds.NAME, "mynote");  
Document doc = folder.createDocument(props,  
    contentStream, null);
```

- Update

```
doc.updateProperties(props);
```

- Delete

```
doc.delete();
```



Versioning

- Version Series
- Private Working Copy
- Check In, Check Out
- Get All Versions
- (optional feature)



Versioning Examples

- Check Out

```
ObjectId pwcId = doc.checkOut();
```

- Check In

```
ObjectId verId = doc.checkIn(true, null, true, "foo");
```

- Get All Versions

```
List<Document> docs = doc.getAllVersions();
```



Versioning Variants

- No versioning (no type versionable)
- Auto-versioning
 - create new version on each edit
- PWC not updatable
 - explicit check in with new changes
- Version-specific filing
- Versions searchable or not



Renditions

- Retrieve Only
- Additional Content Streams
 - MIME type, kind, title, size
- Various uses
 - thumbnail / icon
 - transformations
 - PDF, HTML
 - Multi-Page
- (optional feature)



Renditions Examples

- Get Renditions

```
for (Rendition rendition : doc.getRenditions()) {  
    String kind = rendition.getKind();  
    String title = rendition.getTitle();  
    String mimeType = rendition.getMimeType();  
    ContentStream cs = rendition.getContentStream();  
    ...  
}
```



Relationships

- Source, Target
- Unfiled, not versionable
- May be queryable, controllable
- May use referential integrity
- (optional feature)



Relationships Examples

- Create Relationship

```
Map<String, Serializable> props =  
    new HashMap<String, Serializable>();  
props.put(PropertyIds.OBJECT_TYPE_ID, "Depends");  
props.put(PropertyIds.SOURCE_ID, source.getId());  
props.put(PropertyIds.TARGET_ID, target.getId());  
ObjectId relId = session.createRelationship(props);
```

- Get Relationships

```
for (Relationship rel : doc.getRelationships()) {  
    ...  
}
```

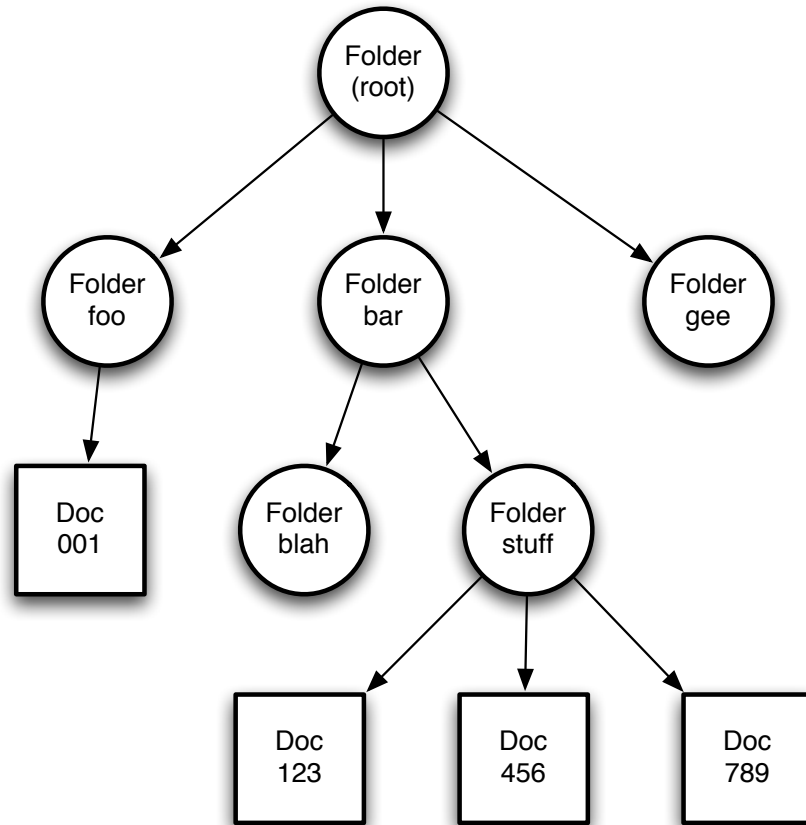


Multi-Filing, Unfiling

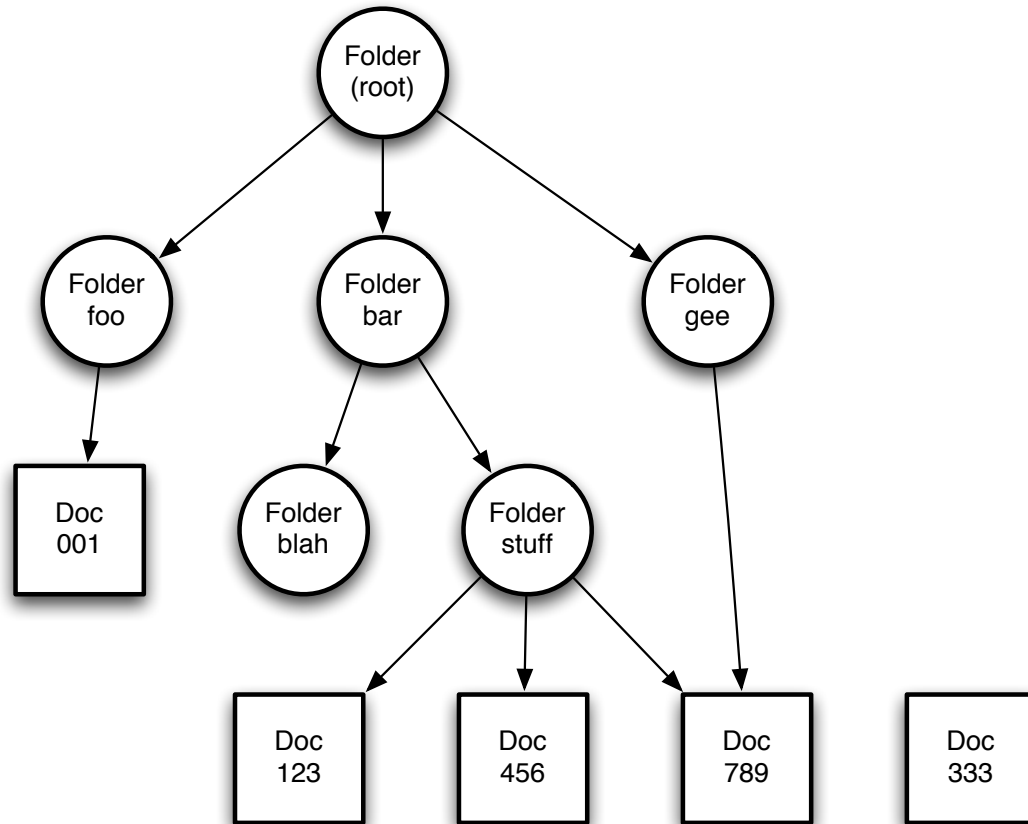
- Only for documents, not folders
- Zero, one or more parents
- All parents are equivalent
- Different paths
 - (if paths are supported)



Folders and Documents



Multi-Filing, Unfiling



Multi-Filing Example

- Multi-Filing

```
doc.addToFolder(folderId, false);
```

- Unfiling

```
doc.removeFromFolder(folderId);
```





ACLs

- Basic Read & Write permissions
- Repository-specific permissions
- Can be inherited along folder hierarchy
- Can be updated
- Mapping to Allowable Actions
 - ACL: bob has Read / Write here
 - AA: bob canMoveObject here
 - canMoveObject (on Object + Source + Target)

Change Log

- List of chronological changes to the repository
 - create, update, delete
 - ID of object
 - optionally properties, ACLs, policies
- Since a given date (change log token)
- May not be available since “forever”



Change Log Examples

- Get Content Changes

```
ChangeEvents events = session.getContentChanges(
    token, includeProperties, 1000);
for (ChangeEvent ev : events.getChangeEvents()) {
    ObjectId id = ev.getObjectId();
    Calendar time = ev.getChangeTime();
    if (ev.getChangeType() == ChangeType.UPDATED) {
        props = ev.getProperties();
        ...
    }
}
if (events.hasMoreItems()) {
    token = events.getLatestChangeLogToken();
}
...

```



Policies

- Attach policies to controllable objects
- Repository-specific
- Security policies
- Aspects / Facets / Mixins
- RM: Retention, Legal Hold



Repositories

- When connecting, list repositories
- Find out repository capabilities
 - implemented services, tree-based navigation, multi-filing, unfiling, query capabilities, ...
- Get repository-wide information
 - description, vendor, CMIS version, ...
 - root folder ID
 - latest change log token



CMIS Bindings

- AtomPub
 - ReST base
 - URI templates
- SOAP
 - Common Web Services
- Browser Bindings
 - JSON-based (work in progress)
- ... more possible



AtomPub

GET http://cmisexample.oasis-open.org/rep1/5ba79978-a87f-4146-9dd4-5197c5ac0962 HTTP/1.0

HTTP/1.1 200 Ok

Content-Type: application/atom+xml;type=entry

```
<atom:entry>
  <atom:content src="..." />
  <atom:id>urn:uuid:5ba79978-a87f-4146-9dd4-5197c5ac0962</atom:id>
  <atom:title type="text">CMIS Example Document</atom:title>
  <atom:updated>2010-01-25T10:20:53.286-08:00</atom:updated>
  <atom:link rel="self" href="..." />
  <atom:link rel="edit" href="..." />
  <atom:link type="application/atom+xml;type=entry" rel="describedby" href="..." />
  <atom:link type="application/atom+xml;type=feed" rel="up" href="..." />
  <atom:link type="application/atom+xml;type=feed" rel="version-history" href="..." />
  <cmisra:object>
    <cmis:allowableActions>...</cmis:allowableActions>
    <cmis:properties>
      ...
    </cmis:properties>
  </cmisra:object>
</atom:entry>
```



Non-ReST AtomPub

- URI templates

```
http://example.com/rep1/objectbyid/{id}
?filter={filter}
&includeAllowableActions={includeAllowableActions}
&includePolicyIds={includePolicyIds}
&includeRelationships={includeRelationships}
&includeACL={includeACL}
```



SOAP

```

<S:Envelope>
  <S:Body>
    <cmism:getProperties>
      <cmism:repositoryId>rep1</cmism:repositoryId>
      <cmism:objectId>
        5ba79978-a87f-4146-9dd4-5197c5ac0962
      </cmism:objectId>
    </cmism:getProperties>
  </S:Body>
</S:Envelope>

<S:Envelope>
  <S:Body>
    <cmism:getPropertiesResponse>
      <cmism:properties>
        ...
      </cmism:properties>
    </cmism:getPropertiesResponse>
  </S:Body>
</S:Envelope>

```



XML Payload

```
<cmis:properties>
  <cmis:propertyId propertyDefinitionId="cmis:objectId">
    <cmis:value>5ba79978-a87f-4146-9dd4-5197c5ac0962</cmis:value>
  </cmis:propertyId>
  <cmis:propertyId propertyDefinitionId="cmis:objectTypeId">
    <cmis:value>invoice</cmis:value>
  </cmis:propertyId>
  <cmis:propertyString propertyDefinitionId="cmis:name">
    <cmis:value>My Document</cmis:value>
  </cmis:propertyString>
  <cmis:propertyDateTime propertyDefinitionId="cmis:creationDate">
    <cmis:value>2010-01-25T10:20:53.364-08:00</cmis:value>
  </cmis:propertyDateTime>
  <cmis:propertyString propertyDefinitionId="cmis:contentStreamFileName">
    <cmis:value>mydocument.pdf</cmis:value>
  </cmis:propertyString>
  <cmis:propertyString propertyDefinitionId="cmis:contentStreamMimeType">
    <cmis:value>application/pdf</cmis:value>
  </cmis:propertyString>
  <cmis:propertyString propertyDefinitionId="keywords">
    <cmis:value>example</cmis:value>
    <cmis:value>sample</cmis:value>
    <cmis:value>frops</cmis:value>
  </cmis:propertyString>
</cmis:properties>
```



CMIS Miscellanea

- Stateless
- Transaction-less
- Authentication left to repository
 - HTTP Basic Auth, WS-Security + Username Token



History of CMIS (I)

- Founding members (from iECM) work on a new standard
 - 2006
 - EMC, IBM, Microsoft
- Contributing members invited for review
 - Aug 2007
 - Alfresco, Open Text, Oracle, SAP



History of CMIS (II)

- Draft spec submitted to OASIS
 - September 2008
- OASIS committee formed
 - November 2008
- First public draft released
 - October 2009
- CMIS 1.0 standard approved
 - May 2010



History of CMIS (III)

- OASIS TC members
 - Adobe, Adullact, Alfresco, ASG Software Solutions, Booz Allen Hamilton, Citytech, Content Technologies, Day, dotCMS, Ektron, EMC, Entropysoft, Exalead, FatWire, Fidelity Investments, Flatirons Solutions, fme, Genus Technologies, Greenbytes, Harris Corp, IBM, Magnolia, Microsoft, Nuxeo, Open Text, Oracle, Pearson, Quark, SAP, Saperion, Structured Software Systems, Sun, Vamosa, Vignette, WeWebU



Future of CMIS

- CMIS 1.1
 - late 2011
 - errata, clarifications
 - additional bindings
 - type mutability?
- CMIS 2.0
 - late 2012?
 - bigger features or non-backward compat
 - Transactions, Hierarchical/complex properties, Mixin types, WebDAV binding, Batch, Multiple content streams, Internationalization, More explicit exceptions, Better exposure of renditions, RepositoryInfo Property types support, AtomPub expressibility and clean-up, Type management, Records Management, Pessimistic locking, Workflow, Content Tagging, Content Recommendations, Commenting, Social



Other Standards

- ODMA
 - desktop-oriented
- WebDAV, DeltaV
 - filesystem-oriented
- RSS, AtomPub
 - limited domain model
- JCR (JSR-170, JSR-283)
 - Java-specific



Apache Chemistry

- Incubating project

- started in 2009

- <http://incubator.apache.org/chemistry/>



Apache
Chemistry

- Implement whole CMIS spec

- Client-side

- Java (OpenCMIS)

- Python, PHP, JavaScript

- Server-side

- Java (OpenCMIS)



Chemistry / OpenCMIS History

- Original Chemistry project
 - Day, Nuxeo in 2009
- OpenCMIS started privately
 - Alfresco, Open Text, SAP
 - Proposed to Apache in December 2009
- Chemistry and OpenCMIS merge
 - 3 days of meetings in April 2010
- OpenCMIS 0.1.0 released Sept. 2010



OpenCMIS Facts

- 90k lines of Java
 - OSGi bundles
 - 5 JARs needed for a client
 - Built with Maven
- Covers all aspects of the spec
- Extensible
- Lots of tests
- Contributors
 - Alfresco, Day, Nuxeo, Open Text, SAP...

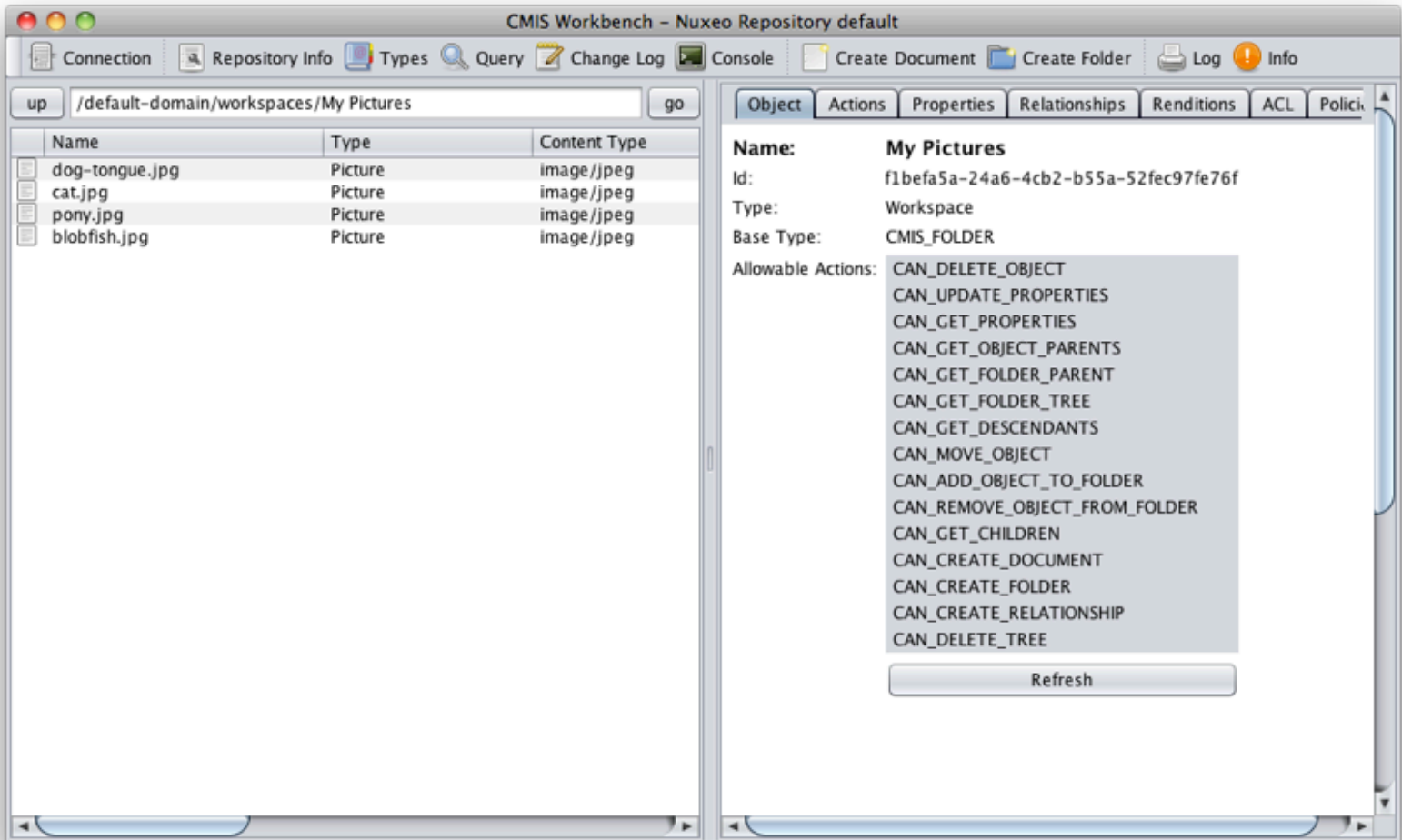


OpenCMIS Components

- Client API
- Client implementation
 - CMIS Workbench
- Server SPI
- Server implementations
 - filesystem
 - in-memory
- Transport protocol bindings
 - AtomPub, SOAP, JSON



CMIS Workbench



CMIS Workbench

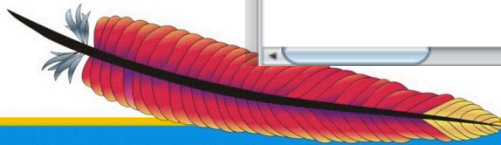
CMIS Workbench - Nuxeo Repository default

Connection Repository Info Types Query Change Log Console Create Document Create Folder Log Info

up /default-domain/workspaces/My Pictures go

Name	Type	Content Type	Size
dog-tongue.jpg	Picture	image/jpeg	
cat.jpg	Picture	image/jpeg	
pony.jpg	Picture	image/jpeg	
blobfish.jpg	Picture	image/jpeg	

Name	Id	Type	Value
Object ID	cmis:objectId	id	9dae7fee-6160-4fea-bcaf-648dcbd25145
Type ID	cmis:objectTypeId	id	Picture
Base Type ID	cmis:baseTypeId	id	cmis:document
Name	cmis:name	string	pony.jpg
Created By	cmis:createdBy	string	Administrator
Creation Date	cmis:creationDate	datetime	2010-11-03 10:17:39 -0400
Last Modified By	cmis:lastModifiedBy	string	Administrator
Last Modification Date	cmis:lastModificationDate	datetime	2010-11-03 10:17:39 -0400
Change Token	cmis:changeToken	string	null
Is Immutable	cmis:isImmutable	boolean	false
Is Latest Version	cmis:isLatestVersion	boolean	false
Is Major Version	cmis:isMajorVersion	boolean	false
Is Latest Major Version	cmis:isLatestMajorVersion	boolean	false
Version Label	cmis:versionLabel	string	null
Version Series ID	cmis:versionSeriesId	id	9dae7fee-6160-4fea-bcaf-648dcbd25145
Is Version Series Checked Out	cmis:isVersionSeriesCheckedOut	boolean	true
Version Series Checked Out By	cmis:versionSeriesCheckedOutBy	string	system
Version Series Checked Out ID	cmis:versionSeriesCheckedOutId	id	9dae7fee-6160-4fea-bcaf-648dcbd25145
Checkin Comment	cmis:checkinComment	string	null
Content Stream Length	cmis:contentStreamLength	integer	223457
MIME Type	cmis:contentStreamMimeType	string	image/jpeg
Filename	cmis:contentStreamFileName	string	pony.jpg
Content Stream ID	cmis:contentStreamId	id	null
dc:creator	dc:creator	string	Administrator
dc:contributors	dc:contributors	string	Administrator
dc:source	dc:source	string	
dc:created	dc:created	datetime	2010-11-03 10:17:39 -0400
dc:description	dc:description	string	
dc:rights	dc:rights	string	
dc:subjects	dc:subjects	string	
dc:valid	dc:valid	datetime	
dc:format	dc:format	string	
dc:issued	dc:issued	datetime	
dc:modified	dc:modified	datetime	2010-11-03 10:17:39 -0400
dc:language	dc:language	string	
dc:expired	dc:expired	datetime	
dc:coverage	dc:coverage	string	
dc:title	dc:title	string	pony.jpg
uid	uid	string	
minor_version	minor_version	integer	0
major_version	major_version	integer	0
headline	headline	string	
genre	genre	string	
typage	typage	string	
origin	origin	string	
slugline	slugline	string	
caption	caption	string	
dateline	dateline	string	



CMIS Workbench Console

```

GroovyConsole
File Edit View History Script Help CMIS
1 import org.apache.chemistry.opencmis.commons.*
2 import org.apache.chemistry.opencmis.commons.data.*
3 import org.apache.chemistry.opencmis.commons.enums.*
4 import org.apache.chemistry.opencmis.client.api.*
5
6 cmis = new scripts.CMIS(session)
7
8 // destination folder
9 Folder destFolder = cmis.getFolder("/")
10
11 // source folder
12 String localPath = "/some/local/folder"
13
14 // upload folder tree
15 upload(destFolder, localPath)
16
17 //-----
18
19
20 def upload(destination, String localPath,
21 String folderType = "cmis:folder",
22 String documentType = "cmis:document",
23 VersioningState versioningState = VersioningState.MAJOR) {
24
25     println "Uploading...\n"
26     doUpload(destination, new File(localPath), folderType, documentType, versioningState)
27     println "\n...done."
28 }
29
30 def doUpload(Folder parent, File folder, String folderType, String documentType, Versioni
31 folder.eachFile {
32
33     if (it.getName().startsWith(".")) {
34         println "skipping " + it.getName()
35         return;
36     }
37
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```

Welcome to Groovy. 49:1



Clients using OpenCMIS

- Spring Surf CMIS Application Browser
- Confluence CMIS Plugin
- CMIS Explorer
- CMIS connectivity for SAP Applications (upcoming)
- Struts2CmisExplorer
- CMIS Workbench
- Alfresco Web Quick Start



Servers using OpenCMIS

- Open Text Enterprise Library CMIS Connector
- OpenWGA CMIS Connectivity Plugin
- Alfresco CMIS Preview
- Nuxeo CMIS Connector



OpenCMIS – Client coding

- See above :)

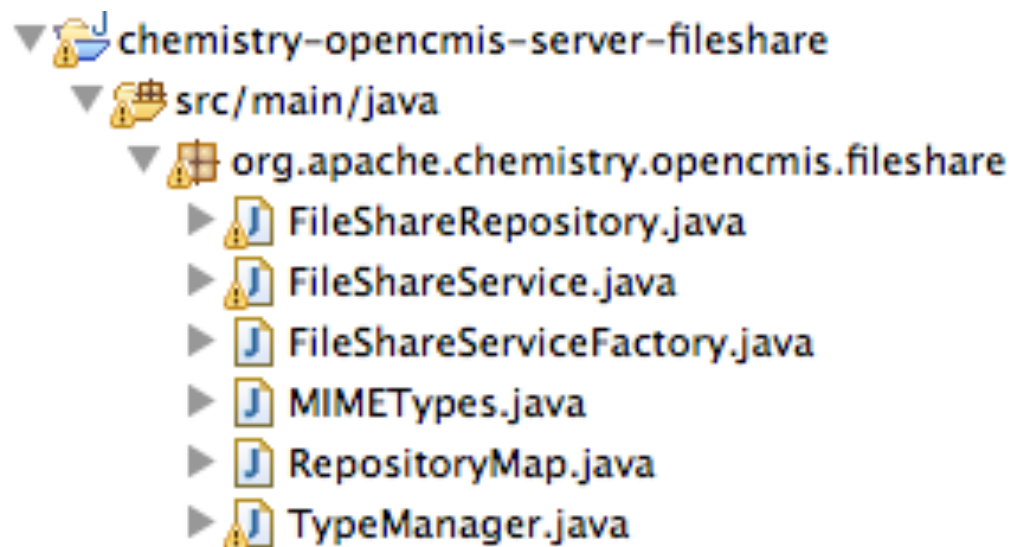


OpenCMIS – Server coding

- Define model mapping
 - types, property types
 - ids, path segments, names
 - files, filenames
 - versioning, locking, content log
- Implement the SPI
 - `CmisService`
- Bindings are taken care of for you!



OpenCMIS – Server coding



▼ ⓘ ObjectService

- createDocument(String, Properties, String, ContentStream, VersioningState, List<String>, Acl, Acl, ExtensionsData) : ContentStream
- createDocumentFromSource(String, String, Properties, String, VersioningState, List<String>, Acl, Acl, ExtensionsData) : ContentStream
- createFolder(String, Properties, String, List<String>, Acl, Acl, ExtensionsData) : String
- createRelationship(String, Properties, List<String>, Acl, Acl, ExtensionsData) : String
- createPolicy(String, Properties, String, List<String>, Acl, Acl, ExtensionsData) : String
- getAllowableActions(String, String, ExtensionsData) : AllowableActions
- getObject(String, String, String, Boolean, IncludeRelationships, String, Boolean, Boolean, ExtensionsData) : Object
- getProperties(String, String, String, ExtensionsData) : Properties
- getRenditions(String, String, String, BigInteger, BigInteger, ExtensionsData) : List<RenditionData>
- getObjectByPath(String, String, String, Boolean, IncludeRelationships, String, Boolean, Boolean, ExtensionsData) : Object
- getContentStream(String, String, String, BigInteger, BigInteger, ExtensionsData) : ContentStream
- updateProperties(String, Holder<String>, Holder<String>, Properties, ExtensionsData) : void
- moveObject(String, Holder<String>, String, String, ExtensionsData) : void
- deleteObject(String, String, Boolean, ExtensionsData) : void
- deleteTree(String, String, Boolean, UnfileObject, Boolean, ExtensionsData) : FailedToDeleteData
- setContentStream(String, Holder<String>, Boolean, Holder<String>, ContentStream, ExtensionsData) : void
- deleteContentStream(String, Holder<String>, Holder<String>, ExtensionsData) : void



Questions?

- <http://www.oasis-open.org/committees/cmis/>
- <http://docs.oasis-open.org/cmisis/CMIS/v1.0/cs01/cmisis-spec-v1.0.html>
- <http://incubator.apache.org/chemistry/>
- <http://doc.nuxeo.com/>

