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## Routes Manipulation & NAT

# RFC1918 Routes Injection = Standard behavior of the Controller

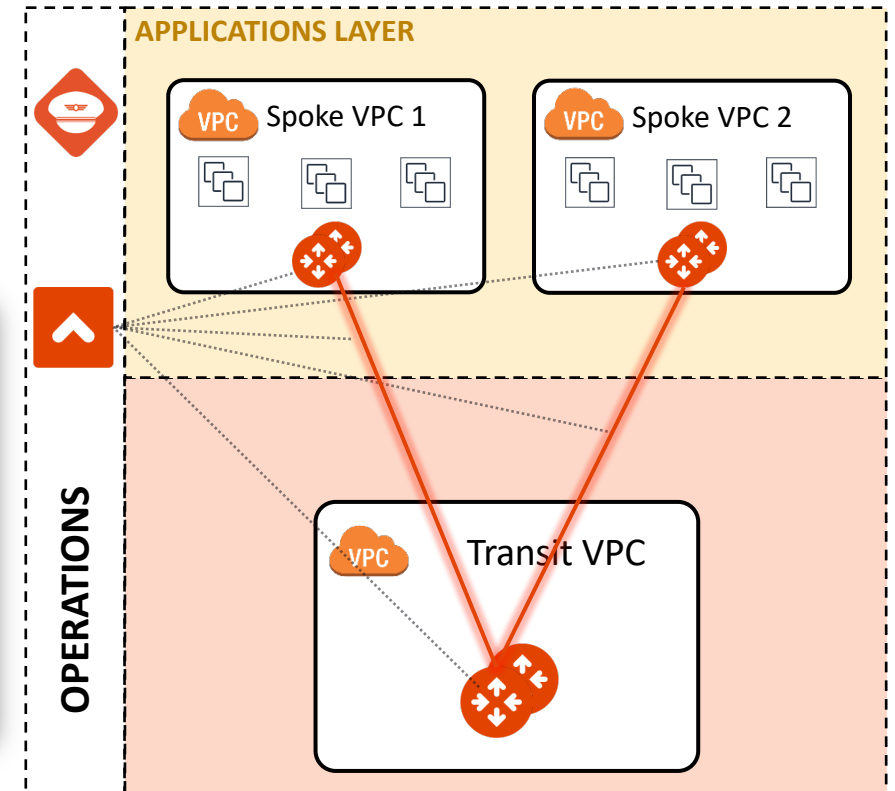
- As soon as the Controller completes the deployment of the **attachments** between Spoke Gateways and Transit Gateways, it will also program the *three RFC1918 routes* in the route tables to point to the ENI of the Spoke Gateways.

Route table for Private Subnet

Routes	Subnet associations	Edge associations	Route propagation	Tags
Routes (4)				
Filter routes				
Destination		Target		
10.0.0.0/8		<a href="#">eni-08ac50fc16cd8c4a5</a>		
10.1.1.0/24		local		
172.16.0.0/12		<a href="#">eni-08ac50fc16cd8c4a5</a>		
192.168.0.0/16		<a href="#">eni-08ac50fc16cd8c4a5</a>		

Route table for Public Subnet

Routes	Subnet associations	Edge associations	Route propagation	Tags
Routes (5)				
Filter routes				
Destination		Target		
0.0.0.0/0		<a href="#">igw-07c6ddedd190d12d3</a>		
10.0.0.0/8		<a href="#">eni-08ac50fc16cd8c4a5</a>		
10.1.1.0/24		local		
172.16.0.0/12		<a href="#">eni-08ac50fc16cd8c4a5</a>		
192.168.0.0/16		<a href="#">eni-08ac50fc16cd8c4a5</a>		



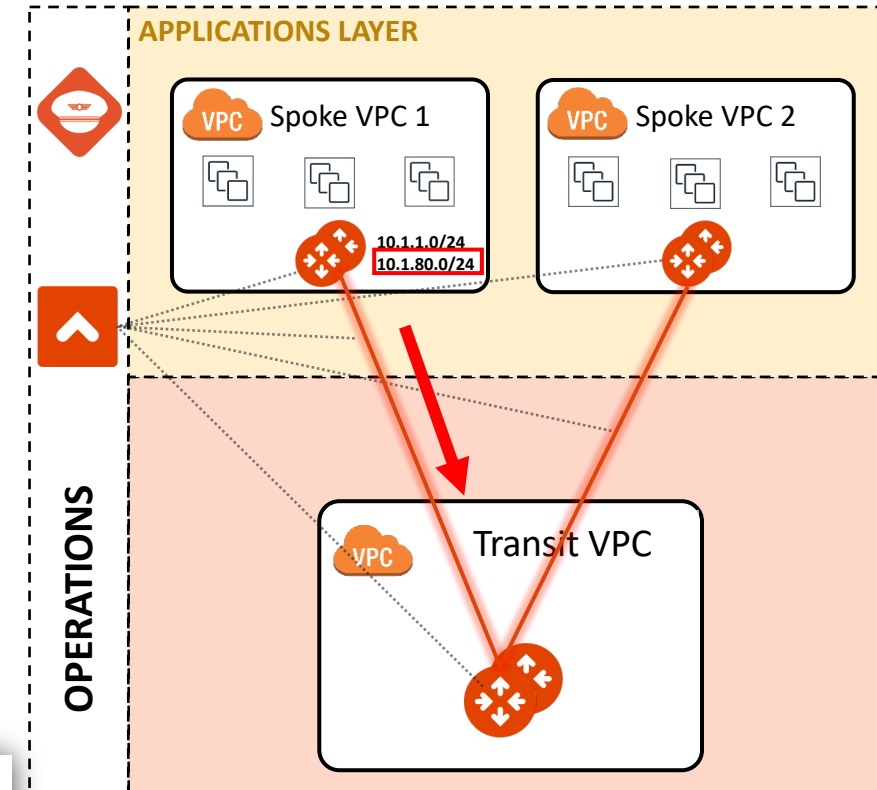
# Routes Manipulation – Customize Spoke Advertised VPC CIDRs

- For example, if you decide to add another CIDR block to an existing VPC, in that case you can also advertise the new CIDR within your MCNA.

CIDRs		Flow logs	Tags
CIDRs Info			
Address type	CIDR		
IPv4	10.1.1.0/24		
IPv4	10.1.80.0/24		

- PATH:** COPILOT > Cloud Fabric > Gateways > Spoke Gateways > select the relevant GW > Settings > Routing > **Customize Spoke Advertised VPC/VNet CIDRs**

The screenshot shows the AviaMatrix console interface. The 'Spoke Gateways' tab is selected in the top navigation bar. Below it, the 'Settings' tab is selected for the gateway 'AVX-AWS-SPOKE-GW-PROD1'. In the left sidebar, the 'Routing' section is expanded. A modal window titled 'Customize Spoke Advertised VPC/VNet CIDRs' is open, showing a list of CIDRs: '10.1.1.0/24' and '10.1.80.0/24'. The 'Save' button is highlighted in blue.



# Routes Manipulation – Customize Spoke VPC Routing Table

- You can also decide to withdraw an RFC1918 route that was previously injected by the Controller, customizing the VPC/Vnet/VCN routing table.

Routes (4)	
<input type="text" value="Filter routes"/>	
Destination	Target
<del>10.0.0.0/8</del>	<a href="#">eni-019dbf18ad5b8857f</a>
10.1.3.0/24	local
172.16.0.0/12	<a href="#">eni-019dbf18ad5b8857f</a>
192.168.0.0/16	<a href="#">eni-019dbf18ad5b8857f</a>

- PATH:** COPILOT > Cloud Fabric > Gateways > Spoke Gateways > select the relevant GW > Settings > Routing > **Customize Spoke VPC/Vnet Route Table**

Gateways Overview Transit Gateways **Spoke Gateways** Specialty Gateways Gateway Management

< AVX-AWS-SPOKE-GW-PROD1

Instances Connections VPC/VNet Route Tables Gateway Routes Interface Stats Route DB **Settings**

Search

Network Address Translation (NAT)

General

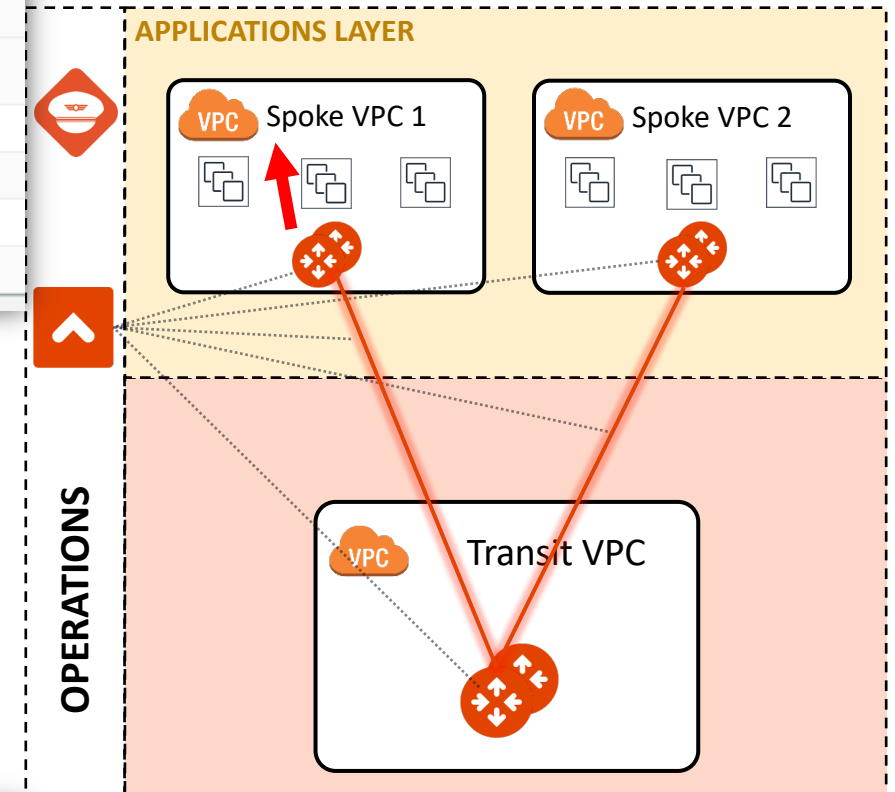
**Routing**

Customize Spoke VPC/VNet Route Table

CIDRs

172.16.0.0/12 192.168.0.0/16

Cancel Save



# Routes Manipulation – Exclude Learned CIDRs to Spoke VPC/VNet Route Table

- You can also decide to filter out a route from the routing table of a Spoke GW.

Gateway Instance		Network Domain				
AVX-AWS-SPOKE-GW-PROD1		All				
		▼	☰	⬇		
Destination	Via	Interface	Next Hop IP	Next Hop Gateway	Metric	
10.1.1.0/24	10.1.1.49	eth0	10.1.1.49		0	
10.1.1.49/32		eth0			100	
<del>10.1.2.0/24</del> + 2 more		tun-0A010147-0	10.1.1.71	AVX-AWS-SPOKE-GW-PROD...	200	

- PATH:** COPILOT > Cloud Fabric > Gateways > Spoke Gateways > select the relevant GW > Settings > Routing > **Exclude Learned CIDRs to Spoke VPC/Vnet Route Table**

Gateways Overview Transit Gateways **Spoke Gateways** Specialty Gateways Gateway Management

AVX-AWS-SPOKE-GW-PROD1

Instances Connections VPC/VNet Route Tables Gateway Routes Interface Stats Route DB **Settings**

Search

Network Address Translation (NAT)

General

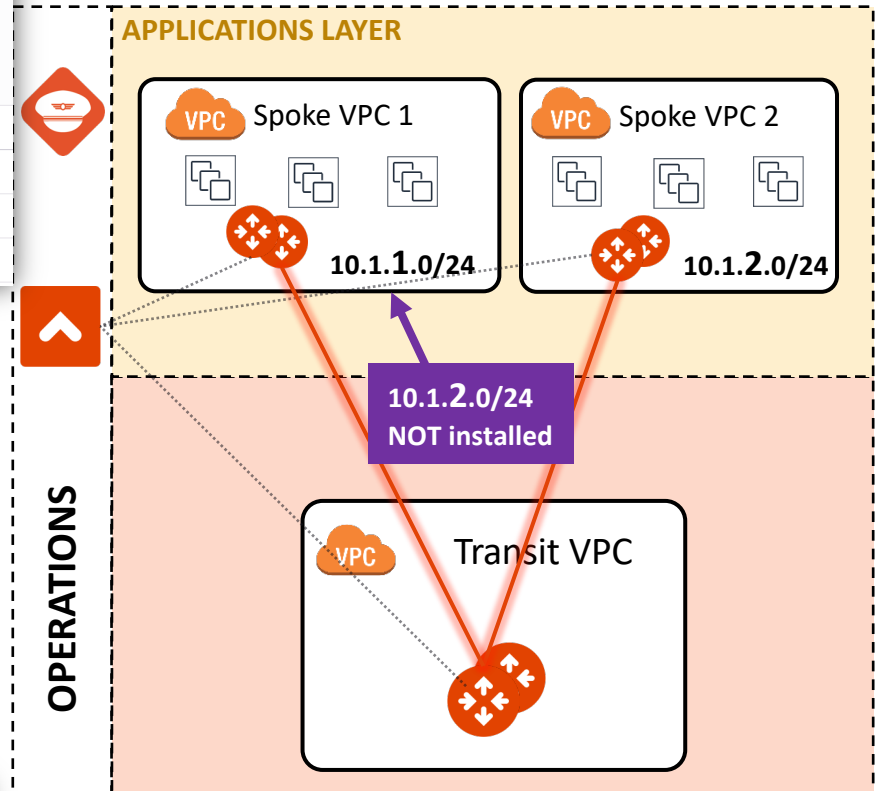
**Routing**

**Exclude Learned CIDRs to Spoke VPC/VNet Route Table**

CIDRs

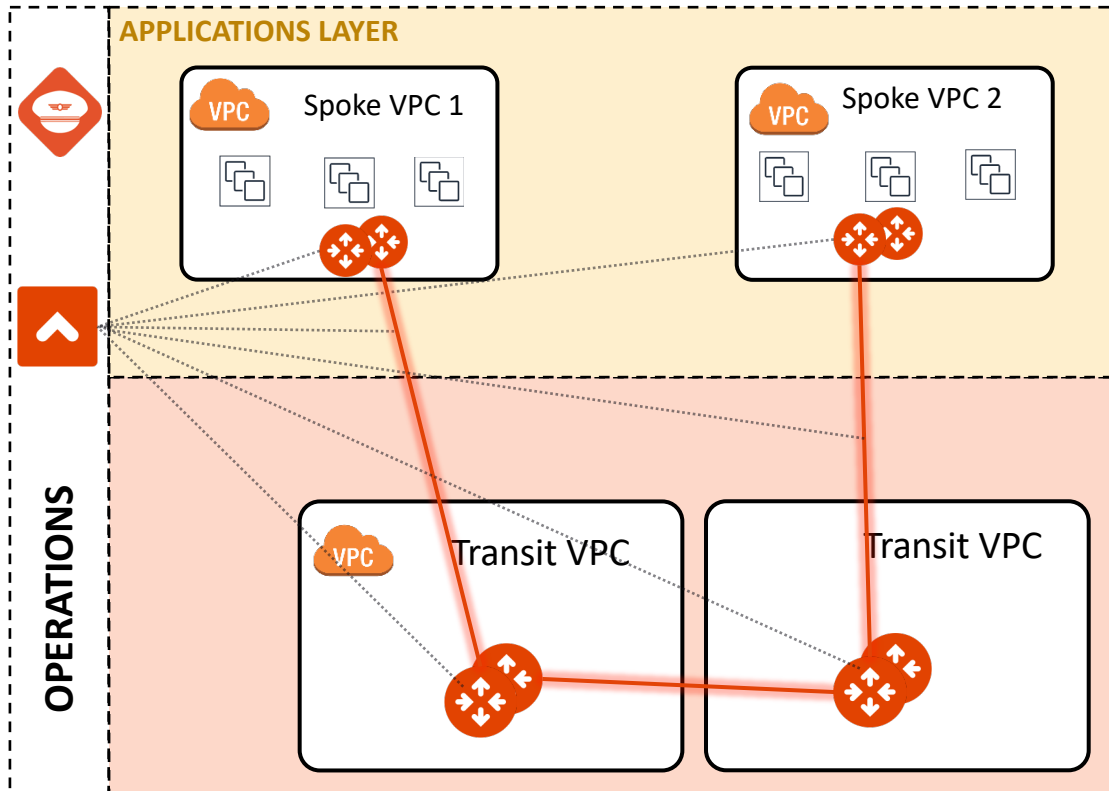
10.1.2.0/24

Cancel Save

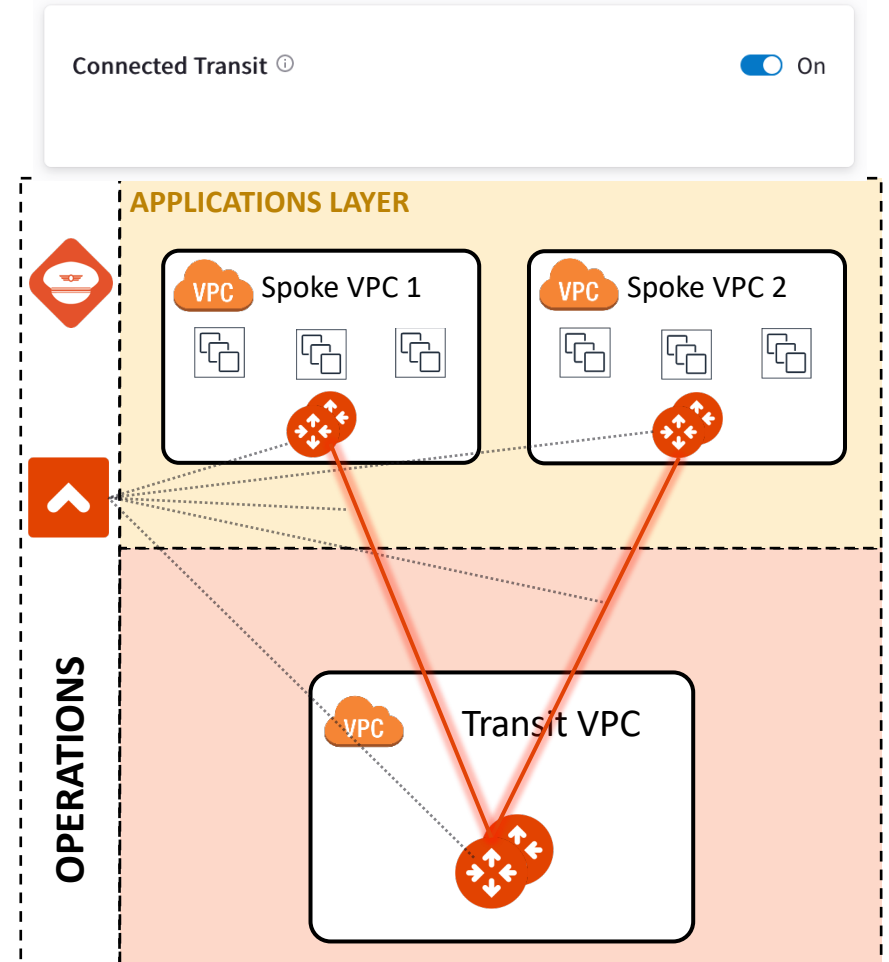


# Routes Manipulation – Connected Transit

- **By default**, Aviatrix Spoke VPCs/VNets do not have routing established to communicate with each other via Transit. They are completely segmented.
- Each Spoke VPC should be connected to its own dedicated Transit VPC.



- If you would like to build a full mesh network where Spoke VPCs/VNets communicate with each other via Transit GW, you can achieve that by enabling **Connected** **Transit** mode.



# NAT - Overview

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- The Aviatrix Spoke Gateways provide advanced NAT capabilities.
- Three NAT functions are supported:
  - ❑ **Source NAT:**
    - Two modes of Source NAT are supported:
      - Single IP
      - Customized SNAT
  - ❑ **Destination NAT**
  - ❑ **Mapped NAT**

# Source NAT: Single IP

The screenshot displays the AWS Management Console interface for configuring a Spoke Gateway. The navigation pane on the left shows the hierarchy: Gateways > Overview > Transit Gateways > Spoke Gateways. The main content area shows the configuration for the gateway 'AVX-AWS-SPOKE-GW-PROD1'. The 'Settings' tab is selected, and the 'Network Address Translation (NAT)' section is expanded. Under 'Source NAT', the 'Single IP' option is selected. The 'On' toggle for Source NAT is also visible. The 'Save' button is highlighted.

Gateways Overview Transit Gateways **Spoke Gateways**

< AVX-AWS-SPOKE-GW-PROD1

Instances Connections VPC/VNet Route Tables Gateway Routes Interfaces Route DB **Settings**

Search

**Network Address Translation (NAT)**

**Source NAT**

☒ Single IP ☐ Customized SNAT

☒ On

Cancel Save

- **PATH:** COPILOT > Cloud Fabric > Gateways > Spoke Gateways > select the relevant gateway > Settings > **NAT**
- In addition to the RFC1918 routes, the Controller will also install a *quad zero* route that points to the ENI of the Spoke Gateway.



# Source NAT: Customized SNAT

- When **Customized SNAT** is selected, the gateway can translate source IP address ranges to different SNAT address and ports.

Network Address Translation (NAT)

**Source NAT** ⓘ On

☐ Single IP ☒ Customized SNAT


Instance: AVX-AWS-SPOKE-GW-PROD1

[+ Rule](#) | [Filter](#) [Grid](#) [Download](#) | Unsaved Changes: [Add: 1](#) |

Src CIDR	Src Port	Dst CIDR	Dst Port	Protocol	Connection	Mark	SNAT IPs	SNAT Port	Apply Route Entry	Exclude Route Table	
10.1.1.0/24		10.1.2.0/24		all	None		192.168.1.0/24		<input checked="" type="checkbox"/>		

Total 1 Rule

[Cancel](#) [Save](#)



# Destination NAT

- Destination NAT (**DNAT**) allow you to change the destination to a virtual address range.

^ Network Address Translation (NAT)

**Source NAT** Off

**Destination NAT** On

Instance  
ace-aws-eu-west-1-spoke1

+ Rule | Filter | Download

Unsaved Changes: Add: 1 | Search

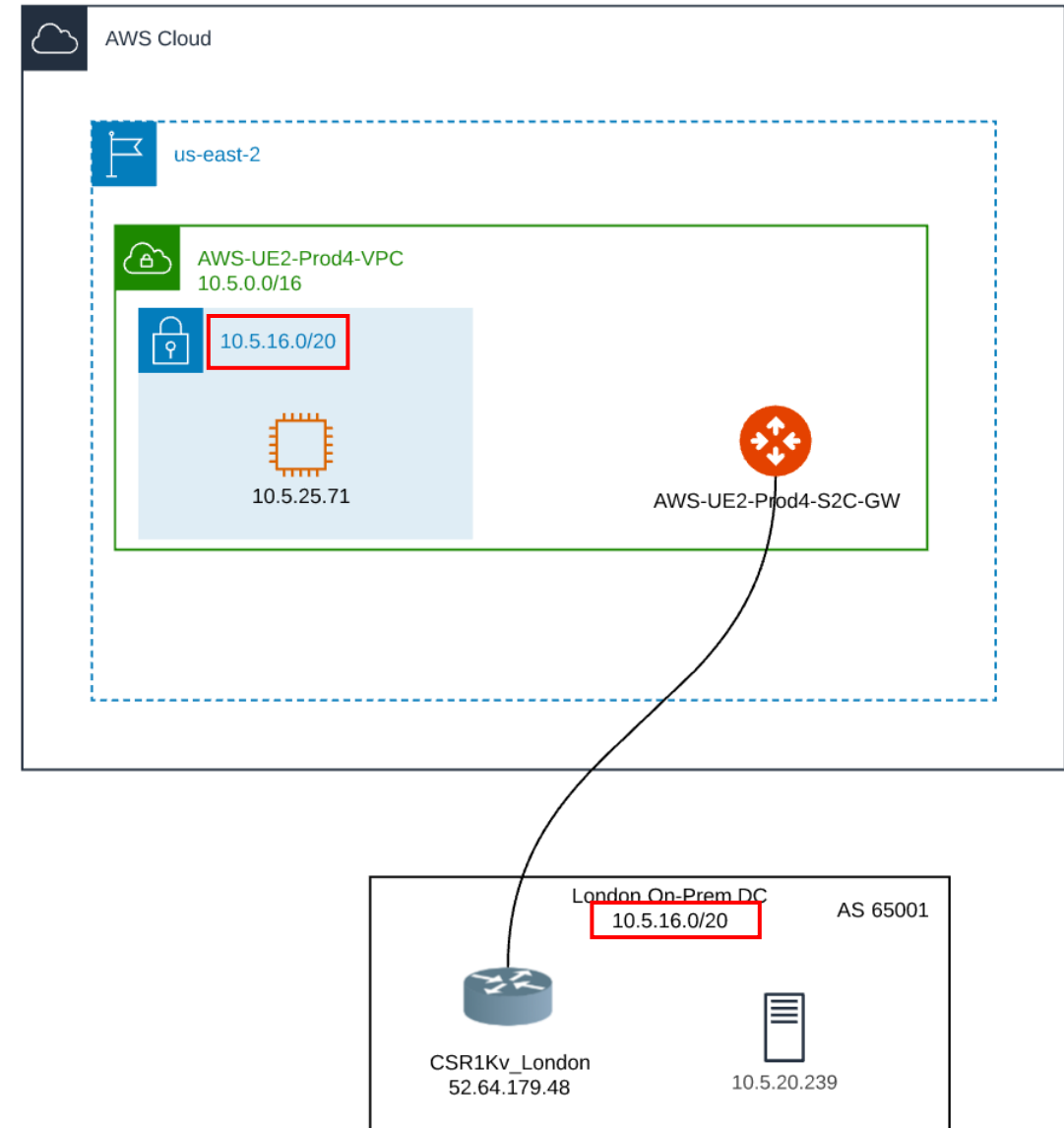
Src CIDR	Src Port	Dst CIDR	Dst Port	Protocol	Connection	Mark	DNAT IPs	DNAT Port	Apply Route Entry	Exclude Route Table
10.1.1.0/24		172.16.211.0/24		all	None		50.50.50.1-50.50.50.254		<span>On</span>	

Total 1 Rule

Cancel Save

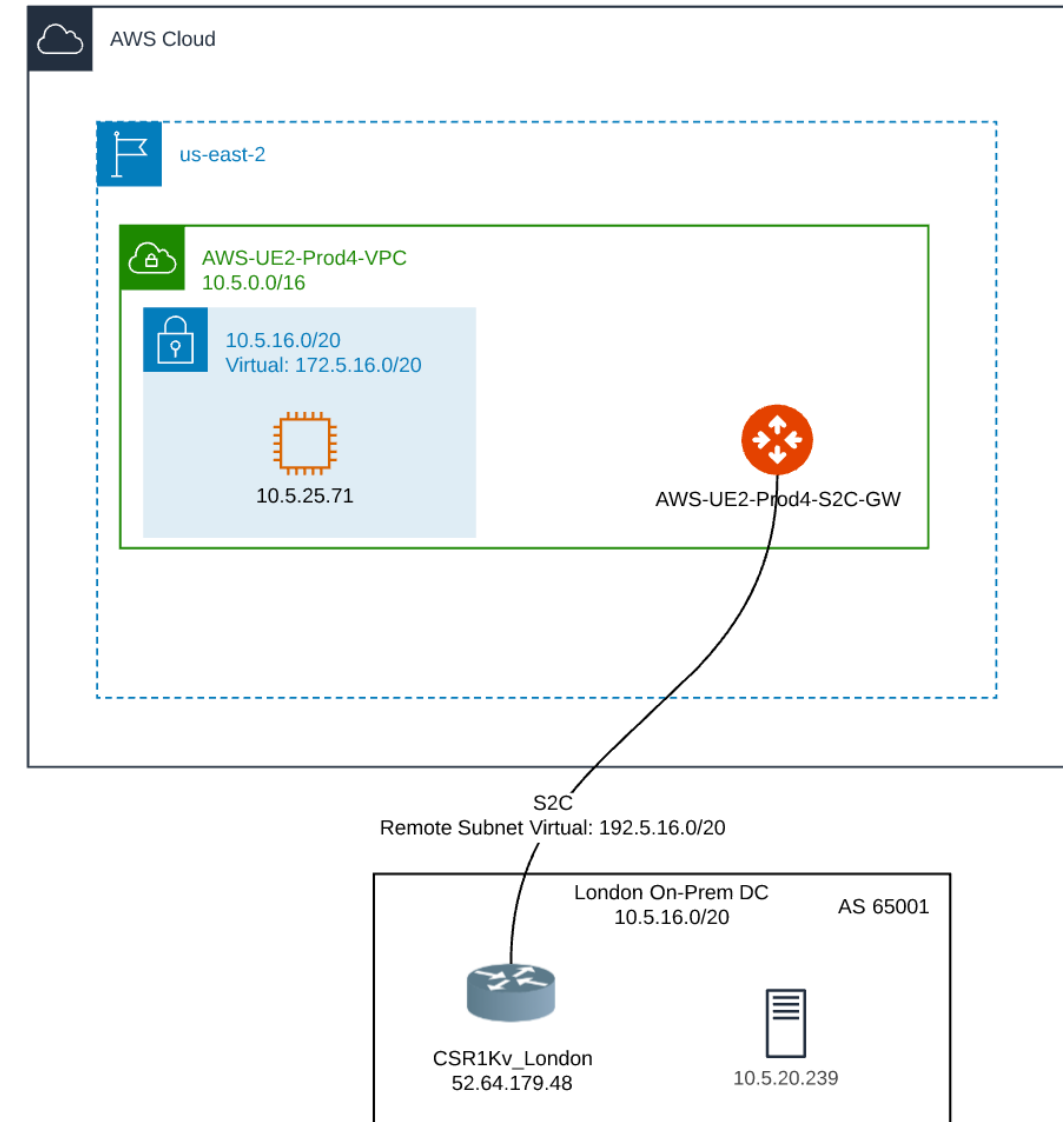
# Mapped NAT - Overview

- Need to connect overlapping networks between the cloud and on-prem
- Don't want the on-prem router to implement any NAT
  - Keep it simple with no on-prem dependency
  - Many on-prem routers have no NAT, or very limited NAT
- The host information must be preserved
- No NAT overload requirement anywhere
- The configuration must be simple and scalable

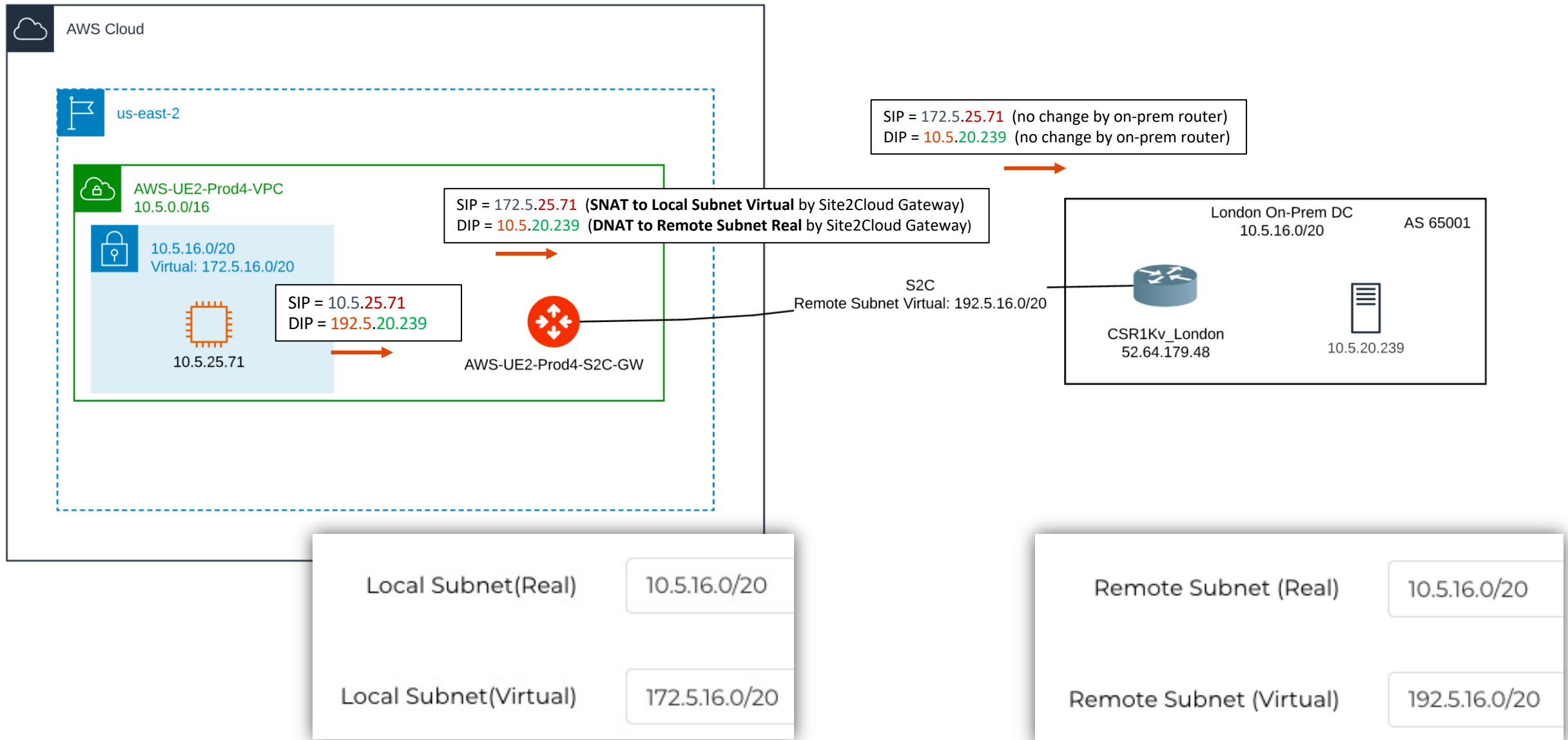


# Mapped NAT – Virtual Subnets

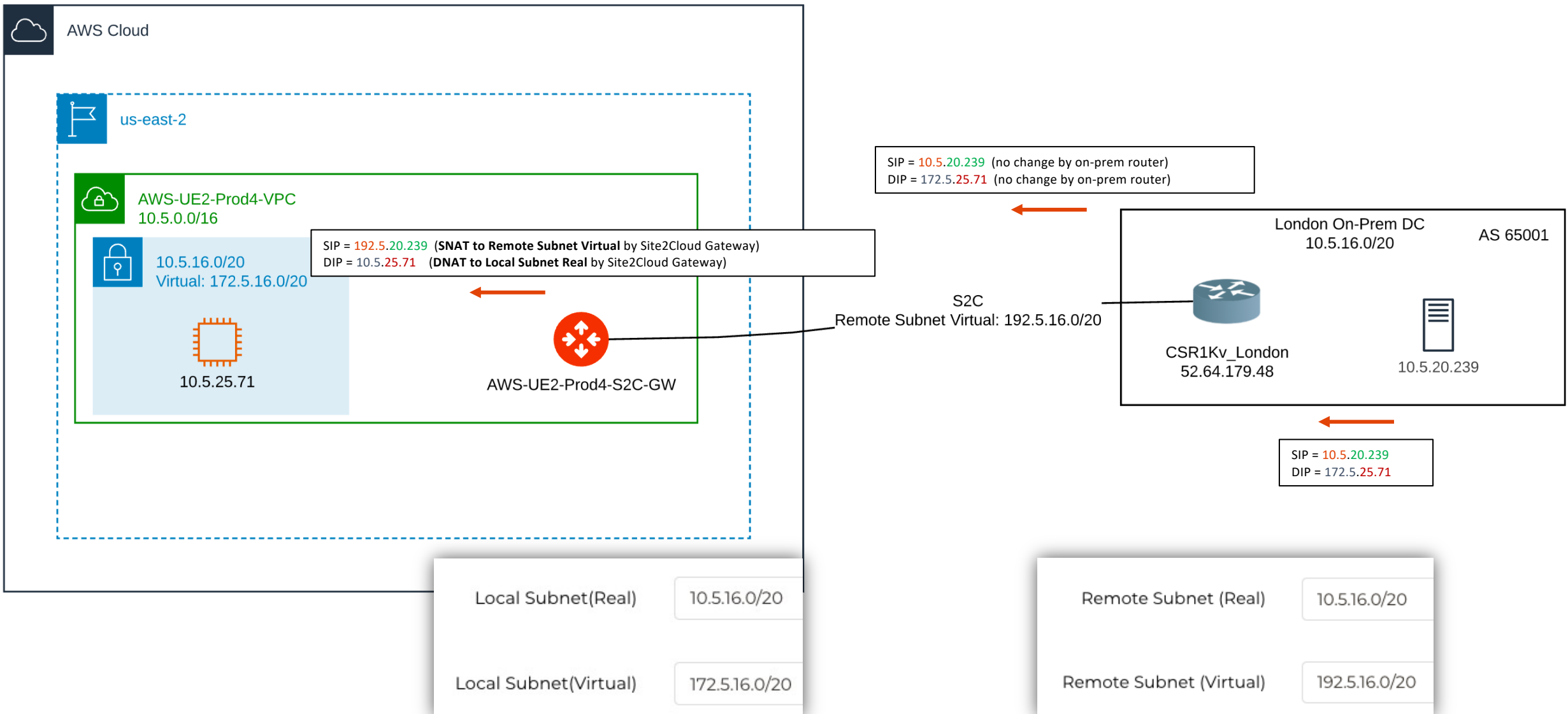
- **Virtual subnets**, which are defined to be unique (not necessarily RFC1918), are used for communication between overlapping VPC and on-prem
- The Site2Cloud Gateway **NATs between real subnets and virtual subnets**, while **preserving the host information** in the IP
- There is **no need for any on-prem NAT** operations
- The configuration is extremely **simple**, and it does not require individual /32 NAT rules
- **Route-based IPsec** is required



# Mapped NAT – Packet Walk (from Local to Remote)



# Mapped NAT – Packet Walk (from Remote to Local)



# Tools for Operating your Routes Manipulation & NAT

# Routes Manipulation - ACTIONS

- **PATH:** COPILOT > Cloud Fabric > Gateways > Spoke Gateways > select the relevant GW > Settings > **Routing**

^ Routing

Configure Private VPC/VNet Default Route ⓘ

Off

Customize Spoke VPC/VNet Route Table ⓘ

CIDRs

Update Encrypted Spoke VPC/VNet CIDRs

Update

Skip Public VPC/VNet Route Table ⓘ

Off

Exclude Learned CIDRs to Spoke VPC/VNet Route Table ⓘ

CIDRs

Auto Advertise Spoke Site2Cloud CIDRs ⓘ

Off

Customize Spoke Advertised VPC/VNet CIDRs ⓘ

CIDRs



# NAT

- **PATH:** COPILOT > AirSpace > Gateways > Spoke Gateways > select the relevant GW > Settings > **NAT**

^ Network Address Translation (NAT)

Source NAT ⓘ

Single IP

Customized SNAT

On

Cancel

Save

Destination NAT ⓘ

On

Instance

AVX-AWS-SPOKE-GW-PROD1

+ Rule

Search

Src CIDR	Src Port	Dst CIDR	Dst Port	Protocol	Connection	Mark	DNAT IPs	DNAT Port	Apply Route Entry	Exclude Route Table
No Rules										

Total 0 Rules



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Next:

Lab 5 Routes Manipulation &  
NAT