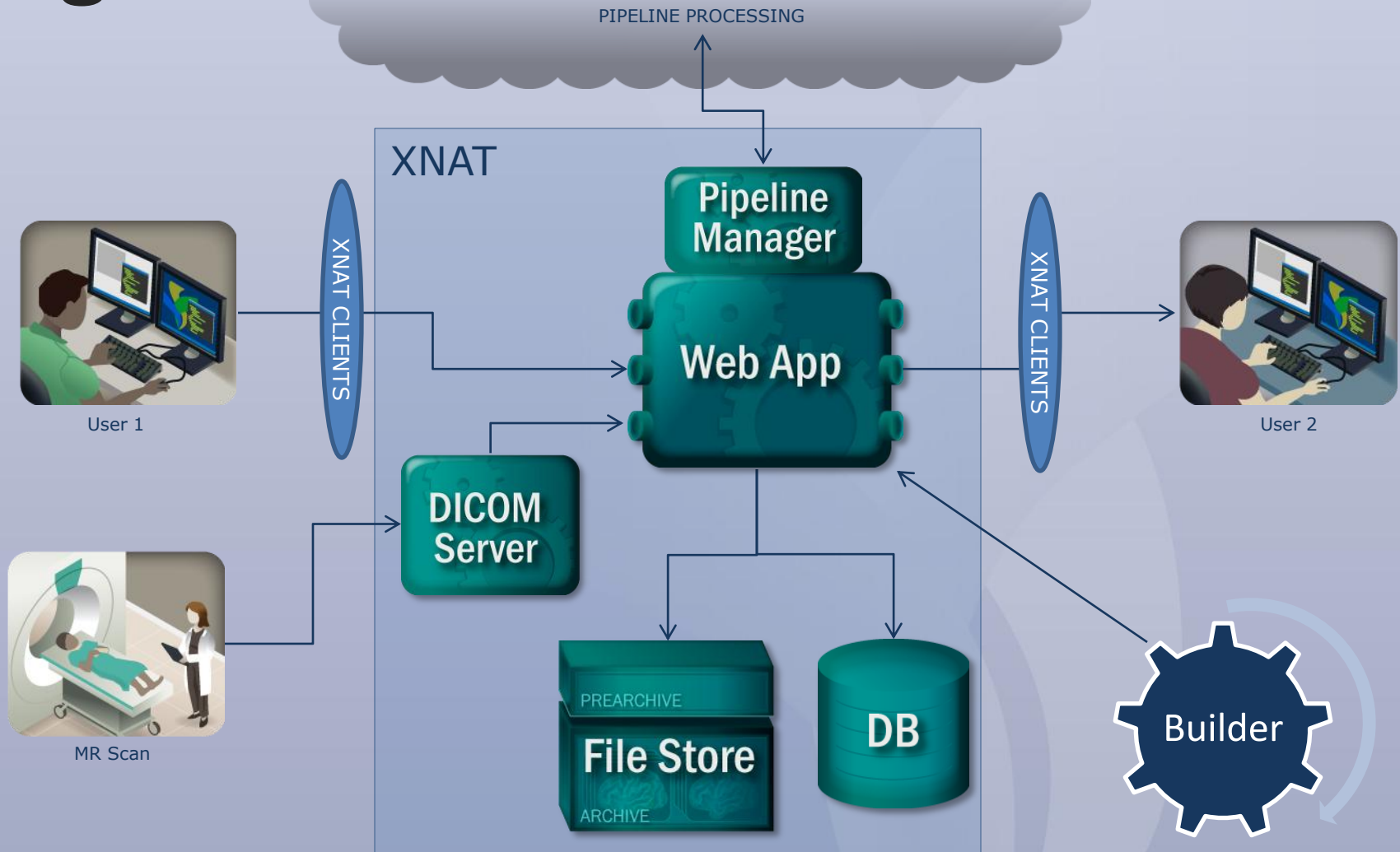
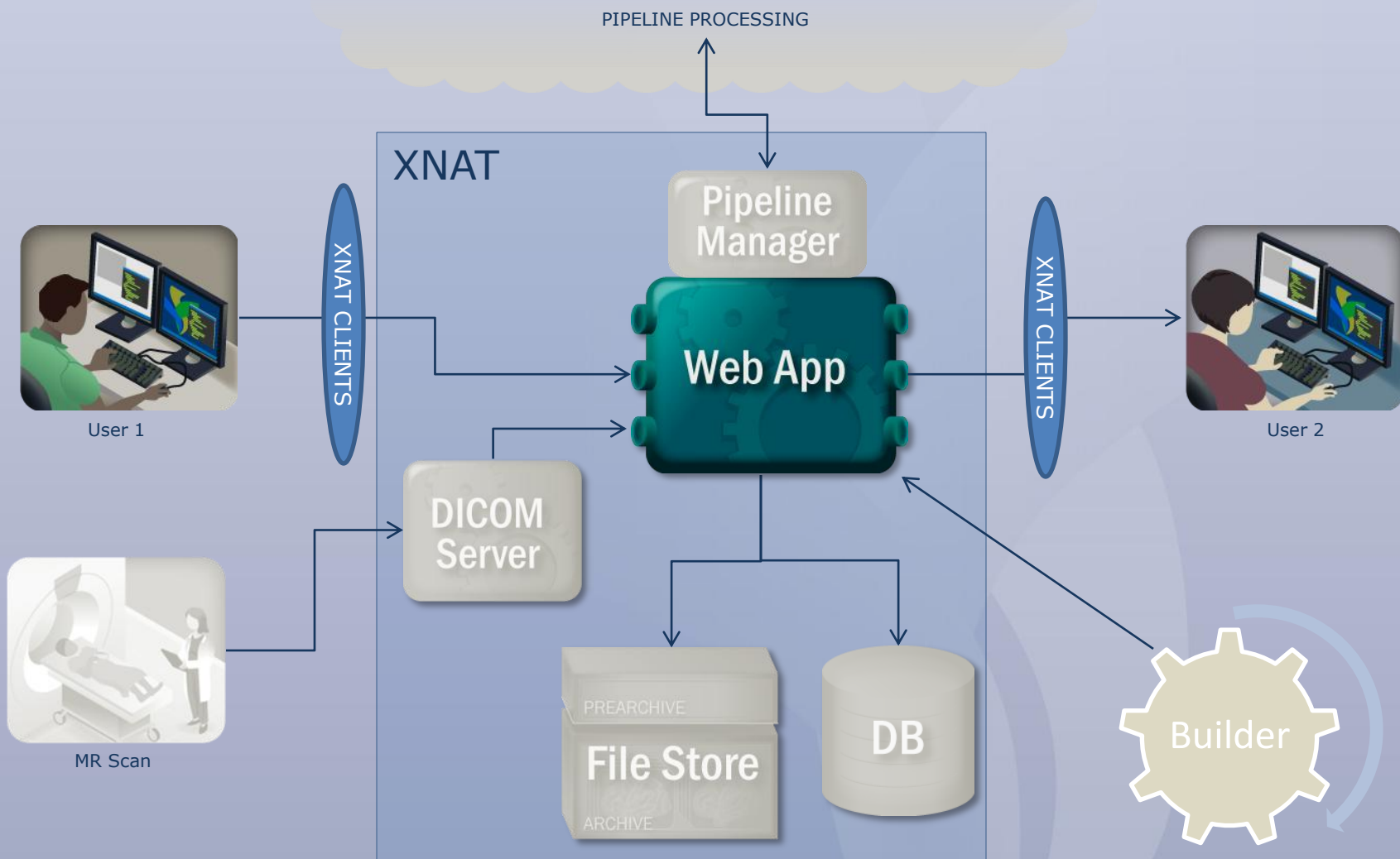


Power Users

Big Picture



In this talk



Plan

- Batch upload options
- Batch download options
- Searching
 - Traditional Search Engine
 - REST Enhanced Listings

Batch Uploads

- Manual Creation
- REST API
- DICOM Send
- XNAT Desktop
- Auto-creation
- Spreadsheet Upload

Batch Uploads: Auto subject creation

- Auto-creation of Subjects
 - Part of Auto-archive feature
 - Uses subject label defined in DICOM header
 - If subject exists, it matches
 - If not, it creates a new subject with that ID
 - No demographics

Batch Uploads: Spreadsheet Upload

- Upload CSV data
- Experimental (due to interface)
- Limitations
 - Can't reformat data on server side
 - Unable to reorder columns
 - Can't add unbounded elements
 - Can't add custom variables

Batch Uploads Spreadsheet Upload



User: admin ([Logout](#)) ([Edit](#)) ([Report a problem](#)) [Advanced](#)

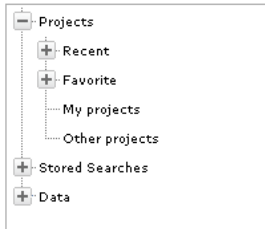
- Home
- New ▾
- Upload ▾
- Administer ▾
- Tools ▾

- Projects
 - Recent
 - Favorite
 - My projects
 - Other projects
- Stored Searches
- Data

Step 1: Select the root data type to be inserted.

Title: (This will be used to reload this spreadsheet template at a later date.)

Root Data Type:



Step 2: Select the fields which will map to columns in your comma-delimited file.

 Check All

xnatsubjectData/ID (Required)

- xnat:subjectData/investigator_xnat_investigatordata_id
- xnat:subjectData/group
- xnat:subjectData/label
- xnat:subjectData/src
- xnat:subjectData/investigator/title
- xnat:subjectData/investigator/firstname
- xnat:subjectData/investigator/lastname
- xnat:subjectData/investigator/institution
- xnat:subjectData/investigator/department
- xnat:subjectData/investigator/email
- xnat:subjectData/investigator/phone
- xnat:subjectData/investigator/ID
- xnat:subjectData/investigator/xnat_investigatorData_id

xnatsubjectData/demographics

- xnat:subjectData/demographics/xnat_abstractDemographicData_id
- xnat:subjectData/demographics/dob
- xnat:subjectData/demographics/yob
- xnat:subjectData/demographics/age
- xnat:subjectData/demographics/gender
- xnat:subjectData/demographics/handedness
- xnat:subjectData/demographics/ses
- xnat:subjectData/demographics/education
- xnat:subjectData/demographics/educationDesc
- xnat:subjectData/demographics/race
- xnat:subjectData/demographics/race2
- xnat:subjectData/demographics/race3
- xnat:subjectData/demographics/race4
- xnat:subjectData/demographics/race5
- xnat:subjectData/demographics/race6
- xnat:subjectData/demographics/ethnicity
- xnat:subjectData/demographics/weight
- xnat:subjectData/demographics/weight/units
- xnat:subjectData/demographics/height
- xnat:subjectData/demographics/height/units
- xnat:subjectData/demographics/gestational_age
- xnat:subjectData/demographics/post_menstrual_age
- xnat:subjectData/demographics/birth_weight

xnatsubjectData/metadata

This field can be extended by multiple data types. Please select the data-type you would like to use.

- Projects
 - Recent
 - Favorite
 - My projects
 - Other projects
- Stored Searches
- Data

Step 3: Enter the data

After entering your data (via upload or manual entry), you will need to click the 'Save' button at the bottom of the page to complete the process.

Option 1: Upload the data

File No file chosen [Download Template](#)

Option 2: Enter the data manually.

<input type="text"/>	xnat:subjectData/ID
<input type="text"/>	xnat:subjectData/group
<input type="text"/>	xnat:subjectData/demographics[@xsi:type='xnat:demographicData']/dob
<input type="text"/>	xnat:subjectData/demographics[@xsi:type='xnat:demographicData']/gender
<input type="text"/>	xnat:subjectData/demographics[@xsi:type='xnat:demographicData']/handedness

	COLUMN 0	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	
0	TEST1	control	01/02/1990	male	f	<input type="button" value="REMOVE"/>
1	TEST2	control	07-20-1975	male	female	<input type="button" value="REMOVE"/>

Project

Batch Uploads: Spreadsheet Upload



User: admin ([Logout](#)) ([Edit](#)) ([Report a problem](#)) [Advanced](#)

- Home
- New ▾
- Upload ▾
- Administer ▾
- Tools ▾

- Projects
 - Recent
 - Favorite
 - My projects
 - Other projects
- Stored Searches
- Data

PROJECT: TEST

Please review the records before storing.

TEST1 (CNINDS01_S000002)	control	Tue Jan 02 00:00:00 CST 1990(NULL)	male	f	MODIFIED
TEST2	control	Wed Dec 27 00:00:00 CST 13	male	female<	NEW

Batch Uploads: Spreadsheet Upload



User: admin ([Logout](#)) ([Edit](#)) ([Report a problem](#)) [Advanced](#)

- Home
- New ▾
- Upload ▾
- Administer ▾
- Tools ▾

- Projects
 - Recent
 - Favorite
 - My projects
 - Other projects
- Stored Searches
- Data

PROJECT: TEST

Please review the records before storing.

TEST1 (CNINDS01_S000002)	control	Tue Jan 02 00:00:00 CST 1990(NULL)	male	left (right)	MODIFIED
TEST2	control	Wed Dec 27 00:00:00 CST 13	male	right	NEW

Batch Uploads: Spreadsheet Upload



User: admin ([Logout](#)) ([Edit](#)) ([Report a problem](#)) [Advanced](#)

[Home](#) [New](#) [Upload](#) [Administer](#) [Tools](#)

- Projects
 - Recent
 - Favorite
 - My projects
 - Other projects
- Stored Searches
- Data

PROJECT: TEST

Your uploaded entries have been stored.

TEST1	control	01/02/1990	male	left	Successful
TEST2	control	07-20-1975	male	right	Successful

Batch Download

- Individual download
- REST API
- Download Applet

Batch Download: Download Applet

- Java Applet
- Used for downloading large amounts of imaging data
- Limitations:
 - Doesn't support project files
 - Doesn't support subject files
 - Doesn't support 'Additional Resources'

- Projects
 - + Recent
 - + Favorite
 - My projects
 - Other projects
- + Stored Searches
- Data

PROJECT: demo

Imaging Data Download

1 Confirm Sessions for download

<input checked="" type="checkbox"/>	Toggle All (41)	
<input checked="" type="checkbox"/>	234	CR
<input checked="" type="checkbox"/>	13562	CR
<input checked="" type="checkbox"/>	25377M9	CR
<input checked="" type="checkbox"/>	CT00000023	CR
<input checked="" type="checkbox"/>	6019	CR
<input checked="" type="checkbox"/>	15_29_06	CT
<input checked="" type="checkbox"/>	012345678910	XA
<input checked="" type="checkbox"/>	28	MR
<input checked="" type="checkbox"/>	93	MR
<input checked="" type="checkbox"/>	930	MR
<input checked="" type="checkbox"/>	000-00-0000	US
<input checked="" type="checkbox"/>	PHANTOM	
<input checked="" type="checkbox"/>	0000002019	CT
<input checked="" type="checkbox"/>	0000002014	CT
<input checked="" type="checkbox"/>	0300003486	CT
<input checked="" type="checkbox"/>	0000002018	CT
<input checked="" type="checkbox"/>	0000000867	CT
<input checked="" type="checkbox"/>	0000002011	CT
<input checked="" type="checkbox"/>	000003_M_47	CT
<input checked="" type="checkbox"/>	3234807	CT
<input checked="" type="checkbox"/>	12966750	CT
<input checked="" type="checkbox"/>	63542	MR
<input checked="" type="checkbox"/>	VOL9998888	MR
<input checked="" type="checkbox"/>	X-545454	MR
<input checked="" type="checkbox"/>	Vol-11100	MR

2 Select image data to download

<input type="checkbox"/>	Toggle All	
Raw Scans		
<input type="checkbox"/>	Unassigned (32)	
<input type="checkbox"/>	t2_spc_1mm_p2 (1)	
<input type="checkbox"/>	thoracic LAT (1)	
<input type="checkbox"/>	PRE CONTRAST LIVER (1)	
<input type="checkbox"/>	C.DIAG (1)	
<input type="checkbox"/>	t1_mpr_1mm_p2_pos50 (2)	
<input type="checkbox"/>	general PA (1)	
<input type="checkbox"/>	C5,2,2.5,1.0,1.1,0.85,106 (1)	
<input type="checkbox"/>	Adv Sim 3.0 RT Structure Sets (1)	
<input type="checkbox"/>	C5,0,2.5,0.6,1.0,0.90,105 (2)	
<input type="checkbox"/>	Adv Sim 3.0 RT Images (1)	
<input type="checkbox"/>	hand AP (1)	
<input type="checkbox"/>	SC Image (Adv Sim 3.0) (1)	
<input type="checkbox"/>	Adv Sim 3.0 RT Plans (1)	
Reconstructions		
Assessments		

3 Select download format

- Option 1: Direct download

You will be prompted to enter a local directory to copy the data to. Then, all of the requested imaging data will be directly downloaded via a java applet into that directory.
- Option 2: Catalog XML (.xcat)

Download an xml representation of the files. This xml can then be used by specific applications to download the data at the user's command.

4 Submit Data Request

Upon page submission, the pertinent files will be reviewed and organized for download. Depending on the number of files, this may take several minutes to process.

Batch Download: Download Applet

The screenshot displays the XNAT web interface. At the top left is the XNAT logo. To the right, the user is identified as 'admin' with links for 'Logout', 'Edit', and 'Report a problem'. A search bar and a 'Search' button are present, along with a link to 'Advanced' options. Below this is a navigation menu with buttons for 'Home', 'New', 'Upload', 'Administer', and 'Tools'. On the left side, there is a sidebar menu with expandable sections: 'Projects' (expanded), 'Recent', 'Favorite', 'My projects', 'Other projects', 'Stored Searches', and 'Data'. The main content area is titled 'Download Images'. At the bottom, a progress indicator shows 'Downloading, 24688 KB completed'. Below this, there is a 'Select local folder:' field containing 'C:\Temp' and a 'Browse...' button. An 'Overall progress:' bar is shown with a blue progress indicator and a 'Stop' button.

User: admin ([Logout](#)) ([Edit](#)) ([Report a problem](#)) [Advanced](#)

[Home](#) [New](#) [Upload](#) [Administer](#) [Tools](#)

Download Images

Downloading, 24688 KB completed

Select local folder:

Overall progress:

Searching

- Traditional Search
 - XML based
 - Robust, Customizable
 - Used in web interface
- Enhanced REST Listings
 - Direct querying against schema structure

Searching: Traditional

- Walk through example search

Searching: Search XML

```
<?xml version="1.0" encoding="UTF-8"?>
<xdat:search ID="" allow-diff-columns="0" secure="false" brief-description="MR Sessions" xmlns:cnda="http://hrg.wustl.edu/cnda" xmlns:arc="http://hrg.wustl.edu/arc"
xmlns:pipe="http://hrg.wustl.edu/pipe" xmlns:fs="http://hrg.wustl.edu/fs" xmlns:wvrk="http://hrg.wustl.edu/workflow" xmlns:xdat="http://hrg.wustl.edu/security"
xmlns:cat="http://hrg.wustl.edu/catalog" xmlns:prov="http://www.nbirn.net/prov" xmlns:xnat="http://hrg.wustl.edu/xnat" xmlns:xnat_a="http://hrg.wustl.edu/xnat_assessments"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <xdat:root_element_name>xnat:mrSessionData</xdat:root_element_name>
  <xdat:search_field>
    <xdat:element_name>xnat:mrSessionData</xdat:element_name>
    <xdat:field_ID>LABEL</xdat:field_ID>
    <xdat:sequence>0</xdat:sequence>
    <xdat:type>string</xdat:type>
    <xdat:header>MR ID</xdat:header>
  </xdat:search_field>
  <xdat:search_field>
    <xdat:element_name>xnat:subjectData</xdat:element_name>
    <xdat:field_ID>LABEL</xdat:field_ID>
    <xdat:sequence>2</xdat:sequence>
    <xdat:type>string</xdat:type>
    <xdat:header>Subject</xdat:header>
  </xdat:search_field>
  <xdat:search_where method="AND">
    <xdat:criteria override_value_formatting="0">
      <xdat:schema_field>xnat:mrSessionData/DERIVED_AGE</xdat:schema_field>
      <xdat:comparison_type>=</xdat:comparison_type>
      <xdat:value>90</xdat:value>
    </xdat:criteria>
    <xdat:criteria override_value_formatting="0">
      <xdat:schema_field>xnat:mrSessionData/scans/scan/type</xdat:schema_field>
      <xdat:comparison_type>=</xdat:comparison_type>
      <xdat:value>MPRAGE</xdat:value>
    </xdat:criteria>
  </xdat:search_where>
</xdat:search>
```

Searching: Search Fields

```
<xdat:search_field>  
  <xdat:element_name>xnat:mrSessionData</xdat:element_name>  
  <xdat:field_ID>LABEL</xdat:field_ID>  
  <xdat:sequence>0</xdat:sequence>  
  <xdat:type>string</xdat:type>  
  <xdat:header>MR ID</xdat:header>  
</xdat:search_field>
```

Values in field_ID:

- Field ID from Display document
- XPATH from schema (xnat:mrSessionData/scans/scan/type)

Searching: Search Criteria

```
<xdat:search_where method="AND">
  <xdat:criteria override_value_formatting="0">
    <xdat:schema_field>xnat:mrSessionData/DERIVED_AGE</xdat:sc
hema_field>
    <xdat:comparison_type>></xdat:comparison_type>
    <xdat:value>90</xdat:value>
  </xdat:criteria>
  <xdat:criteria override_value_formatting="0">
    <xdat:schema_field>xnat:mrSessionData/scans/scan/type</xdat
:schema_field>
    <xdat:comparison_type>=</xdat:comparison_type>
    <xdat:value>MPRAGE</xdat:value>
  </xdat:criteria>
</xdat:search_where>
```

Searching: Execution

- How to post via REST

POST /REST/search?format=xml

retrieves results

Searching: Web interface

- Sorting
- Add Columns
- Join To...
- Saved searches

Enhanced REST Listings

- Available on REST URIs which return listings

/REST/projects

returns a list of projects

/REST/projects/ID/subjects

returns a list of subjects for the given project

/REST/projects/ID/subjects/ID/experiments

returns a list of experiments for a given subject

/REST/projects/ID/experiments

returns a list of experiments for a project

/REST/experiments

returns a list of all experiments

/REST/subjects

returns a list of all subjects

/REST/experiments/ID/scans

returns a list of scans for an imaging session

/REST/experiments/ID/reconstructions

returns a list of reconstructions for an imaging session

/REST/experiments/ID/assessments

returns a list of assessments for an imaging session

Enhanced REST Listings

- `/REST/experiments?format=xml`

```
<columns>
  <column>ID</column>
  <column>project</column>
  <column>date</column>
  <column>xsiType</column>
  <column>label</column>
  <column>insert_date</column>
  <column>URI</column>
</columns>

<row>
  <cell>CNINDS01_E00001</cell>
  <cell>TEST1</cell>
  <cell>2006-12-14</cell>
  <cell>xnat:mrSessionData</cell>
  <cell>SampleID</cell>
  <cell>2010-06-02 12:20:02.0</cell>
  <cell>/REST/experiments/CNINDS01_E00001</cell>
</row>
```

Enhanced REST Listings: xsiType

- By default, all data types returned
- Use xsiType to fine tune results.
 - `xsiType=xnat:mrSessionData`

`/REST/experiments?format=xml&xsiType=xnat:mrSessionData`

Enhanced REST Listings: Columns

- Query String Attribute: **columns**
- Can use XML Path (or path shortcuts)

<http://nrg.wikispaces.com/XNAT+REST+XML+Path+Shortcuts>

- `columns=`

`xnat:mrSessionData/project,`

`xnat:mrSessionData/date,`

`xnat:mrSessionData/ID`

Enhanced REST Listings: Columns

```
/REST/experiments?format=xml  
&xsiType=xnat:mrSessionData  
&columns=xnat:mrSessionData/project,xnat:mrSessionData/date,xnat:mrSessionData/ID
```

```
<columns>  
  <column>xnat:mrsessiondata/id</column>  
  <column>xnat:mrsessiondata/project</column>  
  <column>xnat:mrsessiondata/date</column>  
  <column>URI</column>  
</columns>  
  
<row>  
  <cell>CNINDS01_E00001</cell>  
  <cell>TEST1</cell>  
  <cell>2006-12-14</cell>  
  <cell>/REST/experiments/CNINDS01_E00001</cell>  
</row>
```

Enhanced REST Listings: Columns

Unbounded Elements

- This will result in multiple rows per root entry.
 - `xnat:mrSessionData/scans/scan/type` results in one row per scan, rather than session.

Enhanced REST Listings: Columns

- [] are not currently supported
- Direct child references are allowed.
 - Xnat:mrScanData/parameters/tr
- Work similar to:
 - Xnat:mrSessionData/scans/scan[@xsiType=xnat:mrScanData]/parameters/tr
- XNAT knows how to join extended types
xnat:mrSessionData - xnat:mrScanData

Enhanced REST Listings: Filters

- Constrain root elements returned
- Use same XML Path or Path shortcuts
- Appended as query string parameters
- Supported comparison types: =,<,>
- Separate multiple values with ,
- Use * wildcard in string data for partial match

&xnat:mrSessionData/scans/scan/type=BOLD

Search: Future

- Search engine needs refactoring
 - Unable to control join logic
 - Support for XML Path is a hack
 - Support for [] is limited
 - Inefficient query design

Questions

- ???