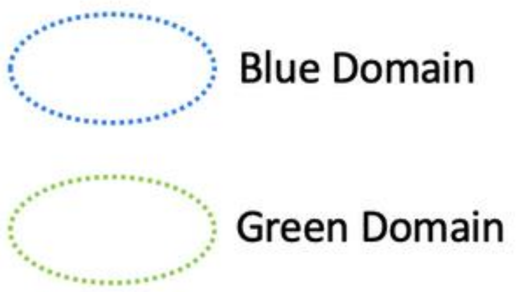
Network Segmentation

ACE Team

Network Segmentation - Overview

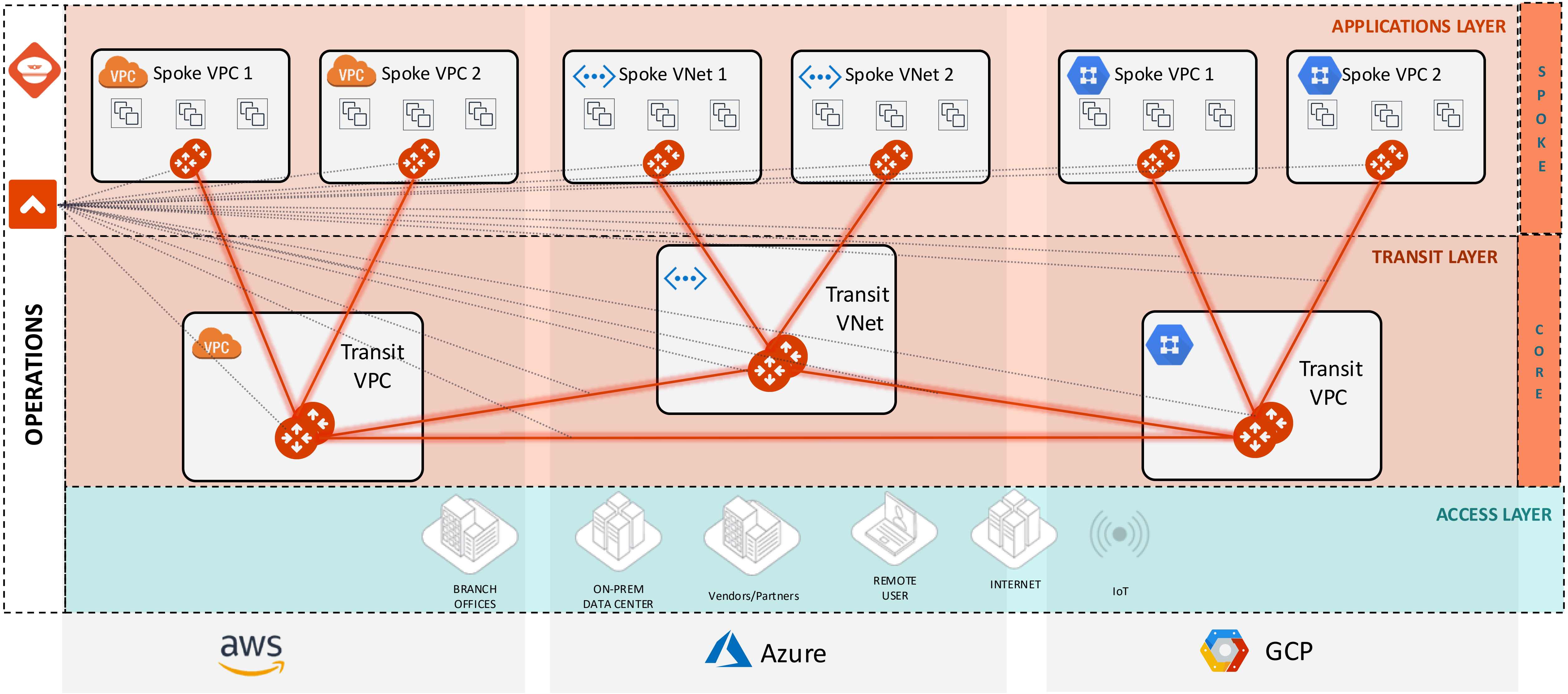
- When you identify groups of spoke and edge VPC/VNets in your infrastructure with the same requirements from a networking point of view (network reachability), you may want to group them in what Aviatrix calls “network domains”.
- A *network domain* is an Aviatrix enforced network of one or more spoke VPC/VCN/VNets.
- The key use case for building network domains is to segment traffic for an enhanced security posture. You use them, in conjunction with *connection policies,* to achieve the network isolation for inter-VPC/VNC/VNets connectivity that you want for your network.



Implementing Network Segmentation in an Aviatrix-Managed Network (official documentation link):

https://docs.aviatrix.com/copilot/latest/network-security/network-segmentation-secured.html?expand=true

CNSF: the Foundations



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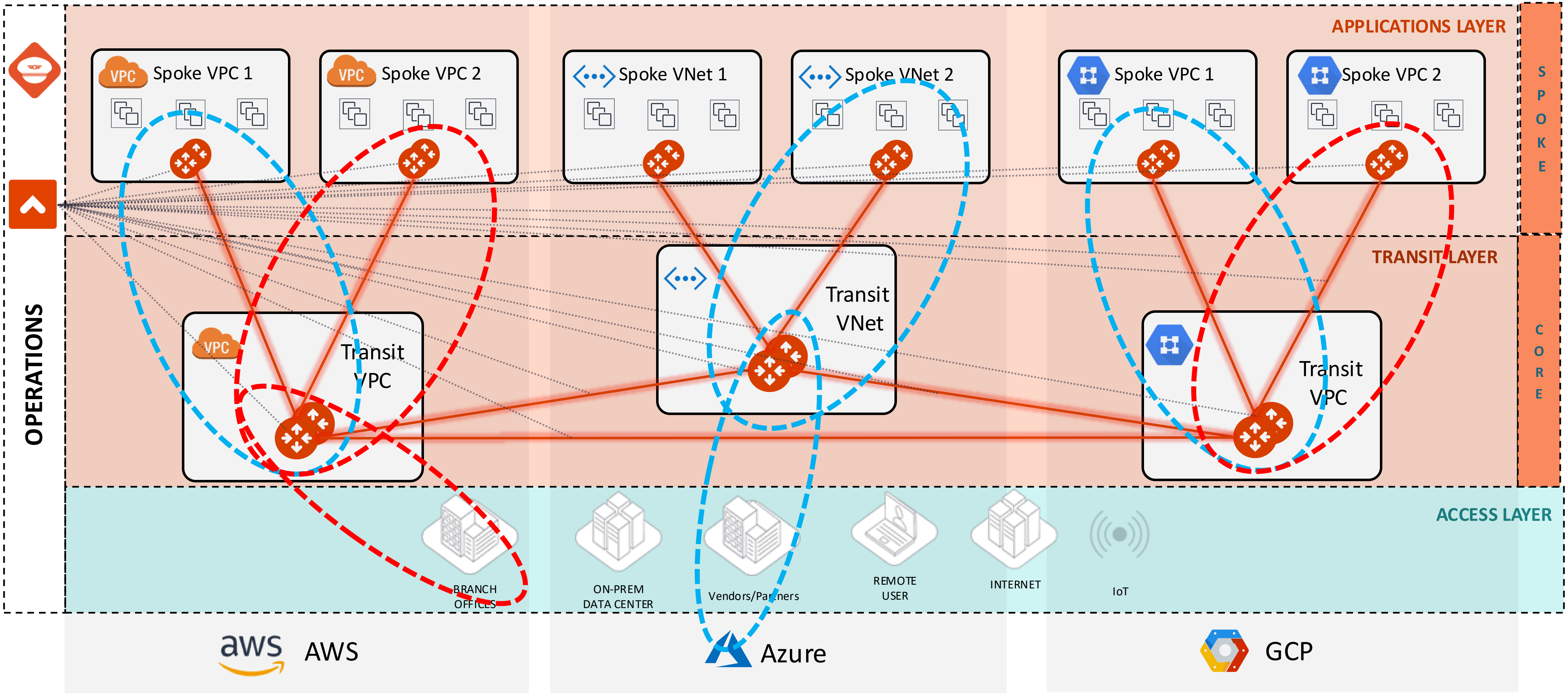
Global Segmentation with Network Domains



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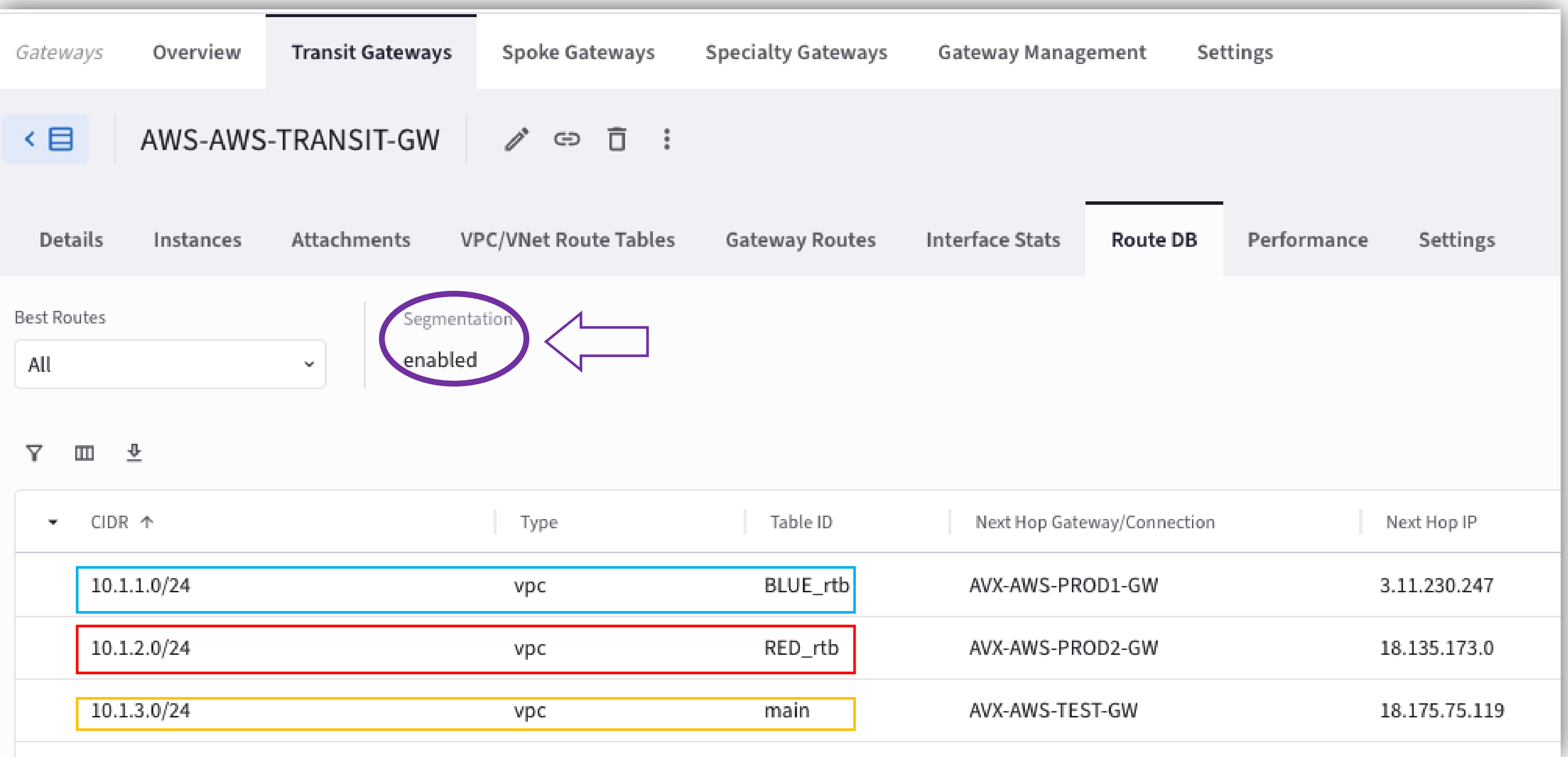
Order of Operations for activating the Network Segmentation

1) Enable Network Segmentation on the relevant Transit Gateway(s)

2) Create Network Domains (aka Segments)

3) Associate Spoke Gateways and/or Site2Cloud connections to the Network Domains

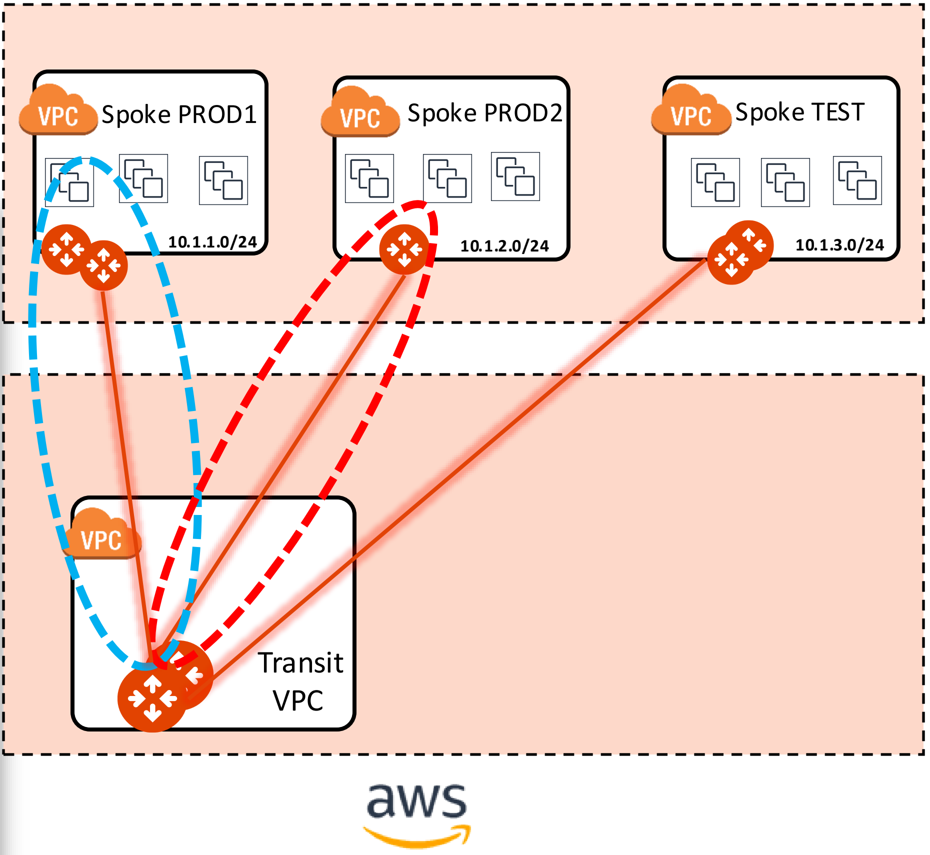
4) Apply the Connection Policy (*optional*)



Best Routes: All

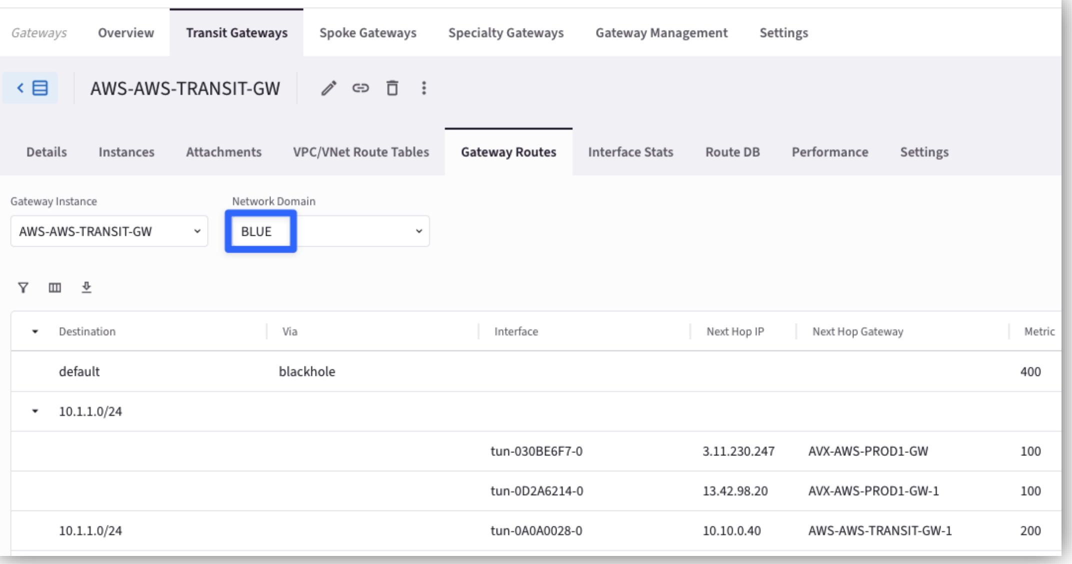
Segmentation: enabled

CIDR ↑	Type	Table ID	Next Hop Gateway/Connection	Next Hop IP
10.1.1.0/24	vpc	BLUE_rtb	AVX-AWS-PROD1-GW	3.11.230.247
10.1.2.0/24	vpc	RED_rtb	AVX-AWS-PROD2-GW	18.135.173.0
10.1.3.0/24	vpc	main	AVX-AWS-TEST-GW	18.175.75.119



PATH: COPILOT > Cloud Fabric > Gateways > Transit Gateways > select the relevant GW > **Route DB** (equivalent of RIB)

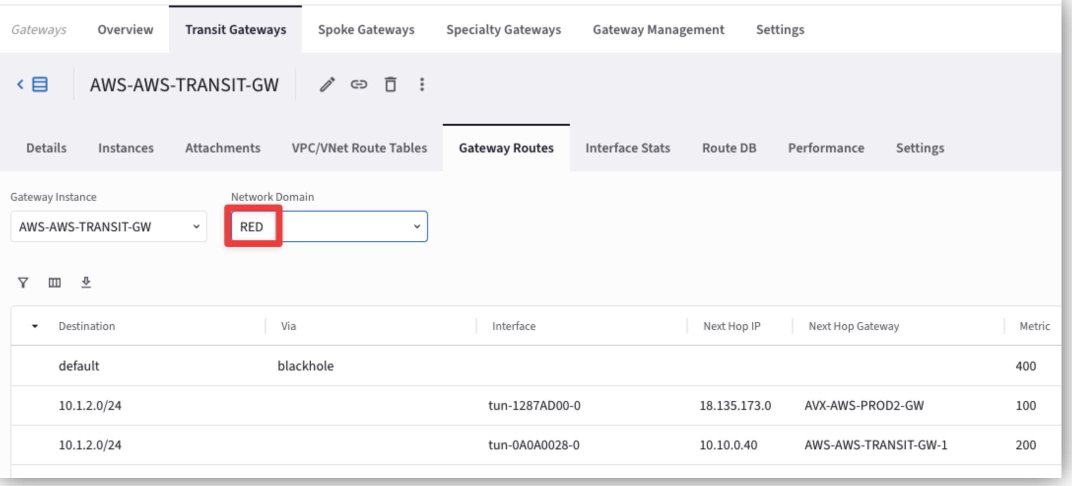
Multiple Routing Domains on the Transit GW



Gateway Instance: AWS-AWS-TRANSIT-GW

Network Domain: BLUE

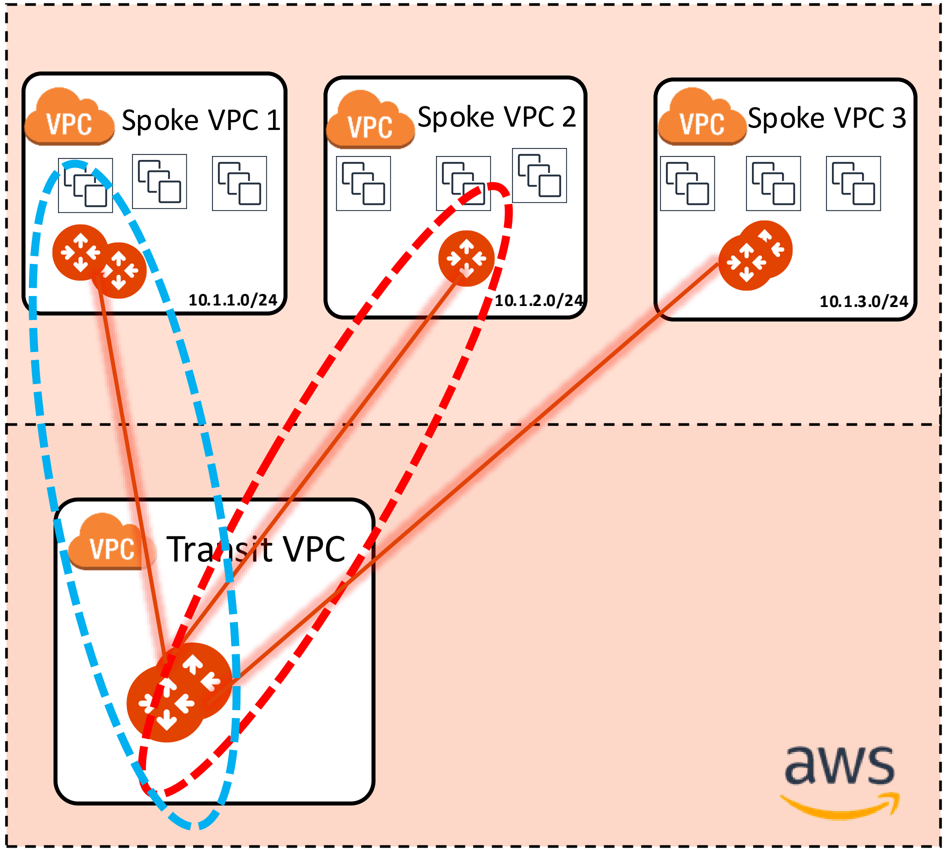
Destination	Via	Interface	Next Hop IP	Next Hop Gateway	Metric
default	blackhole				400
10.1.1.0/24					
		tun-030BE6F7-0	3.11.230.247	AVX-AWS-PROD1-GW	100
		tun-0D2A6214-0	13.42.98.20	AVX-AWS-PROD1-GW-1	100
10.1.1.0/24		tun-0A0A0028-0	10.10.0.40	AWS-AWS-TRANSIT-GW-1	200



Gateway Instance: AWS-AWS-TRANSIT-GW

Network Domain: RED

Destination	Via	Interface	Next Hop IP	Next Hop Gateway	Metric
default	blackhole				400
10.1.2.0/24		tun-1287AD00-0	18.135.173.0	AVX-AWS-PROD2-GW	100
10.1.2.0/24		tun-0A0A0028-0	10.10.0.40	AWS-AWS-TRANSIT-GW-1	200



- A single Spoke gateway or a Cluster of Spoke Gateways can be associated to a unique domain!
- **PATH:** COPILOT > Cloud Fabric > Gateways > Transit Gateways > select the relevant GW > **Gateway Routes** and then filter based on the network domain (i.e. VRF)

CAVEAT: The specific Network Domain view (aka vrf) is only available on the Transit GW. The Spoke GW has only the main routing table (aka GRT).

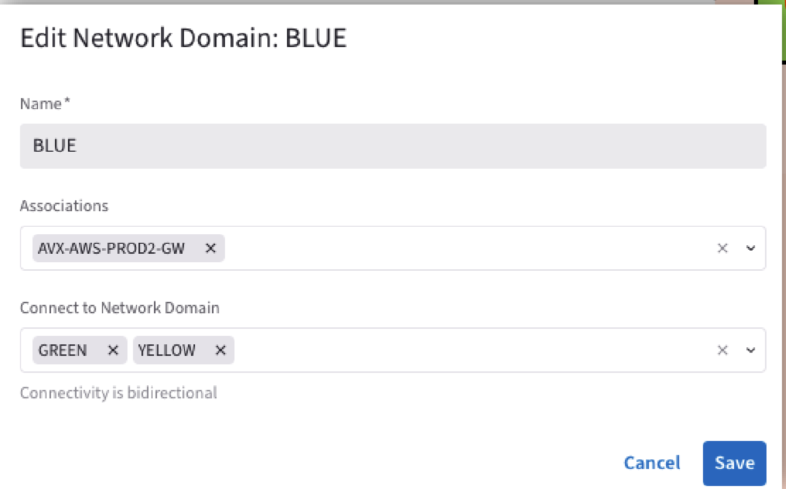
Connection Policy

- The Connection policy allows the **inter-domain** communication or **inter-segment** communication (*vrf leaking*).

- The connection policy establishes a bidirectional connectivity (merging the network domains' RTBs).

In the example on the right, there are three domains: Green, Blue & Yellow

- If the Blue domain acts as the Shared Services Domain, It will be connected to both the GREEN domain and the YELLOW domain.



Edit Network Domain: BLUE

Name *

BLUE

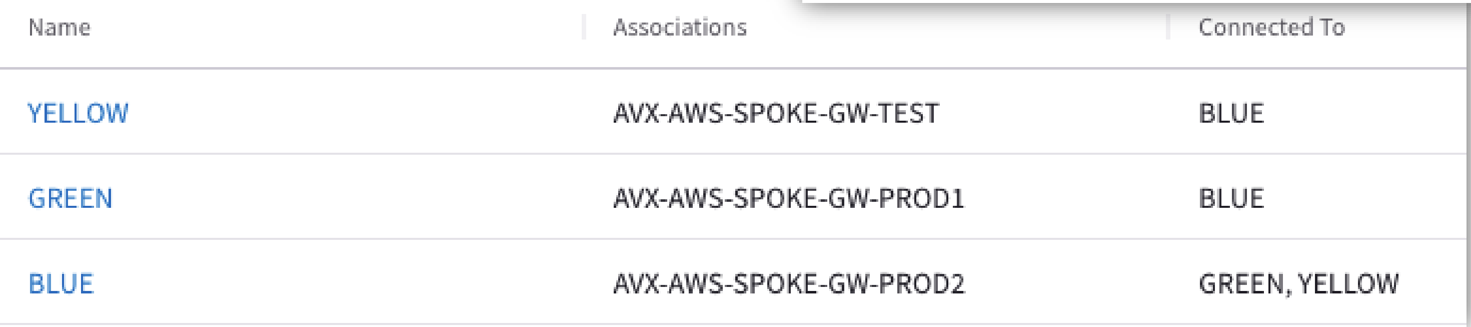
Associations

AVX-AWS-PROD2-GW ×

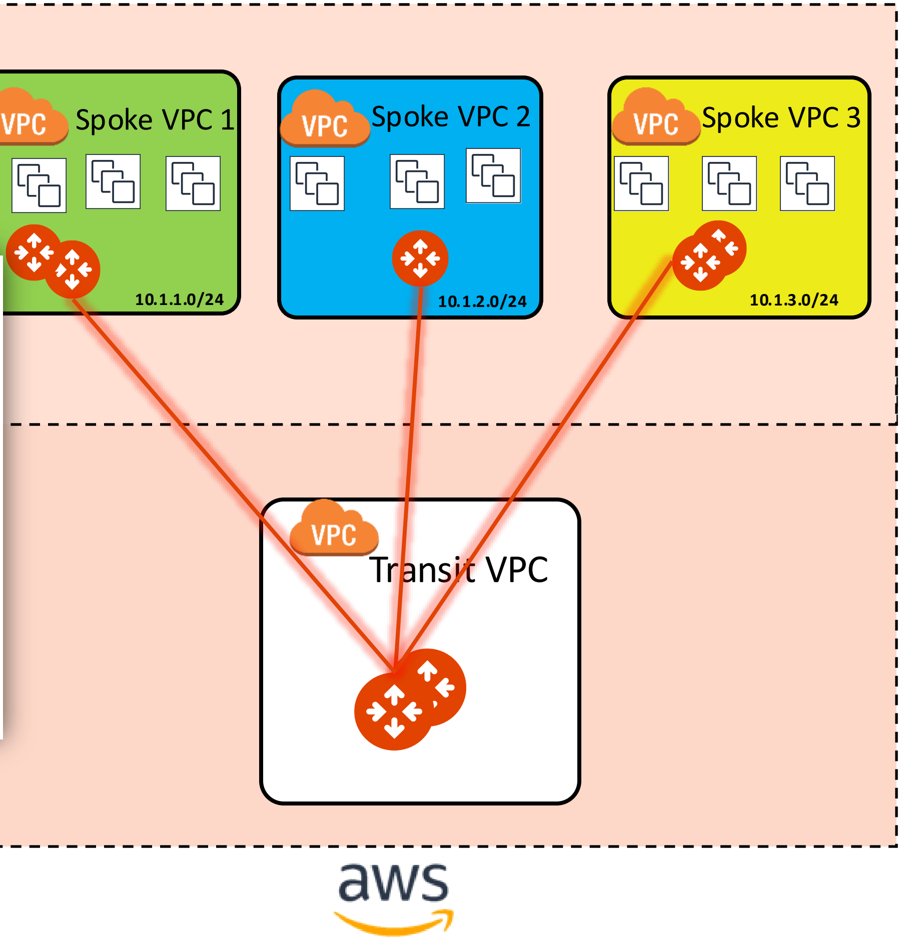
Connect to Network Domain

GREEN × YELLOW ×

Connectivity is bidirectional

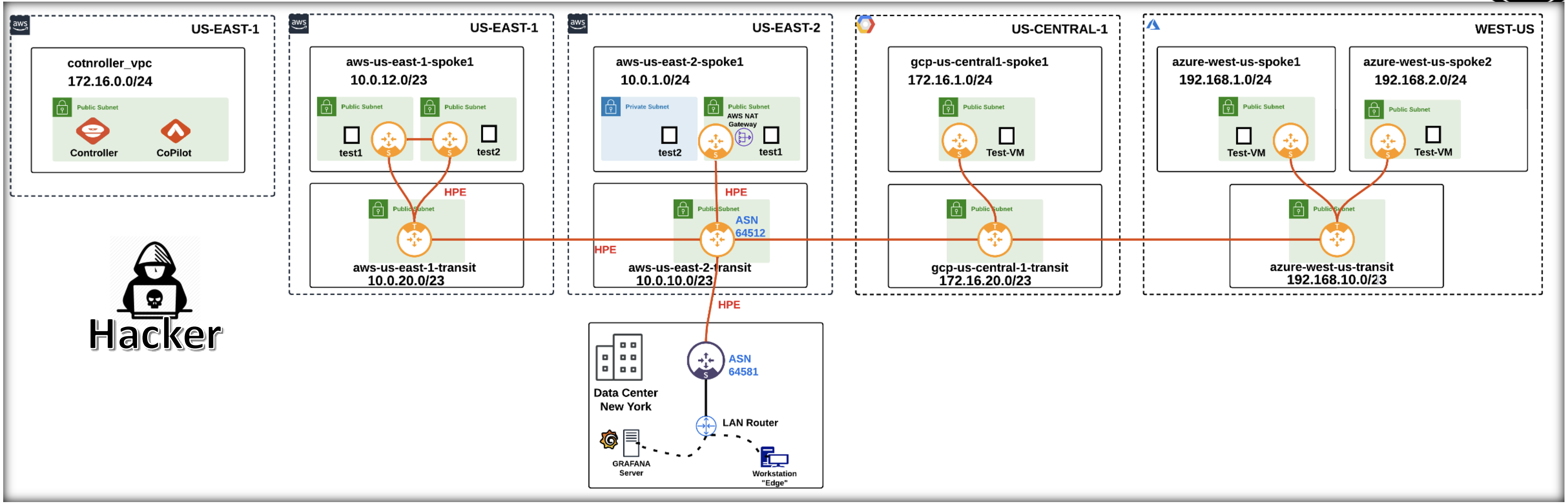


Name	Associations	Connected To
YELLOW	AVX-AWS-SPOKE-GW-TEST	BLUE
GREEN	AVX-AWS-SPOKE-GW-PROD1	BLUE
BLUE	AVX-AWS-SPOKE-GW-PROD2	GREEN, YELLOW



- **CAVEAT**: a connection policy can't be applied on the main RTB (aka Global Routing Table).

Lateral Movement



- An attacker searches for an instance that could serve as a foothold for lateral

- If the Blue domain acts as the Shared Services Domain, It will be connected to both the GREEN domain and the YELLOW domain.

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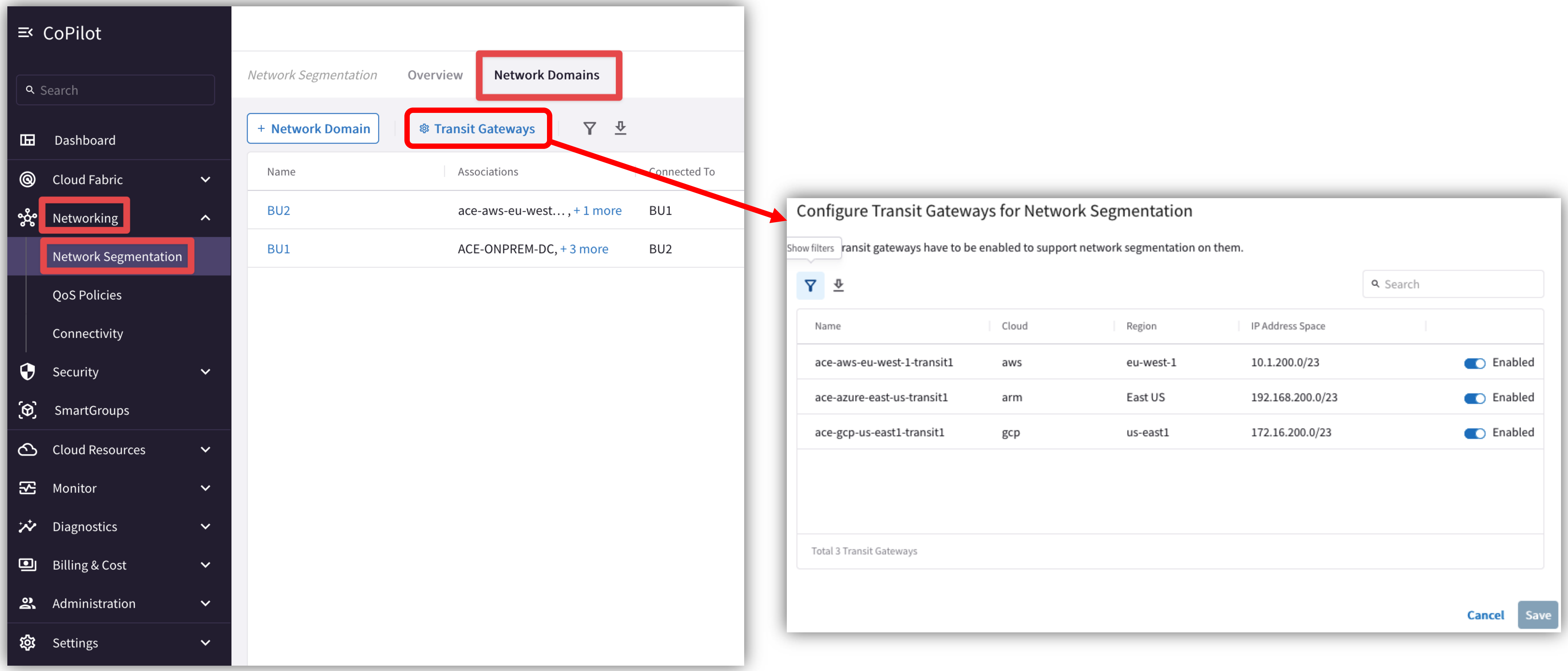
Tools for Operating Network Segmentation

Network Segmentation Visibility

- CoPilot: verify the Network Domains

PATH: COPILOT > Networking > Network Segmentation > Network Domains



Name	Associations	Connected To
BU2	ace-aws-eu-west… , + 1 more	BU1
BU1	ACE-ONPREM-DC, + 3 more	BU2

Configure Transit Gateways for Network Segmentation

Show filters ransit gateways have to be enabled to support network segmentation on them.

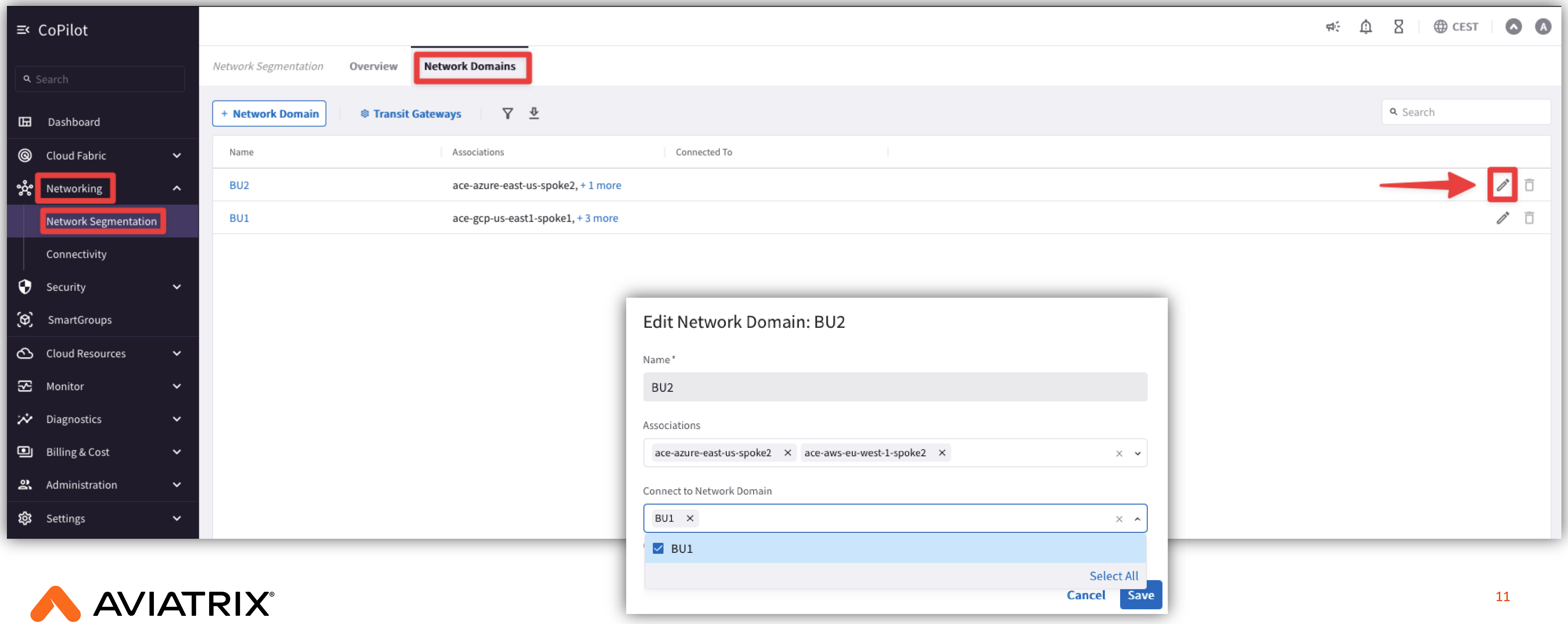
Name	Cloud	Region	IP Address Space	
ace-aws-eu-west-1-transit1	aws	eu-west-1	10.1.200.0/23	Enabled
ace-azure-east-us-transit1	arm	East US	192.168.200.0/23	Enabled
ace-gcp-us-east1-transit1	gcp	us-east1	172.16.200.0/23	Enabled

Total 3 Transit Gateways

Network Segmentation Visibility

- CoPilot: create/modify the Network Domains

PATH: COPILOT > Networking> Network Segmentation > Network Domains > pencil icon (edit)



Name	Associations	Connected To
BU2	ace-azure-east-us-spoke2, + 1 more	
BU1	ace-gcp-us-east1-spoke1, + 3 more	

Edit Network Domain: BU2

Name *: BU2

Associations: ace-azure-east-us-spoke2 ✕ ace-aws-eu-west-1-spoke2 ✕

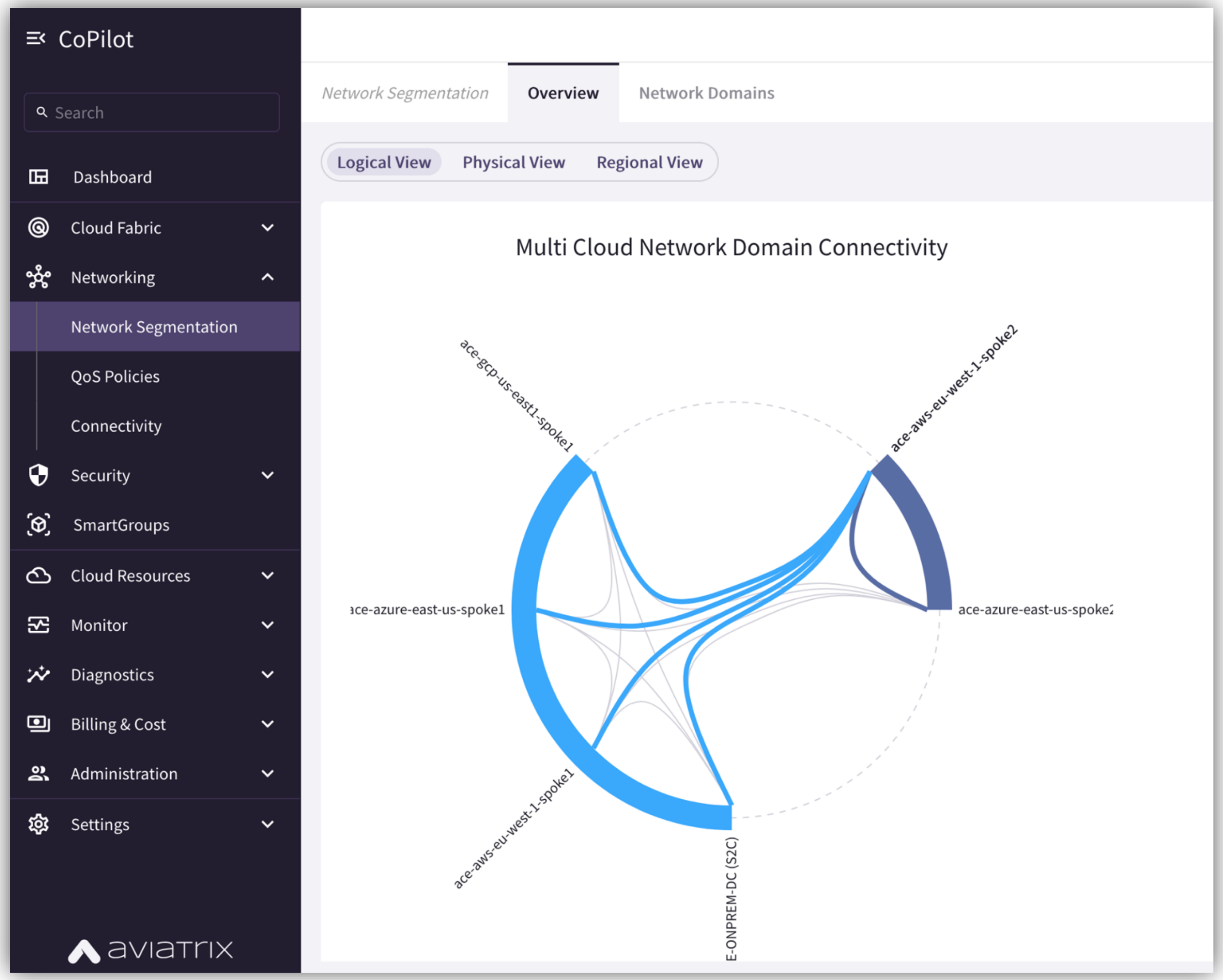
Connect to Network Domain: BU1 ✕

☑ BU1

Network Segmentation Visibility

- CoPilot: verify the Network Relationships

PATH: COPILOT > Networking > Network Segmentation > Overview > Logical View



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Next:
Lab 1 Network Domains
&
Lab 2 Connection Policy