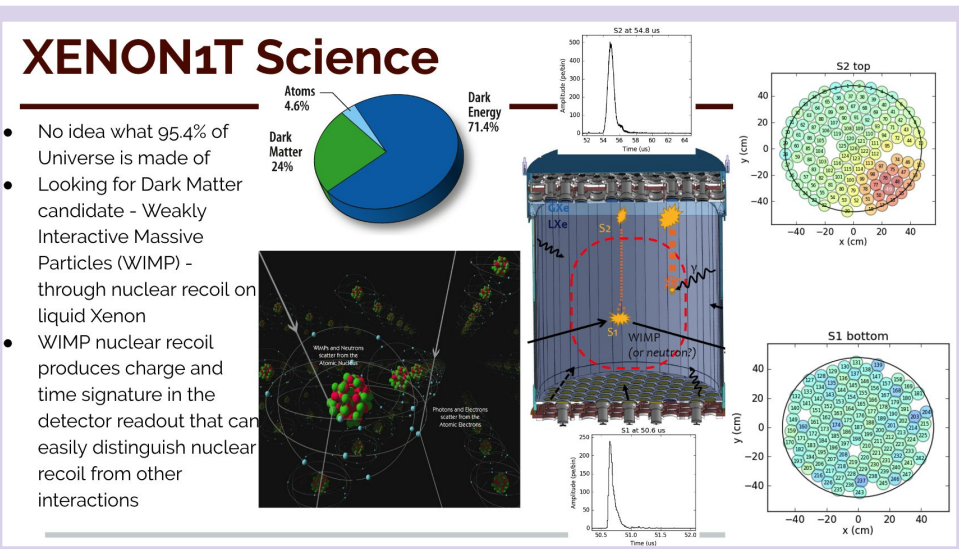# Services Layer At The Edge

SLATECI

CIF21 DIBBs: EI: SLATE and the Mobility of Capability
PI: Rob Gardner (Univ of Chicago)
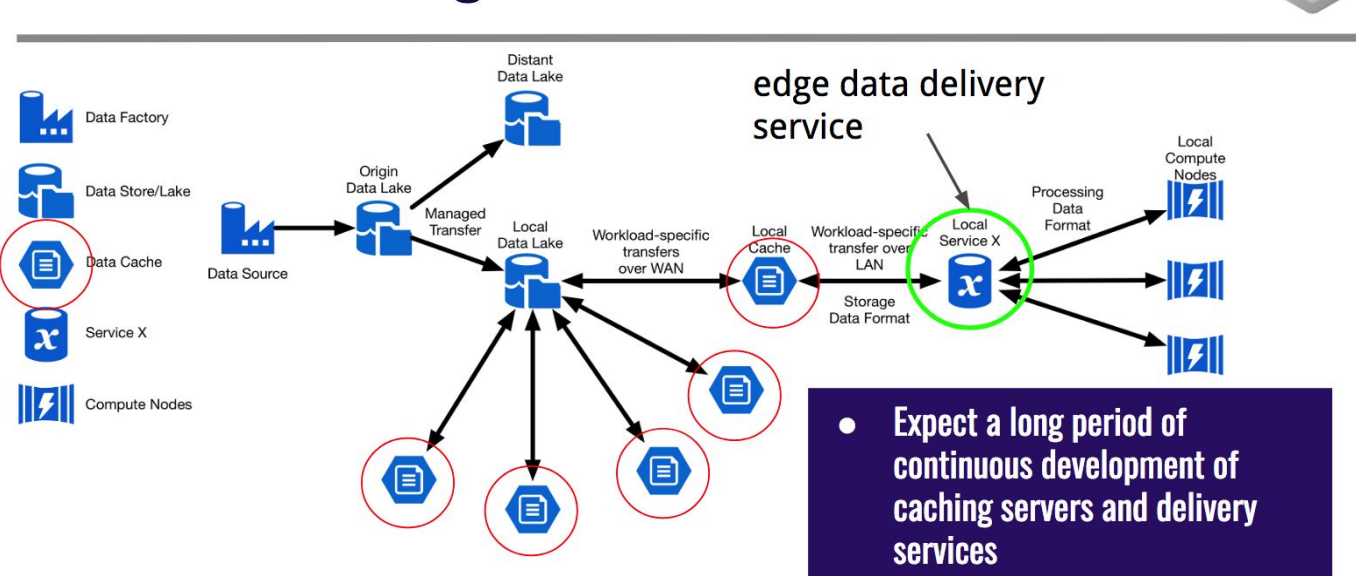Co-PIs: Shawn McKee (Univ of Michigan), Joe Breen (Univ of Utah)

Award 1724821

Enabling Multi-Institution Science

~130 scientists from 22 institutions

Laboratori Nazionali del Gran Sasso (LNGS), Italy — XENON1T

XENON1T Science

- No idea what 95.4% of Universe is made of
- Looking for Dark Matter candidate – Weakly Interactive Massive Particles (WIMP) – through nuclear recoil on liquid Xenon
- WIMP nuclear recoil produces charge and time signature in the detector readout that can easily distinguish nuclear recoil from other interactions

In a rapid, consistent,

Use Case: caching network for data lakes

edge data delivery service

- Data Factory
- Data Store/Lake
- Data Cache
- Service X
- Compute Nodes

- Expect a long period of continuous development of caching servers and delivery services
- Roll out updates centrally
- Configure & control centrally

and *secure* fashion

Policy and Trust

- **SLATE** applications are curated, published by a centralized team
- Applications must define and request all needed network, disk, device, etc access.
  - Think application permissions on your phone
- Site policies must be respected at all costs
  - Access, privileges, capabilities controlled and transparent

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SLATE VISION

SLATE edge platform (in SciDMZ)

Central SLATE Platform Service Factory

Campus or Institute HPC resources

SLATE Platform Operators & Science VO Managers

Application deployment that is:

- Rapid
- Consistent
- Secure
- Distributed
- Scalable
- Manageable

Built for the multi-institutional & international research collaborations

Built to simplify integration with national cyberinfrastructure

Built with *Security* baked in

Monday, January 27, 2020

Trusted CI Concludes SLATE Engagement

In the second half of 2019, Trusted CI and Services Layer at the Edge (SLATE) collaborated in an engagement to address cybersecurity concerns for the SLATE system.

SLATE is funded by an NSF grant managed by the Office of Advanced Cyberinfrastructure (Award #1724821). SLATE accelerates collaborative scientific computing through a secure container

TRUSTED CI — THE NSF CYBERSECURITY CENTER OF EXCELLENCE

WLCG — Worldwide LHC Computing Grid
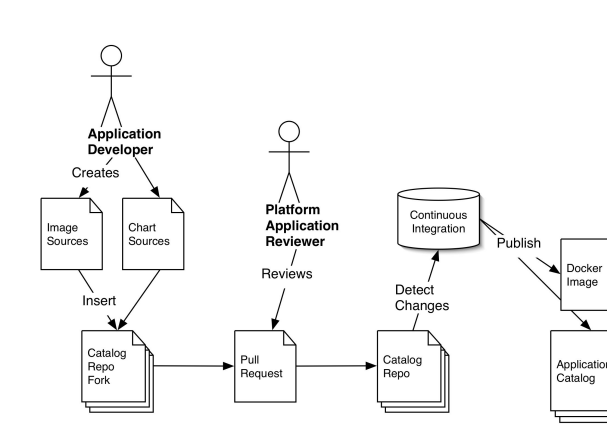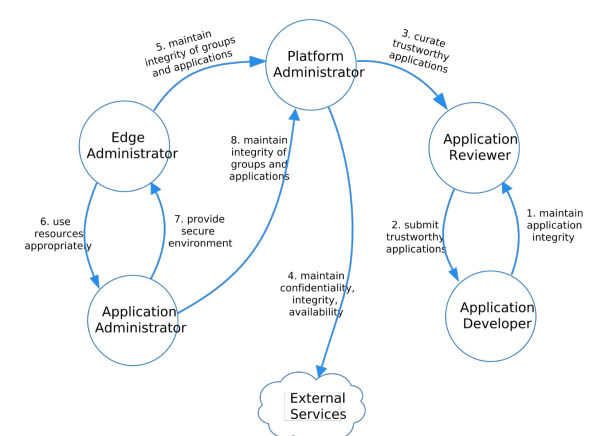
Under Review	Planned
Master Information Security Policy & Procedures	Disaster Recovery Policy
	Access Control Policy
	Edge Admin/Federation Policy
Acceptable Use Policy	Application Review Policy
Asset Management Policy	Information Classification Policy
Incident Response Procedures	Logging/Traceability Policy
	Personnel Exit Checklist
	Mobile Compute Policy
	Network Security Policy
	Password Policy
	Physical/Environmental Security Policy
	Privacy Policy
	Remote Access Policy

Trust relationships and responsibilities

Application Curation Workflow

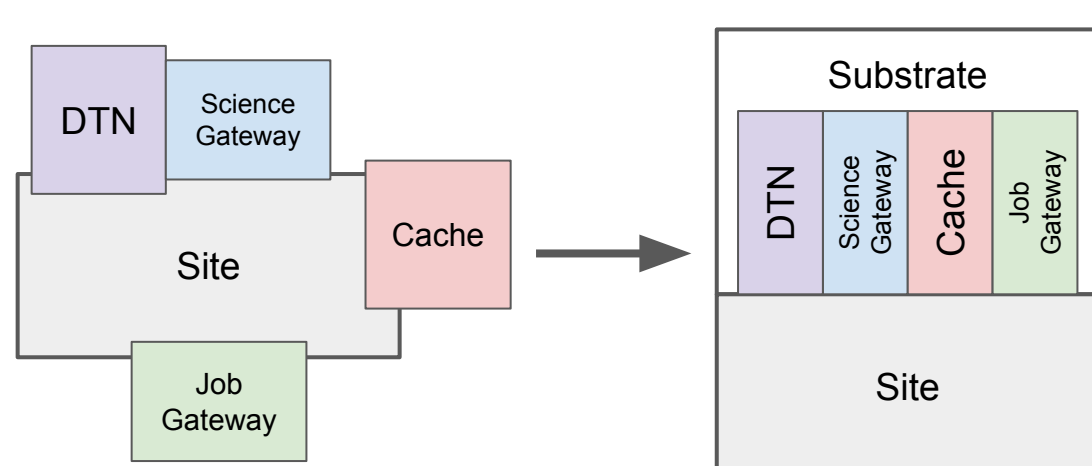**Security Policy and Posture Definitions**

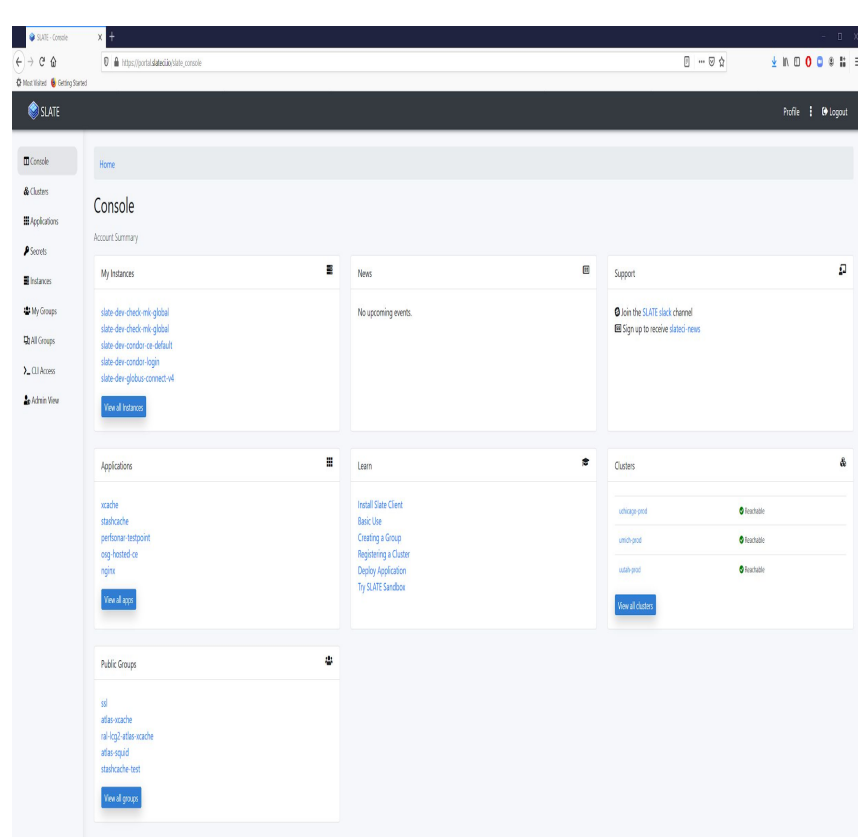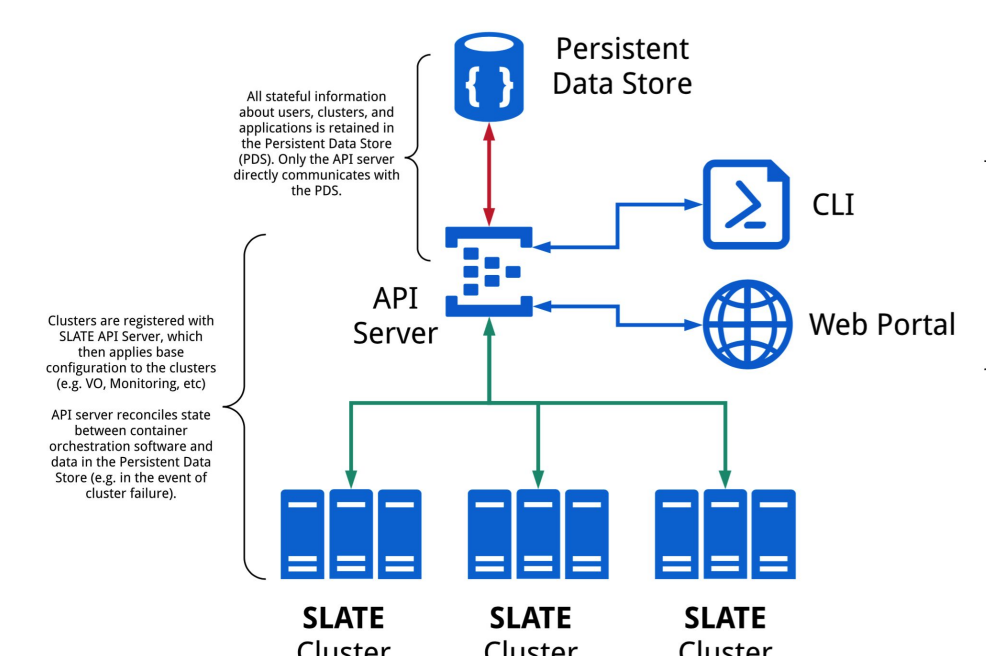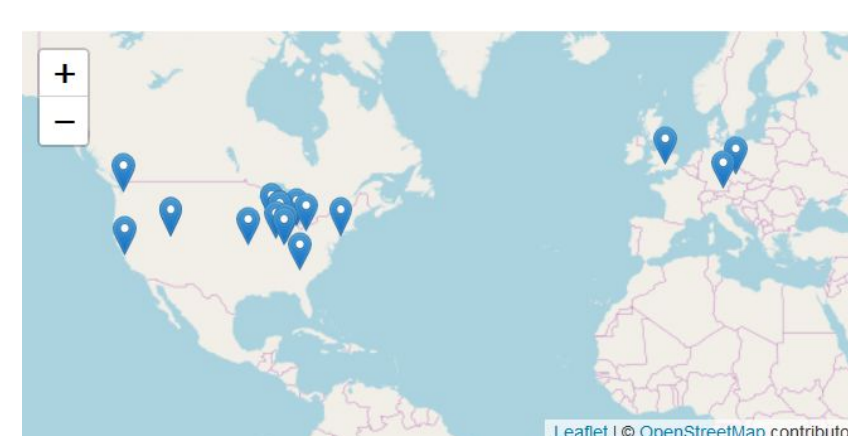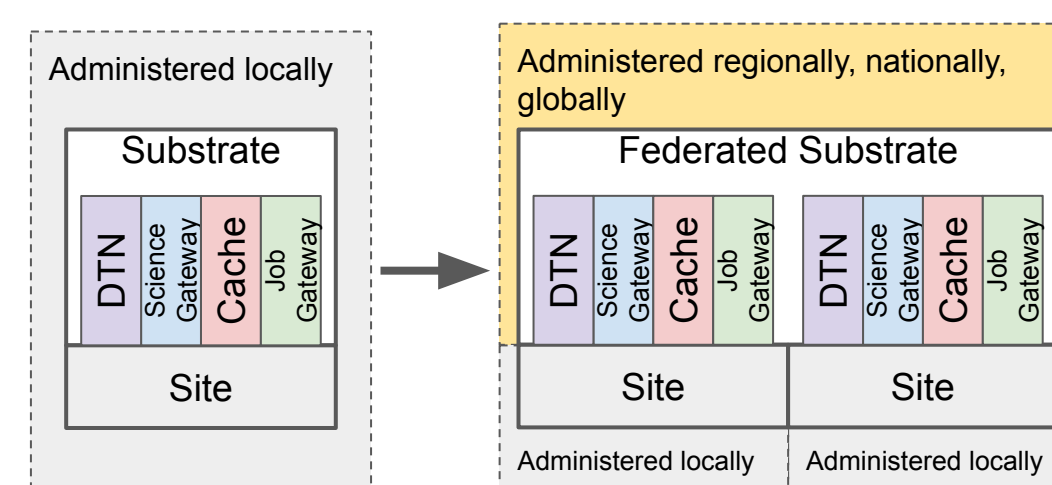## Components & Concepts

SLATE Elements

- Containerized services in managed clusters
- Services curated with security in mind
- Standalone or federated
- Widely used open-source technologies (Kubernetes, Docker, Helm) for growth and sustainability

Standardizing a Service Substrate

- Reduce labor
- common to sites
- modular service components

DTN | Science Gateway | Cache | Site | Job Gateway → Substrate (DTN | Science Gateway | Cache | Job Gateway | Site)

SLATE Console

SLATE CLI

```
slate app install --cluster=uchicago-mwt2,umich-arc harvester:latest
slate app install --cluster=alcf-edge htcondorce
slate app install --cluster=mycluster arccache
slate app status [appname]
slate app status [appinstancename]
slate app delete xcache
slate app delete xcache --instance xcache-ivukotic-mwt2
slate app delete xcache --cluster='uchicago-*'
slate app delete --cluster=uchicago-rcc --org=ATLAS
```

Federated Edge

Persistent Data Store

CLI

API Server

Web Portal

SLATE Cluster | SLATE Cluster | SLATE Cluster

Leaflet | © OpenStreetMap contributors

Site and Federation Security

Administered locally — Substrate (DTN | Science Gateway | Cache | Job Gateway | Site)

Administered regionally, nationally, globally — Federated Substrate (DTN | Science Gateway | Cache | Job Gateway | Site | DTN | Science Gateway | Cache | Job Gateway | Site) — Administered locally

Global and Local Services Offered

Containerized Services

XCache | Globus Connect | perfSONAR | HTCondor | GridFTP

See all available services...

THE UNIVERSITY OF CHICAGO | UNIVERSITY OF MICHIGAN | THE UNIVERSITY OF UTAH | NM STATE UNIVERSITY | CLEMSON UNIVERSITY 1889 | TRUSTED CI THE NSF CYBERSECURITY CENTER OF EXCELLENCE — Reviewed 2019