JupyterHub + Globus: A Foundation for Interactive Data Science

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JupyterHub

• Multi-user Hub
• Manages multiple instances of the single-user Jupyter notebook server
• Serves notebooks to your research group, class of students, etc.

[jupyterhub.readthedocs.io/en/stable]
JupyterHub Components

• Multi-user Hub
• Configurable HTTP proxy
• Multiple single-user Jupyter notebook servers
  – Python
  – R
  – ...
Securing JupyterHub with Globus Auth

• **Globus OAuth plugin**
  – Existing OAuth framework
  – Documentation covers app registration and config
  – Can restrict identity provider
  – Custom scopes
  – Tokens passed into notebook environment
Securing JupyterHub with Globus Auth

Visit https://developers.globus.org/ to set up your app. Ensure Native App is unchecked and make sure the callback URL looks like:

https://[your-host]/hub/oauth_callback

Set scopes for authorization and transfer. The defaults include:

openid profile urn:globus:auth:scope:transfer.api.globus.org:all

Set the above settings in your jupyterhub_config:

```python
# Tell JupyterHub to create system accounts
from oauthenticator.globus import LocalGlobusOAuthenticator
c.JupyterHub.authenticator_class = LocalGlobusOAuthenticator
c.LocalGlobusOAuthenticator.enable_auth_state = True
c.LocalGlobusOAuthenticator.oauth_callback_url = 'https://[your-host]/hub/oauth_callback'
c.LocalGlobusOAuthenticator.client_id = '[your app client id]'  
c.LocalGlobusOAuthenticator.client_secret = '[your app client secret]'  
```

github.com/jupyterhub/oauthenticator#globus-setup
Tokens and Jupyter Notebooks

• Tokens passed back to the JupyterHub server
• Stored as a secure attribute in database
• Passed into Notebook Server environment
• Can be pull into notebook or other code
• Use to communicate with…
  – …Globus services
  – …other REST APIs secured with Globus Auth
Tokens and Jupyter Notebooks

Login

Bearer a45cd...

{ "tokens":...

REST APIs

Browser

Configurable HTTP Proxy

/hub/

/auth

/user/[name]/

Authenticator

User Database

Spawner

Hub

Notebook

{ "tokens":...
Data Analysis Exercise

• Log into our JupyterHub and launch Notebook Server
• Get tokens
• Access some Globus APIs
• Download some data
• Plot it
• PUT to an HTTPS endpoint

Uses Zero to JupyterHub
zero-to-jupyterhub.readthedocs.io