Open Source Identity Management

From Password to Policy

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Agenda

What to expect:

- Introductions
- What’s in an identity and why is it important?
- What are my options?
- Why is this all important?
- Put the sexy back in Identity Management

Introductions

Who am I?

- Senior Technical Account Manager at Red Hat
- Community member for FreeIPA, Dogtag, SSSD, opensc, and 389-ds
- Husband
- Father
- Baker
- Dog owner
- Man of many interests

Also… Happy National Donut Day!

What is an identity?

So… Who do you think you are?

Or “what” for that matter…

- #define identity
- Everything has an identity!
- To secure your environment, you must first identify your environment
  - People (users)
  - Places (locations, hosts, etc.)
  - Things (hosts, services, devices, etc.)
- You ARE a unique snowflake.
- You ARE your job. You ARE the clothes you wear!
  - Sorry Tyler… You’re wrong.

So why is this important?

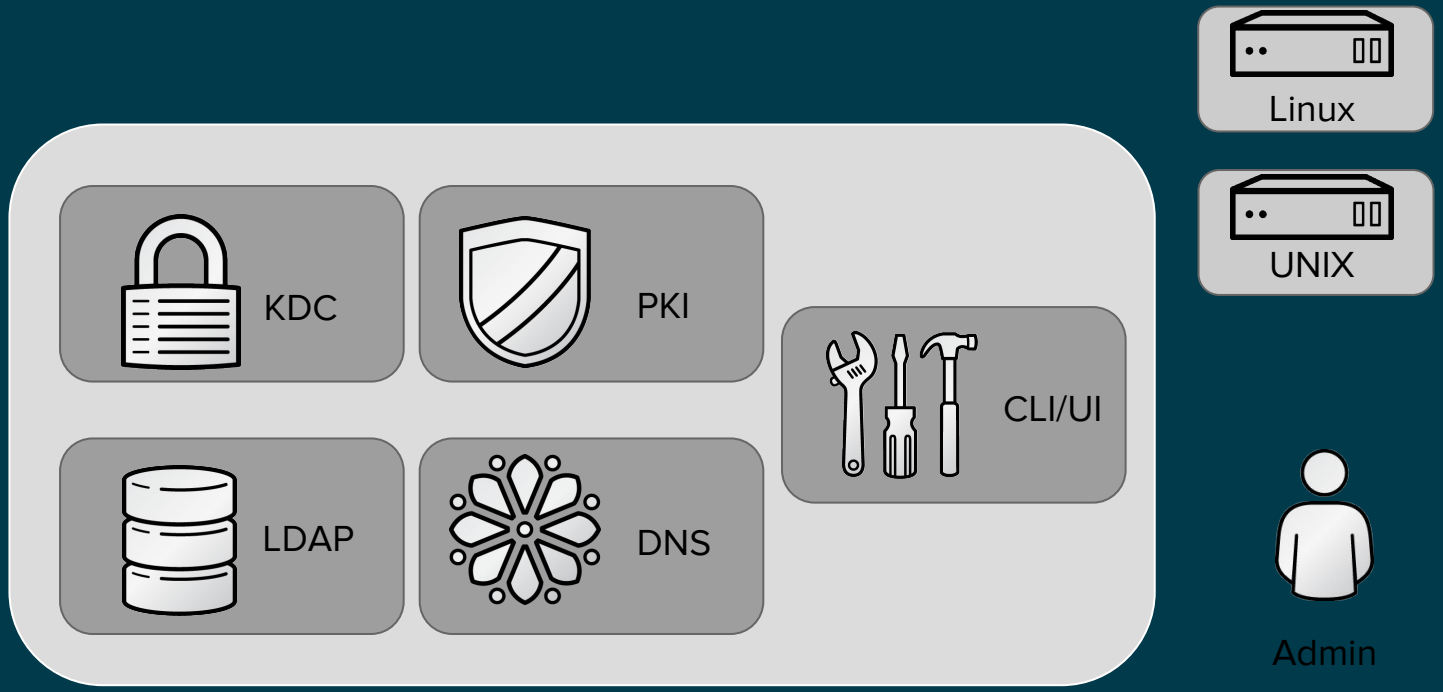
- Well, knowing is half the battle!
  - <pause for unanimous G. I. Joe!>
- When you know WHO you have, and WHAT you have, you can apply policy!
  - Policy provides the when, where, and why

OK… What are my options?

So many tools, not enough time.

- So many different tools out there
  - OpenLDAP
  - MIT Kerberos
  - Etc.
- We're going to focus on a couple today.
  - Enter FreeIPA!

FreeIPA Architecture



FreeIPA Architecture Is...

- Each component provided by individual projects:
  - MIT Kerberos
  - bind, bind-dyndb, bind-ldap
  - 389-ds
  - Dogtag
- client/server based
  - Ipa-server
  - Ipa-client
- SSSD as authentication ‘gateway’

FreeIPA Features

- Centralized authentication via Kerberos or LDAP
- Identity management:
  - users, groups, hosts, host groups, netgroups, services
  - user lifecycle management
    - Stage, Active, Preserved
- Manageability:
  - Simple installation scripts for server and client
  - Rich CLI and web-based user interface
  - Pluggable and extensible framework for UI/CLI
  - Flexible delegation and administrative model
    - Self, delegated, role based; read permissions

Features (cont.)

- Replication:
  - Supports multi-server deployment based on the multi-master replication (up to 20 replicas)
  - Recommended deployment 2K-3K clients per replica
  - Details depend on the number of data centers and their geo location
- Backup and Restore
- Compatibility with broad set of clients (LINUX/UNIX)

Policy Features

- Host-based access control
- Centrally-managed SUDO
- SSH key management
- Group-based password policies
- Automatic management of private groups
- Can act as NIS server for legacy systems
- SELinux user mapping
- Auto-membership for hosts and users
- Serving sets of automount maps to different clients
- Different POSIX data and SSH keys for different sets of hosts

Two factor authentication

- 2FA
  - Native HOTP/TOTP support with FreeOTP and Yubikey
  - Proxied 2FA authentication over RADIUS for other solutions
  - 2FA for AD users (in works)
- Smart Card
  - Associate X.509 certificate with user record
  - Leverage SSSD or pam_pkcs11 to leverage for authentication

DNS

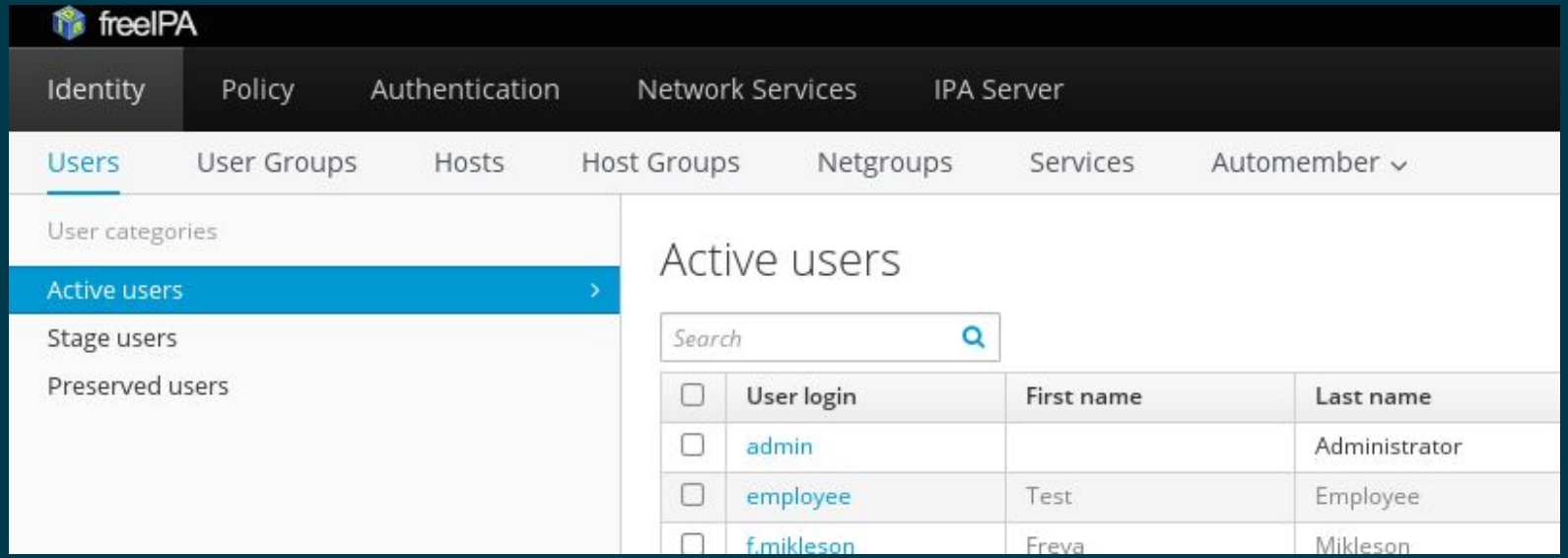
- DNS is optional but convenient
- Advantages (automation and security):
  - The SRV records get created automatically
  - Host records get created automatically when hosts are added
  - The clients can update their DNS records in a secure way (GSS-TSIG)
  - The admin can delegate management of the zones to whomever he likes
  - Built in DNSSEC support (Tech Preview in RHEL 7.2)
- Disadvantages:
  - You need to delegate a zone

PKI

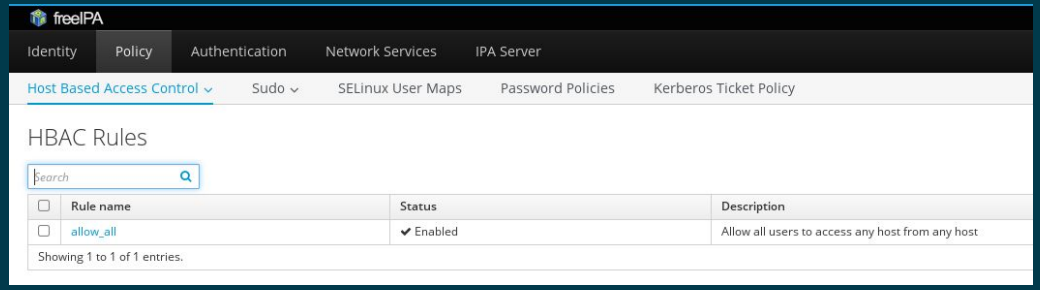
- CA related capabilities
  - Certificate provisioning for users (new in RHEL-7.2), hosts and services
  - Multiple certificate profiles (new in RHEL-7.2)
  - Sub CAs (in works)
- CA deployment types
  - CA-less
  - Chained to other CA
  - Self-signed root
- Tool to change deployment type and rotate CA keys
  - Flexibility in deploying CAs on different replicas
- Key store (Vault) - new in RHEL-7.2

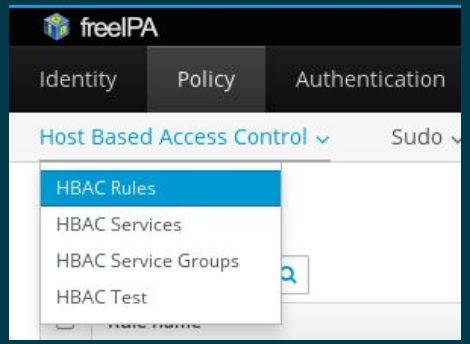
Requisite Meme

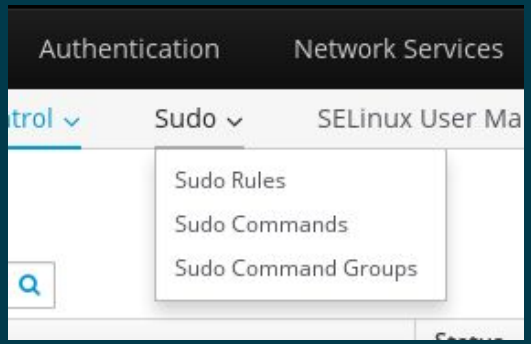
Managing Identities (GUI)



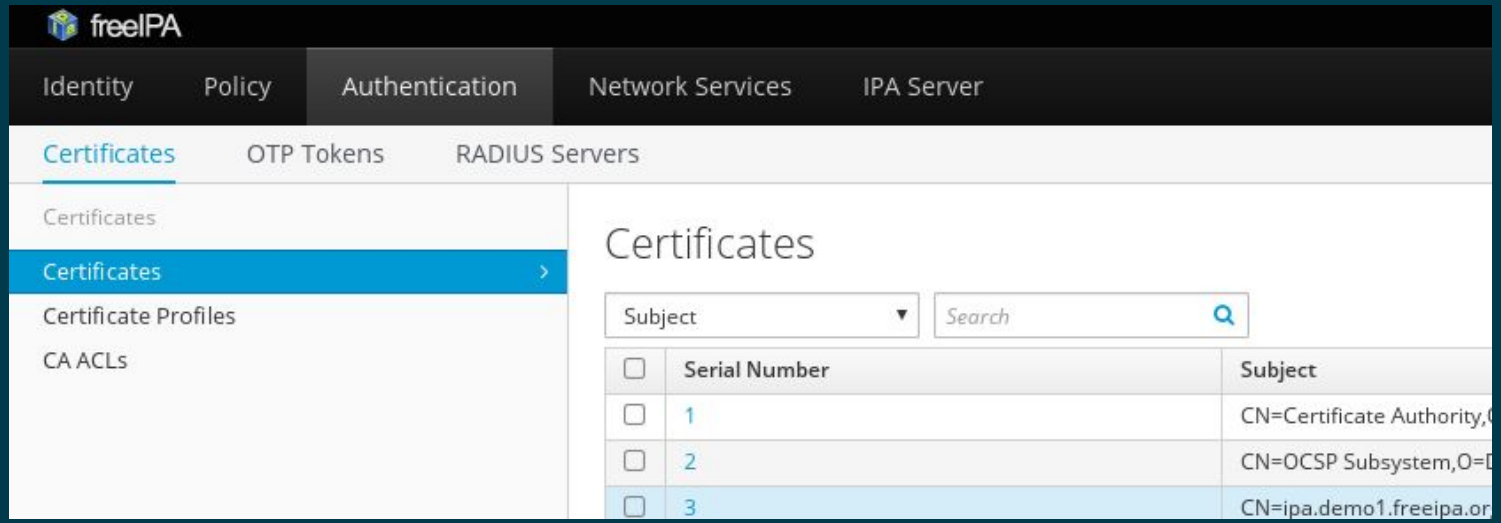
Managing Policy (GUI)



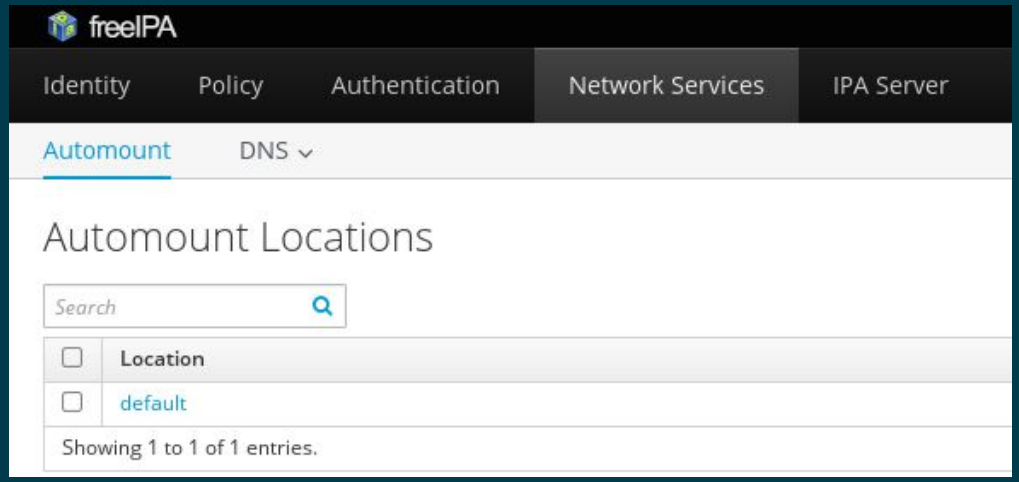




Managing Authentication (GUI)



Managing Network Services (GUI)



Managing the IPA server (GUI)

freeIPA

Identity | Policy | Authentication | Network Services | IPA Server

Role Based Access Control | ID Ranges | ID Views | Realm Domains | Trusts | Topology | API browser | Configuration

Roles

Search

Role name	Description
IT Security Specialist	IT Security Specialist
IT Specialist	IT Specialist
Security Architect	Security Architect
User Administrator	Responsible for creating Users and Groups
helpdesk	Helpdesk

Showing 1 to 5 of 5 entries.

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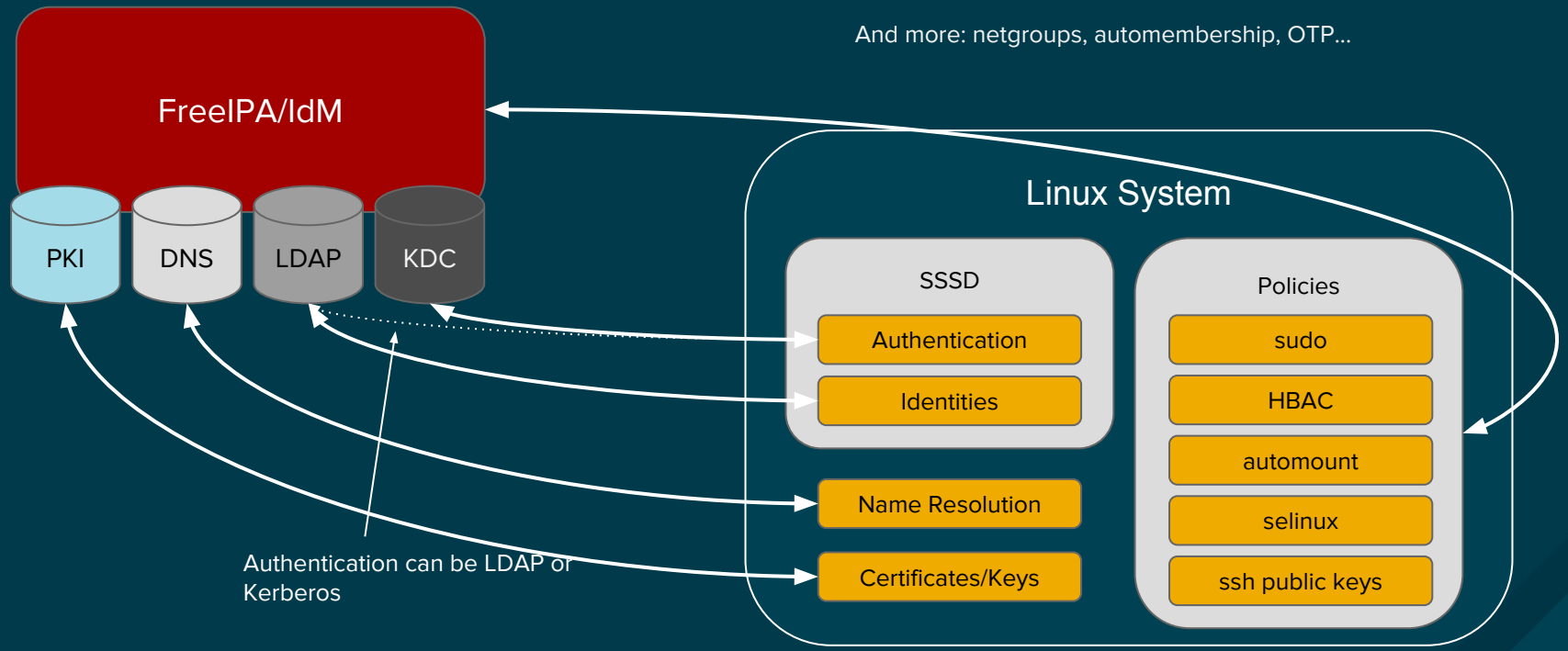
So what about the CLI?

- Everything done through the GUI has an associated CLI command
- Leverages API backend.
- Ipa <operation> <options>
- Examples:
  - Ipa user-add dsirrine --first David --last Sirrine
  - Ipa group-add foo --users=dsirrine
  - Ipa sudocmd-add --setattr=<attribute>

SSSD

- SSSD = System Security Services Daemon
- SSSD is a service used to retrieve information from a central identity management system.
- SSSD connects a Linux system to a central identity store:
  - Active Directory
  - FreeIPA
  - Any other directory server
- Provides authentication and access control
- Credential caching

SSSD/FreeIPA Integration



Realmd

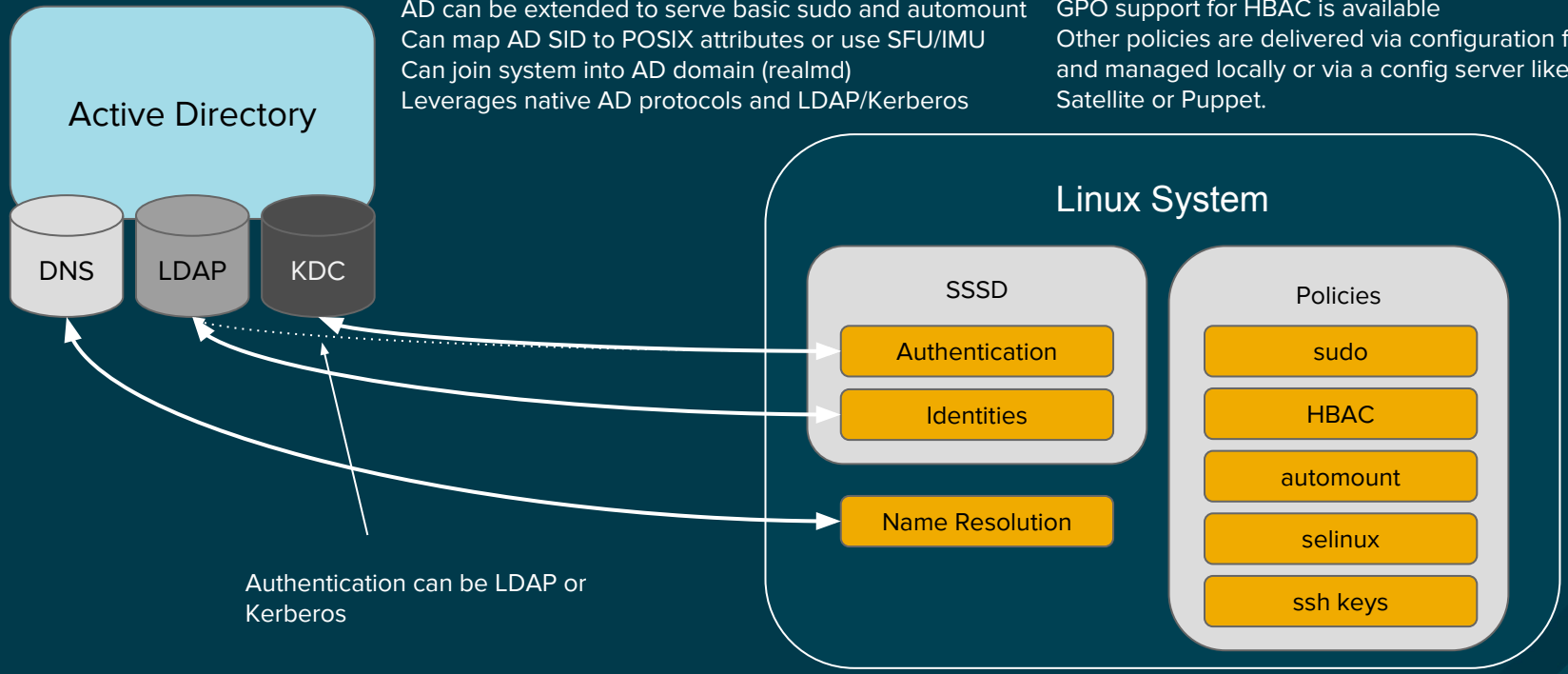
- Component of Linux
- Main goal is to detect domain environment using DNS (detection)
  - AD
  - FreeIPA
  - Kerberos
- Join system to the domain (using SSSD or Winbind)
- Do it in one command or click
- Availability: command line, D-BUS interface, system installer, desktop
  - realm {join, leave, list, trust}

Active Directory Integration

SSSD Based Direct Integration

AD can be extended to serve basic sudo and automount
Can map AD SID to POSIX attributes or use SFU/IMU
Can join system into AD domain (realmd)
Leverages native AD protocols and LDAP/Kerberos

GPO support for HBAC is available
Other policies are delivered via configuration files and managed locally or via a config server like Satellite or Puppet.



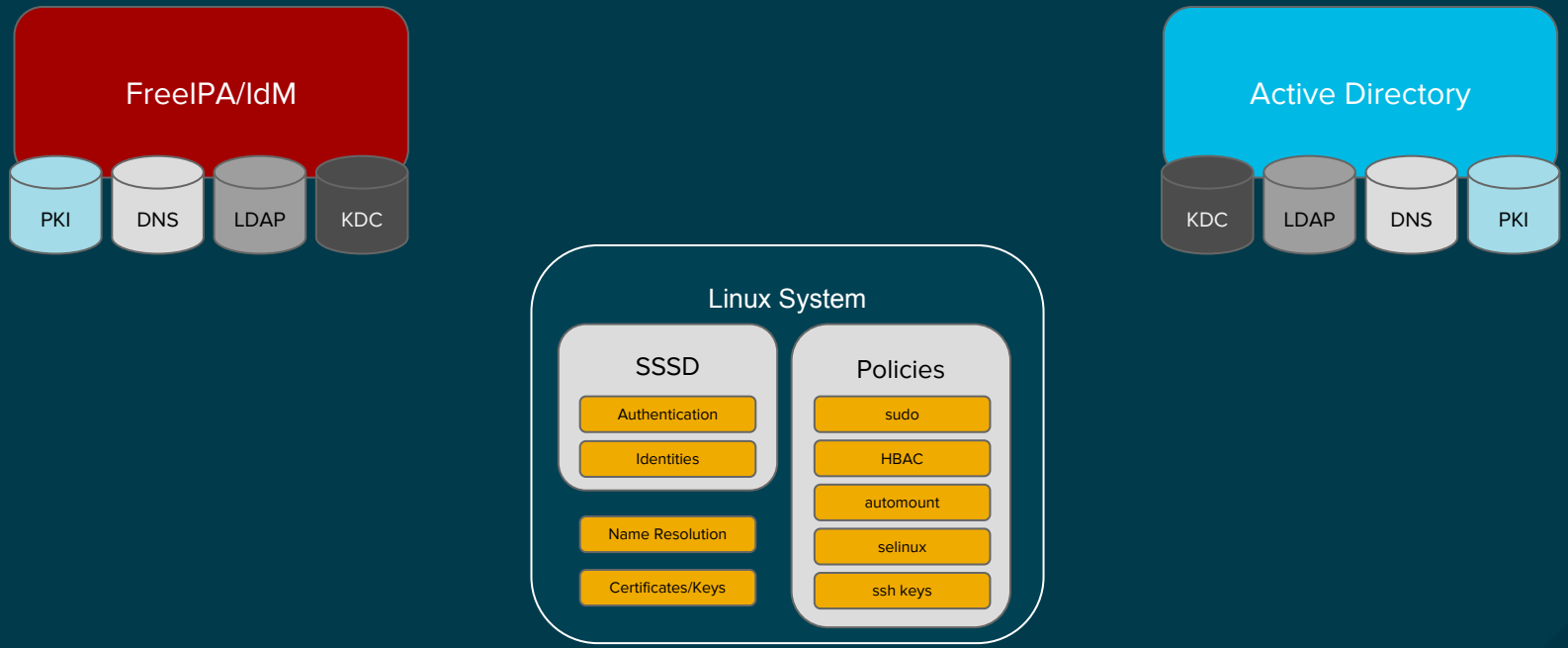
Authentication can be LDAP or Kerberos

SSSD Based Direct Integration

Pros and Cons

- Pros:
  - Does not require SFU/IMU but can use them
  - Can be used with different identity sources
  - Support transitive trusts in AD domains and forest trusts with FreeIPA
  - Supports CIFS client and Samba FS integration
  - GPO for Windows based HBAC
- Cons:
  - No NTLM support, no support for AD forest trusts (yet)
  - No SSO with OTP
  - Not all policies are centrally managed

FreeIPA/IdM AD Integration with Trust



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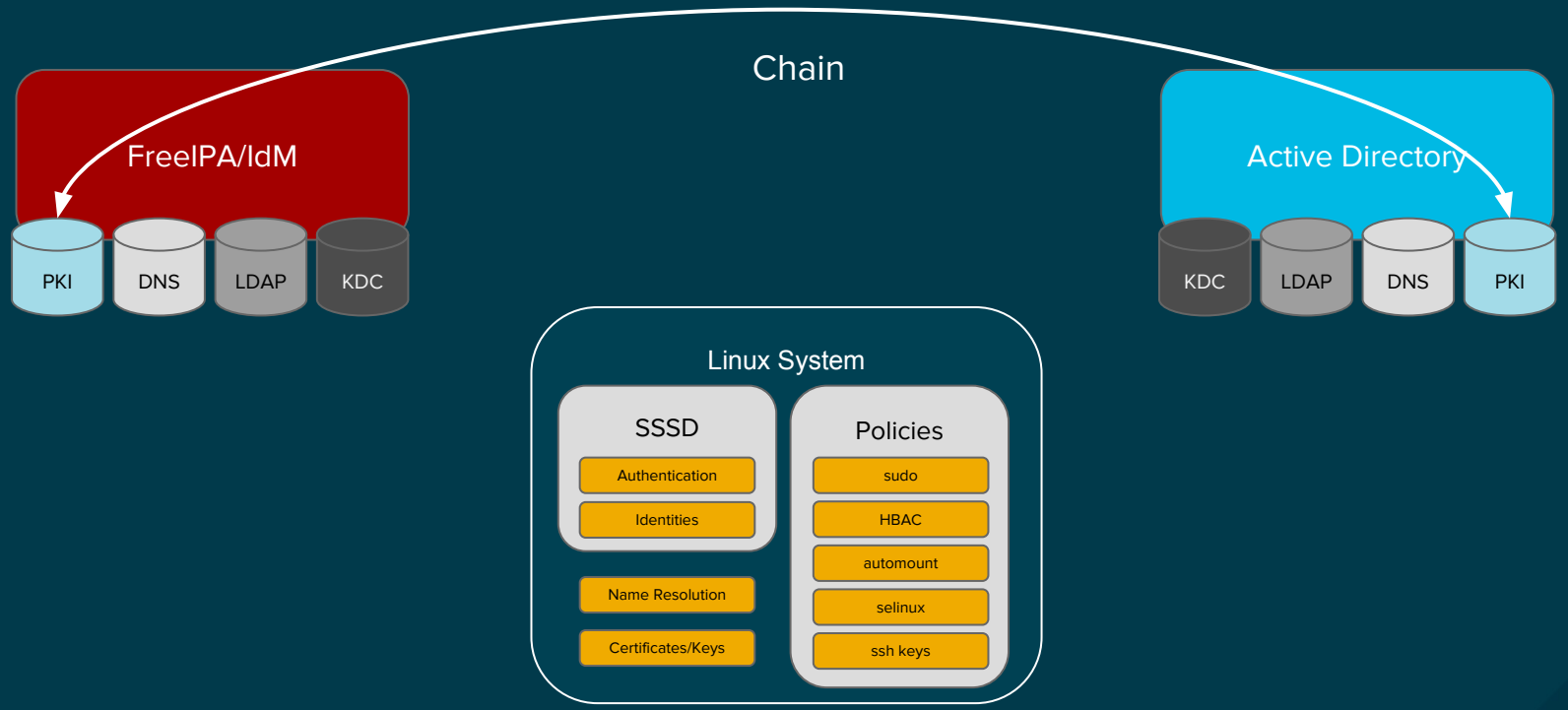

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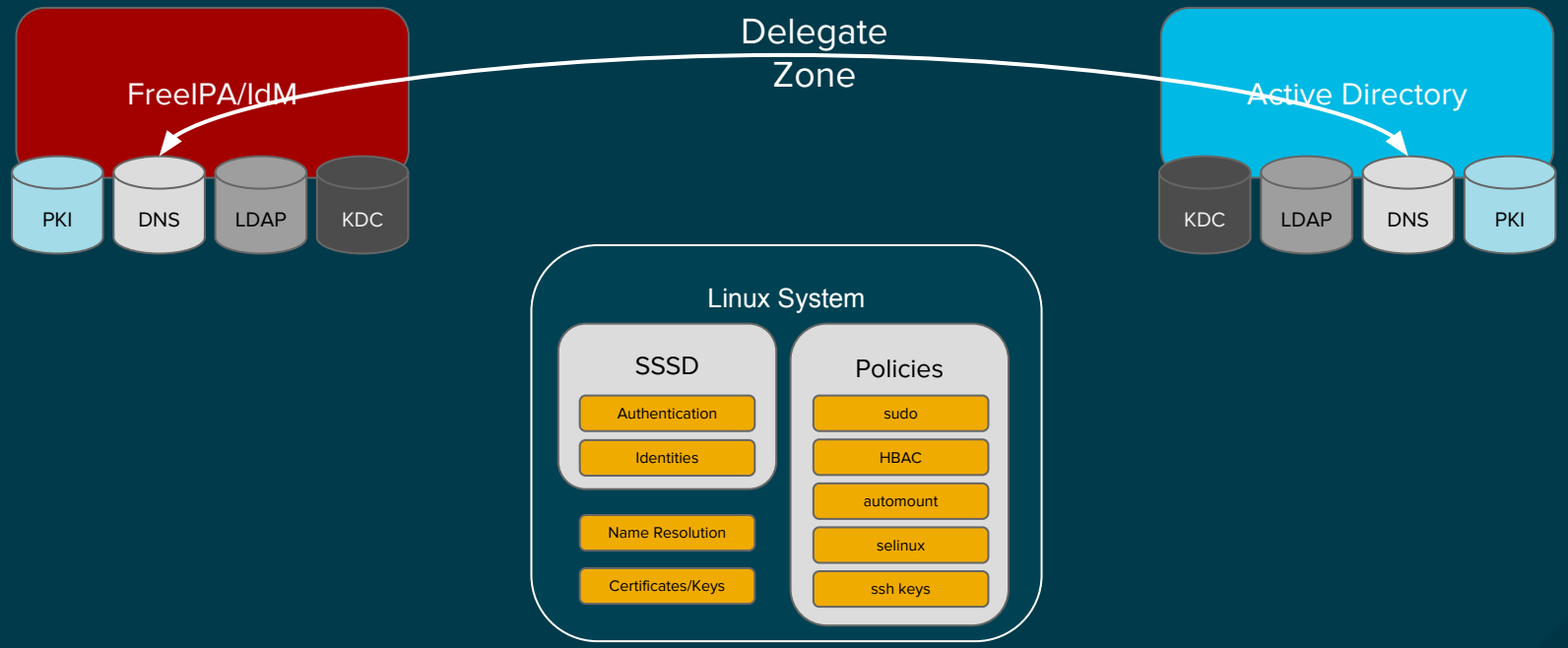

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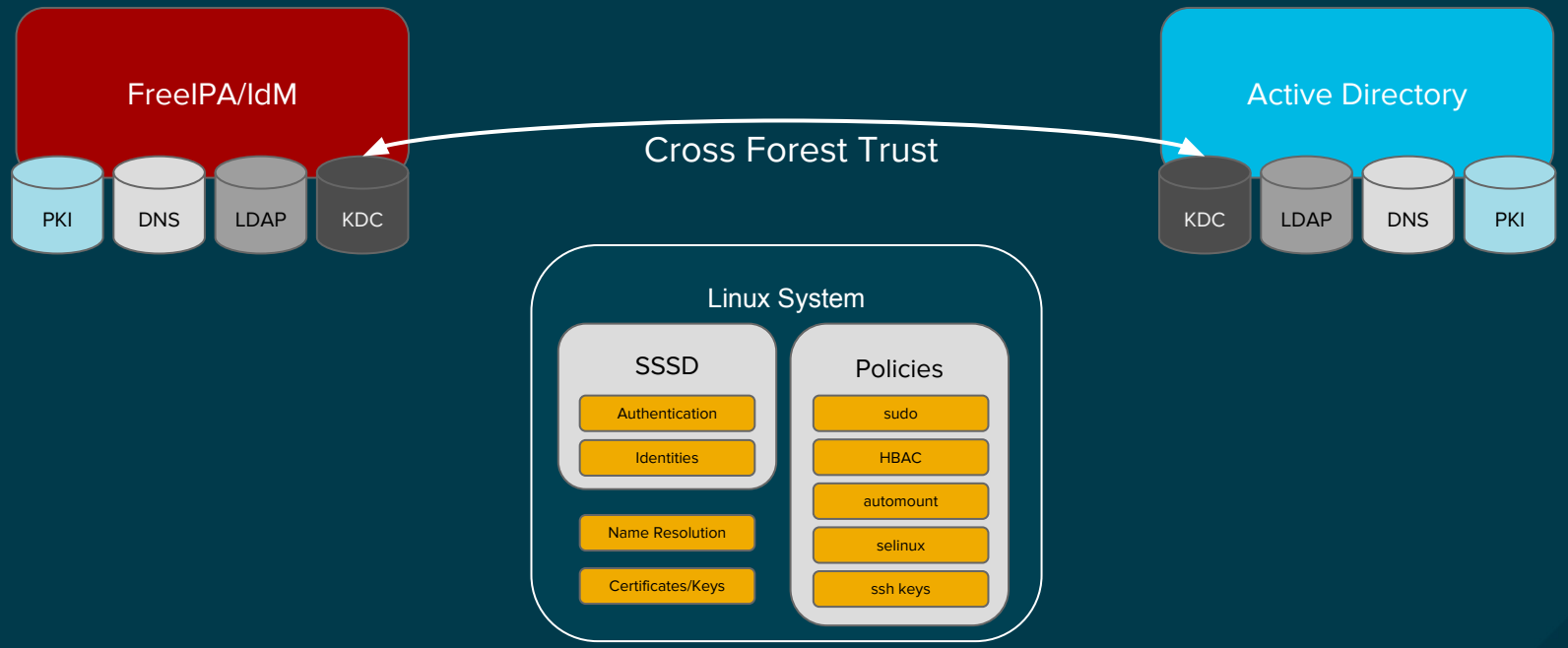

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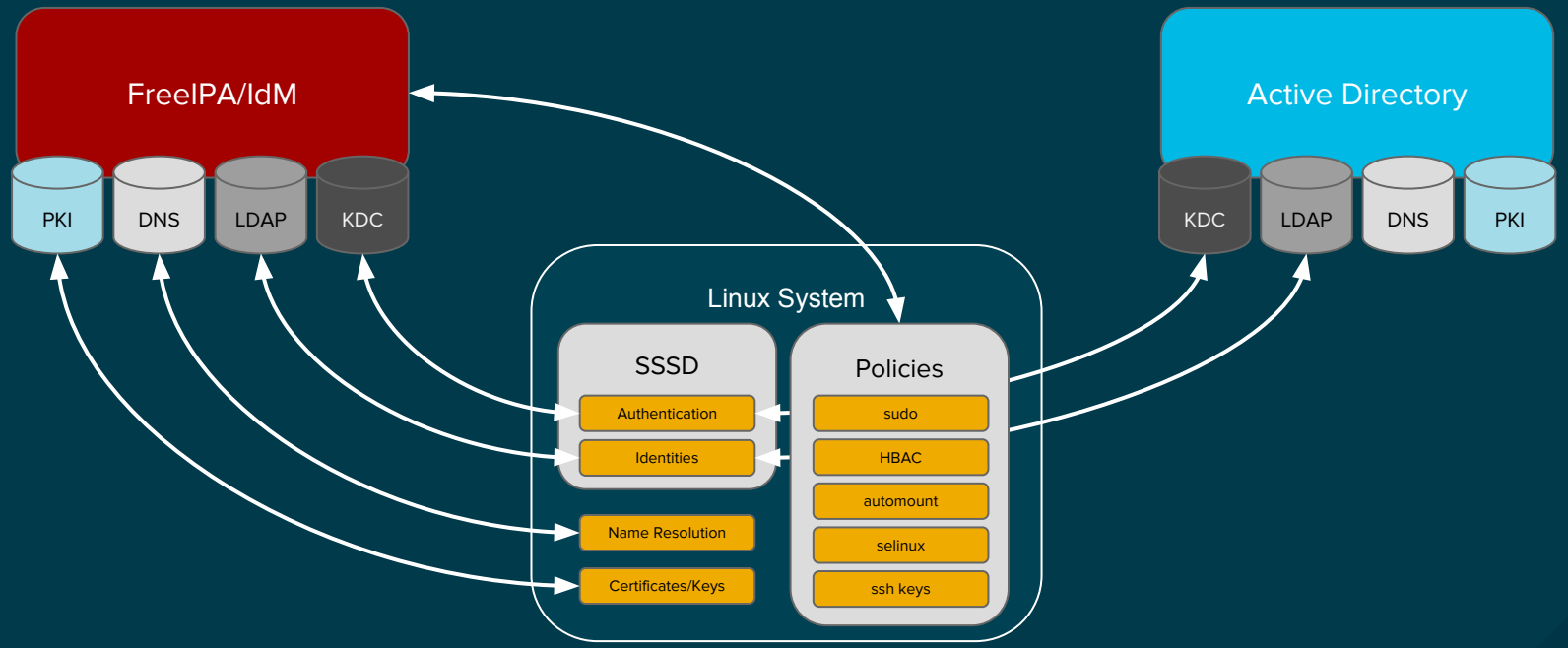

Trust Based Solution

Pros and Cons

- Pros:
  - Reduces cost – no CALs or 3rd party
  - Policies are centrally managed
  - Gives control to Linux admins
  - Enabled independent growth of the Linux environment
  - No synchronization required
  - Authentication happens in AD
- Requirement:
  - Proper DNS setup

User Mapping

Details

- Can leverage SFU/IMU for POSIX (brown field)
- Can do dynamic mapping of the SIDs to UIDs & GIDs (green field)
- Static override with ID views

Trust

Details

- Two-way and one-way trust (FreeIPA trusts AD)
  - AD/Samba DC trusting FreeIPA is on the roadmap
- Trust agents (different behavior of different replicas)
- Migration from the sync to trust

Federated Identity with Ipsilon or Keycloak

- Bring your own Identity Provider (IDP)
- SAML, OpenID, OAUTH
- Allows for authentication with trusted credentials from outside source
  - You've seen it. "Log in with your Facebook now!"
- Think of connecting all your services with a single trusted identity

Interesting and upcoming

- Clevis and Tang
  - Asymmetric secret sharing based on environmental data
- pam_hbac
  - Module that provides hbac support for Unix
- pam_sudo
  - Module that provides sudo support for Unix

Why is this all important?

Limit your known unknowns

- Solid Identity Management concepts and practices can limit your known unknowns
- Users, groups, hosts, services, policies… They're all tied together.

Putting the sexy back in Identity Management

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Resources, blogs, etc.

- Where can you find me?
  - Twitter: @dsirrine
  - https://dsirlab.wordpress.com
  - #freeipa
  - #dogtag-pki

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Training

- Training
  - http://www.freeipa.org/page/Documentation#FreeIPA_Training_Series
- Blog aggregation
  - http://planet.freeipa.org/
- FreeIPA demo instance in the cloud
  - http://www.freeipa.org/page/Demo

More resources!

- Community Sites:
  - FreeIPA - www.freeipa.org
    - freeipa-users@redhat.com & freeipa-devel@redhat.com
  - SSSD - https://fedorahosted.org/sssd/
    - sssd-users@redhat.com & sssd-devel@redhat.com
  - Dogtag - https://pki.fedoraproject.org
    - pki-users@redhat.com & pki-devel@redhat.com
  - 389-ds - http://directory.fedoraproject.org/
    - 389-users@redhat.com & 389-devel@redhat.com

Blogs

- Pam_hbac
  - https://jhrozek.wordpress.com/2016/05/26/pam_hbac-a-pam-module-to-enforce-ipa-access-control-rules/
- Clevis and Tang
  - https://blog-ftweedal.rhcloud.com/2016/02/introduction-to-tang-and-clevis/
- PKI Goodness
  - https://blog-nkinder.rhcloud.com/
  - https://blog-ftweedal.rhcloud.com/
- Security
  - http://sobersecurity.blogspot.com/

THANK YOU