(Reusable) Portal-based Authorization Solution for the Earth System Grid SciDAC Project

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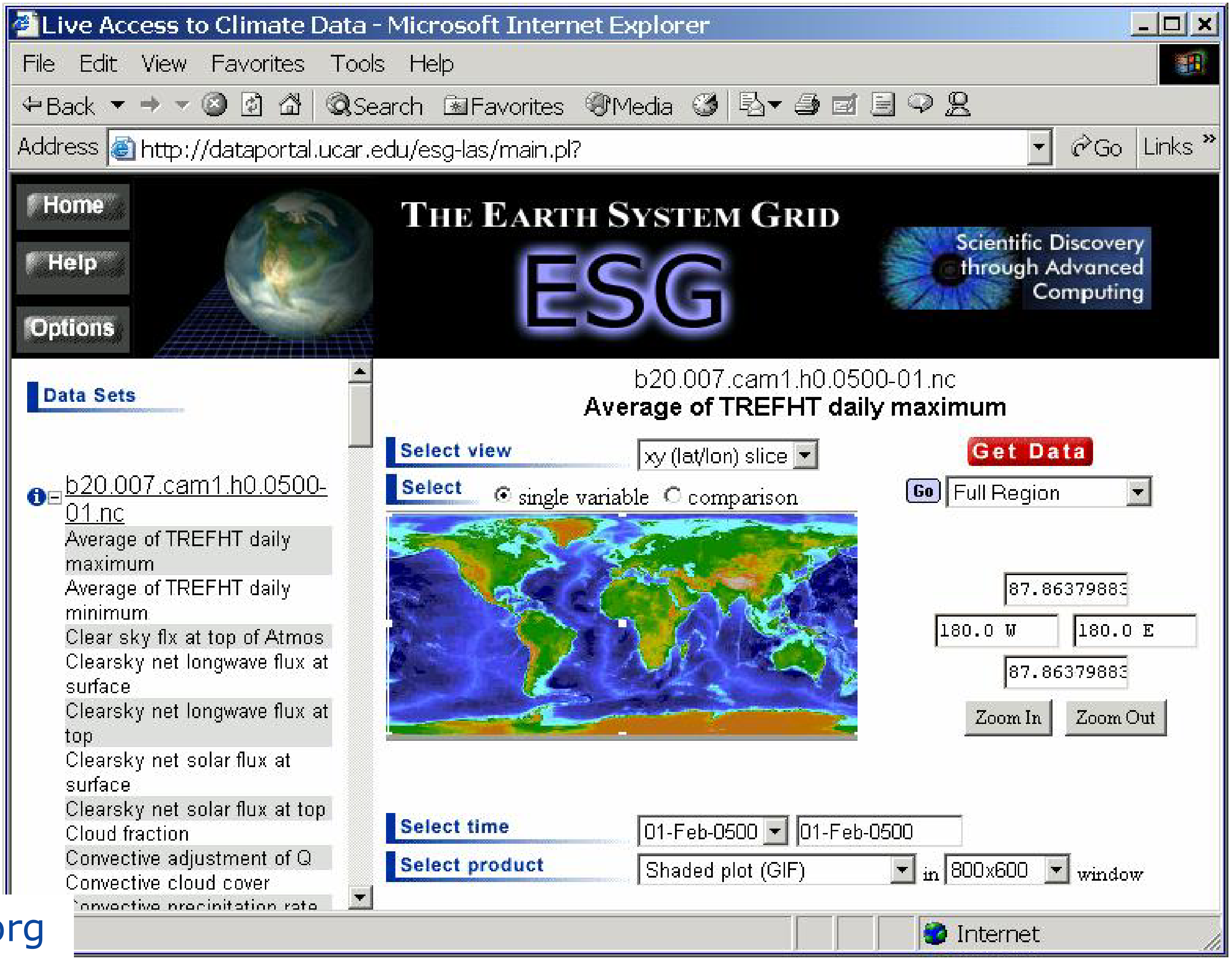
DOE Earth System Grid

Goal: address technical obstacles to the sharing & analysis of high-volume data from advanced earth system models


Live Access to Climate Data - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Go Links
Home
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Options
The Earth System Grid
ESG
Scientific Discovery through Advanced Computing
Get Data
Go
Zoom In
Zoom Out
Internet

Address: http://dataportal.ucar.edu/esg-las/main.pl?

Data Sets

b20.007.cam1.h0.0500-01.nc
- Average of TREFHT daily maximum
- Average of TREFHT daily minimum
- Clear sky flx at top of Atmos
- Clearsky net longwave flux at surface
- Clearsky net longwave flux at top
- Clearsky net solar flux at surface
- Clearsky net solar flux at top
- Cloud fraction
- Convective adjustment of Q
- Convective cloud cover
- Convective precipitation rate

b20.007.cam1.h0.0500-01.nc
Average of TREFHT daily maximum

Select view: xy (lat/lon) slice

Select: ● single variable ○ comparison

Full Region

87.86379883
180.0 W 180.0 E
87.86379883

Select time: 01-Feb-0500 01-Feb-0500

Select product: Shaded plot (GIF) in 800x600 window

www.earthsystemgrid.org

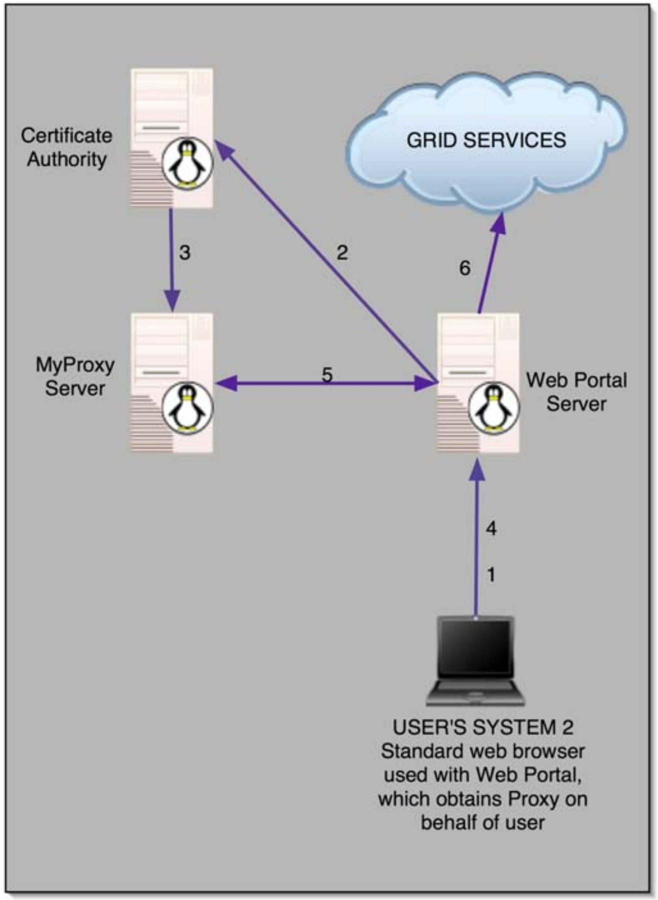
ESG Authorization requirements

- Access to most data requires that the name of the requesting user be logged.
- Access to some private data is restricted to specific users.
- Some data is located on mass storage systems to which access is restricted to users with approved PKI credentials.
- Some data is located on HPSS storage behind GridFTP server
- Some data is located on disk storage behind HTTPS server.

ESG Authorization Requirements

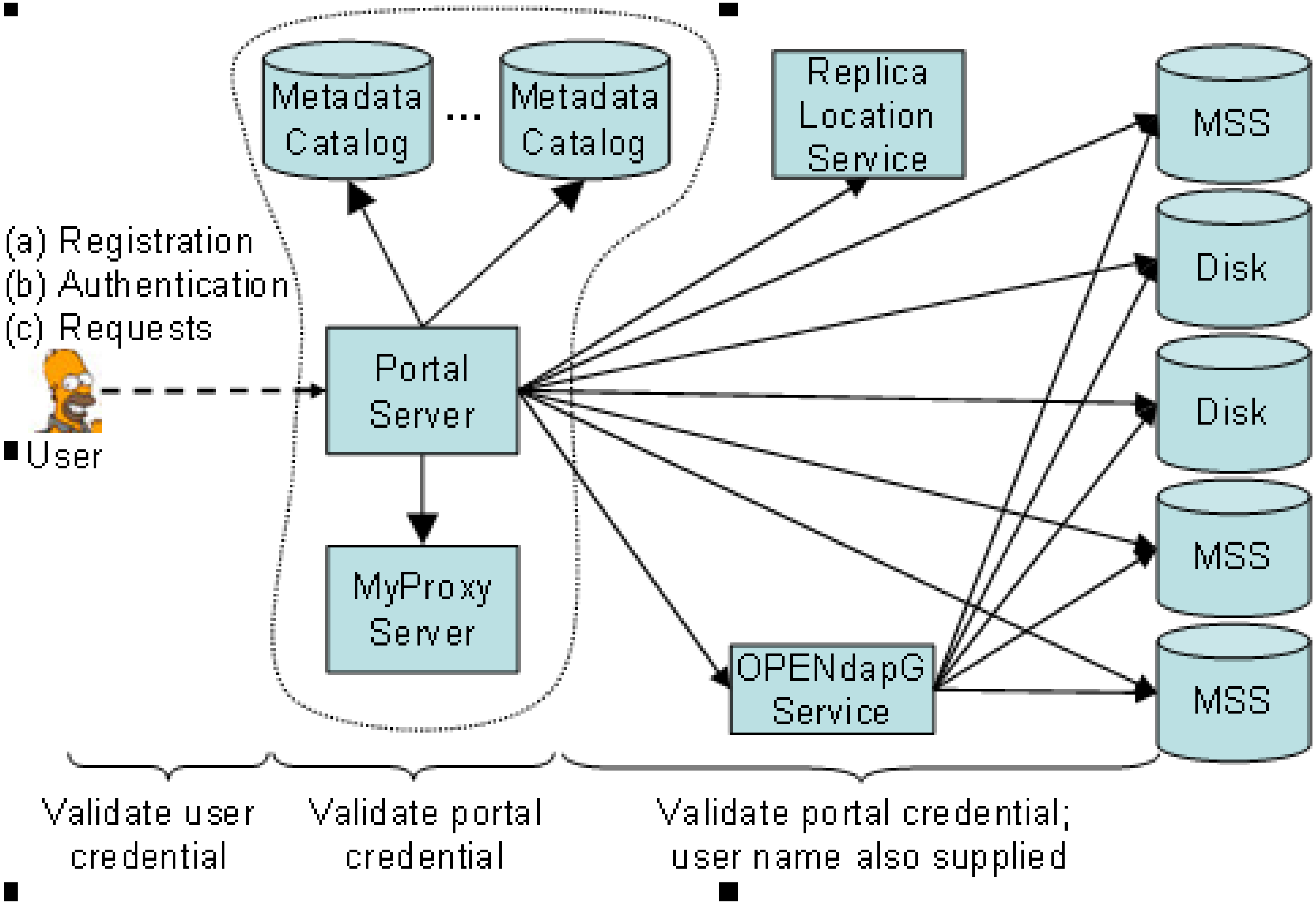
- Access control for data accessed via portal
  - Group-based control to data and metadata
- Variety of data return modalities, e.g.:
  - From portal as intermediary to servers
  - Directly from GridFTP server
- Credentials of a variety of qualities
  - Higher quality via formal CA (personal review)
  - Lower quality via Web (email verification)
- Easy to use Web sign on
  - MyProxy as credential repository
- GSI credentials for GridFTP server access

PURSE: Portal-based User Registration Service

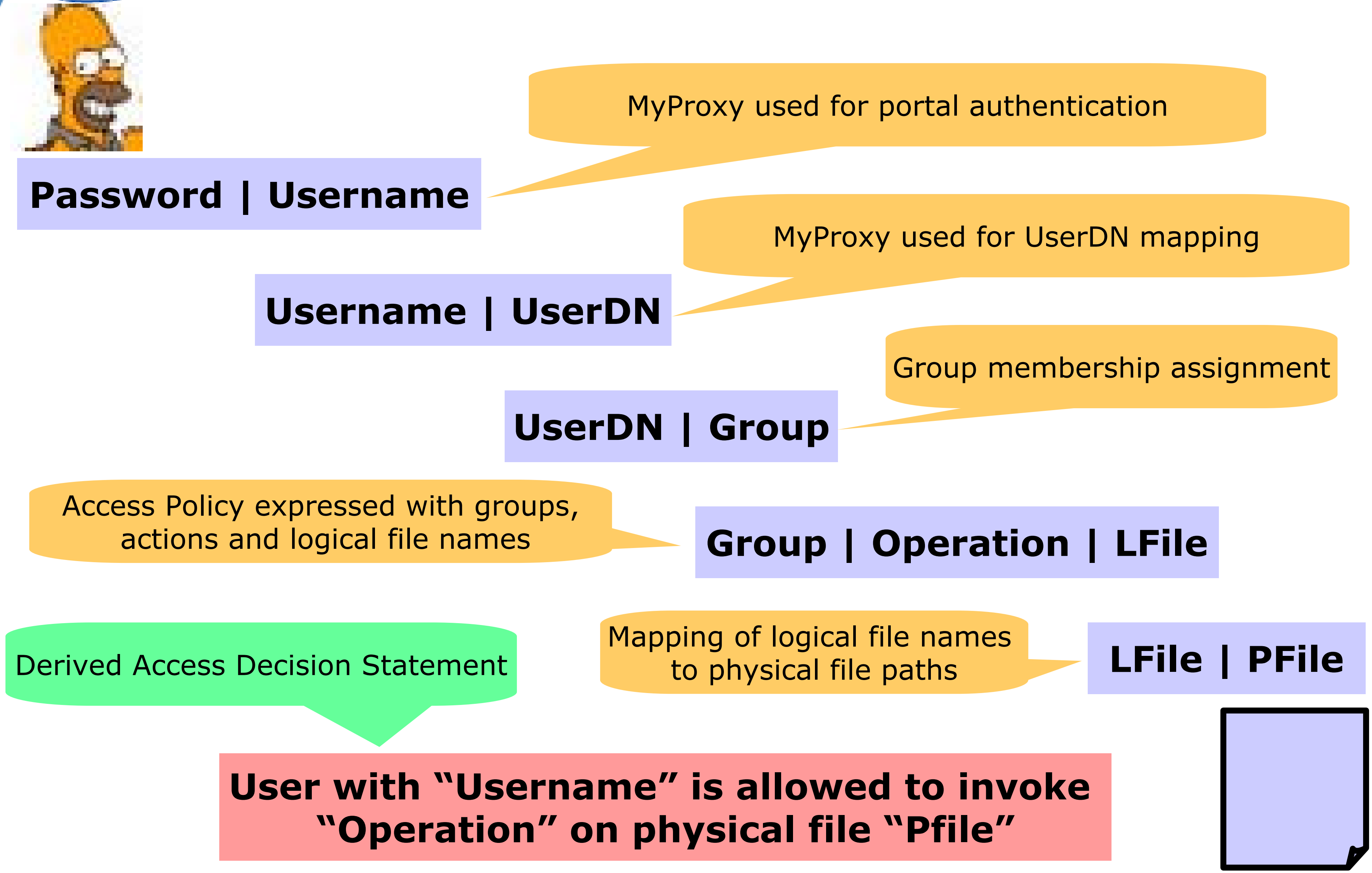


- Portal extensions (CGI scripts) that automate user registration requests.
    - Solicits basic data from user.
    - Generates cert request from ESG CA (implemented with “simple CA” from GT).
    - Admin interface allows CA admin to accept/reject request.
    - Generates a certificate and stores in MyProxy service.
    - Gives user ID/password for MyProxy.
- Benefits
    - Users never have to deal with certificates.
    - Portal can get user cert from MyProxy when needed.
    - Database is populated with user data.
    - Users are assigned to one or several user groups (with different data access permissions)

ESG data access control



ESG Authorization Model



Password | Username

MyProxy used for portal authentication

Username | UserDN

MyProxy used for UserDN mapping

UserDN | Group

Group membership assignment

Access Policy expressed with groups, actions and logical file names

Group | Operation | LFile

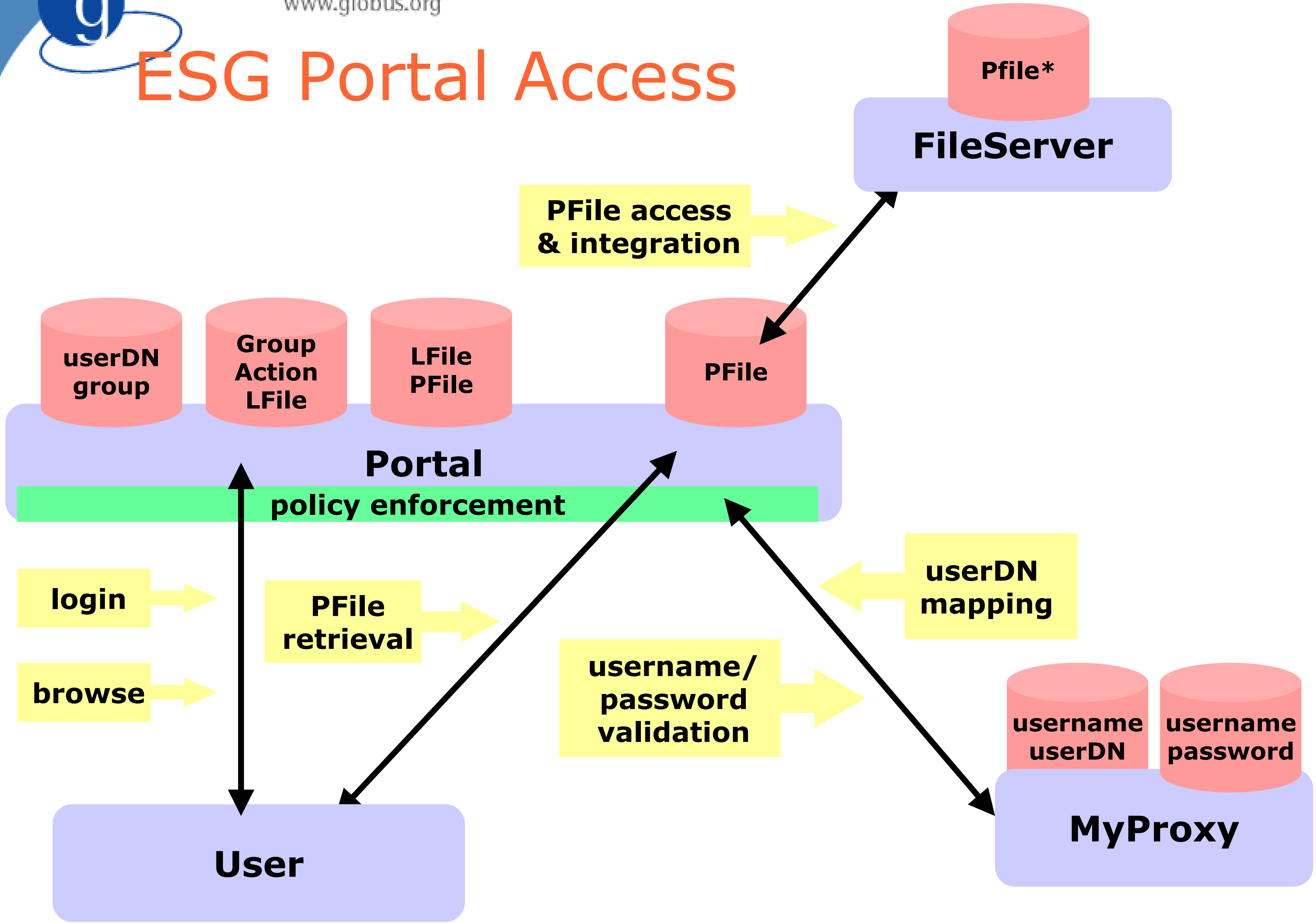
Mapping of logical file names to physical file paths

LFile | PFile

Derived Access Decision Statement

User with “Username” is allowed to invoke “Operation” on physical file “Pfile”

ESG Portal Access



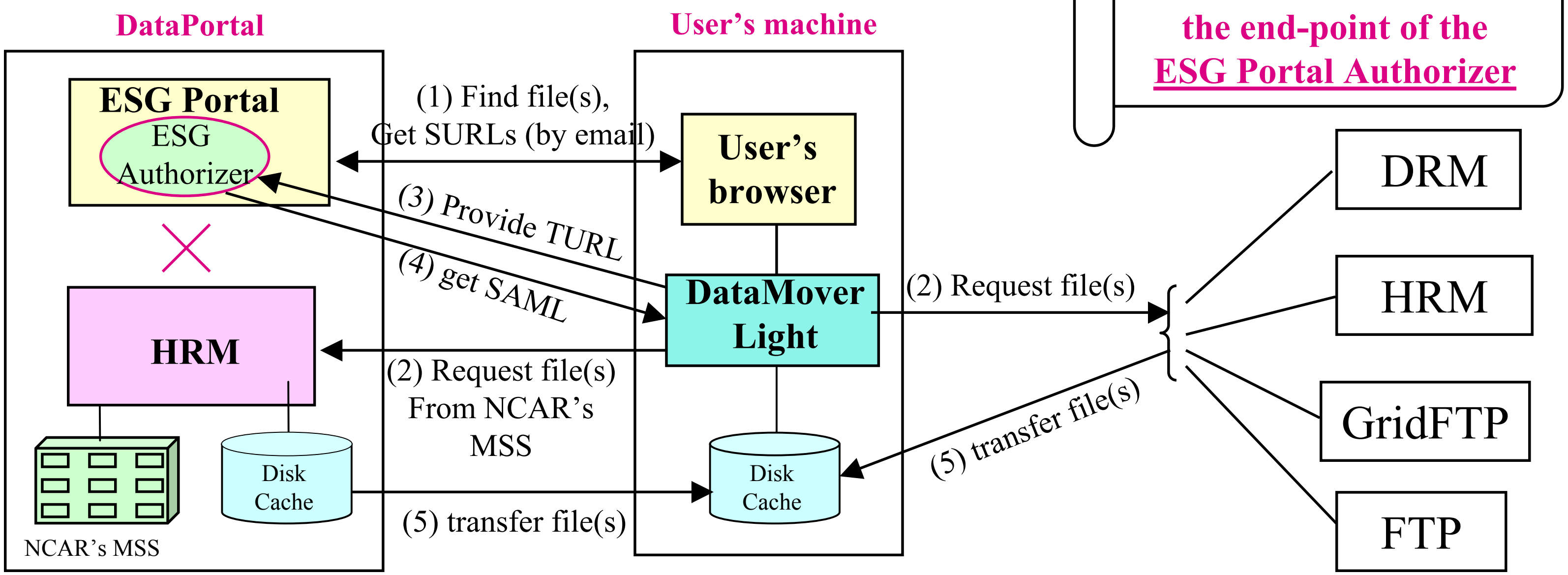
ESG External GridFTP Access

- User browses portal to identify file(s)
- Portal returns
  - Physical file location (URL)
  - SAML assertion in CAS format: "User can invoke requested operation on file(s)"
- User:
  - Obtains proxy-certificate from MyProxy
  - Embeds SAML-assertion in proxy-cert
  - Uses GridFTP client to retrieve physical file(s) from CAS-enabled GridFTP server

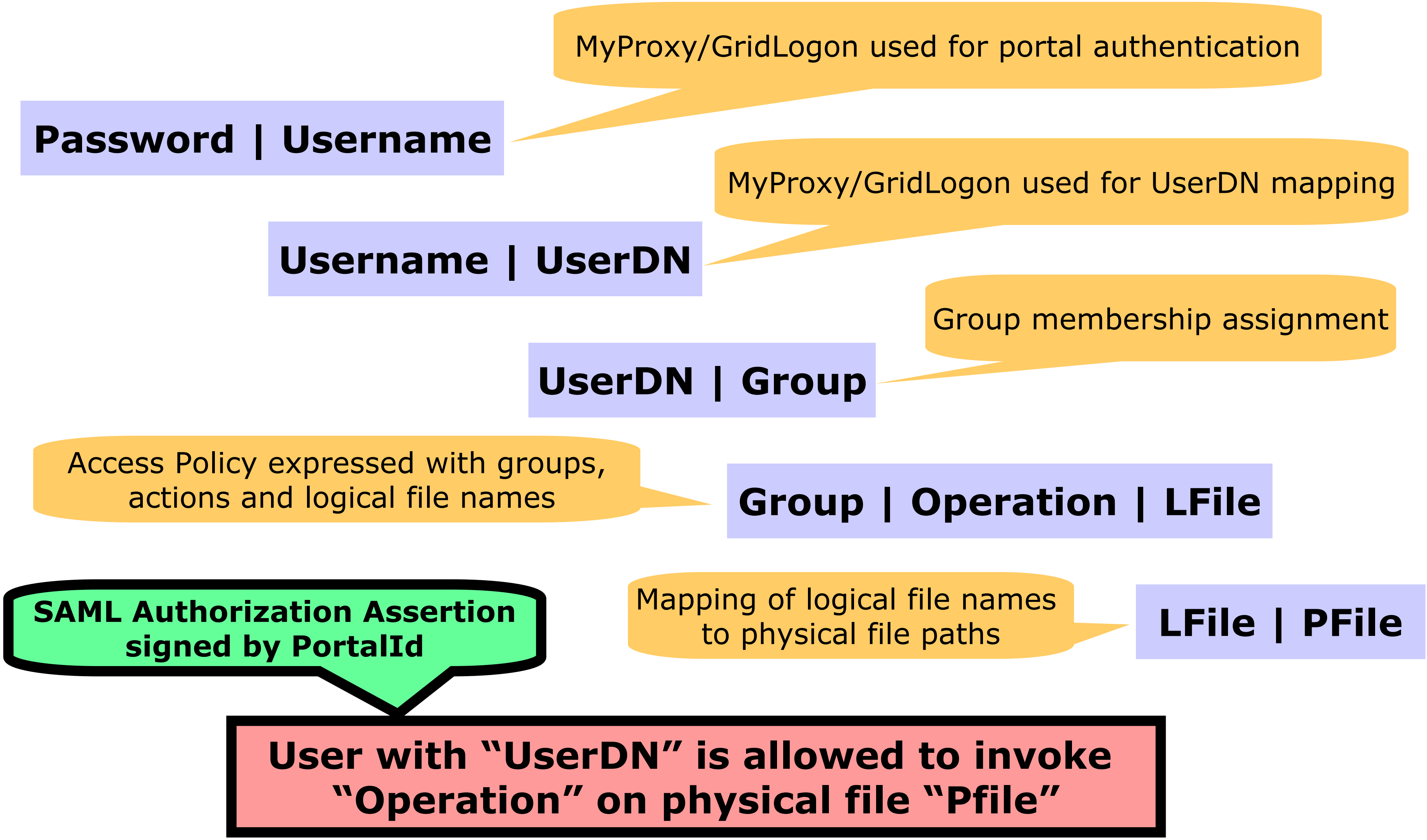
Download with DML from any source locations

- User downloads DataMover-light (must contain GridFTP and GSI)
- User goes to portal, select files
- Portal does not get any file s
- Portal sends email to user
  - Contains a text file of files to be moved
  - Contains instructions and lifetime
- DML contacts source SRMs to get TURL (for GridFTP it is not necessary)
- DML Contact "ESG authorizer", provides it with LFN & TURL
- DML gets back SAML with long lifetime (days) for each file
- DML invokes GridFTP
- DML automatically releases files after it moves them

Note:
The datamover.txt file will contain a header with the end-point of the ESG Portal Authorizer



Authorization Assertions



MyProxy/GridLogon used for portal authentication

Password | Username

MyProxy/GridLogon used for UserDN mapping

Username | UserDN

Group membership assignment

UserDN | Group

Access Policy expressed with groups, actions and logical file names

Group | Operation | LFile

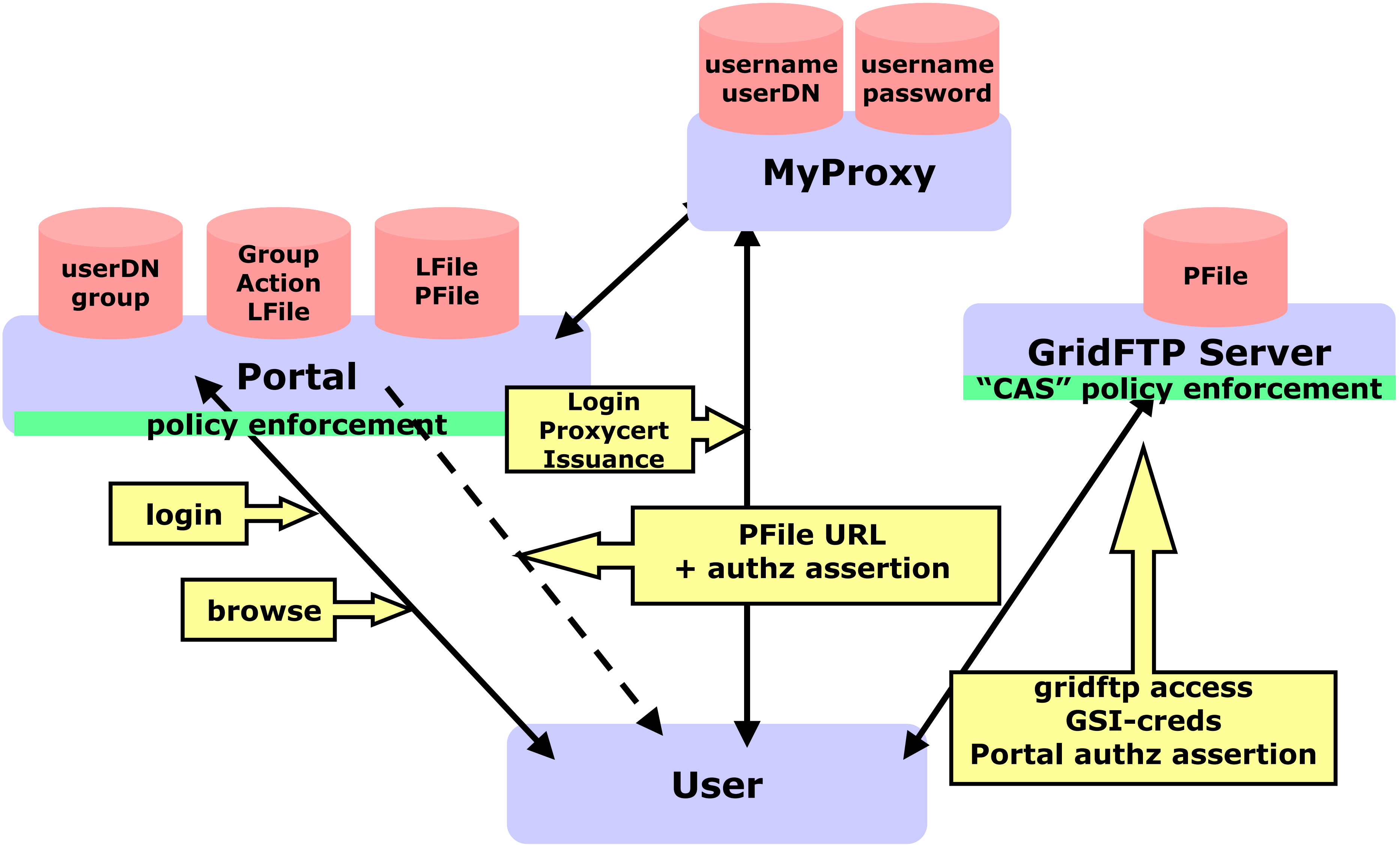
Mapping of logical file names to physical file paths

LFile | PFile

SAML Authorization Assertion signed by PortalId

User with “UserDN” is allowed to invoke “Operation” on physical file “Pfile”

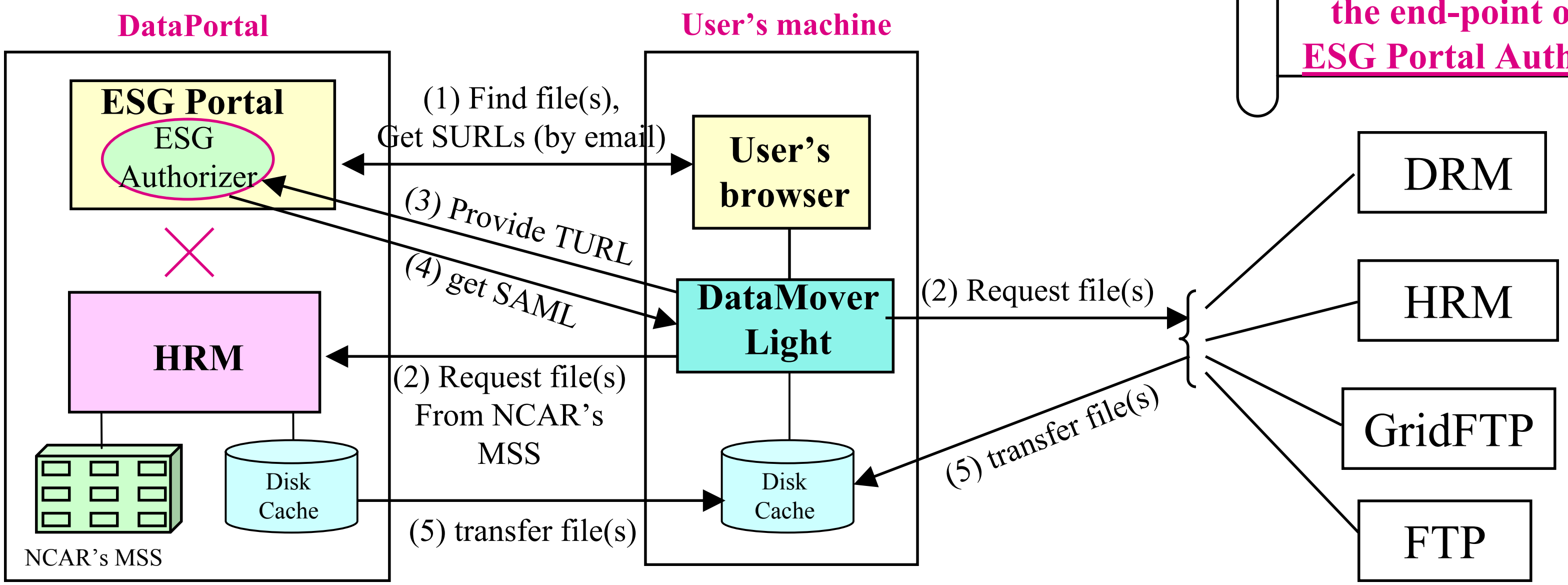
ESG External GridFTP Retrieval



SAML over GridFTP control channel

- •User goes to portal, select files
- •Portal does <u>not</u> get any files
- •Portal sends email to user
- •DML contacts source SRMs to get TURL (not necessary for GridFTP)
- •DML Contact "ESG authorizer", provides it with LFN & TURL
- •DML gets back SAML with long lifetime (days) for each file
- •DML invokes GridFTP
- •DML automatically releases files after it moves them

Note:
The datamover.txt file will contain a header with the end-point of the <u>ESG Portal Authorizer</u>



Reuse of Fabric & Plumbing from Community Auth. Service (CAS)

- ESG-Portal uses no CAS server but generates its own authorization statements
  - Statements are domain specific
- Same assertion format as CAS
  - Standard “SAML” assertion signed by PortalId
- User deploys CAS-enabled GridFTP client
  - Deploys identical GSI creds and proxy-certs
- Site uses CAS-enabled GridFTP server
- Remote site trusts Portal (instead of CAS)
- Portal makes access control decisions

Summary

- ESG work builds on GSI & CAS technology to address specific ESG requirements
  - Ease of use
  - Group-based access control to distributed data
- Yields two broadly useful tools that should find further application in Grid projects
  - PURSE: Portal-based User Reg. System
  - Service access authorization assertions
- Next steps to be defined with ESG & others
  - E.g., access control for arbitrary services