Operations, Visibility, and Troubleshooting in Public Cloud

Operational Challenges in Public Cloud

Evidential Data

When working with Cloud Providers, often customer is challenged to prove providers fault/issues

Unfamiliar Toolset

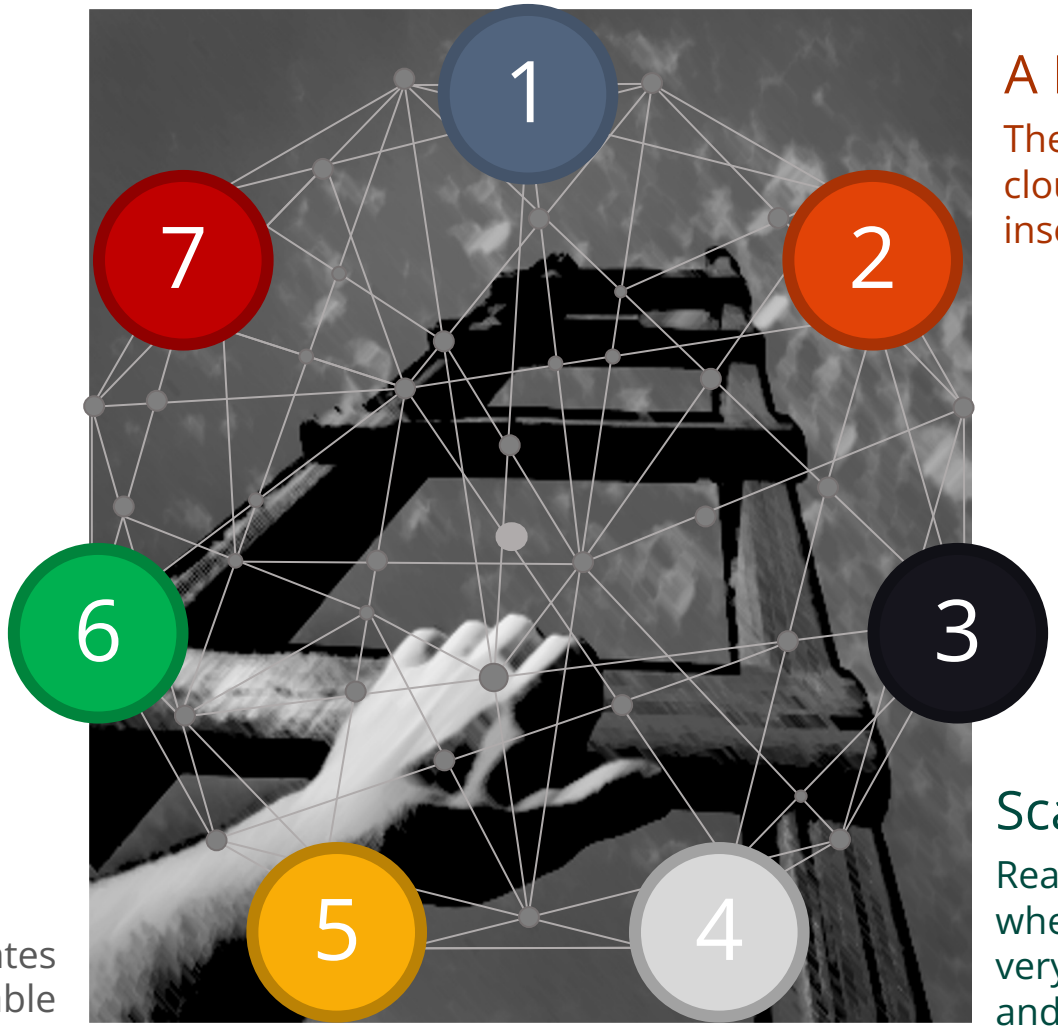
Native cloud lacks familiar tools like ping, packet capture, traceroute

Blackbox – No visibility

Native cloud constructs want you to trust all is well always. No visibility into logs, current state, routing tables, etc.

Infrastructure as Code

Solves agility problem, creates support issues as tier-1 is not able to troubleshoot code problems



A Flat World in Public Cloud

There is a lack of hierarchy in the cloud which means its hard to insert security, control and visibility

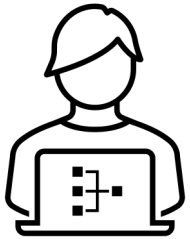
Tier-3 becomes Tier-1

Frontline support teams don't have the skill and tools in public cloud requiring senior network engineers to assist with most support issues

Scaling Out

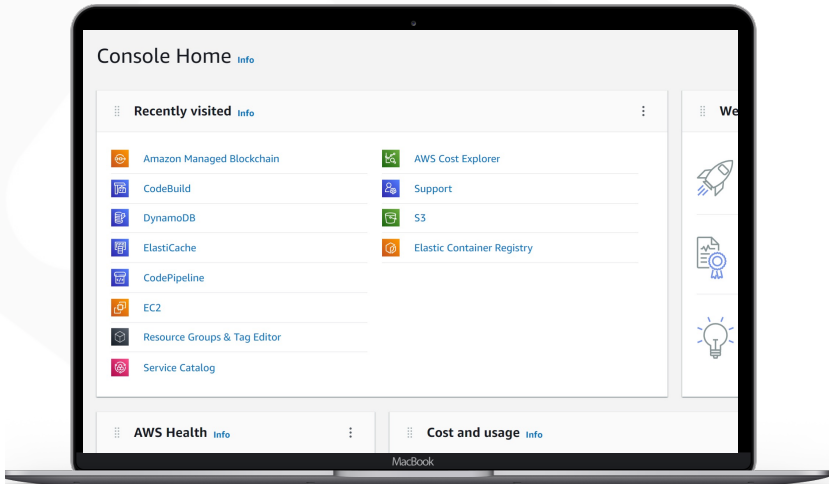
Real problems are experienced when architecture scales out as it very quickly grows to be complex and very hard to troubleshoot

Deploying and Operating Multicloud with Native Constructs

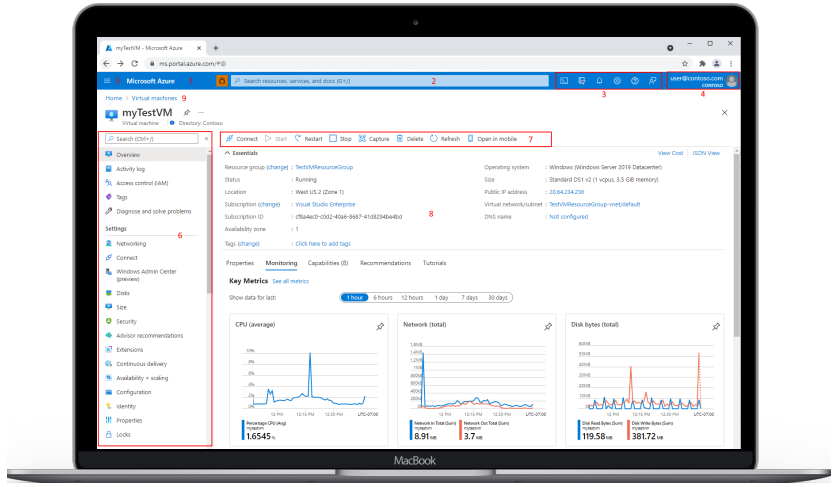


NetSecOps

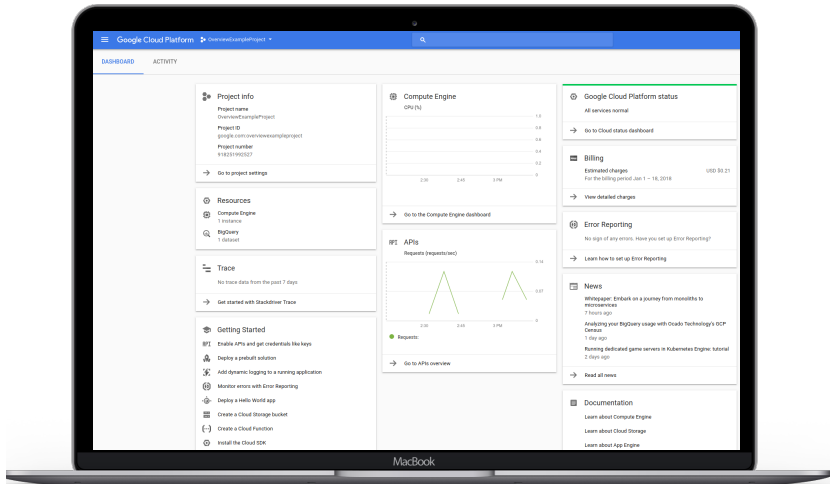
AWS Management Console



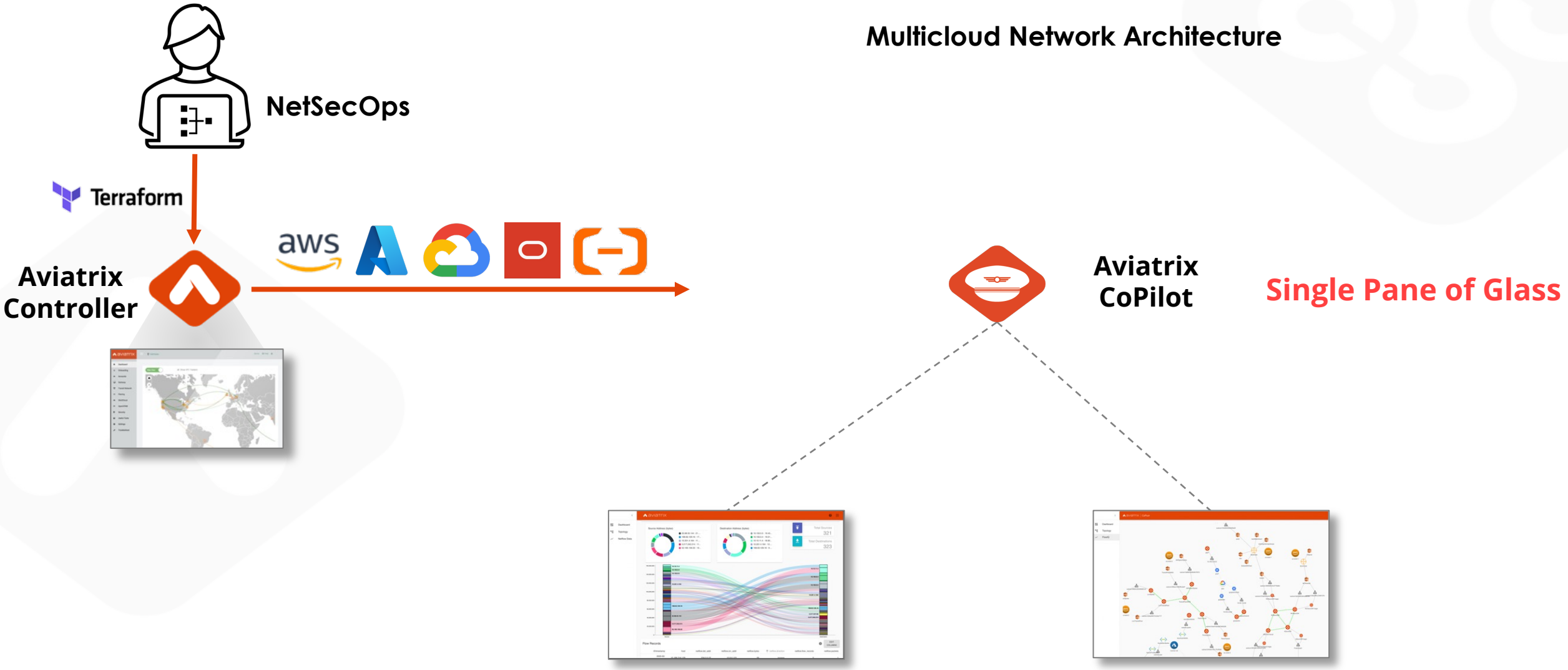
Microsoft Azure Portal



GCP Console

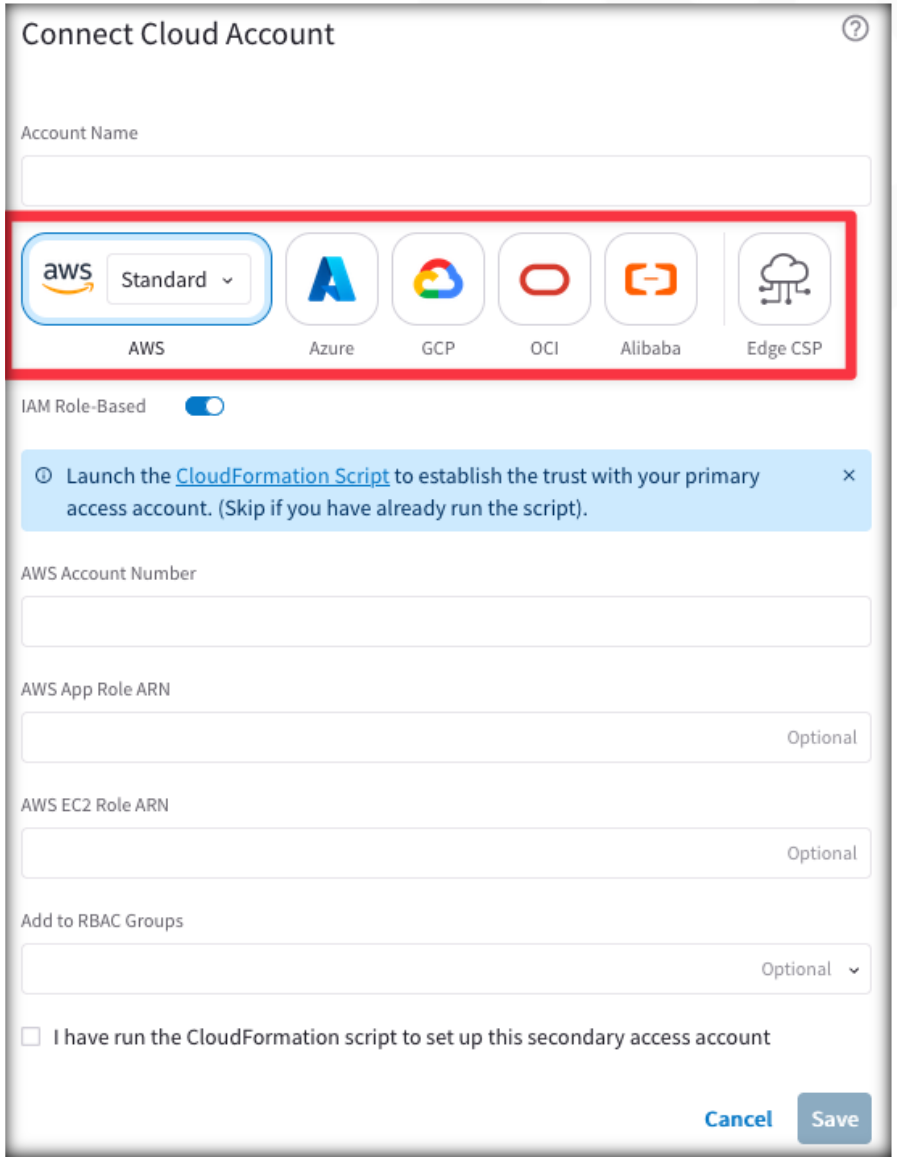


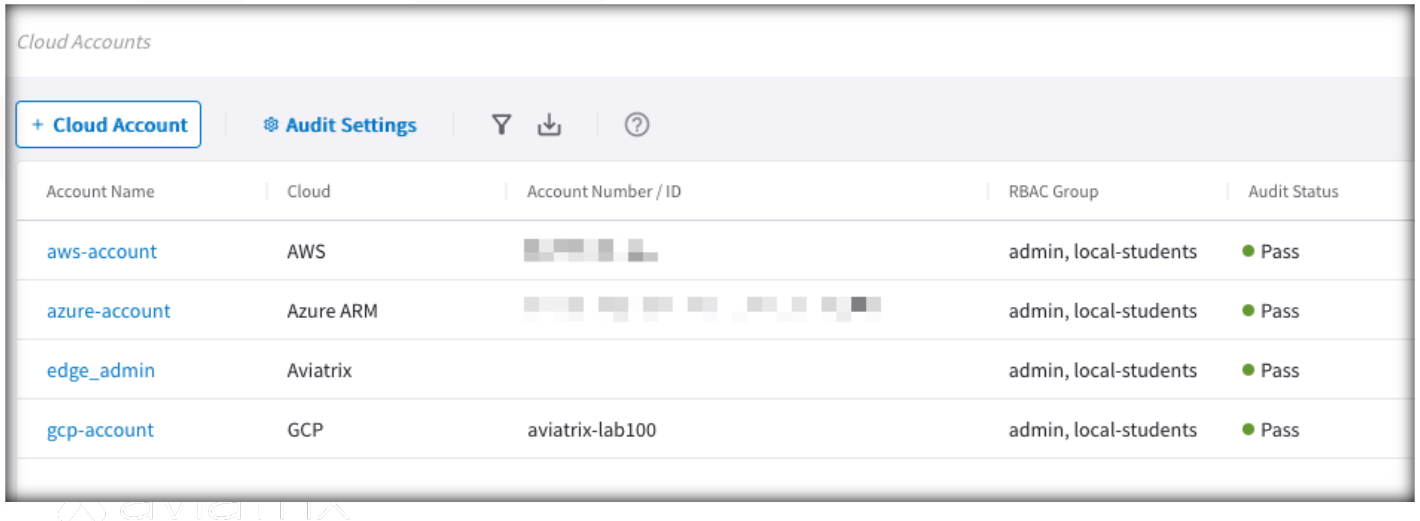
Deploying and Operating Multicloud with Aviatrix



Multicloud – Multi-Account

- Single pane of glass to manage all cloud accounts
- Support for AWS, AWS Gov, Azure, GCP etc. using same workflows, terminologies and tools
- Periodic Account Audits
  - To make sure they are intact and have needed IAM Roles, Policies and Trust Relationships (with Primary Accounts)
  - Notification sent if audit fails





Infrastructure as Code

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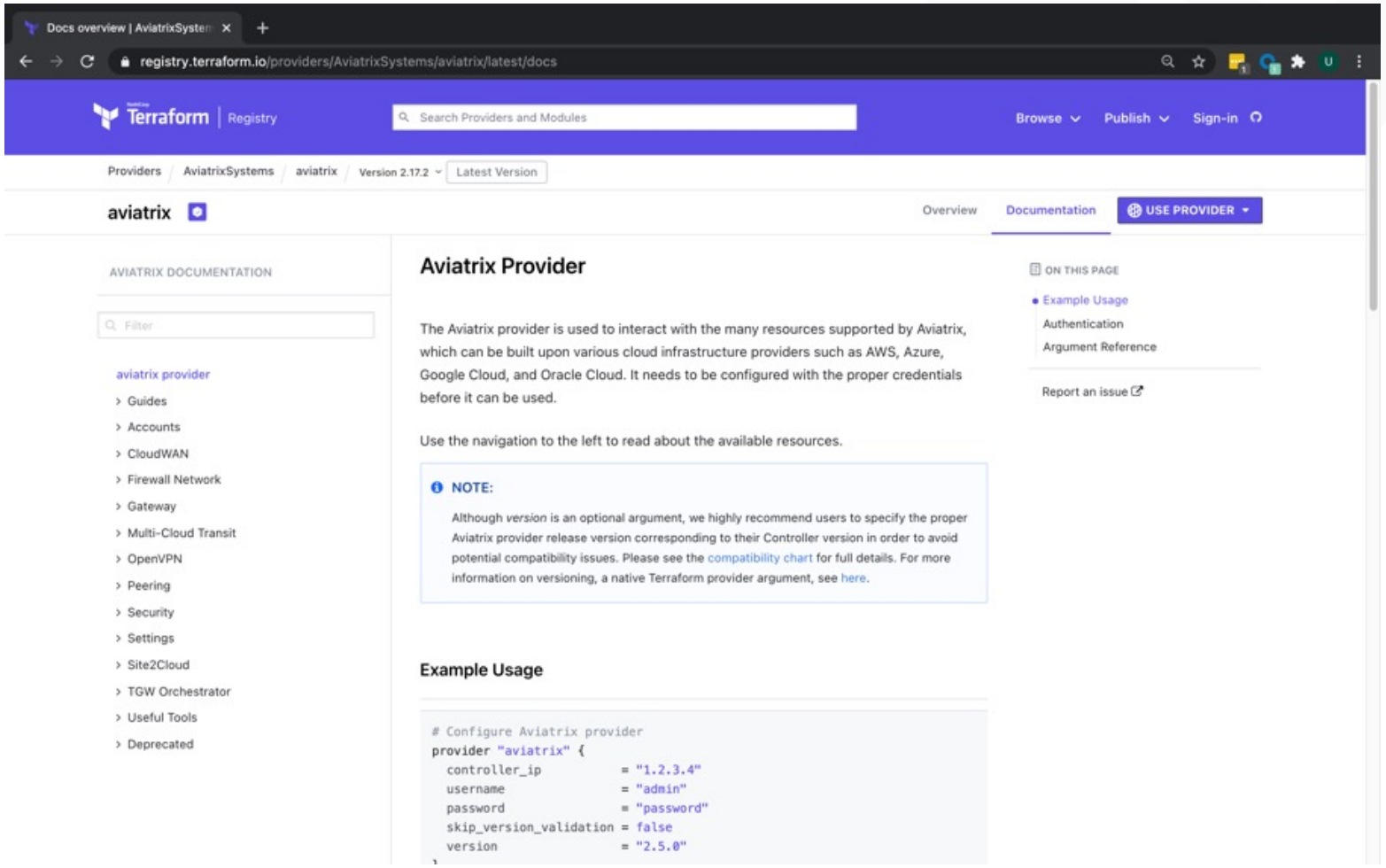
What it is

- Use Infrastructure as Code to provision and manage any cloud, infrastructure, or service
- Write declarative configuration files – define desired state
- Plan and predict changes
- Create reproducible infrastructure – if resource already exists, it won't recreate it
- Maintains knowledge of resources in a database called **State**
    - State maps config to real world

Aviatrix Terraform Provider

- Multi-lingual entity responsible for API interactions with CSPs
- Exposes resources in those CSPs for any account/subscription that has been onboarded
- Feature parity with Controller code



Aviatrix Terraform Resources – Examples

- # Create an Aviatrix AWS Gateway

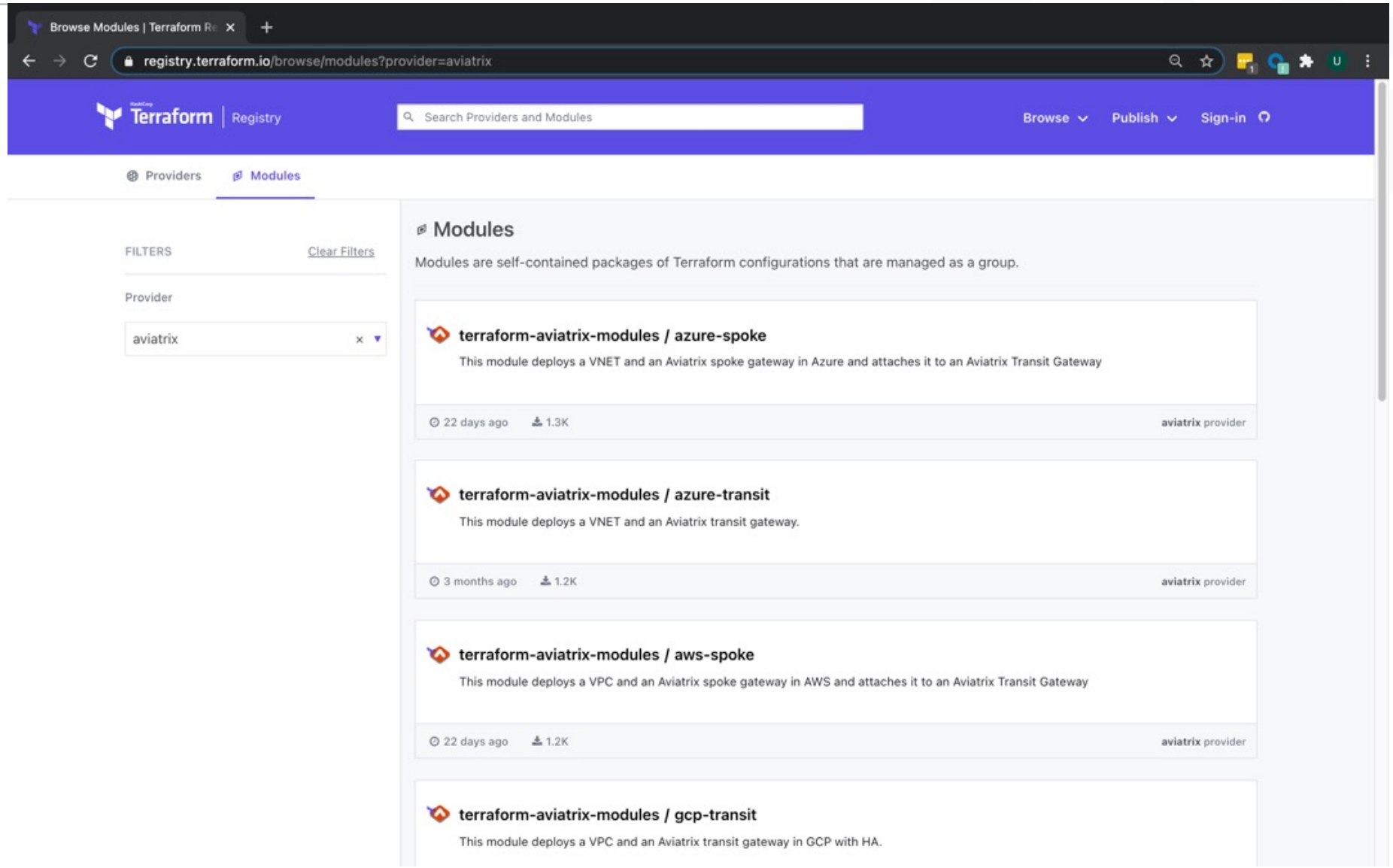
```
resource "aviatrix_gateway"
"test_gateway_aws" {

  cloud_type   = 1

  account_name = "devops-aws"

  gw_name      = "avtx-gw-1"

  vpc_id       = "vpc-abcdef"

  vpc_reg      = "us-west-1"

  gw_size      = "t2.micro"

  subnet       = "10.0.0.0/24"

}
```

- # Create an Aviatrix Azure Gateway

```
resource "aviatrix_gateway"
"test_gateway_azure" {

  cloud_type   = 8

  account_name = "devops-azure"

  gw_name      = "avtx-gw-azure"

  vpc_id       = "gateway:test-gw-123"

  vpc_reg      = "West US"

  gw_size      = "Standard_D2"

  subnet       = "10.13.0.0/24"

}
```

Aviatrix Terraform Modules

- ***"Repeatable++"***
- Similar to the concepts of libraries, packages, or modules found in most programming languages
- Provide many of the same benefits
- ~10X reduction in lines of code
- Can be found on Terraform Registry



Next: UI Walkthrough [Tour]

Aviatrix AppIQ

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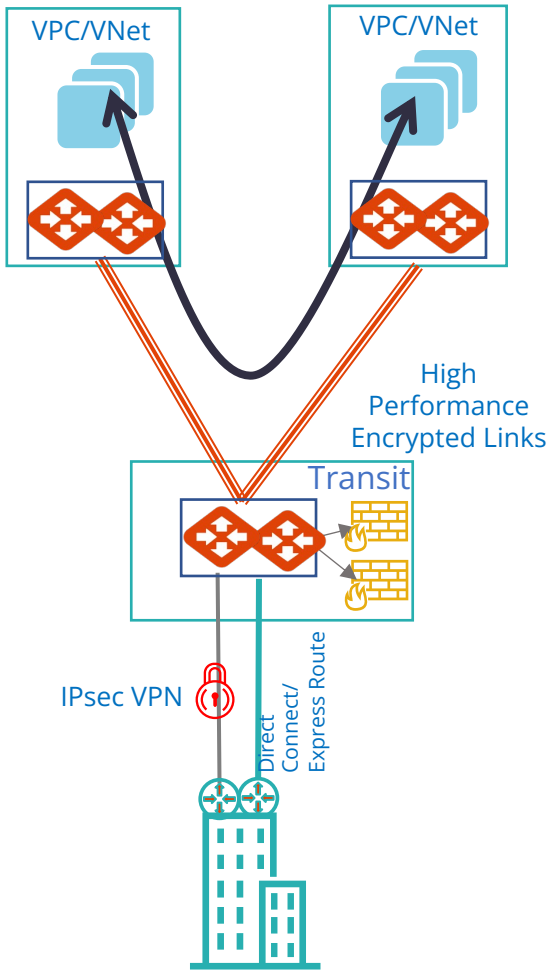
AppIQ – End-to-End Application Path Inspection and Troubleshooting

- Topology
- Gateway Telemetry
- FlowIQ
- FlightPath



Source to Destination

1. Source Instance name
2. Source IP address
3. Source VPC ID
4. Source Subnet ID
5. Source Route Table ID
6. Source Outbound Rules in Security Group used
7. Source outbound NACL rule
8. Source Transit Routing or VPC Peering Route
9. Destination Instance name
10. Destination IP address
11. Destination VPC ID
12. Destination Subnet ID
13. Destination Route Table ID
14. Destination Inbound NACL rule
15. Destination Inbound Rules in Security Group used

Return Traffic

16. Source Subnet ID
17. Source Route Table ID
18. Source outbound NACL rule
17. Source Transit Routing or VPC Peering Route
18. Destination Instance name
19. Destination IP address
20. Destination VPC ID
21. Destination Subnet ID
22. Destination Route Table ID
23. Destination Route used in Routing table
24. Destination Inbound NACL rule
25. Stateful FW rules

Familiar Troubleshooting Tools (Enterprise-grade Tools)

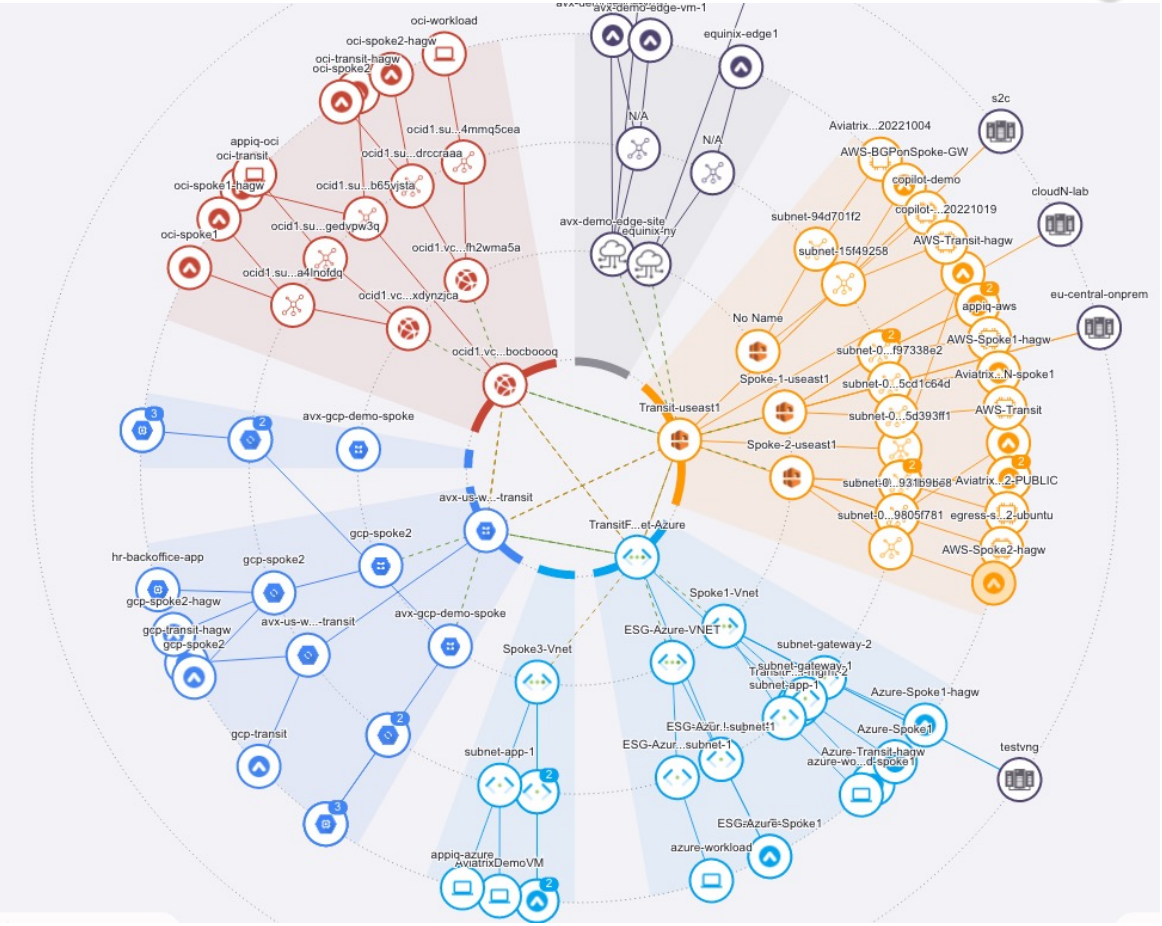
- ICMP-based tool (Ping, Traceroute, Trace Path)
- Active sessions
- Interface stats
- TCP-UDP connectivity tools
- Packet Capture (.pcap file)
- NetFlow (FlowIQ)

Virtual Machine
AWS-Spoke2-hagw

Properties

Search

Attribute	Value
Instance ID	i-026fc883af7ef50e3
Name	AWS-Spoke2-hagw
Type	Virtual Machine
Cloud	AWS
Account Name	Aviatrix-Demo
Region	us-east-1
VPC ID	vpc-04edee14459bd1f4b
Subnet ID	subnet-013f65a299805f781
Public IP	18.214.48.229
Private IP	10.3.131.75
Public DNS N…	ec2-18-214-48-229.compute-1.ama…
Private DNS N…	ip-10-3-131-75.ec2.internal
Associated Ga…	AWS-Spoke2-hagw
Instance Status	running



Diagnostic Tools

Gateway Diagnostics for AWS-Spoke2-hagw

Ping | Traceroute | Tracepath | Tracelog | Test Connectivity | Active Sessions | Interface Stats

Destination
1.1.1.1

Interface
Use Route Table

Ping

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Aviatrix Learning and Testing Tool

For Pre-upgrade /SRE/Learning/Study/etc.

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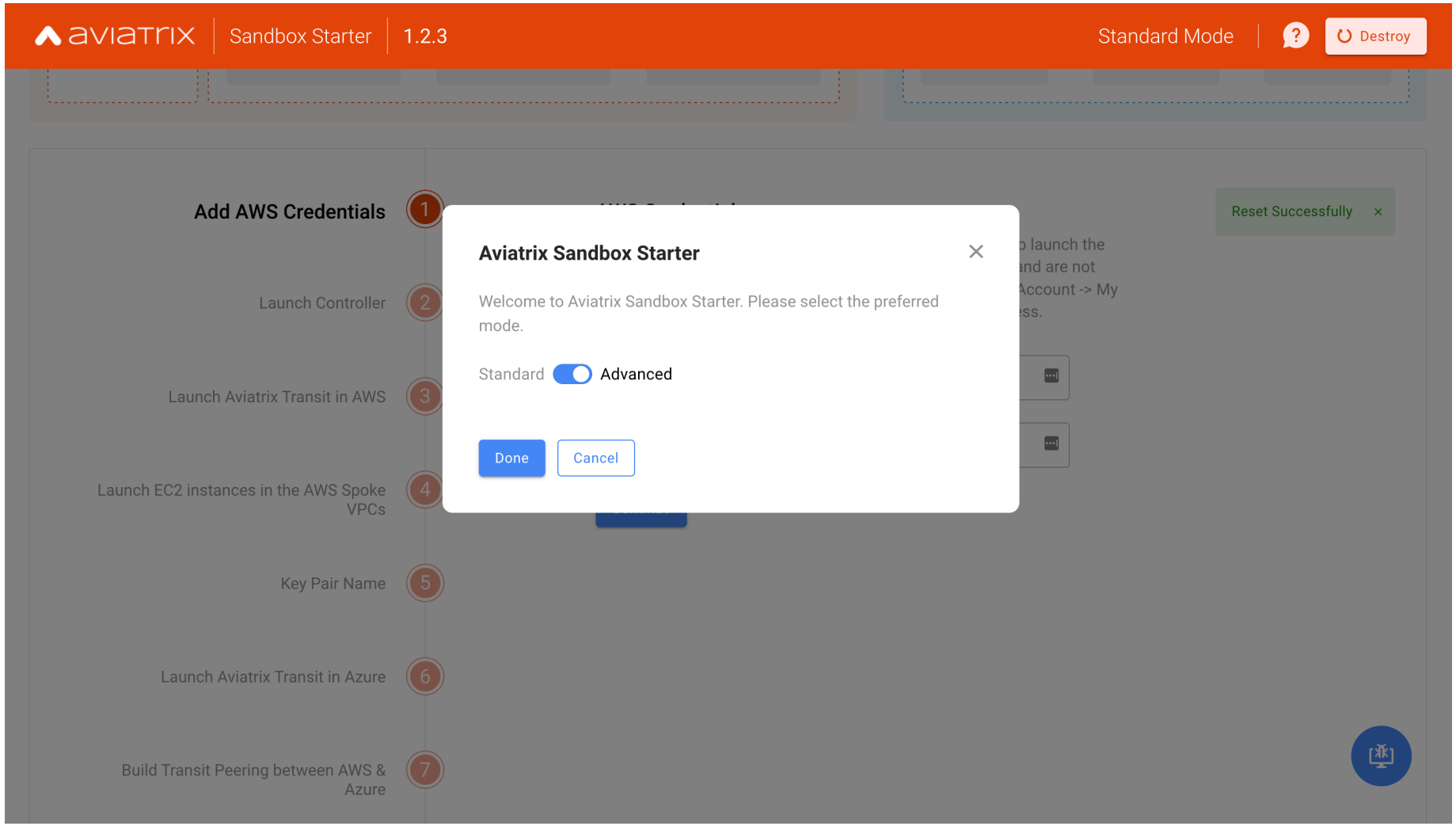
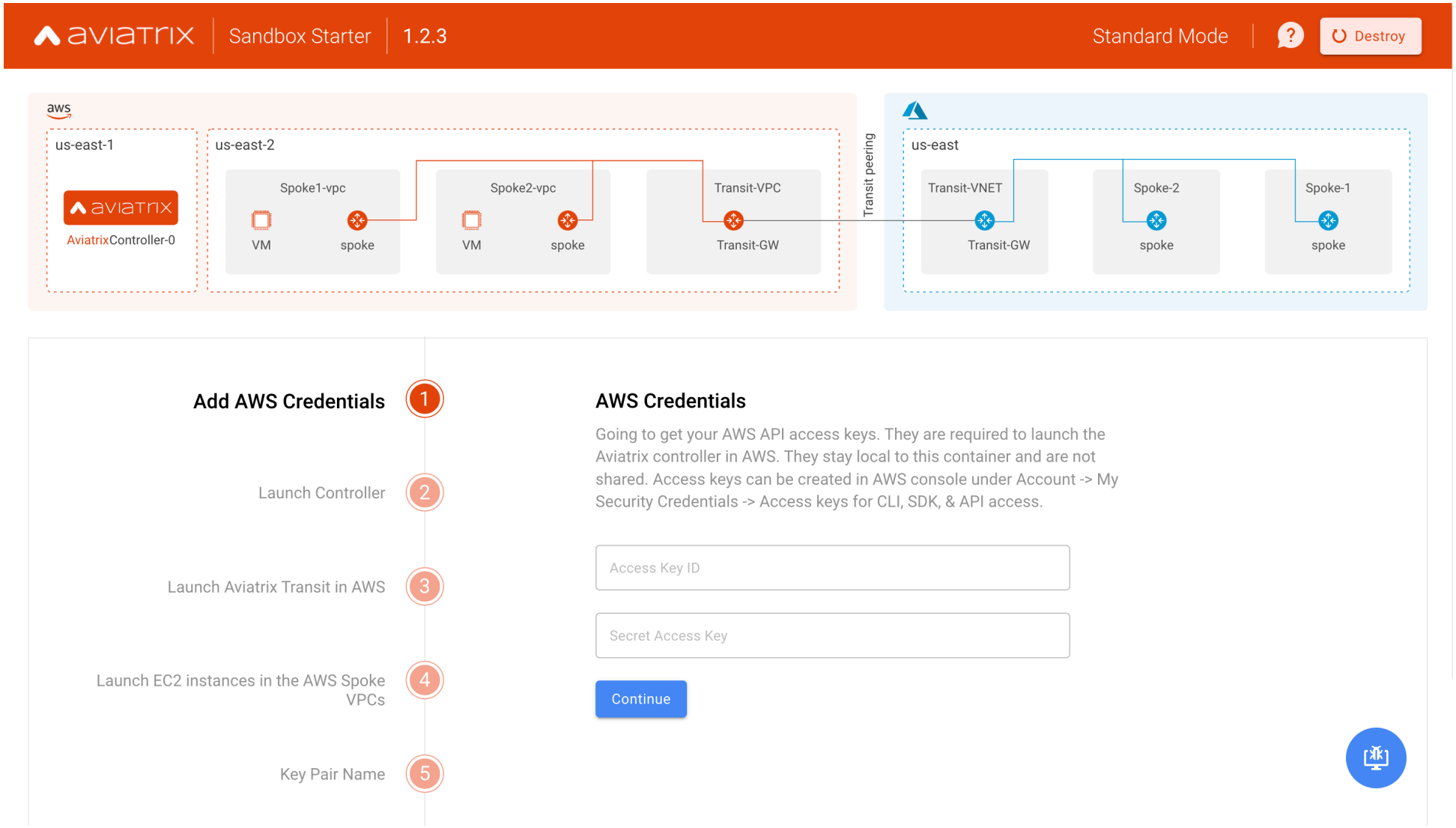
Sandbox Starter Tool Modes

- Standard Mode
  - Fixed regions, resource names, and CIDR blocks
- Advanced Mode
  - Customizable regions, resource names, and CIDR blocks



Sandbox Starter Tool Workflow Start



Sandbox Starter Tool Workflow Completion

aviatrix | Sandbox Starter | 1.2.3 Advanced Mode ? Destroy

- Add AWS Credentials ✓
- Launch Controller ✓
- Launch Aviatrix Transit in AWS ✓
- Launch EC2 instances in the AWS Spoke VPCs ✓
- Key Pair Name ✓
- Launch Aviatrix Transit in Azure ✓
- Build Transit Peering between AWS & Azure ✓

Success!

Sandbox Starter has completed successfully. Access the below link to open the controller:
https://13.228.158.61

Private IPs

Spoke1-VM	10.61.50.103	Copy
Spoke2-VM	10.62.59.49	Copy

Public IPs

Spoke1-VM	13.250.58.65	Copy
Spoke2-VM	13.212.62.117	Copy