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SGCI

Using Keycloak to Provide Authentication, Authorization, and Identity Management Services for Your Gateway

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Award Number
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Overview

- OpenID Connect with CILogon
- Using Keycloak for Authentication and Role-based Authorization
- Integrating Keycloak with Apache Airavata

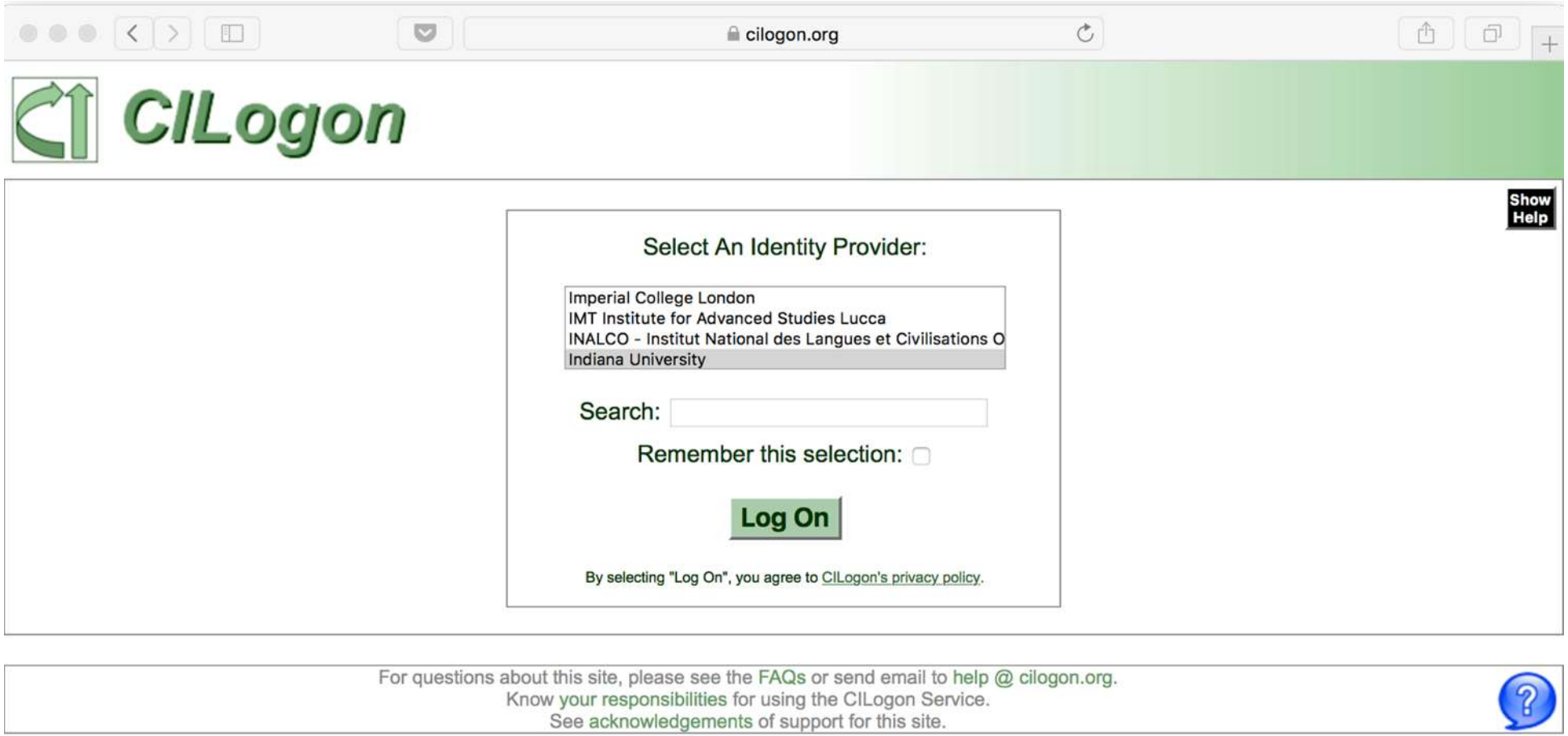
The Problem

- Gateways expose (shared) resources and APIs for manipulating those resources to a diverse set of users
- Authentication – another password to remember?
- Authorization – granting access without too much administrative burden
- Multiple gateways, multiple gateway clients
  - SciGaP (Science Gateway Platform as a Service)
- Campus gateways

Authentication

- Many options here but easiest thing is use an account the user already has
- CILogon
  - A service that allows users to authenticate to their institutions in order to retrieve credentials for accessing cyberinfrastructure.
  - Also provides a **OpenID Connect** (OIDC) interface to this federated authentication
- OpenID Connect
  - Built on top of OAuth2
  - Allows user to sign in with their identity provider
  - User grants client the right to access some of the user's information

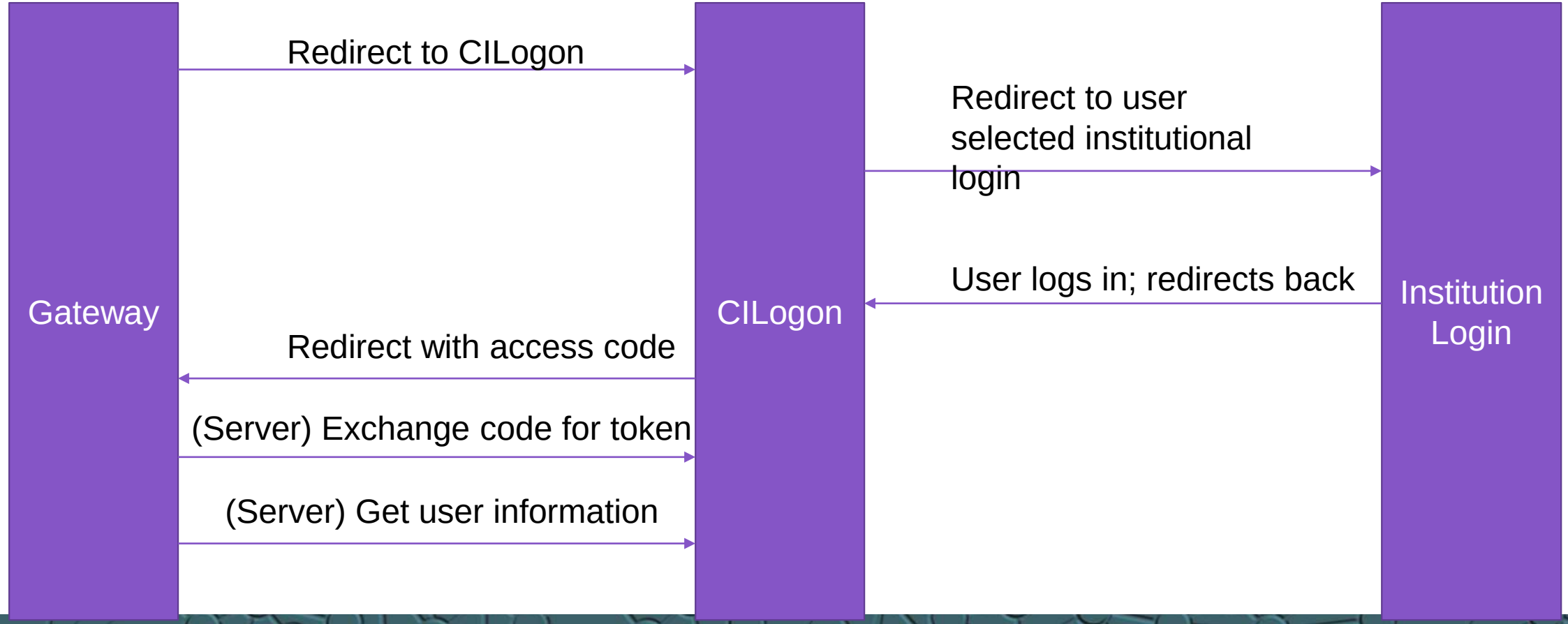
CILogon OpenID Connect



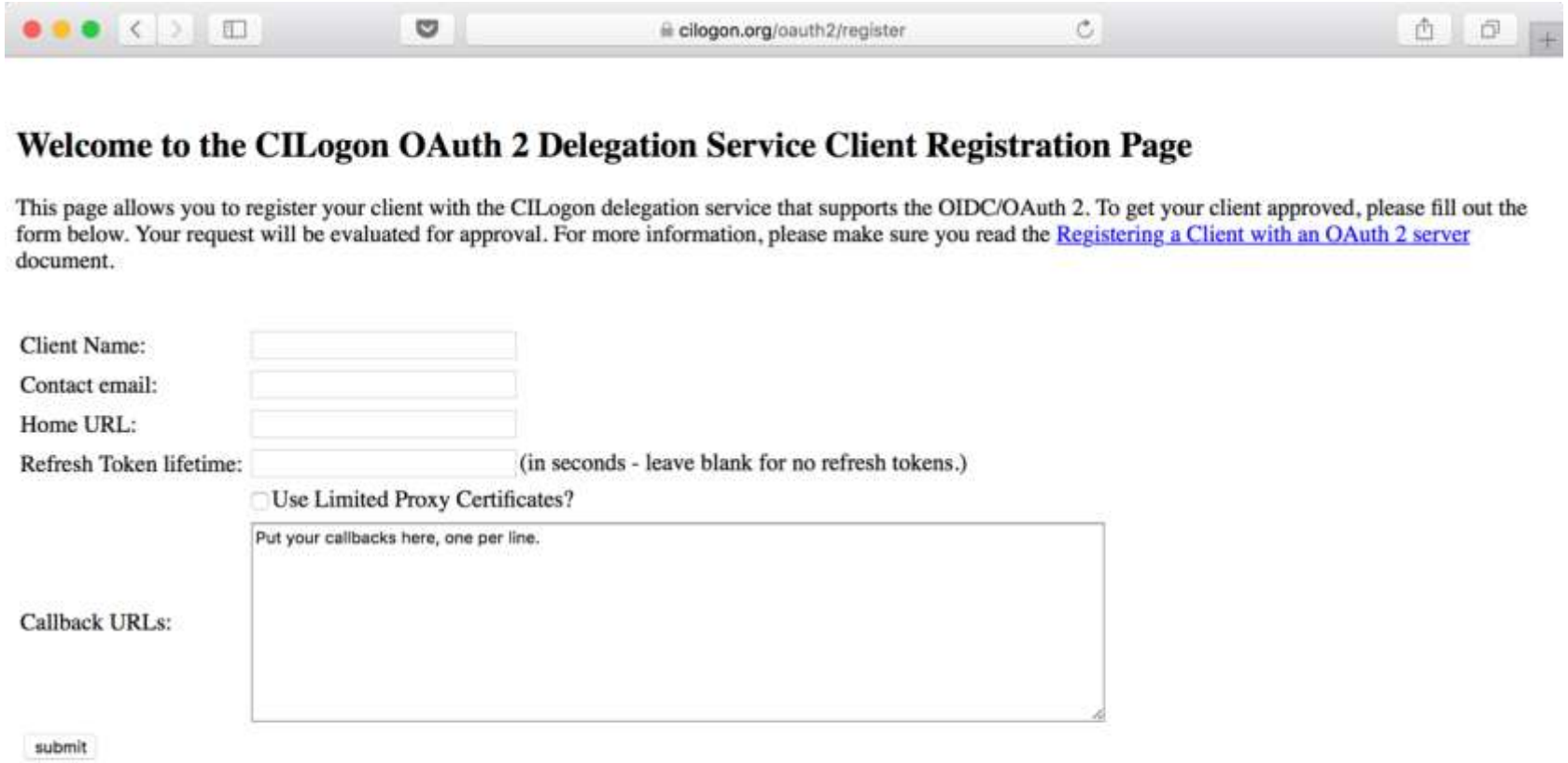
OpenID Connect

- One time initial setup
  - Register a client: client id and client secret
- 1 - Redirect to CILogon
  - Parameters: client id, redirect_uri, scope=openid
- 2 - User signs in
- 3 - Redirect back to gateway
  - Exchange access code for authorization token
- 4 - Get user info
  - Use authorization token to call user info endpoint

OpenID Connect flow



One time setup: Registering a client with CILogon



Step 1: OIDC Redirection

```
https://cilogon.org/authorize?response_type=code
  &client_id=CLIENT_ID
  &redirect_uri=https://mygateway.org/callback
  &scope=openid
```

Step 3: OIDC Exchange code for token

```
https://mygateway.org/callback?
  code=https%3A%2F%2Fcilogon.org%2Foauth2%2FauthzGrant%2F331685b3f...
```

```
POST /oauth2/token HTTP/1.1
Host: cilogon.org
Authorization: Basic Base64($client_id + ":" + $client_secret)

grant_type=authorization_code&code=...&redirect_uri=...
```

```
{
  "access_token": "eyJhbGciOiJ...",
  ...
}
```

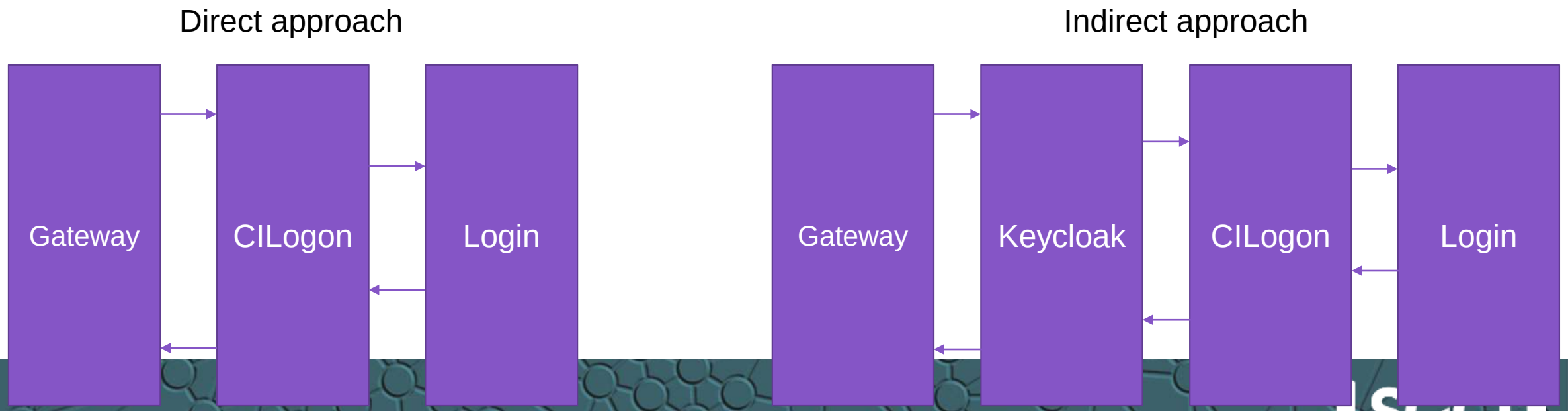
Step 4: OIDC fetch userinfo using access token

```
GET /oauth2/userinfo HTTP/1.1
Host: cilogon.org
Authorization: Bearer $access_token
```

```
{
"sub":"http://cilogon.org/serverA/users/123",
"name":”Marcus Christie",
"given_name":”Marcus",
"family_name":”Christie",
"email":”machrist@iu.edu”,
...
}
```

Integrating gateway with CILogon

- Direct integration
- Indirect integration through an Identity and Access Management (IAM) Server (for example, Keycloak)



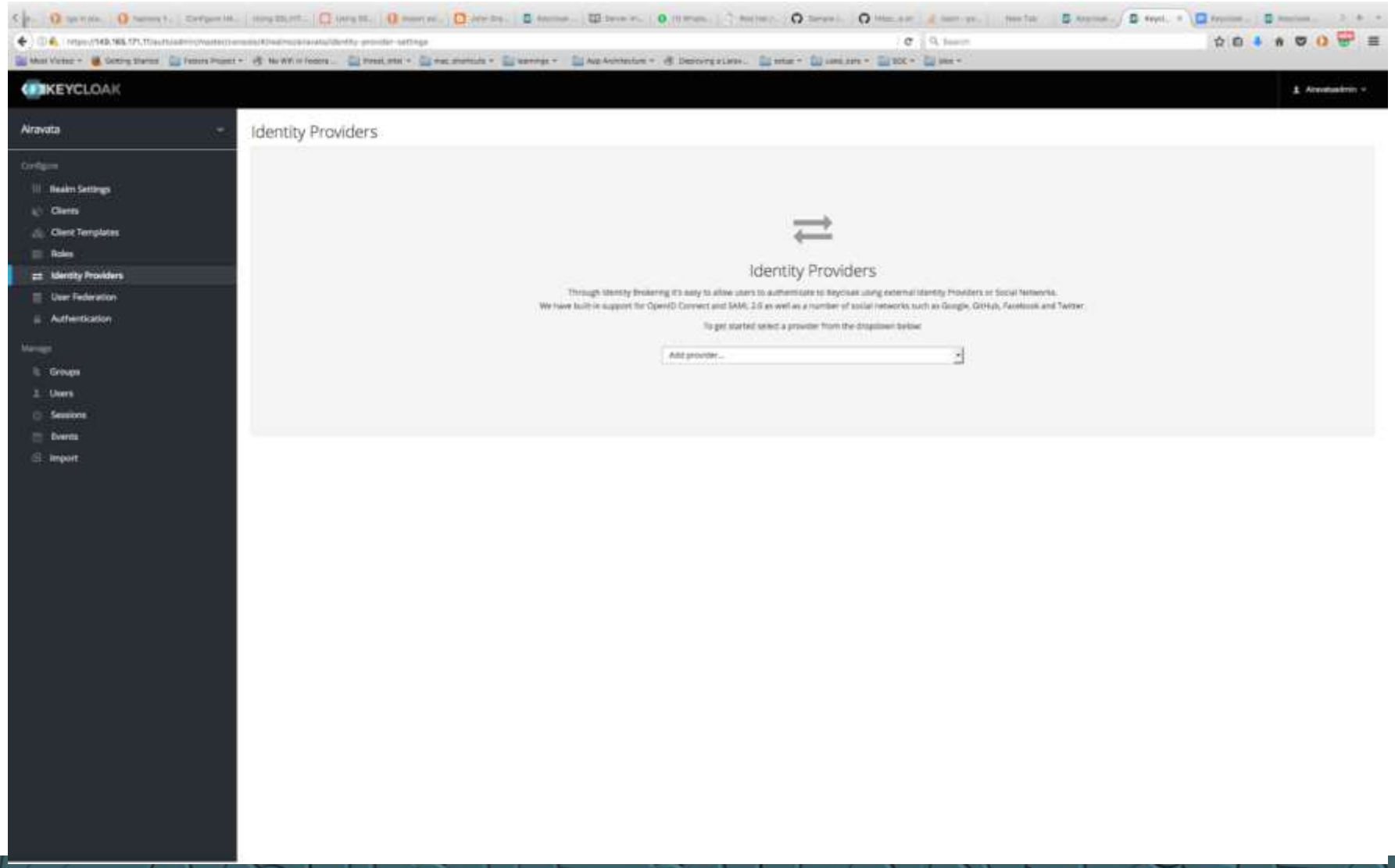
Advantages of using IAM server

- Flexible Authentication options
- Gateway client software integration is done once
- Authorization services

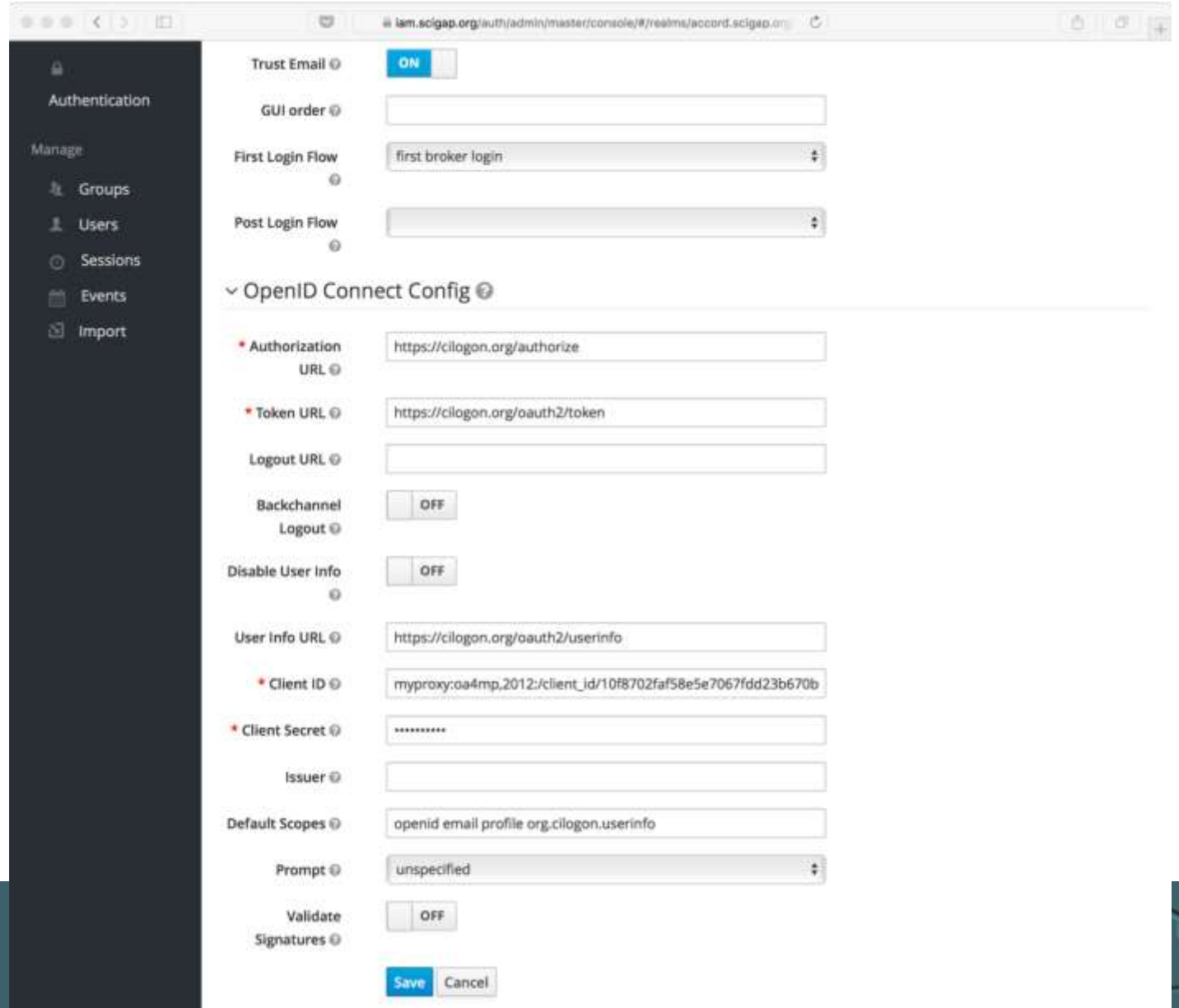
Keycloak

- http://www.keycloak.org/
- Red Hat, 200+ contributors on GH, 4,500+ merged PRs
- Open source (ALv2) identity and access management server
- Identity brokering; pluggable authentication mechanisms
- Authorization services: attribute-based, role-based, group-based, etc.
- Multi-tenanted
- Complete, well-documented REST API

Configuring Keycloak for CILogon



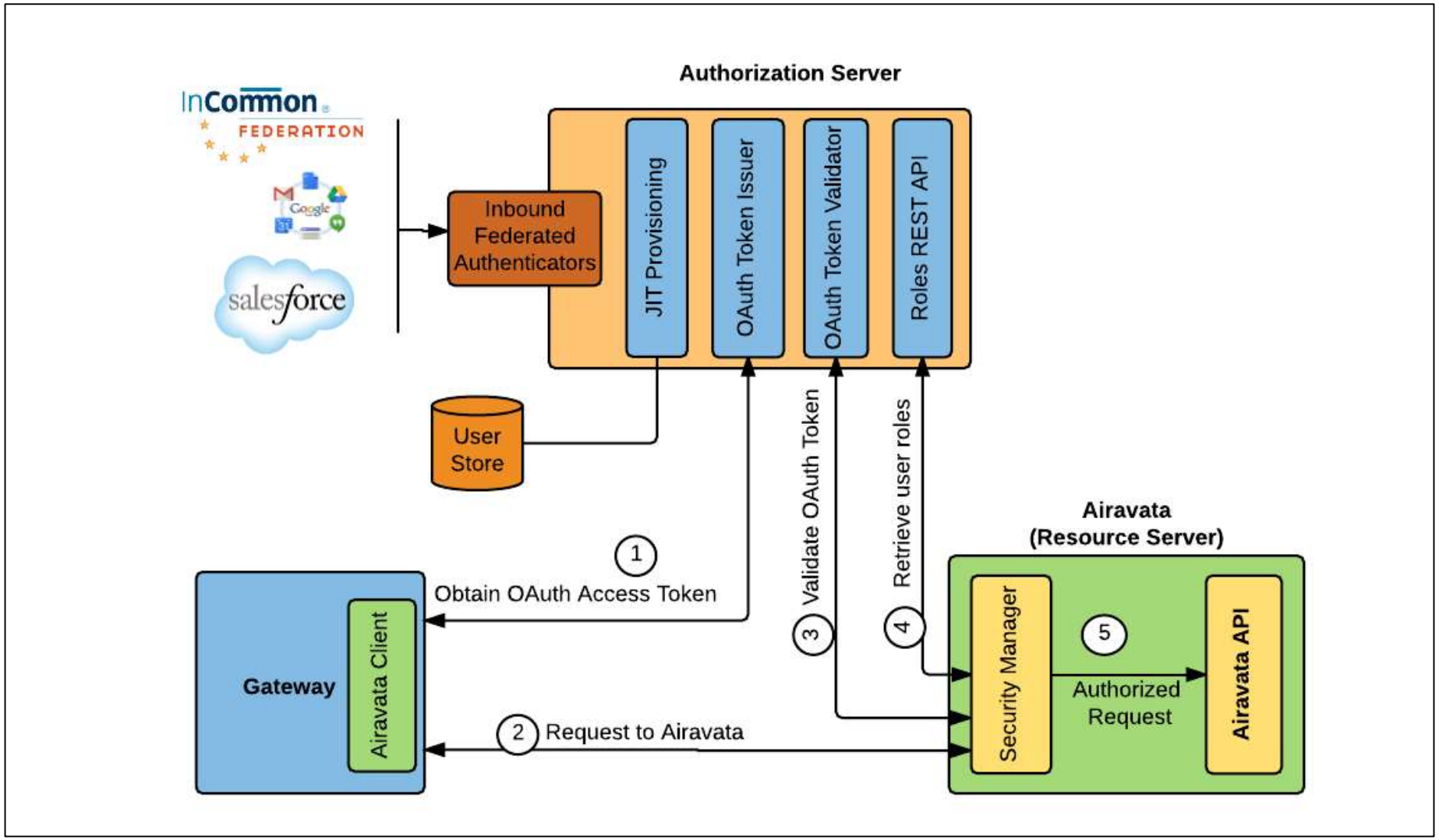
Configuring Keycloak for CILogon



How to integrate Keycloak

- Multi-tenanted: create a “realm” for each gateway
  - configure authentication options, like CILogon
- Web portal to use OpenID Connect for authentication
  - Redirect user to Keycloak to log in
- REST API for administrative and authorization integration
  - http://www.keycloak.org/docs-api/3.0/rest-api/index.html
  - E.g., Manage what roles a user has

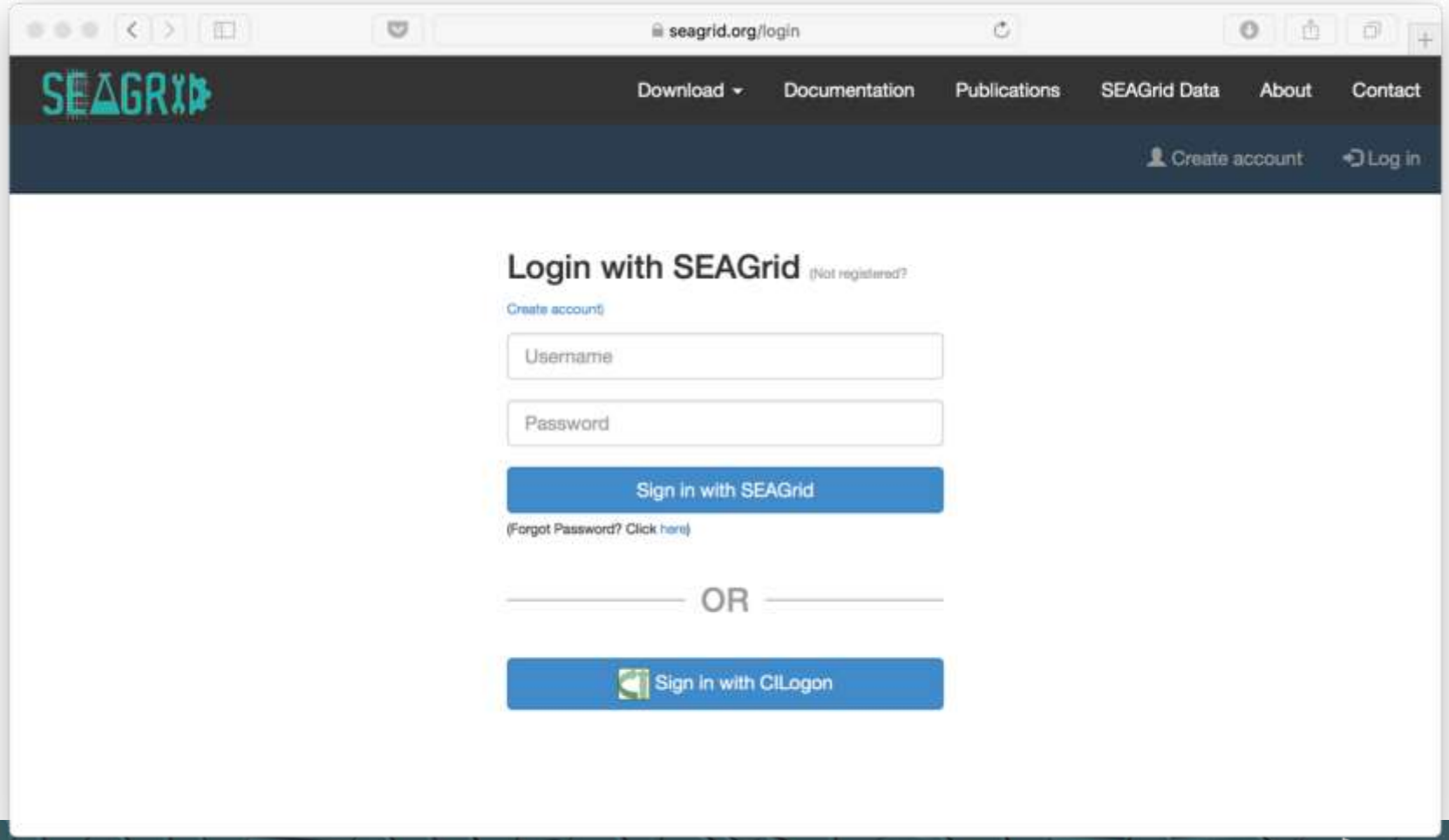
Securing Airavata



Apache Airavata – Profile Service

- Integrates with Keycloak REST API for tenant and user management
- Tenant Management
  - createTenant
    - Keycloak REST API: create Realm, create Realm Roles, create Admin user for Realm, create default client for web application
- User Management
  - createUser – Keycloak REST API: create User
  - enableUser – Keycloak REST API: update User
  - resetUserPassword – Keycloak REST API: update User with updated password
  - addRoleToUser – Keycloak REST API: add Realm Roles to User

User logs in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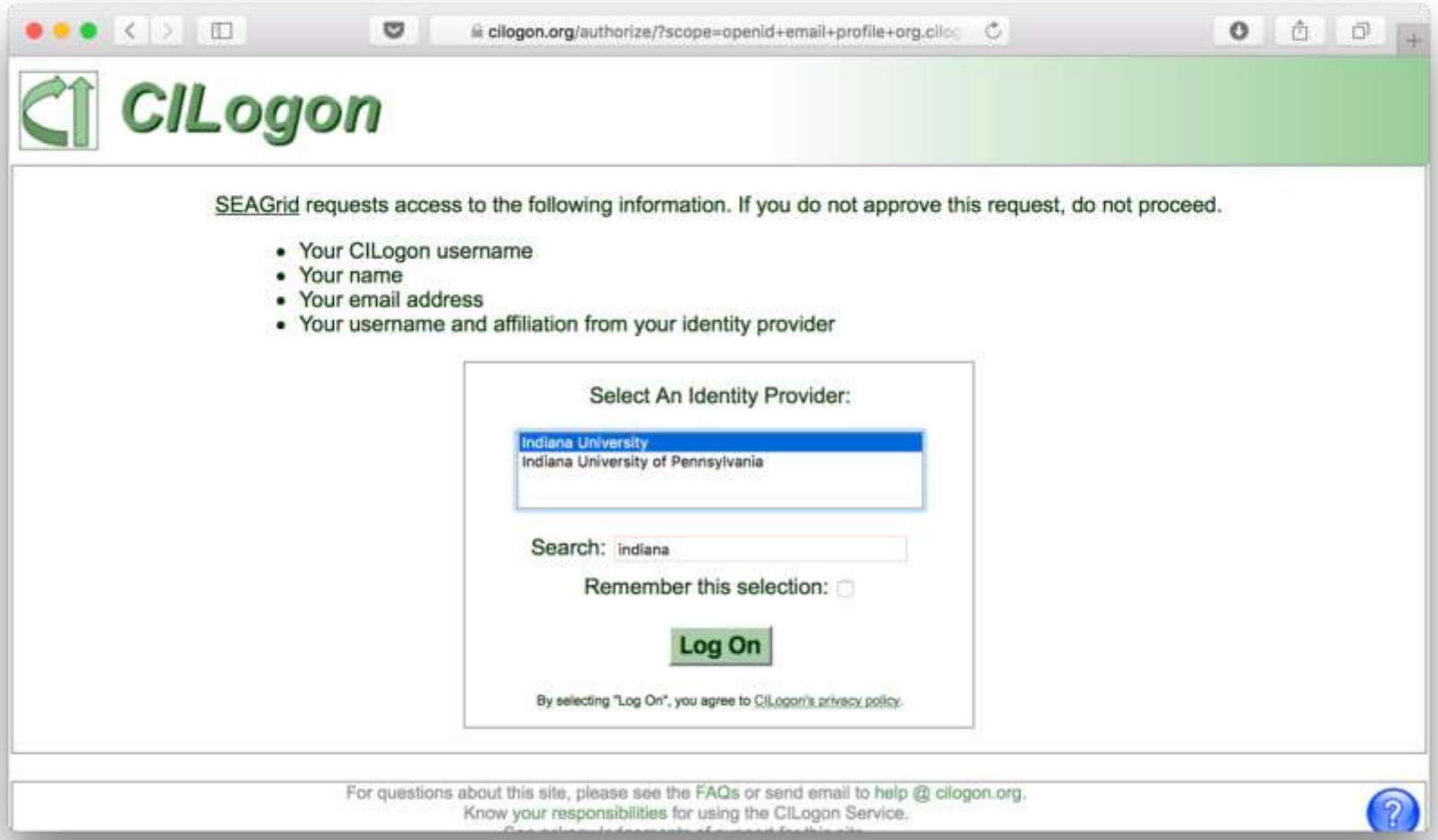
Create account
Log in
Login with SEAGrid
(Not registered?
Create account)
Username
Password
Sign in with SEAGrid
(Forgot Password? Click here)
OR
Sign in with CILogon

User logs in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By selecting "Log On", you agree to CILogon's privacy policy.
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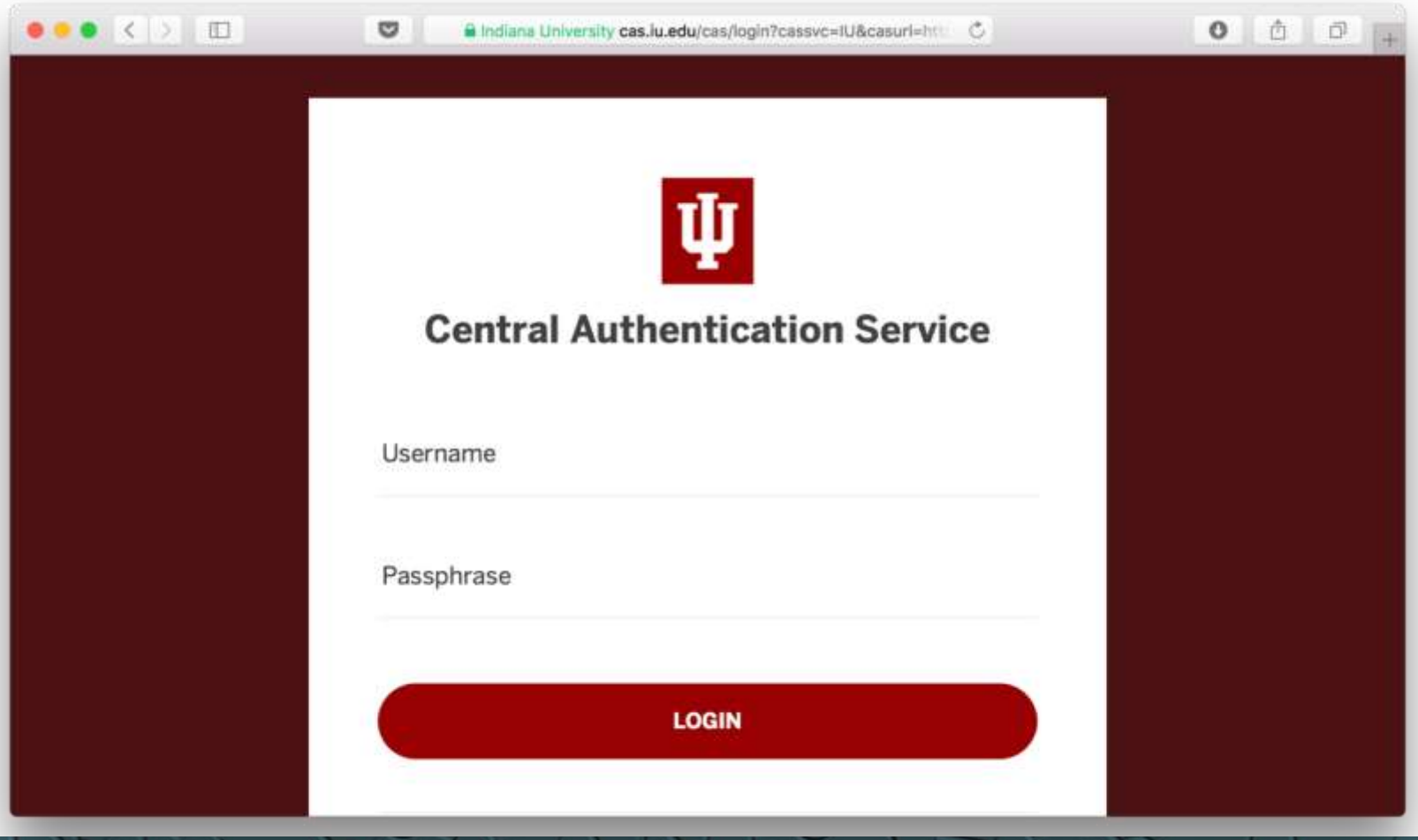
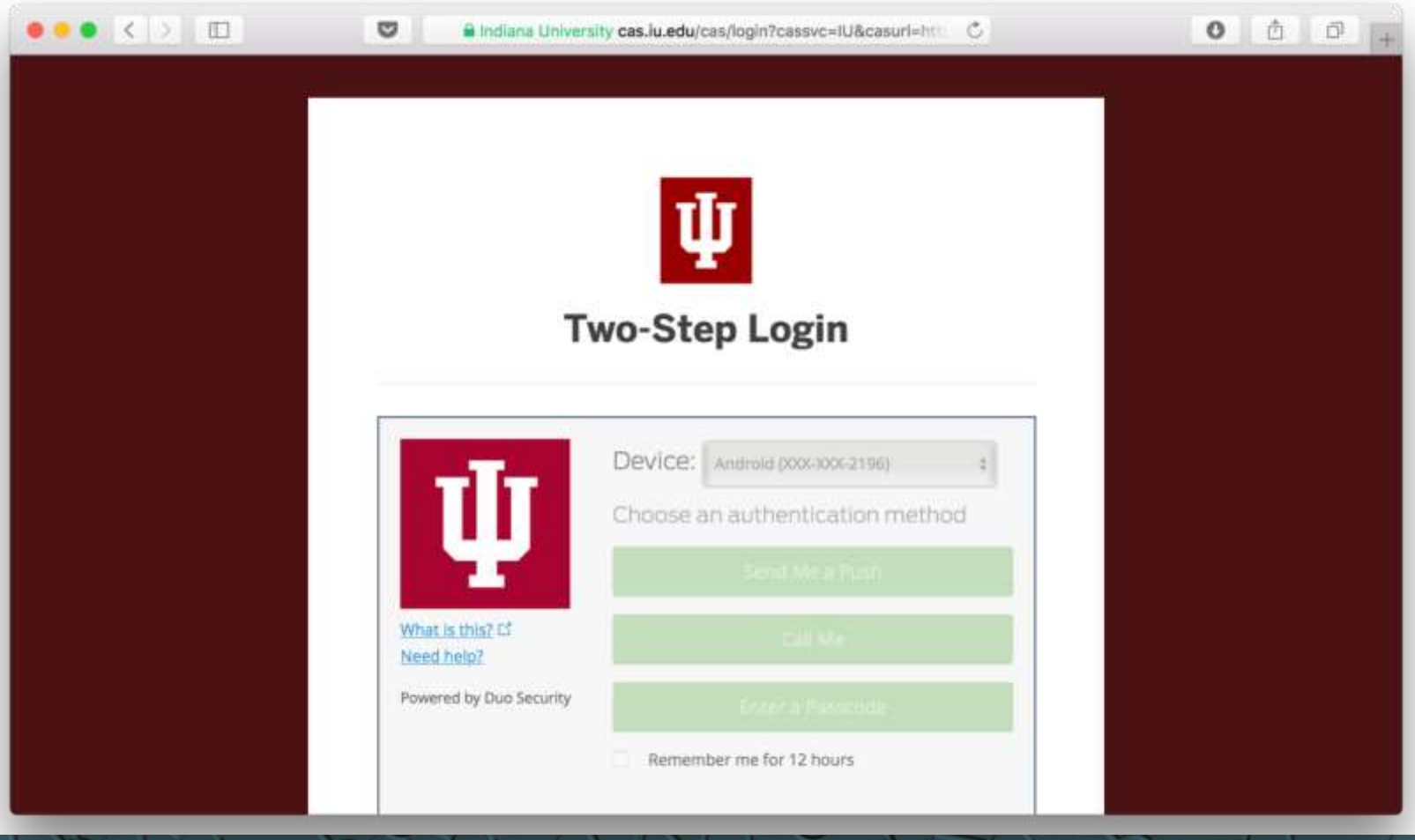
Know your responsibilities for using the CILogon Service.

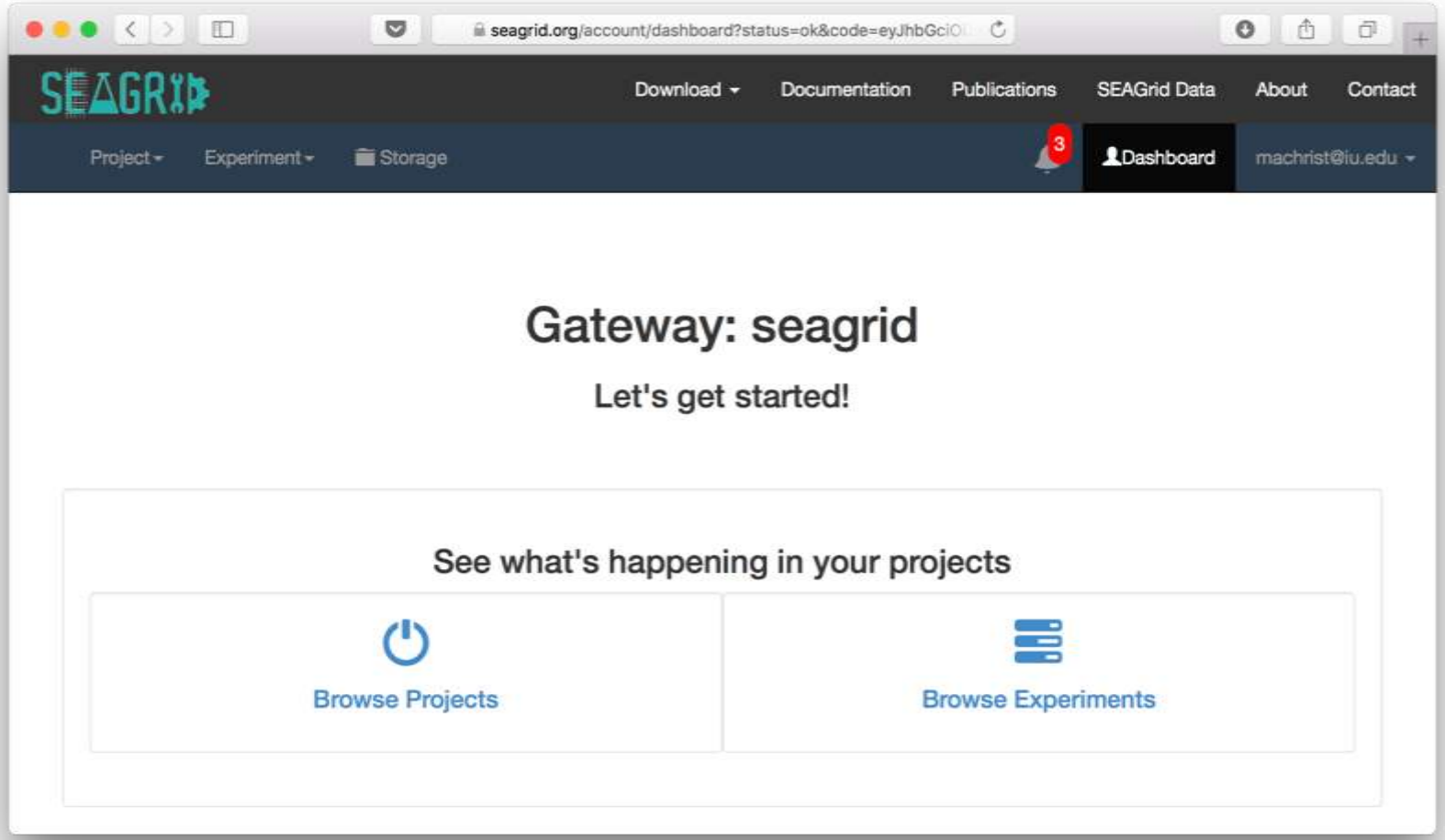
User logs in


Indiana University cas.iu.edu/cas/login?cassvc=IU&casurl=
Central Authentication Service
Username
Passphrase
LOGIN

User logs in


Indiana University cas.iu.edu/cas/login?cassvc=IU&casurl=
Two-Step Login
Device:
Android (XXX-XXX-2196)
Choose an authentication method
What is this?
Need help?
Powered by Duo Security
Remember me for 12 hours

User logs in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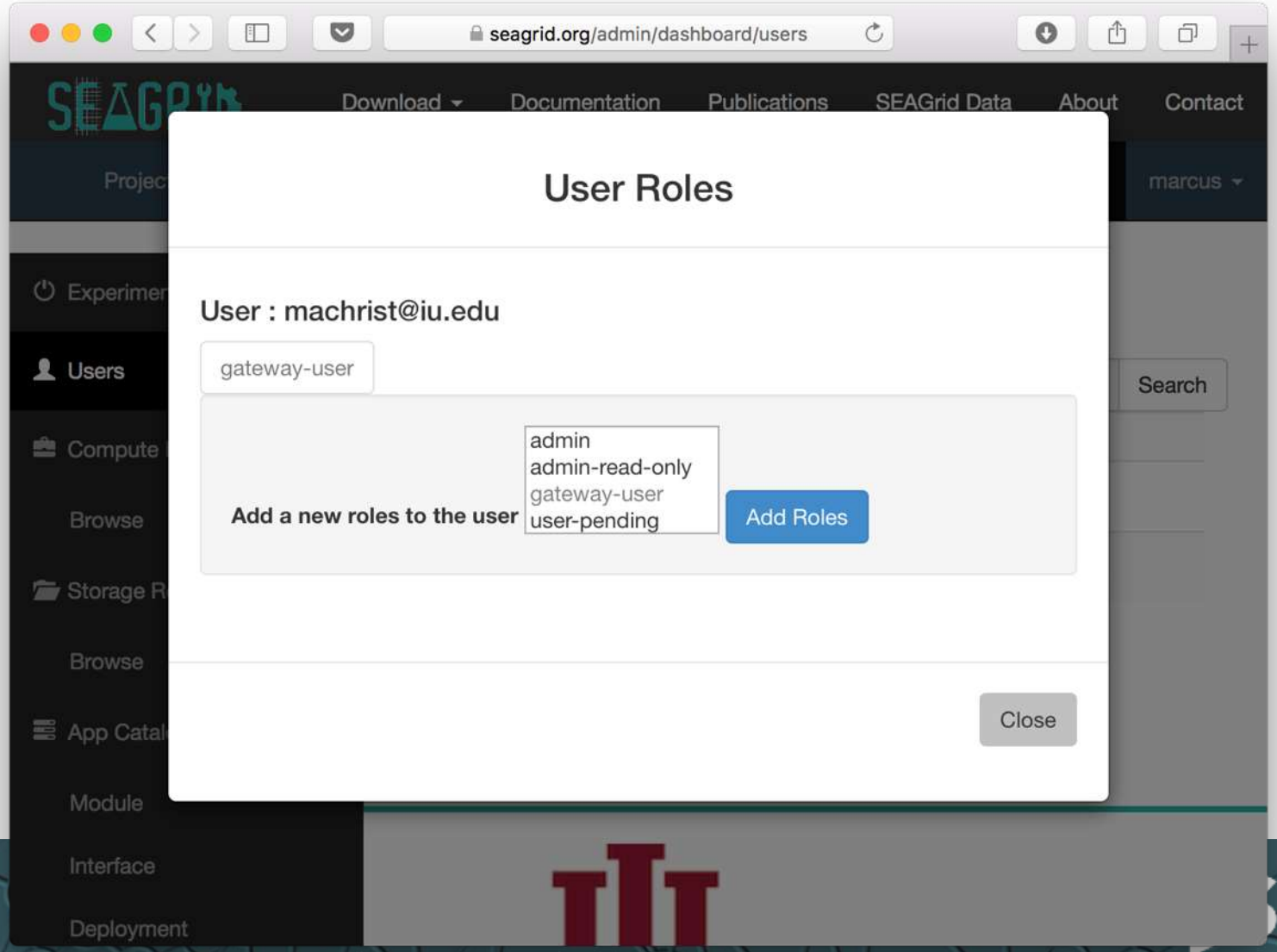
First login: user is assigned a default role

- At this point, the user is logged in but can’t do anything yet
- User is assigned to ‘user-pending’ role
- Gateway admin gets an email about a new gateway user

Admin grants role



How does the role get used?

- Portal – show/hide functionality based on role
- Airavata API server – each API method is restricted to certain roles
  - Uses OIDC endpoints to verify access token
  - Uses Keycloak REST API to get user's roles
  - Mapping from role to API methods accessible by that role

Questions?

- Feel free also to email me at machrist@iu.edu