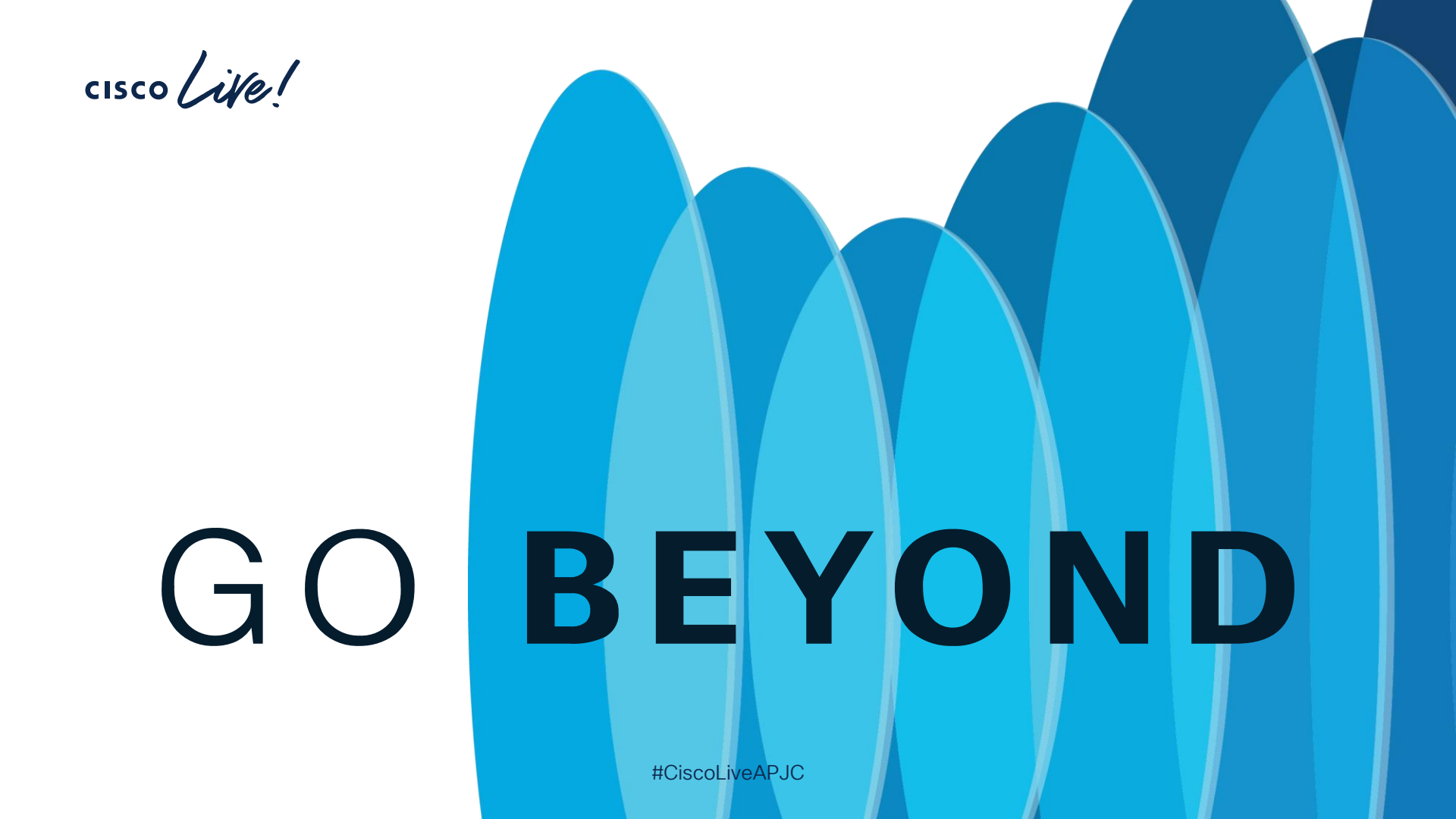
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Application-Driven Networking with Consul-Terraform-Sync and Cisco ACI

An introduction to Event Driven Automation

Lionel Hercot, Technical Marketing Engineer
@LHercot

DEVNET-3005

Cisco Webex App

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

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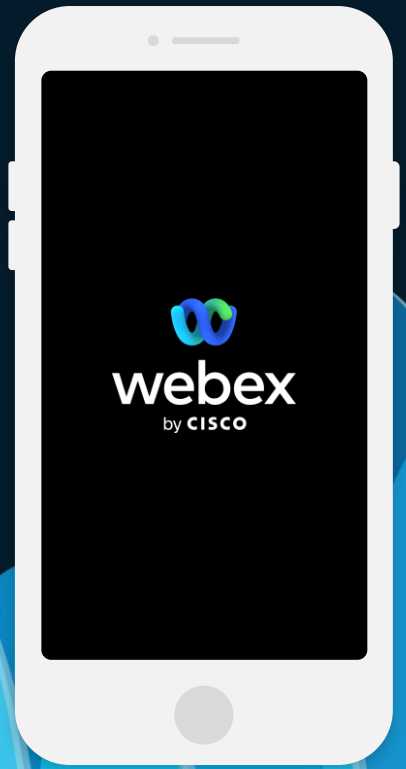

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Agenda

- Introduction
- The Engineer Experience
- What are Application Derivative Changes
- How to use Consul, CTS and ACI together
- To road to Event-Driven Automation
- Recap and next steps

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The Engineer Experience

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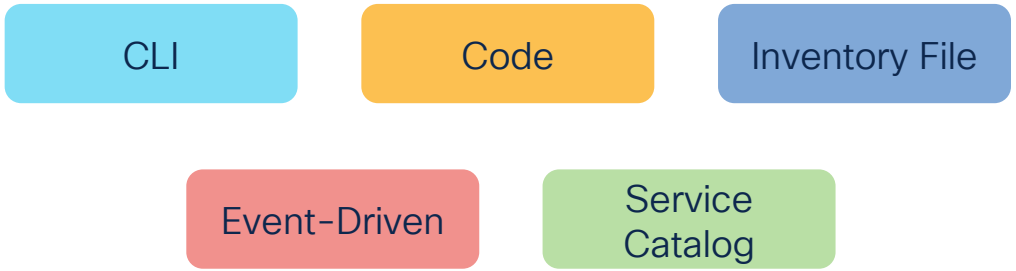
Thinking about the Engineer Experience first

- Pick the Experience before the Tools
- What is the preferred way for you/your Engineers to make changes



- Then look at tools and technologies

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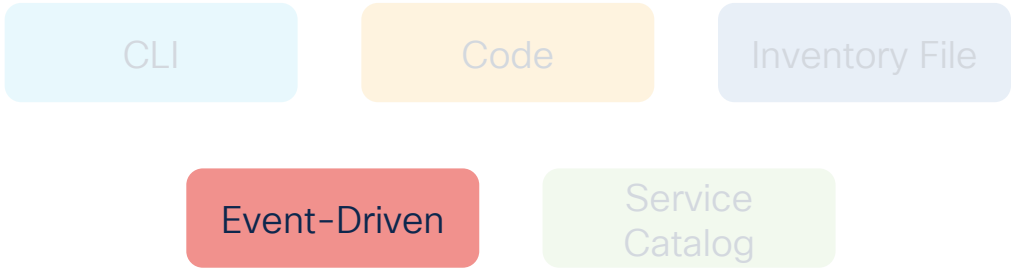

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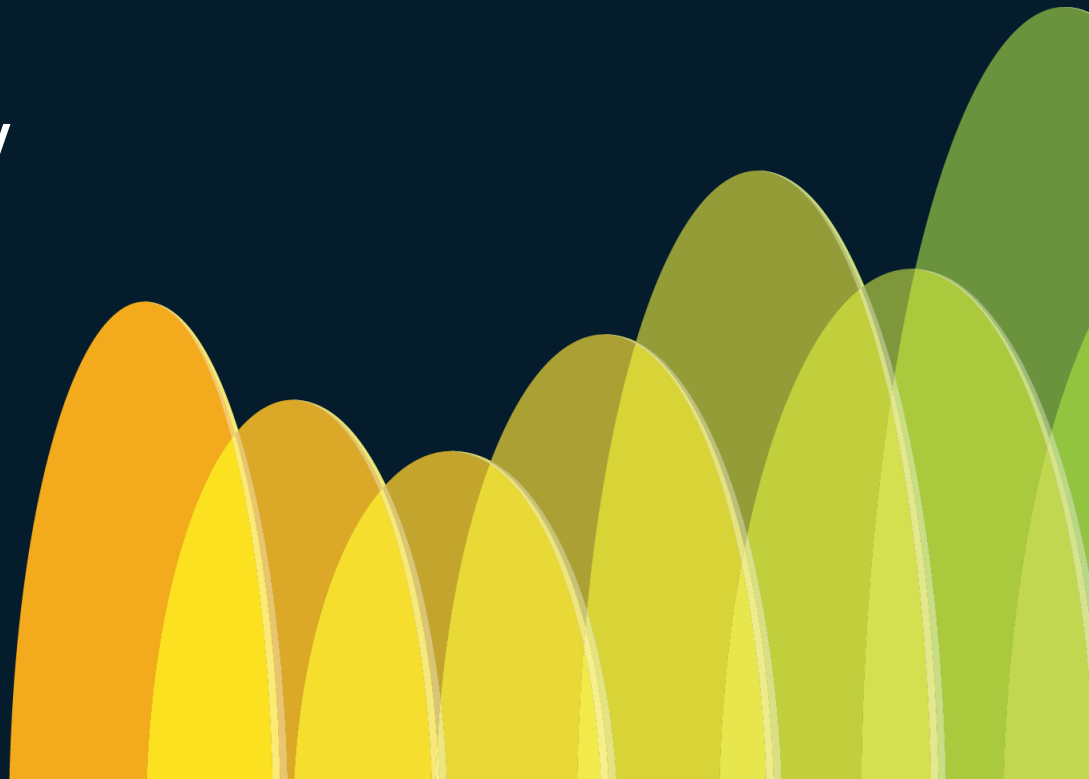
The short history of Event-Driven Automation



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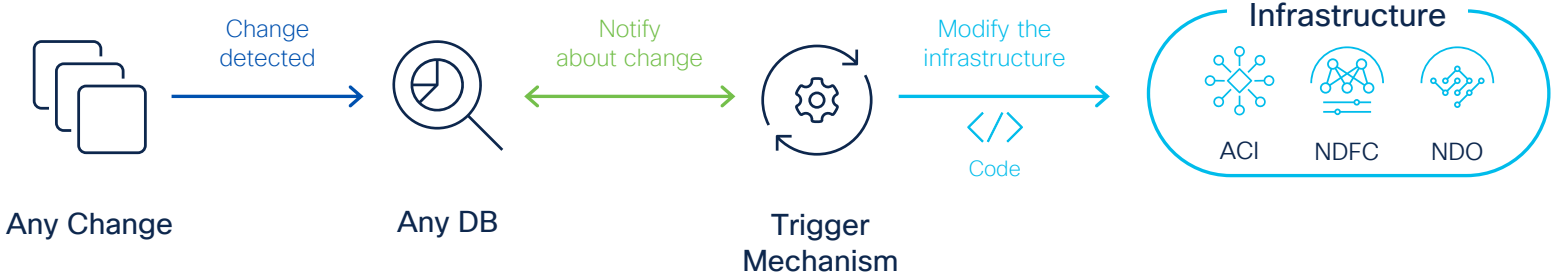
Event-Driven Automation



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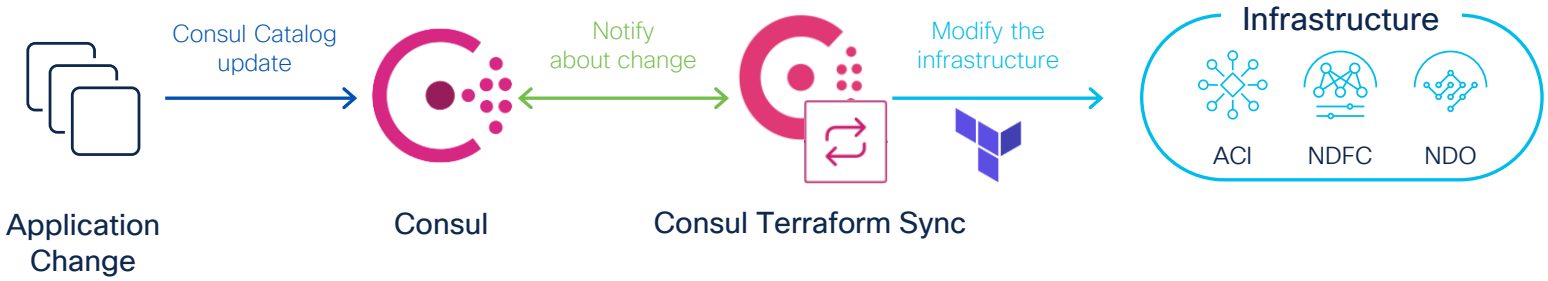
Consul Network Infrastructure Automation



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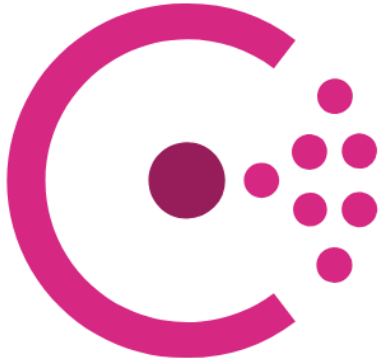
What is HashiCorp Consul?

- 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.



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What is 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

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Cisco DC Networking Terraform Providers

Cisco NXOS	Cisco ACI	Nexus Dashboard Orchestrator	Nexus Dashboard Fabric Controller
CiscoDevNet/nxos	CiscoDevNet/aci	CiscoDevNet/mso	CiscoDevNet/dcnm

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

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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

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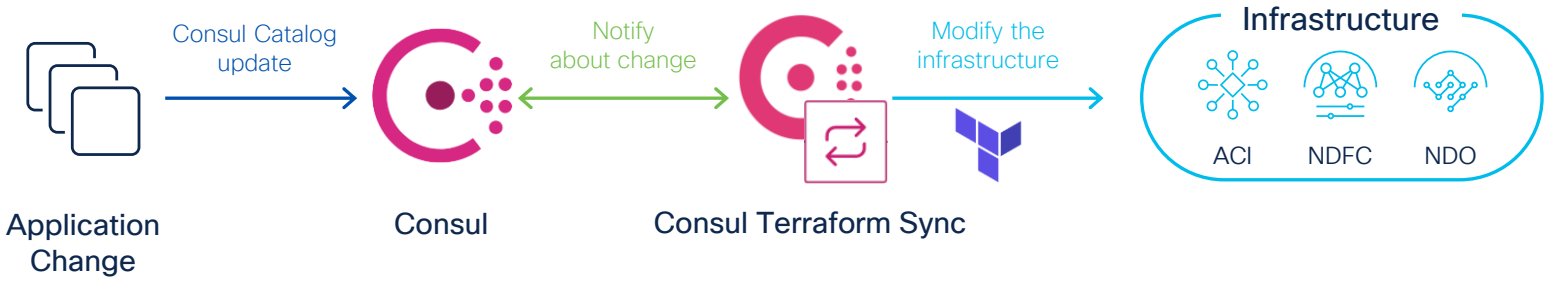
Consul Network Infrastructure Automation



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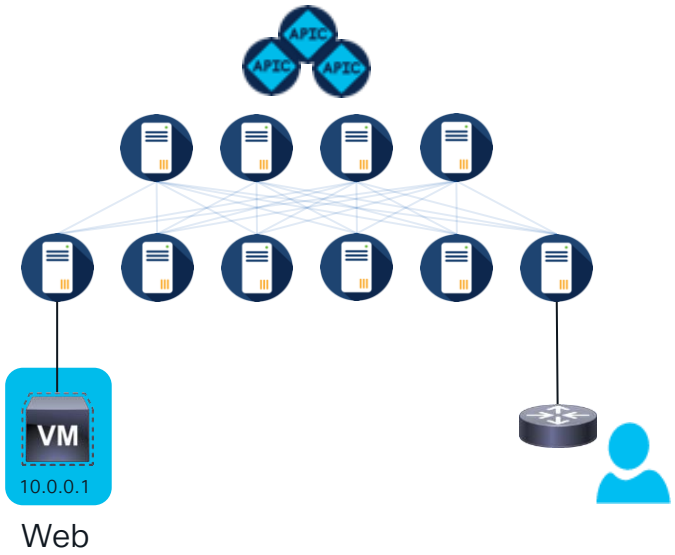
Use Case: Micro segmentation with ESG



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

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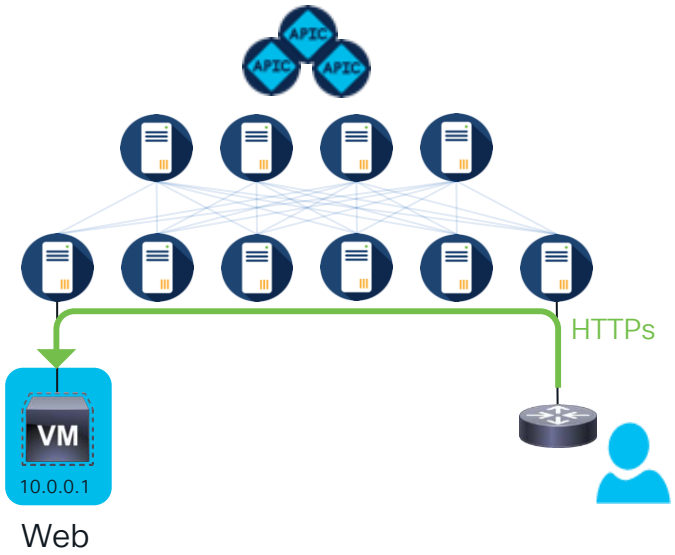
Use Case: Micro segmentation with ESG



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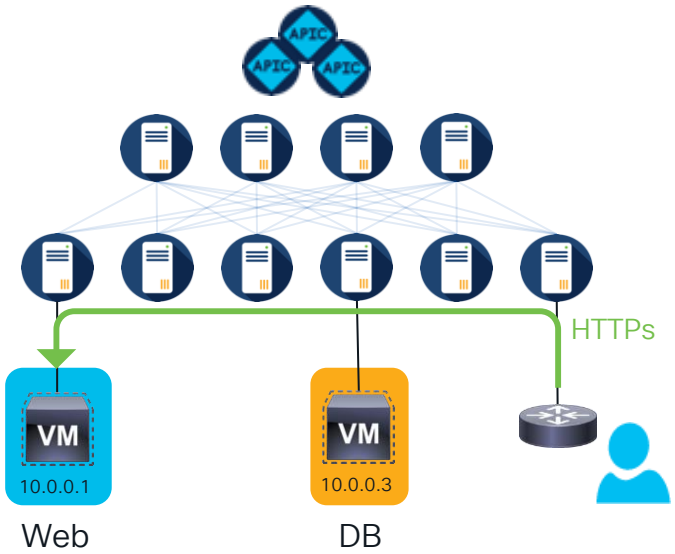

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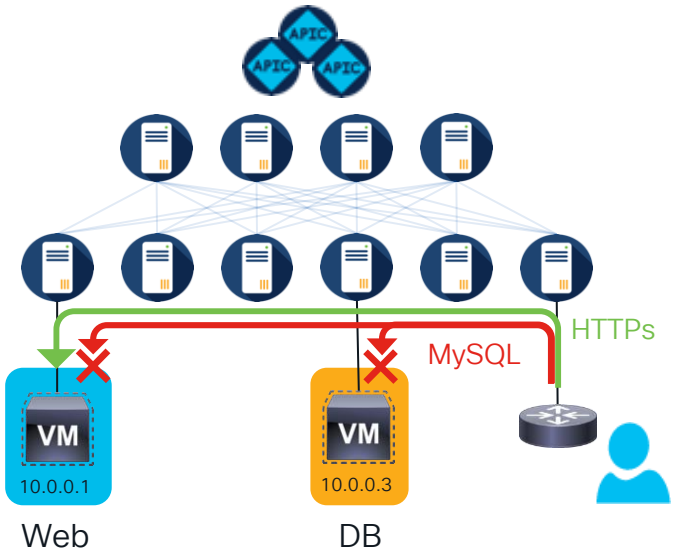

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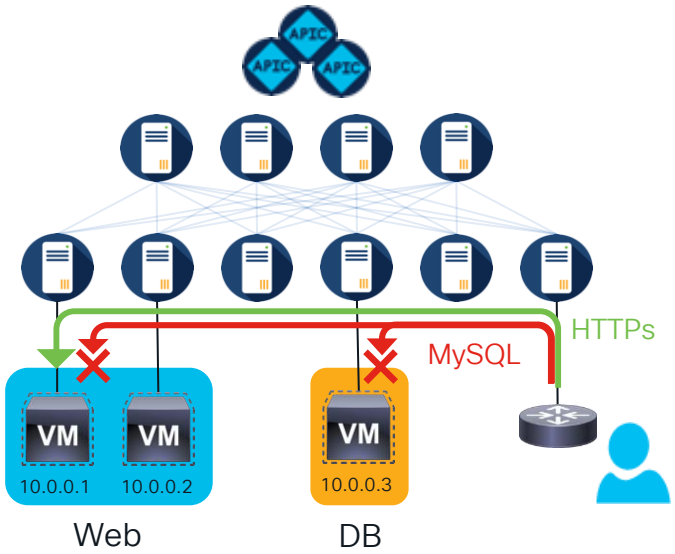

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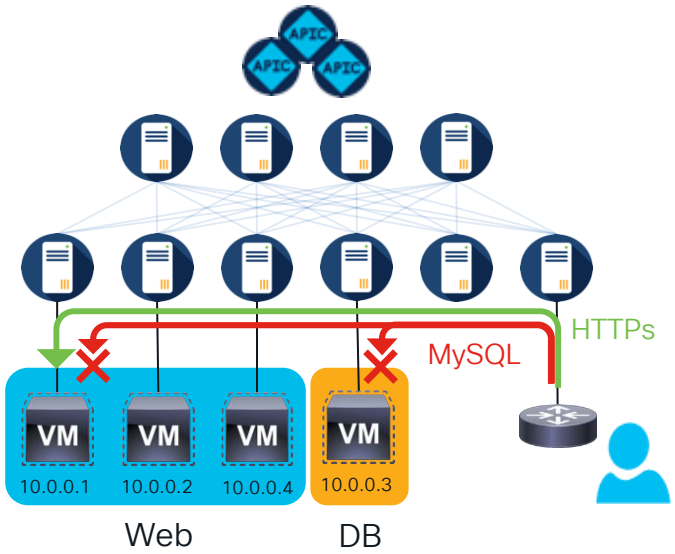

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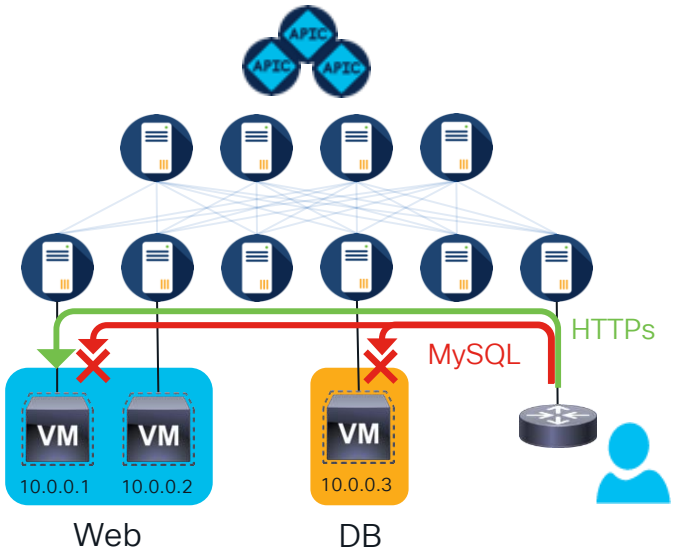

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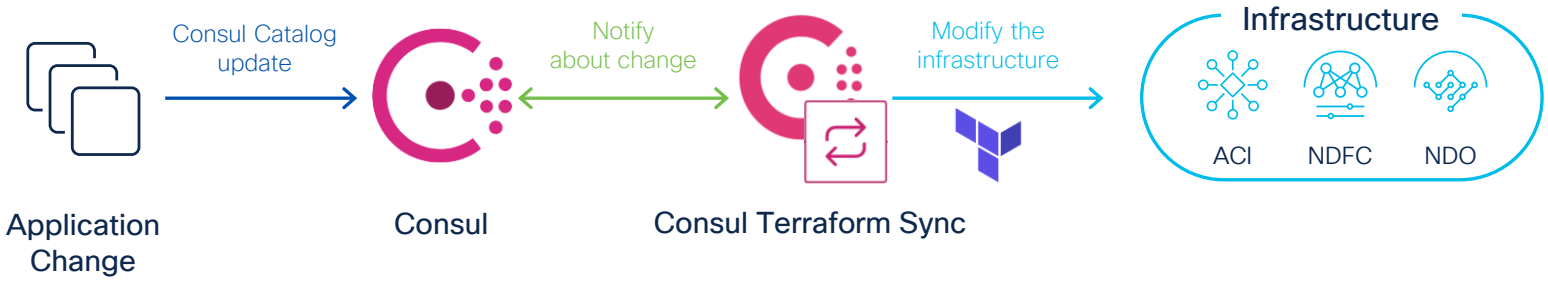
Let’s see it in action!

Consul Network Infrastructure Automation



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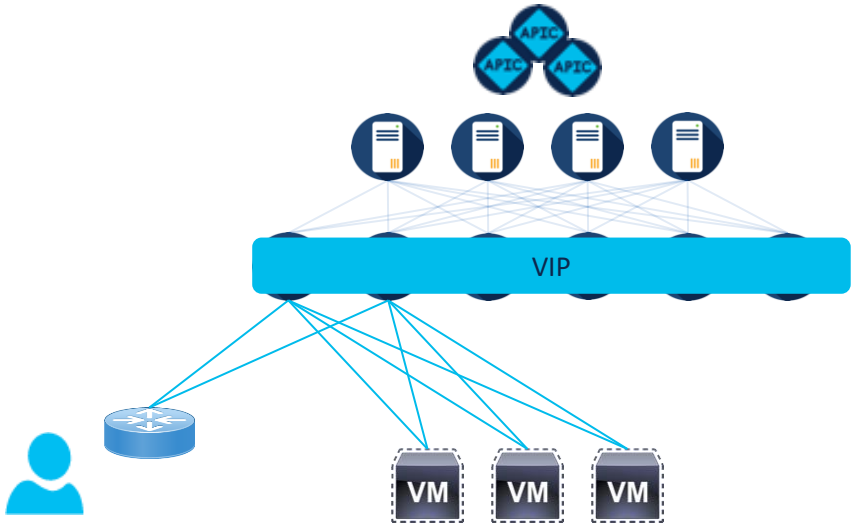
Use Case: Automate and scale stateless SLB



- 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

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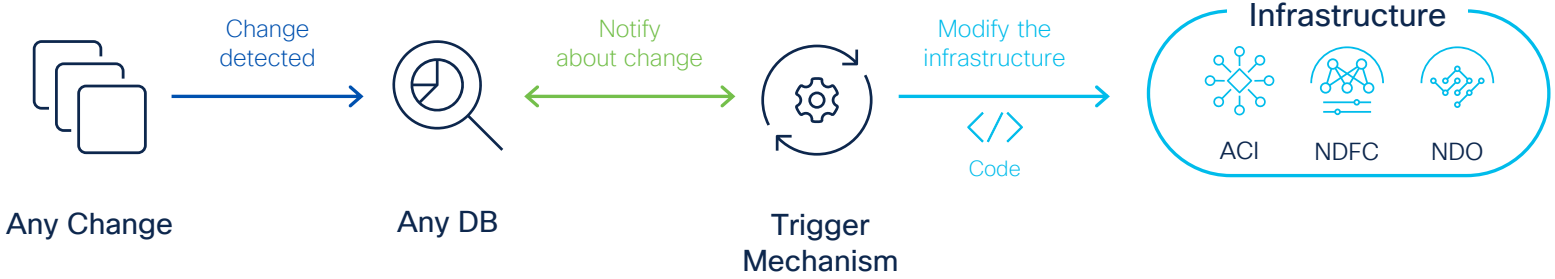
Application Derivative Changes



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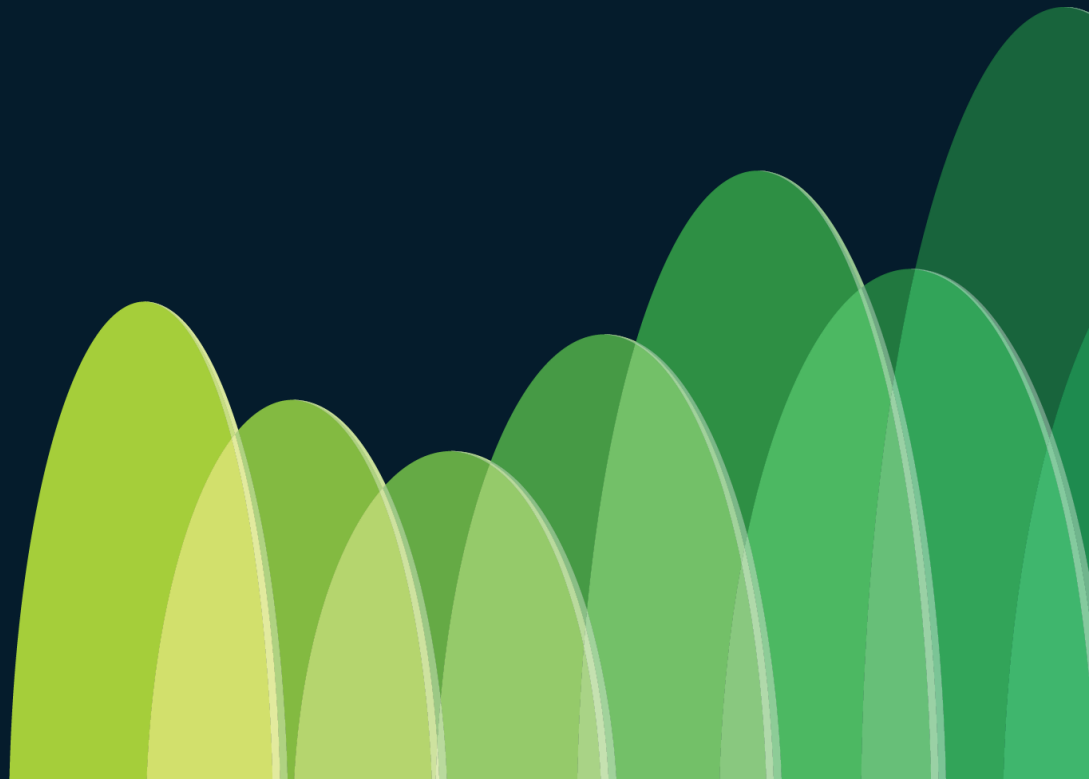
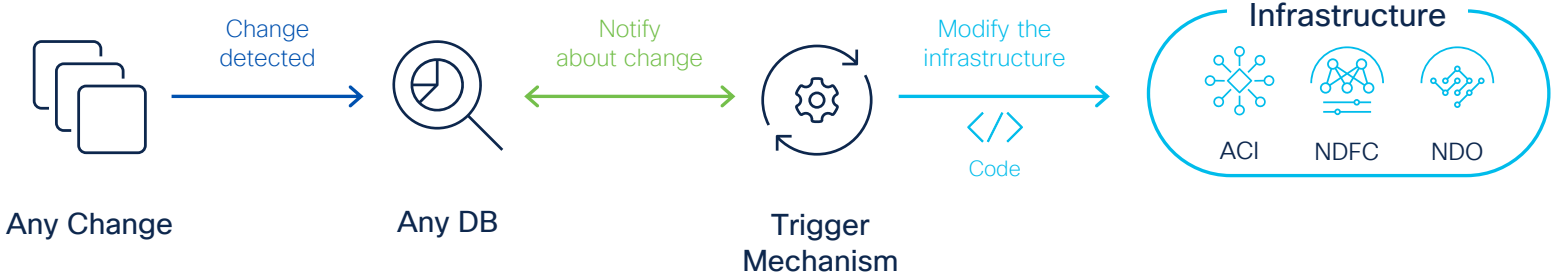
What if we push this further?



Application Derivative Changes



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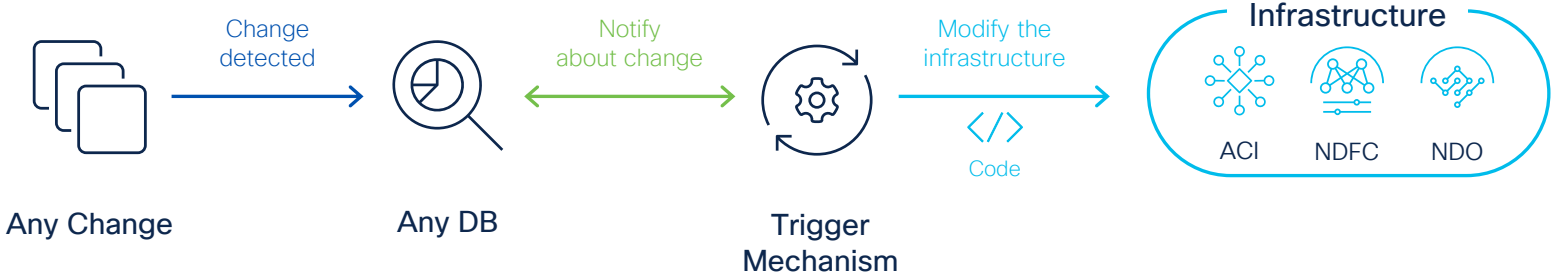
Event-Driven Automation



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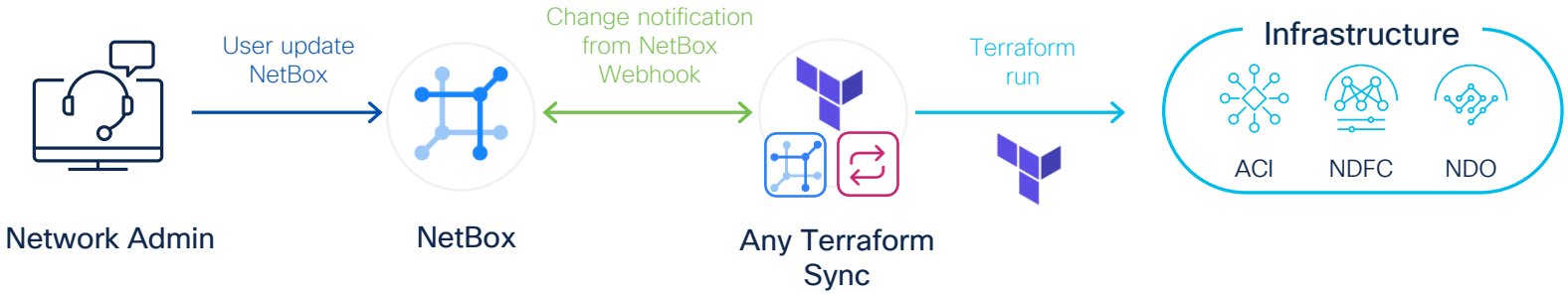
NetBox-Driven Networking



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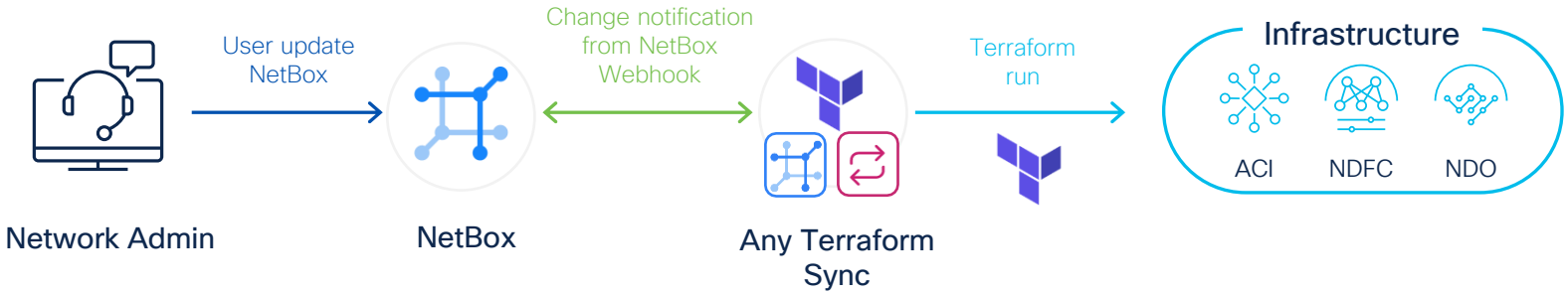
Let's turn theory into reality!

NetBox-Driven Networking



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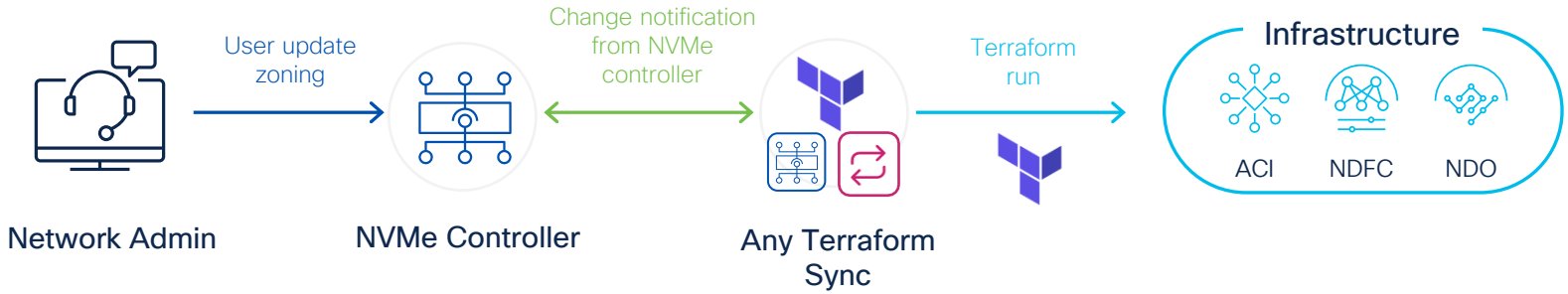
NVMe Controller-Driven Segmentation



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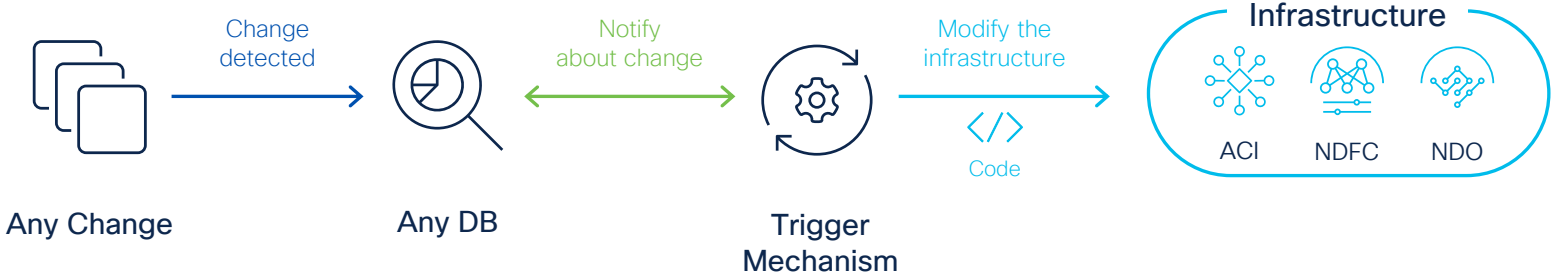
Event-Driven Automation



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Event-Driven Ansible

- Multiple event sources (Kafka, WebHook, URL, ...)
  - Open ecosystem with new sources provided by collections
- 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/

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Using ACI with Event-Driven Ansible

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Using NXOS with Event-Driven Ansible

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Using ND with Event-Driven Ansible

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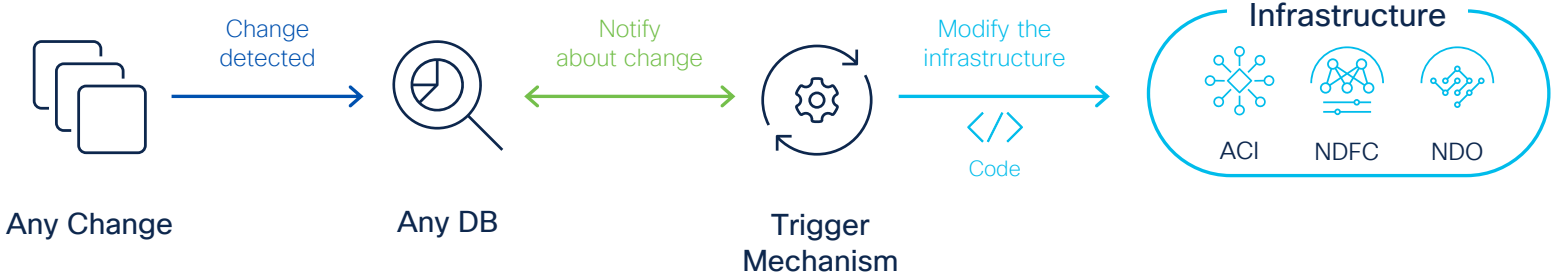
Event-Driven Automation



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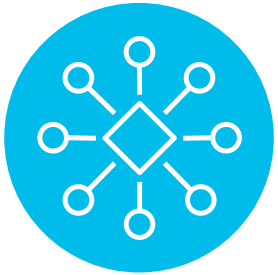
Use DevNet Learning Labs to start your journey!



ACI

- Intro Learning Lab
- Intro Learning Lab
- CTS Learning Lab

NDO

- Intro Learning Lab
- Intro Learning Lab

NDFC

- Intro Learning Lab
- Intro Learning Lab

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Key Takeaways

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

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Wednesday
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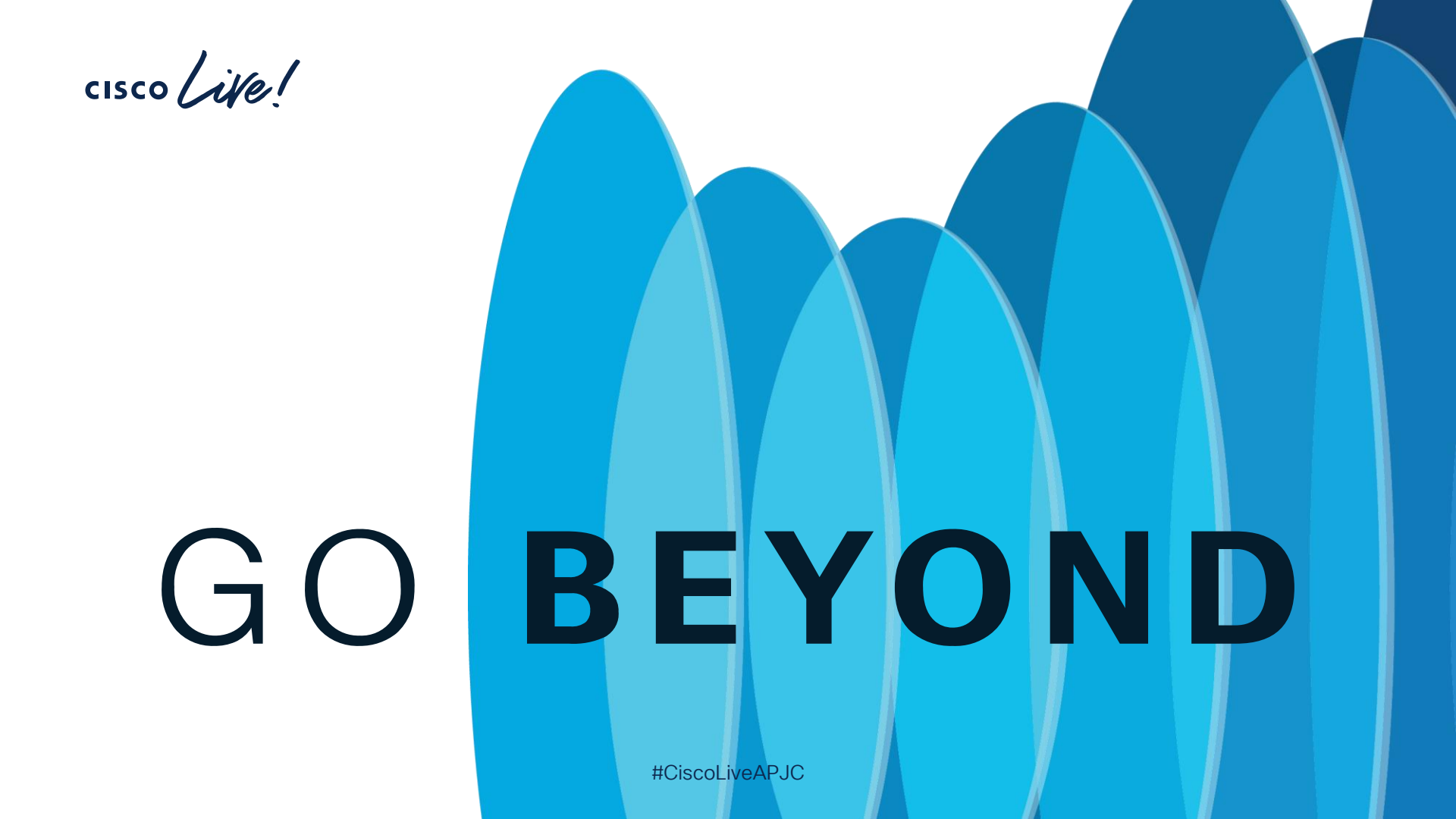
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