Federated Identity Management at BNL

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Scientific Data and Computing Center (SDCC)
Shigeki Misawa

BROOKHAVEN NATIONAL LABORATORY
U.S. DEPARTMENT OF ENERGY
BROOKHAVEN SCIENCE ASSOCIATES

Background

Scientific Data and Computing Center (SDCC)

- Responsible for scientific computing at Brookhaven National Laboratory (BNL)
- Started as RHIC/ATLAS Computing Facility (RACF), supporting Nuclear and High Energy Physics experiments (NP/HEP)
- Expanding user community from groups outside of NP/HEP

SDCC Authentication Domain

- Provides authentication and authorization (AA) service for all non-grid systems/services managed by the SDCC
  - Web sites, Ssh Gateways, file service, compute servers
- Backends SDCC identity provider
- Permanent user name and uid assignment - Key feature
- Separate from the BNL campus AA service
  - Notable feature - user name and uid assignment is time limited. Keyed to the user's active status at BNL

Exciting Times for AAI at the SDCC

- SDCC identity management moved to Red Hat Identity Management Server (based on FreeIPA)
- New SDCC open source Keycloak based Identity Provider
- SDCC IdP joins the InCommon Federation
- NSLS-II requests single identity for users
- Dramatic increase in web sites requiring authentication and authorization services

SDCC Central Identity Management System

- Transition to new system completed December 2018
- Previous implementation
  - OpenLDAP - Authorization
  - MIT Kerberos - Two realms, providing authentication to two AFS cells
- New implementation
  - Red Hat IdM - Authentication and authorization (based on FreeIPA)
  - Single Kerberos realm - supporting existing two AFS cells
- Instituting new password policy, in progress now
  - Conform to new cybersecurity policy
  - 16 character minimum length
  - Continuous comparison with known compromised password list

New SDCC Identity Provider

- Based on Keycloak open source identity management system
- Backended by the SDCC central identity management system
- Online since June 2019
- Replaces legacy Shibboleth based facility single sign on IdP
  - Migration of web sites off Shibboleth IdP and SPs in progress
- Supports both SAML 2, OIDC, and OAuth 2
- New IdP is federated with InCommon (May 2020)
  - Provides federated identity for researchers at the SDCC
- Utilizes OTP capabilities included in Keycloak for multi-factor authentication (MFA) required by cybersecurity policy

Next Major AAI Challenge

- SDCC user population expected to more than double
  - Influx of users from the National Synchrotron Light Source II (NSLS-II) facility at BNL
- NSLS-II part of the BNL campus AA domain
- NSLS-II has requested single identity for their users
- BNL campus authentication
  - Based on Microsoft Active Directory
  - Utilizes Duo for multi-factor authentication
  - Operates an IdP federated with InCommon
  - AA service for VPN and Ssh gateways used by by NSLS-II users

Integrating NSLS-II into SDCC

- Plans for NSLS-II user integration at SDCC in development
- Short term plan
  - Place NSLS-II compute resources at SDCC within the BNL AA domain
  - Quantify extent of user name, uid, group name, and gid conflicts between BNL and SDCC AA domains
  - Implement mechanism to prevent the creation of new conflicting identities
  - Develop a plan to eliminate existing conflicts
- Long term plan
  - Currently investigating options ranging from federation to unification
  - Major issue - MFA for non-web services
  - Web services solved by federation with BNL IdP

AA Services for Web

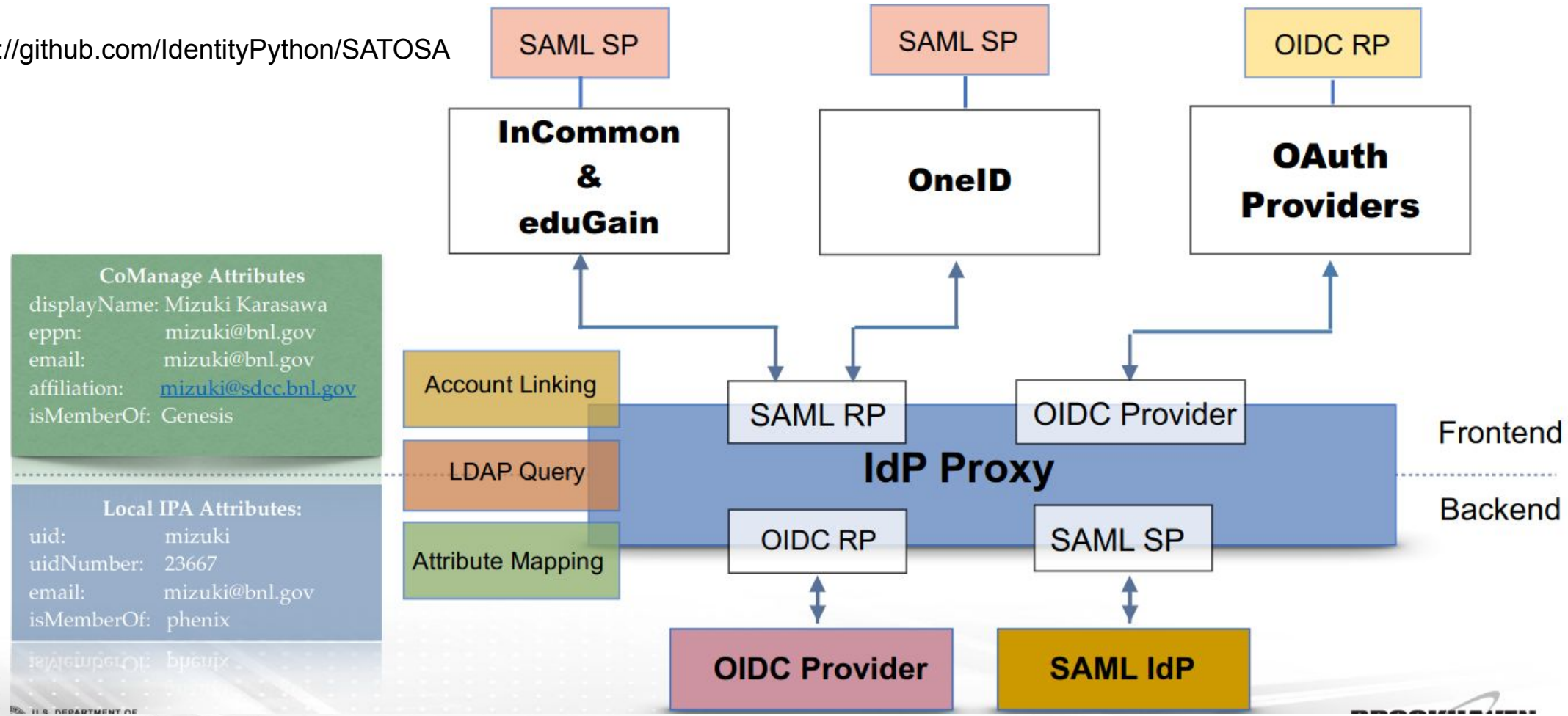
- Increase in demand for centralized AA services for web based applications
- Dramatic increase in demand for federated identity capability
- Need to address multiple AA issues to satisfy demand
  - Support OIDC relying parties, in addition to SAML service providers
  - Support for applications using “legacy” AA mechanisms
  - Provide an authorization solution for web applications
  - Support a range of applications requiring different “levels of assurance”

AA Design Patterns in Use

- IdP Proxy
  - SATOSA proxy
  - Keycloak identity brokering
- SP Proxy
  - w/ Delegation of Authentication
  - Relieves web application of authentication details
  - Web application receives user identity from SP proxy
- CiLogon/CoManage
  - Fine grained authorization (AuthZ)

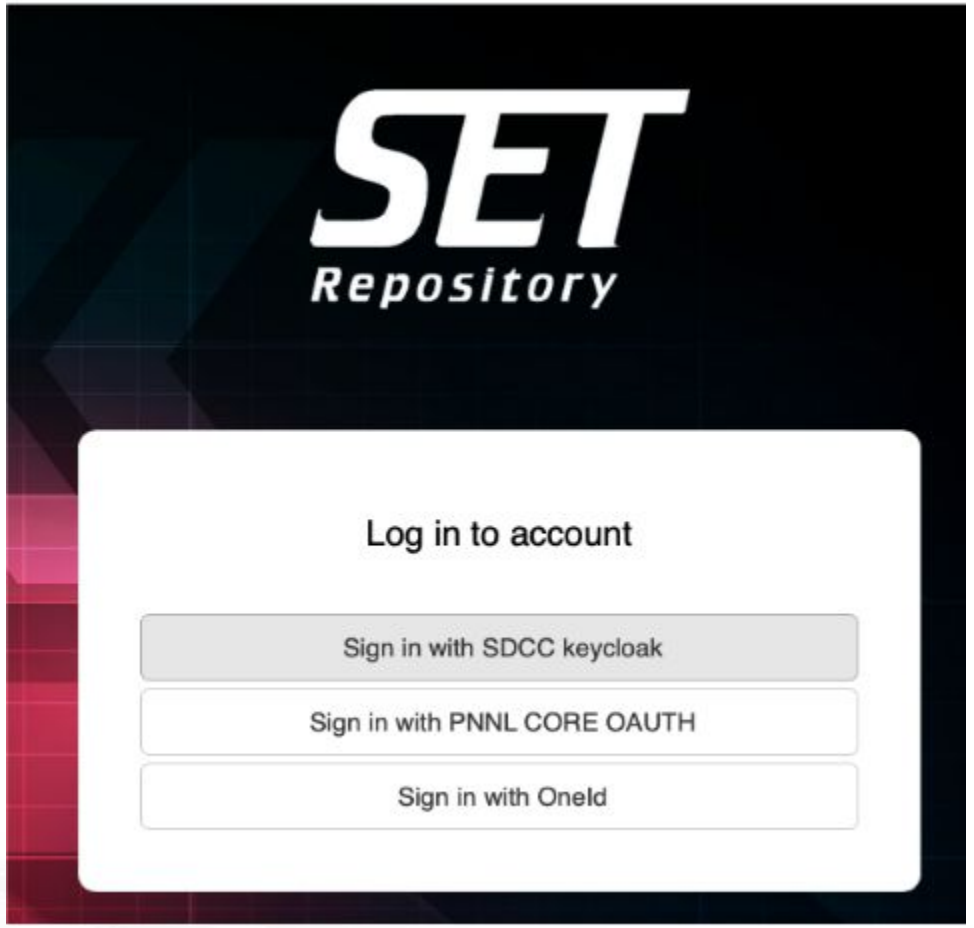
SATOSA Proxy

https://github.com/IdentityPython/SATOSA



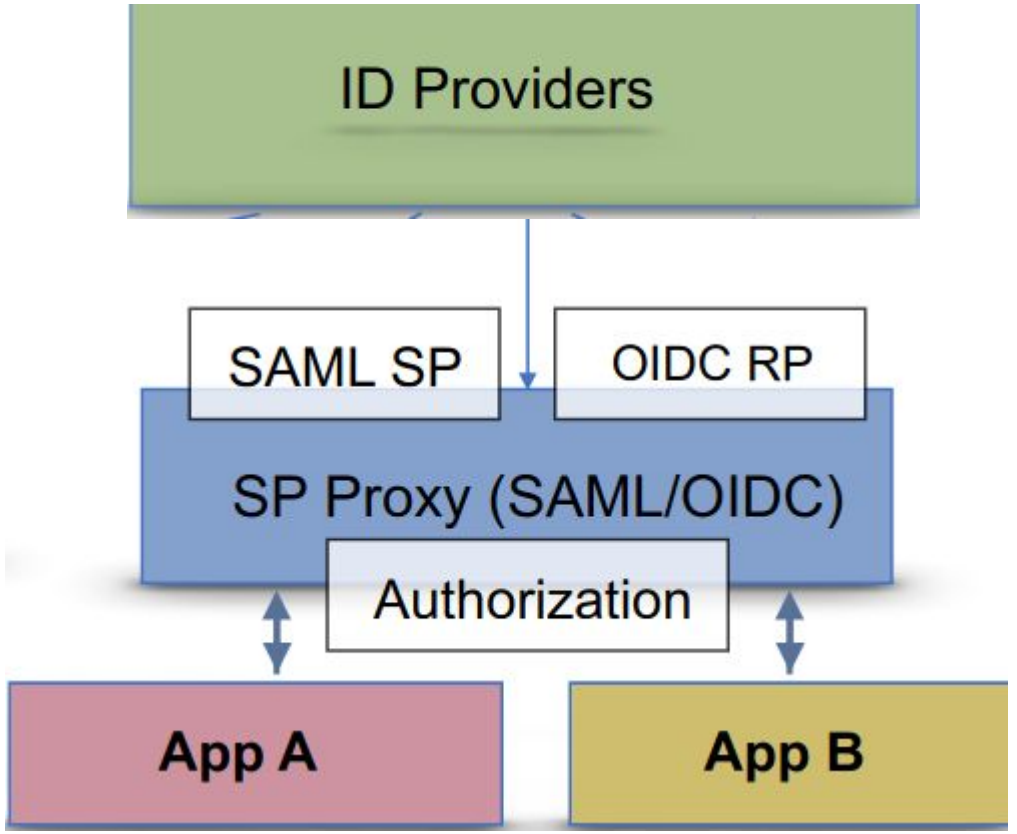
KeyCloak Identity Brokering

- SET Project archives
  - Application is an OIDC client
  - Accepts authentication via SAML and OIDC IdP
  - Keycloak translates between SAML IdPs and OIDC client
- BNLBox local cloud storage
  - BNLBox application is SAML SP
  - Keycloak enables access to BNLBox with BNL or SDCC IdP credentials



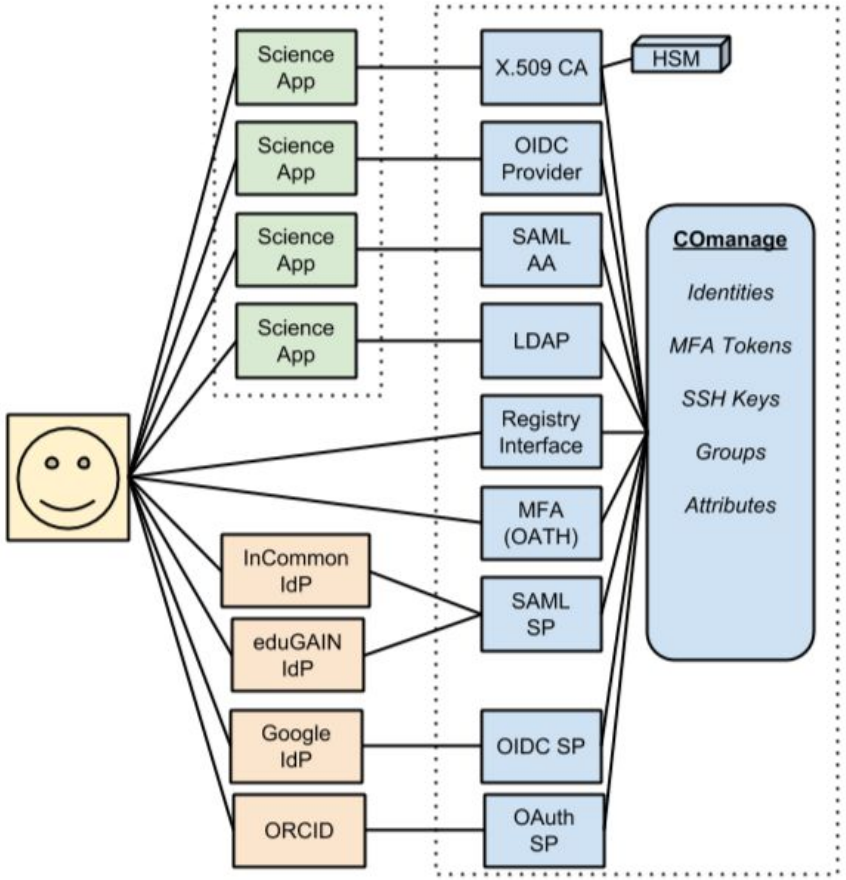
SP Proxy

- Application delegates authentication to SP proxy
  - Application receives user identity from SP proxy
  - mod_auth_openidc used for OIDC
  - mod_auth_mellon used for SAML
- Applications utilizing SP proxy
  - SDCC Jupyter
  - sPhenix, Phenix, and EIC Phonebooks
  - Facility monitoring, configuration management and other SDCC internal website



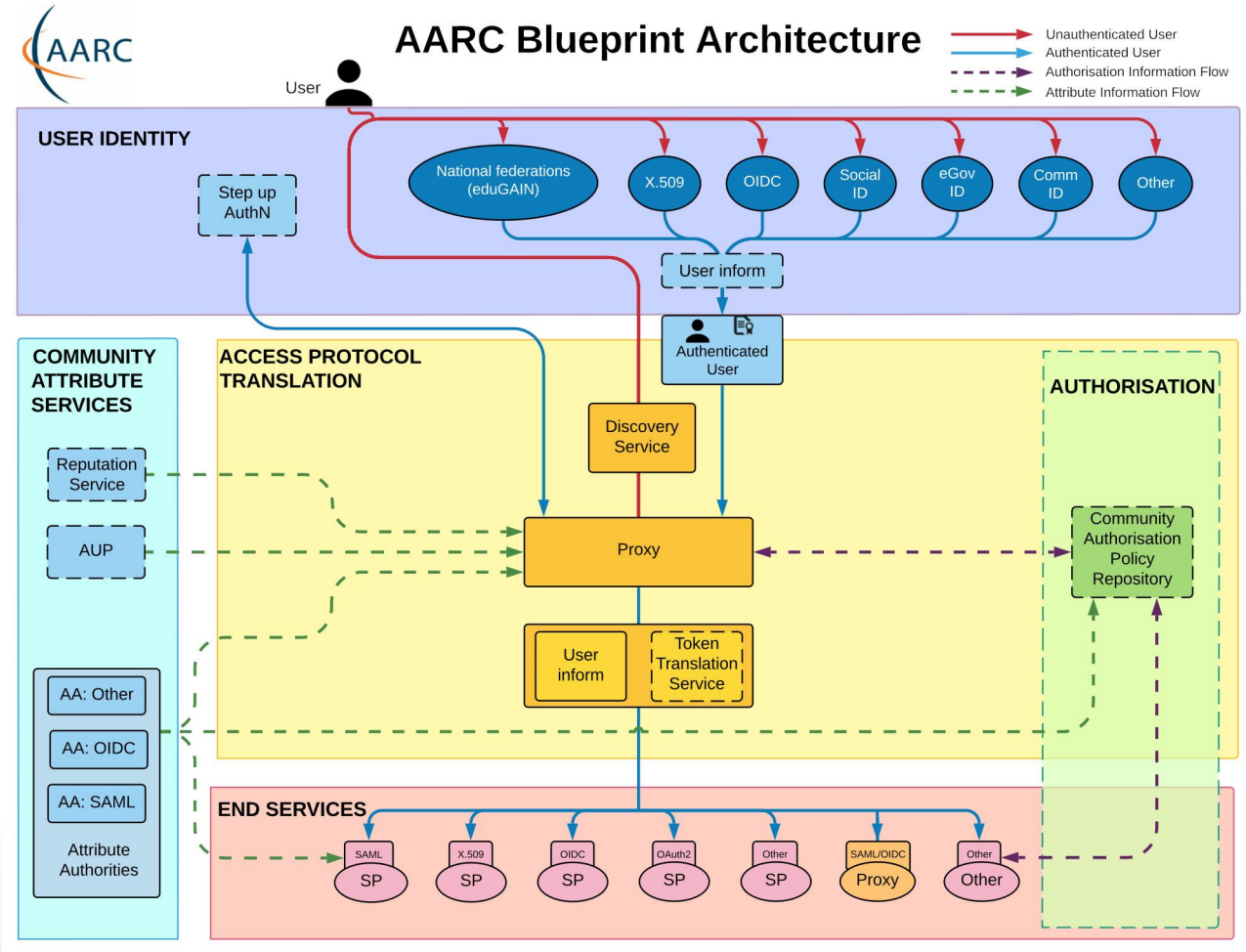
Use of CoManage for Authorization

- Cloud and local CoManage servers tested
- Cloud based CoManage for authorization for Inventio/Zenodo
  - Also for management of AuthZ groups
  - CiLogon used for authentication
  - Used by Genesis, EIC, and BNL internal Covid-19 Invenio/Zenodo archives
- US Atlas Drupal base web site
  - Manage authorization for write access
  - Authentication with CERN, SDCC, or BNL IdPs



Baseny, et. al., International Symposium on Grids & Clouds 2019, ISGC2019

AARC Blueprint as Reference Architecture



Future work

- BNL and SDCC AA interoperability
- Common MFA solution for Keycloak and FreeIPA
  - Necessary to allow the user to use the same MFA mechanism for all services, web and non-web based.
- Federation with non-InCommon id providers
  - US Department of Energy OneID
  - ORCID ID
  - Social Platforms - Google, Facebook, LinkedIn
- Possible MFA for non-web authentication, beyond ssh keys, at SDCC

Contacts

For more information on Federated Identity, identity providers, and service providers at the SDCC contact

- Mizuki Karasawa mizuki@bnl.gov