JupyterHub IAM integration

IAM workshop
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SQUARE KILOMETRE ARRAY
Exploring the Universe with the world's largest radio telescope

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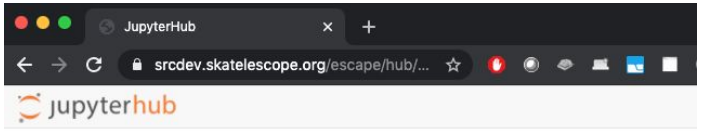
JupyterHub service on IRIS

- Zero to JupyterHub with Kubernetes
  https://zero-to-jupyterhub.readthedocs.io/en/latest/index.html
- JupyterHub prototype hosted on STFC Cloud
  https://srcdev.skatelescope.org/iris
  https://srcdev.skatelescope.org/escape/
  (not entirely a stable deployment, apologies!)
  - Externally accessible bare-metal Kubernetes cluster
  - Helm based deployment
  - Integrated with IAM authentication
  - Dynamically provisioned NFS volumes
  - Custom user environments
  - https service secured with a certificate signed by Let'sEncrypt - thanks to Rob!




```
rjoshi@kubernetes-head-01:~$ kubectl get nodes
NAME                STATUS   ROLES    AGE    VERSION
kubernetes-head-01  Ready    master   175d   v1.18.1
kubernetes-worker-1 Ready    <none>   175d   v1.18.1
kubernetes-worker-2 Ready    <none>   175d   v1.18.1
kubernetes-worker-3 Ready    <none>   160d   v1.18.1
```

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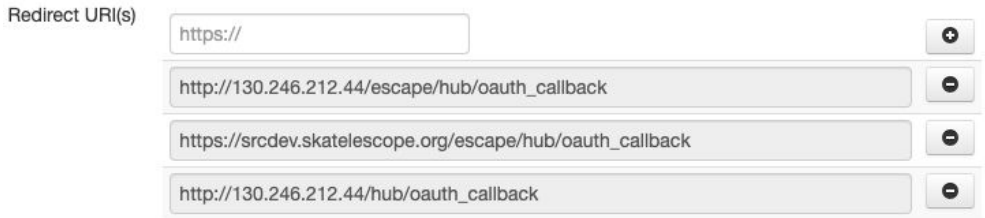
Integrating IAM for authentication

- Created an IAM client
  Instructions here:
  https://indigo-iam.github.io/docs/v/current/user-guide/client-registration.html
- Point to the IRIS/ESCAPE IAM
- oauth_callback_url must match with the Redirect URIs configured in the client
- You can have multiple redirect URIs while you debug
- Currently more authorization, less authentication

```
hub:
  [redacted]
    OAUTH2_TOKEN_URL: https://iam-escape.cloud.cnaf.infn.it/token
    OAUTH_CALLBACK_URL: https://srcdev.skatelescope.org/escape/hub/oauth_callback
```

```
auth:
  type: custom
  custom:
      className: oauthenticator.generic.GenericOAuthenticator
      config:
        login_service: "ESCAPE IAM"
        client_id: "f1f6b483-ee46-479c-b8be-5479ff74c180"
        client_secret: "<redacted>"
        token_url: https://iam-escape.cloud.cnaf.infn.it/token
        userdata_url: https://iam-escape.cloud.cnaf.infn.it/userinfo
        userdata_method: GET
        userdata_params: {'state': 'state'}
        username_key: preferred_username
        oauth_callback_url: "https://srcdev.skatelescope.org/escape/hub/oauth_callback"
```



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Demo

- JupyterHub landing page
- Redirect to be logged in with IRIS IAM
- Redirected back to the JupyterHub service
- New user server of choice created

- Login with ESCAPE IAM

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Possible next steps

Currently, IAM is used to authenticate users but not to authorise them.

- Checking group membership to grant access
- Check the IAM roles to grant varying degrees of access

JupyterHub functionality

- **Dockerhub pull rate limiting has been a major issue** - a workaround is in place but we are still evaluating the efficacy.
- Multiple servers per user
- User profiles based on resources
- Dask enabled notebooks
- Using cluster orchestration services like Magnum
- Kubernetes cluster monitoring

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Useful Links

- JupyterHub WP5 Tech Talk: https://indico.in2p3.fr/event/21938/
  Note: Links to the deployment found in this talk are no longer valid, use links in this presentation instead.
- ESCAPE IAM example: https://github.com/rohinijoshi06/jupyterhub-on-k8s/blob/master/ingress/jupyterhub-config-escape.yaml
- More generally auth with JupyterHub: https://zero-to-jupyterhub.readthedocs.io/en/latest/administrator/authentication.html
- The littlest JupyterHub https://tljh.jupyter.org/en/latest/
- More on the GSOC Rucio JupyterLab extension from WP5 Progress meeting here: https://indico.in2p3.fr/event/22482/contributions/87921/attachments/60444/82166/ESCAPE_WP5_Progress_meeting_261020_RobBarnsley.pdf
- JupyterHub on k8s: https://github.com/rohinijoshi06/jupyterhub-on-k8s/

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Thank you!