HashiCorp

ACME Corp: Challenges and Solutions

Enhancing Service Discovery and Resilience Across AWS & Azure Clouds

Nov'2023

Agenda

- HashiCorp Introduction
- ACME Corp Requirements and Challenges
- HashiCorp Solution Recommendation
- Demo
  - Consul demo – Resiliency and Access Control
- Summary and Next Steps

Challenge: Dynamic infrastructure introduces new **control points** at each layer

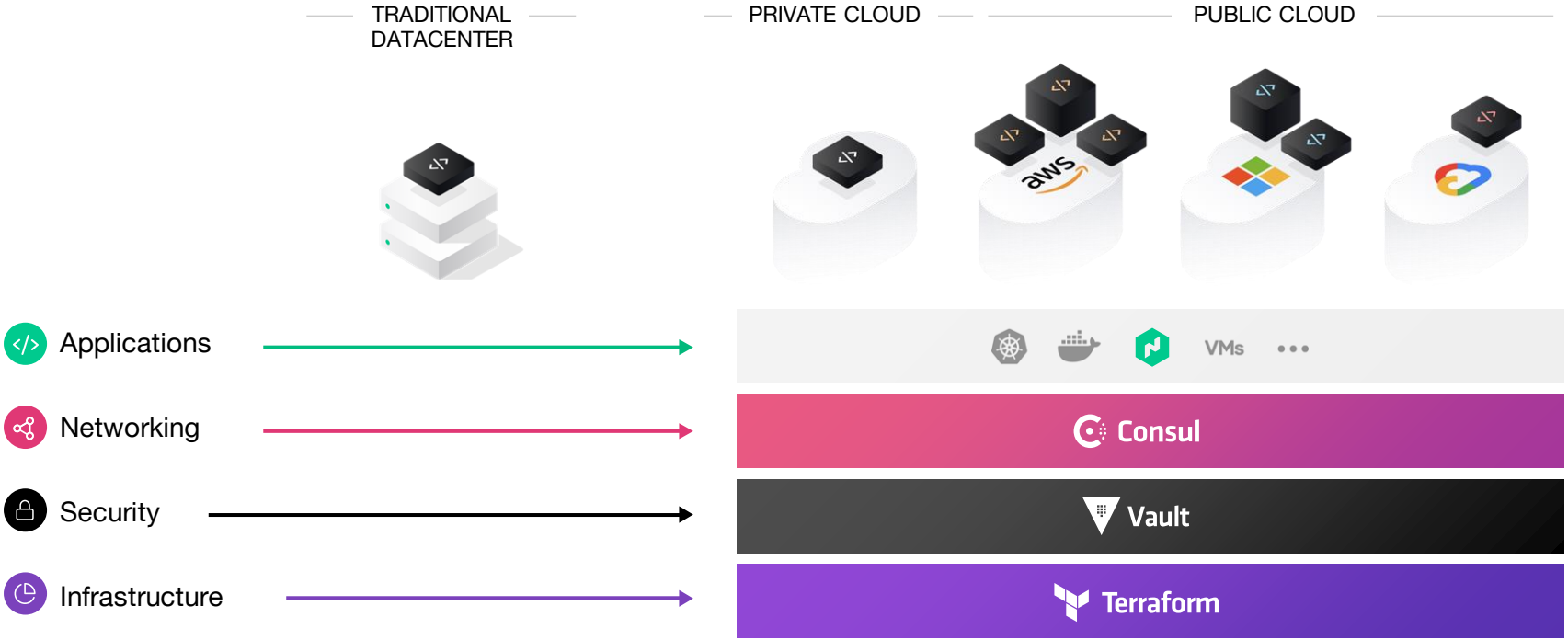
TRADITIONAL DATACENTER

PRIVATE CLOUD

PUBLIC CLOUD

Applications	**Containers / Continuous Delivery**
Networking	**Service Registry**
Security	**Identity**
Infrastructure	**Infrastructure as Code**

Solution: **Unified interfaces** to simplify and accelerate cloud adoption



ACME Corp Requirements and Challenges

- ACME Corp: A leading SaaS-based Business Intelligence application provider
- Revenue Significance: The BI application accounts for over 85% of ACME's revenue
- Current Infrastructure: Hundreds of microservices on AWS EKS clusters
- Key Challenges:
  - Need for a robust service discovery solution
  - Securely connecting microservices
  - Exploring alternate service discovery solutions
  - Ensuring higher availability post recent AWS outages: Considering Azure as a potential platform
  - Seeking a scalable solution with fastest time to market

HashiCorp Solution using Consul on AKS

1. **Service Discovery & Mesh:**
   - Consul provides seamless service discovery for ACME's hundreds of microservices.
   - Consul secures service-to-service communication, crucial for ACME's BI application.
2. **Scalability:**
   - Consul clusters can easily scale to accommodate ACME's growing workload.
   - Consul will ensure the BI application performs optimally, supporting ACME's revenue generation.
3. **Multi-Cloud Capability:**
   - Terraform with Consul eases deployment across AWS and Azure.
   - Addresses ACME's need for higher availability and disaster recovery post recent AWS outages.
4. **Fast Time to Market:**
   - Quick setup and integration of Consul with AKS, meeting ACME's requirement for a fast-to-market solution.
5. **Secure Communication:**
   - Consul provides automatic TLS encryption and identity-based authorization for secure microservices communication.
   - Consul addresses ACME's need for a secure connection between microservices with access control using Intentions.

HashiCorp Solution using Consul across roles

CIO:

- Consul ensures business continuity with multi-cloud resilience.
- Promotes vendor diversity with a multi-cloud approach.
- Enhances operational efficiency via a unified service mesh.
- Provides scalability and flexibility with a service mesh architecture.

Cloud Architect:

- Enables seamless cross-cloud networking with Consul mesh gateways.
- Manages dynamic service discovery and mesh configuration.
- Facilitates infrastructure as code for repeatable, controlled deployments.

DevOps Engineer:

- Consul automates CI/CD, enhancing update efficiency.
- Ensures encrypted microservices communication with sidecars.
- Supports integrated tools for comprehensive monitoring and observability.

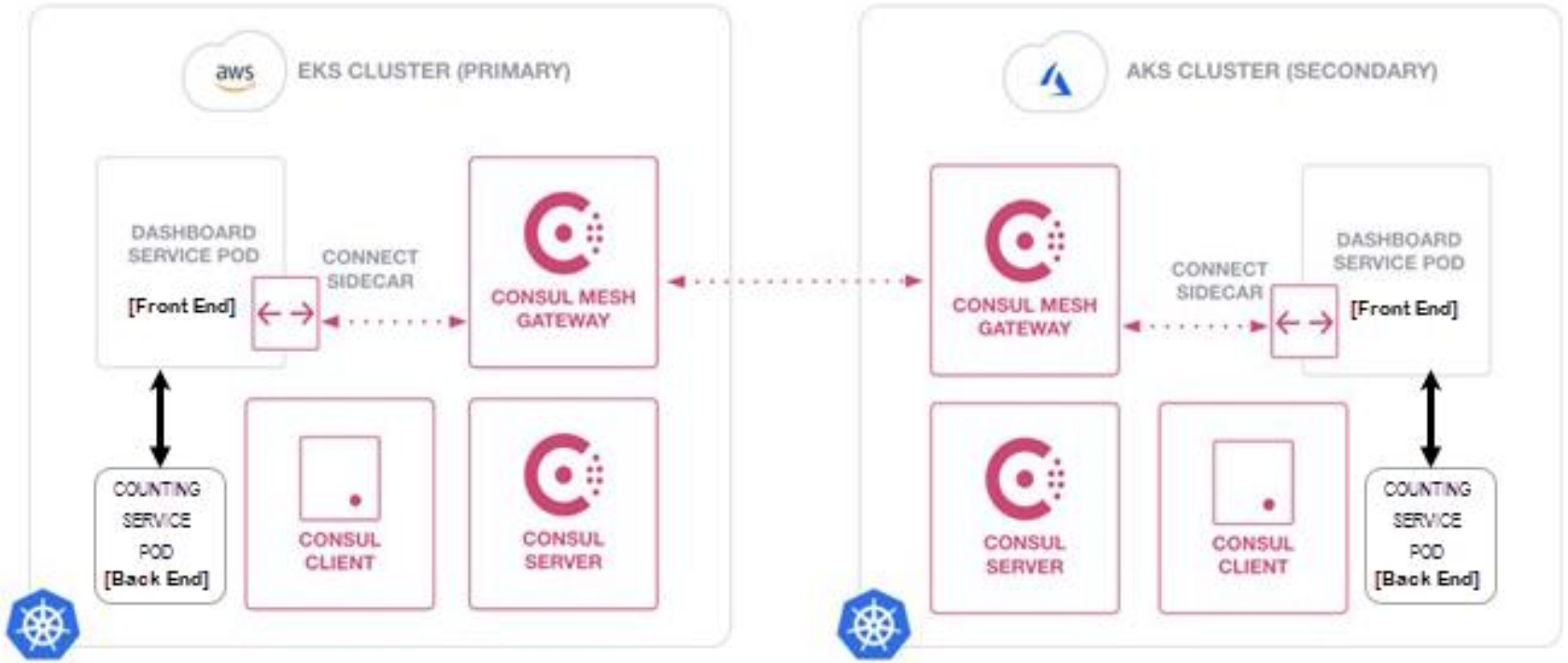
SRE (Site Reliability Engineer):

- Guarantees reliability and uptime with strategic traffic rerouting.
- Helps meet SLOs with consistent, cloud-spanning performance.
- Offers robust DR with multi-cloud cluster failovers.
- Enables dynamic scaling for efficient capacity planning.

HashiCorp Solution using Consul and other products

1. **Multi-Cloud Capability with Terraform and Consul:**
   - Terraform enables infrastructure as code for easy deployment across AWS and Azure.
   - Consul's multi-cloud capability ensures higher availability and disaster recovery.
2. **Service Discovery & Mesh with Consul:**
   - Seamless service discovery for ACME's microservices architecture.
   - Secure service-to-service communication with Consul's service mesh.
3. **Scalability with Nomad and Consul:**
   - Nomad's simple and flexible workload orchestrator scales with ACME's growing workload.
   - Consul ensures optimal performance and scalability of service discovery as workload grows.
4. **Fast Time to Market with Vagrant and Consul:**
   - Vagrant provides development environments to quickly test and deploy microservices.
   - Consul's quick setup and integration with AKS accelerates time to market.
5. **Secure Communication with Vault and Consul:**
   - Vault secures microservices communication with secrets management.
   - Consul ensures automatic TLS encryption and identity-based authorization.

Bridging Multi-Cloud Environments with Consul – Demo layout



Consul demo – Resiliency and Access Control

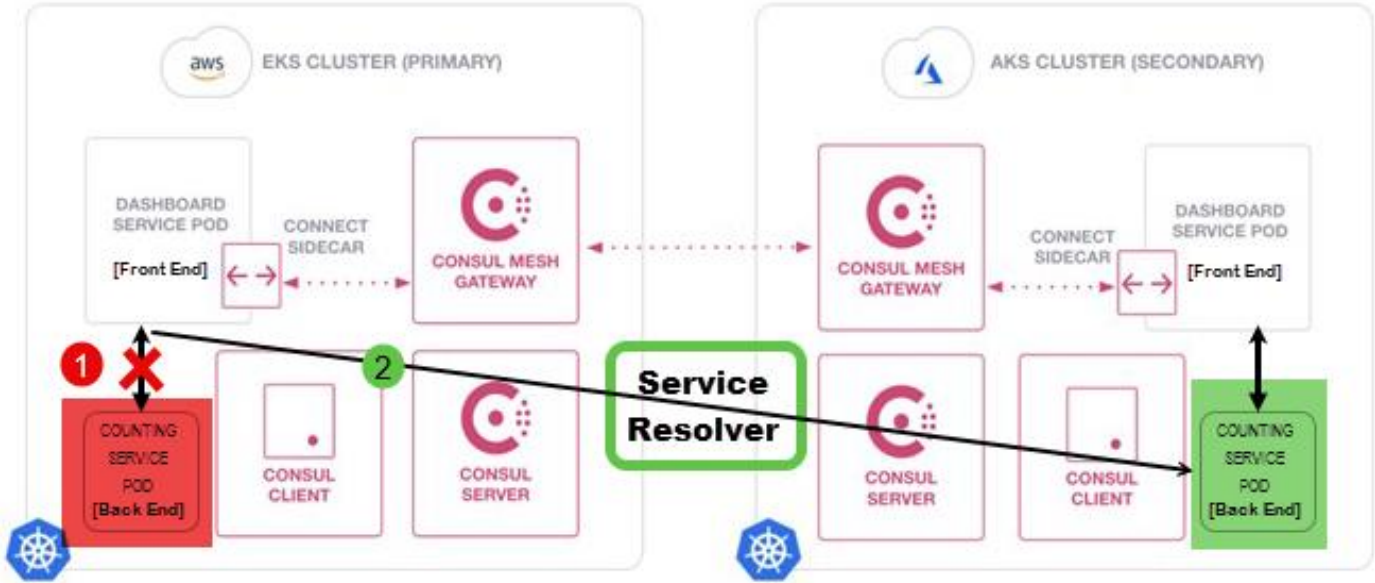
Objective 1: Configure Consul on AWS EKS and Azure AKS to enable multi-cloud service discovery and connectivity.
Live Demonstration with Code review:
Terraform installation and configuration of Consul using Helm. Setup of federated Consul datacenters across AWS and Azure.

Objective 2: Showcase seamless communication between a two-tier application deployed across AWS and Azure.
Live Demonstration with Code review:
Deploy and demonstrate a two-tier application setup with Consul service registration and communication across federated Consul datacenters.

Objective 3: Showcase application resilience by maintaining service continuity during a backend failure (figure next page).
Live Demonstration with Code review:
Using Consul's Service Resolver demonstrate real-time failover by simulating a backend outage in the primary datacenter and observing uninterrupted service on the dashboard app.

Objective 4: Showcase service-to-service communication, allowing or denying requests between a static client and server.
Live Demonstration with Code review:
Execute live changes to Consul Service Intentions, observing allowed and then denied communication between services, illustrating real-time traffic control.

Resiliency failover using Consul's Service Resolver



1. Scale down Counting service to 0 effectively removing EKS back-end
2. With Service Resolver deployed, EKS front-end dashboard now connects to the working AKS Counting service

Summary and Next Steps

Summary

- Consul ensures multi-cloud resilience and operational efficiency.
- Streamlines operations, reducing costs with unified service mesh.
- Empowers microservices with secure, automated cross-cloud communication.

Next Steps

- Initiate Consul deployment across multi-cloud environments.
- Conduct staff training for Consul management and best practices.
- Implement monitoring tools for performance and reliability assessment.