Keeping Secrets Secret with Conjur

CincyDeliver 2022

Who am I?

Shlomo Zalman Heigh

Senior Software Engineer, CyberArk

Developer

Conjur

- Open source projects
- Community engagement
- Long held interest in security

Hobbies

- 3D printing (see my prints on Thingiverse!)
- Woodworking
- Small electronics
- RC planes

Social

Find me on…

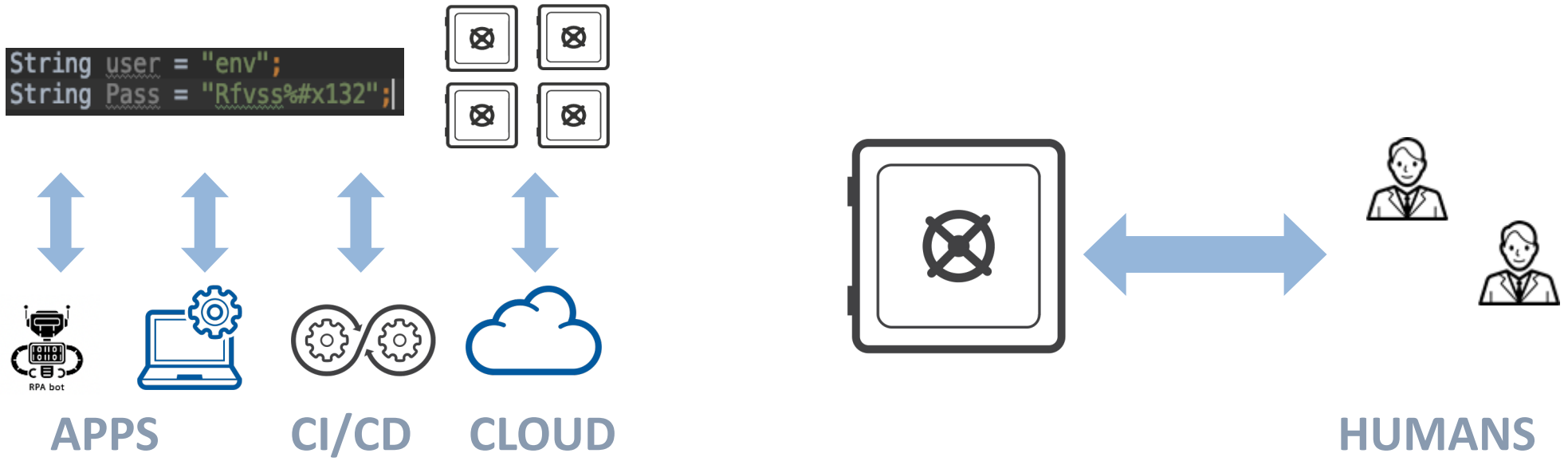
- LinkedIn: linkedin.com/in/szheigh
- GitHub: github.com/szh

CYBERARK®

Story Time!

1 The Problem with Secrets

Organizations today



No Centralized Enterprise Secrets Management

- X No rotation or security governance
- X No audit or logs
- X No centralized control
- X No visibility to security team
- X Secrets stored in multiple vaults (some not secure)
- X Hard coded credentials in code or config files

Common application platforms

RPA / COTS

UiPath Robotic Process Automation

Automation Anywhere

tenable

Qualys.

RAPID7

Homegrown Apps

Java

Apache Software Foundation

CI/CD Automation

Jenkins

Azure DevOps

TC

ANSIBLE

puppet

Cloud native apps

RED HAT OPENSHIFT Container Platform

kubernetes by Google

VMware Tanzu

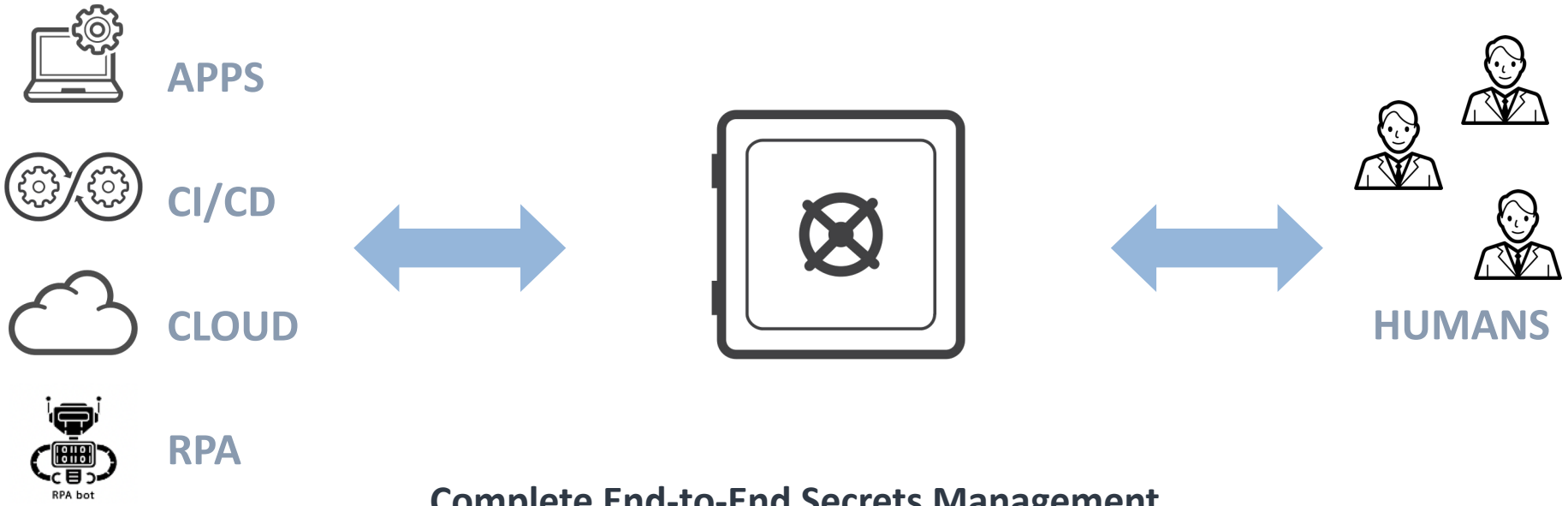
Cloud workloads

Google Cloud Platform

aws

2 The Solution

What is secrets management?



Complete End-to-End Secrets Management

- ✓ One centralized source of truth serves both humans and apps
- ✓ Secures all application types, everywhere
- ✓ Strong authentication and authorization – apply least privilege
- ✓ Automated secrets rotation
- ✓ Fully audited and controlled by security team
- ✓ No hard-coded credentials

Secret Delivery / Consumption Options

Secretless Broker

Brokers the connection to the target resource

Key Advantages:

No Secrets delivered to the application

No code changes required

Supports rotations

Other Considerations:

Requires a service connector to the target (select from list of available connectors)

APIs

Uses API calls to retrieve secrets

Key Advantages:

Available APIs for Java, Ruby, Go.

Supports rotations

Other Considerations:

Requires code change in the application

Summon

Fetches secrets and makes them available to the application as environment variables

Key Advantages:

No code change required

Other Considerations:

Rotations are not supported – requires a pod restart when password changes

Deployments requires more steps

Secrets Provider

(Kubernetes Secrets or File)

Uses init or sidecar container to fetch secrets and push them into Kubernetes Secrets or a shared volume

Key Advantages:

Easier deployment using HELM

Native experience for developers that already use Kubernetes Secrets

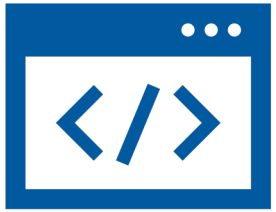
Small footprint

Other Considerations:

Uses Kubernetes RBAC and Audit functions

Secrets can be stored externally to the pod in Kubernetes Secrets.

Secret Delivery / Consumption Options



APIs

Use REST API or SDKs to retrieve secrets

Key Advantages:

Available SDKs for Java, Ruby, Go and more.

Supports rotations

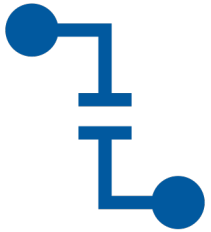
Other Considerations:

Requires code change in the application

C# SDK Example

```
Conjur.Client client = new Conjur.Client("https://localhost:8443", "myConjurAccount");
client.Credential = new System.Net.NetworkCredential("host/demo-aspnet-app/demo-aspnet-app", "83w54e257aw0c
string secret = client.Variable("demo-aspnet-app/mysecret").GetValue();
```


Secret Delivery / Consumption Options



Summon

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Summon Example

```
$ brew tap cyberark/tools
$ brew install summon
$ brew install summon-conjur

$ conjur variable values add "my_vault/my_secret" "mySuperSecretValue"

$ cat > secrets.yml <<EOF
MY_SECRET: !var my_vault/my_secret
EOF

$ summon /bin/bash -ec 'echo $MY_SECRET'
mySuperSecretValue
```


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Secretless Broker Example

```
$ docker container run --rm -p 5432:5432 -p 5454:5454 cyberark/secretless-broker-quickstart

$ psql "host=localhost port=5432 user=secretless dbname=quickstart sslmode=disable" \
    -c 'select * from counties;'

Password for user secretless:
psql: FATAL:  password authentication failed for user "secretless"

$ psql "host=localhost port=5454 user=secretless dbname=quickstart sslmode=disable" \
    -c 'select * from counties;'

id |    name
---+------------
 1 | Middlesex
 2 | Worcester
 3 | Essex
 4 | Suffolk
 5 | Norfolk
```


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Kubernetes Manifest Example

```yaml
spec:
  replicas: 1
  selector:
    matchLabels:
      app: test-app-secrets-provider-rotation
  template:
    metadata:
      labels:
        app: test-app-secrets-provider-rotation
      annotations:
        conjur.org/container-mode: "sidecar"
        conjur.org/secrets-refresh-enabled: "true"
        conjur.org/secrets-refresh-interval: "10s"
        conjur.org/authn-identity: "myLogin"
        conjur.org/secrets-destination: "file"
        conjur.org/conjur-secrets.rotation-app: |
          - test-secrets-provider-rotation-app-db/url
          - test-secrets-provider-rotation-app-db/username
          - test-secrets-provider-rotation-app-db/password
        conjur.org/secret-file-path.rotation-app: "./application.yaml"
        conjur.org/secret-file-format.rotation-app: template
        conjur.org/secret-file-template.rotation-app: |
          spring:
            datasource:
              platform: postgres
              url: jdbc:{{ printf `{{ secret "url" }}` }}
              username: {{ printf `{{ secret "username" }}` }}
              password: {{ printf `{{ secret "password" }}` }}
            jpa:
              generate-ddl: true
              hibernate:
                ddl-auto: update
```

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Summary

Why not keep secrets in code?

- Hard to manage
  - Can’t easily rotate
  - No audit trail
- Violates ”least privilege”
  - Developers shouldn’t have access to production credentials

Why Conjur?

- Open source
  - Can be self hosted near the application (in K8s cluster)
- Enterprise ready
  - Scalable, can sync with CyberArk Vault
- Easy integrations
  - Native K8s integrations, REST API, SDKs
- Trusted
  - Used by Fortune 500 companies
  - Maintained by a trusted security company

QUESTIONS

Resources

- Blog: Remove Secrets from your Codebase
  https://www.conjur.org/blog/remove-secrets-from-your-codebase/
- Conjur OSS Quickstart
  https://www.conjur.org/get-started/quick-start/oss-environment/
- CyberArk Commons Community (Discourse)
  https://discuss.cyberarkcommons.org/
- OWASP Secrets Management Cheat Sheet
  https://cheatsheetseries.owasp.org/cheatsheets/Secrets_Management_CheatSheet.html
- OWASP WrongSecrets
  https://owasp.org/www-project-wrongsecrets/
- Secure Deployment: 10 Pointers on Secrets Management
  https://dev.to/commjoen/secure-deployment-10-pointers-on-secrets-management-187j

Thank You