HashiCorp Terraform

Terraform Enterprise Onboarding Program

Agenda

Code of Conduct

HashiCorp is dedicated to providing a harassment-free Terraform Cloud OnBoarding experience for everyone, regardless of gender, gender identity, sexual orientation, disability, physical appearance, body size, race, national origin, or religion. We value your attendance and do not wish anyone to feel uncomfortable or threatened at any time.

The bottom line is that we do not tolerate harassment of conference participants in any form. Harassment includes but is not limited to offensive verbal comments related to gender, gender identity, sexual orientation, disability, physical appearance, body size, race, national origin, religion; sexual or inappropriate images in public spaces; deliberate intimidation; stalking; trolling; sustained disruption of talks or other events; and unwelcome sexual attention. Participants asked to stop any harassing behavior are expected to comply immediately. If you are being harassed, notice that someone else is being harassed, or have any other concerns, please let the HashiCorp event representative know immediately or email customer.success@hashicorp.com.

01

TFE Onboarding Program

Pre-Onboarding Webinar

Customer Success Overview and Support Model

Please watch the pre-recorded video included in your registration email that provides an overview of:

1. COBRA Onboarding Program
2. Support Model

Terraform Enterprise Onboarding Journey

A 7-week guided community program following a prescriptive path to successfully onboarding and adopting Terraform Enterprise

- Week 1 - Kickoff - Product & Architecture Overview
- Week 2 - Webinar - Architecture Deep Dive
- Week 3 - Webinar - Importing Resources & Migrating State
- Week 4 - Webinar - Terraform Workflows
- Week 5 - Office Hours
- Week 6 - Webinar - Terraform Governance & Integrations
- Week 7 - Webinar - Operating your Terraform Instance
- Exit Ramp and Operational Readiness Check

Onboarding Goal

Our objective is to enable your team to successfully deploy the platform and see value within 90 days

Terraform Enterprise Installed

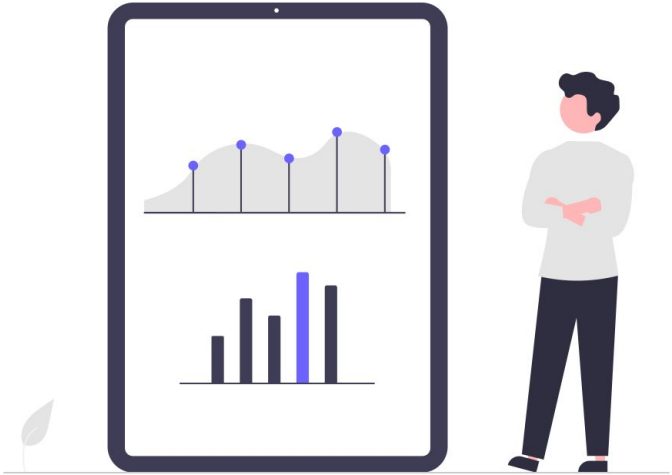
- Terraform Enterprise installed in your environment(s)
- Basic configuration completed
- Telemetry and monitoring in place
- Deployment and operational patterns established

Terraform Enterprise Operational

- Organizations, Teams, and Users created & SAML integration in place (if being used)
- First team onboarded and consuming Terraform Enterprise
- A roadmap created for onboarding additional teams to the platform

Completed within 90 days

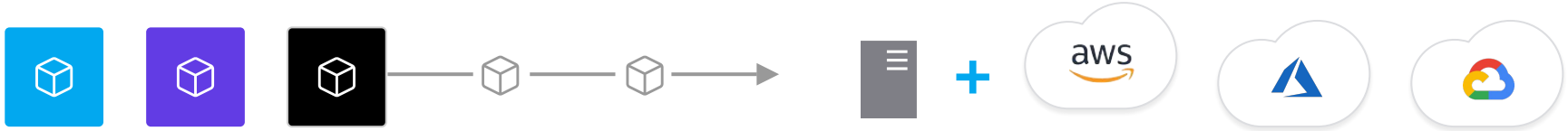
Poll Time



Please let us know where you are at with your Terraform Enterprise (TFE) journey and your implementation goals.

Enabling a Common Operating Model

Standardised interfaces to cloud services, simplify and accelerate cloud adoption



APPLICATIONS
Private datacenter

PRIVATE CLOUD
Systems of record

HETEROGENEOUS APPLICATIONS
Workloads

	DATACENTER	CLOUD
Run Development	**Dedicated** infrastructure	**Orchestration**
Connect Networking	**Host**-based Static	**Service**
Secure Security	High trust **IP**-based	**Identity**
Provision Operations	**Dedicated** servers	**Infrastructure as Code**

02

TFE Technical Overview

Terraform Enterprise

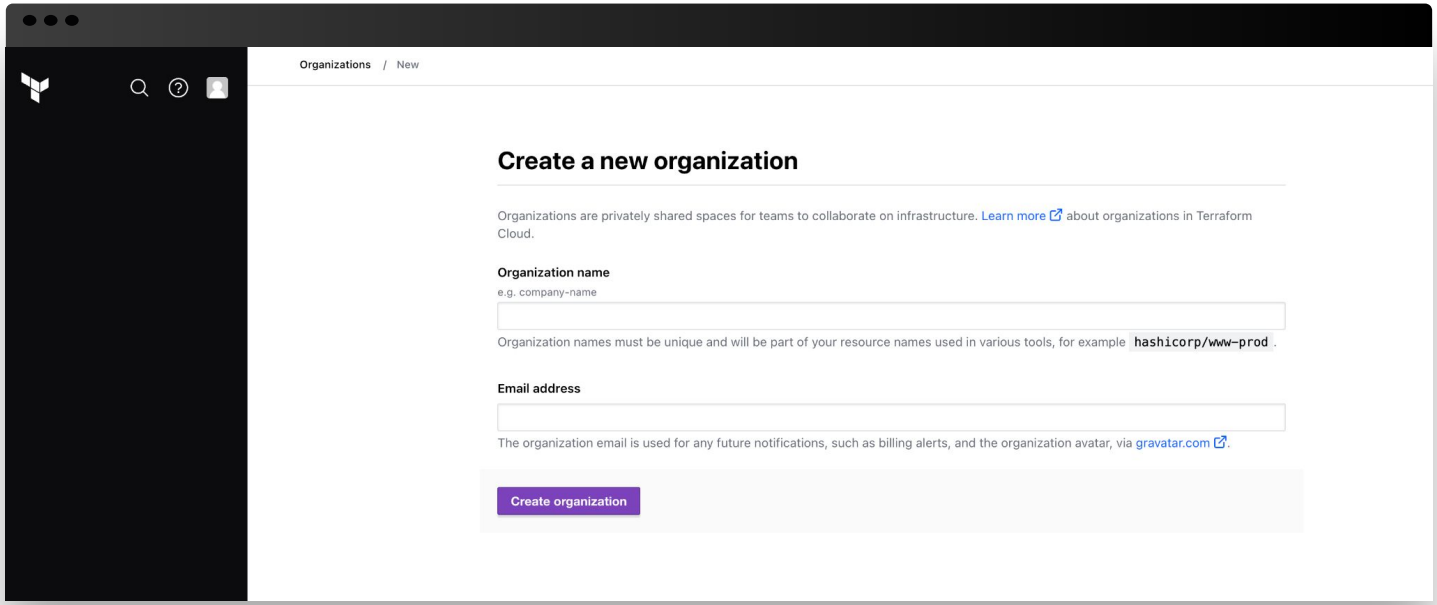
- Terraform Enterprise (TFE) is an Infrastructure as Code **(IaC)** system that enables users to create and manage resources on cloud platforms & other services via their APIs
- TFE uses the Hashicorp Configuration Language (HCL) & familiar languages via CDK for Terraform
- HCL should be stored in a Git repo, to be automated, versioned, and audited
- Providers enable Terraform to work with virtually any platform or service with an accessible API
- The Terraform Registry contains thousands of providers for use with Terraform

Features

- Organizations
- SSO, Teams, Users
- API Tokens
- VCS Provider / Git Connections
- Private Module Registry
- SSH Keys
- Sentinel Policy Sets
- Workspaces
  - Tags
  - Terraform Code, Statefiles
  - Run History
  - Variables, Sensitive, ENV, Sets
  - Run Notifications, Tasks, Triggers
  - RBAC for selective Team Access
- Cloud Agents

Organizations

- Security boundary and shared space for teams to collaborate on workspaces
- Users can belong to multiple organizations, the UI allows users to self-select and operate in the organization they choose



Organizations Components

- SSO Settings
- Teams
- Users
- API Tokens (Org, Teams, Users)
- VCS Provider / Git Connections
- Private Module Registry
- Workspaces (TF Code + Statefile)
- Variables, ENV Variables, CLI Flags
- SSH Keys
- Sentinel Policy Sets
- Cloud Agents

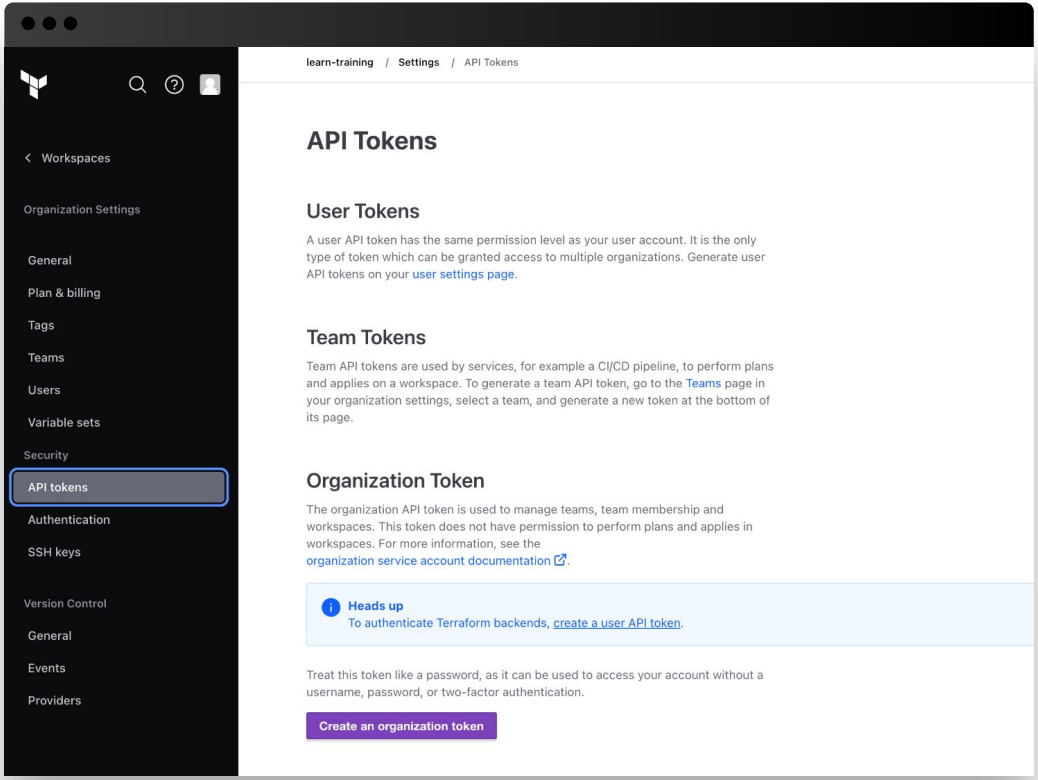
Single Sign On

- Terraform Enterprise supports the SAML 2.0 standard
- Tested and supported IdPs include:
  - ADFS
  - Azure AD
  - Okta
  - OneLogin
- Prior to activating SAML always create a non-SSO admin account for recovery purposes
- SAML SSO Configuration Settings

Teams & Users

- Teams are groups of users within an organization that can be assigned to workspaces within the organization
- Teams can be assigned to multiple workspaces and have different permissions in each workspace
- Teams can also be assigned organization-level permissions
- Users in Terraform Enterprise are members of Teams within Organizations
- Users do not belong to any organization or workspaces until an owner of them has added them to a team

API Tokens



API Tokens Allow:

- Auth with TFE API
- Auth with TF remote backend for CLI runs
- Using private modules in command-line runs on local machine

Terraform Enterprise supports 3 types of API tokens:

- **User**: inherit permissions from the user
- **Team**: allow access to team's workspaces
- **Organization**: create & configure workspaces & teams before delegation

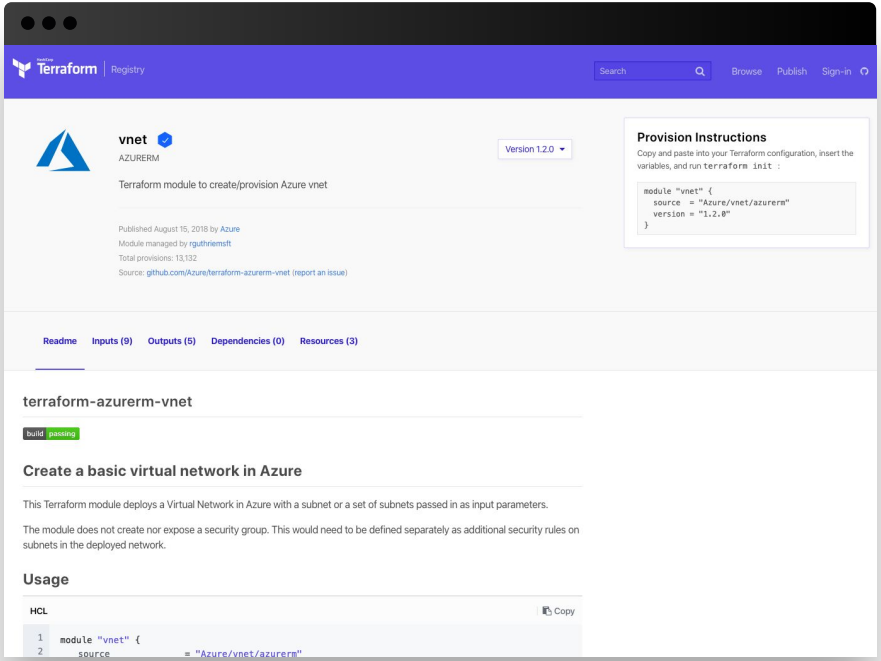
VCS Integration

- TFE is most powerful when integrated with a VCS Provider
- TFE registers Git webhooks with Git repos to monitor for commits and pull requests
- TFE interacts with most Git providers using the API and OAuth token
- BitBucket Server & Azure DevOps server require an SSH key
- TFE supports integrating with multiple VCS providers within an Organization
- During workspace creation a configured Git provider is selected

Supported VCS Providers
GitHub
GitHub Enterprise
GitLab.com
GitLab EE and CE
BitBucket Cloud
BitBucket Server
Azure DevOps

Private Module Registry

- Terraform modules are a container for multiple cloud resources that are used together
- Modules can be used to create lightweight abstractions, to describe infrastructure in terms of its architecture, rather than directly in terms of specific cloud resources
- The Private Module Registry (PMR) works similarly to the public registry and includes support for versioning and a searchable list



Sentinel Policy Sets

Sentinel is a framework for Policies as Code (PaC) similar to how Terraform implements Infrastructure as Code (Iac)

- Sandboxing
- Codification
- Version Control
- Automation
- Testing

```
import "tfconfig"
import "strings"

# Require all modules directly under root module
# to come from Terraform
validate_modules_from_pmr  = func() {
 validated = true
 for tfconfig.modules as _, m {
   if not strings.has_prefix(m.source, "app.terraform.io/jrx") {
     print("Module with source", m.source, "is not in the PMR" )
     validated = false
   }
 }
 return validated
}
```

Workspaces

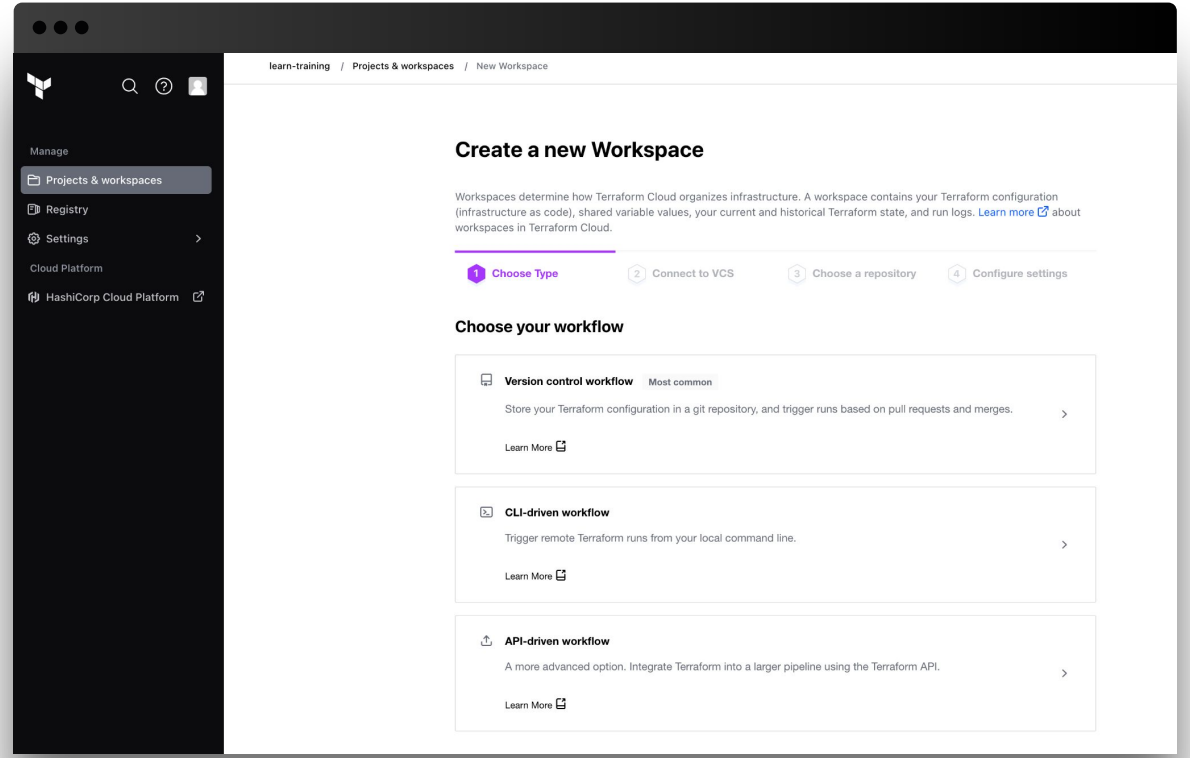
Workspaces consist of...

- Terraform Code, from a VCS Git Repo or uploaded as a .zip file to the API
- Variables (can be marked as Sensitive)
- Environment Variables
- Persistently stored TF Statefiles for cloud resources that are managed
- Historical TF Statefiles and Run logs

Workspaces

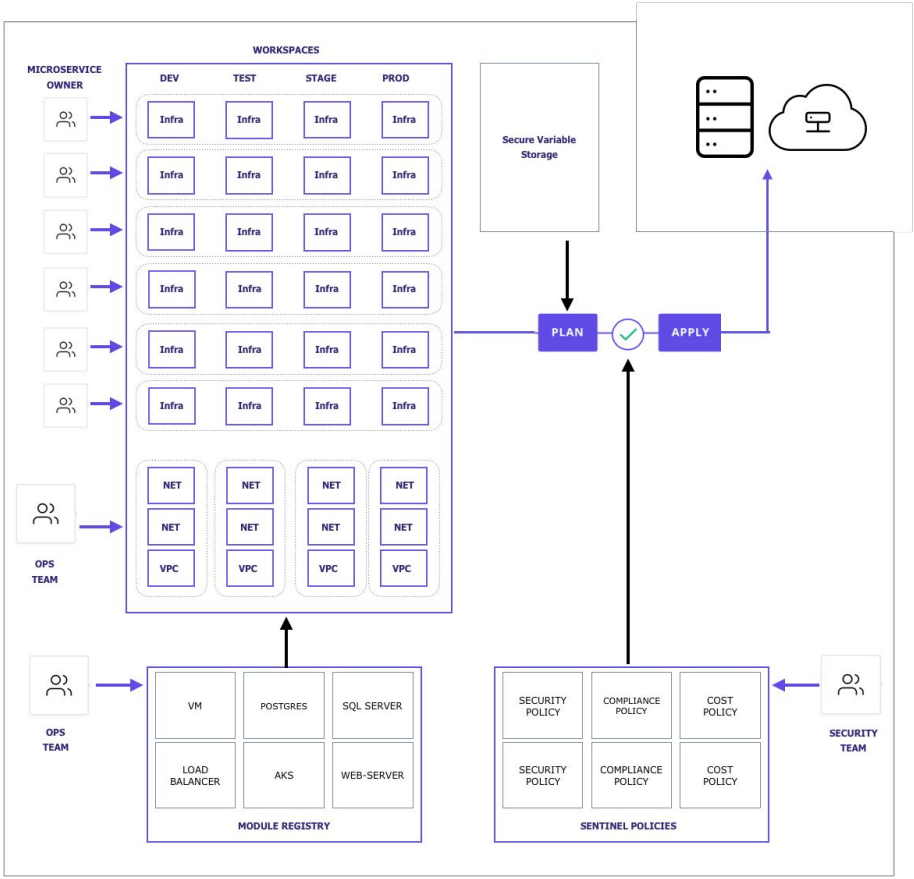
Workspaces can be run in the following ways:

1. Uploading a .zip file of TF code via the API
2. Connected to a Git Repository from your VCS provider and will monitor for changes using Git Webhooks



Workspaces

- Organize and decompose monolithic infrastructure into micro-infrastructures
- Match the organization of your application or teams with your infrastructure
- “Micro-infrastructures” are linked to create the complete infrastructure for the application

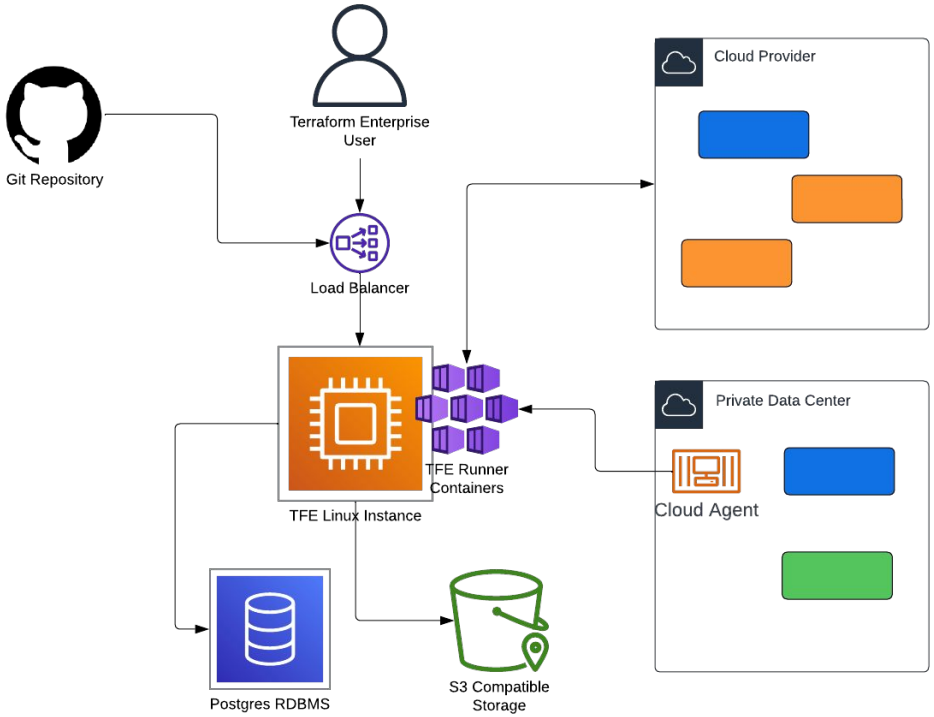


Terraform Cloud Agents

- Terraform Cloud Agents allow TFE to communicate with isolated, private, or on-premises infrastructure
- Deployed as lightweight Docker container or a binary on x86_64 Linux within a specific network segment
- Useful for on-premises infrastructure types such as vSphere, Nutanix, OpenStack, enterprise networking providers, and **anything in a protected enclave**
- **The agent architecture is pull-based, so no inbound public internet connectivity is required**
- Agents poll Terraform Enterprise for work and carry out execution of that work locally

Terraform Enterprise Architecture

- TFE is a self-managed service composed of microservices running within [Docker]
- TFE uses S3-compatible storage, Postgres RDBMS, Redis, and Replicated (license management)
- Remote runners called Cloud Agents are available for deployment where desired



TFE Installation

What do we need to decide?

1

Network Access

Network connectivity type?

- **Online**
- **Air-Gapped**

2

Installation Location

Where will TFE be installed?

- **On-Premise Data Center**
- **Cloud Provider**

3

Operational Mode

Which supported operational mode?

- **External Services**
- **Mounted Disk**

1 Network Access

How will installation be performed?

Online

- Requires public internet access for the TFE server
- Admin executes the installer directly in a terminal session
- Installer manages all required software and outputs the dashboard URL

Air-Gapped

- Does not utilize or require public internet access for the TFE server
- Admin installs a supported version of Docker
- Admin downloads, transports, and executes the air-gap file & installer bootstrapper

2 Installation Location

Where will Terraform Enterprise be installed?

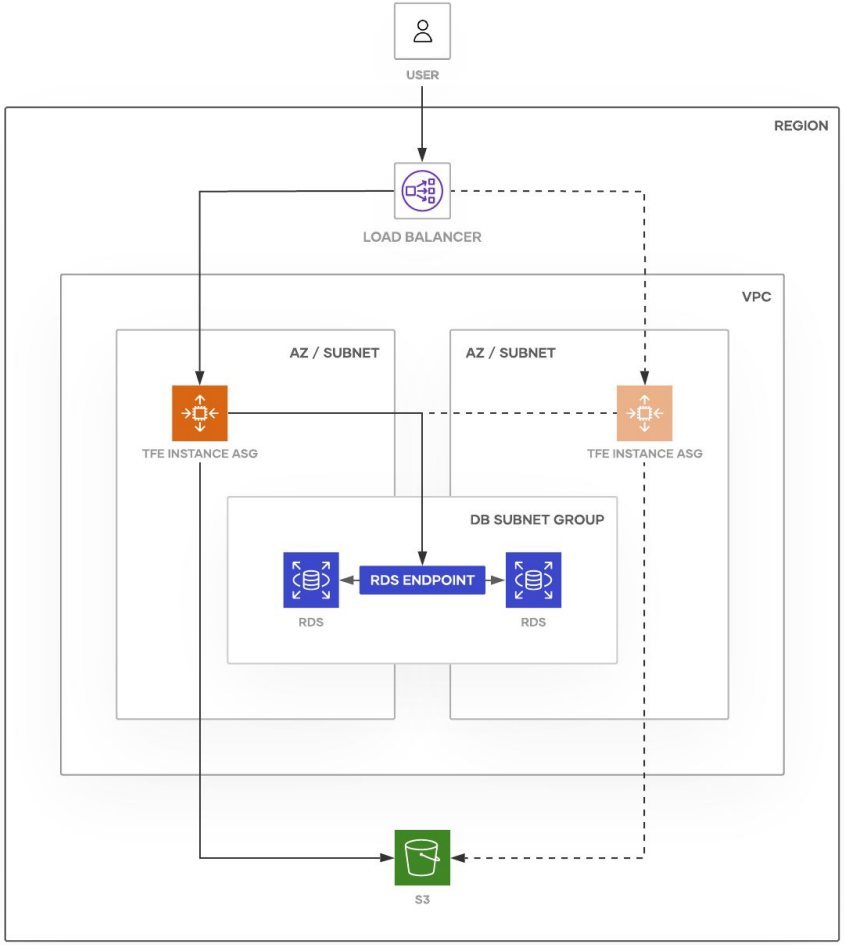
Cloud Provider

- HashiCorp provides reference architectures for deploying onto a cloud platform
- AWS Reference Architecture
- Azure Reference Architecture
- GCP Reference Architecture

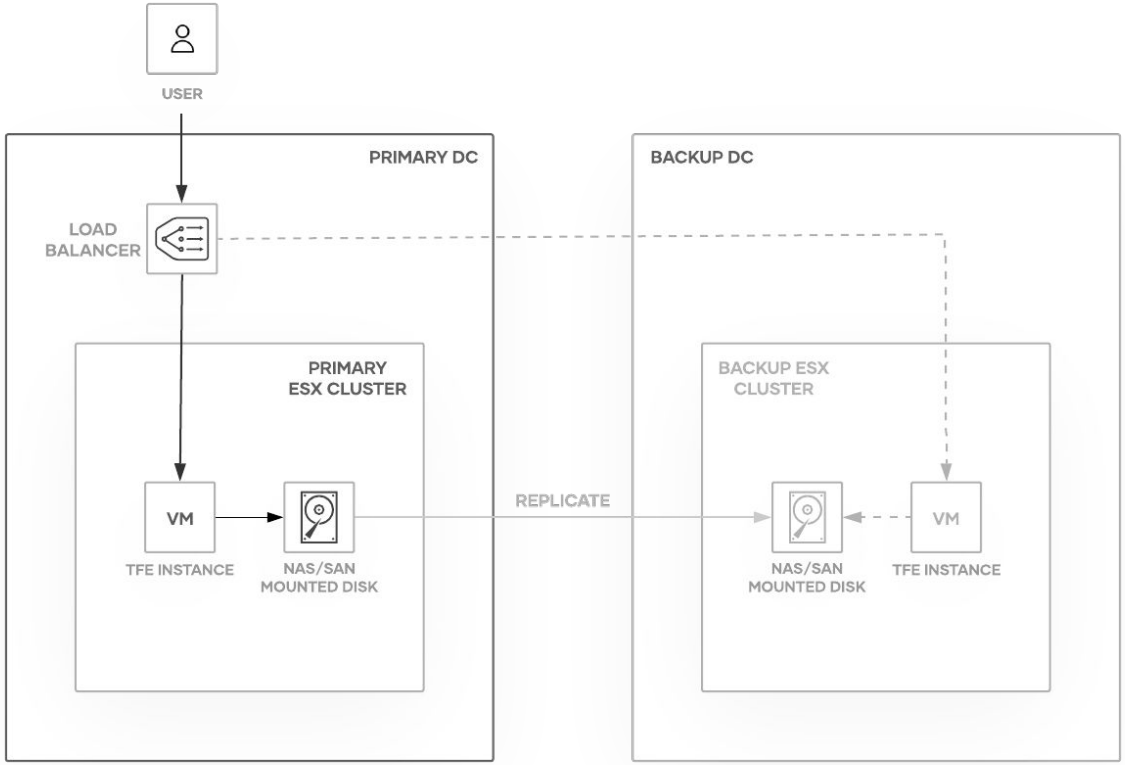
Data-Center Deployment

- HashiCorp provides a reference architecture for deploying to VMWare
- VMware Reference Architecture

Recommended Cloud Provider Architecture



Recommended VMware Architecture



3 Operational Mode

External Services

- High Capacity
- Needs automation to set up quickly
- Good for Production Workloads
- Uses externally running Postgres, S3 Storage, and Redis (in Active/Active)
- Required to move to Active/Active
- **Preferred** mode for Cloud installation

Mounted Disk

- Low Capacity
- Self-contained
- Easy to set up manually
- Good for Non-Production Workloads and Testing
- Single Docker instance for Postgres, S3 Storage, Redis

Next Steps

Tutorials

https://developer.hashicorp.com/terraform/tutorials

Step-by-step guides to accelerate deployment of Terraform Cloud

Terraform

Home | Documentation | Tutorials | Install | Registry | Try Cloud

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Get Started - Terraform Cloud

Collaborate on version-controlled configuration using Terraform Cloud. Follow this track to build, change, and destroy infrastructure using remote runs and state.

Create an account to track your progress.

Start | 10 tutorials

5min

What is Terraform Cloud - Intro and Sign Up

Sign up for Terraform Cloud, which provides free remote state storage, a stable run environment, version control system (VCS) driven plans and applies, a collaborative web GUI, and more. Create your first organization.

3min

Log in to Terraform Cloud from the CLI

Log into Terraform Cloud or Enterprise with the Terraform CLI to migrate state, trigger remote runs, and interact with Terraform Cloud.

3min

Create a Credentials Variable Set

Create a variable set for your AWS IAM credentials that you can reuse across workspaces. Apply the variable set to a workspace.

Need Additional Help?

Customer Success

Contact our Customer Success Management team with any questions. We will help coordinate the right resources for you to get your questions answered.

customer.success@hashicorp.com

Technical Support

Something not working quite right? Engage with HashiCorp Technical Support by opening a ticket for your issue at:

support.hashicorp.com.

Discuss

Engage with the HashiCorp Cloud community including HashiCorp Architects and Engineers

discuss.hashicorp.com

Upcoming Webinars

Architecture Deep Dive

This webinar covers best practices for architecting and installing Terraform Enterprise

Importing Resources & Migrating State

Topics include Terraform Basics, Importing existing infrastructure into a TFE instance, and migrating from TF OSS to TFE

Terraform Workflow Management

Deep dive into best practices around run workflows, workspaces, variables, modules, and Git repo structure

Action Items

- Identify your use case(s) and define your goals and project milestones with Terraform Enterprise
- Share to customer.success@hashicorp.com
  - Authorized technical contacts for support
  - Stakeholders contact information (name and email addresses)
- Gather requirements and complete 3 critical decisions:
  - Network connectivity type
  - Installation location
  - Installation mode

Q&A

Thank you

customer.success@hashicorp.com

www.hashicorp.com/customer-success