



ORACLE

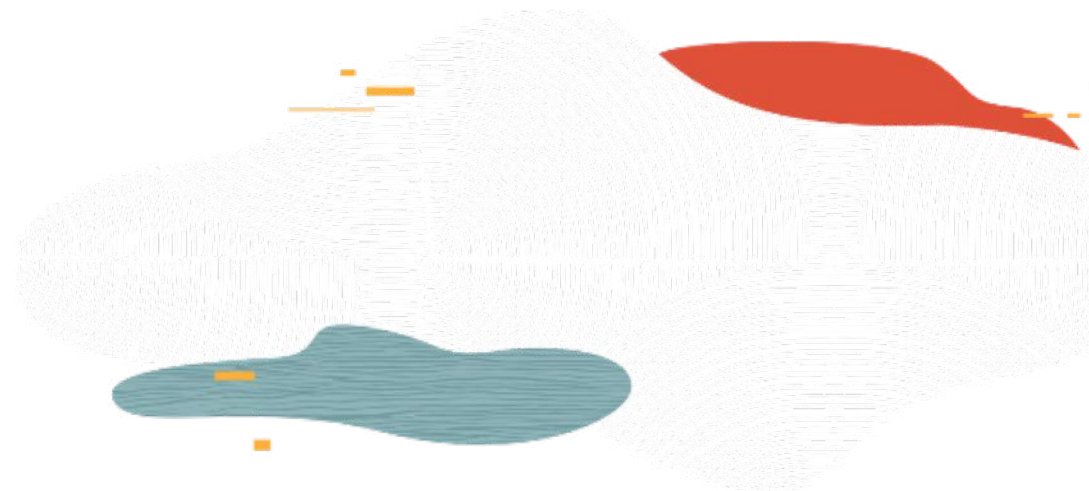
# Connectivity - FastConnect

## Level 200

Jamal Arif

Oracle Cloud Infrastructure

November 2019



## Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions.

The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

# Objectives

After completing this lesson, you should be able to:

- FastConnect Use cases
- FastConnect Concepts
- Describe FastConnect Service Models

Direct to Oracle:

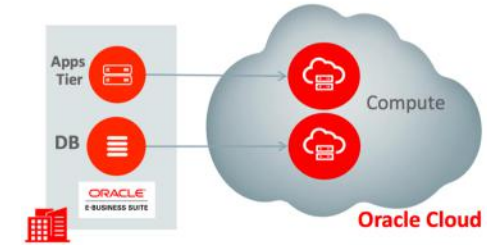
Datacenter Colocation (1a)

Dedicated Circuits from a 3rd Party Network Carrier (1b)

Using an Oracle Network Provider or Exchange Partner

- Pre-requisites: Connectivity – Level 100

# Why do you need dedicated connectivity into cloud?



Latency sensitive enterprise applications

Applications with relational database especially vulnerable to latency and require predictable performance including backup, replication use cases

Big Data & High Performance Computing with data-transfer needs

Large data transfer (for example batch jobs or real-time queries) require high performance and low latency

Sensitive data that cannot traverse the public internet

Applications that contain sensitive data benefit from an extra level of privacy and isolation

Lift-and-shift to Cloud

Moving Web-App-DB tiers to Oracle Cloud needs dedicated network connectivity

# FastConnect - Product Overview

FastConnect provides an easy, elastic, and economical way to create a dedicated and private connection with higher bandwidth options, and a more reliable and consistent networking experience when compared to internet-based connections

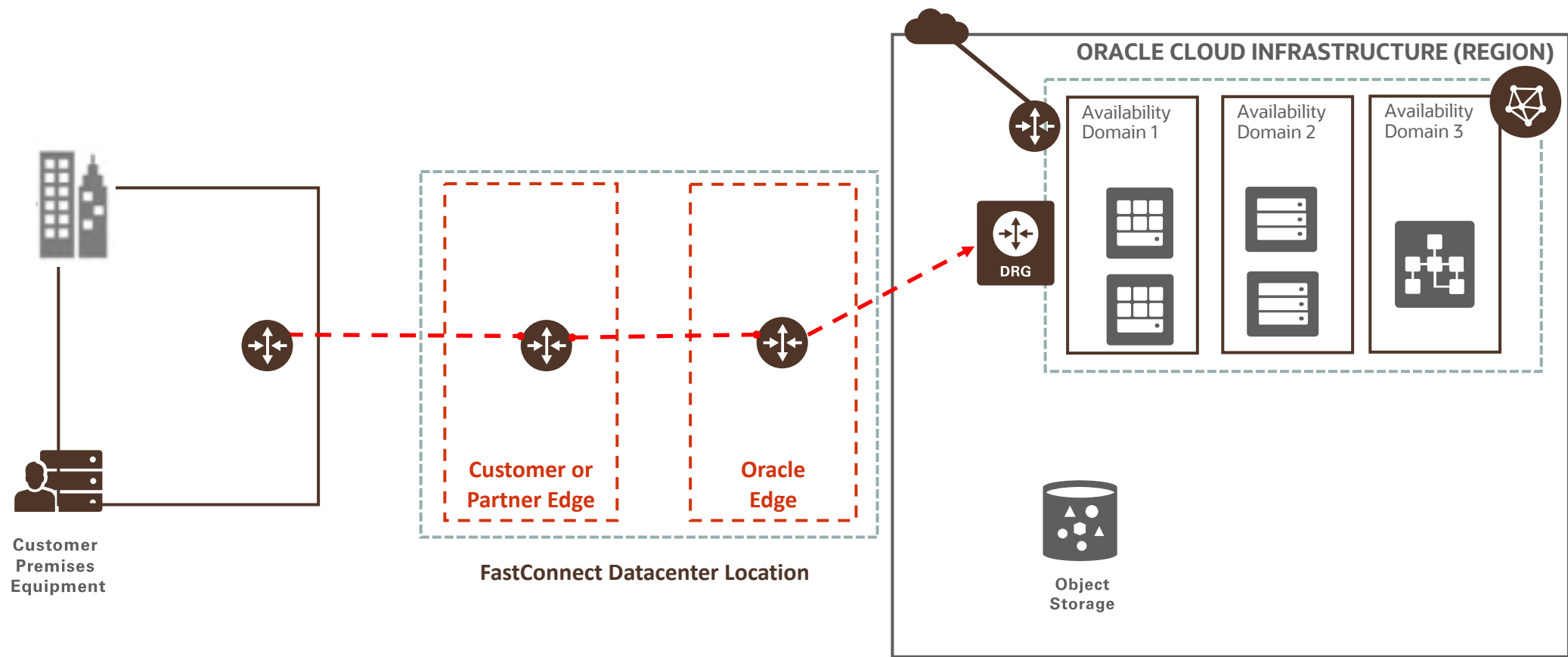
- Connect to OCI directly or via pre-integrated Network Partners
- 1Gbps and 10Gbps increments
- Extend remote datacenters into Oracle (“*Private peering*”) or connect to Public resources (“*Public peering*”)
- No charges for inbound/outbound data transfer
- Uses BGP protocol

# FastConnect Use Cases

# FastConnect Use Scenarios

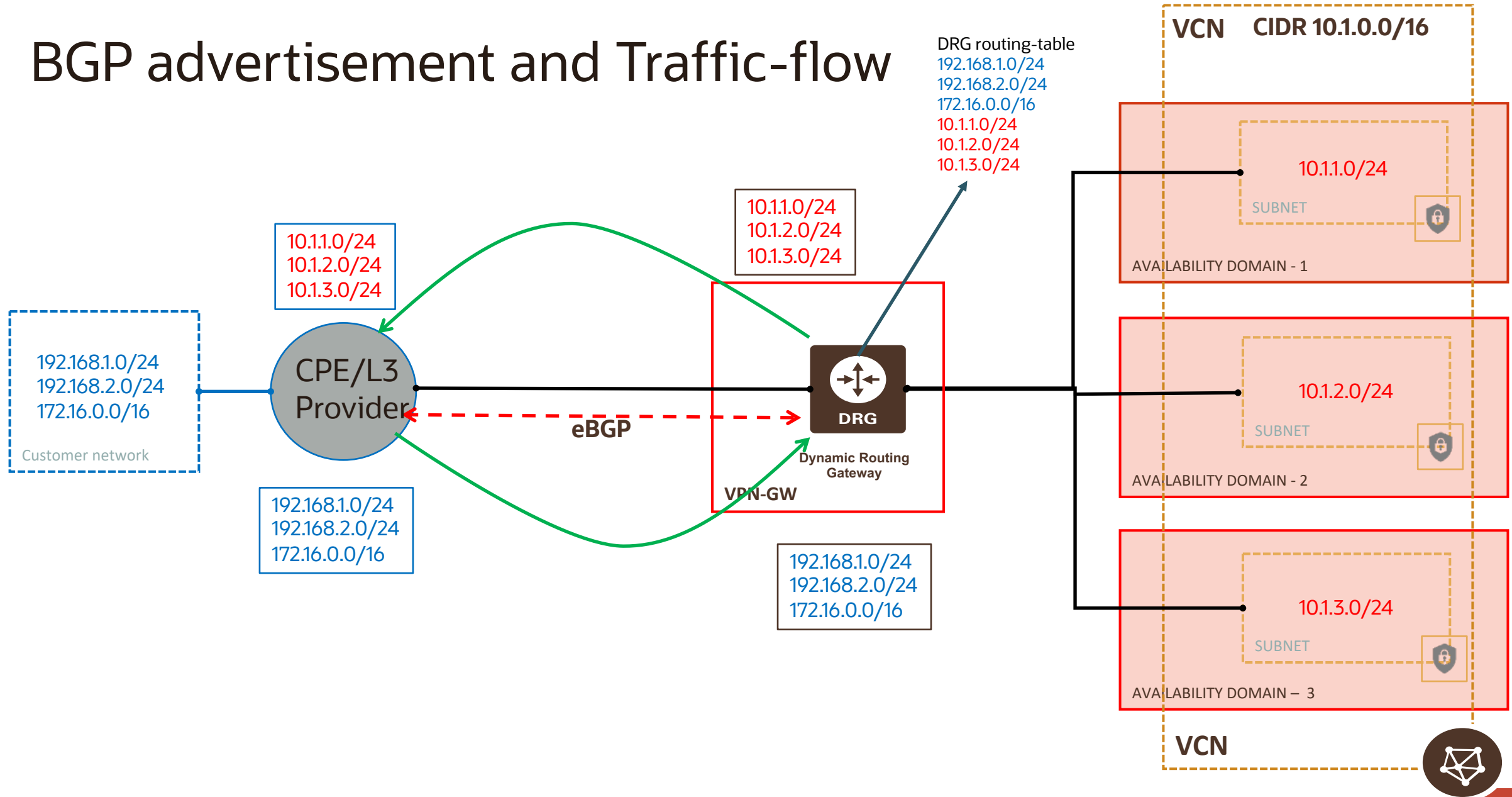
- Private Peering
  - Extension of the on premise network to the OCI VCN
  - Communication across connection with private IP addresses
- Public Peering
  - To access public OCI services over dedicated FastConnect connection
  - Access Object storage, OCI Console or APIs
  - Communication across connection with public IP addresses

# FastConnect (Private Connection)





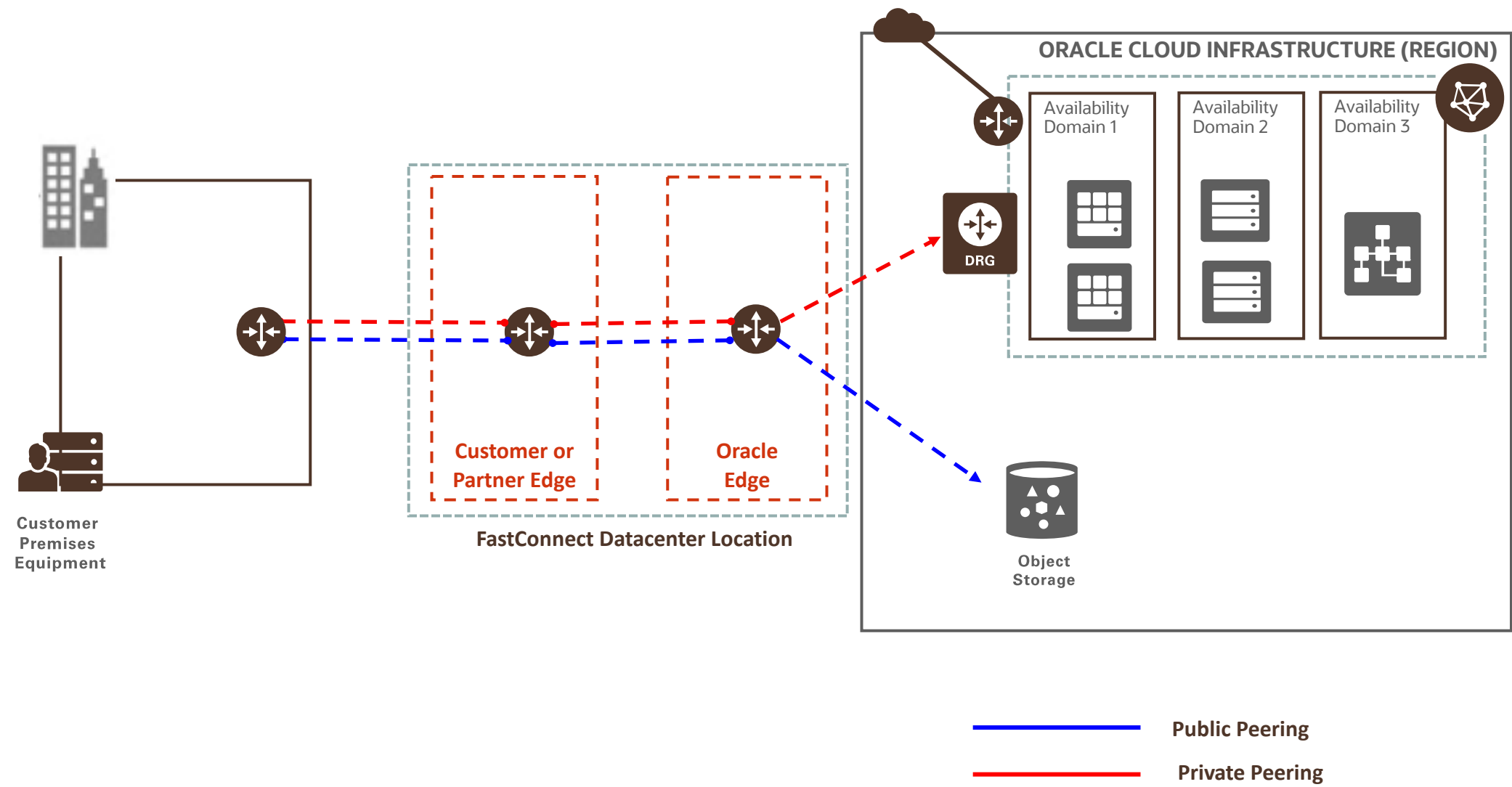
# BGP advertisement and Traffic-flow



# FastConnect Use Scenarios

- Private Peering
  - Extension of the on premise network to the OCI VCN
  - Communication across connection with private IP addresses
- Public Peering
  - To access public OCI services over dedicated FastConnect connection
  - Access Object storage, OCI Console or APIs
  - Communication across connection with public IP addresses

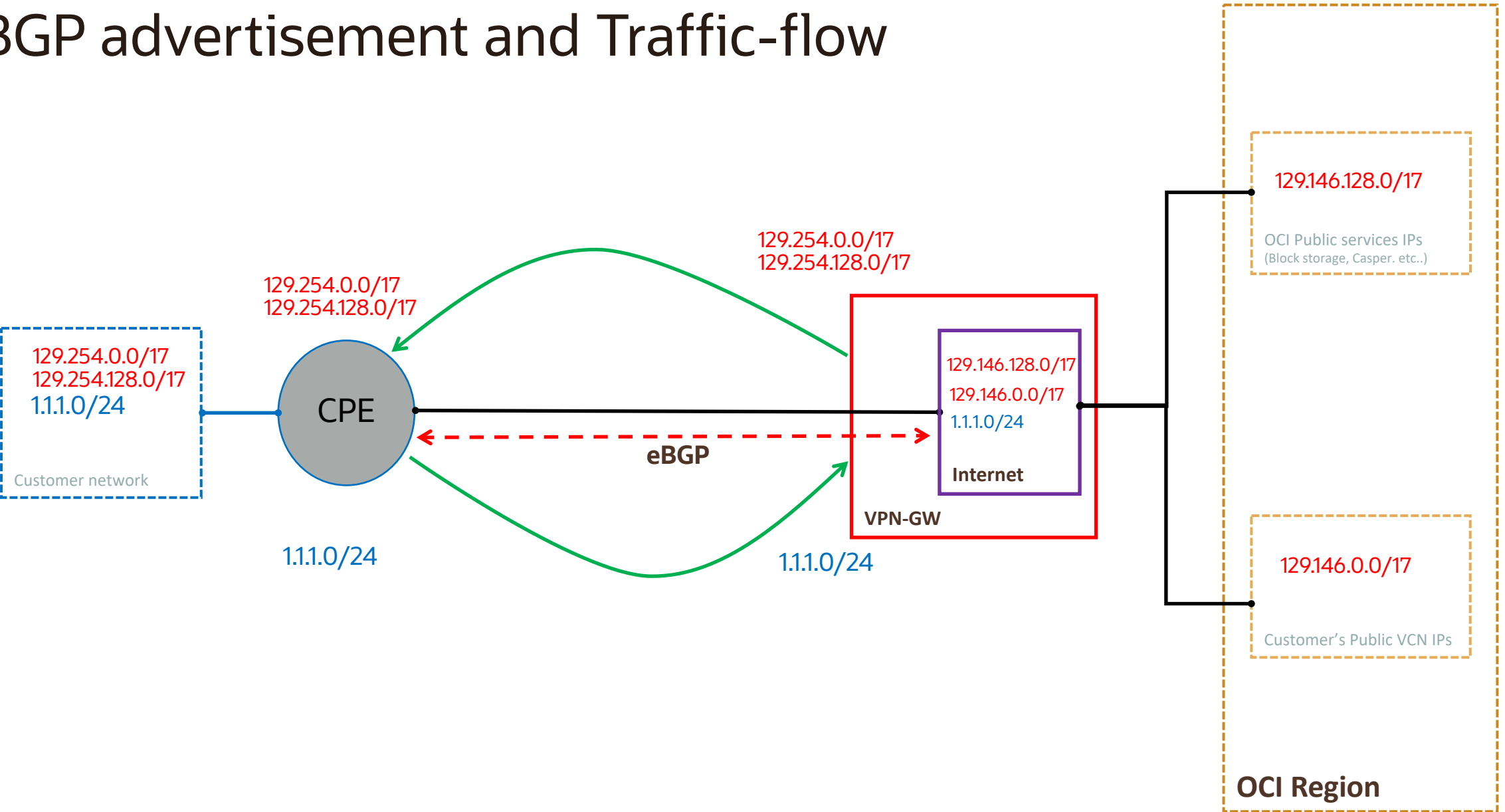
# FastConnect (Public Peering Connection)



# FastConnect (Public Peering Connection)

- You choose which of your organization's public IP prefixes you want to use with the virtual circuit. Each prefix must be /31 or less specific.
- Oracle verifies your organization's ownership of each prefix before sending any traffic for it across the connection.
- When configuring your edge for public peering, make sure to give higher preference to FastConnect over your ISP
- Oracle prefers the most specific route when routing traffic from Oracle Cloud Infrastructure to other destinations that means even if you have a IGW, replies to your verified public prefixes will go over the FastConnect connection.
- You can add or remove public IP prefixes at any time by editing the virtual circuit

# BGP advertisement and Traffic-flow



# Private and Public Peering

	FastConnect-Private	FastConnect-Public
Use case	To manage VCN resources privately	To access OCI's public service offering
Typical bandwidth	Higher bandwidth; increments of 1 Gbps, and 10 Gbps ports	Higher bandwidth; increments of 1 Gbps, and 10 Gbps ports
Protocols	BGP	BGP
Point-to-point IPs	Customer assigns IPs (/30 or /31)	Oracle assign IPs (/30 or /31)
Prefix-advertisement	OCI advertises VCN subnet routes	OCI advertises public VCN routes and public Services routes
Prefix-validation	Not needed	OCI does validation that prefixes are owed by customer or not
Prefix-limit	2000	200
BGP ASN	Any ASN	Public ASN

# FastConnect Connectivity Models

# Fast Connect Concepts

- **FastConnect location**

A specific Oracle data center where you can connect with Oracle Cloud Infrastructure.

- **Metro Area**

A geographical area (for example, Ashburn) with multiple FastConnect locations.

All locations in a metro area connect to the same set of availability domains for resiliency in case of failure in a single location.

- **Oracle provider**

A network service provider that has integrated with Oracle in a FastConnect location.

- **Third-party provider**

A network service provider that is NOT on the list of Oracle providers

- **Colocation**

The situation where your equipment is deployed into a FastConnect location.



# Fast Connect Concepts contd..

- Cross-connect

In a colocation or third-party provider scenario, this is the physical cable connecting your existing network to Oracle in the FastConnect location.

- Cross-connect group

In a colocation or third-party provider scenario, this is a link aggregation group (LAG) that contains at least one cross-connect.

You can add additional cross-connects to a cross-connect group as your bandwidth needs increase. This is applicable only for colocation.

# Fast Connect Concepts contd..(2)

- Virtual Circuit

- A virtual circuit is an isolated network path that runs over one or more physical network connections to provide a single, logical connection between the customer's edge router and their DRG
- Each virtual circuit is made up of information shared between the customer, Oracle, and a provider
- The customer could have multiple virtual circuits to isolate traffic from different parts of their organization (e.g. one virtual circuit for 10.0.1.0/24; another for 172.16.0.0/16), or to provide redundancy
- FastConnect uses Border Gateway Protocol (BGP) to exchange routing information between the various autonomous systems involved in the connection
- With FastConnect, there are two scenarios for how the virtual circuit's BGP session is established (Layer 2 or Layer 3)

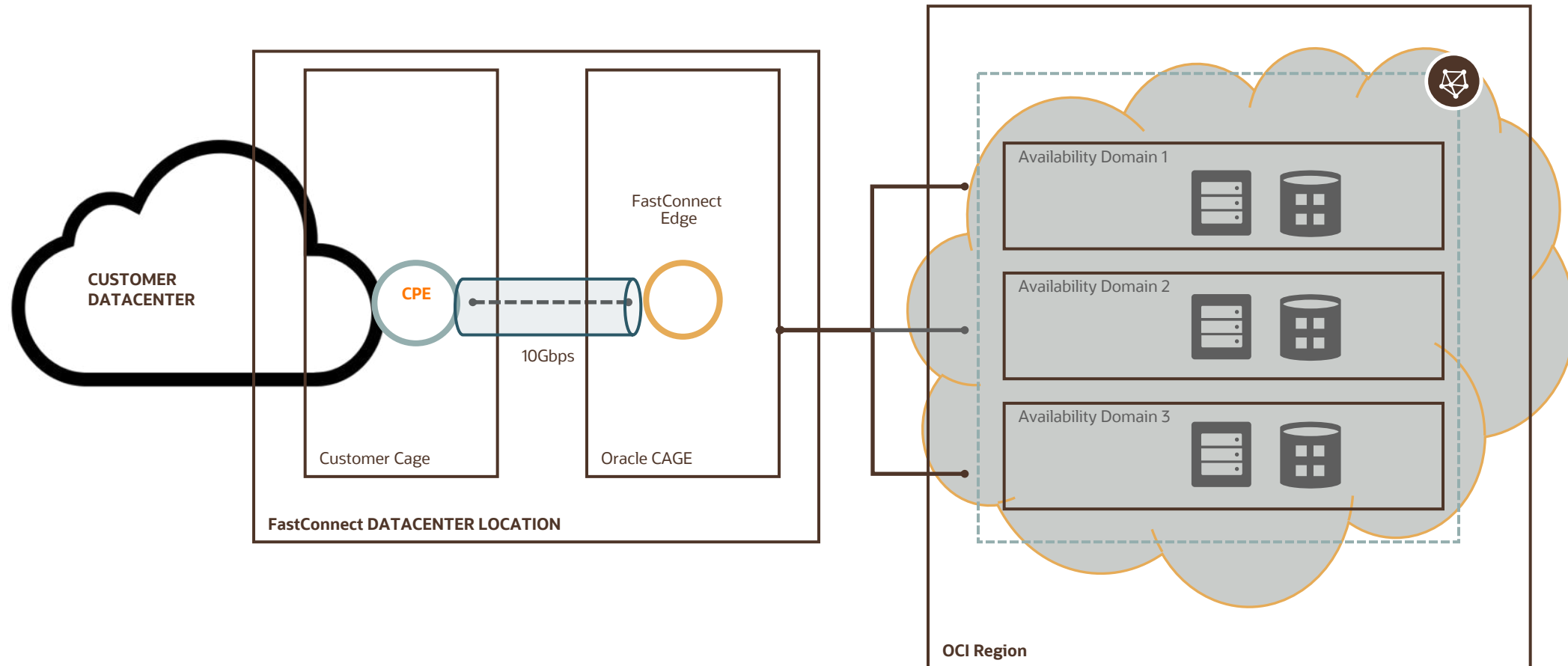
# FastConnect Connectivity Options

## Connectivity Models

- Direct to Oracle:
  - Datacenter Colocation (1a)
  - Dedicated Circuits from a 3rd Party Network Carrier (1b)
- Using an Oracle Network Provider or Exchange Partner

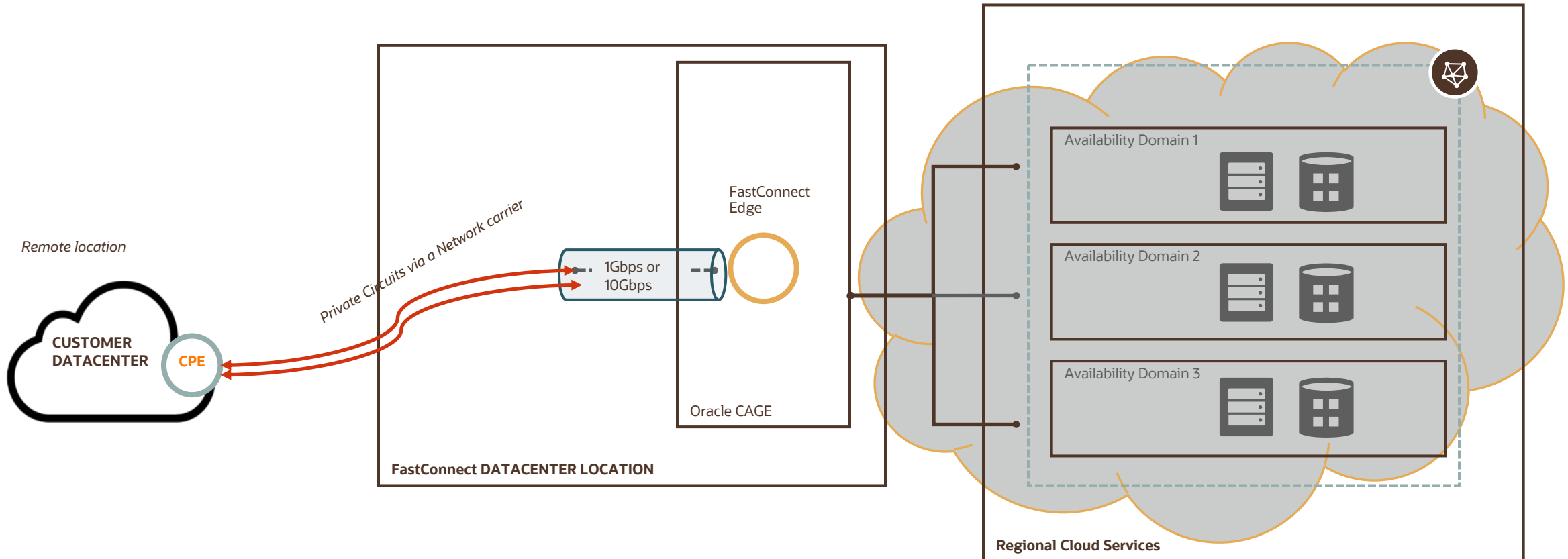
# Direct to Oracle: Datacenter Colocation (1a)

## Physical Connection:



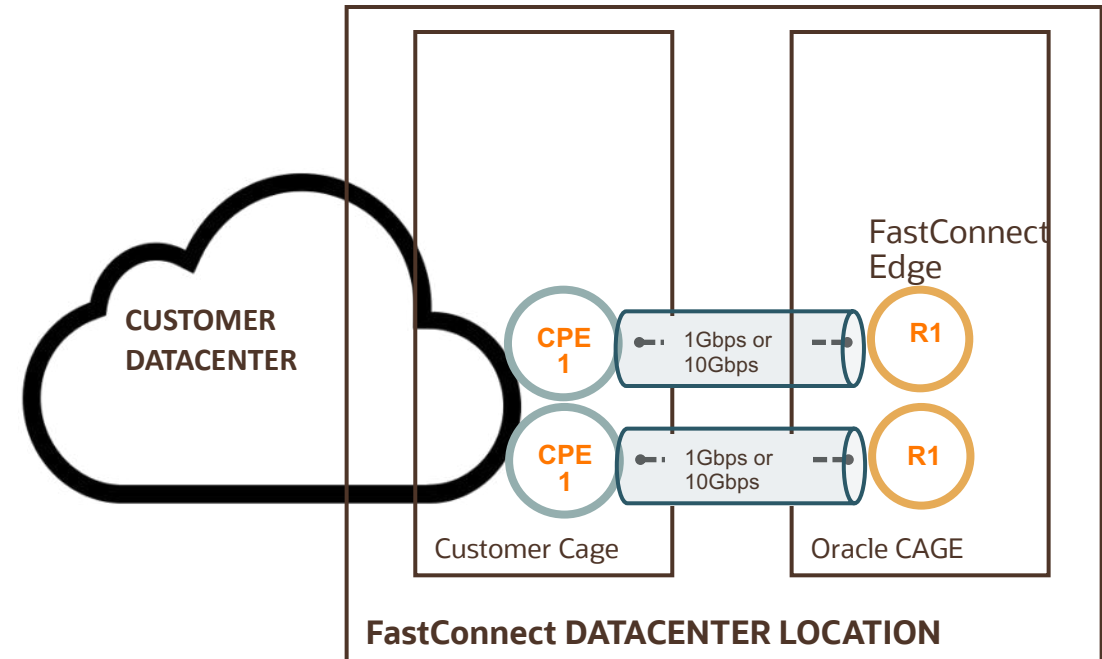
# Direct to Oracle: Dedicated Circuits using a Network Service Provider (1b)

## Physical Connection



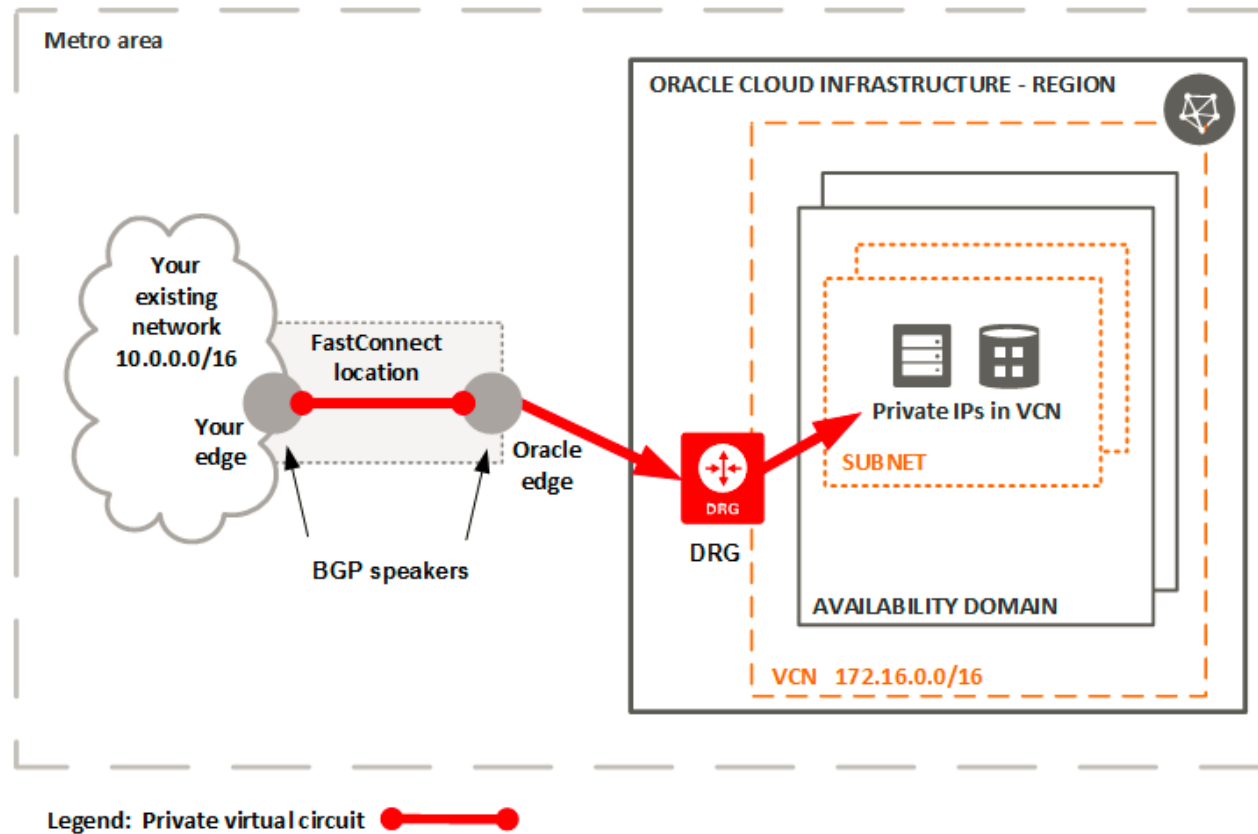
# Cross Connects in Models 1a and 1b - Physical Connection

- In colocation model 1a and 1b
  - You can add additional cross-connects to a cross-connect group as your bandwidth needs increase such as 2x10G ports into a LAG.
  - When you create a Cross-Connect Group, the Cross-Connects are grouped together to form a Link Aggregation Group (LAG).
  - Can group up to 8 cross-connects in a cross-connect group. (8x10G if required)
  - In a cross-connect group, all ports are on the same router



# Direct to Oracle

## Logical Connection - virtual circuit:



- A single, logical connection (virtual circuit) between your edge and Oracle Cloud Infrastructure by way of your Dynamic Routing Gateway. Traffic is destined for private IP addresses in your VCN.

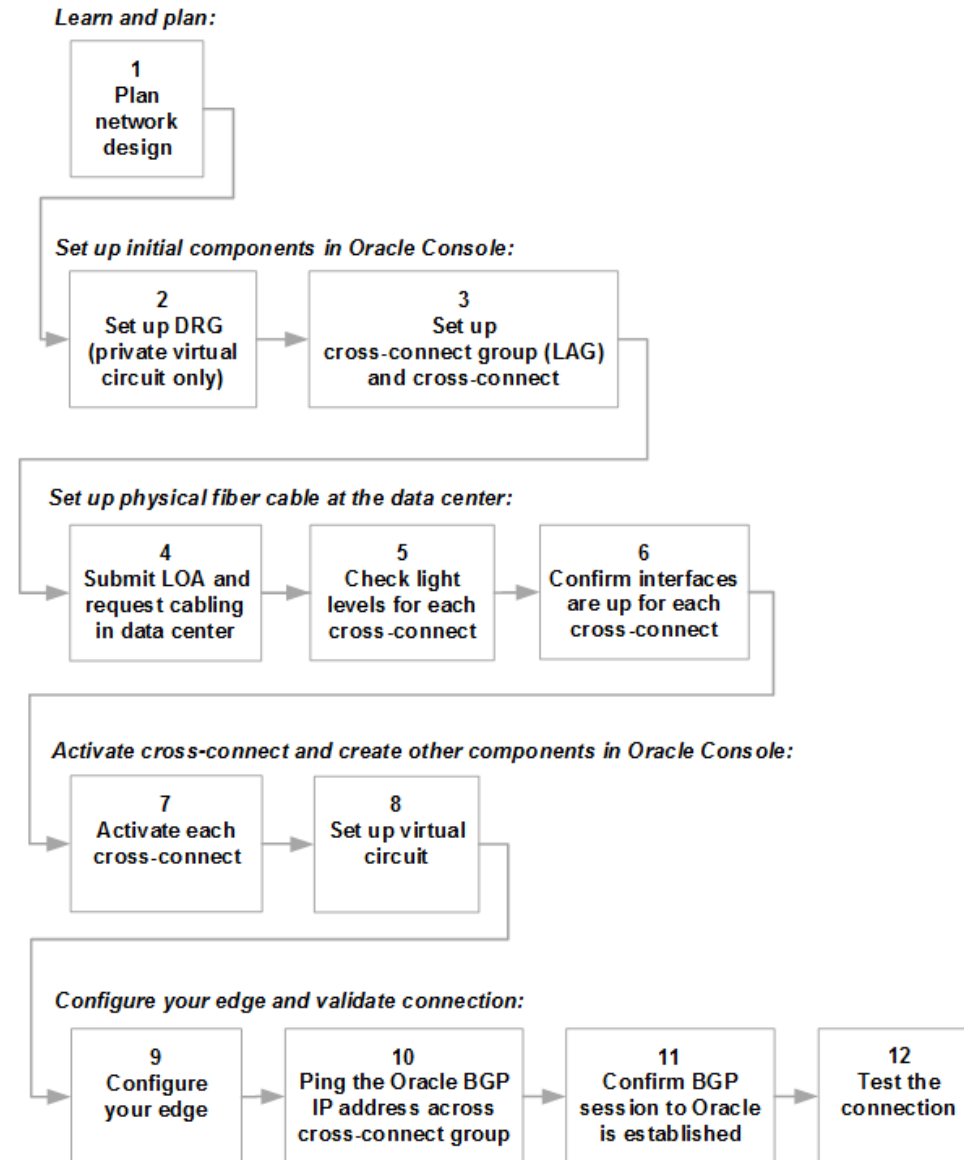
# How to setup a FastConnect Virtual Circuit in Colocation Model?

## Service Models

- Direct to Oracle:
  - Datacenter Colocation – 1a
  - Dedicated Circuits from a 3<sup>rd</sup> Party Network Carrier – 1b



# How to setup a FastConnect Virtual Circuit in Colocation Model?



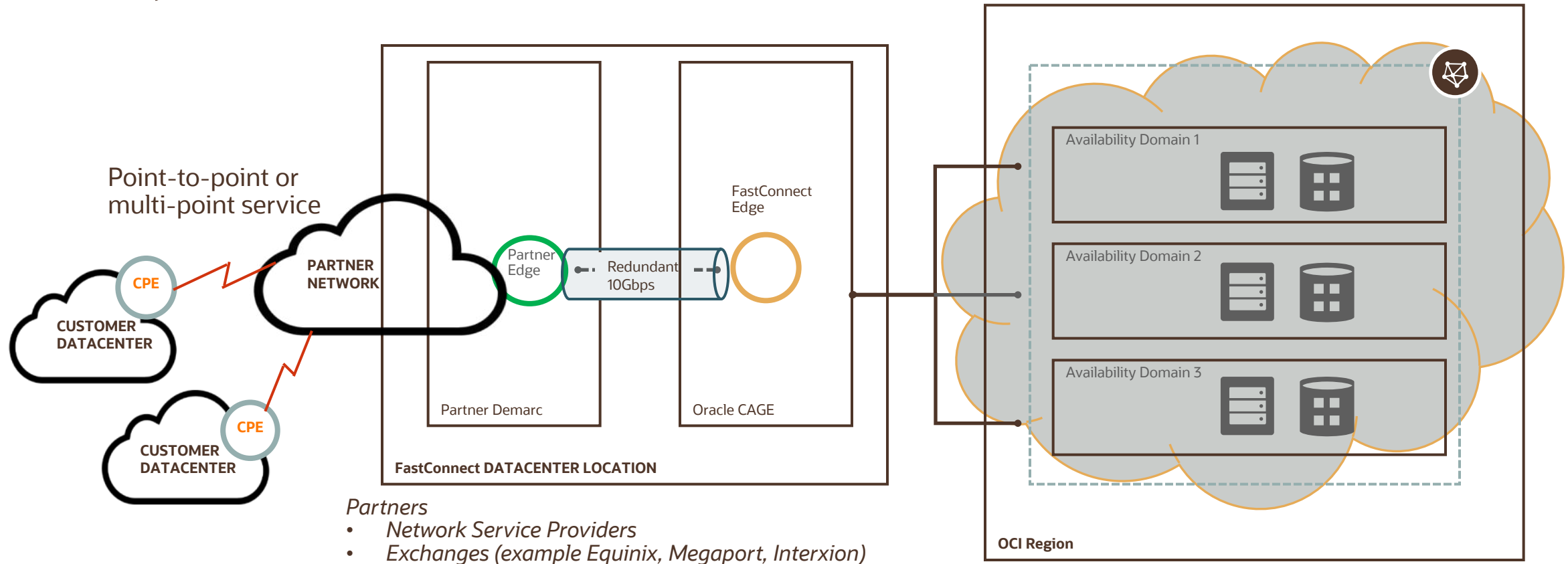
# FastConnect Connectivity Options

## Service Models

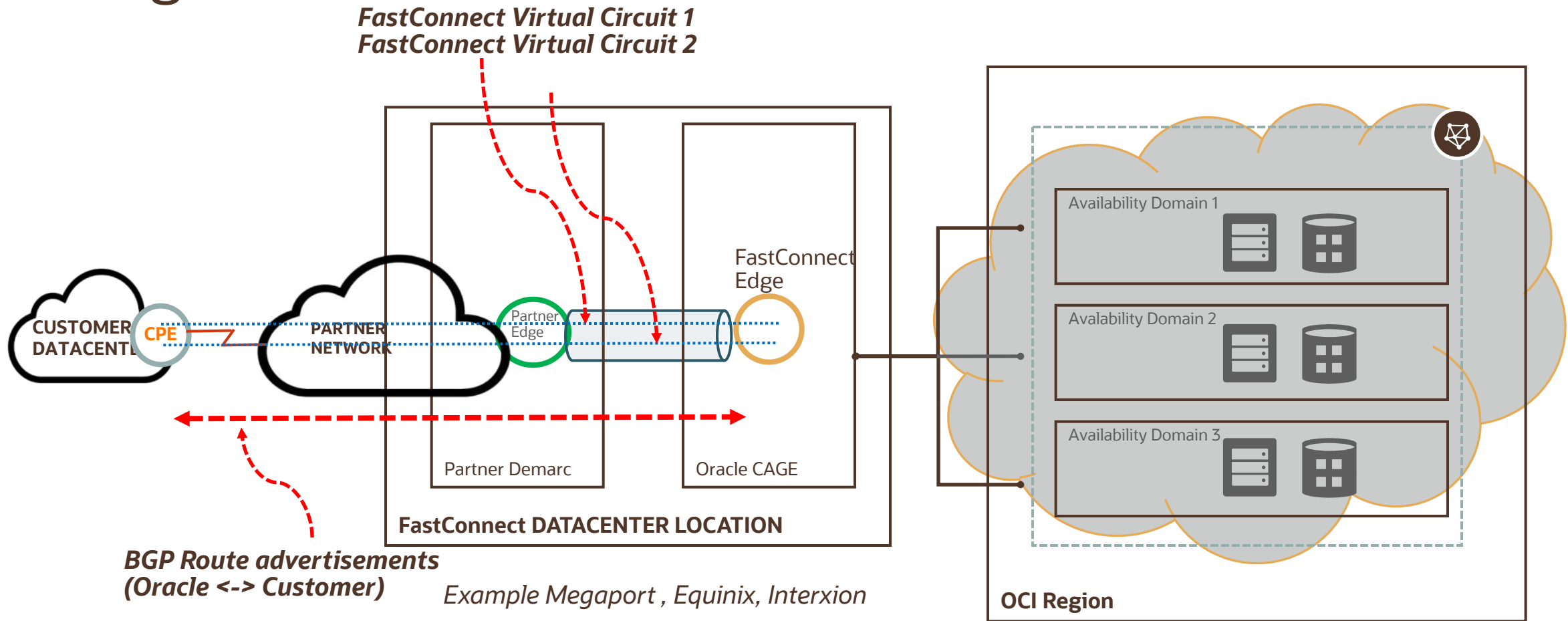
- Direct to Oracle:
  - Datacenter Colocation
  - Dedicated Circuits from a 3<sup>rd</sup> Party Network Carrier
- Using an Oracle Network Provider or Exchange Partner (Layer 2 or Layer 3)

# Using an Oracle Network Provider or Exchange Partner

## Physical Connection:

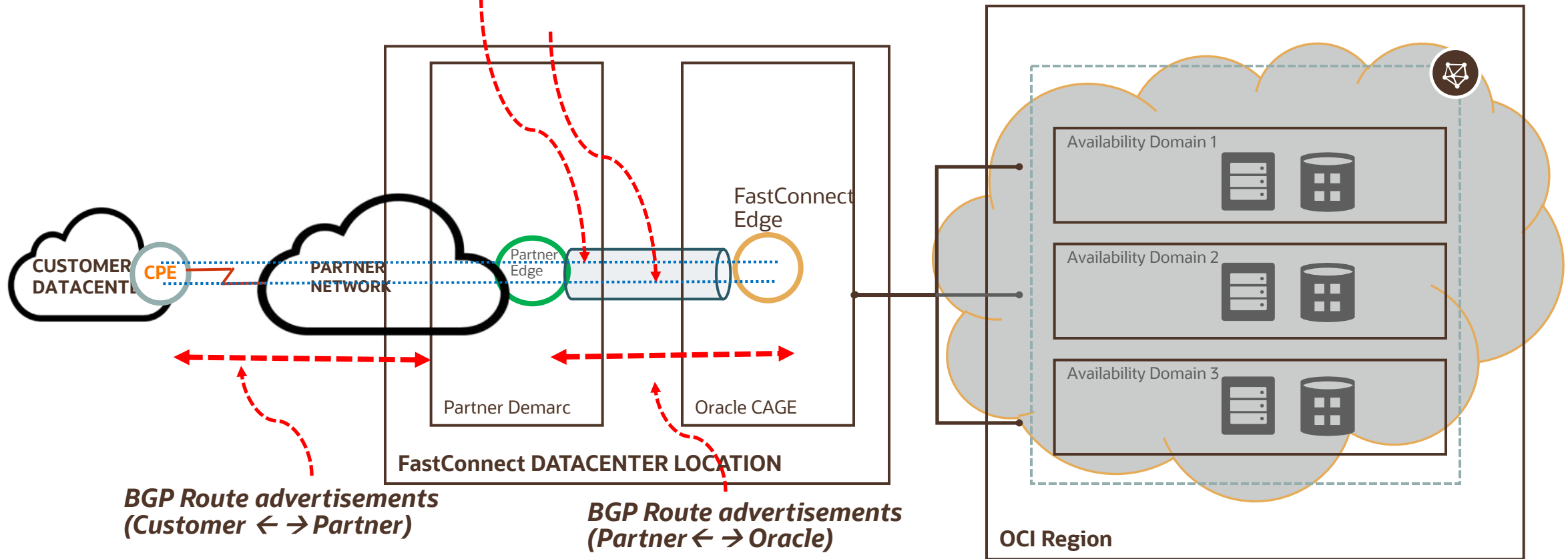


# Using an Oracle Network Provider or Exchange Partner– Layer 2 Logical Connection:



# Using an Oracle Network Provider or Exchange Partner– Layer 3 Logical Connection:

*FastConnect Virtual Circuit 1*  
*FastConnect Virtual Circuit 2*



# FastConnect Connectivity Partners

## North America Network Provider and Exchange Partners

FastConnect Partners	Oracle Cloud Location Phoenix, AZ, USA	Oracle Cloud Location Ashburn, VA, USA	Oracle Cloud Location Toronto, ON, Canada
Aryaka	✗	✓	✗
AT&T NetBond® for Cloud	✓	✓	✗
BT Cloud Connect	✗	✓	✗
C3ntro	✓	✓	✗
CenturyLink® Cloud Connect	✓	✓	✓
Cologix Hyperscale Connect	✗	✓	✓
Coresite Open Cloud Exchange	✗	✓	✗
Digital Realty Service Exchange	✓	✓	✗
EdgeConneX	✓	✗	✗
Epsilon	✗	✓	✗

<https://www.oracle.com/cloud/networking/fastconnect-providers.html>

# How to Setup a FastConnect virtual circuit with Partner:

## Demo example - Megaport Layer3 Partner

Service Models

- Direct to Oracle:
  - Datacenter Colocation – 1a
  - Dedicated Circuits from a 3<sup>rd</sup> Party Network Carrier – 1b
- Using an Oracle Network Provider or Exchange Partner (Layer 2 or Layer 3)

# 1. Setup OCI Components

- a. DRG (Private Peering Only)
- b. Setup a Virtual Circuit with Provider

Create Connection

[help](#)[cancel](#)

FastConnect lets you access your existing network from your Virtual Cloud Network (VCN) without traversing the internet. Choose an option:

☐ COLOCATE WITH ORACLE

You must be colocated with Oracle in a FastConnect location. Here you'll set up a Cross-Connect Group with at least one Cross-Connect. After cabling is complete at the location, you'll return here to activate the Cross-Connect(s) and set up at least one Virtual Circuit.


☒ CONNECT THROUGH A PROVIDER

You use a provider that is already connected to Oracle, and set up at least one Virtual Circuit on the provider's connection.

PROVIDER

Megaport: Service

Continue





# 1. Setup OCI Components

a. DRG (Private Peering Only)

b. Setup a Virtual Circuit with Provider

Create Connection [help](#) [cancel](#)

Create a Virtual Circuit that runs on the provider's connection to Oracle.

NAME  
FCMegaPort

CREATE IN COMPARTMENT  
intoracerohit (root)

VIRTUAL CIRCUIT TYPE

☒ PRIVATE VIRTUAL CIRCUIT  
Private IPv4 addresses are advertised (typically RFC 1918). The connection is via a Dynamic Routing Gateway you attach to your VCN.

☐ PUBLIC VIRTUAL CIRCUIT  
Regional Oracle Cloud Infrastructure public IPv4 addresses are advertised (for example, for Object Storage). You also provide the public IP prefixes that you want to advertise.

DYNAMIC ROUTING GATEWAY COMPARTMENT  
intoracerohit (root)

DYNAMIC ROUTING GATEWAY  
DRG-ASH

PROVISIONED BANDWIDTH  
1 Gbps

CUSTOMER BGP IP ADDRESS  
192.168.5.1/30

ORACLE BGP IP ADDRESS  
192.168.5.2/30

CUSTOMER BGP ASN  
64556

[Continue](#)

Select the type of circuit

Select the DRG


**Private Peering:** Provide customer and oracle BGP IP address and ASN

**Public Peering:** Customer Public BGP ASN and public Prefixes

# 1. Setup OCI Components

c. Provide details of Virtual Circuit to provider

Networking » FastConnect » Connection Detail



**FCMegaPort**

Delete

OCID: ...faqtua [Show](#) [Copy](#)

Created: Tue, 31 Jul 2018 15:49:27 GMT

PENDING PROVIDER

Resources


Virtual Circuits (1)

List Scope

COMPARTMENT

intoraclero hit (root)

**Virtual Circuits in intoraclero hit (root) *Compartment***

 <p>PENDING PROVIDER</p>	<p><a href="#">FCMegaPort</a></p> <p><b>Connection Type:</b> Provider Connection</p> <p><b>Provider Name:</b> Megaport: Service</p>	<p><b>Lifecycle State:</b> PENDING PROVIDER</p> <p><b>Time Created:</b> Tue, 31 Jul 2018 15:49:27 GMT</p> <p><b>OCID:</b> ...faqtua <a href="#">Show</a> <a href="#">Copy</a></p> <p><b>Virtual Circuit Type:</b> Private</p>
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Pending Provider

OCID of the Virtual Circuit

## 2. Setup Megaport Connection

### a. Use OCID of the Virtual Circuit in Megaport

Secure | <https://megaport.al/dashboard>

Megaport PORTAL

Dashboard Company Tools Megaport Exchange 2 Oracle

Saved Items

Fc\_demo\_us\_grp@Oracle.Com - June 19th 2018, 4:34pm PDT

Load

Create Megaport Create MCR

FILTER

OCI-OCIC #4ffb232  
MCR 100 Mbps (200% allocated) - Digital Realty ASH1, Ashburn, USA

+ Connection

MCR-OCI-Connection #cf2ab2e9  
A End VXC (100 Mbps) - OCI (us-ashburn) Primary (BMC)

MCR-OCIC-Connection #0e1f8c6a  
A End VXC (100 Mbps) - Oracle

OCI-MCR-Demo #2700c63f  
MCR 1 Gbps (210% allocated) - Digital Realty ASH1, Ashburn, USA

+ Connection

AWS-OCI-Demo #a92d8363  
A End VXC (1 Gbps) - OCI (us-ashburn) Secondary (BMC)

AWS-OCI-Demo #c7884385  
A End VXC (100 Mbps) - US East (Ohio) (us-east-2)

AWS-OCI-VXC2 #1c88682a  
A End VXC (1 Gbps) - OCI (us-ashburn) Primary (BMC)

ORACLE Cloud

aws

ORACLE Cloud

Create a Virtual Circuit

Create Megaport

Create MCR

OCI-OCIC #4ffa232

MCR 100 Mbps

OCI-MCR-1

MCR 1 Gbps

New Connection


1 Select Type

2 Select Port


3 Connection Details

4 MCR A End


5 Summary

OCI-MCR-Demo  
1 Gbps  
Ashburn, USA


⇌

Select Destination


Choose Destination



Cloud




Private VXC



Megaport Exchange

Back To Dashboard

Next ➔



## New Connection

① Select Type   ② **Select Port**   ③ Connection Details   ④ MCR A End   ⑤ Summary



**OCI-MCR-Demo**  
1 Gbps  
Ashburn, USA



**OCI (us-ashburn) Primary (BMC)**  
Ashburn, USA

### Select Provider \*



AMS-IX  
4 Ports



AWS  
28 Ports



Alibaba Cloud Computing Ltd  
7 Ports



Azure ExpressRoute  
84 Ports



Google Inc  
31 Ports



Oracle  
10 Ports



Salesforce.Com Inc  
8 Ports



Webair  
1 Ports



Back To Dashboard

### Oracle Virtual Circuit ID \*

ocid1.virtualcircuit.oc1.iad.aaaaaaaavmd2lbw4ievszxcz2jp55mxiszvdrccxx27jw6voopv2r3

### Choose From Available Oracle Ports \*



OCI (Us-Ashburn) Primary (BMC)  
Oracle At Equinix DC2/6



OCI (Us-Ashburn) Secondary (BMC)  
Oracle At CoreSite VA1



For a list of all available Oracle ports please refer to their [Megaport Exchange Profile](#)

Choose POP Location

Provide OCI virtual circuit OCID

Back

Next



## New Connection

① Select Type   ② Select Port   ③ **Connection Details**   ④ MCR A End   ⑤ Summary



**OCI-MCR-Demo**

1 Gbps  
Ashburn, USA



**OCI (us-ashburn) Primary (BMC)**

Ashburn, USA

Name Your Connection \*

Test\_FC|

Invoice Reference

Rate Limit \*

MAX: 1000 Mbps

1000

[Back To Dashboard](#)

[← Back](#)

[Next →](#)

Monthly rate: 0.00 USD (Price Excludes Tax)



## Edit Connection

[Configuration](#)[Configure A End](#)[Details](#)[Logs](#)[Usage](#)[Billing](#)**OCI-MCR-Demo**1 Gbps  
Ashburn, USA**OCI (us-ashburn) Primary (BMC)**

Ashburn, USA

IP Addresses ?

192.168.5.1/30



Static Routes ? 0/10



Add New Static Route

BGP Connections ? 1/10



BGP Connection 1



Peer ASN \* ?

31898

Local IP \* ?

192.168.5.1/30

Peer IP \* ?

192.168.5.2/30

BGP Auth ?

Override MCR ASN ?

64556

Cancel

Ok

Add New BGP Connection

NAT IP Addresses ? 0/10



Add New NAT IP Address

[Back To Dashboard](#)[Back](#)[Next](#)[Apply](#)

New Connection

- ① Select Type   ② Select Port   ③ Connection Details   ④ MCR A End   ⑤ **Summary**



**OCI-MCR-Demo**  
1 Gbps  
Ashburn, USA

⇔



**OCI (us-ashburn) Primary (BMC)**  
Ashburn, USA

Connection Name    Test\_FC

Rate Limit    1 Gbps

MCR A End Details ▼

Cloud Details (ORACLE) ▼

Monthly Rate    **0.00 USD** Price excludes TAX

Back To Dashboard

← Back

Add To Cart





### Test\_FC

OCI-MCR-Demo => Oracle OCI (Us-Ashburn)  
Primary (BMC)



\$0.00 USD



Monthly charge excluding taxes



Save Cart

Check-Out



Create Megaport



Create MCR



OCI-OCIC #4ffba232

MCR 100 Mbps (200% allocated) - Digital Realty ASH1, Ashburn, USA



MCR-OCI-Connection #cf2ab2e9

A End VXC (100 Mbps) - OCI (us-ashburn) Primary (BMC)



MCR-OCIC-Connection #0e118c6a

A End VXC (100 Mbps) - Oracle



OCI-MCR-Demo #2700c631

MCR 1 Gbps (310% allocated) - Digital Realty ASH1, Ashburn, USA



AWS-OCI-Demo #a92d8363

A End VXC (1 Gbps) - OCI (us-ashburn) Secondary (BMC)



AWS-OCI-Demo #c7884385

A End VXC (100 Mbps) - US East (Ohio) (us-east-2)



AWS-OCI-VXC2 #1c88682a

A End VXC (1 Gbps) - OCI (us-ashburn) Primary (BMC)



Test\_FC

A End VXC (1 Gbps) - OCI (us-ashburn) Primary (BMC)

## Checkout

Monthly Rate



Test\_FC  
No Term

\$0.00 USD

[+ Promo Code](#)

Price excludes taxes

### Important Information

This Order constitutes a binding offer to acquire the Services described above and which, if accepted by Megaport, creates a separate agreement incorporating the terms set out in (a) this Order; and (b) where an agreement signed by Customer or its Affiliate relating to this Service exists, that agreement or, otherwise, the [Global Services Agreement](#).

[Back To Dashboard](#)

[Deploy Now](#)

[Networking](#) » [FastConnect](#) » Connection Detail



UP

## FCMegaPort

Delete

OCID: ...ypblfq [Show](#) [Copy](#)

Created: Tue, 31 Jul 2018 18:30:12 GMT

### Resources

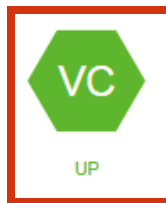
[Virtual Circuits \(1\)](#)

### List Scope

COMPARTMENT

intoraclohit (root)

## Virtual Circuits *in* intoraclohit (root) *Compartment*



[FCMegaPort](#)

Connection Type: Provider Connection

Provider Name: Megaport: Service

**Lifecycle State:** PROVISIONED

Time Created: Tue, 31 Jul 2018

OCID: ...ypblfq [Show](#) [Copy](#)

Virtual Circuit Type: Private

# FastConnect Connectivity Resiliency

# FastConnect Redundancy

- Have multiple redundant connections into OCI and avoid having single points of failure in your design.
- For IPsec VPN - OCI recommends using multiple connections from redundant physical devices at the customer premises. High availability connections require redundant hardware, even when connecting from the same physical location
- OCI FastConnect provides multiple redundancy options, and its recommended to use multiple vendors if financially feasible to ensure you have redundant network connections
- Plan for sufficient network capacity with your FastConnect virtual circuits to ensure individual circuits are not overwhelmed in case of failures on redundant circuits
- Have a service level redundancy by creating a IPsec VPN service alongside FC. Oracle always prioritizes FC over VPN connection.

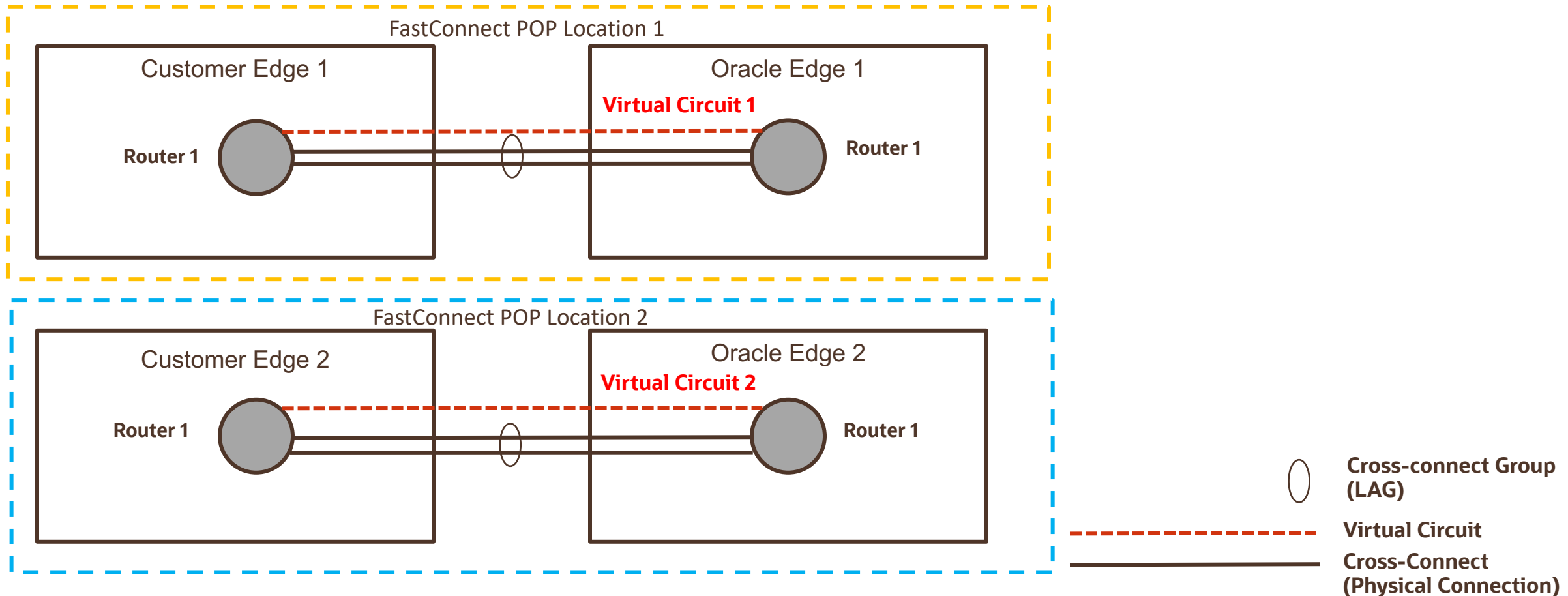
# FastConnect Redundancy

- With FastConnect there are multiple types of redundancy
  - Transit POP redundancy
  - Router redundancy with-in a single Transit POP
  - Partner redundancy
  - Service redundancy
- Oracle provides:
  - 2 Oracle FastConnect (POPs), for location redundancy in following regions. Each is connected to all of Oracle's Availability Domains in the region.
    - Ashburn, Phoenix, London, Frankfurt
  - **Per Oracle POP:** 2 routers, for router redundancy
  - Multiple physical connections between each Oracle provider and Oracle (for a given region)

# Redundancy: Connectivity Model

## Colocation or colocation via third party Network Provider

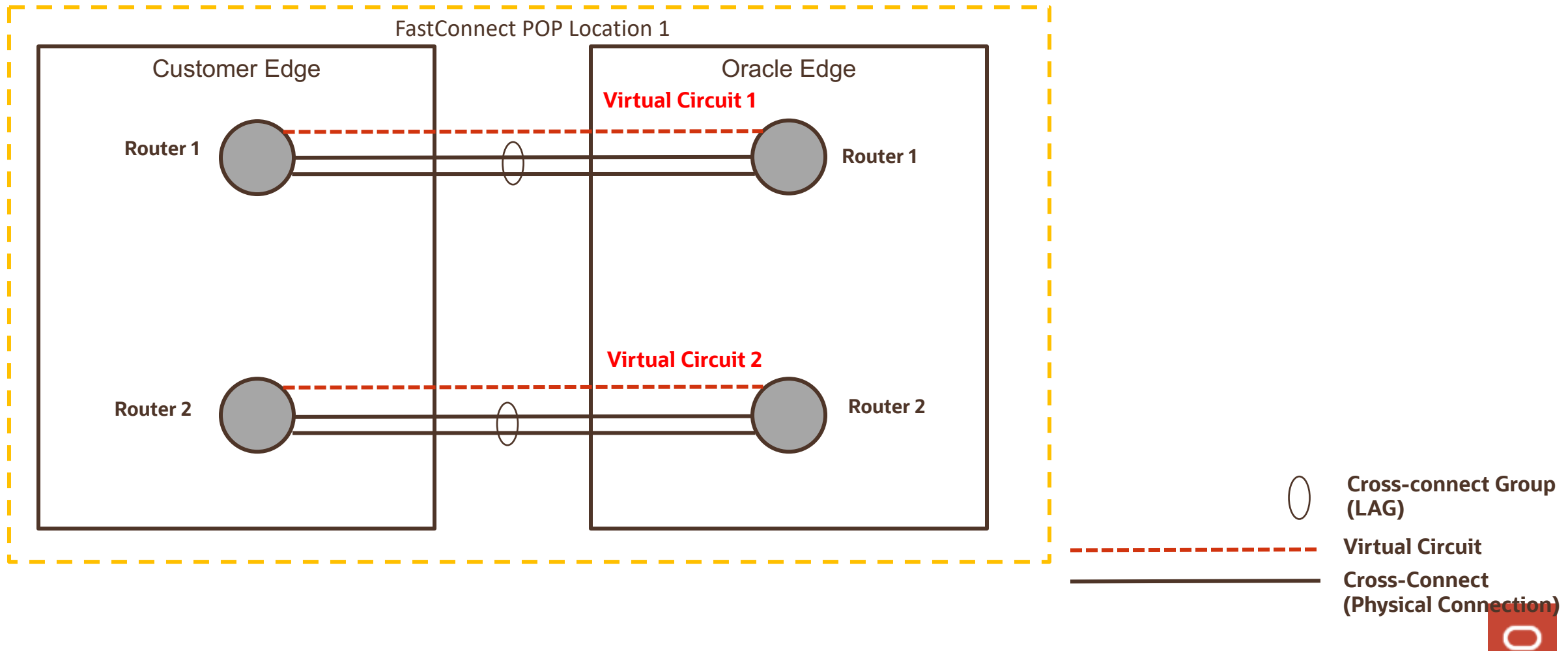
- Transit POP redundancy



# Redundancy: Connectivity Model

## Colocation or colocation via third party Network Provider

Router redundancy with-in a single Transit POP



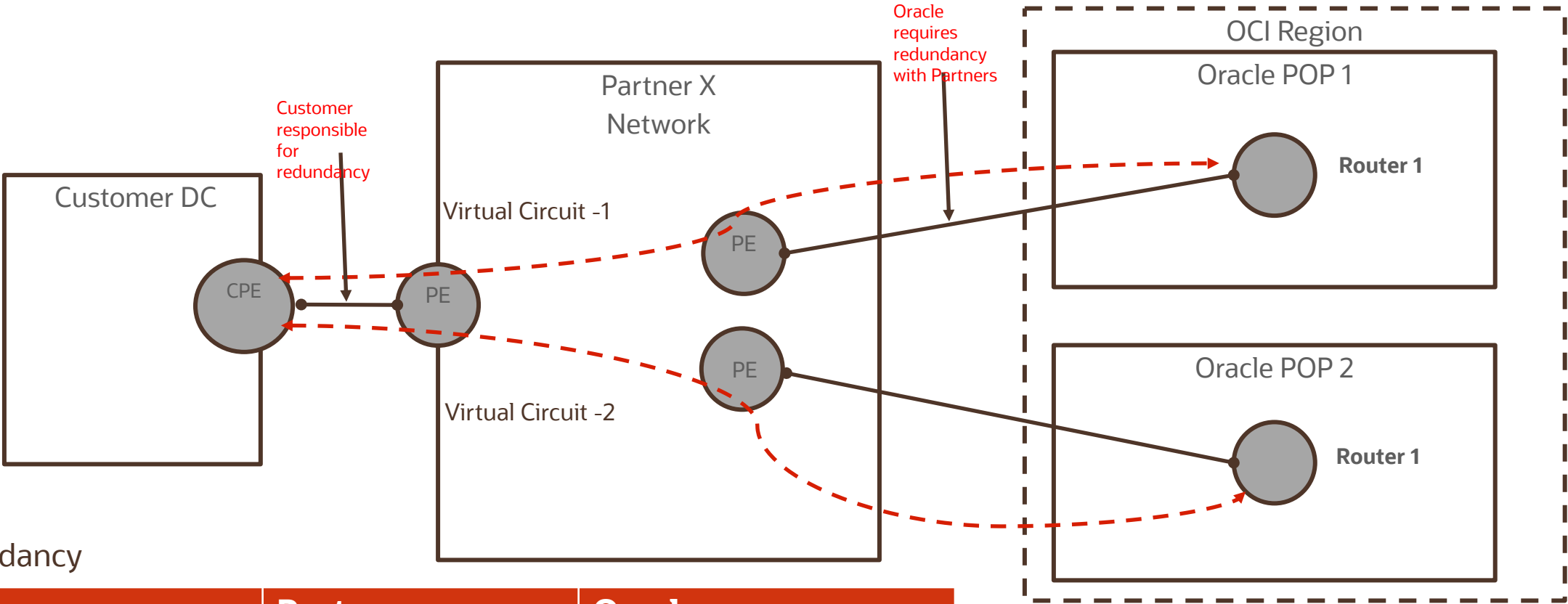


# Redundancy: Connectivity Model

## Oracle Partner (Layer 2)

- For a **Layer 2** partner, a given virtual circuit can run on only a single port group (formerly known as Cross-Connect) (LAG), or single cross-connect (an individual cable, no LAG).
- Redundancy can be achieved by provisioning 2<sup>nd</sup> virtual circuit.
- Partner will make sure that 2<sup>nd</sup> virtual circuit will land on redundant cross-connect LAG between them and Oracle.
- Redundant cross-connect LAG could land in same POP or different POP depending upon connectivity between partner and oracle.
- Active/Active or Active/Passive setup is possible with “LP” and “AS\_PATH” BGP attributes influencing egress traffic from customer and OCI respectively

# Layer 2 Partners : Megaport, Equinix, CenturyLink



For Redundancy

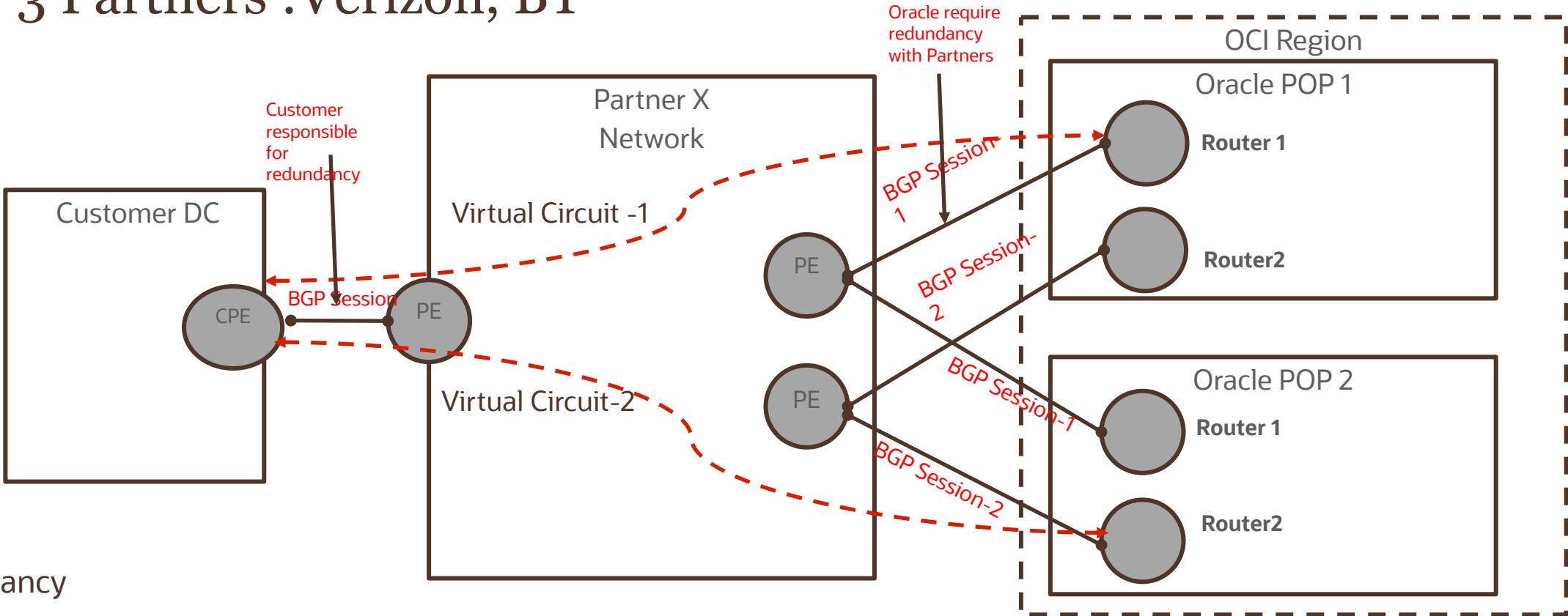
Customer	Partner	Oracle
<ul style="list-style-type: none"><li>• Order 2X VC with Oracle</li><li>• Order 2X cross-connects to partner</li></ul>	<ul style="list-style-type: none"><li>• Min 2X Circuits to Oracle.</li><li>• Provisions 2<sup>nd</sup> VC on redundant cross-connect</li></ul>	<ul style="list-style-type: none"><li>• Min 2X Circuits to Partner</li><li>• Agreement with partner to Provision 2<sup>nd</sup> VC on redundant cross-connect</li></ul>

# Redundancy: Connectivity Model

## Oracle Partner (Layer 3)

- For a **Layer 3** partner, a given virtual circuit can run on multiple cross-connect groups (LAGs) or multiple cross-connects (a cross-connect is an individual cable, no LAG), which provides router redundancy for the virtual circuit.
- Customer would get 2 BGP sessions tied to single virtual circuit by default running over redundant cross-connect group or cross-connects.
- Partner and Oracle will make sure that 2<sup>nd</sup> BGP session will land on redundant cross-connect LAG between partner and Oracle.
- Customer can still provision 2<sup>nd</sup> virtual circuit with additional cost should they need redundancy with virtual circuits

# Layer 3 Partners :Verizon, BT

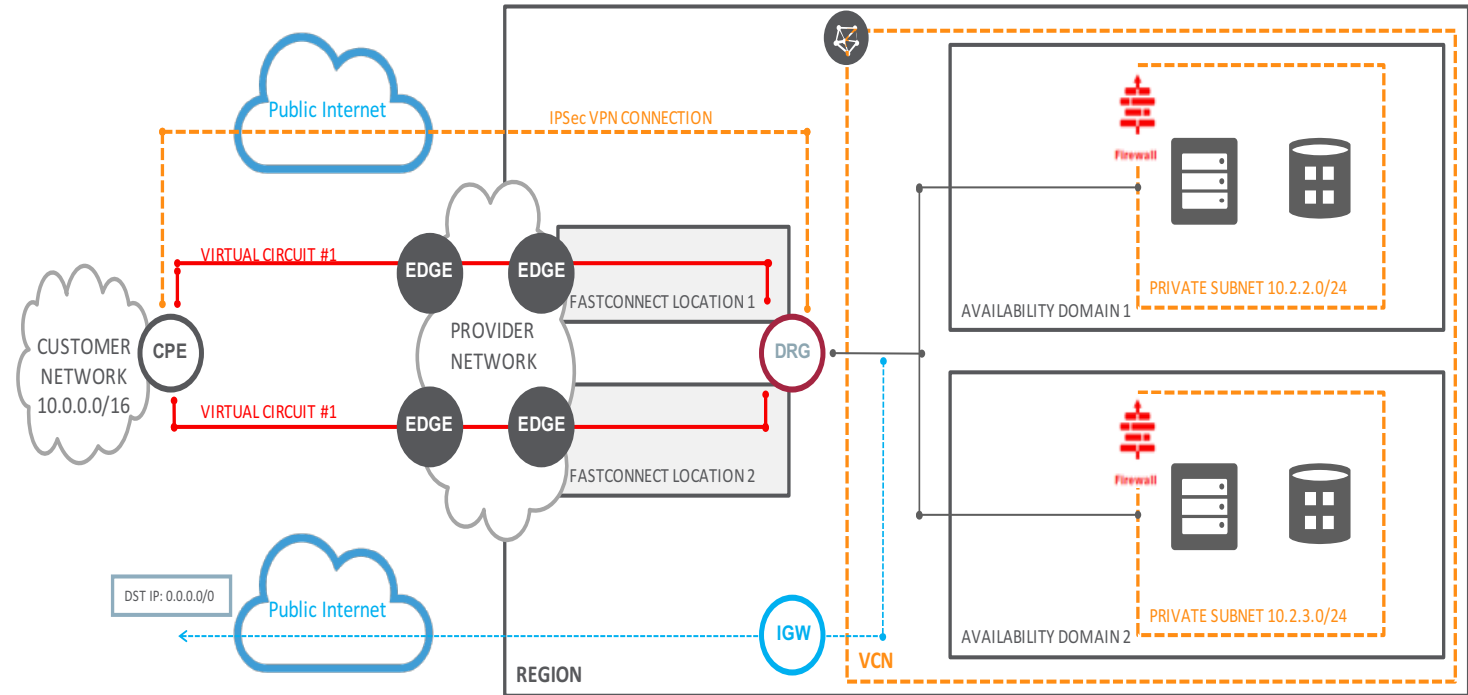


For Redundancy

Customer	Partner	Oracle
<ul style="list-style-type: none"><li>Order 2X VC with Oracle</li><li>Order 2X cross-connects to partner</li></ul>	<ul style="list-style-type: none"><li>Min 2X Circuits to Oracle</li><li>Runs 2BGP sessions with Oracle</li></ul>	<ul style="list-style-type: none"><li>Min 2X Circuits to Partner</li><li>Runs 2 BGP sessions with Partner.</li></ul>

# Service Redundancy

- Customer can provision IPsec along with FastConnect.
- IPsec can be treated as back up incase if FastConnect fails
- Egress traffic from OCI will prefer FastConnect.\*
- Bandwidth, latency concerns over IPsec
- Highly recommended if customer has single FastConnect to OCI



# Summary

After completing this lesson, you should have learned:

- FastConnect Use cases
- FastConnect Concepts
- Describe FastConnect Service Models
- FastConnect resiliency options



**Oracle Cloud always free tier:**

[oracle.com/cloud/free/](https://oracle.com/cloud/free/)

**OCI training and certification:**

[oracle.com/cloud/iaas/training](https://oracle.com/cloud/iaas/training)

[oracle.com/cloud/iaas/training/certification](https://oracle.com/cloud/iaas/training/certification)

[education.oracle.com/oracle-certification-path](https://education.oracle.com/oracle-certification-path)

**OCI hands-on labs:**

[ocitraining.qcloudable.com/provider/oracle](https://ocitraining.qcloudable.com/provider/oracle)

**Oracle learning library videos on YouTube:**

[youtube.com/user/OracleLearning](https://youtube.com/user/OracleLearning)

