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Fermilab's data driven approach with Affiliations to drive Science and business processes

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Abstract

Fermilab supports scores of experiments, collaborations, and projects with approximately 5,000 affiliates and users participating throughout the world requiring access to our resources. We started on the journey to associate experiments and collaborations to compute resources using a concept called virtual organization allowing us to automate scientific services provisioning. About four years ago, the science and business areas requested a centralized database for experiments and collaborations. We have expanded the scope to include many other types of affiliation to the laboratory and it now drives data about our affiliates, users, sub-contractors, and other visitors for site access, account and scientific resource access, facility contracts and more. Learn how Fermilab has outlined their roadmap to drive scientific and business processes using configuration data in the Affiliations database. Find out more about what it means and what we have planned next.

Agenda

- Where we started
- Business Needs
- Affiliations Database
- How its used
- Data Driven Approach

Virtual Organizations (VO)

Concept borrowed from Open Science Grid (OSG)

Used it for Fermilab scientific experiment/projects:

- Auto-provisioning of scientific accounts based on VO data
- Manage and provision scientific services automatically based on VO information
- Account authorizations
- Tracking of services

provided

The screenshot shows a web-based form for managing a Virtual Organization (VO). The top navigation bar includes a back button, a menu icon, the VO name 'E-1071 DUNE(Deep Underground Neutrino Experiment)', a dashboard link, and a user icon. The main form fields are:

Name	E-1071 DUNE(Deep Underground Neutrino Experiment)
Title	Experiments - Approved
Map to Lab Affiliation	DUNE - DEEP UNDERGROUND NEUTRINO EXPERIMENT
Virtual Organization Managed By	Eileen Berman, Thomas Junk, Andrew Norman
Include in service request menus <input checked="" type="checkbox"/>	
Include in access request menus <input checked="" type="checkbox"/>	
email	
Family	DUNE
Frontier	Intensity
Affiliation group	dune
User	E-1071 DUNE(Deep Underground Neutrino Experiment)

Below the form is a section titled 'Contractor Approvers' with two buttons: 'Update' and 'Save'. At the bottom are links for 'Related Links', 'Subscribe', 'Clone Relationships of', and 'Remove Relationships'. The footer includes buttons for 'Service Commitments', 'Users (421)', and 'Subscribes to Service (115)'.

Business Needs

Provide consistent data for following activities

- Data reporting to DOE (experimenters database)
- Point of Contact Approvals
- Organizational, Project, Experiment Approvals
- Foreign National Access Program (FNAP), Foreign National Security Plans (FNSP)
- Host information
- Physical site access

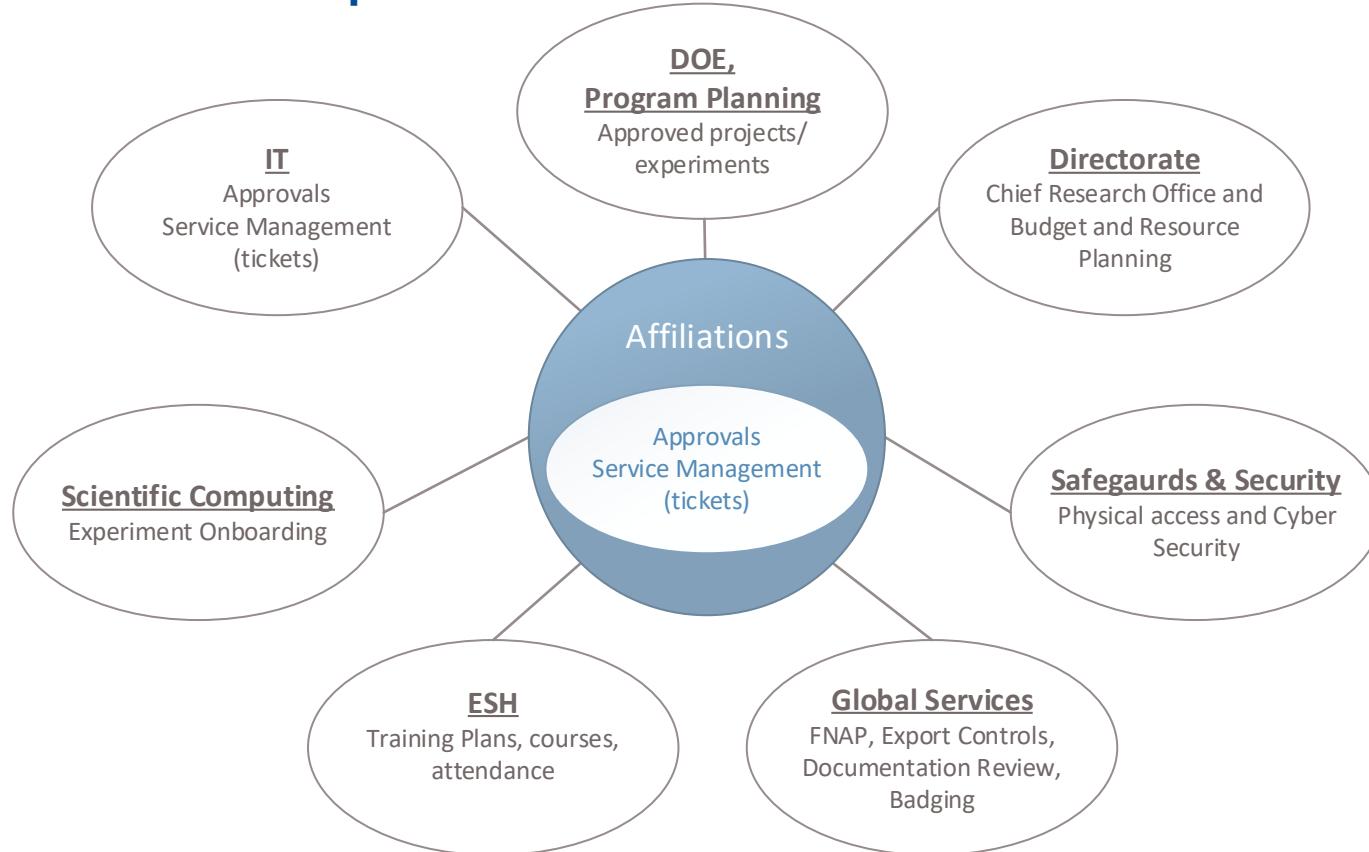
We saw value in the approach that the VOs had taken and decided to repurpose / reengineer the idea of VOs providing a broader concept.

VOs grew into what we call the Affiliations Database

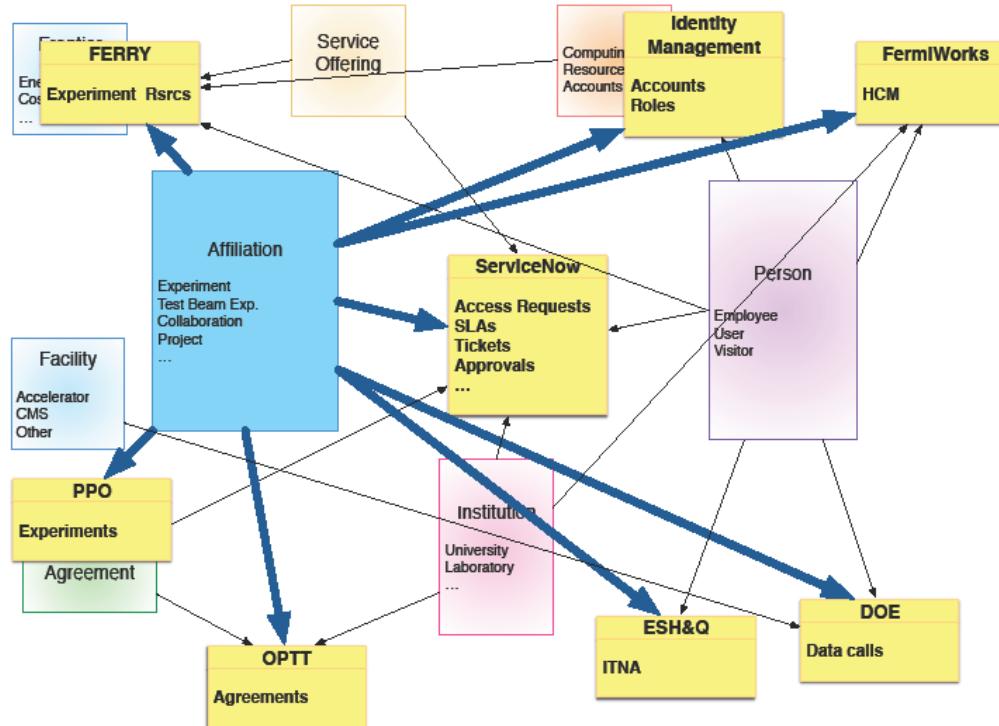


Affiliations Database –

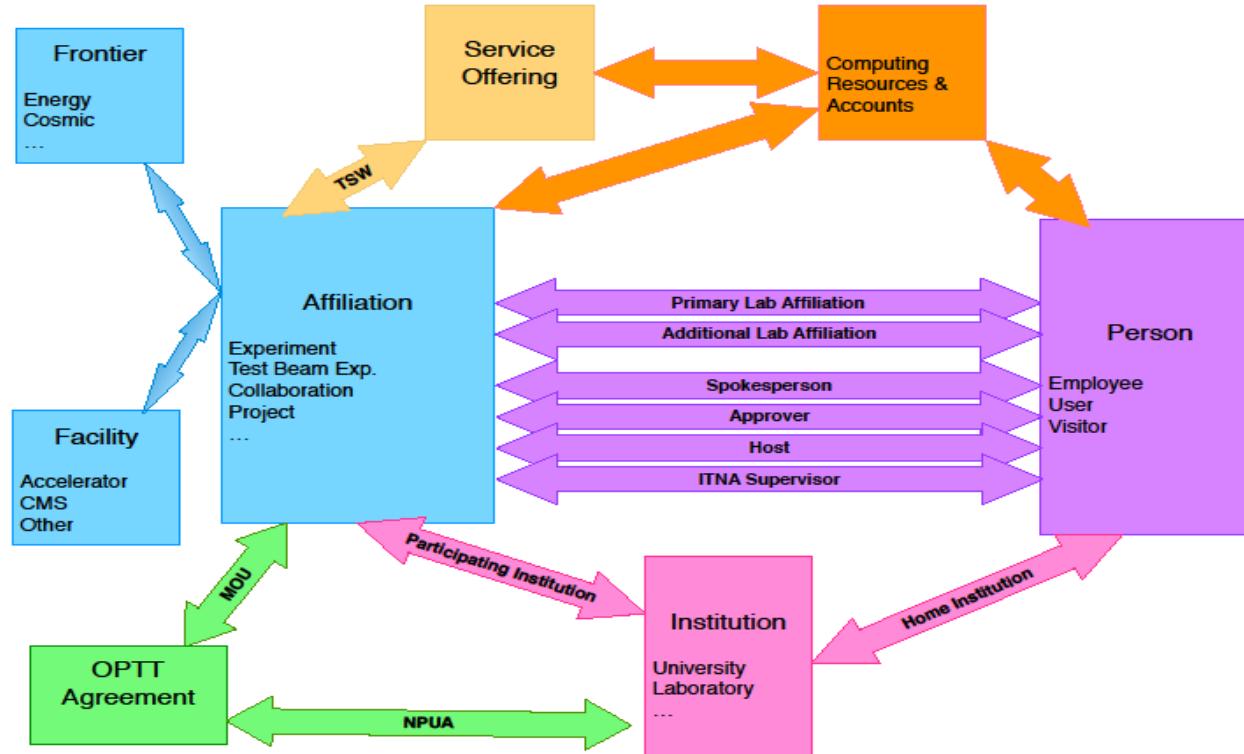
What areas work with Experiments and Collaborations at Fermilab?



Systems that Need Affiliation Data



Relationships Between Affiliations and Other Data



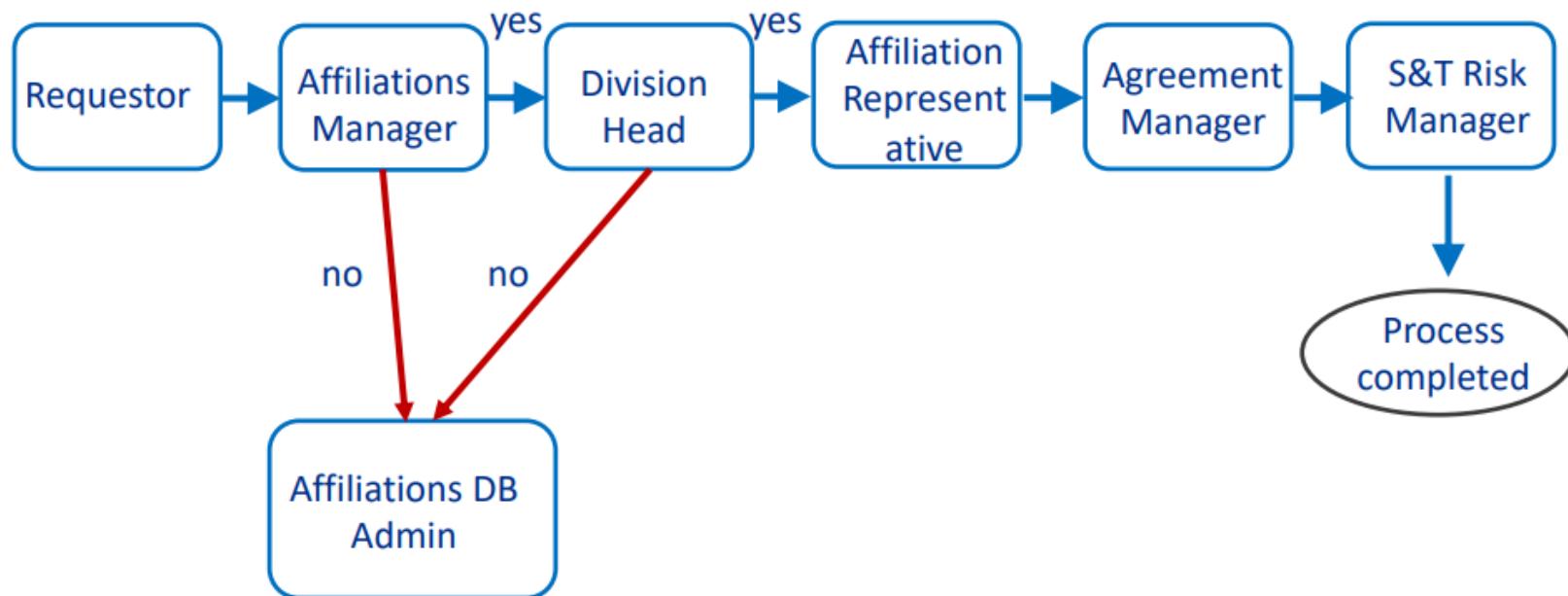
What is the Affiliation Database?

- A centralized location where you can find key information
- Data management is decentralized with IT oversight.
 - Roles: Affiliations Manager, Division Head, Affiliation Representative, Agreement Manager, S&T Risk Manager
- Affiliation Data:

Affiliation Name	Experiment Number	Spokespersons
TRAIN supervisors	Hosts	Offline and On-line run coordinators
Agreement types	S&T Assignment	Computing approvers

- Replace the various disconnected spreadsheets, emails and phone calls that are currently being used to track this information

Process overview for creating a new Affiliation



Fermilab's Site Access Program

How Affiliations support the business:

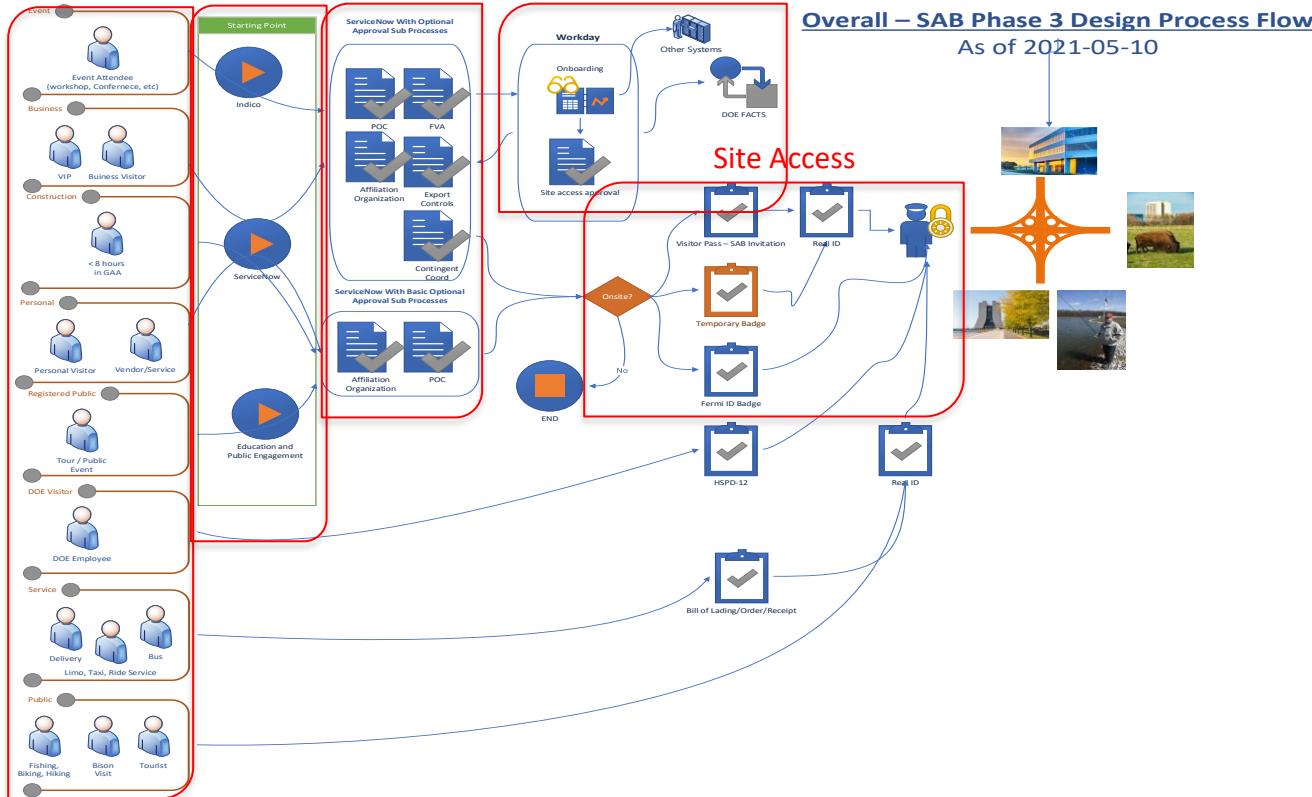
- Original SAB Charge: Who's here and why are they here?
- Goals
 - Common way to request access (single point of entry) -
 - Standard set of rules / workflow “easily” adjustable
 - Implement necessary repositories to support site access rules
 - Do all of this in a secure way

Original Site Access Charge & Goals

Visit Types

Entry Points Workflow

Conditional Data Flow



Data Driven Process

The process and workflow is a rules-based engine that takes into consideration several factors. Most significantly:

- **Who they are:** Person Data (citizenship, country of birth, etc....)
- **What organization are they representing** while at Fermilab: Home Institution, Supplier Company, other
- **What are they coming for:** Affiliation* – Fermilab Project, Experiment, Organization, Event
- **Is there an Agreement in place:** Some circumstances require formal Agreements between the Home Institution and Fermilab and/or the Affiliation
- **When is access requested:** Specifically, the duration of access
- **Where will access be needed:** Locations and Applications

Affiliation

All

Affiliation Membership

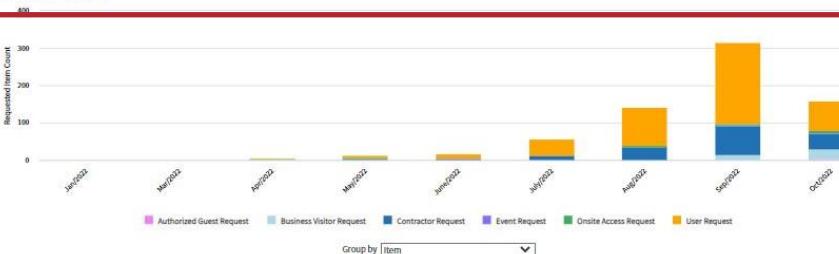
Affiliation Data



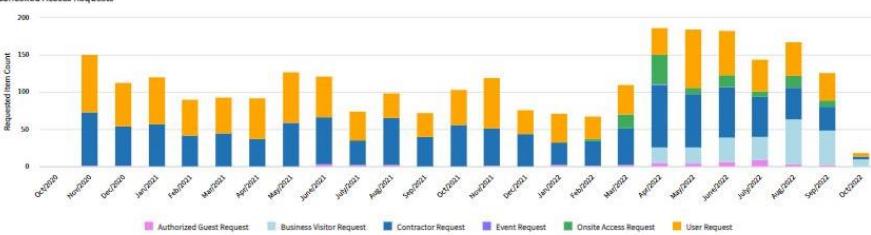
Onsite = 16,254 (56.07%) Offsite = 12,710 (43.85%) Pending = 19 (0.07%) empty = 4 (0.01%)

Group by Person Primary position Access type

All Open Access Requests

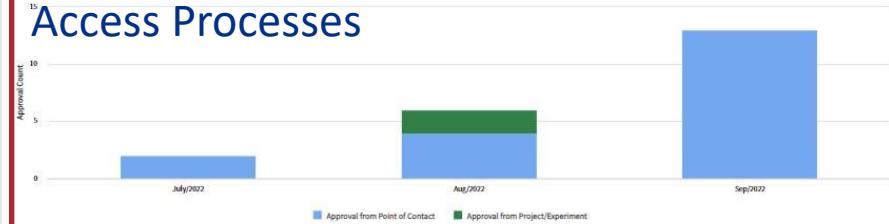


Cancelled Access Requests



Ab Aging Approvals Pending for Over 7 Days

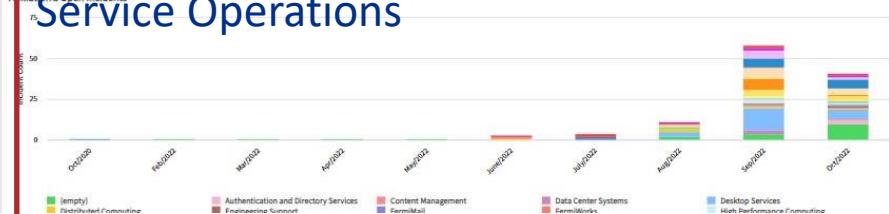
Access Processes



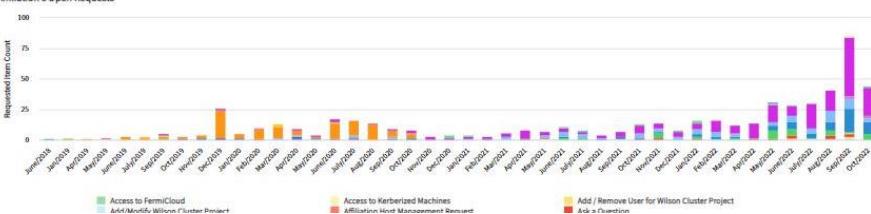
Group by Approval for Current AWE Activity [requested item/Activity Name]

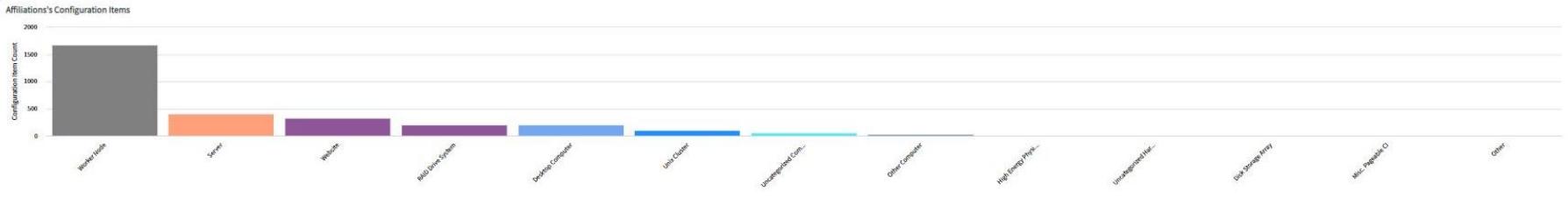
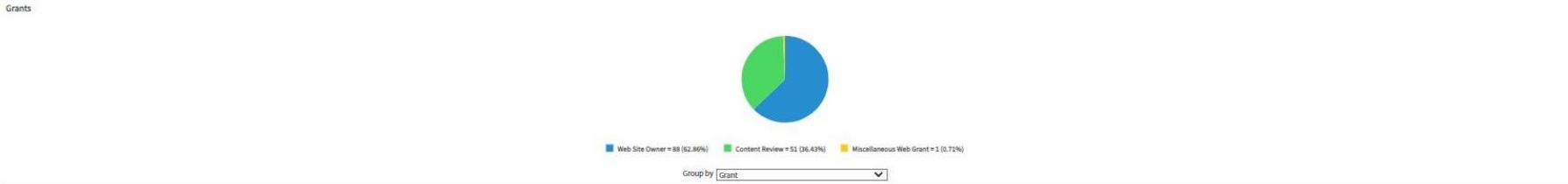
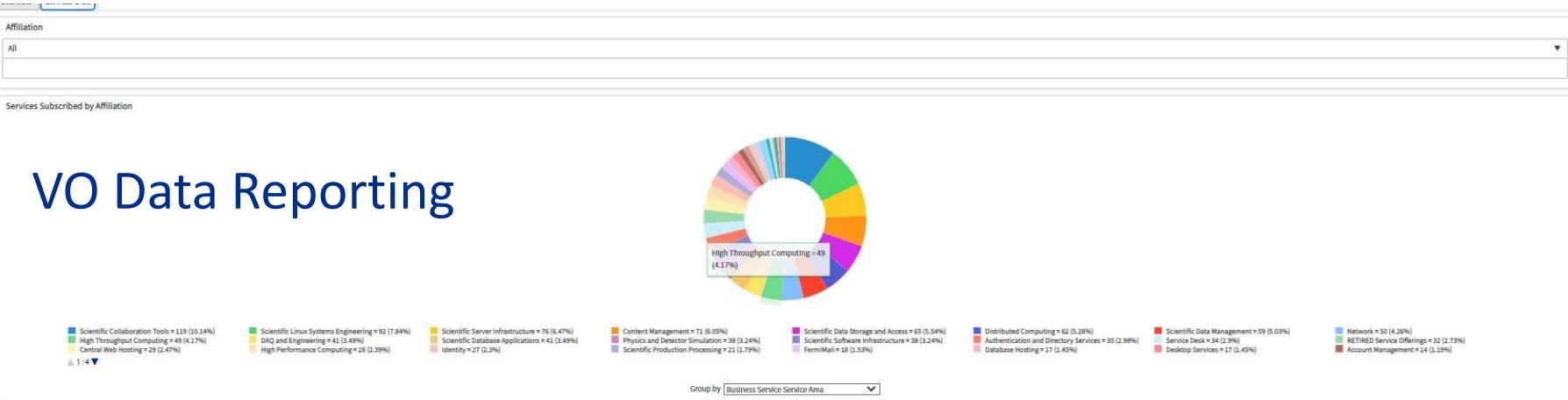
Affiliation's Open Incident

Service Operations



Affiliation's Open Requests





Summary

Having the affiliation database is a customization that is very powerful and is serving us well. Better analytics, automation, reporting, etc. And it's consistent and easy (ish) to use by services owners and management types : both lab employees and experiment coordinators.

Data driven application

- Risk management in a centrally managed system
- Allows for data driven versus human decisions
- Roll up location risks, applications, etc.
- S&T matrix to identify affiliations for Export controls and FNAP

Affiliations Database centralized configurations

- Automated Data flow
- Eliminated paper and Improved data quality
- Reduced redundant data entry
- Reporting improvements – DOE Data calls, DOE User Report, Collaboration Service Reporting / Dashboards

About the Authors

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BIO: Tammy leads the Enterprise Architecture team at Fermilab. She strives to enable Fermilab's IT organization to meet their strategic initiatives and continuously improve the business of IT. She has been essential in developing the strategic partnerships between IT and the laboratory. Tammy has worked in information technology for more than 25 years and has experience in several industries and has managed all aspects of IT organizations including Technology, Applications, IT business process management, quality management, business continuity, information security and risk management processes.

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BIO: Craig is a member of the Enterprise Architecture team at Fermilab. He enjoys working with the business and IT to identify solutions that meet each other's needs. Craig's recent work includes leading Fermilab's HCM platform, providing technical leadership for the Site Access and Badging Program, and performing architectural planning work for smaller projects. Craig has been with Fermilab for over 21 years filling various roles including developer, system, business and functional analyst, group lead for collaboration, reporting, and messaging applications, Workday platform lead, project management, and now enterprise and solution architecture

