Leveraging the Globus Platform in your Web Applications

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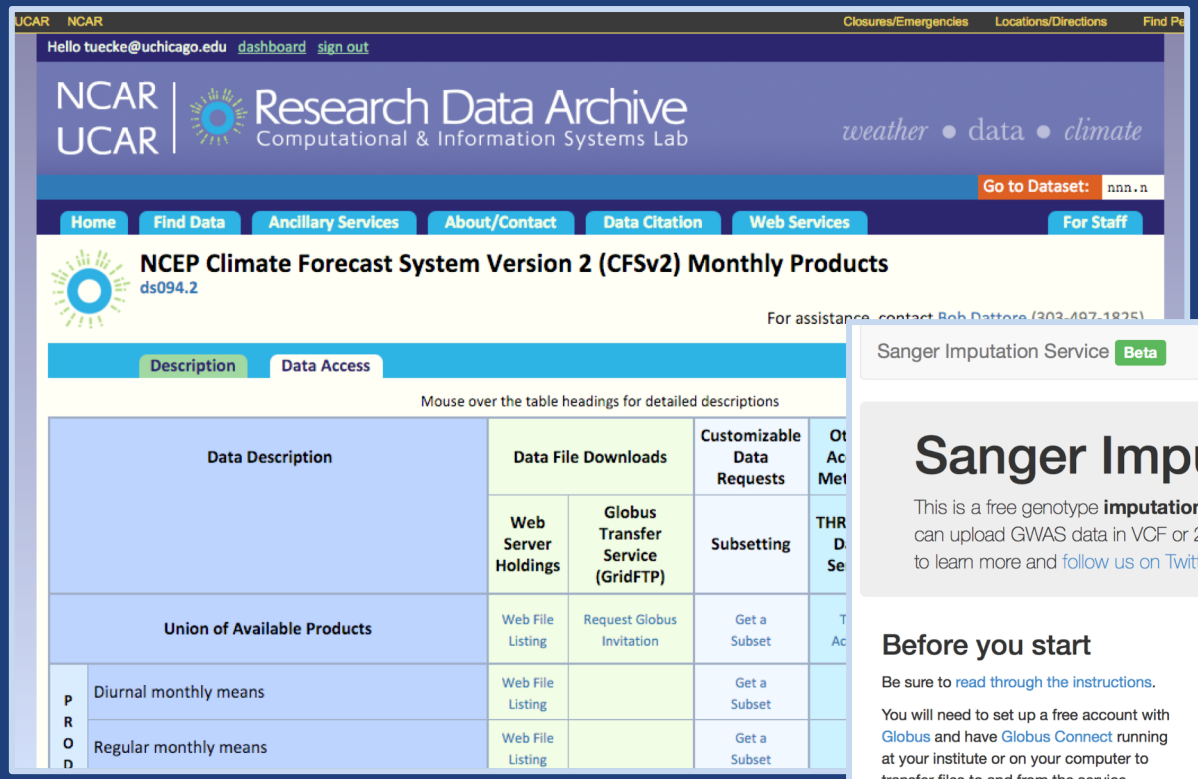
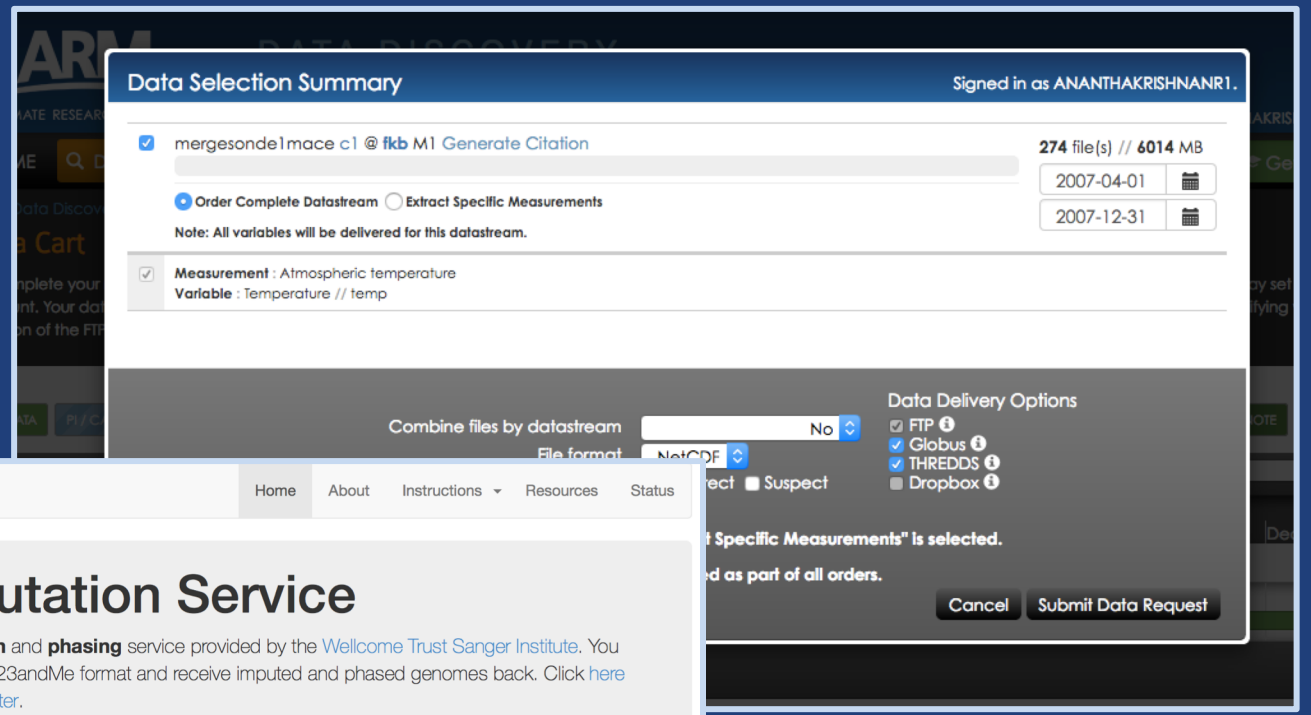
globus

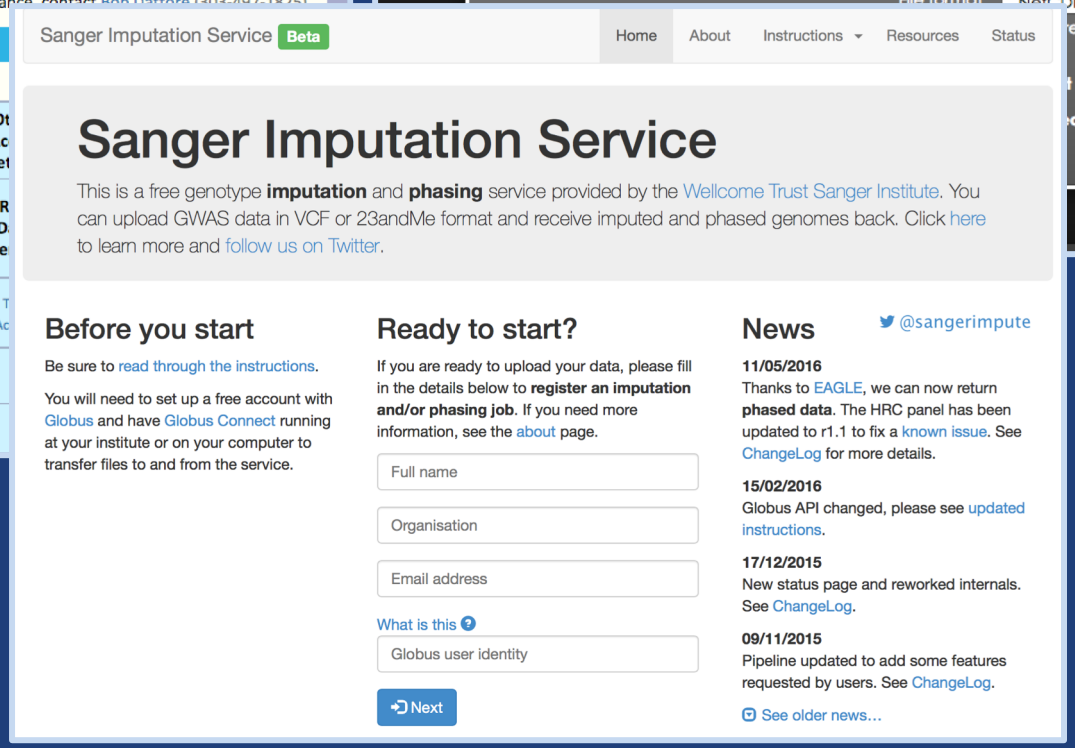
Globus serves as...

A platform for building science gateways, web portals and other applications in support of research and education

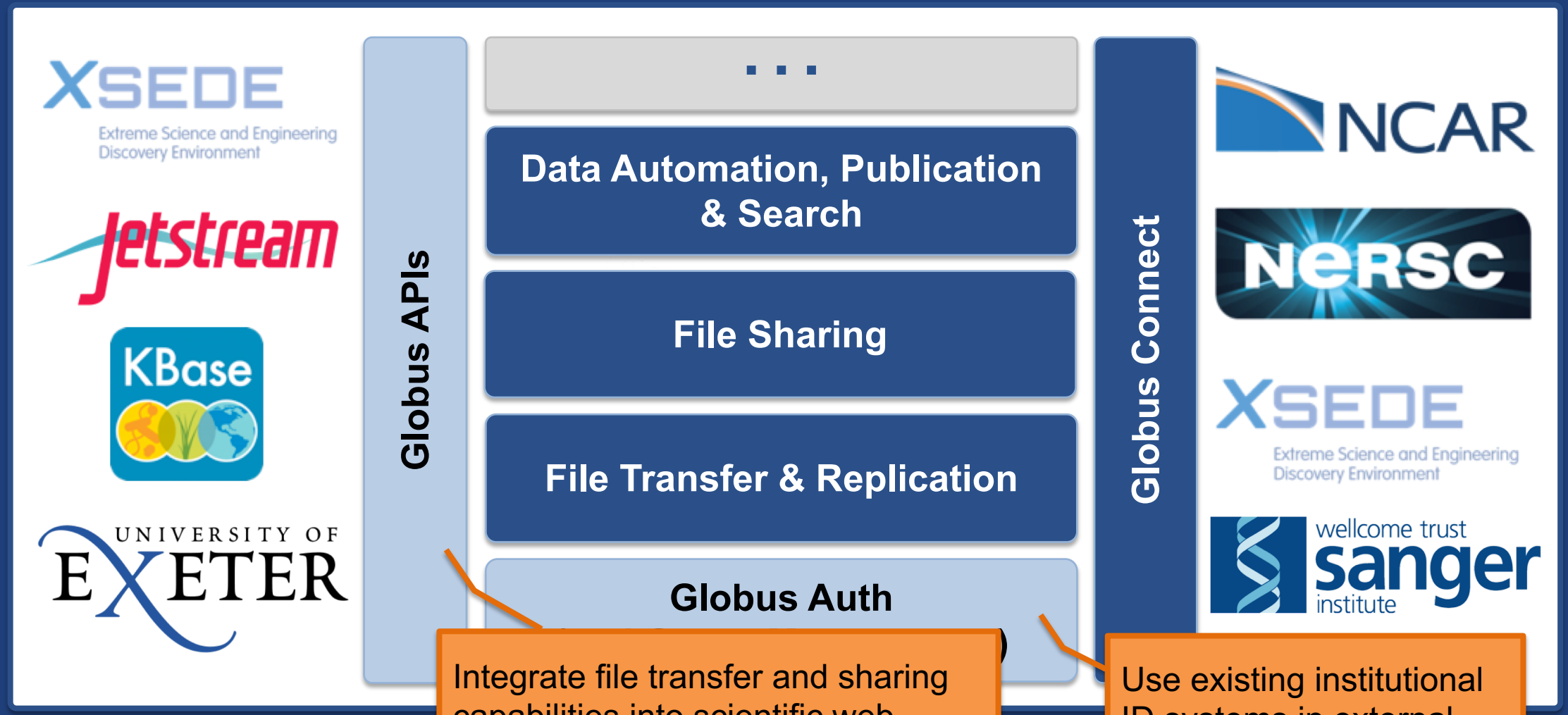
Example web apps that leverage Globus







Globus Platform-as-a-Service



PaaS Security Challenges – Globus Auth

- **How to provide:**
  - Login to apps
    - Web apps (Jupyter Notebook, Portals), Mobile, Desktop, Command line
  - Protect all REST API communications
    - App → Globus service (Jupyter Notebook, MRDP)
    - App → non-Globus service (MRDP)
    - Service → service (MRDP)
- **While:**
  - Not introducing even more identities
    - Providing a platform to consolidate those identities
  - Providing least privileges security model (consents)
  - Being agnostic to programming language and framework
  - Being web friendly
  - Making it easy for users and developers

Authorization Code Grant

Browser (User)

1. Access portal

2. Redirects user

3. User authenticates and consents

4. Authorization code

5. Authenticate using client id and secret, send authorization code

6. Access token(s)

7. Authenticate with access token(s) to give the client the authority invoke the transfer service

Client (Web Portal, Application, Jupyter)

Globus Auth (Authorization Server)

Identity Provider

Globus Transfer (Resource Server)

Globus Platform
Transfer API

Globus Transfer API

- **Globus Web App consumes public Transfer API**
- **REST API: Resources/actions named by URL**
  - Query params allow refinement (e.g., filter)
- **Globus APIs use JSON for documents and resource representations**
- **Requests authorized via Globus Auth issued OAuth2 access token**
  - Authorization: Bearer asdflkqhafsdafeawk

docs.globus.org/api/transfer

Globus Python SDK

- **Python client library for the Globus Auth and Transfer REST APIs**
- `globus_sdk.TransferClient` **class handles connection management, security, framing, marshaling**

```
from globus_sdk import TransferClient
tc = TransferClient()
```

globus.github.io/globus-sdk-python

`TransferClient` low-level calls

- **Thin wrapper around REST API**
  - `post()`, `get()`, `update()`, `delete()`

  `get(path, params=None, headers=None, auth=None, response_class=None)`
    - `path` – path for the request, with or without leading slash
    - `params` – dict to be encoded as a query string
    - `headers` – dict of HTTP headers to add to the request
    - `response_class` – class response object, overrides the client's `default_response_class`
    - Returns: `GlobusHTTPResponse` object

`TransferClient` higher-level calls

- **One method for each API resource and HTTP verb**
- **Largely direct mapping to REST API**

```
endpoint_search(filter_fulltext=None,
                filter_scope=None,
                num_results=25,
                **params)
```

Walkthrough Jupyter Notebook with our Hub

- **https://jupyter.demo.globus.org**
  - Sign in with Globus
  - Verify the consents
  - Start My Server (this will take about a minute)
  - Open folder: globus-jupyter-notebooks
  - Open folder: globusWorld2018
  - Run SDK_autoAuth.ipynb
- **If you mess it up and want to "go back to the beginning"**
  - Back down to the root folder
  - Run NotebookPuller.ipynb
- **If you want to use the notebook outside of our hub**
  - https://github.com/globus/globus-jupyter-notebooks
  - Autentication is a manual cut and paste of exchanging the authorization code for an access token

Endpoint Search

- **Plain text search for endpoint**
  - Searches owner, display name, keywords, description, organization, department
  - Full word and prefix match
- **Limit search to pre-defined scopes**
  - `all`, `my-endpoints`, `recently-used`, `in-use`, `shared-by-me`, `shared-with-me`
- **Returns: List of endpoint documents**

Endpoint Management

- **Get endpoint (by id)**
- **Update endpoint**
- **Create & delete (shared) endpoints**
- **Manage endpoint servers**

Endpoint Activation

- **Activating endpoint means binding a credential to an endpoint for login**
- **Globus Connect Server endpoint that have MyProxy or MyProxy OAuth identity provider require login via web**
- **Auto-activate**
  - ***Globus Connect Personal*** and ***Shared*** endpoints use Globus-provided credential
  - Must auto-activate before any API calls to endpoints

File operations

- **List directory contents (ls)**
- **Make directory (mkdir)**
- **Rename**
- **Note:**
  - Path encoding & UTF gotchas
  - Don’t forget to auto-activate first

Task submission

- **Asynchronous operations**
  - Transfer
    - Sync level option
  - Delete
- **Get `submission_id`, followed by submit**
  - Once and only once submission

Task management

- **Get task by id**
- **Get task_list**
- **Update task by id (label, deadline)**
- **Cancel task by id**
- **Get event list for task**
- **Get task pause info**

Bookmarks

- **Get list of bookmarks**
- **Create bookmark**
- **Get bookmark by id**
- **Update bookmark**
- **Delete bookmark by id**

- **Cannot perform other operations directly on bookmarks**
  - Requires client-side resolution

Shared endpoints and access rules (ACL)

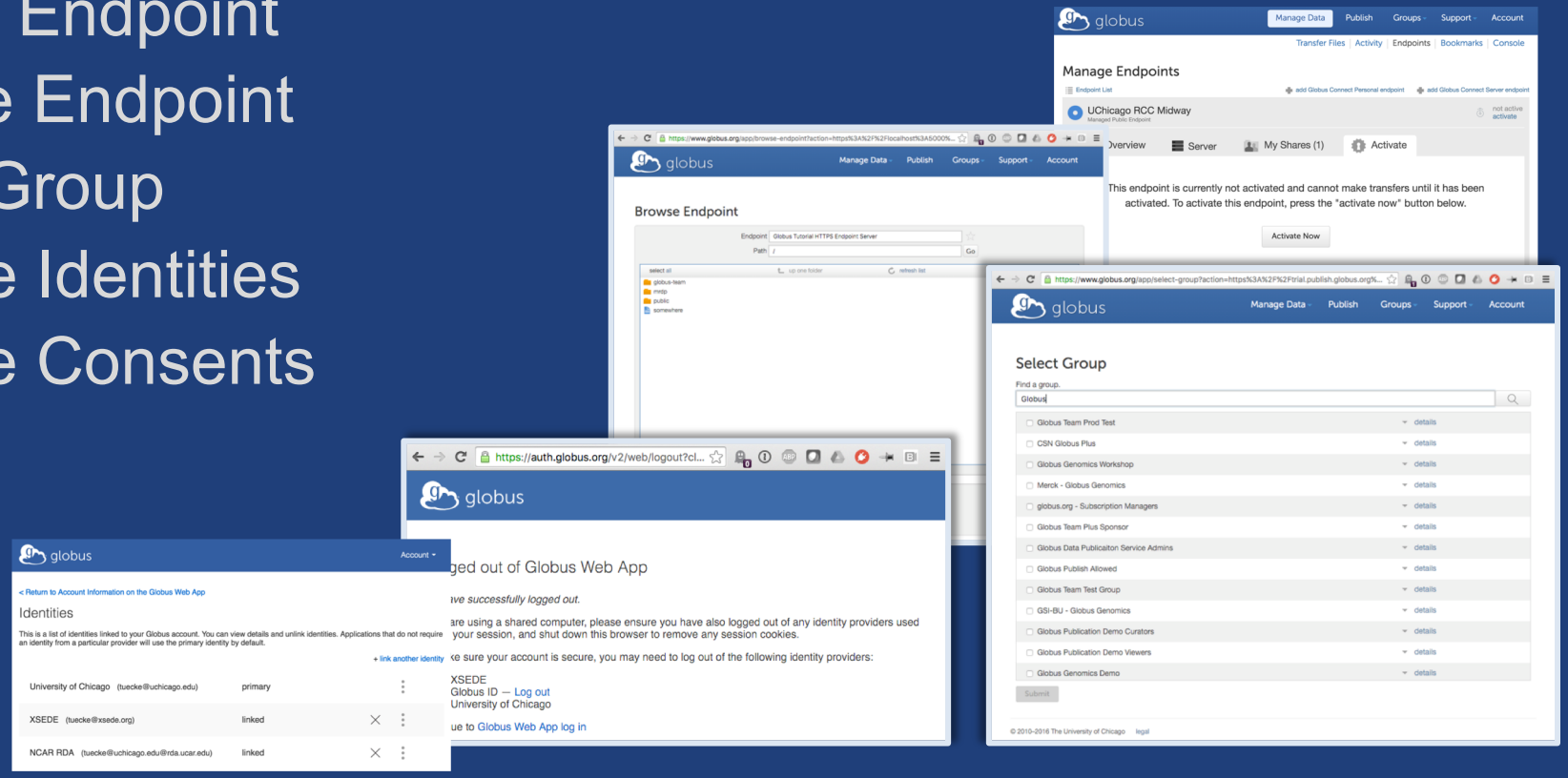
- **Shared Endpoint – create / delete / get info / get list**
- **Administrator role required to delegate access managers**
- **Access manager role required to manage permissions/ACL**
- **Operations:**
  - Get list of access rules
  - Get access rule by id
  - Create access rule
  - Update access rule
  - Delete access rule

Management API

- **Allow endpoint administrators to monitor and manage all tasks with endpoint**
  - Task API is essentially the same as for users
  - Information limited to what they could see locally
- **Cancel tasks**
- **Pause rules**

Globus Helper Pages

- **Globus pages designed for use by your web apps**
  - Browse Endpoint
  - Activate Endpoint
  - Select Group
  - Manage Identities
  - Manage Consents
  - Logout



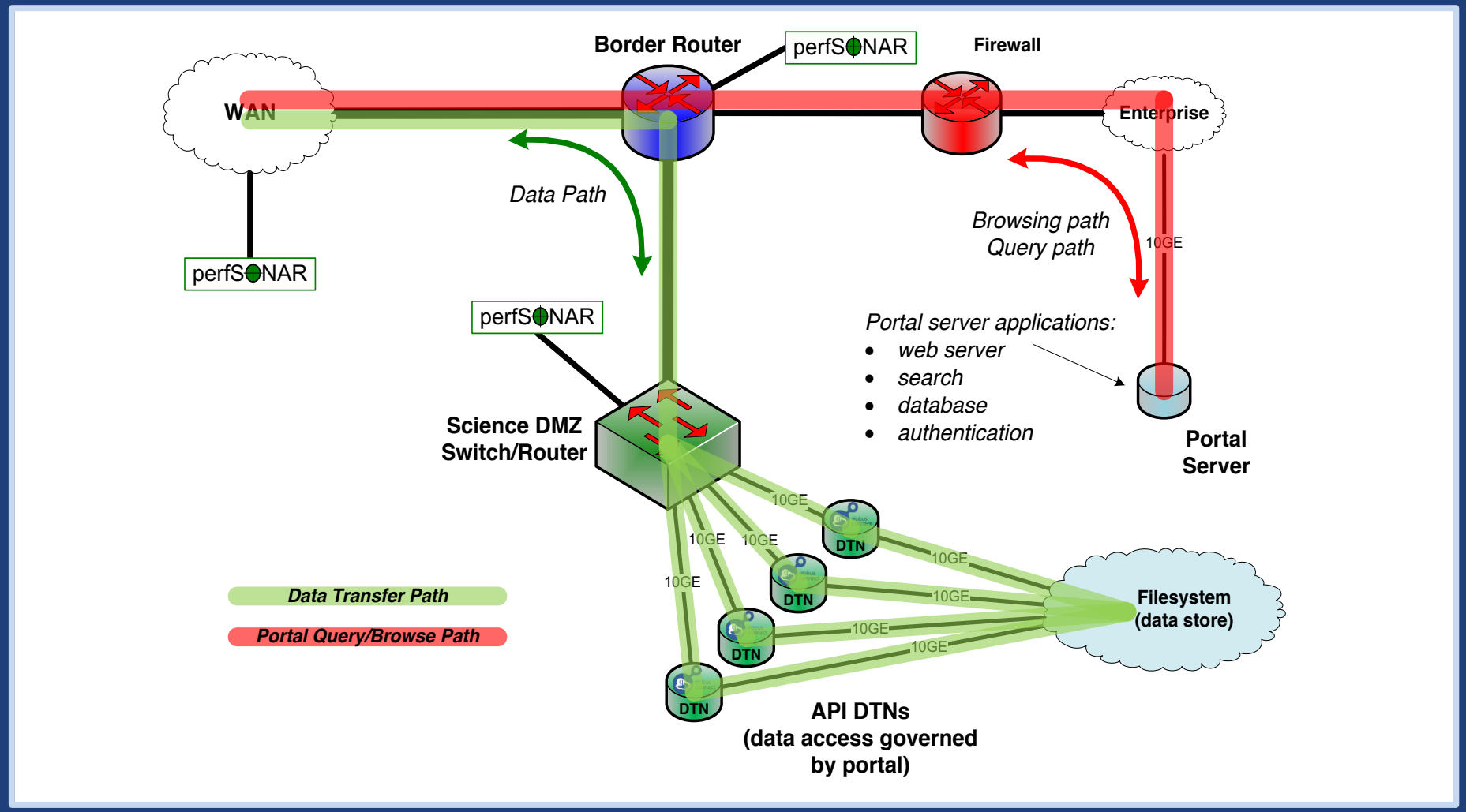
docs.globus.org/api/helper-pages

Example

Modern Research Data Portal

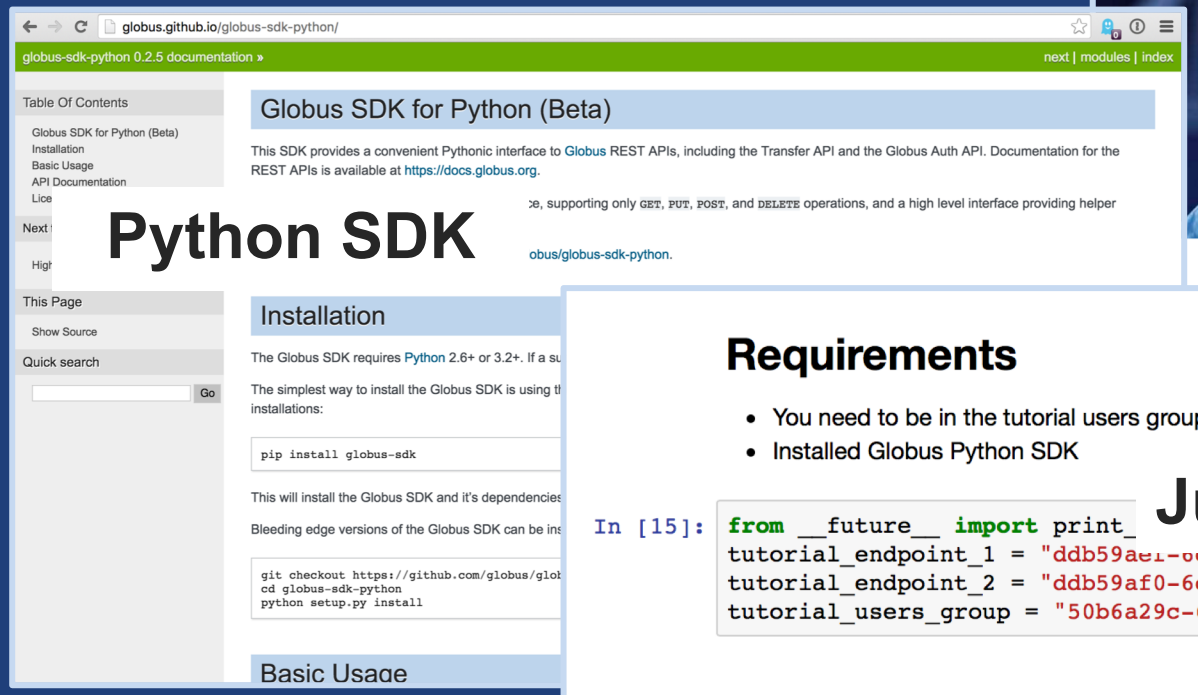
https://docs.globus.org/modern-research-data-portal/

Modern data apps leverage the Science DMZ

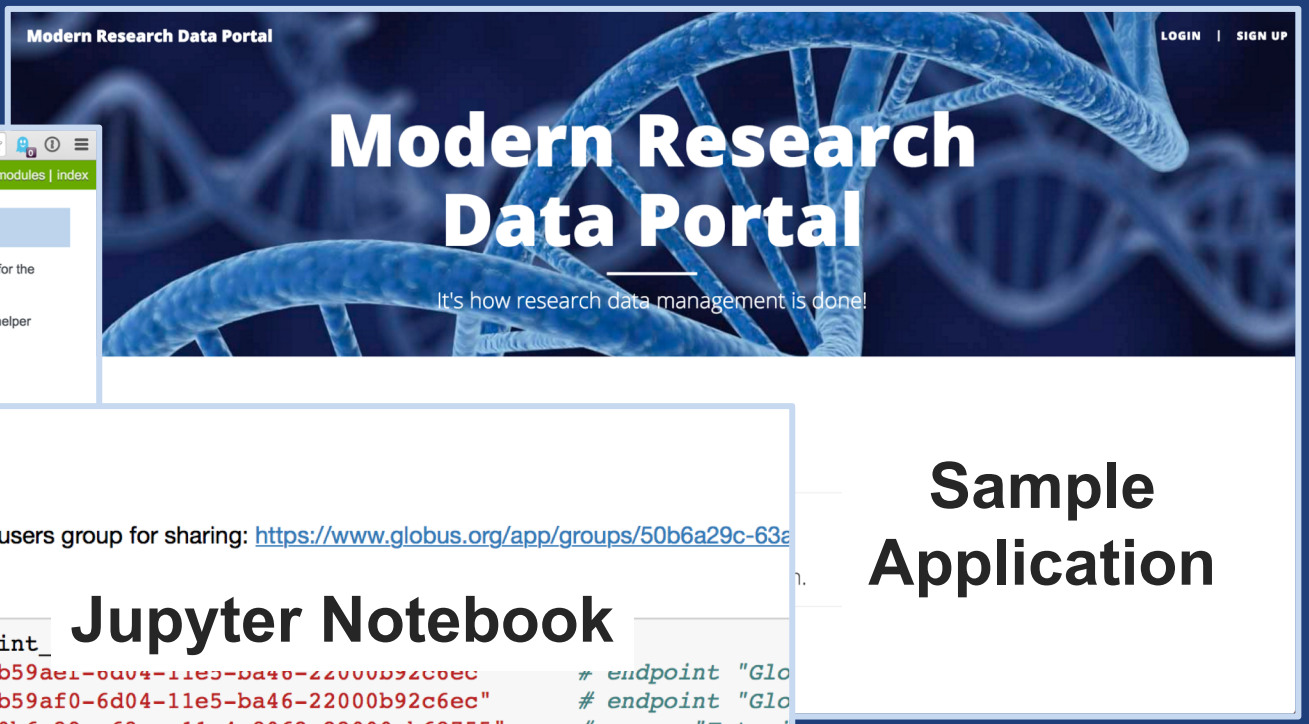


fasterdata.es.net/

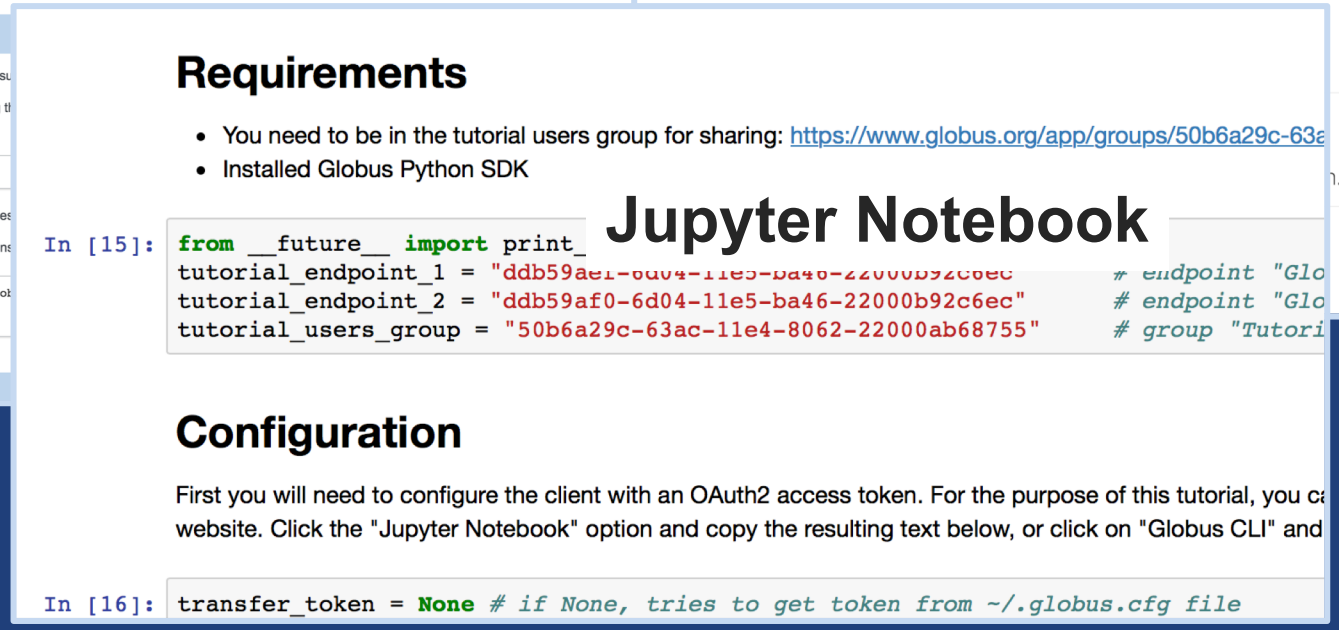
Globus PaaS developer resources



Python SDK



Sample Application



Jupyter Notebook

docs.globus.org/api

github.com/globus

Support resources

- **Globus documentation: docs.globus.org**
- **Helpdesk and issue escalation: support@globus.org**
- **Customer engagement team**
- **Globus professional services team**
  - Assist with portal/gateway/app architecture and design
  - Develop custom applications that leverage the Globus platform
  - Advise on customized deployment and integration scenarios