FTS3: Data Movement Service in containers deployed in OKD

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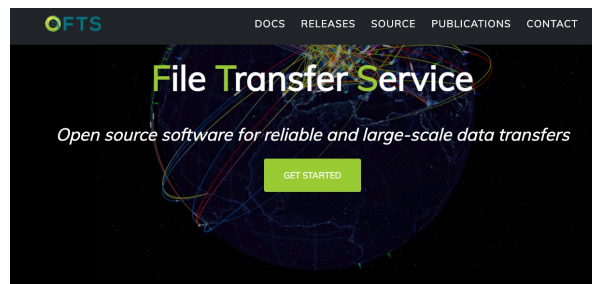CHEP 2021 online Workshop

20 May 2021

What am I going to present today?

- FTS3

- Architecture

- Certificate Management and Maintenance – Kubernetes Cronjobs

- FTS3 instances running at Fermilab

- Summary

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FTS3

- File Transfer System that efficiently schedule data transfers

- Composed by a Frontend and a backend (database)

- Integrated with experiment frameworks: Rucio, PhEDEx and DIRAC

Multiprotocol support (WebDAV/HTTPS GridFTP ,XRootD and SRM)

Clients can access the service (REST APIs, python bindings, CLI)

Transfers from and to different Storage Systems as EOS, DPM, Object storages such as S3, dCache, CASTOR and CTA

Support for tapes (bringonline)

Fermilab

FTS3

SLATEci

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Powering science collaborations with flexible and secure service deployment
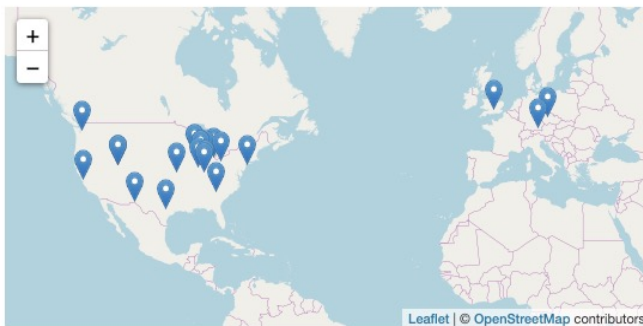
Federated Operation of Science Platforms

Modern research requires collaboration across facilities, institutions and scientific domains. SLATE helps build multi-institution cyberinfrastructure using secure and declarative deployment tools.

SLATE enables a federated "NoOps" operations model that gives cyberinfrastructure developers the flexibility to innovate at scale, expanding the reach of domain specific science gateways and multi-site research platforms.

Leaflet | © OpenStreetMap contributors

Containerized Services

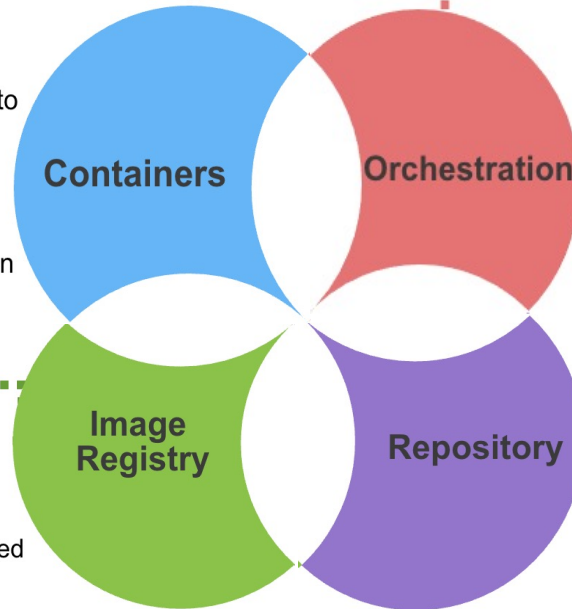| XCache	Globus Connect	perfSONAR	HTCondor	GridFTP

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Architecture

- A standard **MariaDB image for the backend database** (provided by OKD and used without modification)

- An image from the **frontend FTS3 server**, based on an image provided by the SLATE project and adapted to manage grid certificates in a container volume

- A **fetch-crl image**, for the purpose of fetching certificate authorities and updating certificate revocation
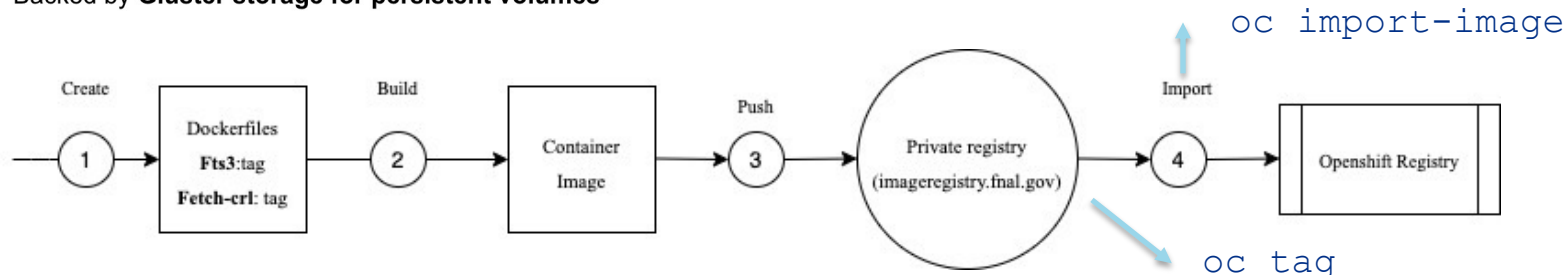
- Fermilab image registry (**imageregistry.fnal.gov**)

- Docker images mentioned are built and pushed to/pulled from there

- Backed by **Gluster storage for persistent volumes**

- Underlying infrastructure in which the FTS3 project is deployed

- Fermilab deploys **OKD**, the community distribution of OpenShift

- **Container management** that provides a secure, multi-tenant infrastructure

- OKD versus Kubernetes (DeploymentConfigs,BuildConfigs,ImageStreams)

Control version repository for the code and documentation

Containers

Orchestration

Image Registry

Repository

`oc import-image`

`oc tag`

Create		Build		Push		Import	
1	Dockerfiles **Fts3**:tag **Fetch-crl**: tag	2	Container Image	3	Private registry (imageregistry.fnal.gov)	4	Openshift Registry

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Certificate Management and Maintenance - Kubernetes CronJobs

- FTS3 developers assume Certificate Authorities, certificate revocation lists (CRLs), and certificates (certs) to be in a common area

- We have installed OSG repository

  - CAs provide the trust roots for the OSG public

  - Help to have CRLs up to the date on the hosts

  - osg-ca-manager

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FTS3 public instances running at Fermilab

Credit to Burt Holzman

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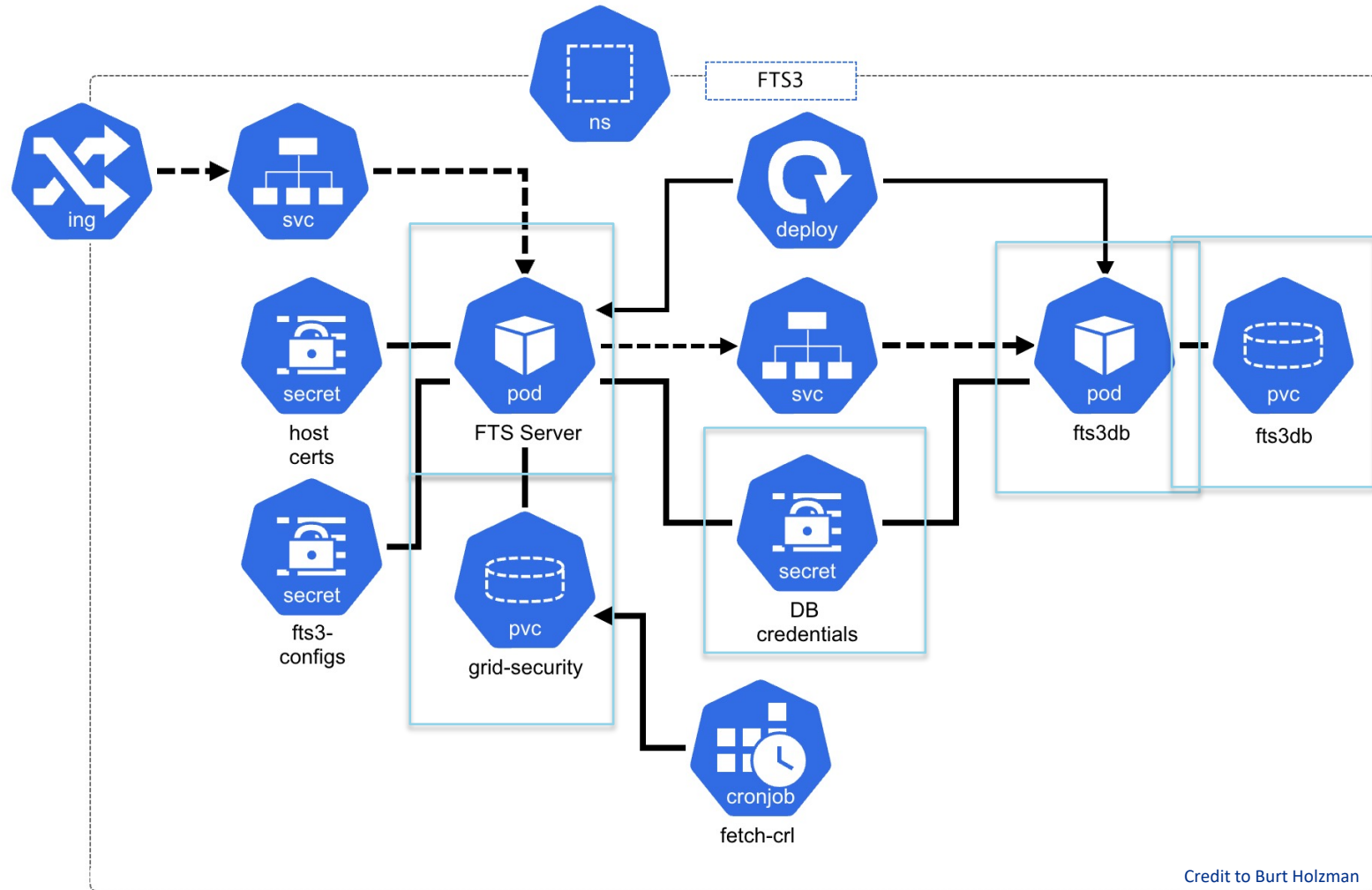
Summary

✓ Have a public FTS3 instance at least for transfers involving Americas

- ❑ Containerized deployment -> Horizontal Scaling according to demand

✓ OKD instance that supports multiple tenants enabling sharing of the cluster

✓ Resilience to hardware or application faults

✓ We keep working..

- ❑ DUNE: RUCIO tests (petabytes of data in the next few months) + monitoring

- ❑ Production coming soon + JWT tokens provided by 2 different Entity Providers

Questions?
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