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Secure and Unified: Integrating Vault with EKS

Lingxian Kong | 6th Sep, 2023

Lingxian Kong

- Lead Cloud Consultant @ Sourced Group
- Working in cloud space for 11 years
- Open Source project maintainer for 7 years (OpenStack, Kubernetes)

Agenda

- What is a Secret
- Challenges of Managing Secret
- Vault Overview
- AWS Elastic Kubernetes Service (EKS) Overview
- Vault Integration in EKS

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What is a Secret

- Password
- API keys
- Database credentials
- Certificates
- Tokens
- ...

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Challenges of Secret Management

- Secure storage
- Access control
- Auditing and monitoring
- Rotation
- Automation
- Compliance
- Integration
- ...

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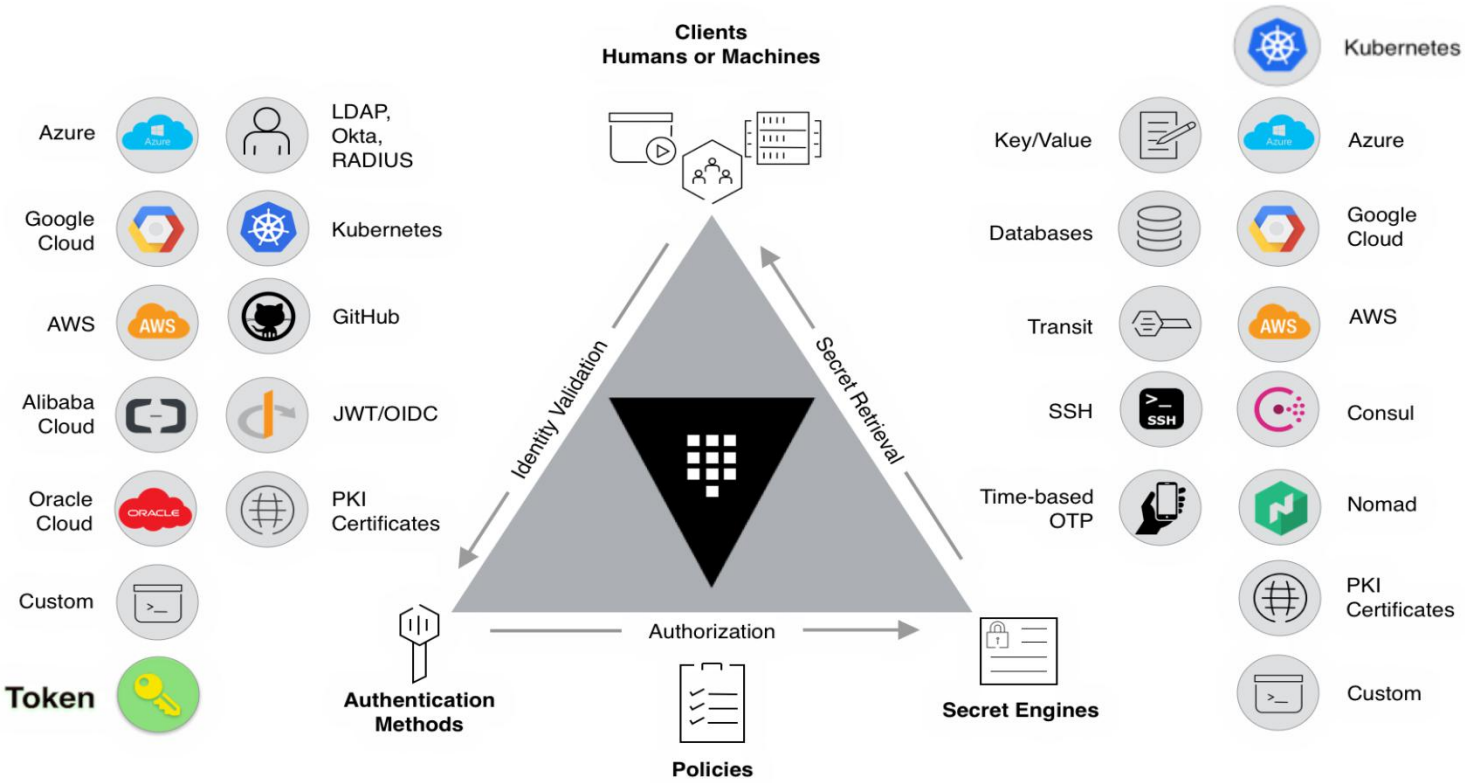
Vault Overview


Clients
Humans or Machines
Azure
LDAP, Okta, RADIUS
Google Cloud
Kubernetes
AWS
GitHub
Alibaba Cloud
JWT/OIDC
Oracle Cloud
PKI Certificates
Custom
Token
Identity Validation
Secret Retrieval
Authorization
Authentication Methods
Policies
Secret Engines
Key/Value
Databases
Transit
SSH
Time-based OTP
Kubernetes
Azure
Google Cloud
AWS
Consul
Nomad
PKI Certificates
Custom

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Vault Demo

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AWS Elastic Kubernetes Service (EKS) Overview

- Fully managed
- VPC networking connection
- AWS integration
- Ecosystem

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EKS cluster demo

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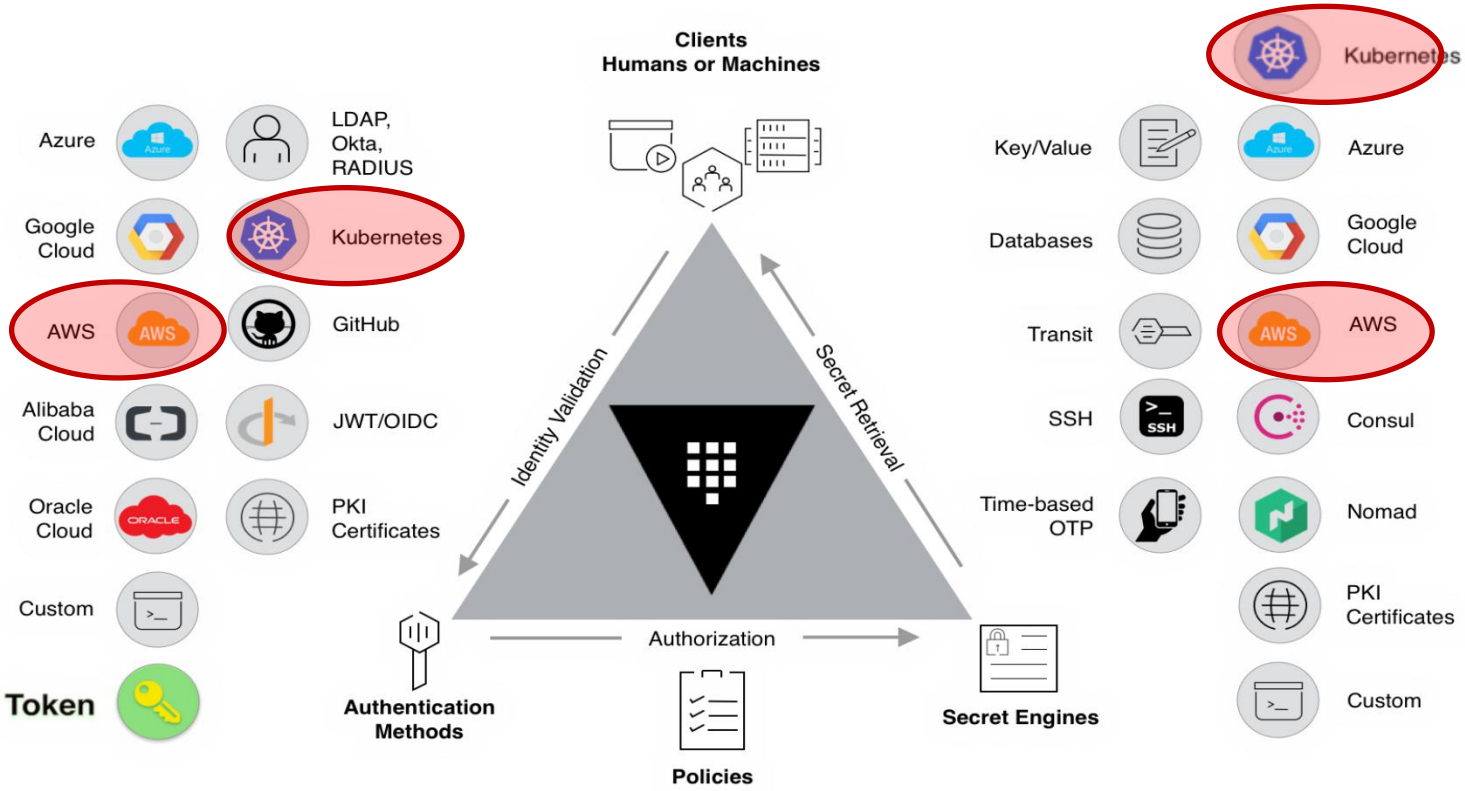
Vault Integration in EKS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Kubernetes

- How does the application log in Vault?
- How does the application access the secrets in the cloud native way?
- How does the application communicate with each other in a secure way?

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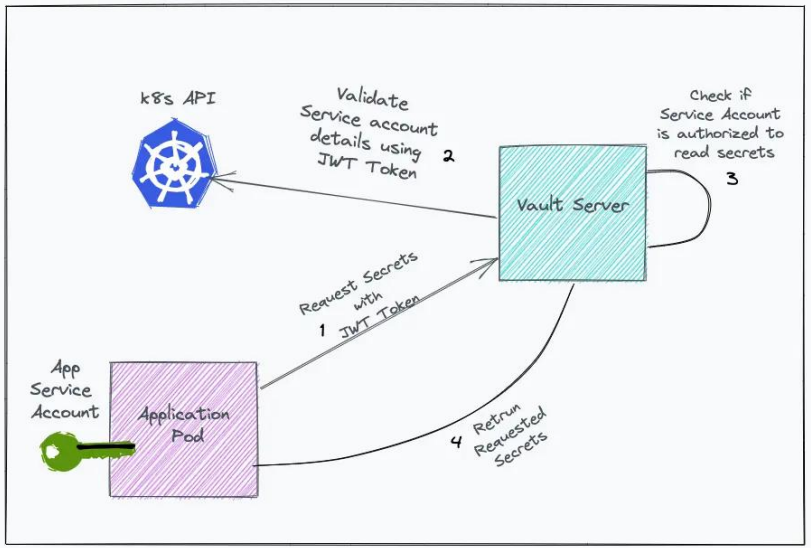
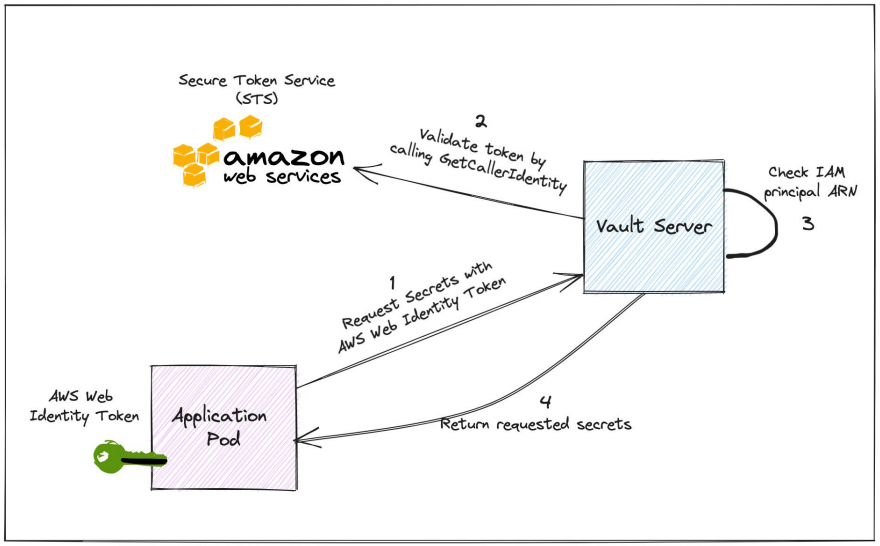
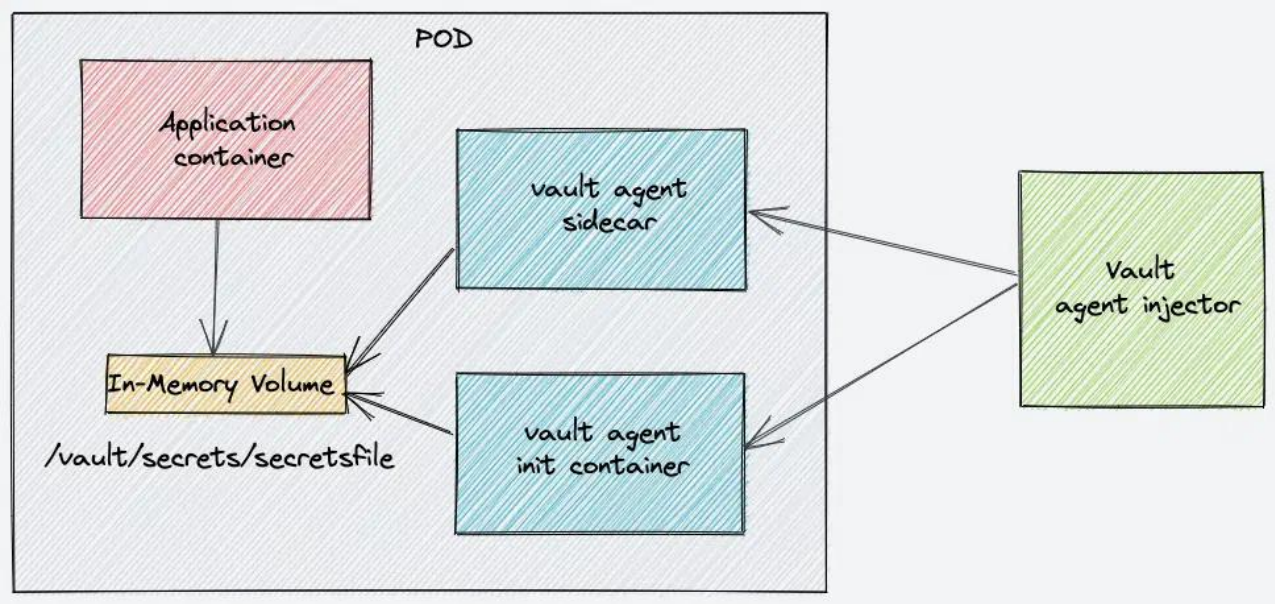
- Kubernetes service account



- AWS IAM roles for service account



- Vault Agent Injector



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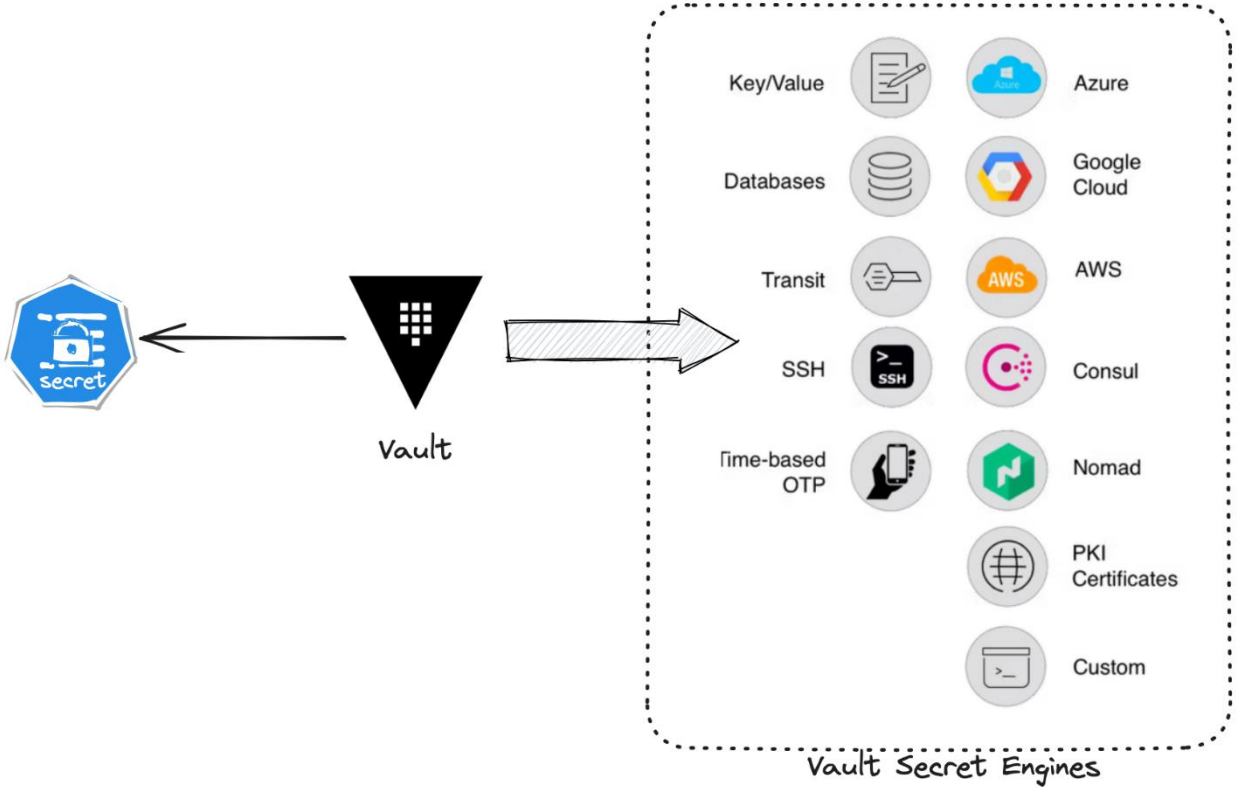
Demo

Vault Agent Injector

- How does the application log in Vault?
- How does the application access the secrets in the cloud native way?
- How does the application communicate with each other in a secure way?

```
apiVersion: v1
kind: Secret
metadata:
  name: mysecret
type: Opaque
data:
  username: YWRtaW4=
  password: MWYyZDFlMmU2N2Rm
```

Proposal 1


secret
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Key/Value
Databases
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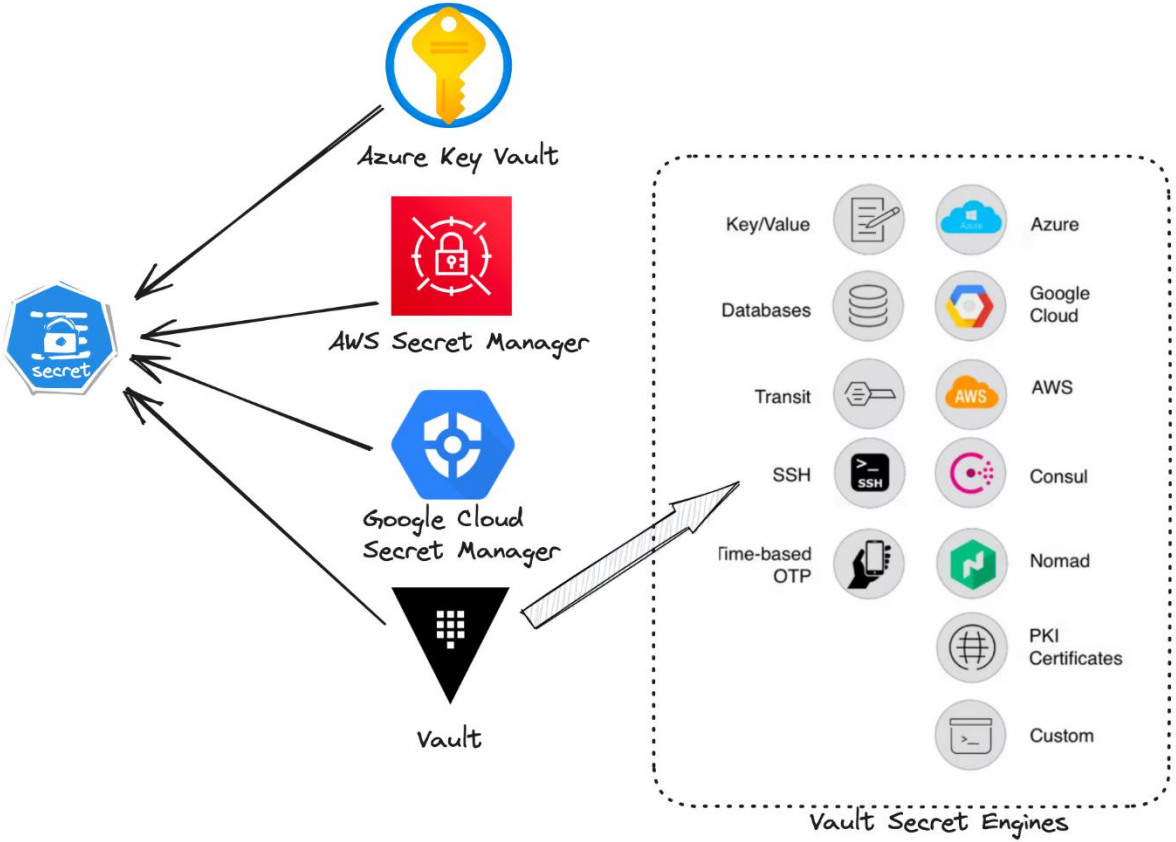
Vault Secret Engines

Proposal 2


Azure Key Vault
AWS Secret Manager
secret
Google Cloud
Secret Manager
Vault
Key/Value
Databases
Transit
SSH
Time-based
OTP
Azure
Google
Cloud
AWS
Consul
Nomad
PKI
Certificates
Custom
Vault Secret Engines

Solution 1 - Vault Secrets Operator

```yaml
---
apiVersion: secrets.hashicorp.com/v1alpha1
kind: VaultStaticSecret
metadata:
  namespace: vso-example
  name: example
spec:
  vaultAuthRef: vault-auth
  mount: kv
  type: kv-v2
  name: secret-in-vault
  refreshAfter: 60s
  destination:
    create: true
    name: secret-in-k8s
```

Solution 2 - External Secrets Operator

```yaml
---
apiVersion: external-secrets.io/v1beta1
kind: ExternalSecret
metadata:
  name: vault-example
spec:
  refreshInterval: "5m"
  secretStoreRef:
    name: secretstore-vault
    kind: SecretStore
  target:
    name: test-vault-secret
  data:
  - secretKey: db_pass
    remoteRef:
      key: mysql
      property: MYSQL_PASSWORD
```

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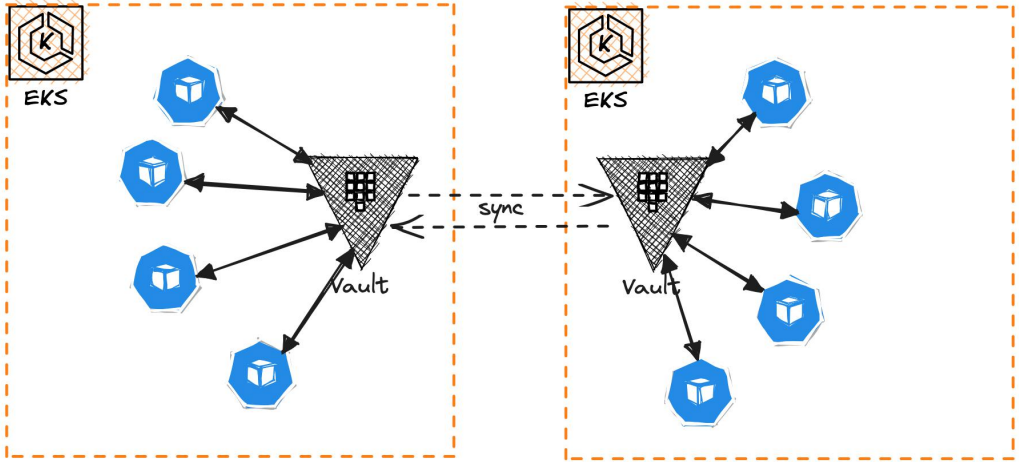
Demo

External Secrets Operator

- How does the application log in Vault?
- How does the application access the secrets in the cloud native way?
- How does the application communicate with each other in a secure way?

- Zero trust
- Indentity information included
- Support different EKS clusters or different environments
- ...via Vault
- JWT auth method



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Demo

Unified Identity Token

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Q&A