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Let's go

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The bridge to possible

Application-Driven Networking with Consul-Terraform-Sync and Cisco ACI

An introduction to Event Driven Automation

Lionel Hercot, Technical Marketing Engineer
@LHercot
DEVNET-3005

Cisco Webex App

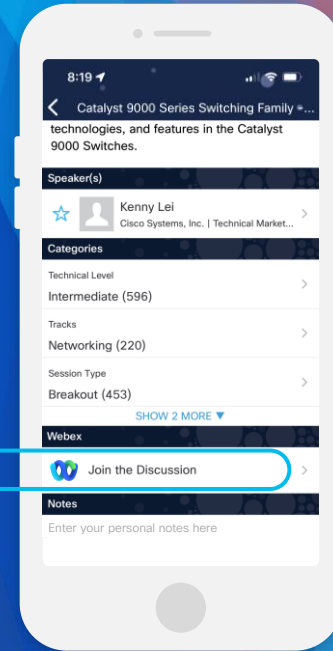
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 9, 2023.



<https://ciscolive.ciscoevents.com/ciscolivebot/#DEVNET-3005>

Agenda

- Introduction
- The Infrastructure as Code Journey
- The Engineer Experience
- What are Application Derivative Changes
- How to use Consul, CTS and ACI together
- Glimpse into the Future
- Recap and next steps

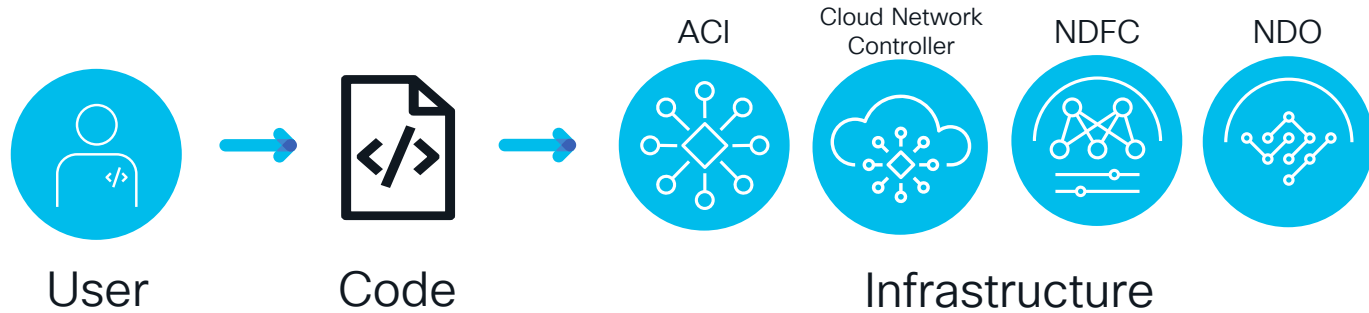
The Infrastructure as Code Journey



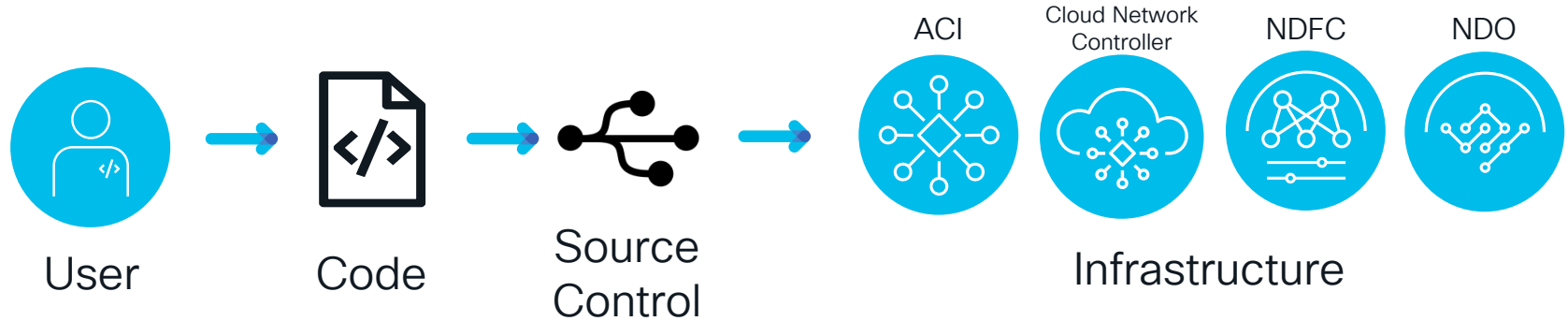
Infrastructure as Code (IaC) – What/Why/How

- Automate the provisioning and management of the technology stack
- Translate manual tasks into reusable, robust, distributable code
- Rely on practices that have been successfully used for years in software development (version control, automated testing, release tagging, continuous delivery, etc.)
- Benefits: much higher delivery speed; significant reliability boost

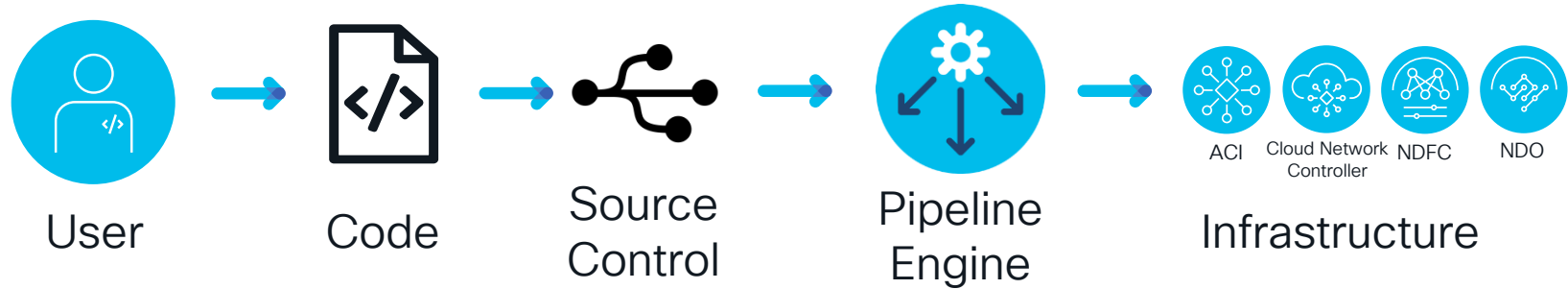
The Infrastructure as Code journey



The Infrastructure as Code journey



The Infrastructure as Code journey



The Engineer Experience

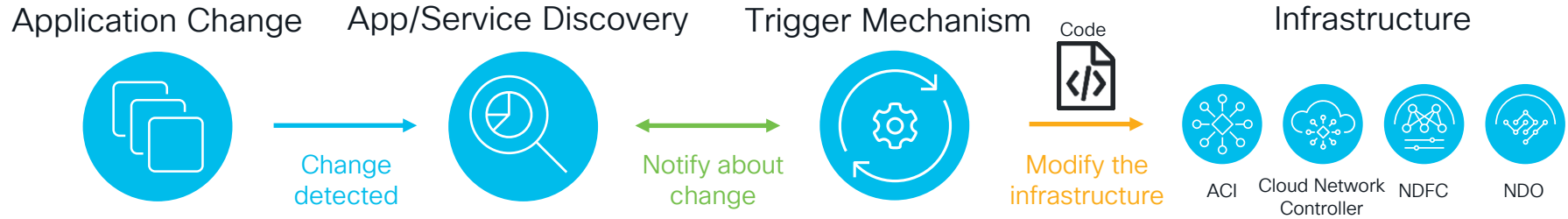
Thinking about the Engineer Experience first

- Pick the Experience before the Tools
- What is the preferred way for you/your Engineers to make changes
 - CLI
 - Code
 - Inventory file
 - 3rd party UI / Database
 - Service Catalog
- Then look at tools and technologies

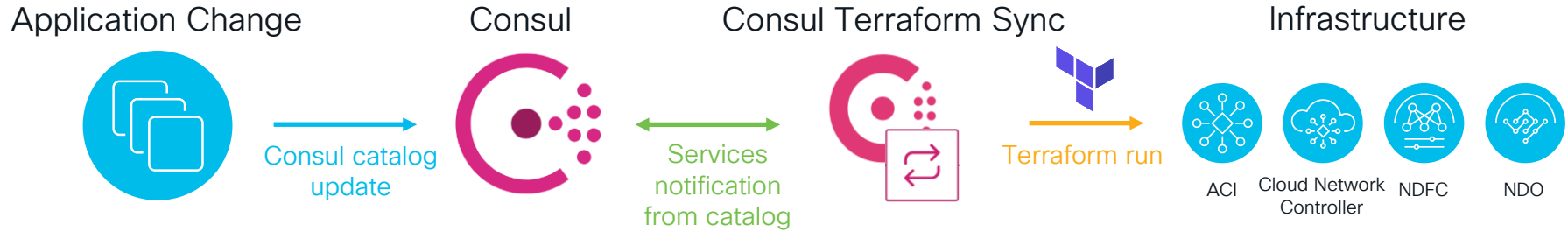
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Application Derivative Changes

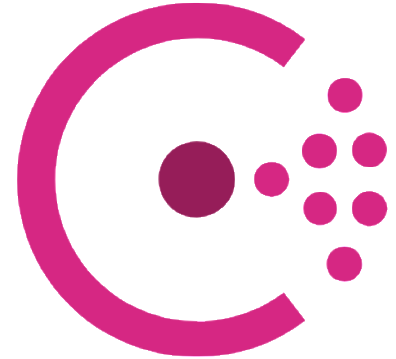


Consul Network Infrastructure Automation



What is HashiCorp Consul?

- Consul is a distributed service discovery and registration tool, a key-value store and a Service Mesh with micro-segmentation capabilities.
- Distributed control-plane in a hierarchical client-server model with
 - Cluster membership (gossip, SWIM, Serf)
 - Consensus (Raft) and service registration
- Maintains a central catalog where all services are synchronized and provides distributed health checking with edge triggered updates (agent)
- The catalog is accessible using DNS, REST API or CLI
- Supports multi-datacenter, multi-cloud, service federation, encryption and identity management.



What is Terraform?



HashiCorp

Terraform

- Open-source Infrastructure Provisioning Tool
- Commercial support from HashiCorp
- Declarative and idempotent
- Immutable infrastructure concept
- Can manage a wide range of systems:
 - VMs, network devices, cloud instances, etc.
- Agentless, single binary file
- Zero server-side dependencies

Cisco Cloud Networking Terraform Providers



Network
Central
Cloud

ACI
Cloud / Onprem



CiscoDevNet/aci

Nexus
Dashboard
Orchestrator



CiscoDevNet/mso

Nexus
Dashboard
Fabric
Controller



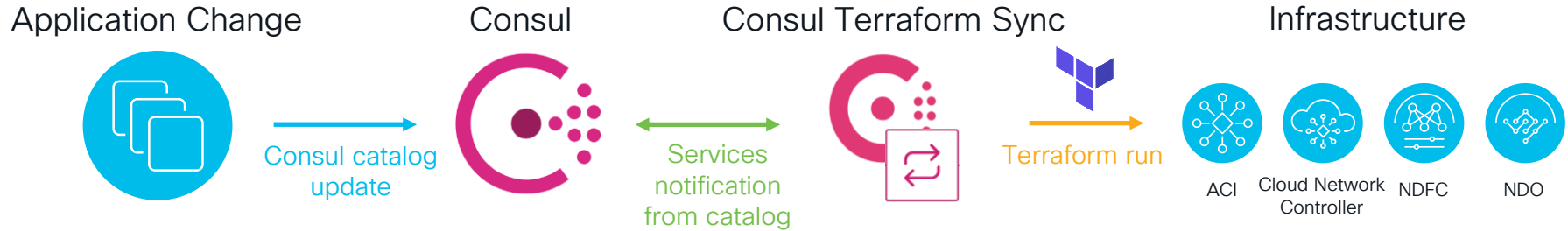
CiscoDevNet/dcnm

All Cisco providers can be found here: <https://registry.terraform.io/search/providers?namespace=CiscoDevNet>

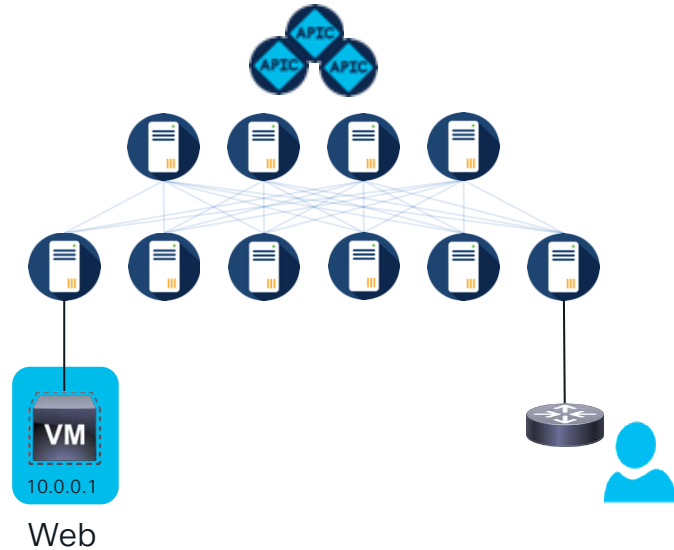
What is Consul-Terraform-Sync (CTS)?

- Open-source service-oriented tool for managing network infrastructure near real-time
- Subscribes to Consul application/services changes
- Uses Terraform to modify the network infrastructure
- Single binary file
- Support Terraform CLI, Cloud and Enterprise

Consul Network Infrastructure Automation

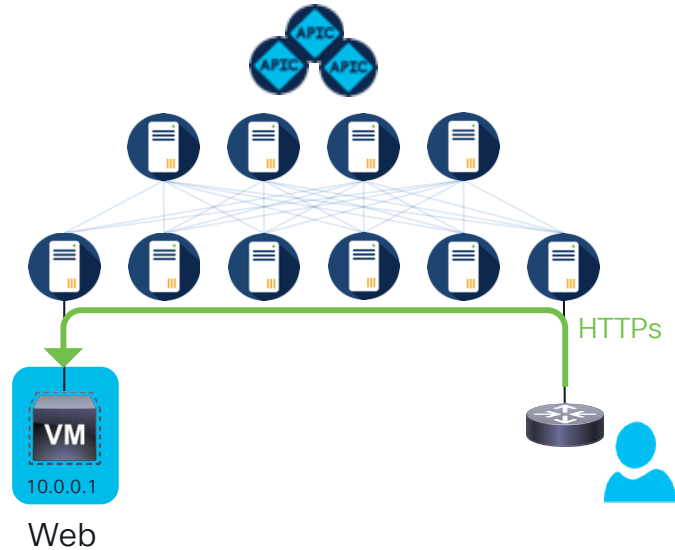


Use Case: Micro segmentation with ESG



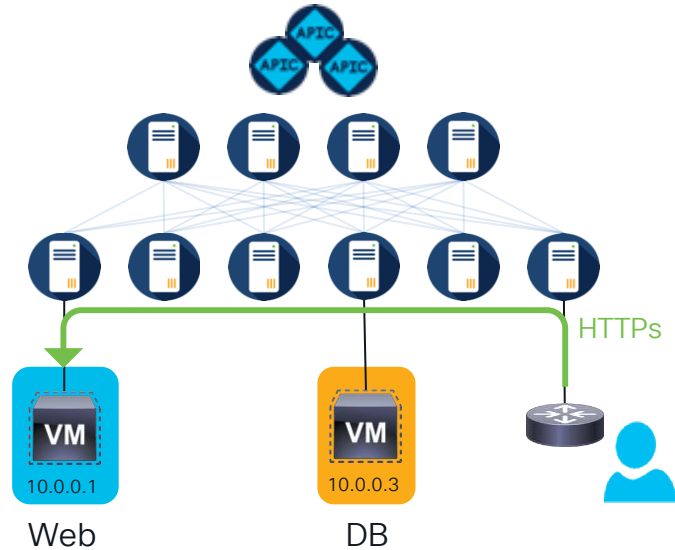
- ACI Endpoint Security Group (ESG)
- Enforce Service Micro Segmentation in network
- Consul-Terraform-Sync automates
 - ESG and ESG Selector
 - Contracts

Use Case: Micro segmentation with ESG



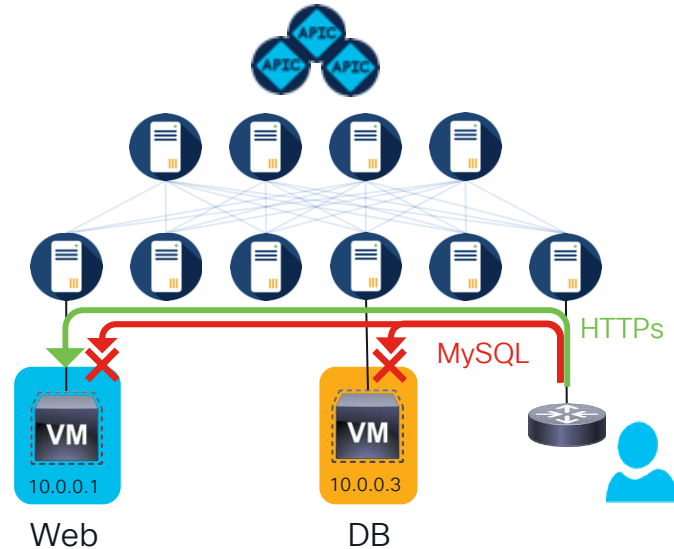
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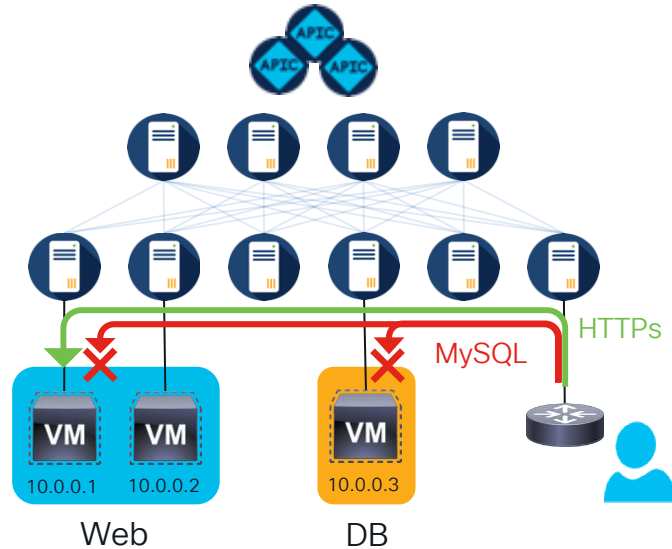
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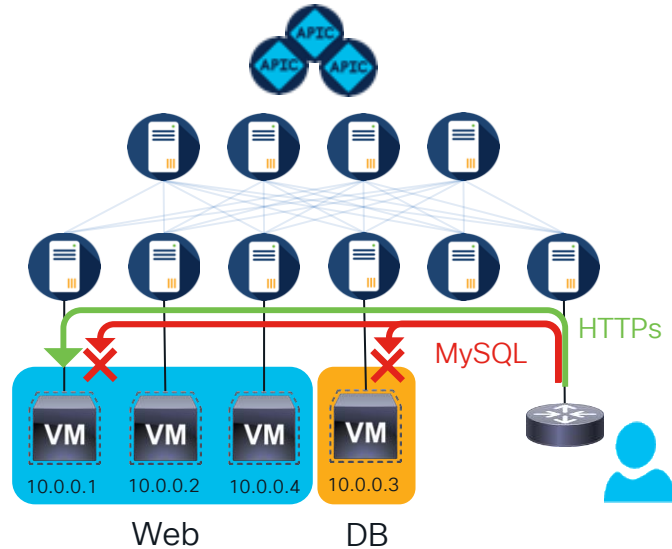
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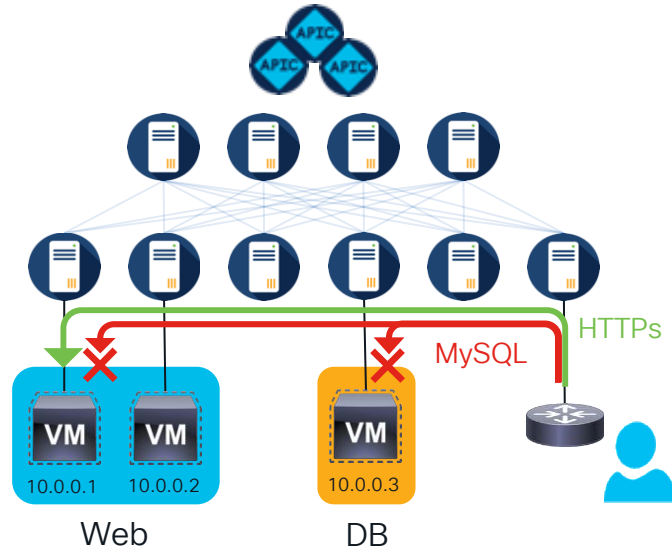
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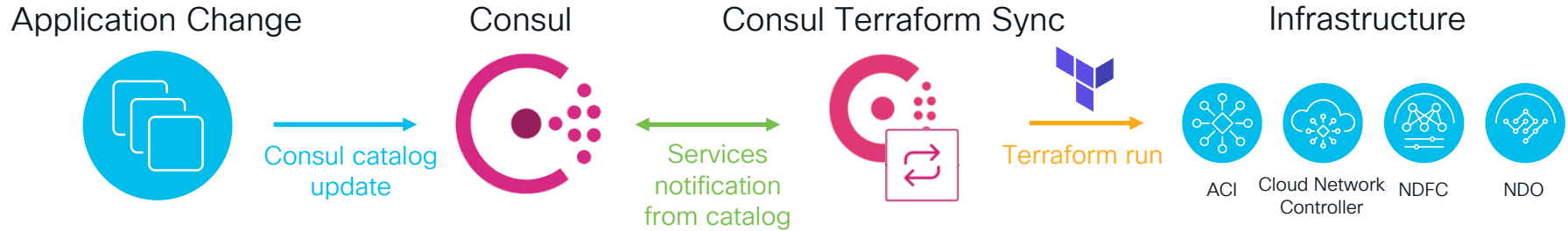


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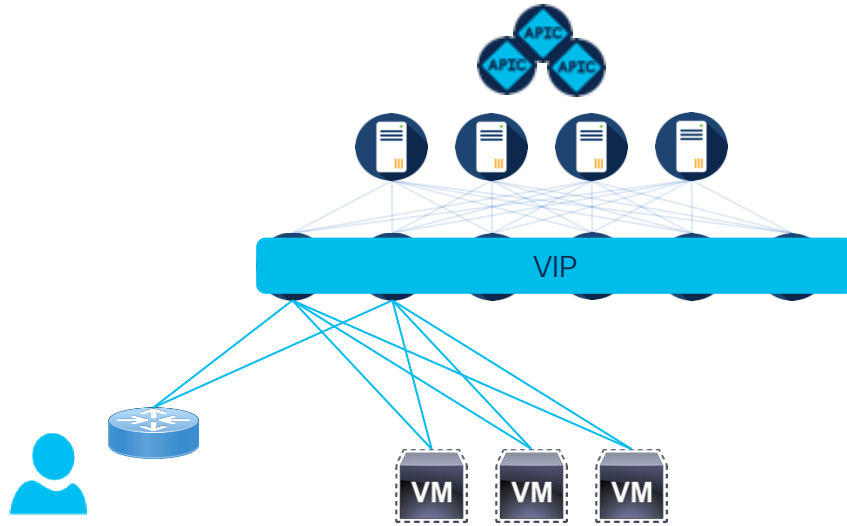


Let's see it in action!

Consul Network Infrastructure Automation

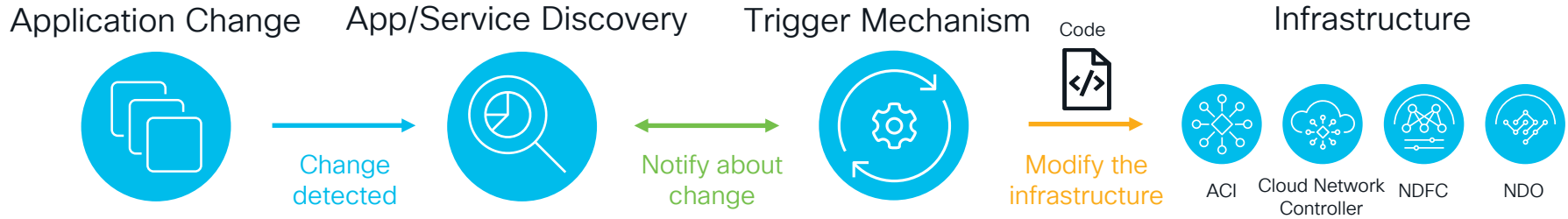


Use Case: Automate and scale stateless SLB



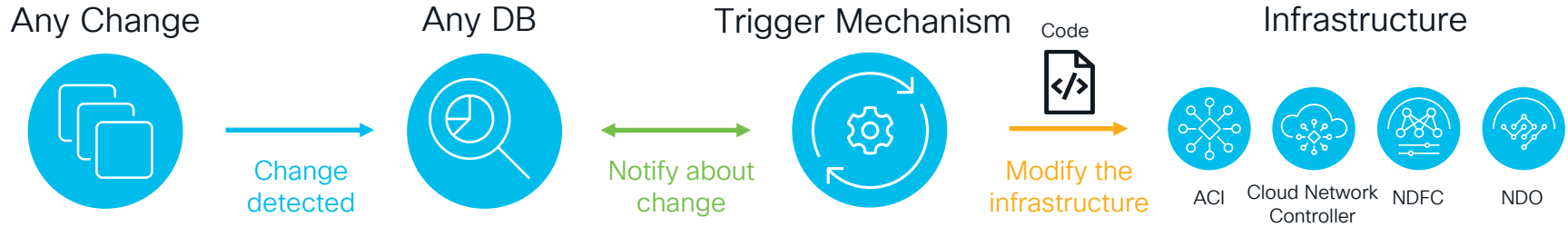
- ACI Policy Based Redirect (PBR)
- Use the fabric as a fast stateless load-balancer
- Destination is a simple hash
- Consul-Terraform-Sync automates
 - Redirection Policy
 - Destination Policy
- Scale out or scale in

Application Derivative Changes



What if we push
this further?

Application Derivative Changes



NetBox-Driven Networking

Network Admin



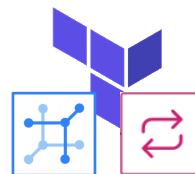
→
User update
NetBox

NetBox



↔
Change
notification
from NetBox
Webhook

Any Terraform Sync



→
Terraform run

Infrastructure



ACI



Cloud Network
Controller



NDFC

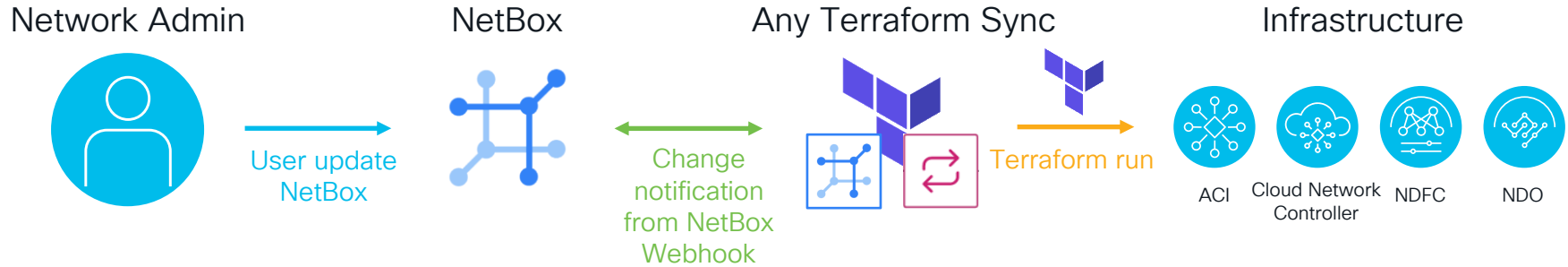


NDO

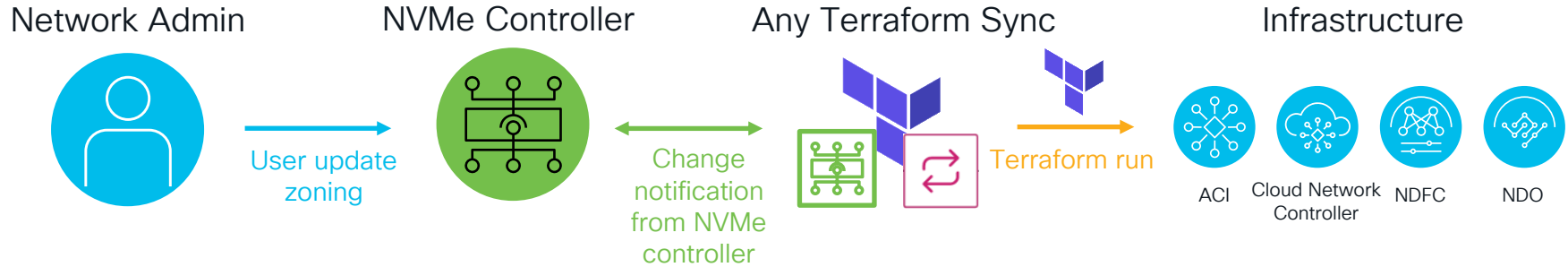


Let's glimpse into the
future!

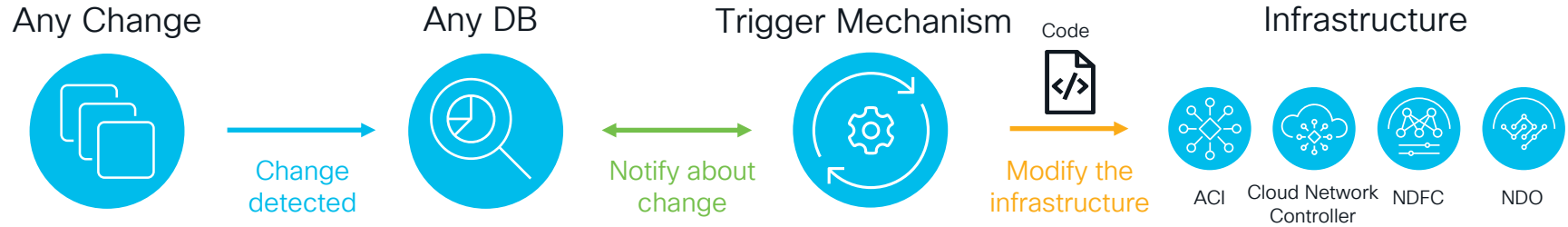
NetBox-Driven Networking



NVMe Controller Driven Segmentation



Application Derivative Changes



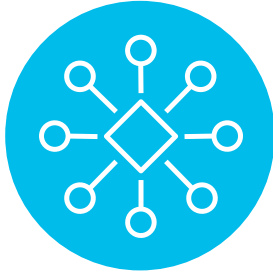
Event-Driven Ansible

- Multiple event sources (Kafka, WebHook, URL, ...)
- Ansible Rulebooks define the condition and action
 - YAML
 - Similar to Ansible Playbooks
 - Re-use Ansible modules for large ecosystem of actions



<https://github.com/ansible/event-driven-ansible/>
<https://ansible-rulebook.readthedocs.io/>

Use DevNet Learning Labs to start your journey!



ACI



NDO



NDFC



[Intro Learning Lab](#)



[Intro Learning Lab](#)



[CTS Learning Lab](#)



[Intro Learning Lab](#)



[Intro Learning Lab](#)



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Key Takeaways

- IaC is a journey not a destination
- Cloud Networking products are designed to be automated
- Event Driven Automation reduce the amount of manual code changes needed
- Engineer Experience should be at the center of IaC
- Go learn with our DEVNET learning labs

Fill out your session surveys!



Attendees who fill out a minimum of four session surveys and the overall event survey will get **Cisco Live-branded socks** (while supplies last)!



Attendees will also earn 100 points in the **Cisco Live Challenge** for every survey completed.



These points help you get on the leaderboard and increase your chances of winning daily and grand prizes

Continue your education



- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand

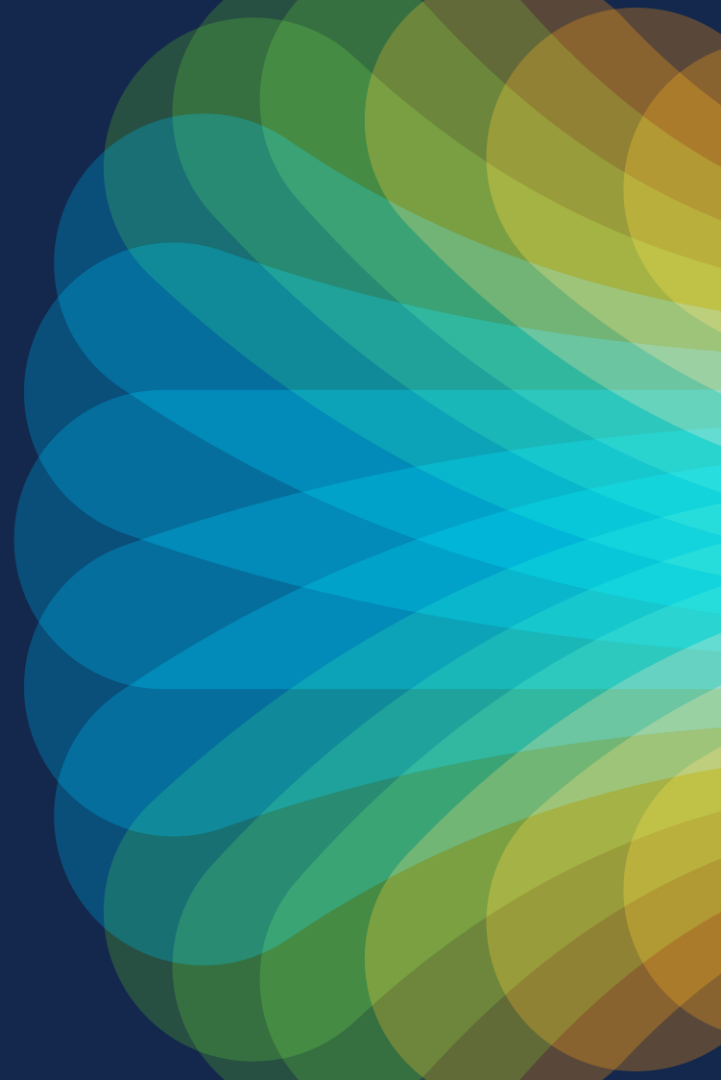


The bridge to possible

Thank you

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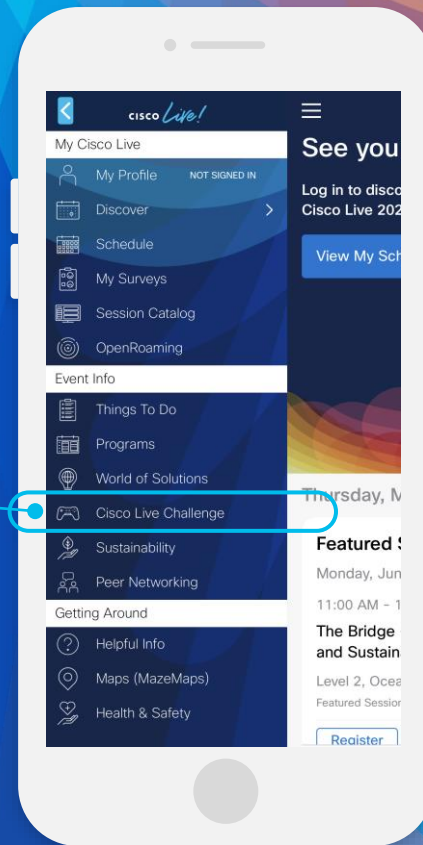


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How:

- 1 Open the Cisco Events App.
- 2 Click on 'Cisco Live Challenge' in the side menu.
- 3 Click on View Your Badges at the top.
- 4 Click the + at the bottom of the screen and scan the QR code:



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