



VyOS
Networks



HashiCorp
Terraform



/ SOLUTION BRIEF

VYOS AUTOMATION WITH TERRAFORM

Overview

Modern IT and network infrastructures are increasingly dynamic, distributed, and cloud-centric. Managing them manually is inefficient and prone to error.

Terraform, developed by **HashiCorp**, brings Infrastructure as Code (IaC) principles to networking, allowing teams to **define, provision, and manage infrastructure through code** instead of manual configuration.

When combined with **VyOS**, a flexible open-source network operating system, Terraform enables **automated, version-controlled, and repeatable** network deployments across physical, virtual, and cloud environments.

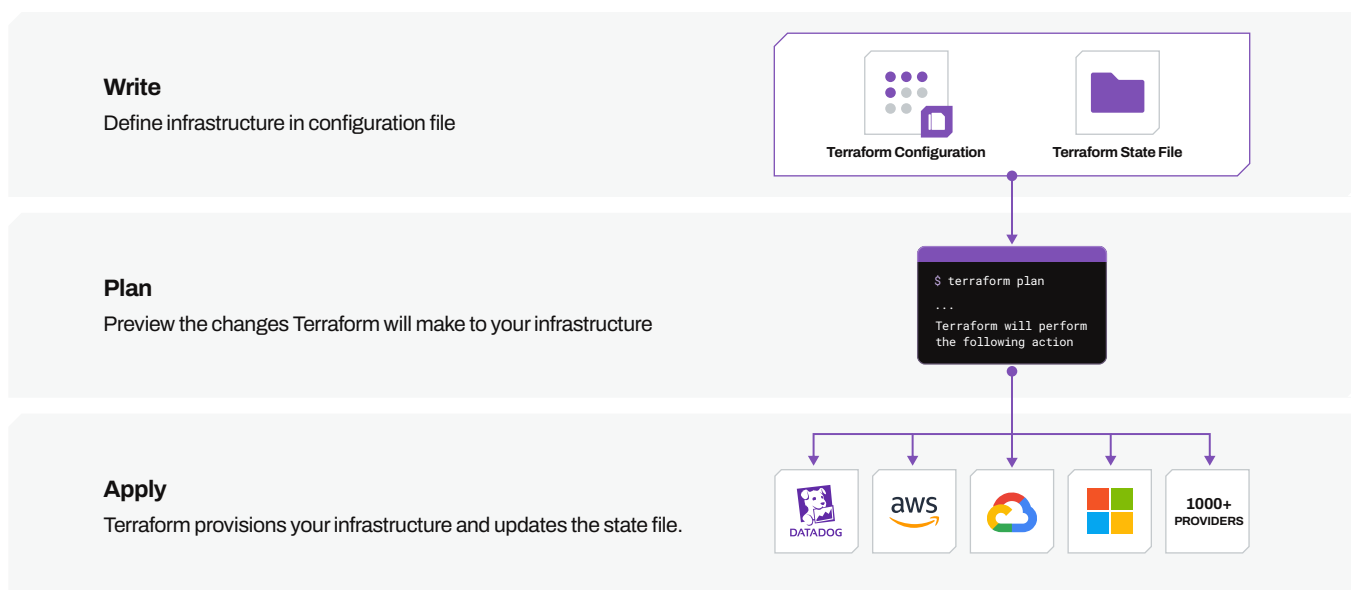
What is Terraform?

Terraform is a declarative Infrastructure as Code (IaC) tool that allows administrators and DevOps teams to define the desired state of their infrastructure using simple configuration files written in **HashiCorp Configuration Language (HCL)**.

Terraform then automates the process of creating, modifying, and deleting resources to match that state, ensuring consistency and predictability.

Key Capabilities:

- **Automated provisioning:** Deploy routers, firewalls, or network services at any scale.
- **Multi-environment consistency:** Apply the same configurations across dev, staging, and production.
- **Multi-vendor integration:** Manage devices across different platforms, clouds, and APIs.
- **Version control:** Maintain all configurations in Git or similar systems for traceability and rollback.
- **Orchestration-ready:** Integrate with CI/CD pipelines, SDN controllers, or cloud orchestrators.





How Terraform Works

Terraform follows a straightforward and reliable workflow based on three key stages:

1. **Write:** Define infrastructure resources in HCL – such as virtual networks, routers, firewalls, or VPNs – across multiple providers (AWS, Azure, GCP, VMware, etc.).
2. **Plan:** Terraform analyzes the current environment and generates an execution plan describing what will be created, changed, or destroyed.
3. **Apply:** Upon user approval, Terraform executes the plan, performing all operations in the correct dependency order to ensure reliable outcomes.

This declarative model allows network engineers to describe the “desired state” of their infrastructure – and let Terraform ensure that the environment always matches that description.

Advantages of Using Terraform with VyOS

VyOS, a powerful open-source network OS, provides enterprise-grade routing, VPN, and firewall capabilities in a lightweight, platform-agnostic package.

When paired with **Terraform**, VyOS becomes an integral component of a fully automated and scalable network infrastructure.

Key Advantages:



Fully automated deployments

Launch VyOS routers across cloud or on-prem environments without manual configuration.



Consistent configuration

Enforce uniform network settings across labs, staging, and production.



Rapid scalability

Spin up new routers or topologies within minutes.



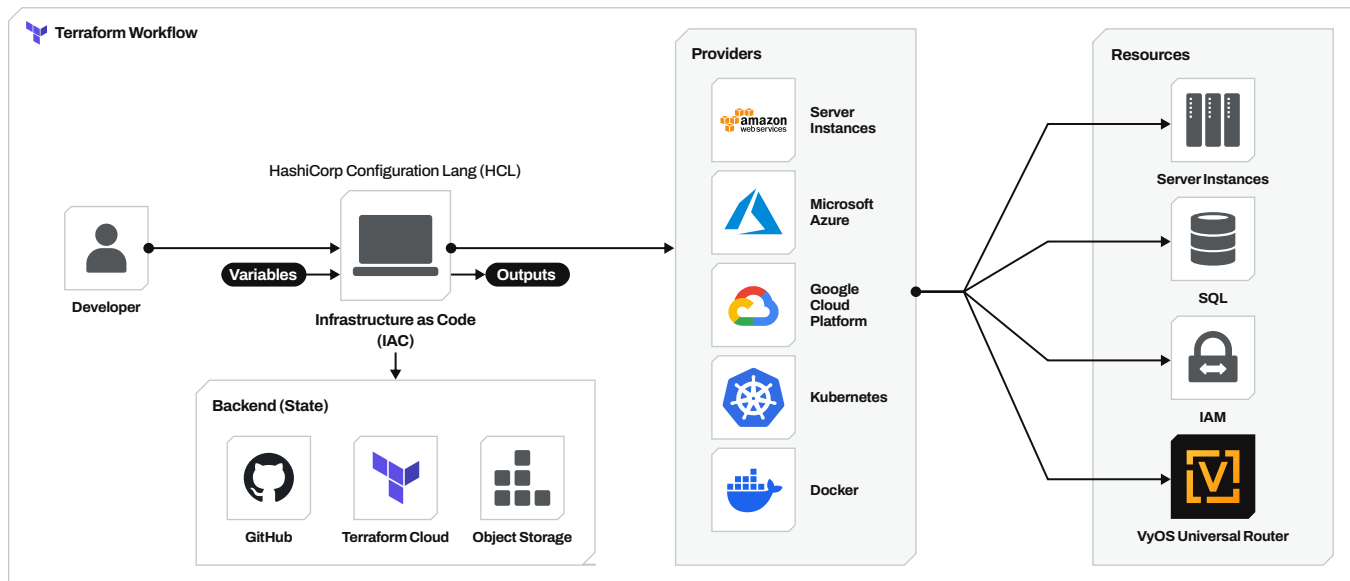
Cost efficiency

Combine open-source VyOS with Terraform automation for a high-value, low-cost network solution.



Integration-ready

Use alongside Cloud-Init, Ansible, and orchestration frameworks for complete automation pipelines.



Use Cases

- Automated deployment of VPN gateways, firewalls, or edge routers in multi-cloud environments.
- Network topology provisioning for CI/CD testing, validation, and simulation.
- Hybrid or multi-cloud management, maintaining consistent routing and security policies across environments.
- Integration into DevOps workflows, enabling infrastructure and network provisioning in the same pipeline.

Conclusion

The combination of **Terraform's declarative automation** and **VyOS's flexible, enterprise-grade networking** transforms how organizations build and operate their networks.

This approach provides a foundation for **agile, scalable, and secure** infrastructures, where networks can be deployed, updated, or decommissioned automatically, with full version control and minimal manual effort.

With Terraform and VyOS, network automation becomes not just efficient but strategic, enabling faster innovation and greater operational reliability across any environment.

Resources

VyOS documentation: <https://docs.vyos.io/en/latest/automation/>

Terraform documentation: <https://developer.hashicorp.com/terraform>