



# AWS Direct Connect Deep Dive

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 @sseymour



# What is AWS Direct Connect ?

# AWS Direct Connect



- Dedicated, private connection into AWS
- Create private (VPC) or public virtual interfaces to AWS
- Reduced data-out rates (data-in is free)
- Consistent network performance
- Option for redundant connections
- Work with Multiple AWS Regions
- Multiple AWS accounts can share a connection
- Uses BGP to exchange routing information over a VLAN
- HIPAA Eligible Service

# The Toolbox



Virtual Private Cloud



VPN Connections

172.16.0.0  
172.16.1.0  
172.16.2.0

Route Tables



Customer Gateway



Internet Gateway



AWS Direct Connect



Virtual Private Gateway



Direct Connect Gateway

# The Toolbox



Virtual Private Cloud



AWS Direct Connect

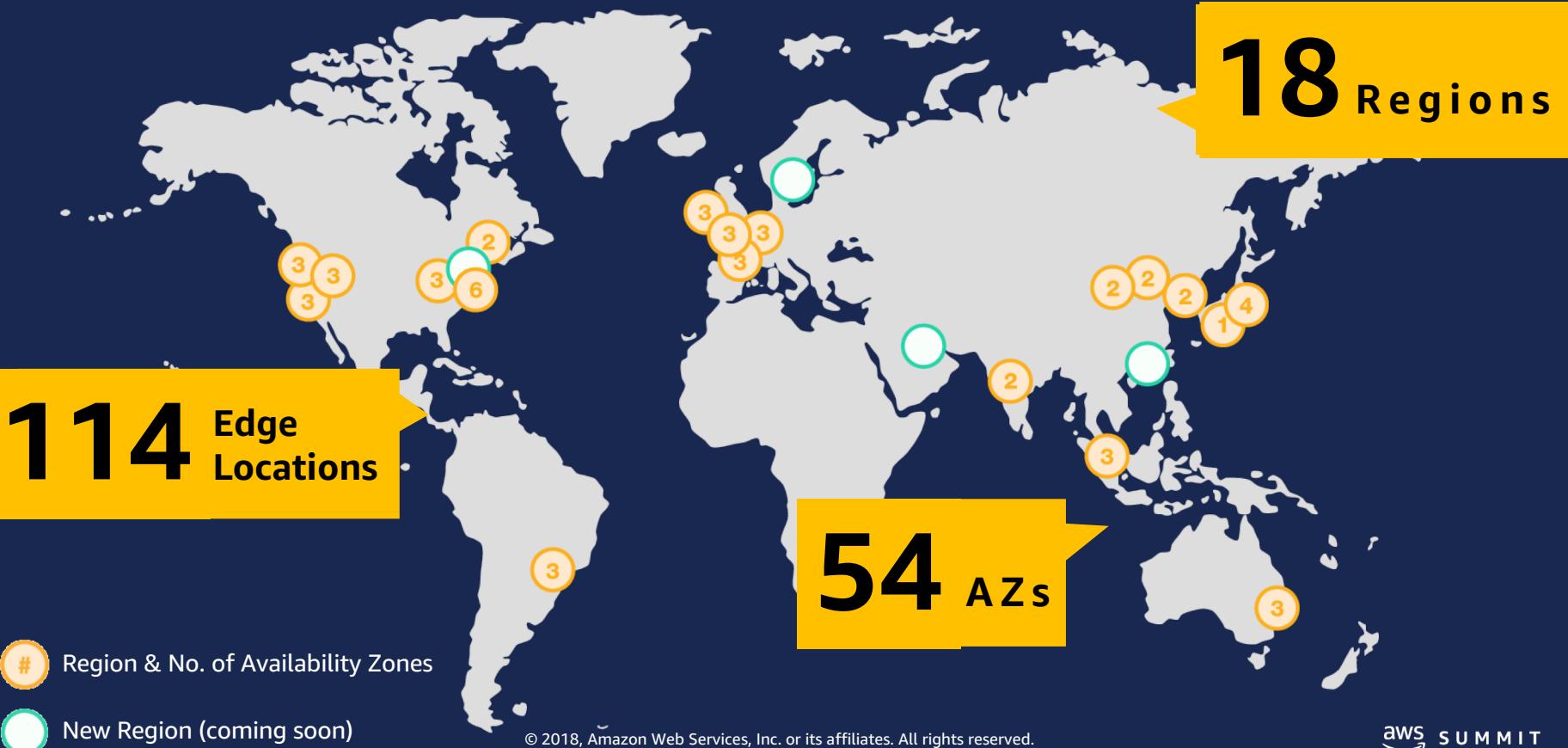


Virtual Private Gateway



Direct Connect Gateway

# Global Infrastructure



# AWS Direct Connect

84 Direct Connect Locations (June 2018)



**84** Direct  
Connect  
Locations

AWS Region

Direct Connect  
Location

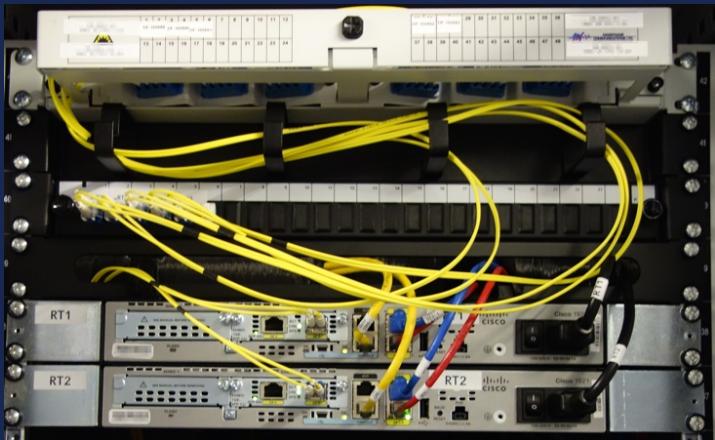
# Terminology for physical connections



- Dark fiber, DWDM
- Leased line
- Ethernet private line
- Pseudo-wire
- Point-to-point circuit
- LAN extension
- MPLS/VPLS/IP-VPN/L3-VPN
- MetroE, L2 link, eline, QinQ, EoMPLS

# Physical connection

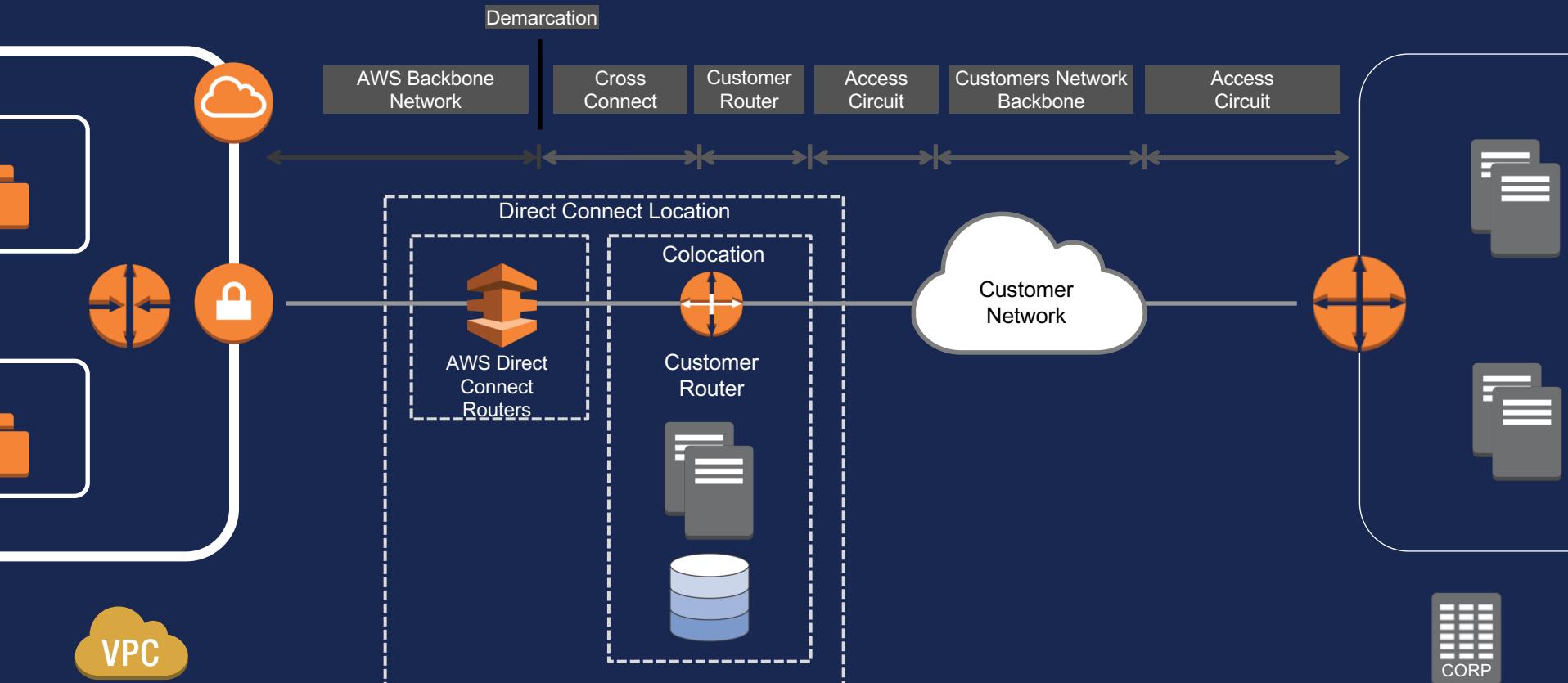
- Cross connect at the location
- Single mode fiber
  - 1000Base-LX or 10GBASE-LR
- Potential onward delivery via Direct Connect Partner
- Customer router



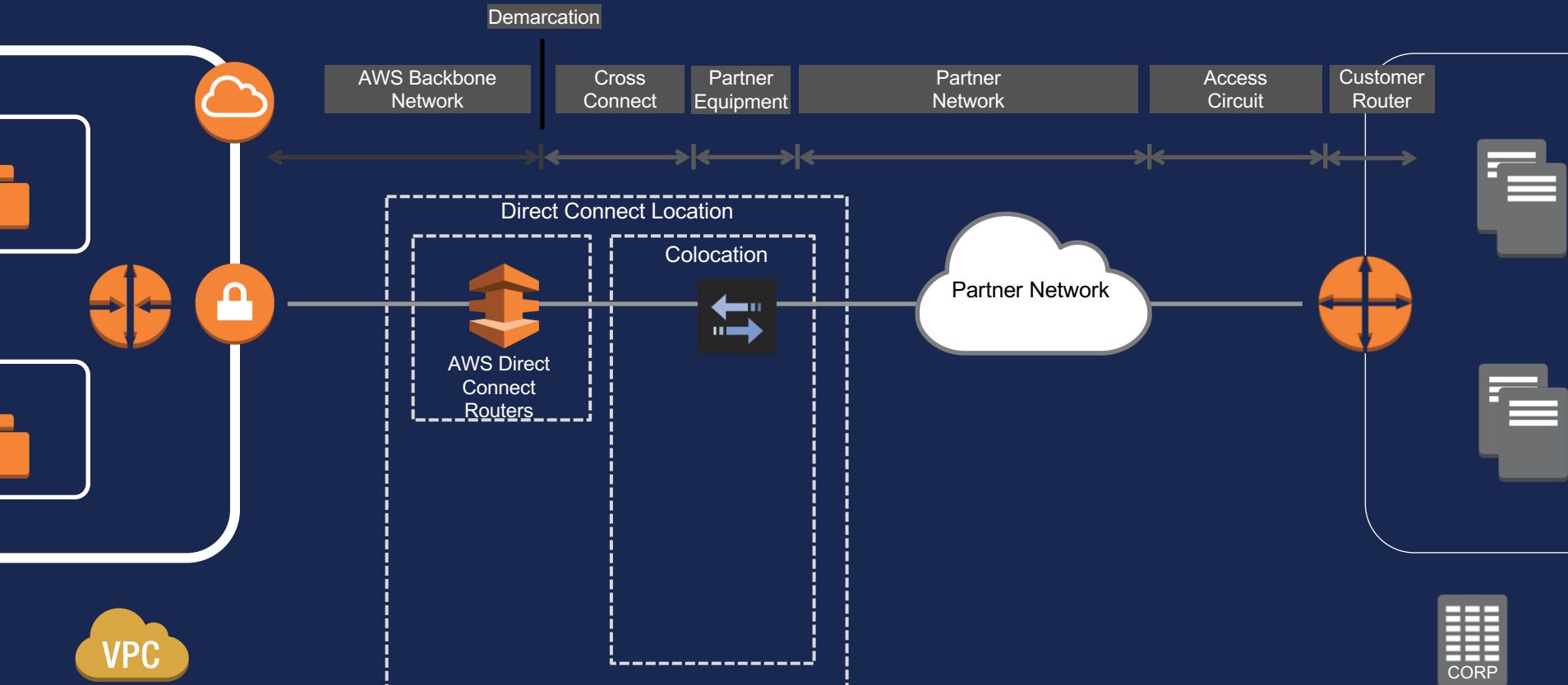
# 1 G/10 G dedicated vs. hosted connections

- 1 G/10 G dedicated ports—‘regular connections’
  - Full port speed available to you
  - Supports multiple virtual interfaces
- Hosted connections—sub-1G (50 Mbps–500 Mbps)
  - Provided on a partner interconnect
  - Each hosted connection has defined bandwidth and VLAN
  - Each hosted connections supports a single virtual interface

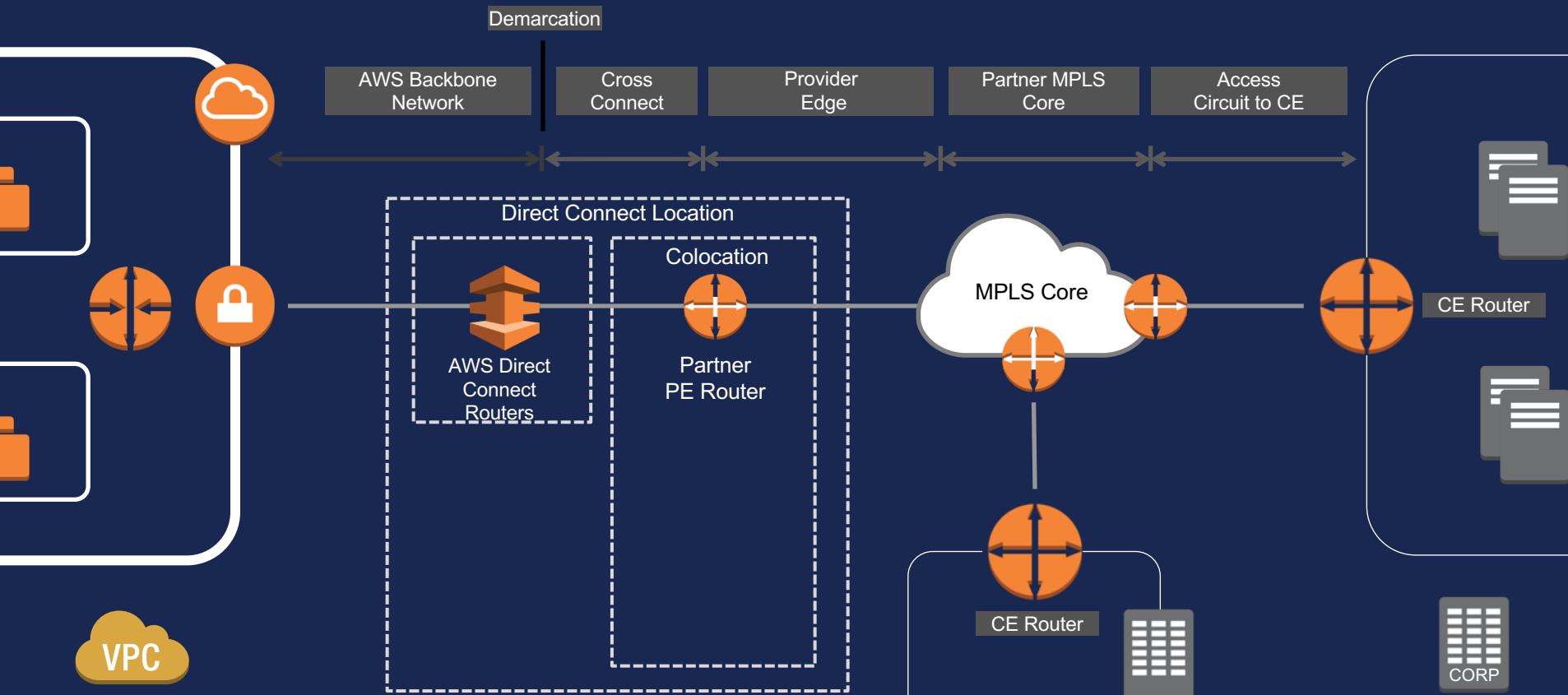
# At the Direct Connect Location



# Dedicated Port via Direct Connect Partner



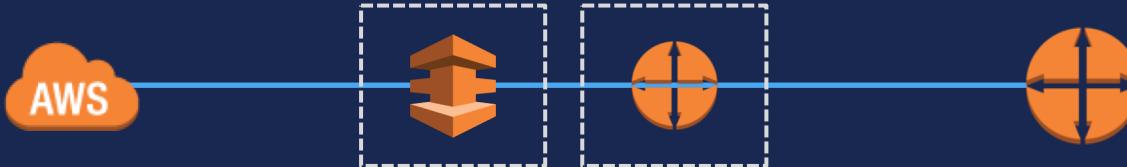
# At the Direct Connect Location – via MPLS



# Direct Connect—physical connectivity



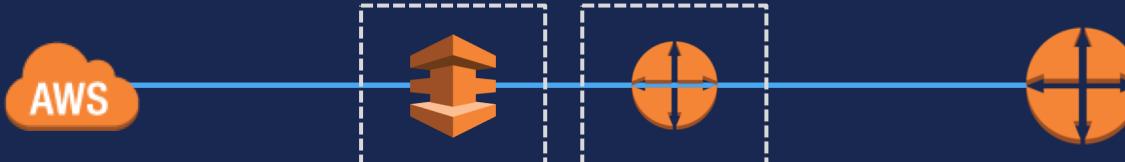
- 1) Customer presence in the same DX location



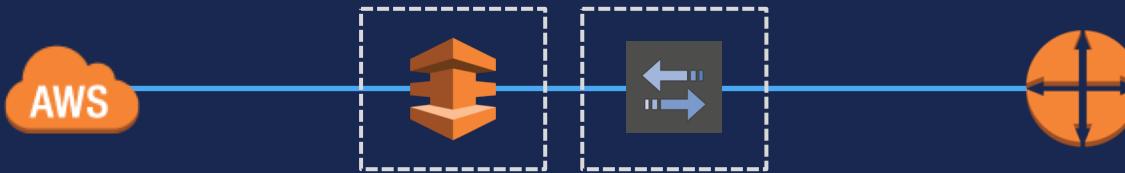
# Direct Connect—physical connectivity



1) Customer presence in the same DX location



2) Circuit between customer data center and DX location



# Direct Connect—physical connectivity



1) Customer presence in the same DX location



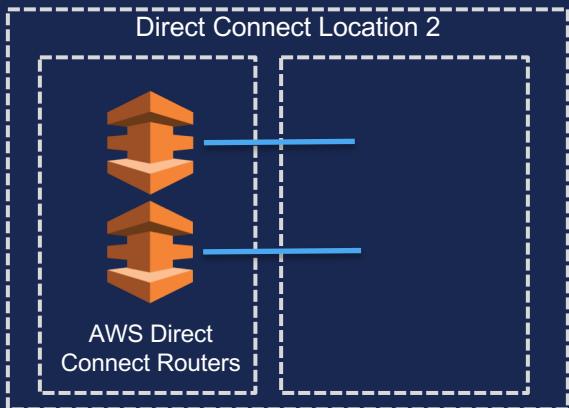
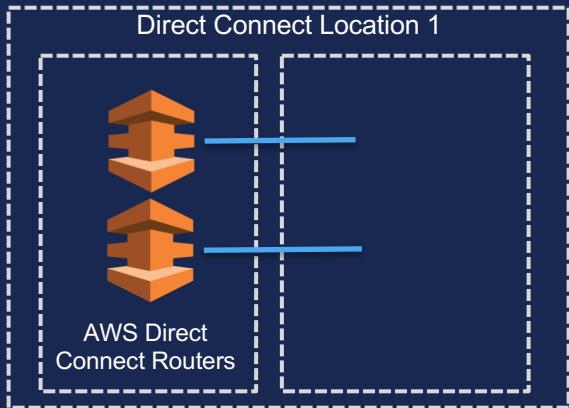
2) Circuit between customer data center and DX location



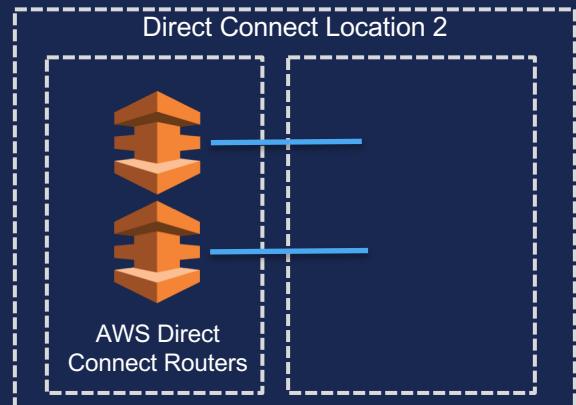
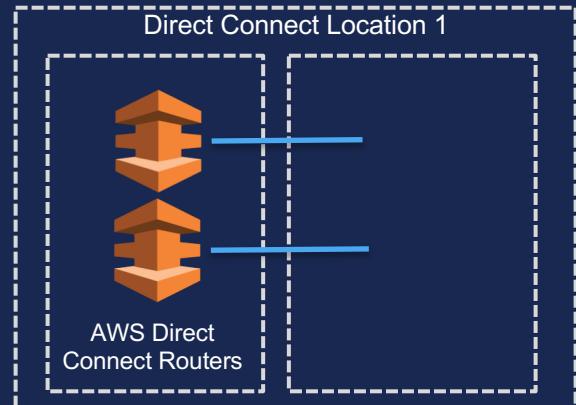
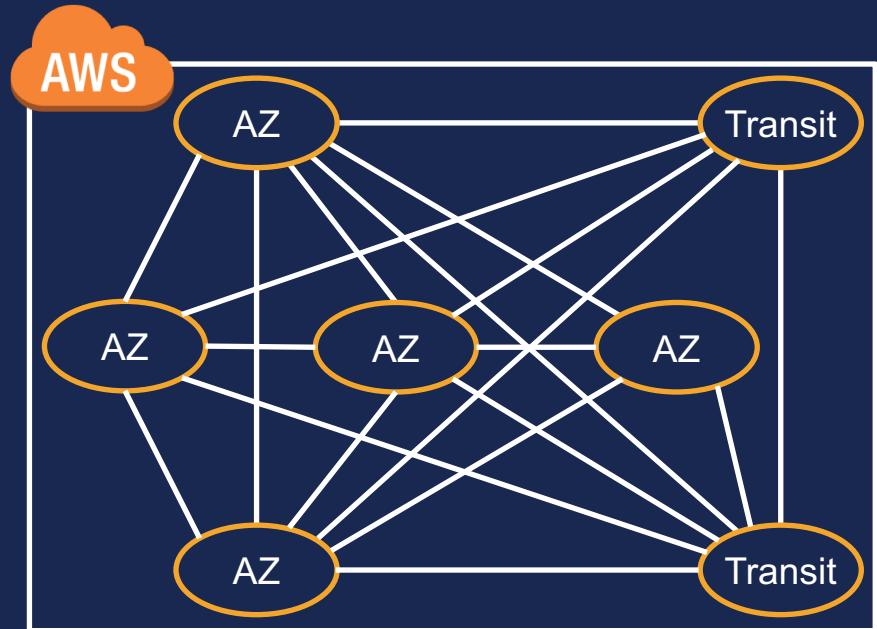
3) Service provider network extending to DX location



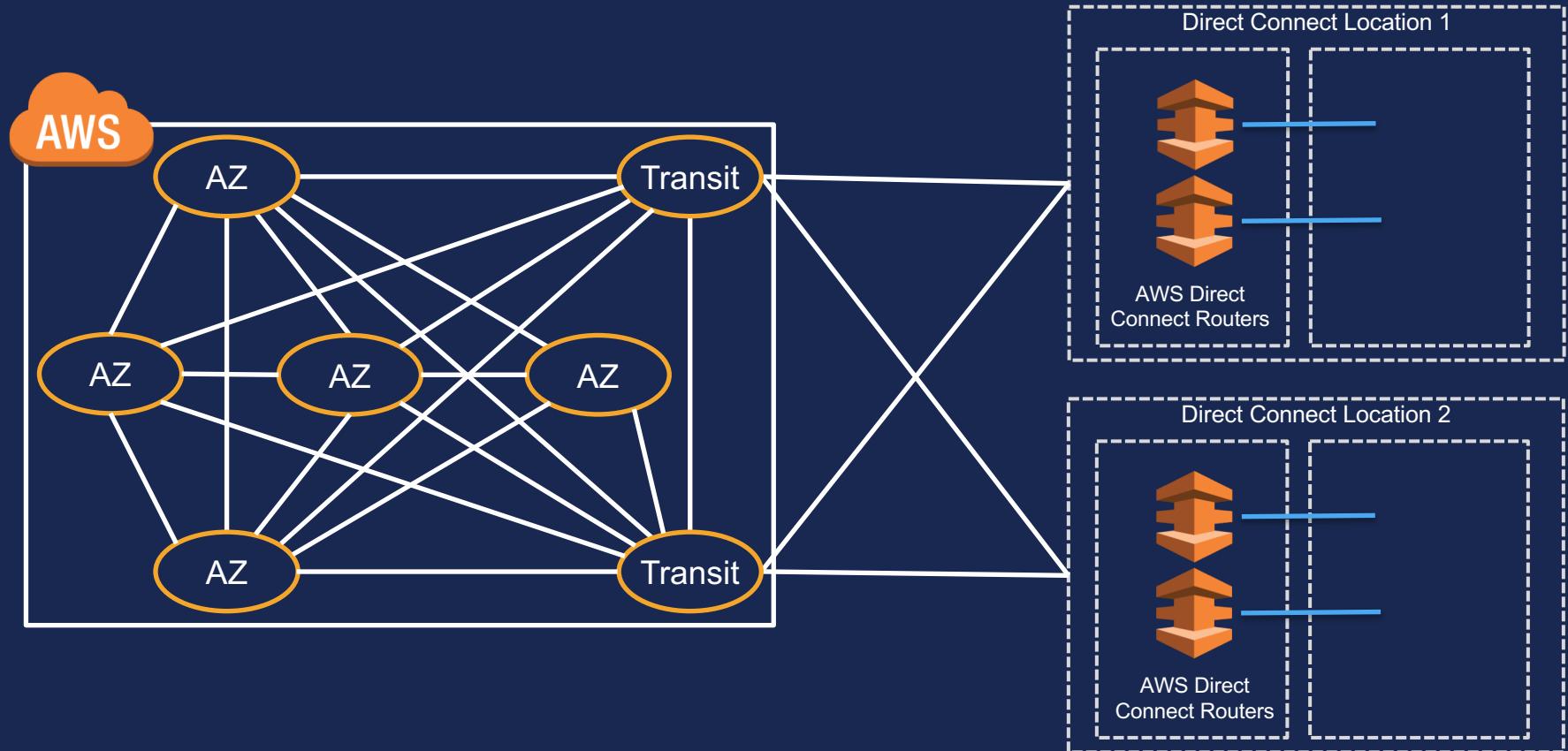
# Direct Connect—resilient & diverse paths



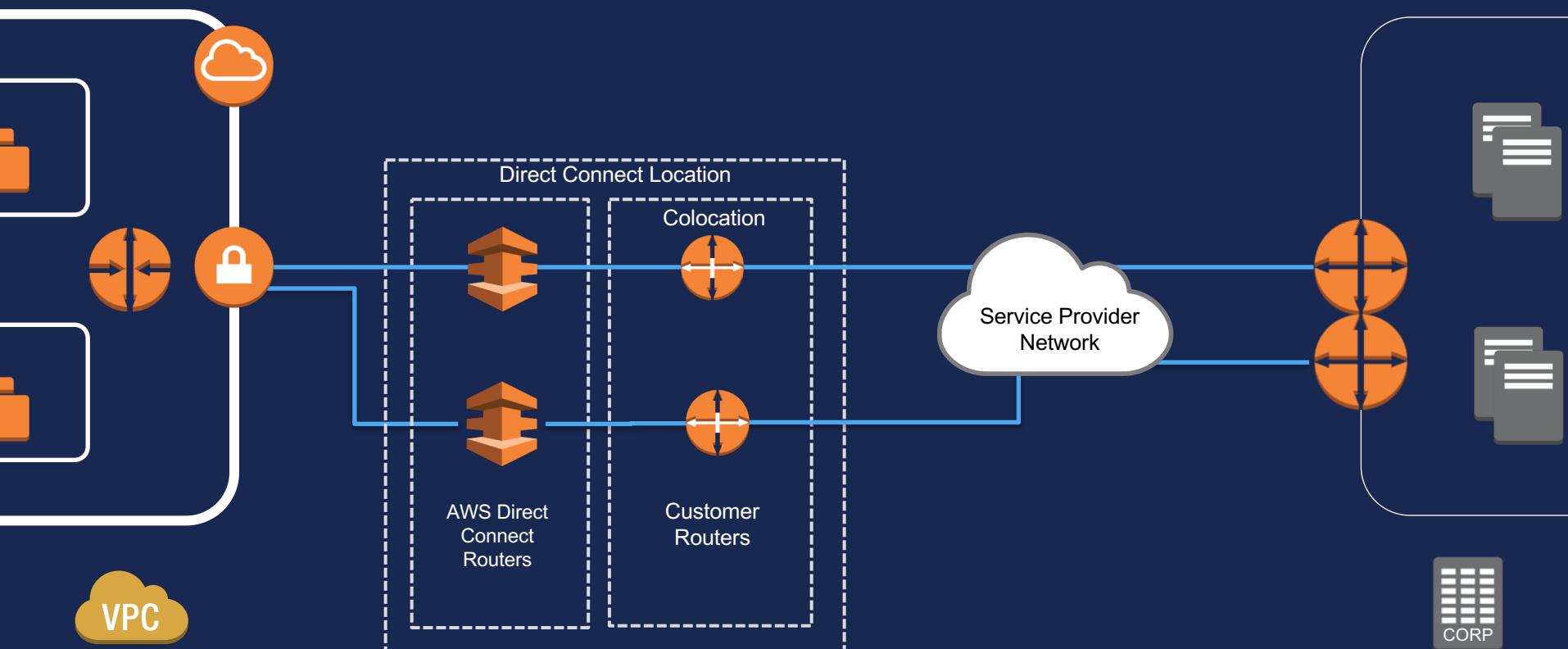
# Direct Connect—resilient & diverse paths



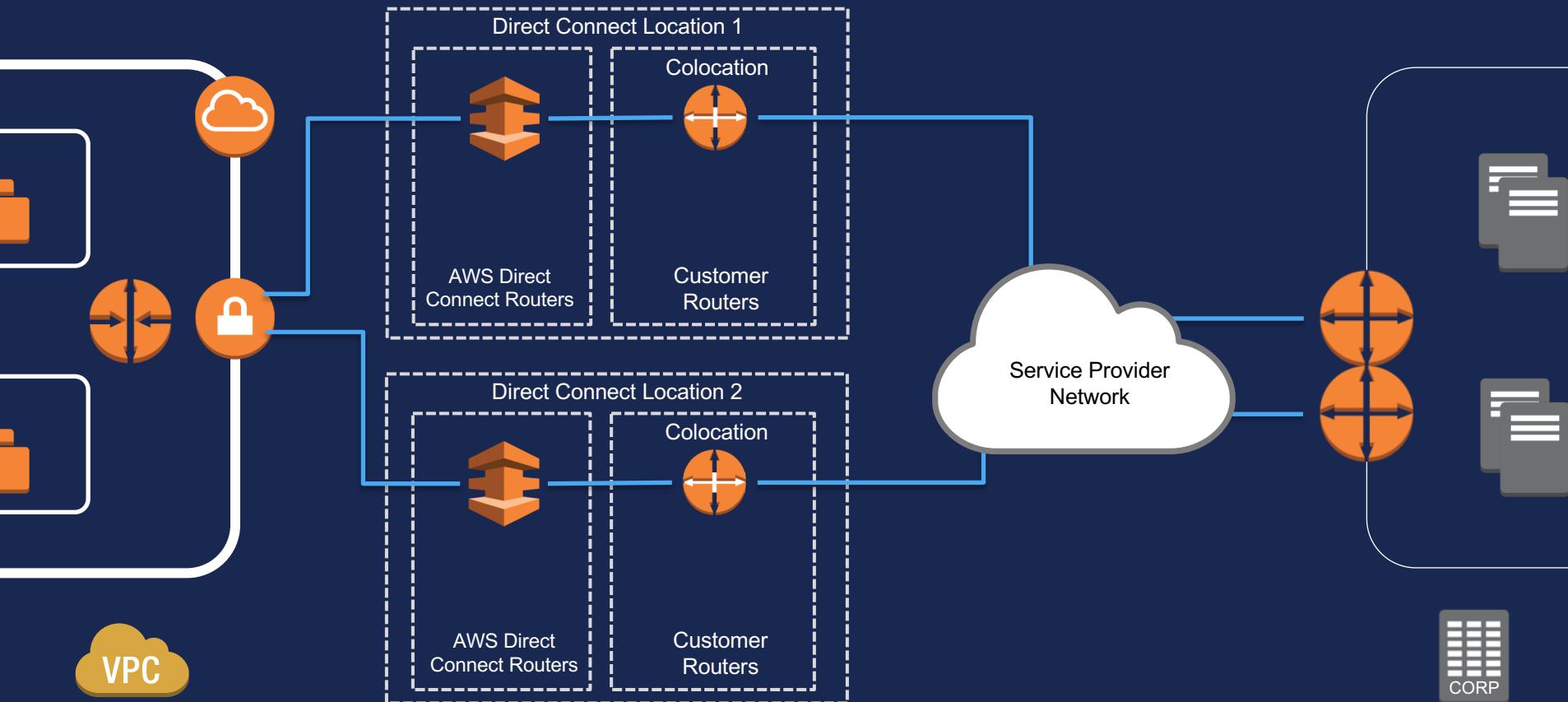
# Direct Connect—resilient & diverse paths



# Single Direct Connect Location – 2 Connections



# Multiple Direct Connect Locations





# Ordering Process

# How to order AWS Direct Connect



## 1. Select Your Region



## 2. Create a Connection



## 3. Receive LOA-CFA

## 4. Cross Connect

## 5. Create Virtual Interface

## 6. Configure Customer Router

US East (N. Virginia)

US East (Ohio)

US West (N. California)

US West (Oregon)

Asia Pacific (Mumbai)

Asia Pacific (Seoul)

Asia Pacific (Singapore)

Asia Pacific (Sydney)

Asia Pacific (Tokyo)

Canada (Central)

EU (Frankfurt)

EU (Ireland)

**EU (London)**

EU (Paris)

South America (São Paulo)

# How to order AWS Direct Connect

1. Select Your Region

2. Create a Connection

3. Receive LOA-CFA

4. Cross Connect

5. Create Virtual Interface

6. Configure Customer Router

**Create a Connection**

You are currently operating in EU (London). Use the region selector to change to another AWS region.

To begin, name your new Connection, select the AWS Direct Connect location in this region where you would like to connect, and the port speed you are requesting. If these choices don't fit your use case, for other options to connect you can [contact one of our partners](#).

Please note that port-hours are billed once the connection between the AWS router and your router is established, or 90 days after you ordered the port, whichever comes first. For more information, please [see our FAQ](#).

Connection Name	Demo	<a href="#">i</a>
Location	Telehouse West, London, GBR	<a href="#">i</a>
Port Speed	<input checked="" type="radio"/> 1Gbps <input type="radio"/> 10Gbps	<a href="#">i</a>

[Cancel](#) [Create](#)



# How to order AWS Direct Connect



1. Select Your Region

2. Create a Connection

3. Receive LOA-CFA

4. Cross Connect

5. Create Virtual Interface

6. Configure Customer Router

Letter of Authorization and Connecting Facility Assignment	
Issue Date	Requested By
March 16, 2013	
Issued By*	Issued To
VADATA, Inc.	IBX - Equinix DC2
Facility - Cage Number	AWS Direct Connection ID
Equinix DC2 - 2030	dxcon-fglbz3ny
Rack, Patch Panel, Port Number	Cable Type
Rack: 211 Patch Panel: CP:0211:104714 Strands: 13/14	Single Mode Fiber
Access Ticket Number**	
0020398879	

# How to order AWS Direct Connect



1. Select Your Region

2. Create a Connection

3. Receive LOA-CFA

4. Cross Connect

5. Create Virtual Interface

6. Configure Customer Router

EU (London)	
Location	How to request a connection
Digital Realty (UK), Docklands	Requests for cross connects can be submitted by contacting Digital Realty (UK) at <a href="mailto:amazon.orders@digitalrealty.com">amazon.orders@digitalrealty.com</a> .
Equinix LD5, London (Slough)	Requests for cross connects can be submitted by contacting Equinix at <a href="mailto:awsdealreg@equinix.com">awsdealreg@equinix.com</a> .
Equinix MA3, Manchester	Requests for cross connects can be submitted by contacting Equinix at <a href="mailto:awsdealreg@equinix.com">awsdealreg@equinix.com</a> .
Telehouse West, London	Requests for cross-connects can be submitted by contacting Telehouse UK at <a href="mailto:sales.support@uk.telehouse.net">sales.support@uk.telehouse.net</a> .

# How to order AWS Direct Connect

## 1. Select Your Region

## 2. Create a Connection

## 3. Receive LOA-CFA

## 4. Cross Connect

## 5. Create Virtual Interface

## 6. Configure Customer Router

**Create a Virtual Interface**

You may choose to create a private or public virtual interface. Select the appropriate option below.

**Private** - A private virtual interface should be used to access an Amazon VPC using private IP addresses.

**Public** - A public virtual interface can access all AWS public services (including EC2, S3, and DynamoDB) using public IP addresses.

**Define Your New Private Virtual Interface**

Enter the name of your virtual interface. If you're creating a virtual interface for another account, you'll need to provide the other AWS account ID. For more information about virtual interface ownership, see "Hosted Virtual Interfaces" in the [AWS Direct Connect Getting Started Guide](#).

**Connection:**  ⓘ

**Interface Name:**  ⓘ

**Interface Owner:**  My AWS Account  Another AWS Account ⓘ

**VGW:**  ⓘ

Enter the VLAN ID, if not already supplied by your AWS Direct Connect partner, and the IP Addresses for your router interface and the AWS Direct Connect interface.

**VLAN:**  ⓘ

**Auto-generate peer IPs:**  ⓘ

Before you can use your virtual interface, we must establish a BGP session. You must provide an ASN for your router. You will also need an MD5 key to authenticate the BGP session. We can generate one for you, or you can supply your own.

**BGP ASN:**  ⓘ

**Auto-generate BGP key:**  ⓘ

**WS SUMMIT**

# How to order AWS Direct Connect



1. Select Your Region

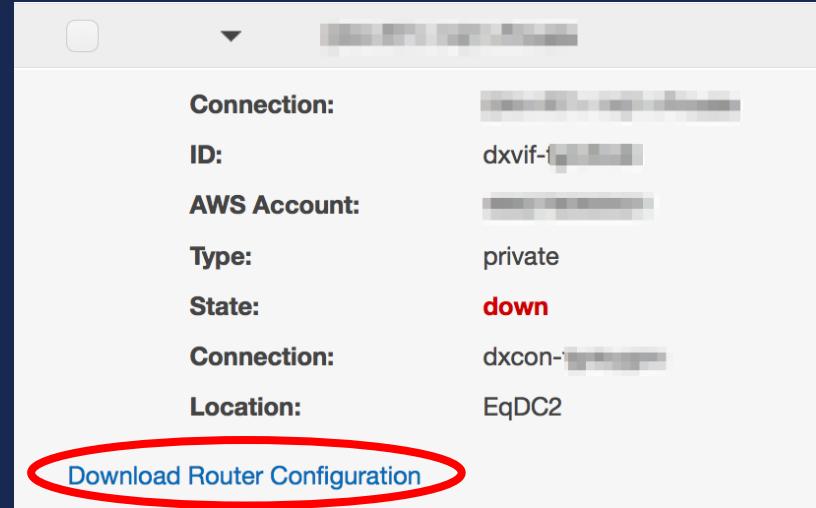
2. Create a Connection

3. Receive LOA-CFA

4. Cross Connect

5. Create Virtual Interface

6. Configure Customer Router



# Link Aggregation Groups (LAGs)



- Multiple 1 G or 10 G ports—but treat them like a single managed connection
- Ports need to be on the same AWS Direct Connect Router (visible in the console)
- A group of ports will be configured and managed as a single connection
- Traffic will load balance across these links, per flow

# Link Aggregation Groups (LAGs)

**Create a LAG**

You are currently operating in EU (Ireland). Use the region selector to change to another AWS region.

To begin, specify whether to create a LAG from one or more of your existing Connections, or by ordering new Connections.

Use existing Connections    Request new Connections

**Create a LAG from existing Connections**

Select the Connections to be included in the new LAG. The Connections must all have the same port speed and must be on the same AWS device. Also, note that Connections in 'pending' state cannot be associated with a LAG until they have transitioned to 'available' or 'down', and as such they are not displayed below.

Please note that port hour charges will continue to apply to each Connection that you include in the LAG. There is no additional charge for the LAG. For more information, [please see our FAQ](#).

ID	Name	Location	Bandwidth	AWS Device	State
dxcon-ffyw2vsx	AWS EMEA Lab DX1	TCSH	1Gbps	TCSH-2dpw08p8tss1i	available
dxcon-fgec0c2q	AWS EMEA Lab DX2	TCSH	1Gbps	TCSH-2xviv1vla96ps	available
dxcon-fhebfafj	AWS EMEA Lab DX3	TCSH	1Gbps	TCSH-2dpw08p8tss1i	available
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	available

**LAG Name**  (i)

**Set Minimum Links**  (i)

I understand that by clicking Create, the selected Connections will go down for a brief period.



# Virtual Interfaces

# Public vs. private virtual interfaces



- 802.1Q VLAN & eBGP Session
- Private VIF: connects you to a virtual private cloud (VPC)
  - ... via Direct Connect Gateway to any AWS region
- Public VIF: connects you to public AWS services
  - ... located in any AWS region (except China)
  - ... and anyone else using AWS public IPs
  - ... and managed VPN public IPs

# Virtual interfaces (VIFs)

- Public or private

Create a Virtual Interface

You may choose to create a private or public virtual interface. Select the appropriate option below.

Private - A private virtual interface should be used to access an Amazon VPC using private IP addresses.  
 Public - A public virtual interface can access all AWS public services (including EC2, S3, and DynamoDB) using public IP addresses.

**Define Your New Public Virtual Interface**

Enter the name of your virtual interface. If you're creating a virtual interface for another account, you'll need to provide the other AWS account ID. For more information about virtual interface ownership, see 'Hosted Virtual Interfaces' in the [AWS Direct Connect Getting Started Guide](#).

Connection: dxcon-fh23bnod (AWS EMEA Lab DX9) [i](#)

Virtual Interface Name: e.g. My Virtual Interface [i](#)

Virtual Interface Owner:  My AWS Account  Another AWS Account [i](#)

Enter the VLAN ID, if not already supplied by your AWS Direct Connect partner, and the IP Addresses for your router interface and the AWS Direct Connect interface.

VLAN: e.g. 100 [i](#)

Address family:  IPv4  IPv6 [i](#)

Your router peer IP: e.g. 8.18.144.0/31 [i](#)

Amazon router peer IP: e.g. 8.18.144.1/31 [i](#)

Before you can use your virtual interface, we must establish a BGP session. You must provide an ASN for your router and any prefixes you would like to announce to AWS. You will also need an MD5 key to authenticate the BGP session. We can generate one for you, or you can supply your own.

BGP ASN: e.g. 65000 [i](#)

Auto-generate BGP key:  [i](#)

BGP Authentication Key: e.g. my-secret-password [i](#)

Prefixes you want to advertise: e.g. 192.0.2.0/28,192.0.2. [i](#)

It may take up to 72 hours to verify that your IP prefixes are valid for use with Direct Connect.

[Cancel](#) [Continue](#)

# Virtual interfaces (VIFs)

- Public or private
- VLAN & IPs

## Create a Virtual Interface

You may choose to create a private or public virtual interface. Select the appropriate option below.

Private - A private virtual interface should be used to access an Amazon VPC using private IP addresses.  
 Public - A public virtual interface can access all AWS public services (including EC2, S3, and DynamoDB) using public IP addresses.

### Define Your New Public Virtual Interface

Enter the name of your virtual interface. If you're creating a virtual interface for another account, you'll need to provide the other AWS account ID. For more information about virtual interface ownership, see 'Hosted Virtual Interfaces' in the [AWS Direct Connect Getting Started Guide](#).

Connection dxcon-fh23bnod (AWS EMEA Lab DX9) 

Virtual Interface Name e.g. My Virtual Interface 

Virtual Interface Owner  My AWS Account  Another AWS Account 

Enter the VLAN ID, if not already supplied by your AWS Direct Connect partner, and the IP Addresses for your router interface and the AWS Direct Connect interface.

VLAN e.g. 100 

Address family  IPv4  IPv6 

Your router peer IP e.g. 8.18.144.0/31 

Amazon router peer IP e.g. 8.18.144.1/31 

Before you can use your virtual interface, we must establish a BGP session. You must provide an ASN for your router and any prefixes you would like to announce to AWS. You will also need an MD5 key to authenticate the BGP session. We can generate one for you, or you can supply your own.

BGP ASN e.g. 65000 

Auto-generate BGP key  

BGP Authentication Key e.g. my-secret-password 

Prefixes you want to advertise e.g. 192.0.2.0/28,192.0.2. 

It may take up to 72 hours to verify that your IP prefixes are valid for use with Direct Connect.

Cancel

Continue

# Virtual interfaces (VIFs)

- Public or private
- VLAN & IPs
- BGP

## Create a Virtual Interface

You may choose to create a private or public virtual interface. Select the appropriate option below.

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Connection dxcon-fh23bnod (AWS EMEA Lab DX9)  

Virtual Interface Name e.g. My Virtual Interface 

Virtual Interface Owner  My AWS Account  Another AWS Account 

Enter the VLAN ID, if not already supplied by your AWS Direct Connect partner, and the IP Addresses for your router interface and the AWS Direct Connect interface.

VLAN e.g. 100 

Address family  IPv4  IPv6 

Your router peer IP e.g. 8.18.144.0/31 

Amazon router peer IP e.g. 8.18.144.1/31 

Before you can use your virtual interface, we must establish a BGP session. You must provide an ASN for your router and any prefixes you would like to announce to AWS. You will also need an MD5 key to authenticate the BGP session. We can generate one for you, or you can supply your own.

BGP ASN e.g. 65000 

Auto-generate BGP key  

BGP Authentication Key e.g. my-secret-password 

Prefixes you want to advertise e.g. 192.0.2.0/28,192.0.2. 

It may take up to 72 hours to verify that your IP prefixes are valid for use with Direct Connect.

Cancel

Continue

# Private Virtual interfaces

- Public or private

- VLAN & IPs

- BGP

## Create a Virtual Interface

You may choose to create a private or public virtual interface. Select the appropriate option below.

- Private - A private virtual interface should be used to access an Amazon VPC using private IP addresses.  
 Public - A public virtual interface can access all AWS public services (including EC2, S3, and DynamoDB) using public IP addresses.

### Define Your New Private Virtual Interface

Enter the name of your virtual interface. If you're creating a virtual interface for another account, you'll need to provide the other AWS account ID. For more information about virtual interface ownership, see 'Hosted Virtual Interfaces' in the [AWS Direct Connect Getting Started Guide](#).

Connection dxcon-fh23bnod (AWS EMEA Lab DX9)  

Virtual Interface Name e.g. My Virtual Interface 

Virtual Interface Owner  My AWS Account  Another AWS Account 

Select the gateway for this virtual interface. You can connect to Virtual Private Gateway (VGW) or Direct Connect Gateway. Connecting with Direct Connect Gateway will enable you to associate with multiple VGWs, providing connectivity with multiple Virtual Private Clouds across multiple regions; connecting with Virtual Private Gateway will allow you to connect with one Virtual Private Cloud in the selected region.

Connection To  Direct Connect Gateway  Virtual Private Gateway

Virtual Private Gateway vgw-65fa7755  

Enter the VLAN ID, if not already supplied by your AWS Direct Connect partner, and the IP Addresses for your router interface and the AWS Direct Connect interface.

VLAN e.g. 100 

Address family  IPv4  IPv6 

Auto-generate peer IPs  

Before you can use your virtual interface, we must establish a BGP session. You must provide an ASN for your router. You will also need an MD5 key to authenticate the BGP session. We can generate one for you, or you can supply your own.

BGP ASN e.g. 65000 

Auto-generate BGP key  

BGP Authentication Key e.g. my-secret-password 

# Private Virtual interfaces

## Create a Virtual Interface

You may choose to create a private or public virtual interface. Select the appropriate option below.

- Private - A private virtual interface should be used to access an Amazon VPC using private IP addresses.
- Public - A public virtual interface can access all AWS public services (including EC2, S3, and DynamoDB) using public IP addresses.

### Define Your New Private Virtual Interface

Enter the name of your virtual interface. If you're creating a virtual interface for another account, you'll need to provide the other AWS account ID. For more information about virtual interface ownership, see 'Hosted Virtual Interfaces' in the [AWS Direct Connect Getting Started Guide](#).

Connection  (i)

Virtual Interface Name  (i)

Virtual Interface Owner  My AWS Account  Another AWS Account (i)

Select the gateway for this virtual interface. You can connect to Virtual Private Gateway (VGW) or Direct Connect Gateway. Connecting with Direct Connect Gateway will enable you to associate with multiple VGWs, providing connectivity with multiple Virtual Private Clouds across multiple regions; connecting with Virtual Private Gateway will allow you to connect with one Virtual Private Cloud in the selected region.

Connection To  Direct Connect Gateway  Virtual Private Gateway

Virtual Private Gateway  (i)

Enter the VLAN ID, if not already supplied by your AWS Direct Connect partner, and the IP Addresses for your router interface and the AWS Direct Connect interface.

VLAN  (i)

Address family  IPv4  IPv6 (i)

Auto-generate peer IPs  (i)

Before you can use your virtual interface, we must establish a BGP session. You must provide an ASN for your router. You will also need an MD5 key to authenticate the BGP session. We can generate one for you, or you can supply your own.

BGP ASN  (i)

Auto-generate BGP key  (i)

BGP Authentication Key  (i)

# Private Virtual interfaces

Connect to either—

- A Direct Connect Gateway

Select the gateway for this virtual interface. You can connect to Virtual Private Gateway (VGW) or Direct Connect Gateway. Connecting with Direct Connect Gateway will enable you to associate with multiple VGWs, providing connectivity with multiple Virtual Private Clouds across multiple regions; connecting with Virtual Private Gateway will allow you to connect with one Virtual Private Cloud in the selected region.

**Connection To**  Direct Connect Gateway  Virtual Private Gateway

Direct Connect Gateway   

[Create Direct Connect Gateway](#)

Or

- A Virtual Private Gateway

Select the gateway for this virtual interface. You can connect to Virtual Private Gateway (VGW) or Direct Connect Gateway. Connecting with Direct Connect Gateway will enable you to associate with multiple VGWs, providing connectivity with multiple Virtual Private Clouds across multiple regions; connecting with Virtual Private Gateway will allow you to connect with one Virtual Private Cloud in the selected region.

**Connection To**  Direct Connect Gateway  Virtual Private Gateway

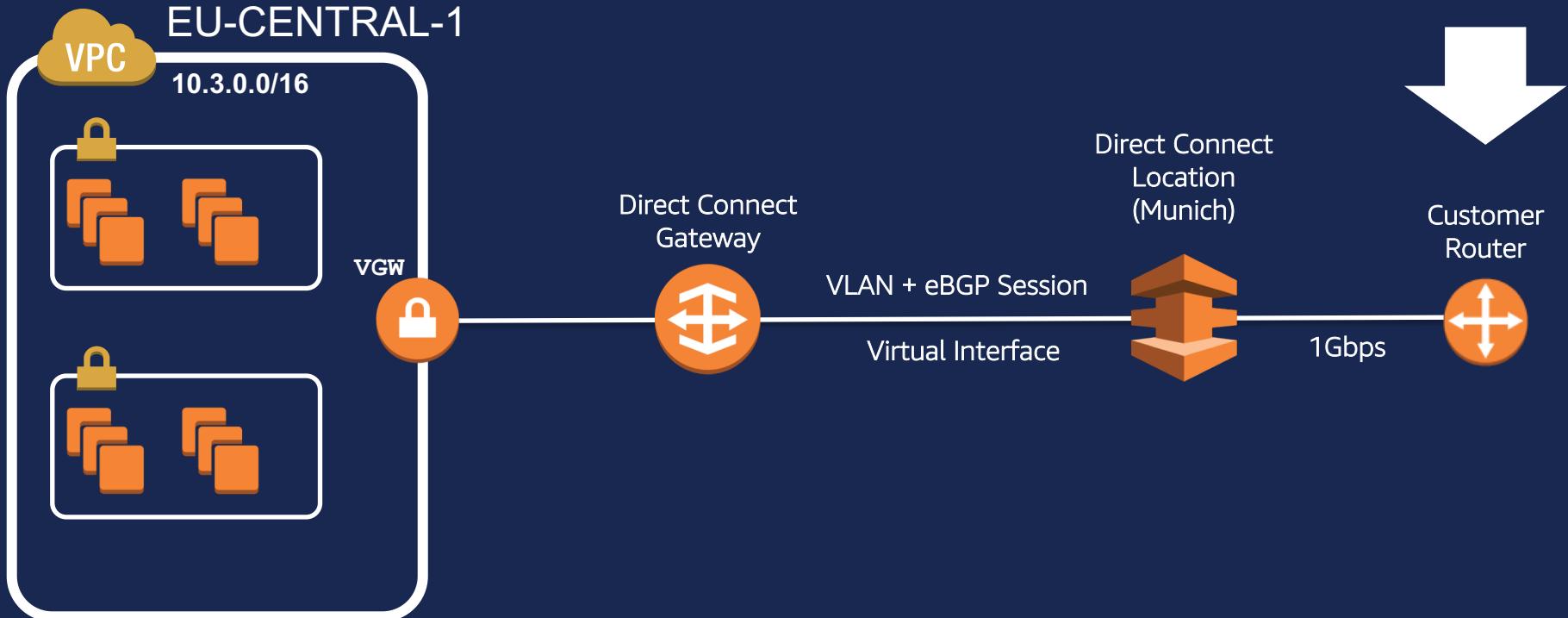
Virtual Private Gateway   

# IPv6 over Direct Connect

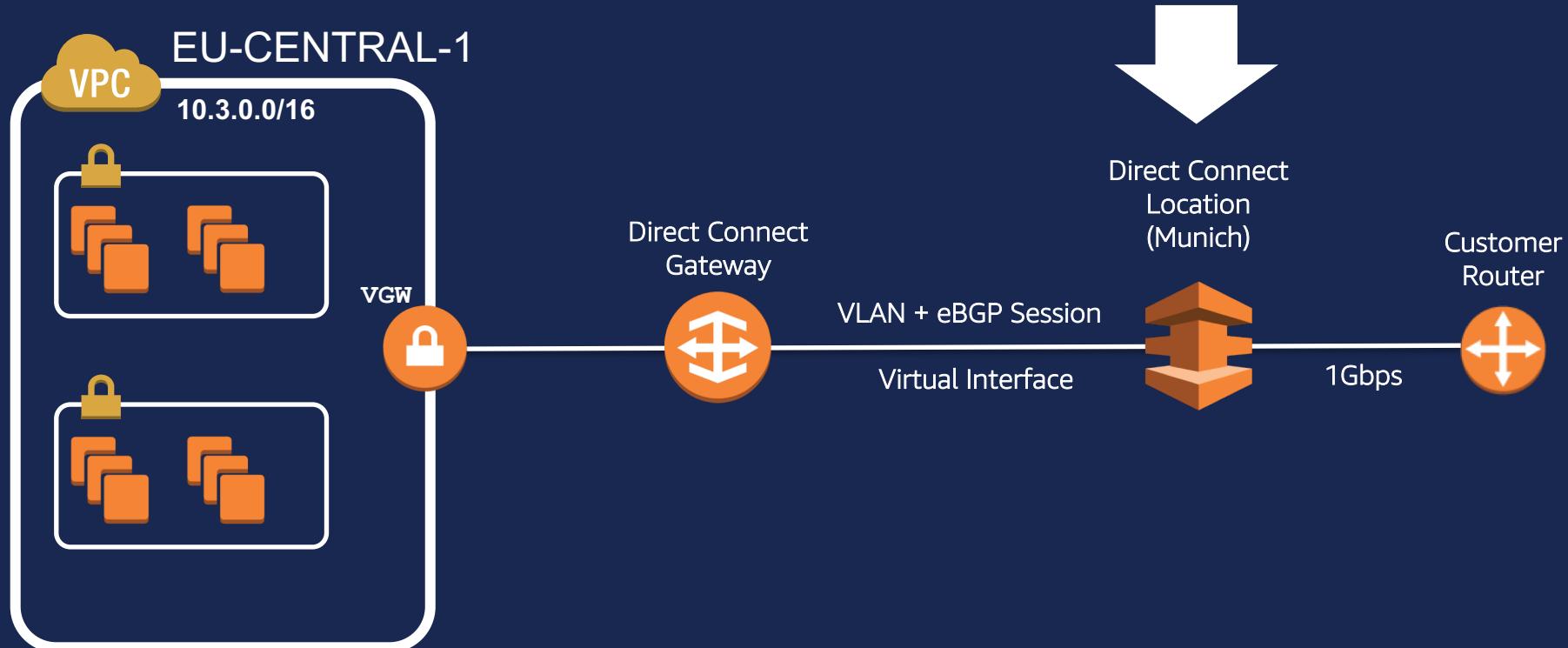
- IPv6 on Direct Connect—Amazon supplied /125 CIDR
- Accept /64 or shorter prefixes
- Additional peering session on the same VIF for IPv6
- Supported on both public and private VIFs
- IPv6 is supported in VPC

Enterprise VIF			
Summary		IPv4 IPv6	
Name	Enterprise VIF	State	available
ID	dxvif-ffw1t3f2	BGP Status	up
AWS Account	399561169276	BGP ASN	65502
Type	private	BGP Auth Key	[REDACTED]
State	available	Your Peer IP	2600:1ffd:1103:150:0:f:191a:cde6/125
Connection	dxcon-fh8j1atx	Amazon Peer IP	2600:1ffd:1103:150:0:f:191a:cde1/125
Location	TCSH		
Virtual Gateway	vgw-e22a1c96		
VLAN Assigned	501		

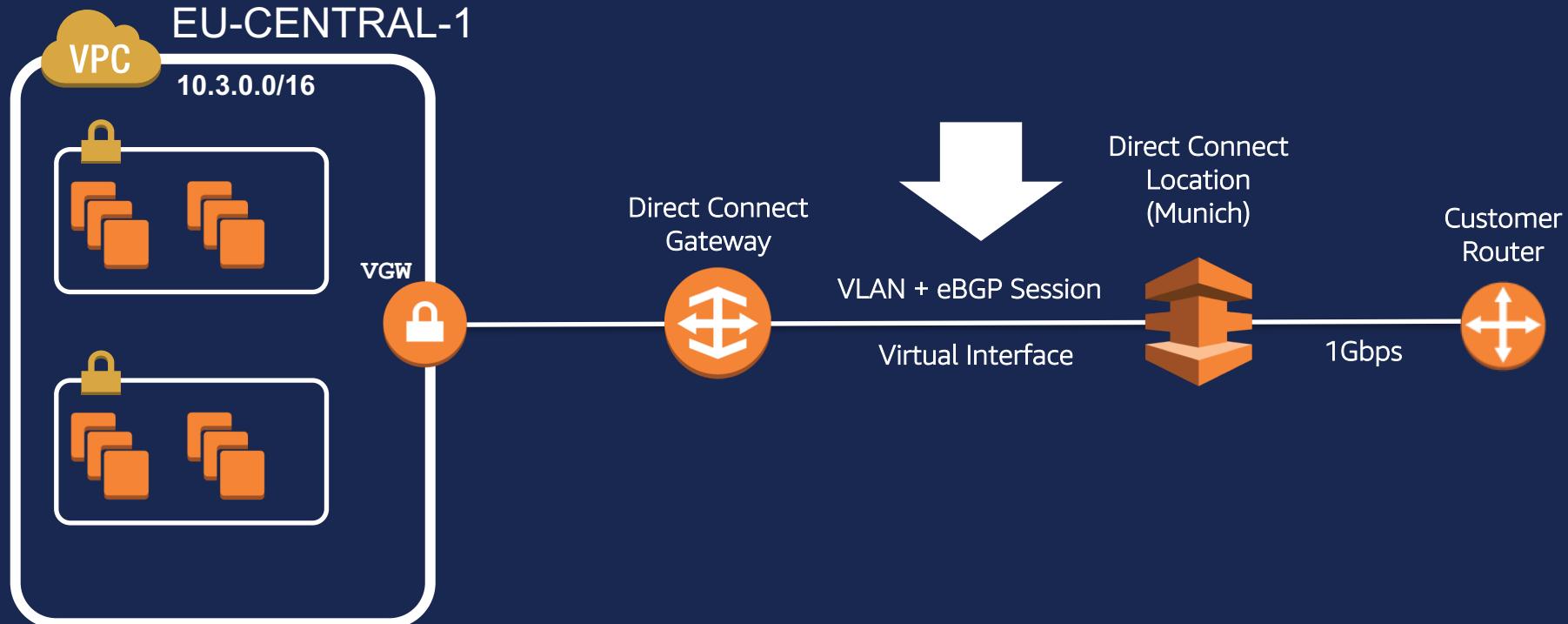
# A Private Virtual Interface on 1Gbps Direct Connect



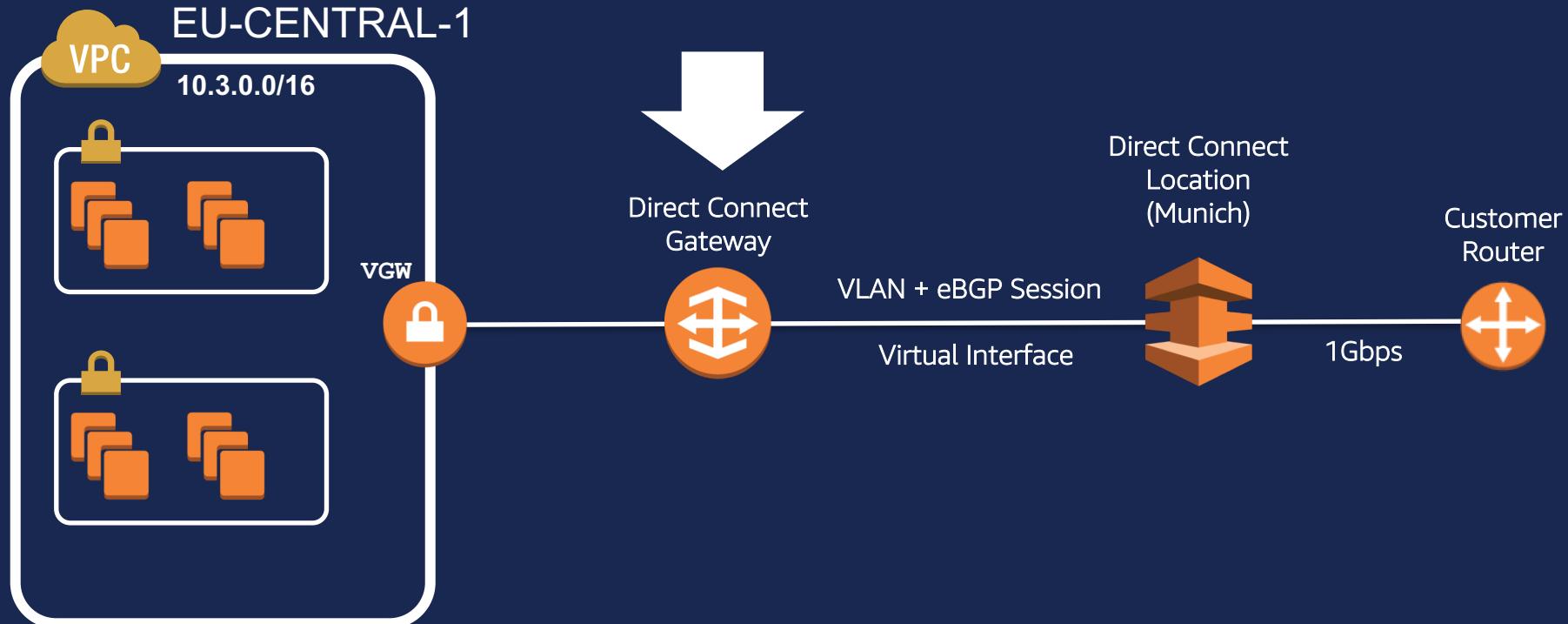
# A Private Virtual Interface on 1Gbps Direct Connect



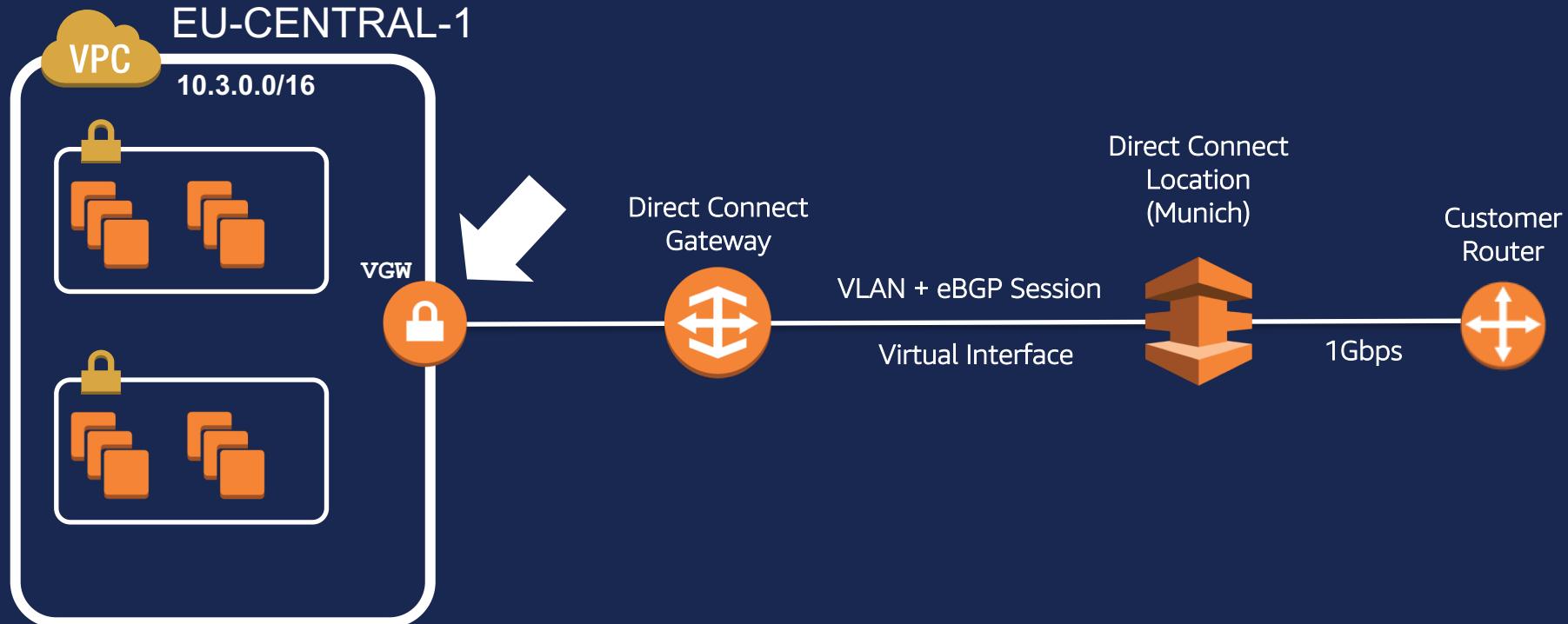
# A Private Virtual Interface on 1Gbps Direct Connect



# A Private Virtual Interface on 1Gbps Direct Connect



# A Private Virtual Interface on 1Gbps Direct Connect



# 1 G/10 G dedicated connections

## Your Account

Direct Connect Connection  
‘Regular Connection’  
dxcon-xxxxxx  
Port Speed: 1 or 10 Gbps

# 1 G/10 G dedicated connections

## Your Account

Direct Connect Connection  
‘Regular Connection’  
dxcon-xxxxxx  
Port Speed: 1 or 10 Gbps

Virtual Interface  
dxvif-xxxxxx  
VLAN: 101

# 1 G/10 G dedicated connections

## Your Account

Direct Connect Connection  
‘Regular Connection’  
dxcon-xxxxxx  
Port Speed: 1 or 10 Gbps

Virtual Interface  
dxvif-xxxxxx  
VLAN: 101

Virtual Interface  
dxvif-xxxxxx  
VLAN: 102

# 1 G/10 G dedicated connections

## Your Account

Direct Connect Connection  
‘Regular Connection’  
dxcon-xxxxxx  
Port Speed: 1 or 10 Gbps

Virtual Interface  
dxvif-xxxxxx  
VLAN: 101

Virtual Interface  
dxvif-xxxxxx  
VLAN: 102

Virtual Interface  
dxvif-xxxxxx  
VLAN: 103

# 1 G/10 G dedicated connections, hosted VIF

## Your Account

Direct Connect Connection  
‘Regular Connection’  
dxcon-xxxxxx  
Port Speed: 1 or 10 Gbps

## Your Other Account

Hosted Virtual Interface  
dxvif-xxxxxx  
VLAN: 101

# 1 G/10 G dedicated connections, hosted VIFs

Your Account

Direct Connect Connection  
‘Regular Connection’  
dxcon-xxxxxx  
Port Speed: 1 or 10 Gbps

Your Other Account

Hosted Virtual Interface  
dxvif-xxxxxx  
VLAN: 101

Another Account

Hosted Virtual Interface  
dxvif-xxxxxx  
VLAN: 102

# Hosted connections (sub-1 G)

Partner Account

Your Account

Interconnect

'Hosted Connection'  
dxcon-xxxxxx  
VLAN: 101  
Port Speed: 50-500 Mbps

# Hosted connections (sub-1 G)

Partner Account

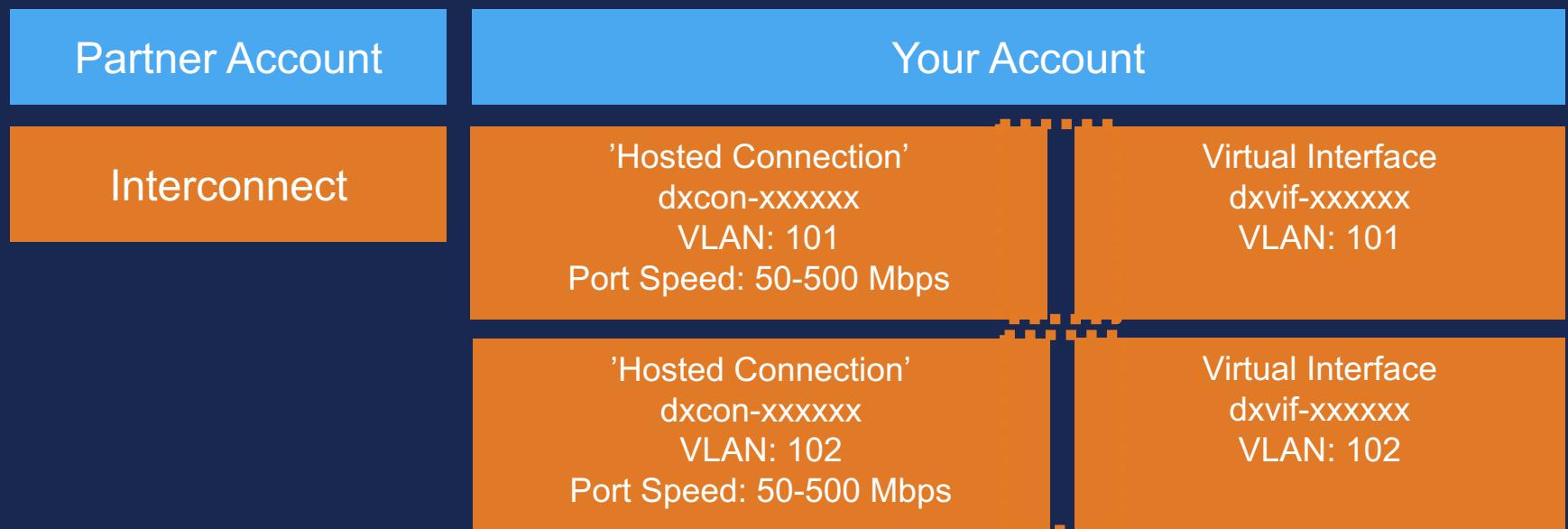
Your Account

Interconnect

'Hosted Connection'  
dxcon-xxxxxx  
VLAN: 101  
Port Speed: 50-500 Mbps

Virtual Interface  
dxvif-xxxxxx  
VLAN: 101

# Hosted connections (sub-1 G)



# Border Gateway Protocol (BGP)

# What is BGP?



- TCP-based protocol on port 179
- BGP neighbors exchange routing information—prefixes
- More specific prefixes are preferred
- Uses Autonomous System Numbers—ASNs
- iBGP—between peers in the same AS
- eBGP—between peers in different AS
- AS\_PATH—measure of network “distance”
- Local preference—weighting of identical prefixes

# Public virtual interface

- Provides access to Amazon public IP addresses
- Requires public IP addresses for BGP session
  - If you can't provide them, raise a case with AWS Support
- Public ASN must be owned by customer—private is OK
- Global prefixes is the default for new Public Virtual Interfaces



# DX public VIF—AS\_PATH & NO\_EXPORT

```
Router#show ip bgp 54.220.0.0/16
BGP routing table entry for 54.220.0.0/16, version 487
Paths: (1 available, best #1, table default, not advertised to EBGP peer)
  Not advertised to any peer
    7224 7224 16509, (received & used)
      54.x.x.x from 54.x.x.x (178.236.14.224)
        Origin IGP, metric 10, localpref 100, valid, external, best
        Community: no-export
```

# DX public VIF—AS\_PATH & NO\_EXPORT

```
Router#show ip bgp 54.220.0.0/16
BGP routing table entry for 54.220.0.0/16, version 487
Paths: (1 available, best #1, table default, not advertised to EBGP peer)
  Not advertised to any peer
  7224 7224 16509, (received & used)
    54.x.x.x from 54.x.x.x (178.236.14.224)
      Origin IGP, metric 10, localpref 100, valid, external, best
      Community: no-export
```

“AWS Public Direct Connect advertises prefixes  
with a minimum path length of 3”

# DX public VIF—AS\_PATH & NO\_EXPORT

```
Router#show ip bgp 54.220.0.0/16
BGP routing table entry for 54.220.0.0/16, version 487
Paths: (1 available, best #1, table default, not advertised to EBGP peer)
  Not advertised to any peer
    7224 7224 16509, (received & used)
      54.x.x.x from 54.x.x.x (178.236.14.224)
        Origin IGP, metric 10, localpref 100, valid, external, best
          Community: no-export
```

“AWS Public Direct Connect announces all public prefixes with the IANA well-known NO\_EXPORT community set”

# Public VIF—Global Public Access



*How far will customer announcements propagate within AWS ?*

You can use the following BGP communities for your prefixes:

**7224:9100** Local AWS Region

**7224:9200** All AWS regions for a continent (for example, North America-wide)

**7224:9300** Global (all public AWS Regions)

# Public VIF—Global Public Access



*How do I choose what AWS Prefixes to accept?*

AWS Direct Connect applies the following BGP communities to its advertised routes:

**7224:8100** Routes that originate from the same AWS Region in which the AWS Direct Connect point of presence is associated

**7224:8200** Routes that originate from the same continent with which the AWS Direct Connect point of presence is associated

No tag Global (all public AWS Regions)

# Public VIF—same region (Ireland)



eu-west-1 (Ireland)
IP 54.239.244.57 /31
BGP AS 7224

BGP routing table entry for 52.218.48.0/24, version 10616

Paths: (1 available, no best path)

Not advertised to any peer

7224 7224 16509, (received-only)

54.239.244.57 from 54.239.244.57 (178.236.14.224)

Origin IGP, metric 10, localpref 100, valid, external

Community: 7224:8100 7224:8200 no-export

# Public VIF—same continent (Frankfurt)



eu-west-1 (Ireland)

IP 54.239.244.57 /31

BGP AS 7224

BGP routing table entry for 52.219.73.0/24, version 10828  
Paths: (1 available, no best path)

Not advertised to any peer

7224 7224 16509, (received-only)

54.239.244.57 from 54.239.244.57 (178.236.14.224)

Origin IGP. metric 10. localpref 100, valid, external

Community: 7224:8200 no-export

# Public VIF—global (Canada)



eu-west-1 (Ireland)

IP 54.239.244.57 /31

BGP AS 7224

BGP routing table entry for 52.95.147.0/24, version 10261  
Paths: (1 available, no best path)

Not advertised to any peer

7224 7224 16509, (received-only)

54.239.244.57 from 54.239.244.57 (178.236.14.224)

Origin IGP, metric 10, localpref 100, valid, external

Community: no-export



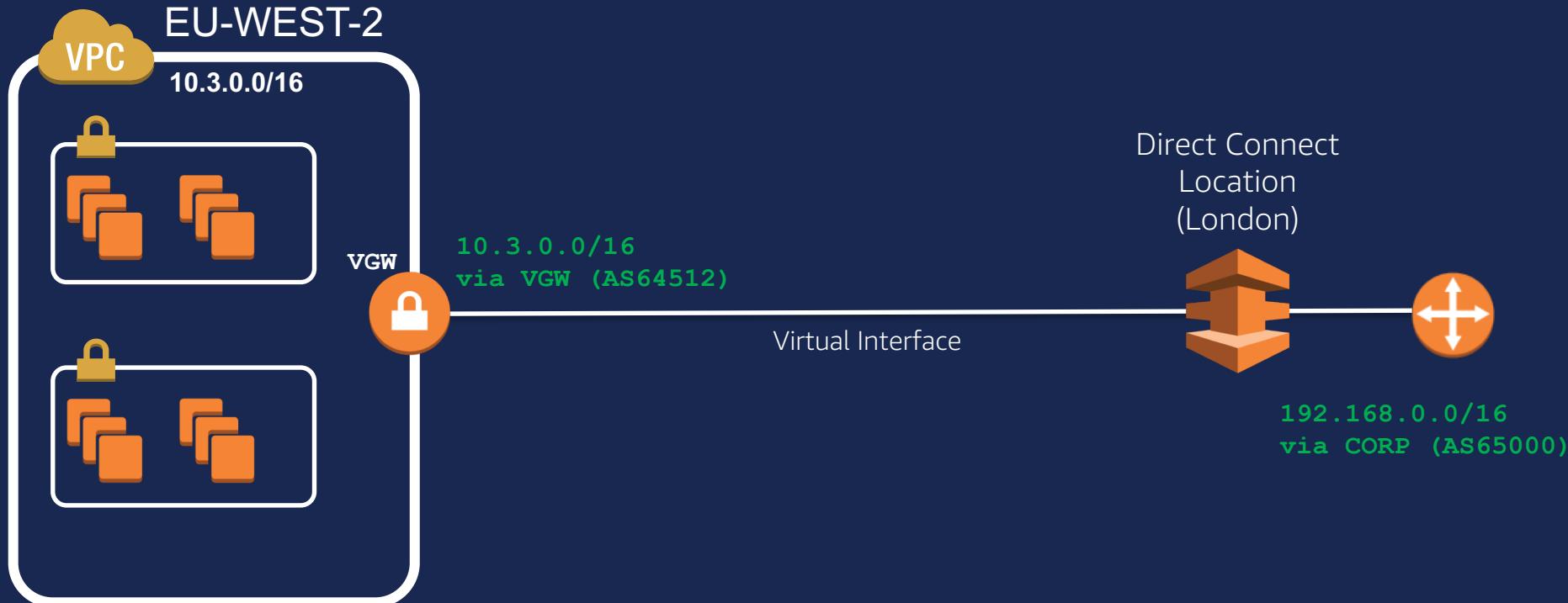
# AWS Direct Connect Gateway

# AWS Direct Connect Gateway



- Works with Private Virtual Interfaces
- You can attach multiple private virtual interfaces to your Direct Connect gateway from connections at any Direct Connect location
- You associate a Direct Connect gateway with the virtual private gateway for the VPC
- Connects to one or more VPCs in your account that are located in the same or different regions
- A Direct Connect gateway is a globally available resource. You can create the Direct Connect gateway in any region and access it from all other regions.

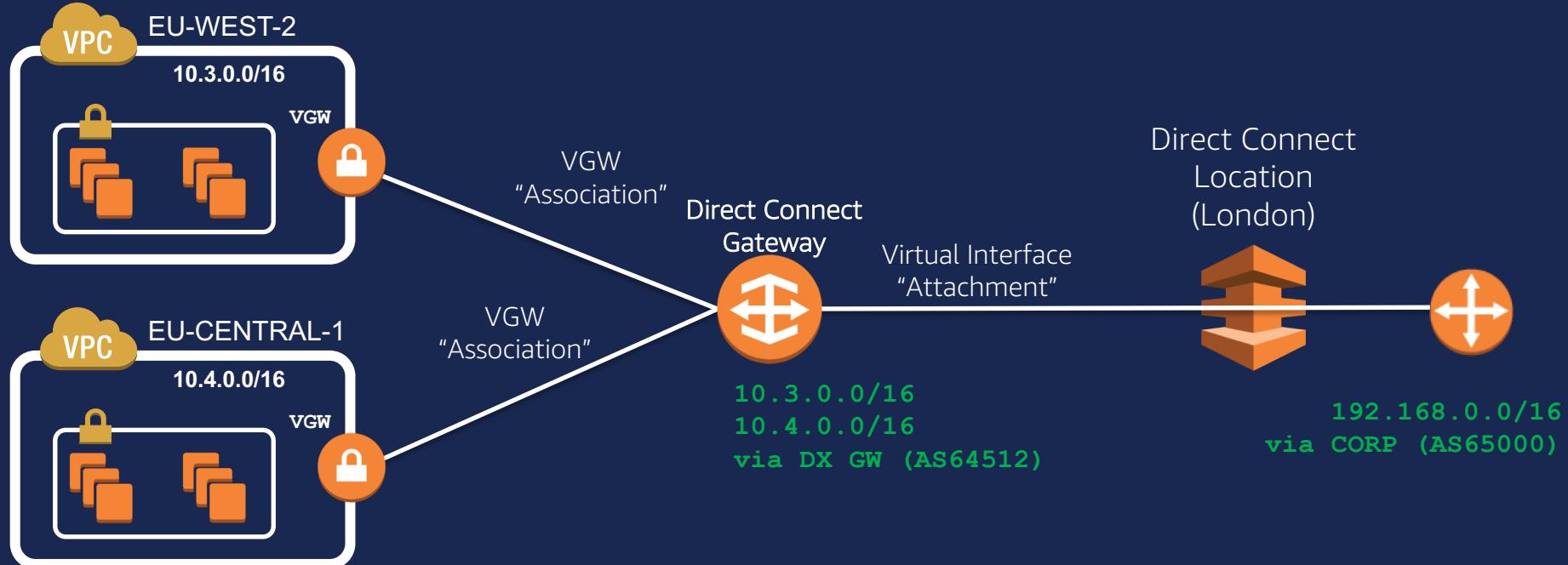
# Before AWS Direct Connect Gateway



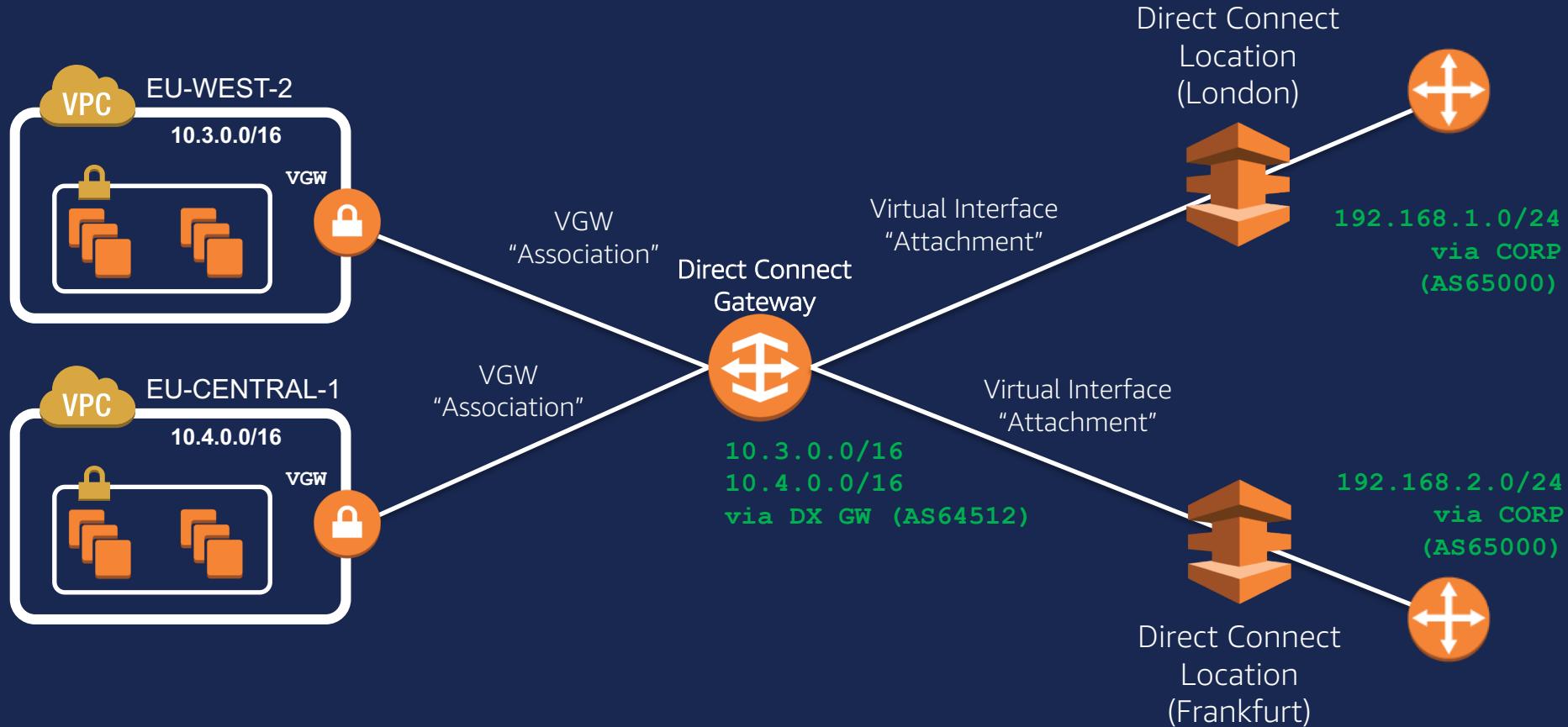
# AWS Direct Connect Gateway



# AWS Direct Connect Gateway



# AWS Direct Connect Gateway



# AWS Direct Connect Gateway



Summary			
Virtual Interface Attachments		Virtual Gateway Associations	
Name	DX-GW	State	available
AWS Account	[REDACTED]	Amazon side ASN	64512
ID	10172c18-d8e1-44e0-a406-[REDACTED]		

Virtual Interface Attachments			
ID	Region	AWS Account	State
dxvif-fh7tbqaf	eu-west-2	[REDACTED]	attached
dxvif-fh4r9cdh	us-east-1	[REDACTED]	attached
dxvif-fhcqj3me	eu-west-1	[REDACTED]	attached
dxvif-ffw0t6fv	eu-west-2	[REDACTED]	attached

# AWS Direct Connect Gateway



Summary    Virtual Interface Attachments    Virtual Gateway Associations

Viewing 4 of 4 Virtual Interface Attachments

ID	Region	AWS Account	State
dxvif-fh7tbqaf	eu-west-2	[REDACTED]	attached
dxvif-fh4r9cdh	us-east-1	[REDACTED]	attached
dxvif-fhcqj3me	eu-west-1	[REDACTED]	attached
dxvif-ffw0t6fv	eu-west-2	[REDACTED]	attached

Summary    Virtual Interface Attachments    Virtual Gateway Associations

Viewing 3 of 3 Virtual Gateway Associations

ID	Region	AWS Account	State	Error
vgw-20774054	eu-west-1	[REDACTED]	associated	
vgw-1f51df2f	eu-central-1	[REDACTED]	associated	
vgw-399a1709	eu-central-1	[REDACTED]	disassociated	VPC CIDR Overlap Detected

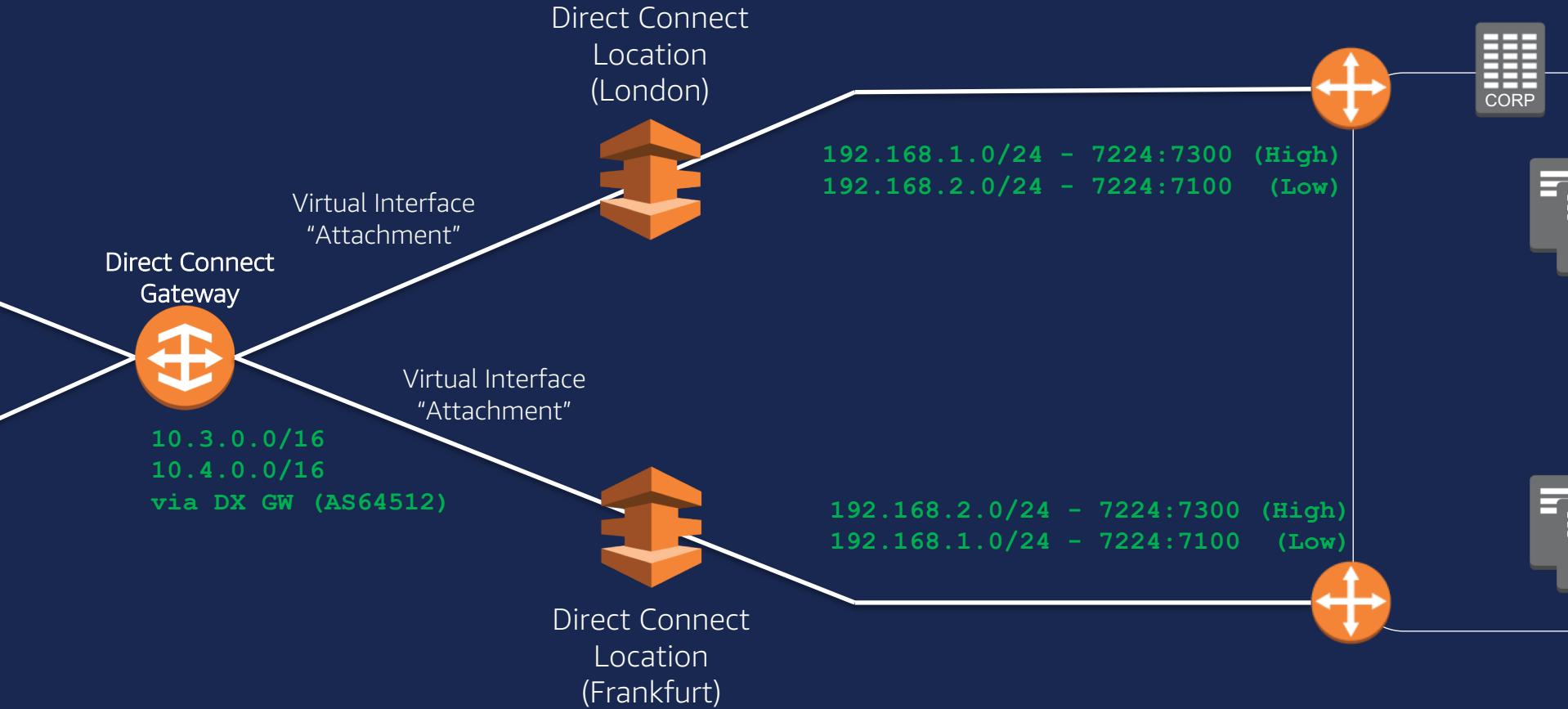
# Private VIF's - Local Preference Communities

Advertise prefixes to AWS with the following communities :

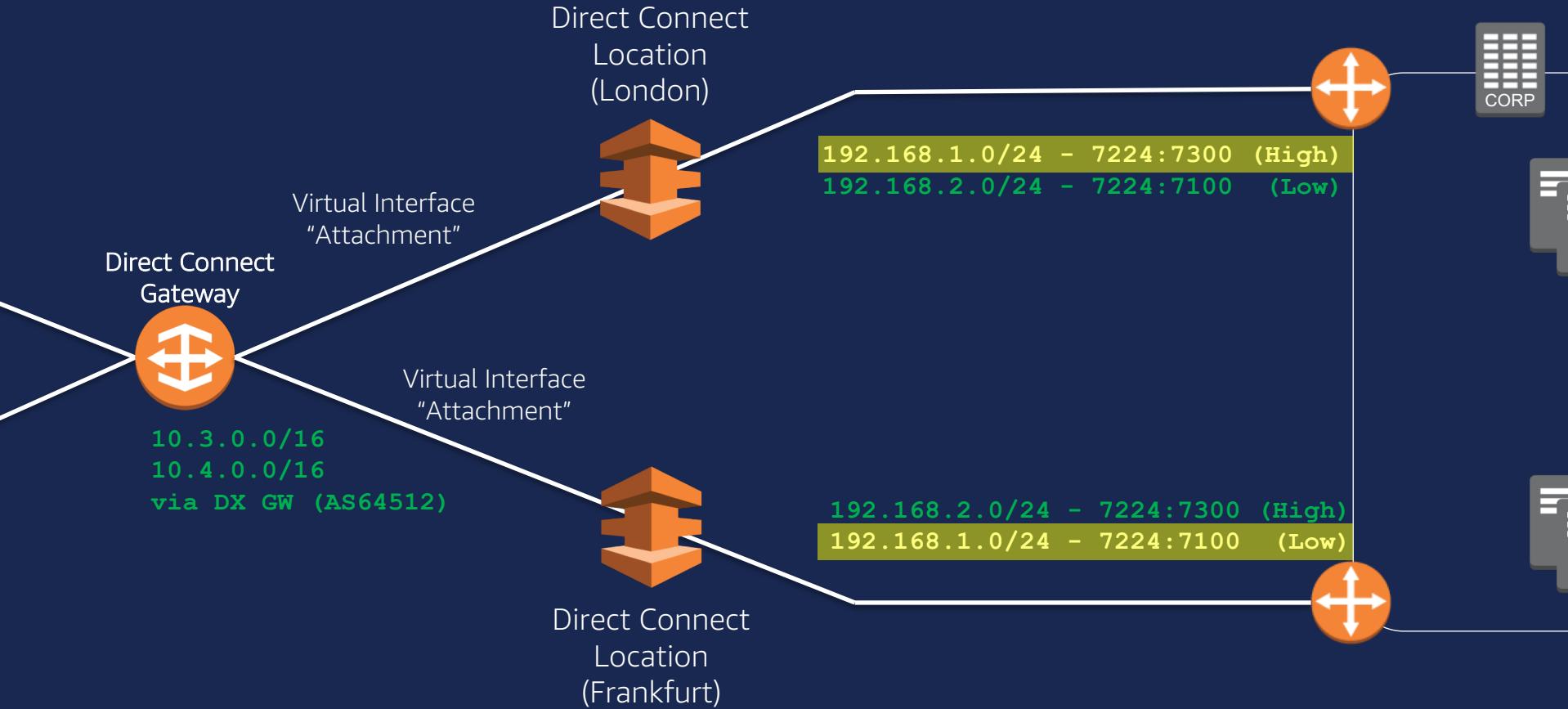
- 7224:7100—Low preference
- 7224:7200—Medium preference
- 7224:7300—High preference



# Local Preference Communities



# Local Preference Communities

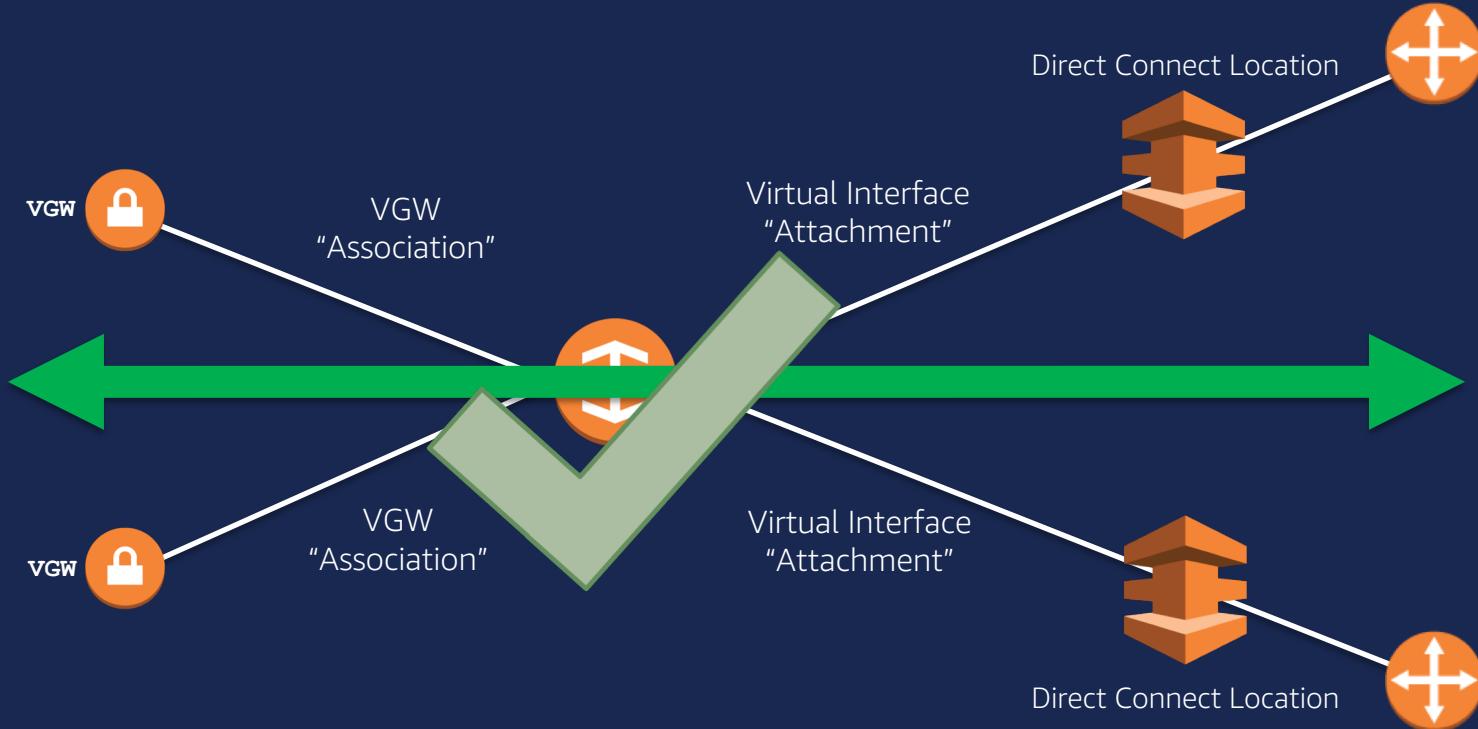


# The rules

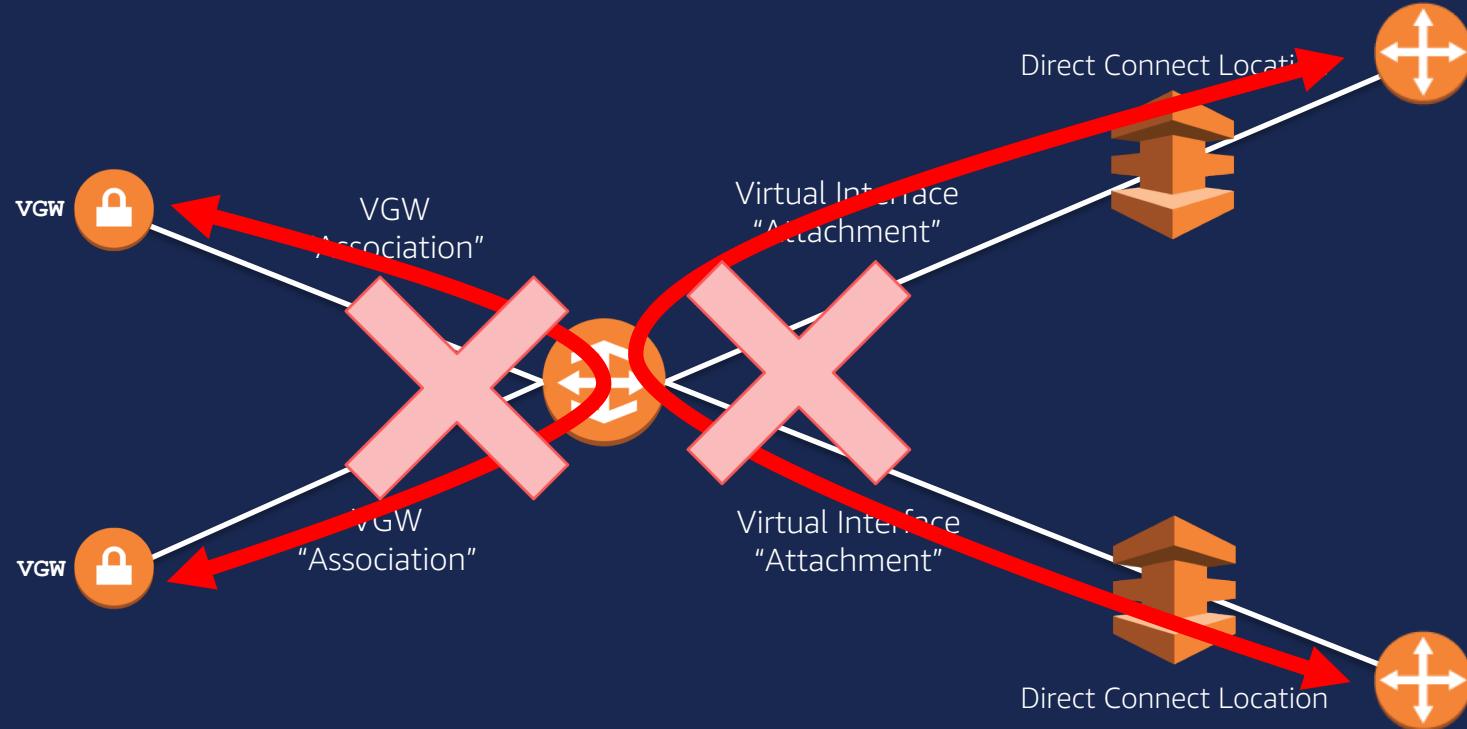
- The VPCs to which you connect through a Direct Connect gateway cannot have overlapping CIDR blocks
- You cannot create a public virtual interface to a Direct Connect gateway
- A virtual private gateway that you associate with a Direct Connect gateway must be attached to a VPC
- You cannot use a Direct Connect gateway to connect to a VPC in the China (Beijing) region
- You cannot use a Direct Connect gateway to connect to a VPC in a different AWS account



# Direct Connect Gateway—traffic flows



# Direct Connect Gateway—traffic flows



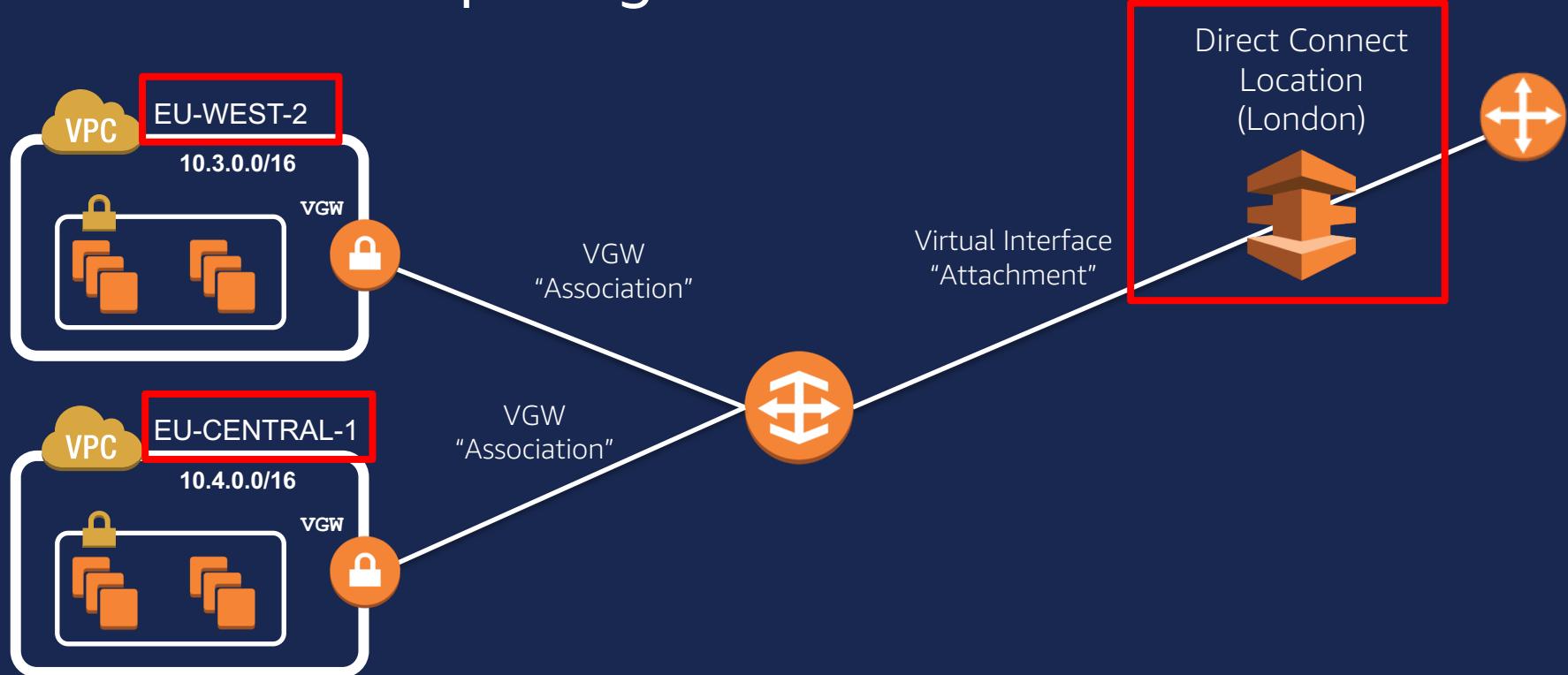
# Direct Connect pricing

Data Transfer Out pricing is dependent on—

- The source AWS Region
- and
- AWS Direct Connect location



# Direct Connect pricing



# Direct Connect pricing

To Direct Connect Location	From US East (Ohio), US East (Virginia), US West (N. California), US West (Oregon), AWS GovCloud (US)	From Canada (Central)	From EU Central (Frankfurt), EU West (Ireland), EU West (London)	From Asia Pacific (Tokyo)	From Asia Pacific (Seoul), Asia Pacific (Singapore)	From Asia Pacific (Mumbai)	From South America (Sao Paulo)	From Asia Pacific (Sydney)
165 Halsey Street, Newark, NJ	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Cologix COL2, Columbus, OH	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
CoreSite DE1, Denver, CO	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
CoreSite NY1 & NY2	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
CoreSite One Wilshire	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
CoreSite SV3 - SV7	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
CoreSite VA1 & VA2	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
CyrusOne West I - III, Houston, TX	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Digital Realty ATL1, Atlanta, GA	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
EdgeConneX Portland	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix CH1 - CH2 & CH4	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix DA1 - DA3 & DA6	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix DC1 - DC6 & DC10 - DC11	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix LA1 - LA4	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix SE2 & SE3	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix SE2 & SE3	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Equinix SV1 & SV5 (AWS Gov Cloud)	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Lighttower, Philadelphia, PA	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Markley, One Summer Street, Boston, MA	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
PhoenixNAP, Phoenix, AZ	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Pittock Exchange Portland	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
QTS Chicago	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
Switch SUPERNAP 8	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130
TierPoint Seattle	\$0.020	\$0.020	\$0.028	\$0.090	\$0.090	\$0.085	\$0.150	\$0.130

# Direct Connect pricing

	<b>From US East (Ohio), US East (Virginia), US West (N. California), US West (Oregon), AWS GovCloud (US)</b>	<b>From Canada (Central)</b>	<b>From EU Central (Frankfurt), EU West (Ireland), EU West (London), EU West (Paris)</b>
<b>Telehouse West, London</b>	\$0.0200	\$0.0300	\$0.0200
<b>Telehouse Voltaire, Paris</b>	\$0.0200	\$0.0300	\$0.0200

# Thank You!

Steve Seymour  
Principal Specialist Solutions Architect, AWS

 @sseymour