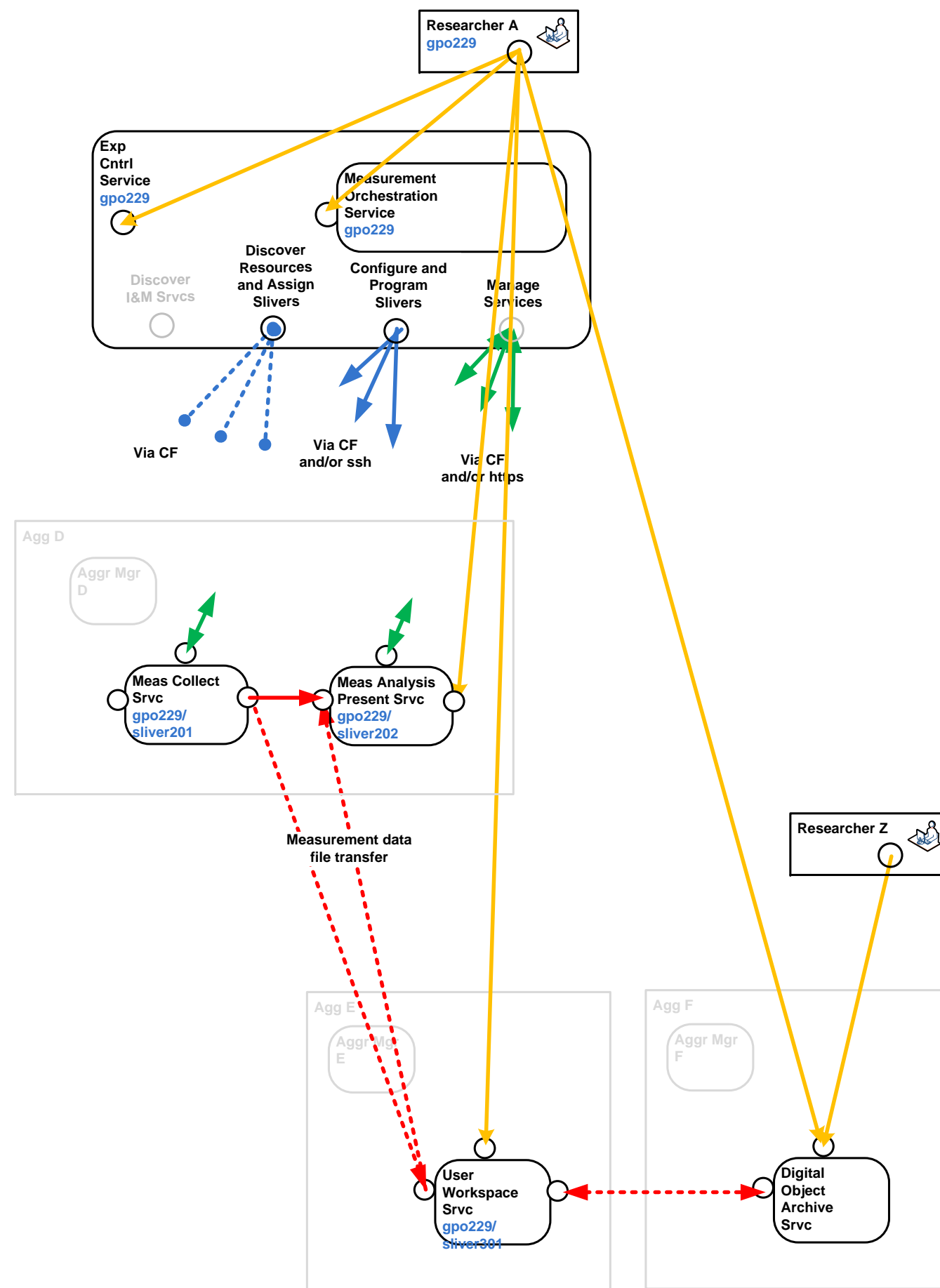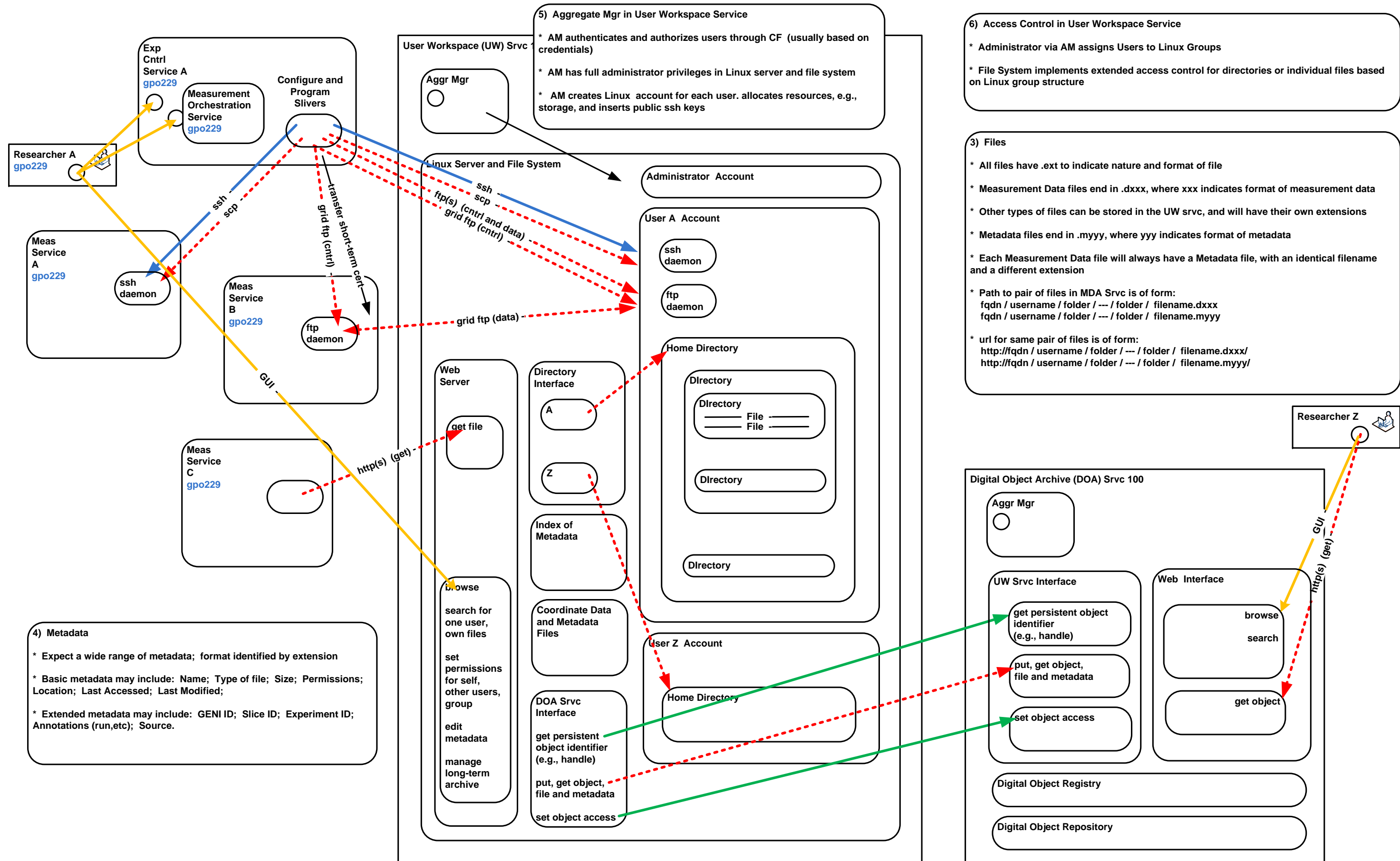**1) Meas Data Archive (MDA) Srvc Overview**

* From one to many MDA services are provided for use by GENI users (e.g., researchers).

* The MDA srvc is partitioned for use by multiple GENI users.

* The MDA srvc allows users to store, retrieve, browse, search, share and archive measurement data files, including their associated metadata.

* The MDA srvc is not limited to measurement data, and can be used for other types of files needed by a researcher.

* The MDA srvc utilizes the mechanisms provided by the CF to authenticate and authorize users.
        Assume: CF drops public keys of authorized users into MDA srvc; presence of key indicates an "account" on the MDA srvc

* The MDA srvc is implemented by a User Workspace (UW) Srvc, which in turn utilizes an Digital Object Archive (DOA) Srvc.

* The UW srvc utilizes a Linux server and file system structure so that the user can easily transfer files to (and from) a familiar Linux home directory structure, which has been customized by and for the user.

* The UW srvc is expected to accumulate a large number (e.g., thousands) of files for a user, which from time to time can be discarded. For example, It might accumulate directories of multiple files for each of 29 runs of a particular experiment. Eventually, run 29 is certified as the "golden run", and all others can be discarded.

* There can be many UW srvcs. One UW srvc is expected to be shared by a natural group(s), so that users in the group can easily share files. Such a group might be a campus, project or slice.

* A DOA srvc is used to archive files for long-term reference, and gives each file a persistent identifier.

* The DOA srvc trusts one or more UW srvc's, and accepts files from them.

* The DOA srvc holds files for a long time, with high availability, and makes them available to their owners and to other users, as authorized.
        For example, the owner may reference a file in a research paper.
        For example, the owner may make a measurement data set available to other researchers to guide their research.

2) Meas Data Archive (MDA) Srvc Use Cases

* User can transfer meas data (and other types of) files between Exp Cntrl Srvc or Meas Srvc (or a component) and User Workspace UW) Srvc, which contains a Linux home directory structure, setup by user

* Supported protocols include: scp; ftp(s); grid (third-party) ftp; http(s).

* When transferring a file, authentication and authorization are done using keys "dropped" by the CF into the involved services

* User can set directory or file permissions for self, other users and identified groups

* User can generate metadata file where data is collected, and transfer it in parallel to the UW srvc; otherwise, metadata file will be generated in the UW srvc

* User can browse files via ssh or web interfaces

* Use can search metadata via web interface.

* User can edit metadata, e.g., add annotation, via web interface

* User can select file(s) (including metadata) for transfer to Digital Object Archive (DOA) Srvc, get necessary persistent object identifier, transfer file, and set object access rules

* User can update file in DOA service

* User can retrieve file from DOA service

* User can allow others to browse, search and get files from DOA service

Researcher A
gpo229

Exp Cntrl Service
gpo229

Measurement Orchestration Service
gpo229

Discover I&M Srvcs

Discover Resources and Assign Slivers

Configure and Program Slivers

Manage Services

Via CF

Via CF and/or ssh

Via CF and/or https

Agg D

Aggr Mgr D

Meas Collect Srvc
gpo229/ sliver201

Meas Analysis Present Srvc
gpo229/ sliver202

Measurement data file transfer

Researcher Z

Agg E

Aggr Mgr E

Agg F

Aggr Mgr F

User Workspace Srvc
gpo229/ sliver301

Digital Object Archive Srvc

Exp Cntrl Service A
gpo229

Measurement Orchestration Service
gpo229

Configure and Program Slivers

Researcher A
gpo229

Meas Service A
gpo229

ssh daemon

Meas Service B
gpo229

ftp daemon

ssh
scp

transfer short-term cert
grid ftp (cntrl)

GUI

Meas Service C
gpo229

User Workspace (UW) Srvc 1

Aggr Mgr

5) Aggregate Mgr in User Workspace Service

*   AM authenticates and authorizes users through CF (usually based on credentials)

*   AM has full administrator privileges in Linux server and file system

*   AM creates Linux account for each user. allocates resources, e.g., storage, and inserts public ssh keys

6) Access Control in User Workspace Service

*   Administrator via AM assigns Users to Linux Groups

*   File System implements extended access control for directories or individual files based on Linux group structure

Linux Server and File System

ssh
scp

ftp(s) (cntrl and data)
grid ftp (cntrl)

Administrator Account

User A Account

ssh daemon

ftp daemon

grid ftp (data)

Home Directory

DIrectory

DIrectory

DIrectory
File
File

DIrectory

DIrectory

3) Files

*   All files have .ext to indicate nature and format of file

*   Measurement Data files end in .dxxx, where xxx indicates format of measurement data

*   Other types of files can be stored in the UW srvc, and will have their own extensions

*   Metadata files end in .myyy, where yyy indicates format of metadata

*   Each Measurement Data file will always have a Metadata file, with an identical filename and a different extension

*   Path to pair of files in MDA Srvc is of form:
    fqdn / username / folder / --- / folder / filename.dxxx
    fqdn / username / folder / --- / folder / filename.myyy

*   url for same pair of files is of form:
    http://fqdn / username / folder / --- / folder / filename.dxxx/
    http://fqdn / username / folder / --- / folder / filename.myyy/

Web Server

get file

http(s) (get)

Directory Interface

A

Z

Index of Metadata

Coordinate Data and Metadata Files

DOA Srvc Interface

get persistent object identifier (e.g., handle)

put, get object, file and metadata

set object access

browse

search for one user, own files

set permissions for self, other users, group

edit metadata

manage long-term archive

User Z Account

Home Directory

Researcher Z

Digital Object Archive (DOA) Srvc 100

Aggr Mgr

UW Srvc Interface

get persistent object identifier (e.g., handle)

put, get object, file and metadata

set object access

Web Interface

browse

search

get object

GUI

http(s) (get)

Digital Object Registry

Digital Object Repository

4) Metadata

* Expect a wide range of metadata; format identified by extension

* Basic metadata may include: Name; Type of file; Size; Permissions; Location; Last Accessed; Last Modified;

* Extended metadata may include: GENI ID; Slice ID; Experiment ID; Annotations (run,etc); Source.