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Simplify your Cisco HyperFlex Management

with Cisco Intersight Service for Terraform (IST)

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DEVNET-3022

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Agenda

- Products Overview
  - Cisco Intersight.
  - Cisco HyperFlex.
  - Terraform Cloud for Business.
- Infrastructure as Code – What's it and Why?
- Cisco Intersight Service for Hashicorp Terraform
- Automating our Cisco HyperFlex Management with IST.
- Key take-aways.

Products
Overview

Cisco Intersight

Intersight as a cloud operations platform

A SaaS-delivered, common platform for intelligent visualization, optimization, and orchestration for applications and infrastructures across the hybrid cloud.
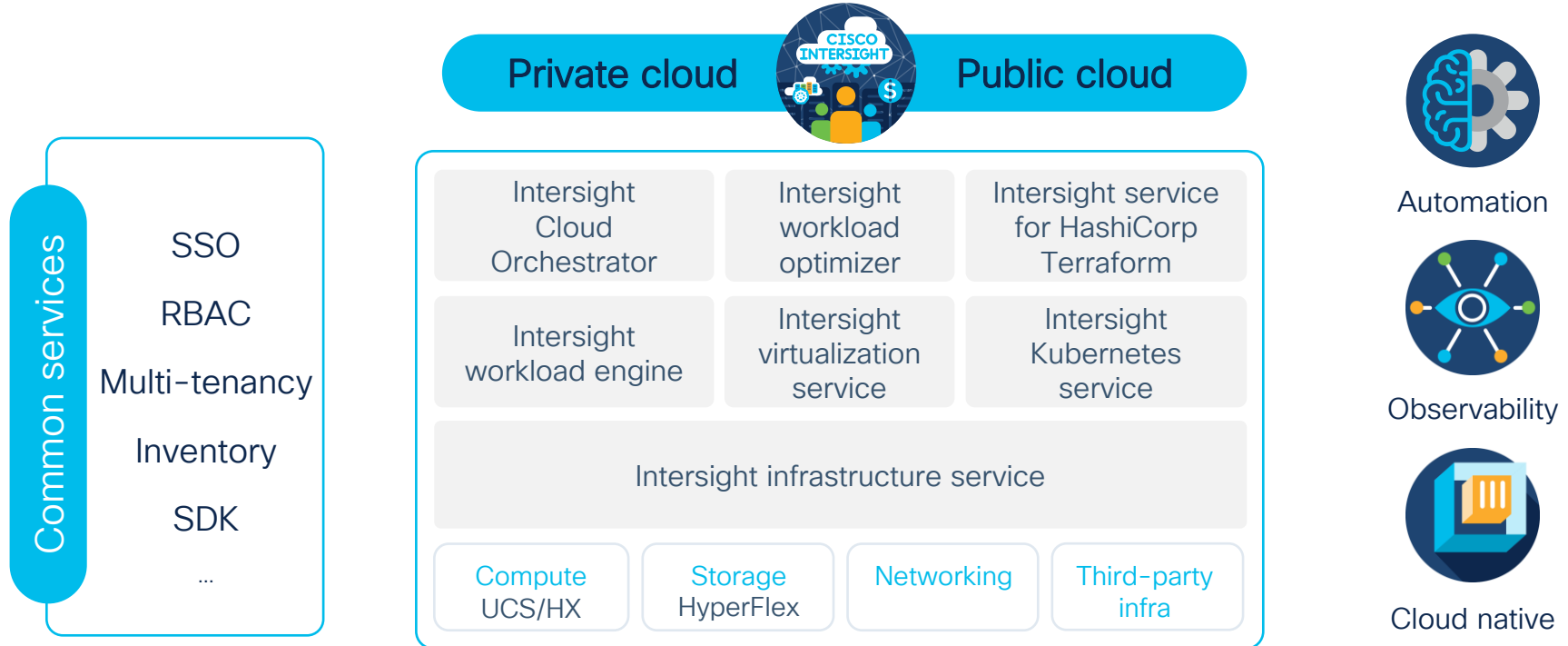
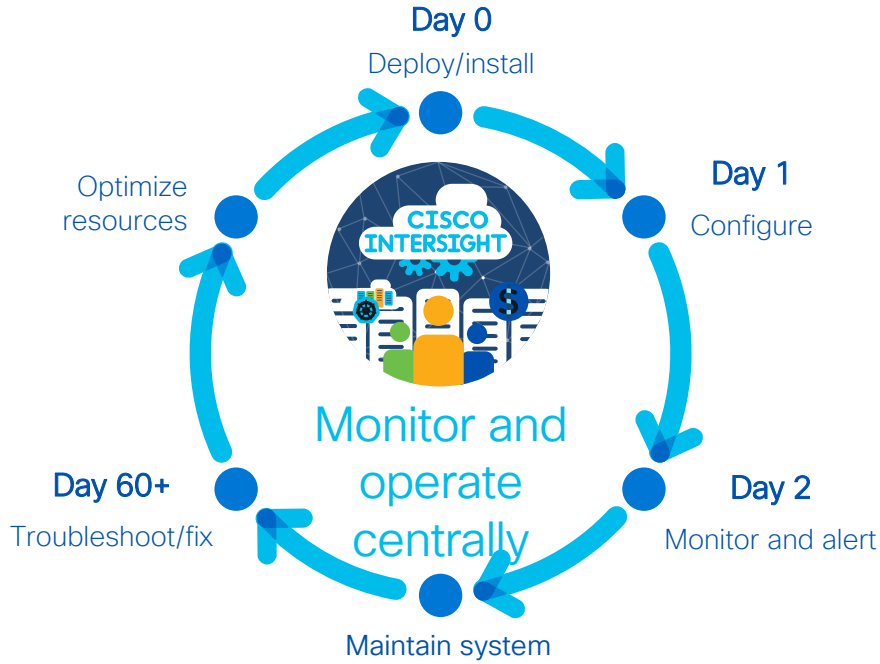| Faster delivery | Simplified operations | Continuous optimization |

Intersight Services

How Intersight solves the operational model challenge

Common services

SSO

RBAC

Multi-tenancy

Inventory

SDK

…

Private cloud | **Public cloud**

| Intersight Cloud Orchestrator | Intersight workload optimizer | Intersight service for HashiCorp Terraform |
| Intersight workload engine | Intersight virtualization service | Intersight Kubernetes service |

Intersight infrastructure service

| Compute UCS/HX | Storage HyperFlex | Networking | Third-party infra |

Automation

Observability

Cloud native

Cisco Intersight

Infrastructure Service benefits

Day 0
Deploy/install

Day 1
Configure

Day 2
Monitor and alert

Maintain system

Day 60+
Troubleshoot/fix

Optimize resources

Monitor and operate centrally

- Faster deployment
- Fewer tools
- Lower administration costs
- Faster problem resolution
- Reduced complexity

Cisco HyperFlex
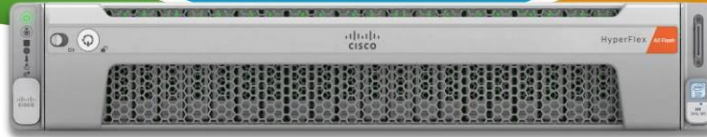## Engineered and Optimized HCI

HX Data Platform

Purpose Built for HCI
Fast and Flexible
Enterprise Grade Storage

Cloud Innovations

Cisco Intersight
Cisco Cloud Center
AppDynamics

UCS Foundation

Software Defined Compute
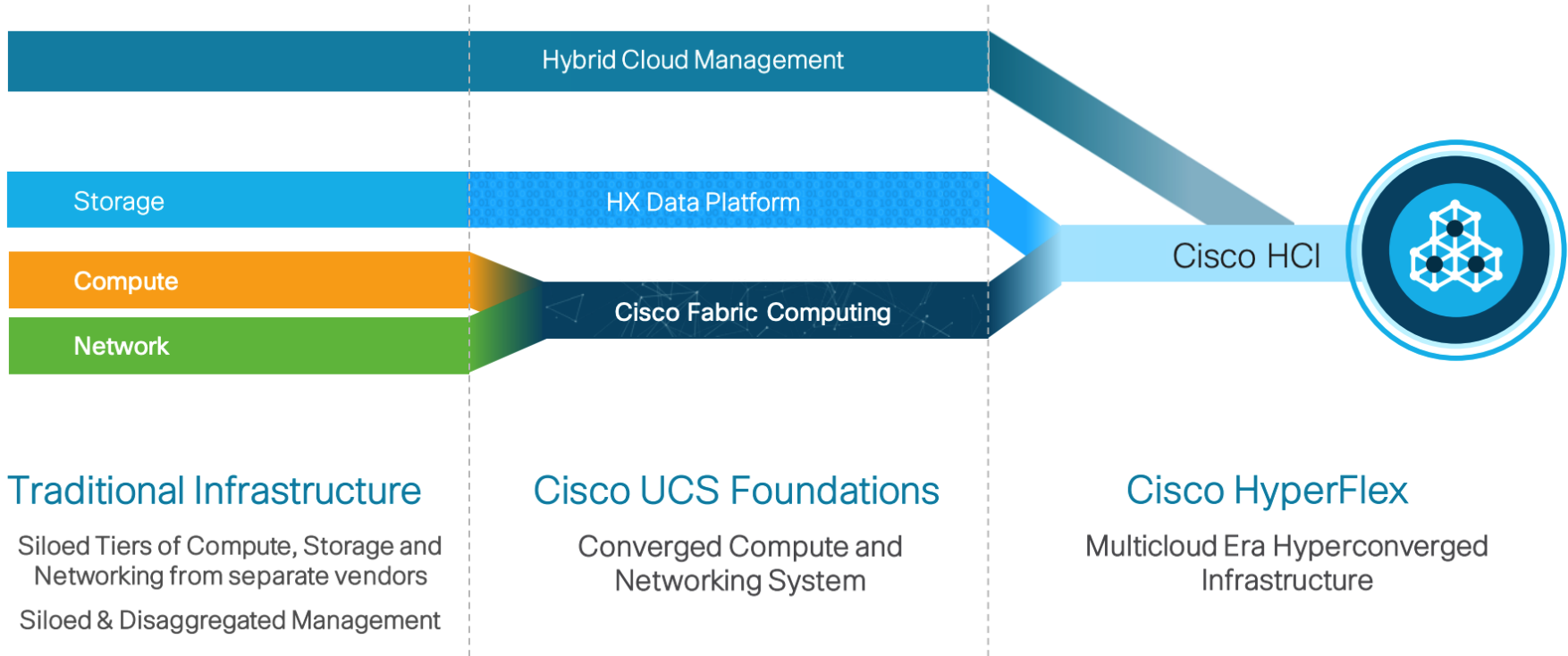Fabric Centric
Intent-Based

Software, Compute, Networking
Fully-engineered Together

Optimized for Performance and
Scaling Density

Complete Hyperconvergence
Compute, Network, HCI Software Engineered Together

Hybrid Cloud Management

Storage

HX Data Platform

Compute

Cisco Fabric Computing

Network

Cisco HCI

Traditional Infrastructure

Siloed Tiers of Compute, Storage and Networking from separate vendors

Siloed & Disaggregated Management

Cisco UCS Foundations

Converged Compute and Networking System

Cisco HyperFlex

Multicloud Era Hyperconverged Infrastructure

Terraform Cloud for Business

HashiCorp
Terraform Cloud

Infrastructure as Code
Create provision infrastructure

Collaborative Infrastructure as Code
Manage and share infrastructure

Team management and governance
Manage and enforce teams and policies (as code)

Advanced security, compliance, and governance
SSO, audit, and private data center networking

Self-service infrastructure
Allow end-users to create, update, and delete infrastructure

Performance and scale
Concurrent runs and functional workspaces

Terraform overview
How it works

- Allows infrastructure to be expressed as code (HCL).

- Terraform CLI reads configuration files and provides an execution plan of changes.

- Review the plan for safety and then apply and provision.

- Providers allow Terraform to manage a broad range of resources

Infrastructure as Code

What's it and Why?

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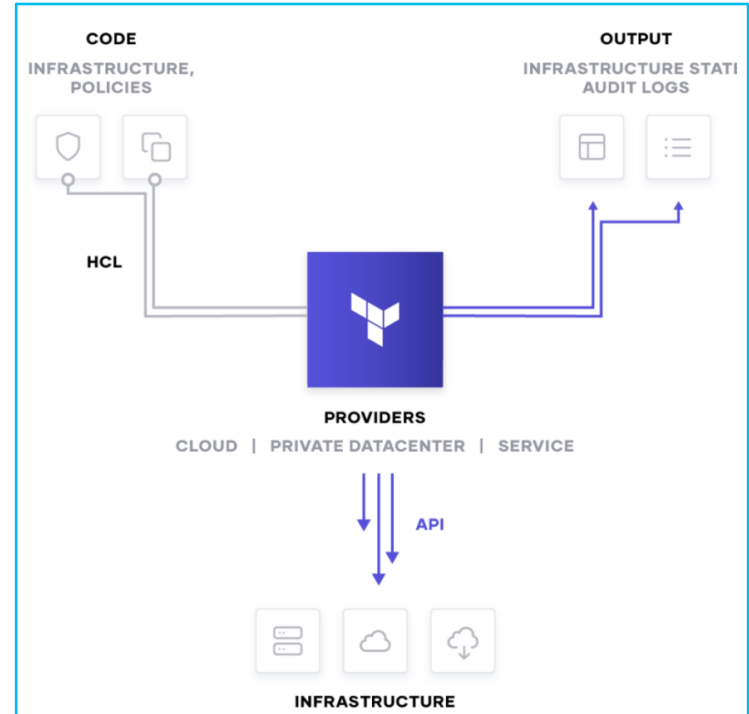
What is Infrastructure as Code (IaC) ?

- Infrastructure as Code (IaC) is the management of infrastructure (networks, virtual machines, and connection topoly) in a descriptive model, using the same versioning as the DevOps team for source code

- Management of infrastructure in a declarative model, using versioning of source code.

- IaC configuration files are read by software that uses the file's instructions to define and configure infrastructure.

- Deployments should always set the target environment to the **same configuration**, regardless of the environment's starting state.

Configure   Test   Deploy
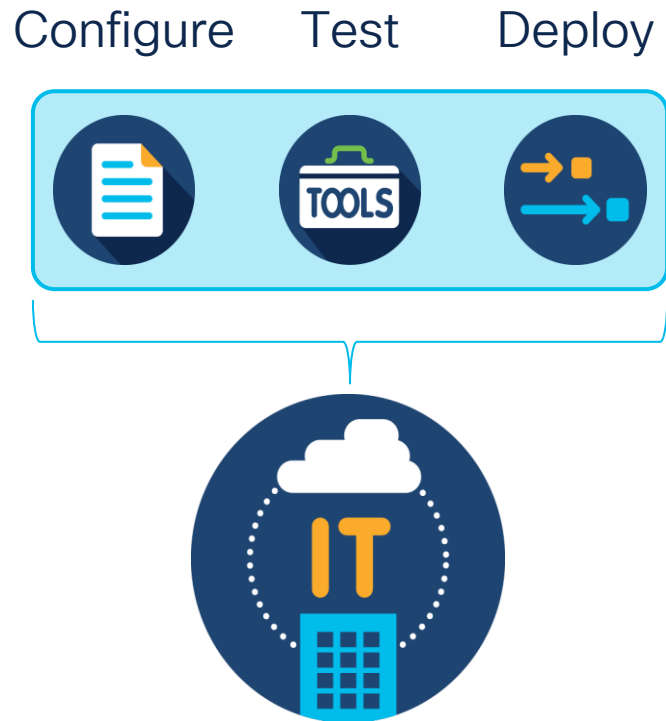
Current IT needs

- IT ops teams are feeling the pressure of an always-on world.

- Many organizations want to release new changes weekly of even more frequency.

- They want to be able to restore services between as soon as possible.

IaC challenges for hybrid cloud

Management

Can I implement IaC on-prem without introducing another tool to maintain and manage?

Security

How can I ensure that my on-prem resources are secure when managed via SaaS?

Orchestration

What about all the other things that are not immutable?

Training

How do I encourage my team to level-up their skills ?

Problems associated with traditional Infrastructure

The solutions and benefits of IaC

- Administration and maintenance.
- Inconsistency among environments.
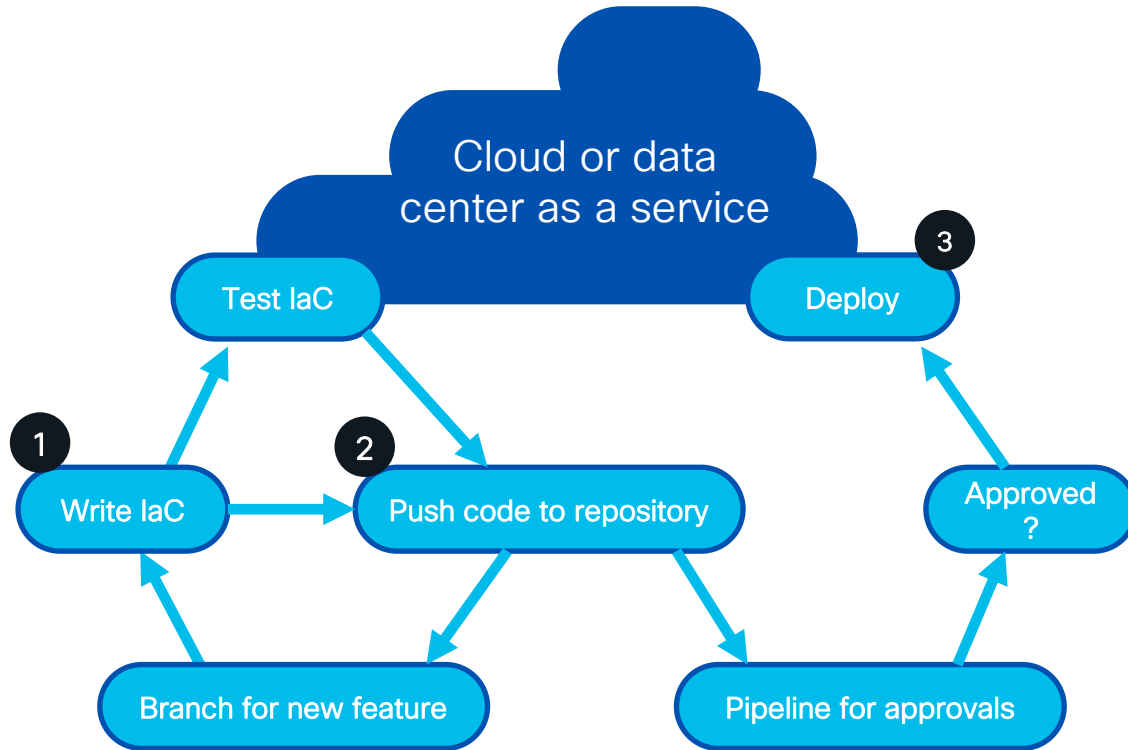- Testing and audit.
- Collaboration.

- Repeatable
- Predictable
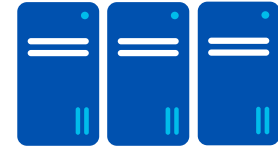- Trackable
- Accessible

- Speed and simplicity
- Minimize risk
- Audit compliance
- Avoid deployment inconsistencies
- Increase developer efficiency
- Lower cost

How does IaC work?

Cloud or data center as a service

Test IaC

Deploy **3**

1 Write IaC → **2** Push code to repository

Approved ?

Branch for new feature

Pipeline for approvals

Components
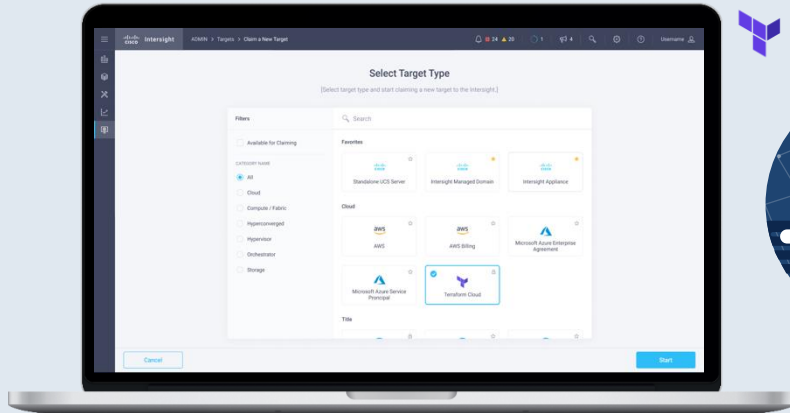
Infrastructure

Code

Tools

Cisco Intersight Service for Hashicorp Terraform (IST)

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Cisco Intersight Service for Hashicorp Terraform
Simplifying your IaC strategy across the hybrid cloud

Secure integration with Terraform Cloud business
Single-sign-on, secure on-prem access

One SaaS-delivered control point for orchestration
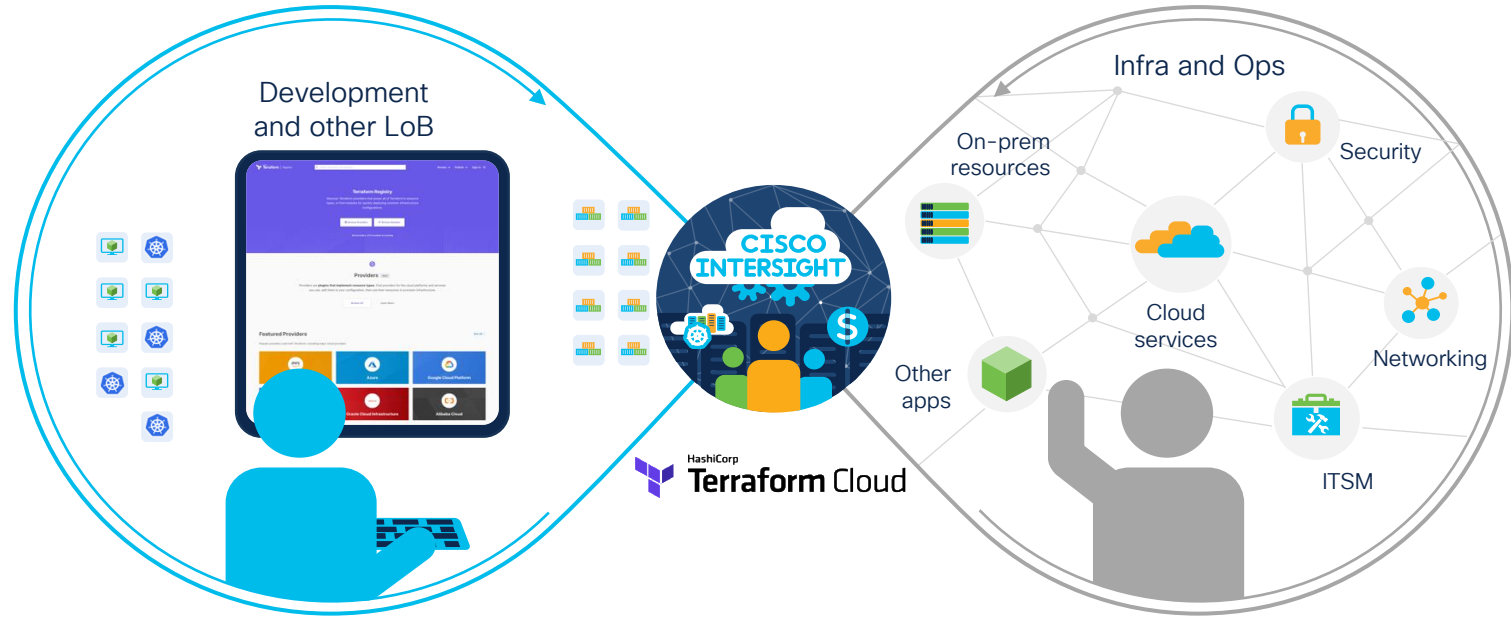Consolidate APIs in a common automation framework

Bridge the gap between DevOps and IT ops
Consistent IaC experience anywhere

Reduce operational complexity

Lower risk and attack surface

Accelerate application innovation consistently

Simplify application and infrastructure deployment and delivery

Development and other LoB

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HashiCorp Terraform Cloud

Infra and Ops

On-prem resources

Security

Cloud services

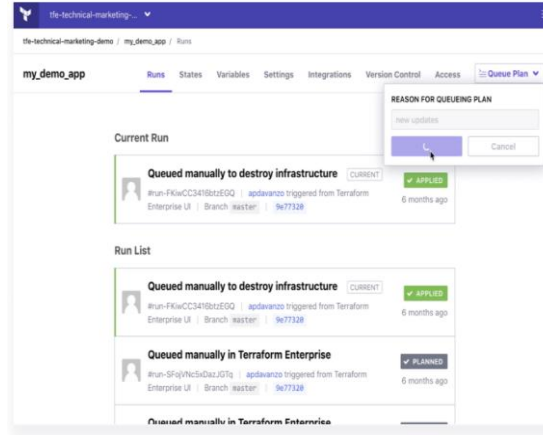Other apps

Networking

ITSM

Intersight and Terraform Cloud provide
end-to-end coverage for the management, orchestration and consumption of your private and hybrid cloud environments

Terraform editions

Open Source
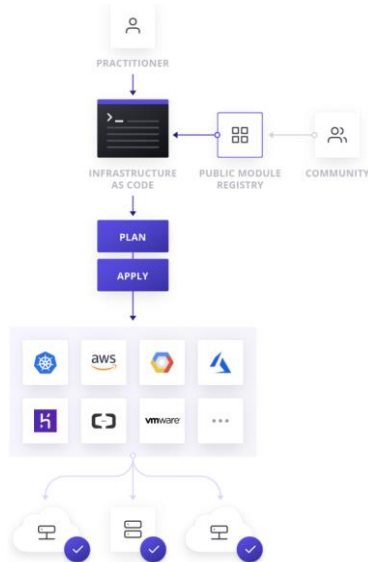
Cloud

Self-Hosted

- Data localization policies
- Strict operational policies
- Requirements for single-tenancy

Terraform overview
Platform agnostic IaC tool

- Terraform is an Infrastructure as Code (IaC) tool that allows you to build, change, and version infrastructure safely and efficiently. This includes low-level components such as compute instances, storage, and networking, as well as high-level components such as DNS entries and SaaS features.

- Terraform is platform agnostic, which means it is not tied to a specific product or vendor, and you can use it across all your infrastructure.

- With Terraform you can automate your infrastructure while maintaining state, and keeping changes auditable

Terraform overview
Key features

- **Infrastructure as Code:** You describe your infrastructure using Terraform's high-level configuration language in human-readable, declarative configuration files. This allows you to create a blueprint you can version, share, and reuse.

- **Execution plans:** Terraform generates an execution plan describing what it will do and asks for your approval before making any infrastructure changes. This allows you to review changes before Terraform creates, updates, or destroys infrastructure.

- **Change automation:** Terraform can apply complex changesets to your infrastructure with minimal human interaction. When you update configuration files, Terraform determines what changed and creates incremental execution plans that respect dependencies.

Terraform Cloud for Business

Organizations and workspaces

- Organizations are a shared space for teams to collaborate on workspaces in the Terraform Cloud.

- On a Terraform account, you can have multiple organizations.

- The Terraform Cloud manages infrastructure collections with workspaces instead of directories.

- These workspaces contains everything Terraform needs to manage a given collection of infrastructure–including variables, secure state management, and integration with version control systems (VCS).

Terraform Cloud

Agent

- Allows communication with isolated, private, or on-premises infrastructure

- The agent architecture is pull-based, so no inbound connectivity is required

- The deployment of the agents happen through Intersight directly into Intersight Assist appliances

Token

- User
  - Same permission level as the user account
  - Can provide access to multiple organizations

- Team
  - Used by services, to perform plans and applies on Workspaces

- Organization
  - Manged teams, team membership and Workspaces

Terraform Agents

- Terraform Cloud agents allow TFCB to communicate with isolated, private, or on-premise infrastructure.

- By deploying lightweight agents within a specific network segment, you can establish a simple connection between your environment and Terraform Cloud–which allows for provisioning operations and management.

- The agent architecture is pull-based, so no inbound connectivity is required. Any agent you provision will poll TFCB for work and carry out the execution of that work locally.

- The deployment of these agents happen through Intersight, directly into the Intersight Assist appliances.
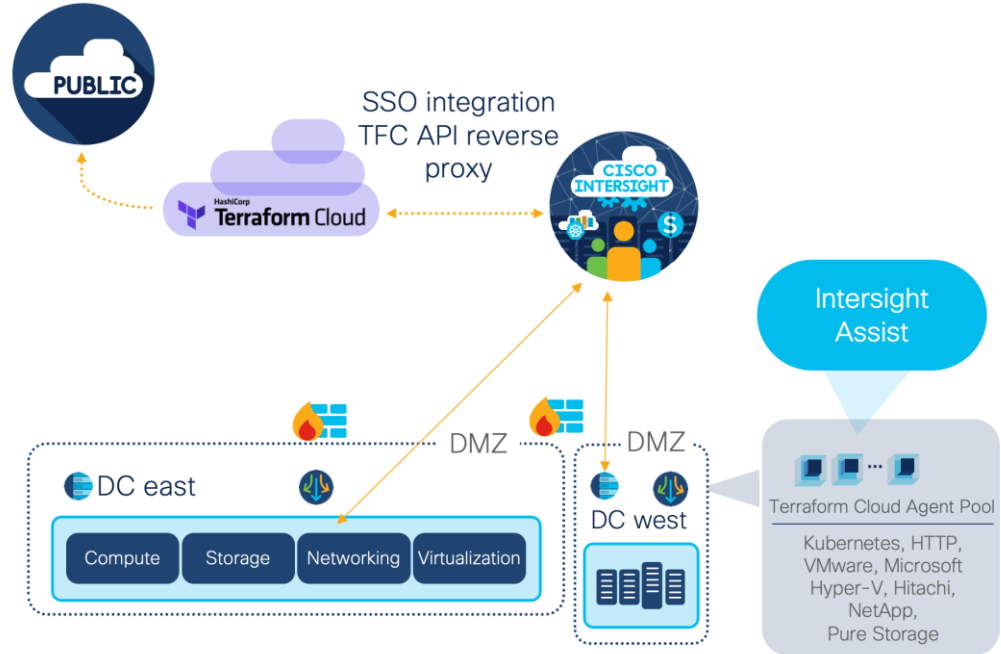
Intersight service for Terraform

Helping solve IaC challenges across the hybrid cloud

- Addresses the challenge of securely connecting and configuring on-premises environments to work with Terraform Cloud business.

- Allows for direct cross launch with SSO.

- Manages the lifecycles of Terraform Cloud agents.

- Acts as an API reverse proxy.

- Reduces the operational overhead of managing IaC.

- Intersight Assist supports a library of integrations with Terraform, pure storage, Hitachi, NetApp, and VMware to help IT operations.

Intersight Service for Hashicorp Terraform
Components

- HW and SW
  - UCS, HX, vCenter, supported devices
- Tools
  - Terraform Cloud for Business (multicloud)
  - Terraform Cloud Agent (for installing in Cisco Intersight Assist)
  - Version Control System (github, gitlab, bitbucket and Azure devOps)
- Intersight

Integration prerequisites

- ✓ Terraform Cloud Business account.

- ✓ An organization on Terraform Cloud.

- ✓ User-based API token.

- ✓ Intersight account.

- ✓ Intersight Assist Appliance claimed.

- ✓ TFC Business License (multiple tiers) – users/concurrent runs, applies.

- ✓ Intersight Advantage or Premier License – 1 per agent, 1 for TFC target.

- ✓ A VCS (version control software) to host and manage your code.
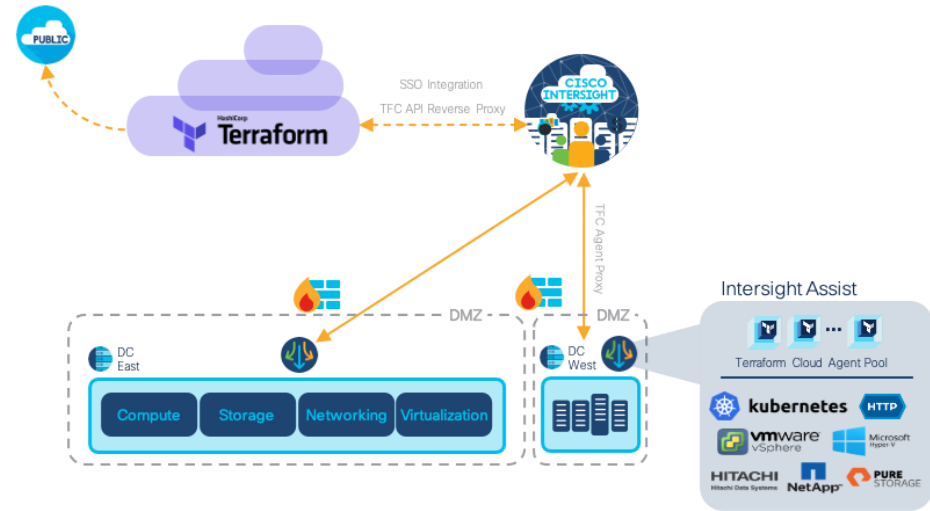
Integrating IaC with On-Prem resources in 3 easy steps
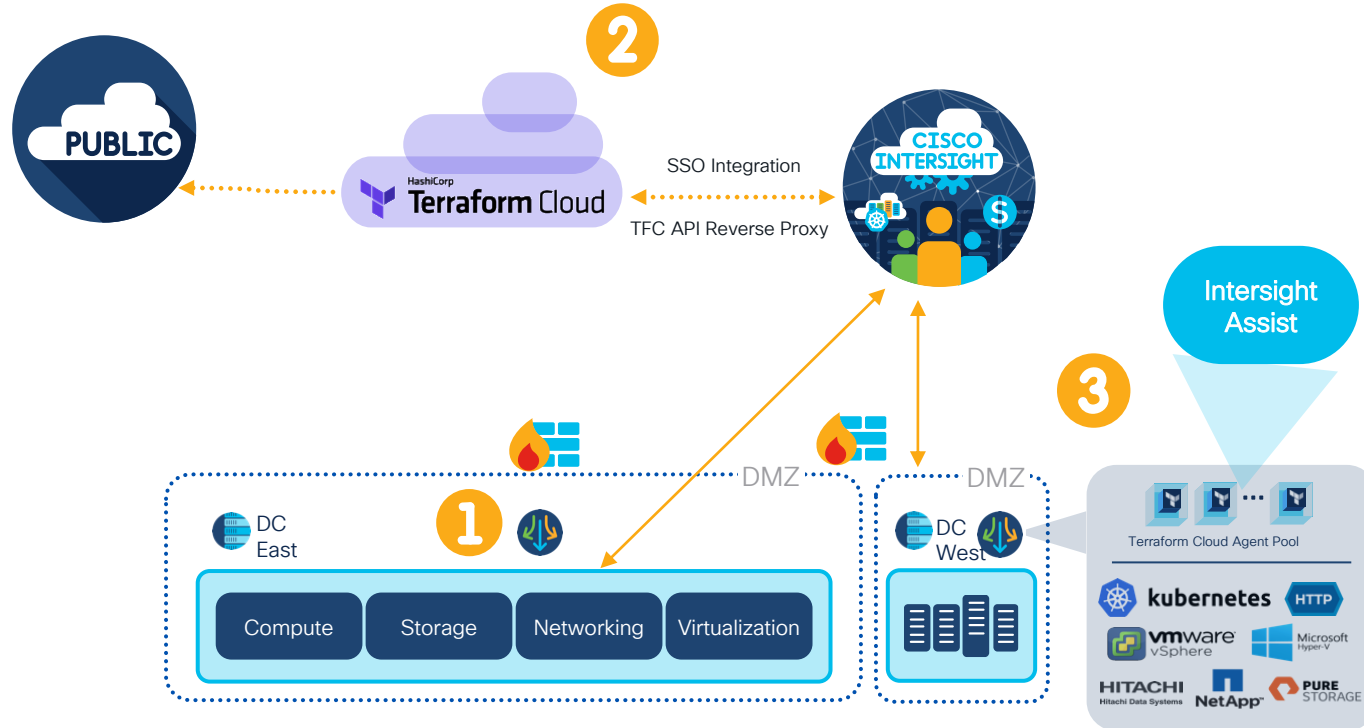
Let's have a look at the integration

How can we use IST to automate HyperFlex administration tasks?

Let's see it live!

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Key take-aways

➢ Infrastructure as Code (IaC) enables IT and development teams to automate and scale the provisioning and management of IT resources aligned with application source-code releases in a descriptive manner.

➢ Intersight Service for HashiCorp Terraform (IST) enables customers to securely integrate their on-premises environment with their IaC plans in Terraform Cloud Business

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Develop your skills for the future
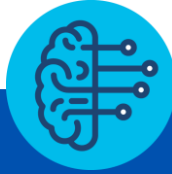
Build confidence	Innovate	Achieve outcomes

Learning Labs   Sandbox   Sample Code   Providers

Cisco
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HashiCorp Terraform Cloud

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Additional Resources

- https://intersight.com/ [Cisco Intersight Account]
- https://intersight.com/help/resources [Cisco Intersight Resources]
- https://intersight.com/help/saas/resources/Cisco_Intersight_Service_for_HashiCorp_Terraform_User_Guide#overview [Cisco Intersight Service for HashiCorp Terraform (IST) User Guide.
- https://developer.cisco.com/ [Cisco DevNet portal]
- https://developer.cisco.com/automation-terraform/, https://developer.cisco.com/iac/ [Cisco DevNet (IaC)]
- https://github.com/sandkum5/terraform-intersight-hx-edge-deploy [HX Edge Cluster deployment with Terraform]
- https://github.com/CiscoDevNet/ist-vm-provisioning [IST Provisioning Playbooks]

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

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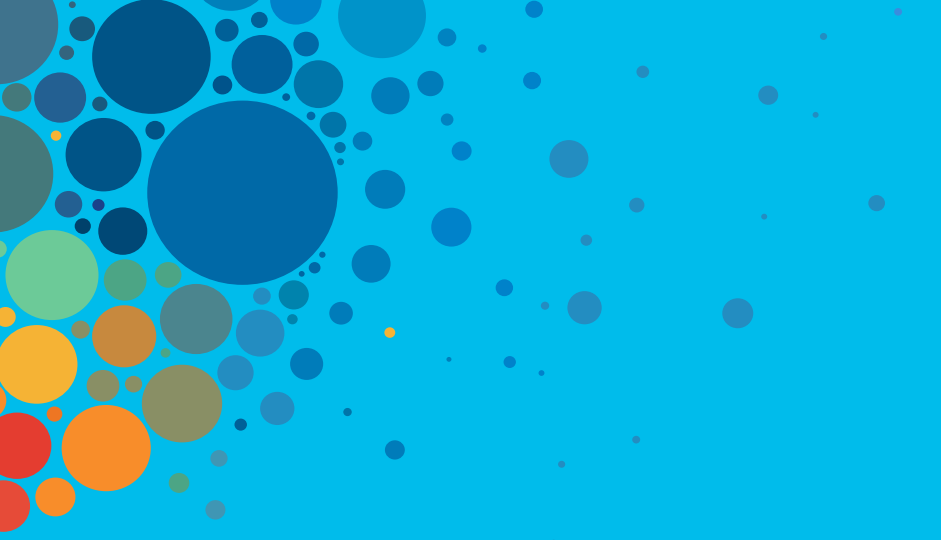
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