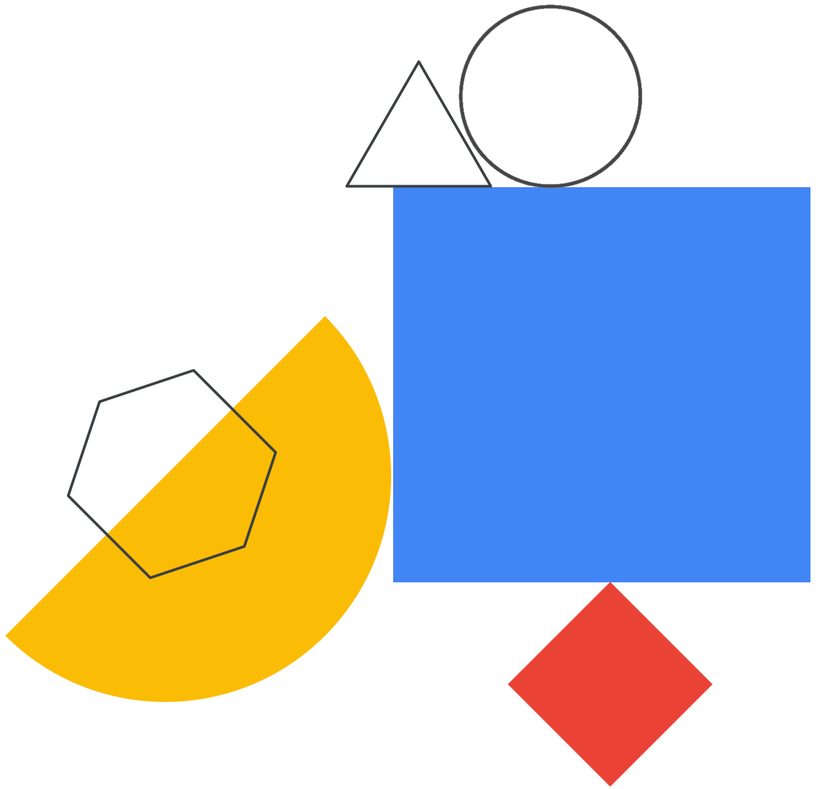
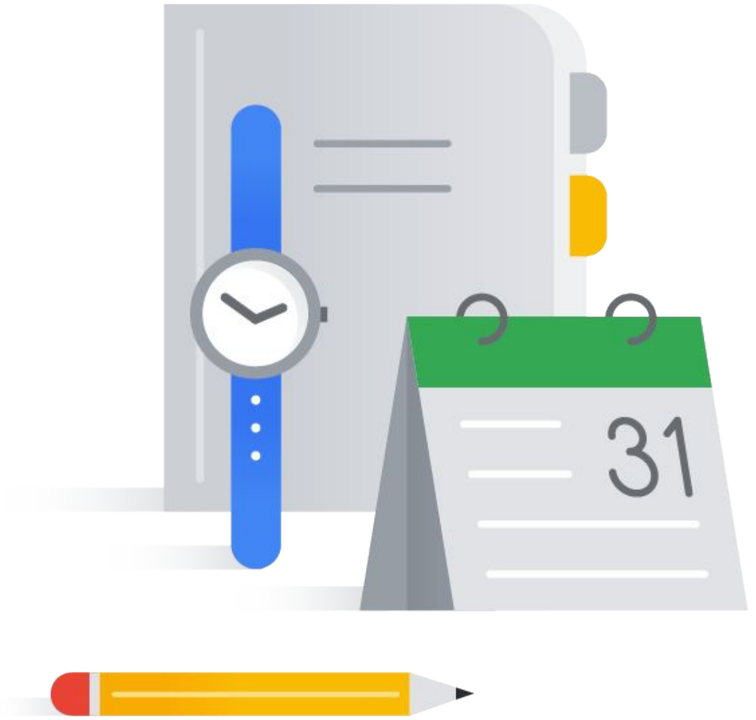
Google Cloud

Interconnecting Networks



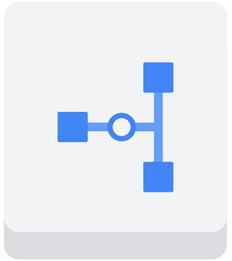
Agenda

01	Cloud VPN Lab: Configuring Google Cloud HA VPN
02	Cloud Interconnect and Peering
03	Sharing VPC Networks



Cloud VPN

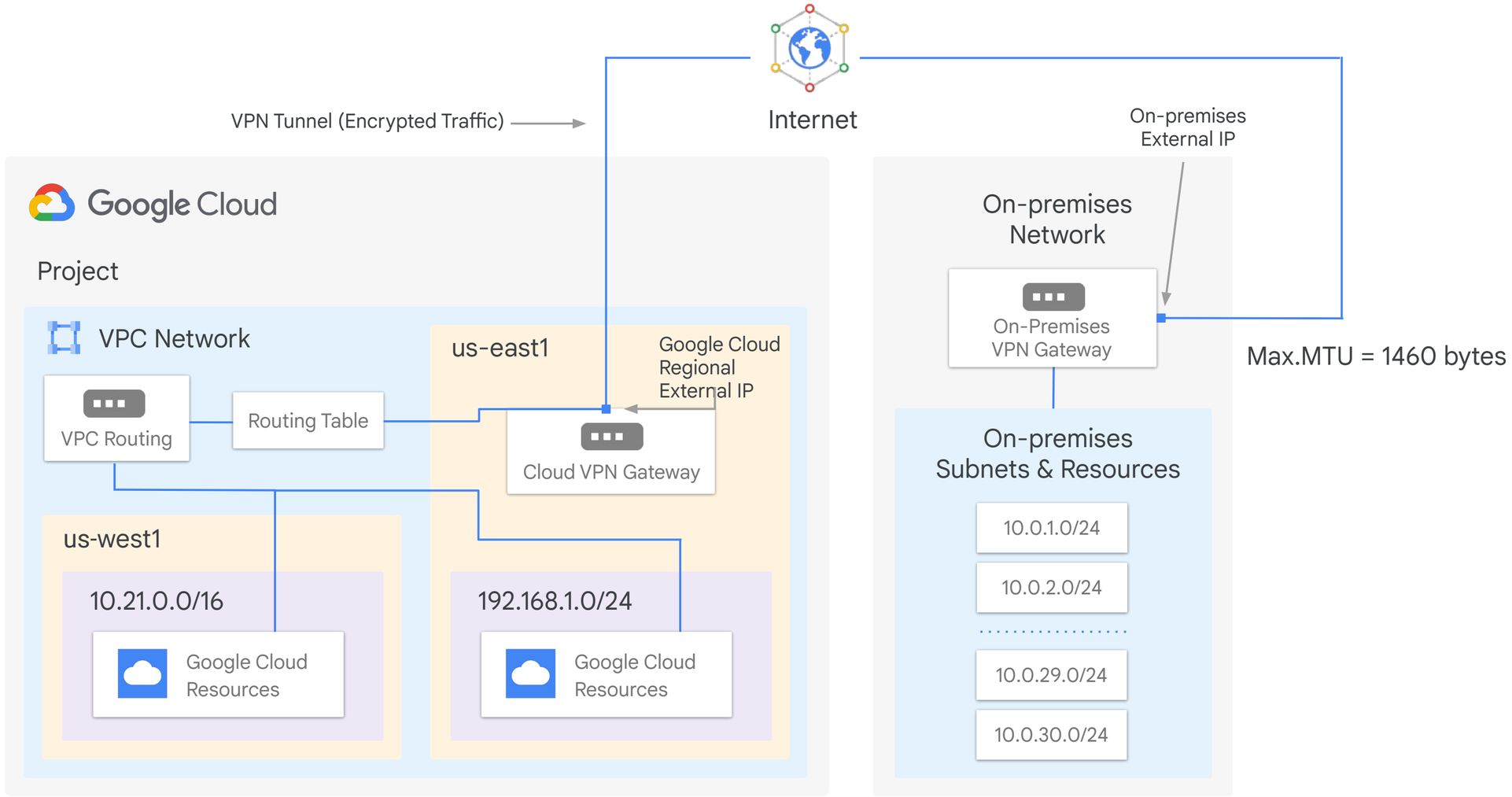
Cloud VPN securely connects your on-premises network to your Google Cloud VPC network



Cloud VPN

- Useful for low-volume data connections
- 99.9% SLA
- Supports:
  - Site-to-site VPN
  - Static routes
  - Dynamic routes (Cloud Router)
  - IKEv1 and IKEv2 ciphers

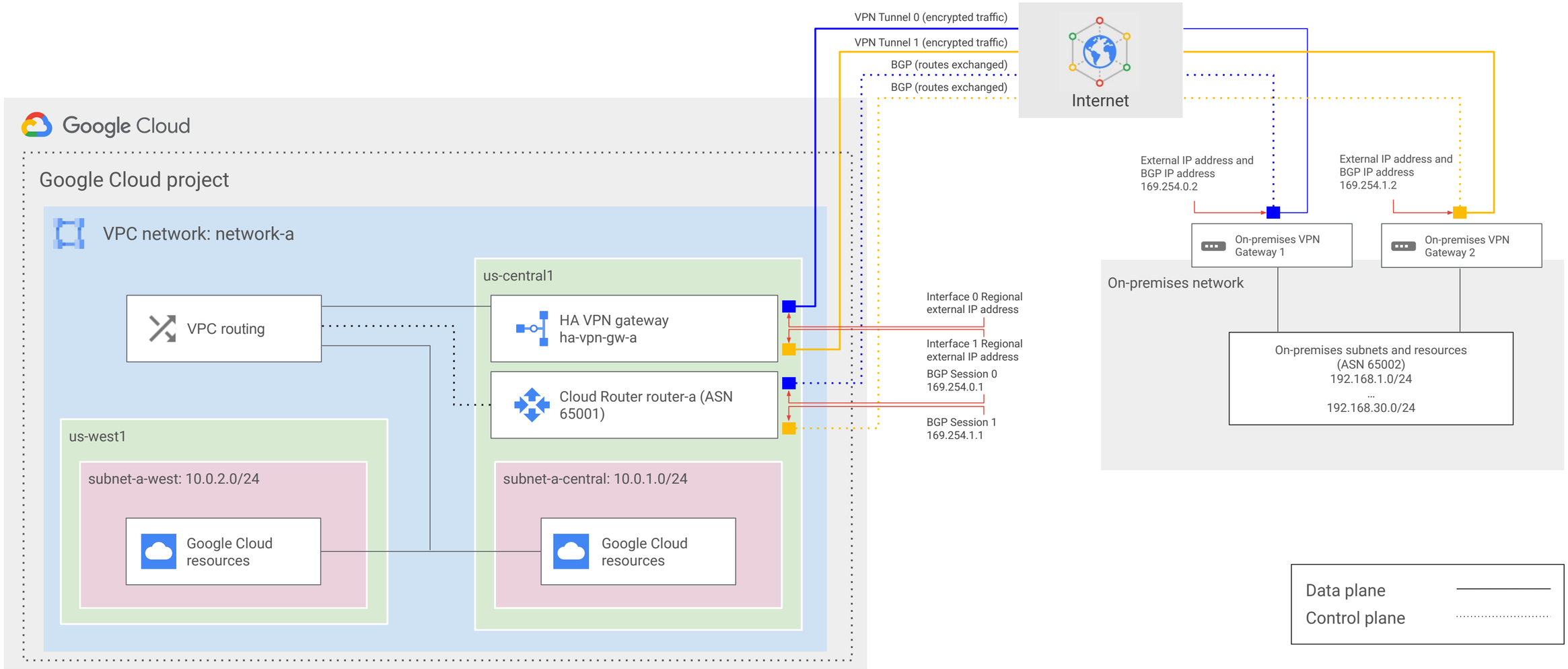
Classic VPN topology



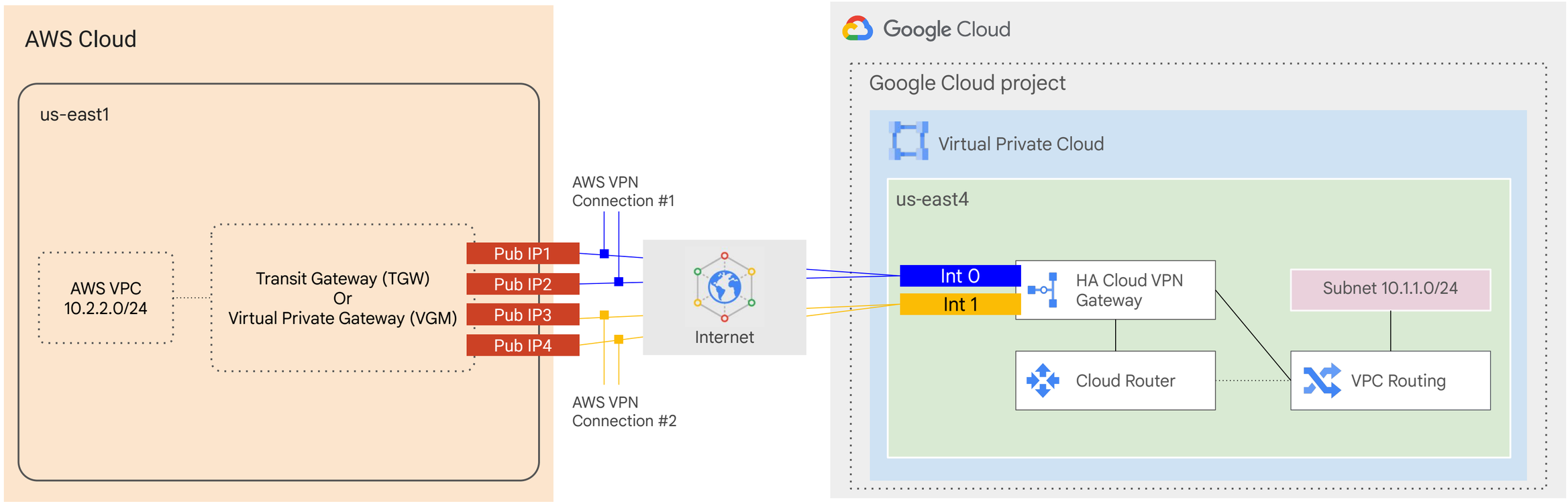
HA VPN overview

- Provides 99.99% service availability.
- Google Cloud automatically chooses two external IP addresses.
  - Supports multiple tunnels
  - VPN tunnels connected to HA VPN gateways must use dynamic (BGP) routing
- Supports site-to-site VPN for different topologies/configuration scenarios:
  - An HA VPN gateway to peer VPN devices
  - An HA VPN gateway to an Amazon Web Services (AWS) virtual private gateway
  - Two HA VPN gateways connected to each other

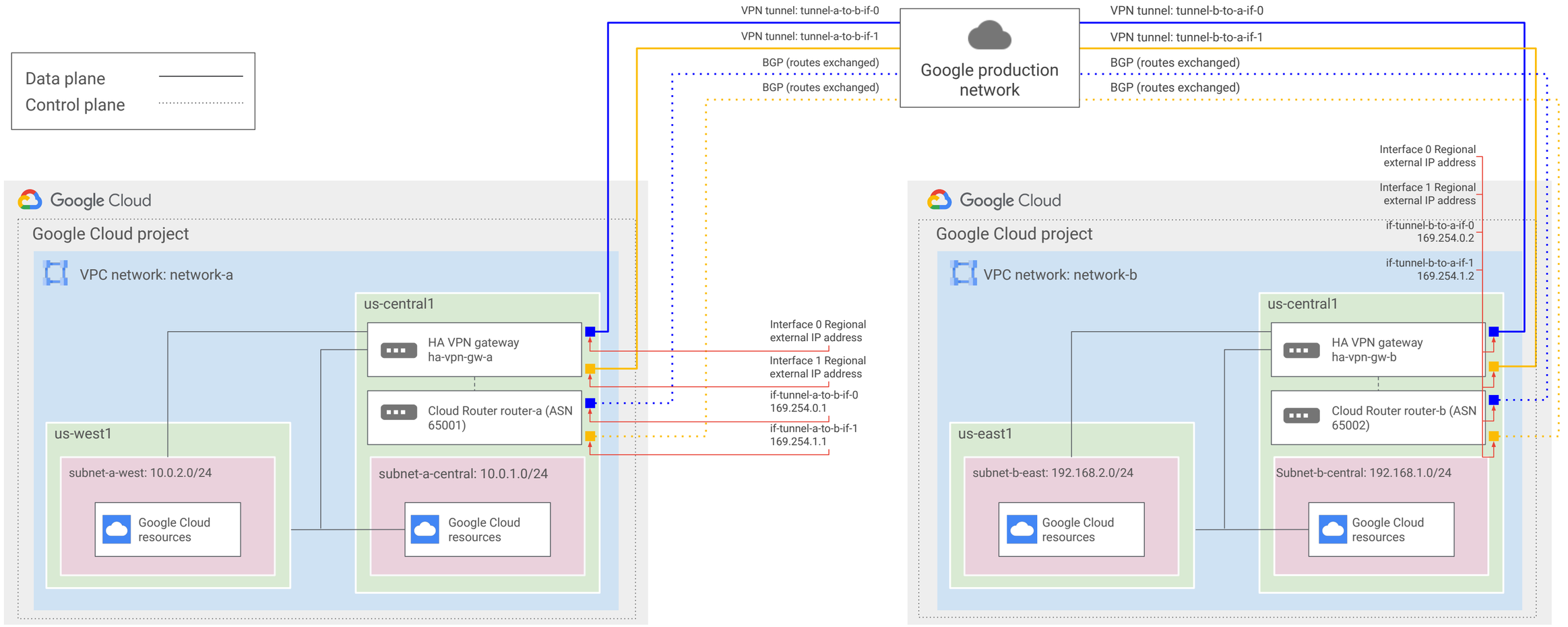
HA VPN to peer VPN gateway topology



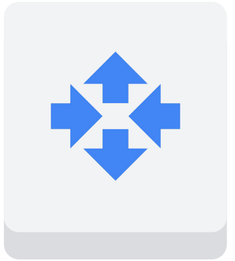
HA VPN to AWS peer gateway topology



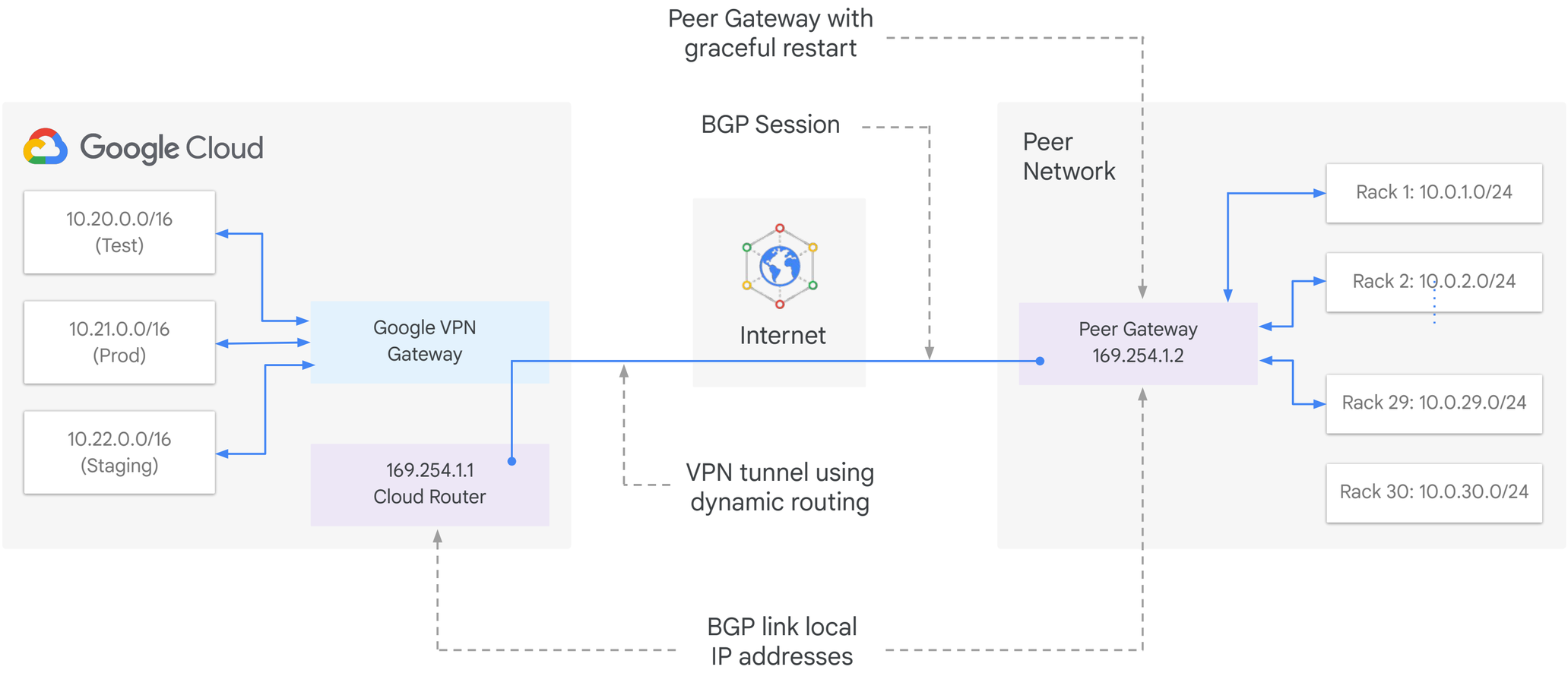
HA VPN between Google Cloud networks topology



Dynamic routing with Cloud Router

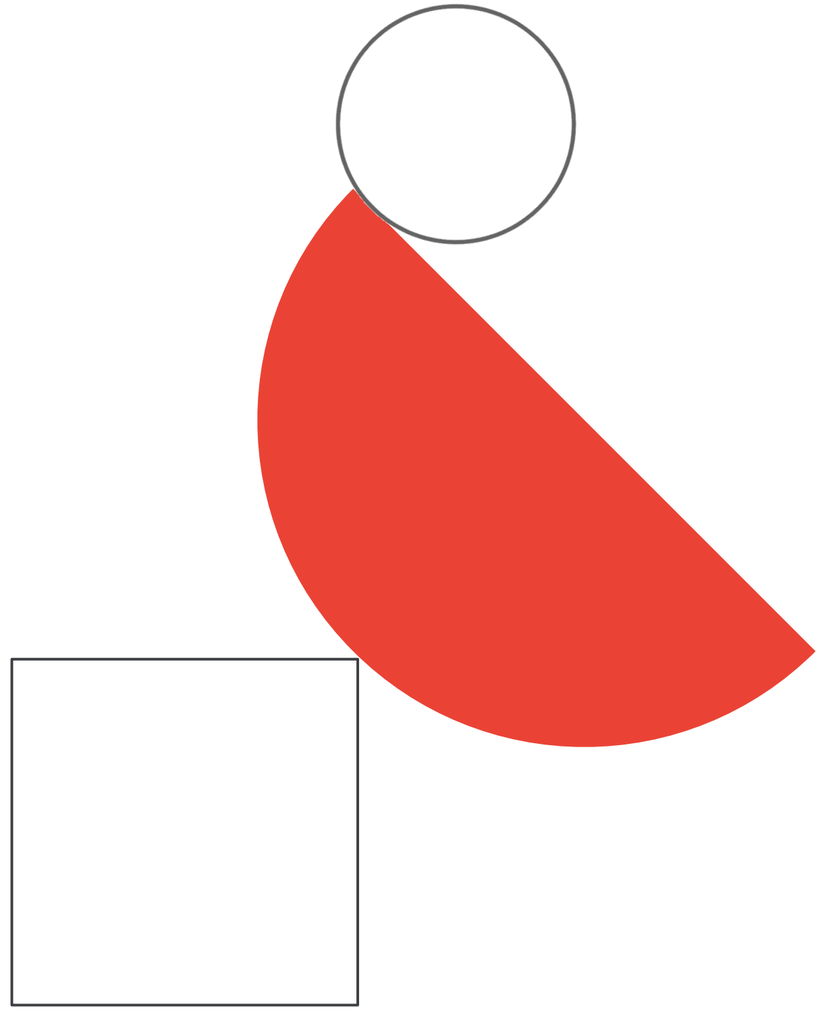


Cloud Router



Lab Intro

Configuring Google Cloud HA VPN



Lab objectives

01 Create two VPC networks and instances

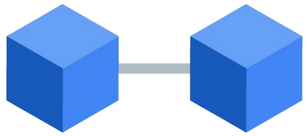
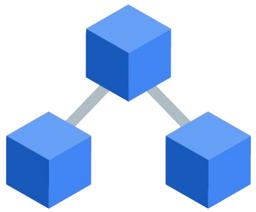
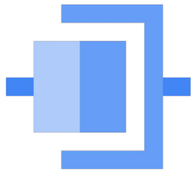
02 Configure HA VPN gateways

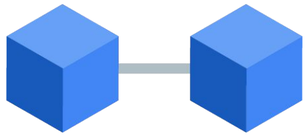
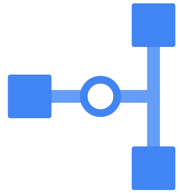
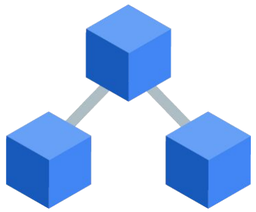
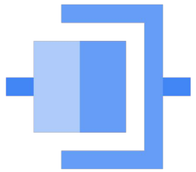
03 Configure dynamic routing with VPN tunnels

04 Configure global dynamic routing mode

05 Verify and test HA VPN gateway configuration

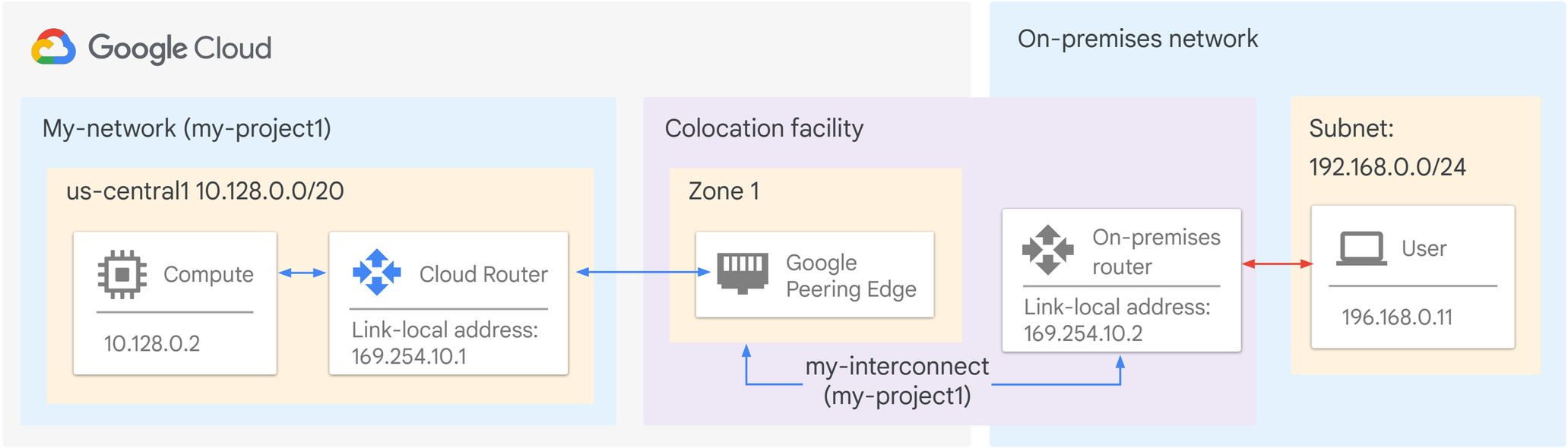
Cloud Interconnect and Peering

	Dedicated	Shared
Layer 3	 Direct Peering	 Carrier Peering
Layer 2	 Dedicated Interconnect	 Partner Interconnect

	Dedicated	Shared
Layer 3	 Direct Peering  Cloud VPN  Carrier Peering	
Layer 2	 Dedicated Interconnect	 Partner Interconnect

Dedicated Interconnect provides direct physical connections

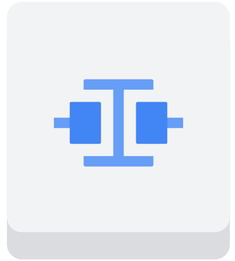
Dedicated Interconnect



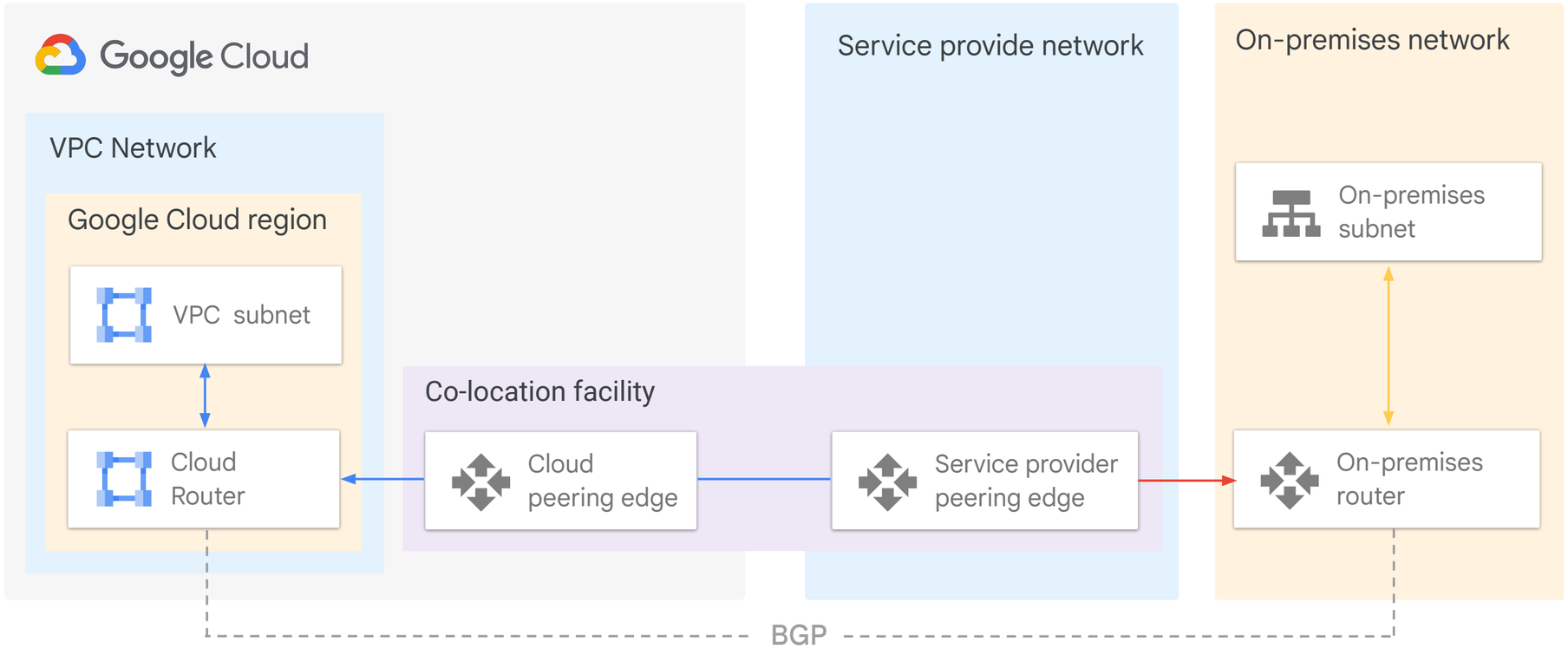
Colocation facility locations

Google Cloud

Partner Interconnect provides connectivity through a supported service provider



Partner Interconnect

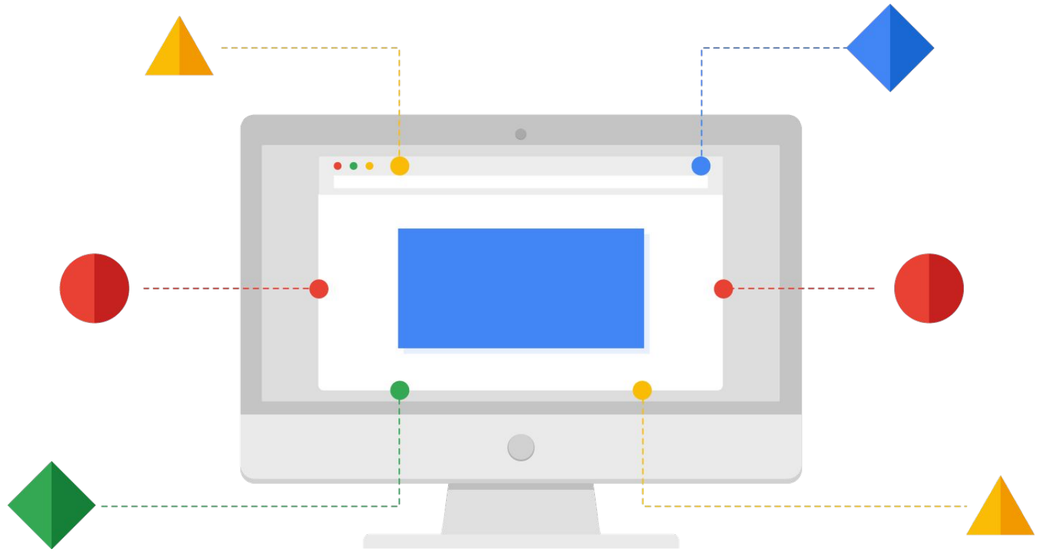


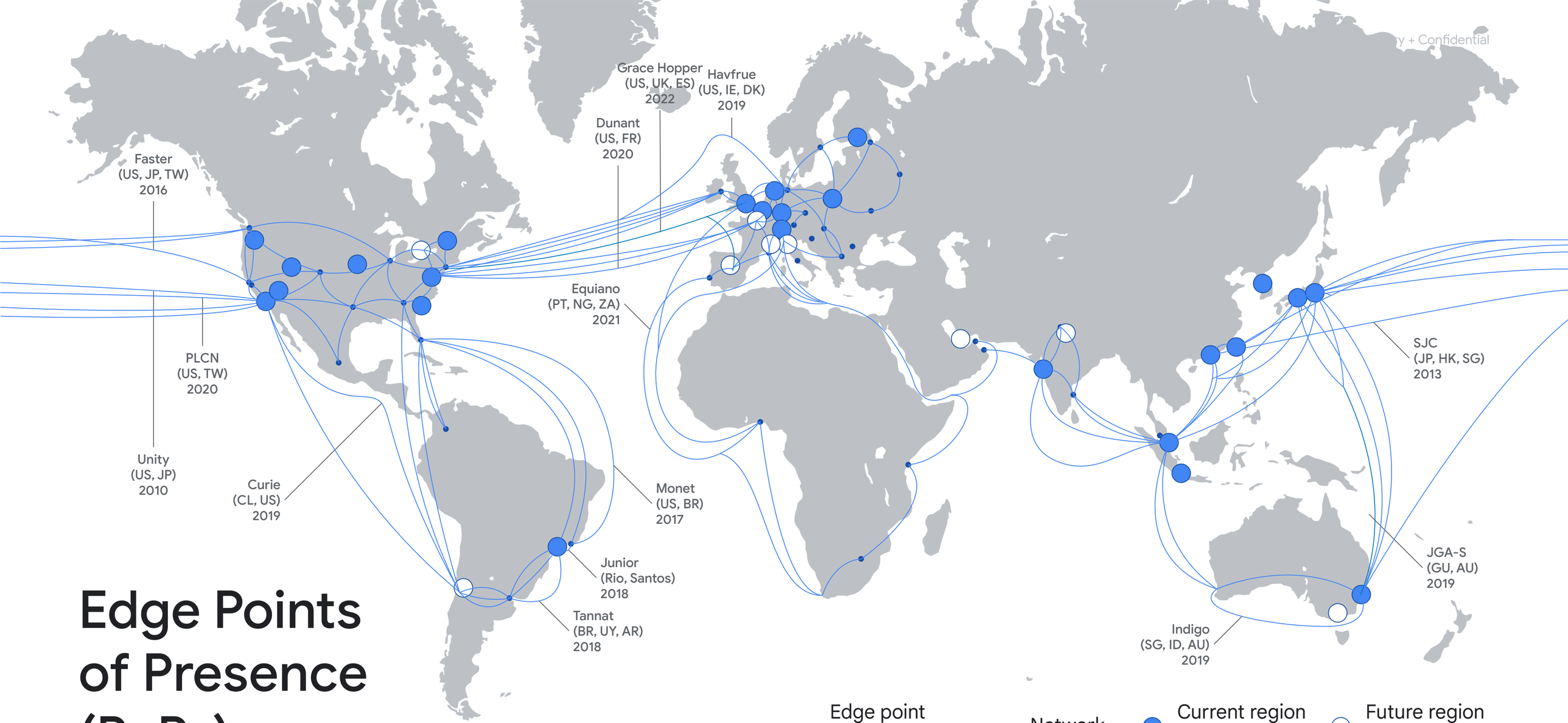
Comparison of Interconnect options

Connection	Provides	Capacity	Requirements	Access Type
IPsec VPN tunnel	Encrypted tunnel to VPC networks through the public internet	1.5-3 Gbps per tunnel	On-premises VPN gateway	Internal IP addresses
Dedicated Interconnect	Dedicated, direct connection to VPC networks	10 Gbps or 100 Gbps per link	Connection in colocation facility	
Partner Interconnect	Dedicated bandwidth, connection to VPC network through a service provider	50 Mbps – 10 Gbps per connection	Service provider	

Direct Peering provides a direct connection between your business network and Google's

- Broad-reaching edge network locations
- Exchange BGP routes
- Reach all of Google's services
- Peering requirements
- No SLA





Edge Points of Presence (PoPs)

Edge point of presence

Network

Current region with 3 zones

Future region with 3 zones

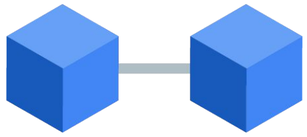
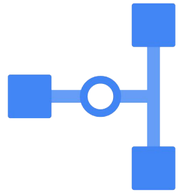
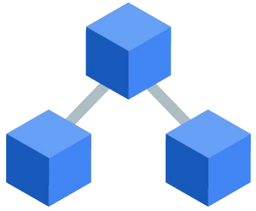
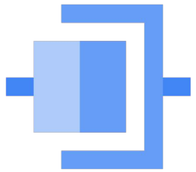
Carrier Peering provides connectivity through a supported partner

- Carrier Peering partner
- Reach all of Google’s services
- Partner requirements
- No SLA

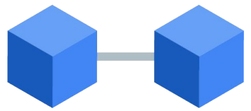
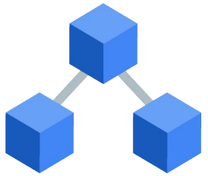
Comparison of Peering options

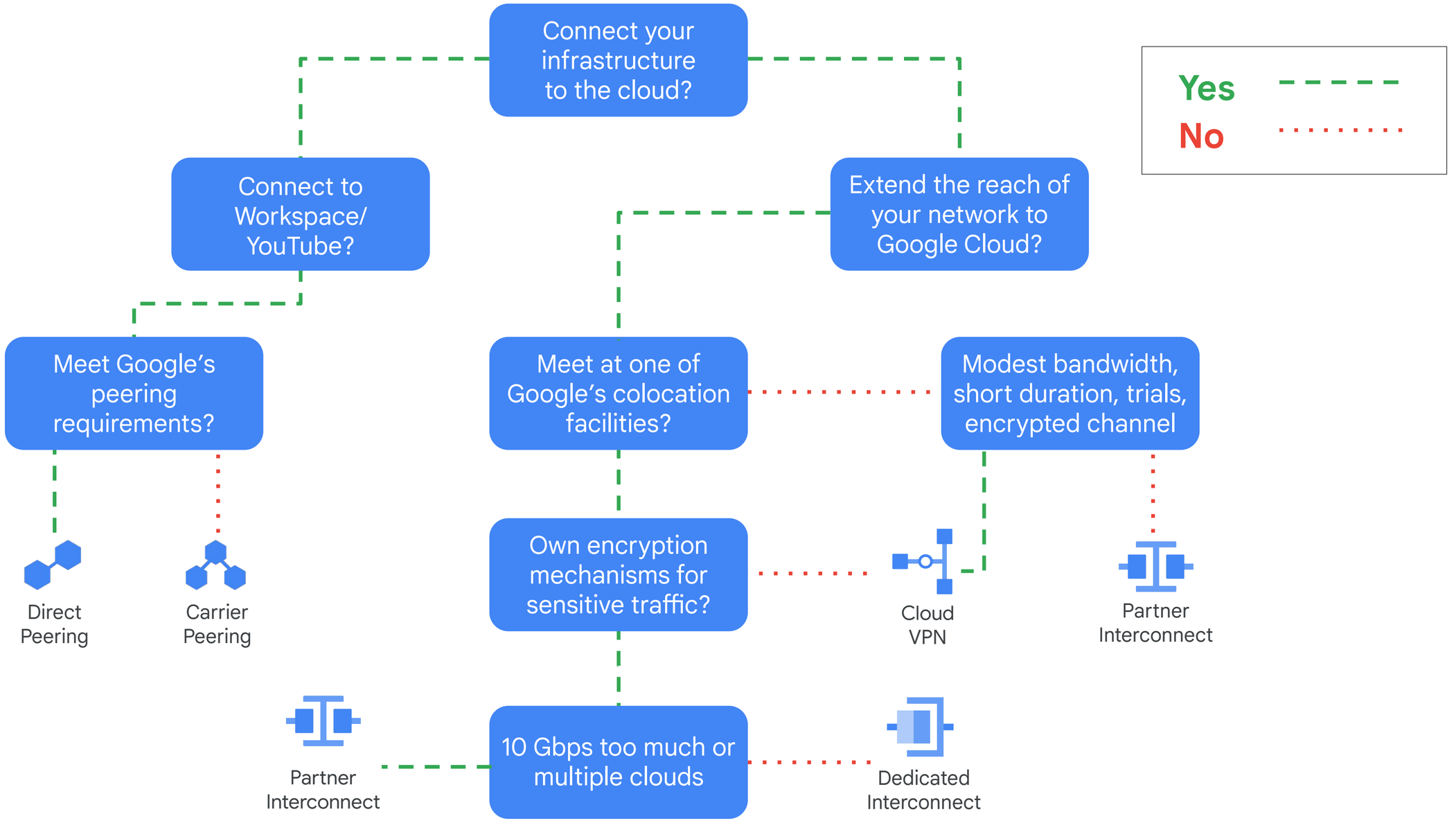
Connection	Provides	Capacity	Requirements	Access Type
Direct Peering	Dedicated, direct connection to Google's network	10 Gbps Per link	Connection in Google Cloud PoPs	Public IP addresses
Carrier Peering	Peering through service provider to Google’s public network	Varies based on partner offering	Service provider	

5 ways to connect your infrastructure to Google Cloud

	Dedicated	Shared
Layer 3	 Direct Peering  Cloud VPN	 Carrier Peering
Layer 2	 Dedicated Interconnect	 Partner Interconnect

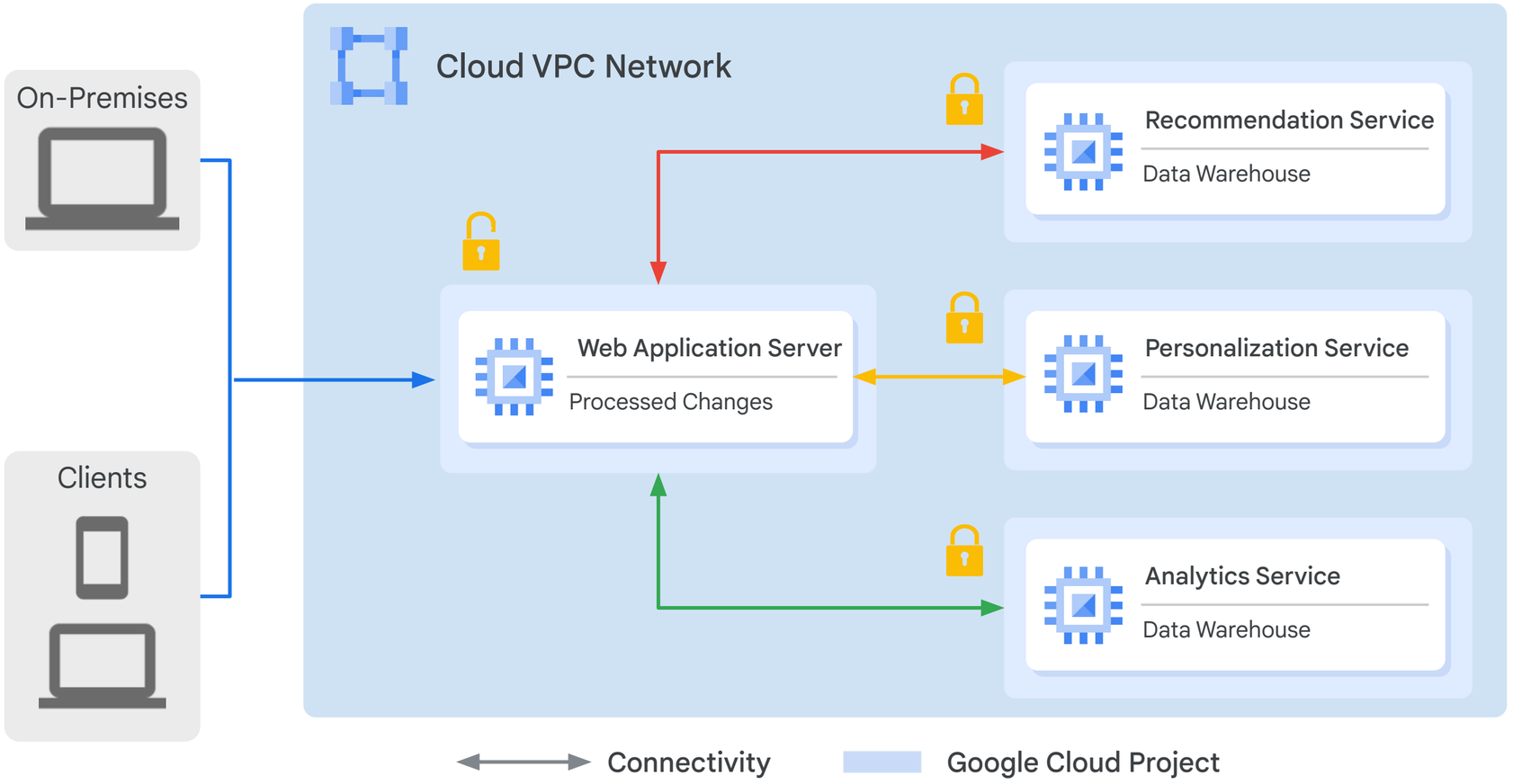
Choosing a network connection option

Interconnect	Peering
Direct access to RFC1918 IPs in your VPC - with SLA	Access to Google public IPs only - without SLA
 Dedicated Interconnect  Partner Interconnect  Cloud VPN	 Direct Peering  Carrier Peering

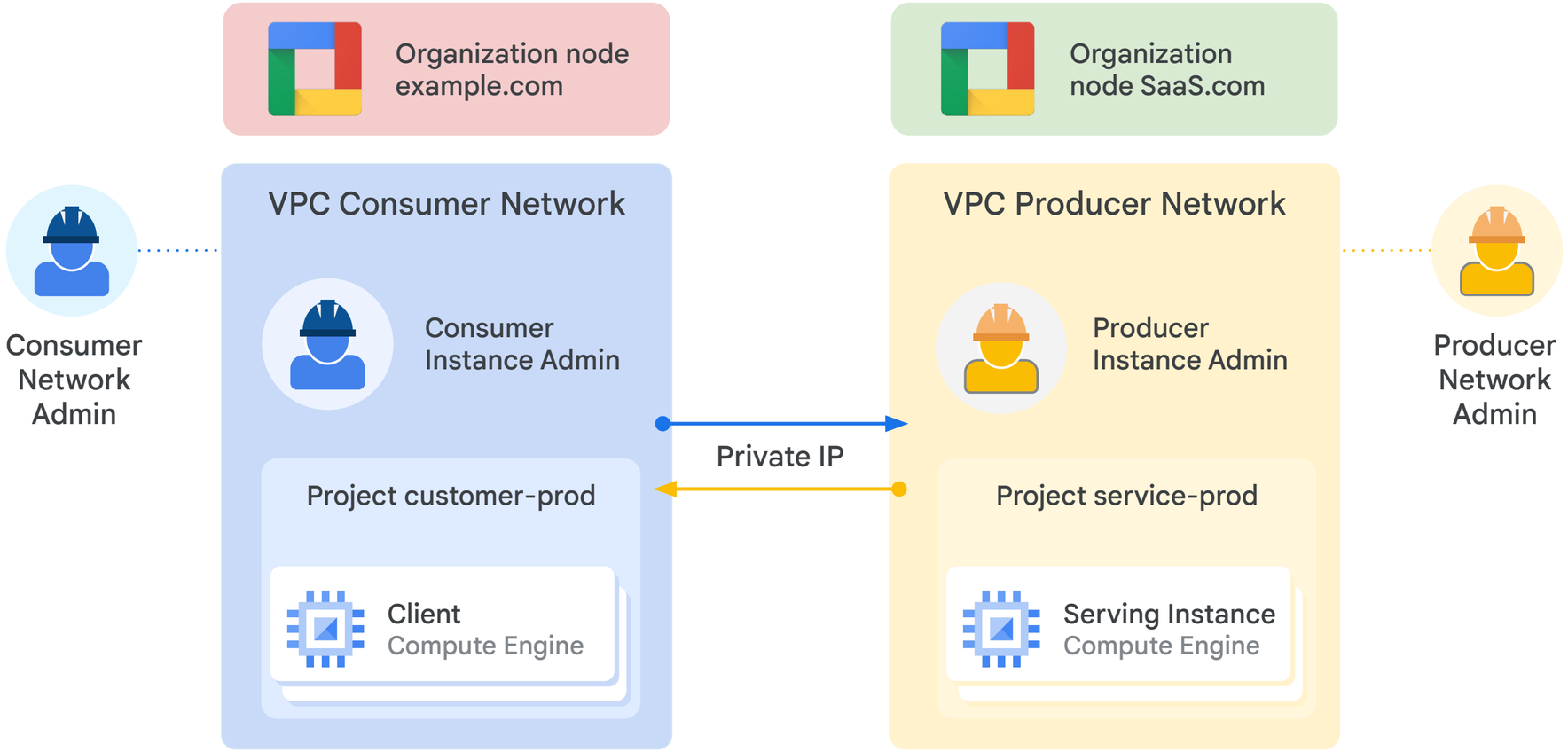


Sharing VPC Networks

Shared VPC



VPC peering



Shared VPC versus VPC peering

Consideration	Shared VPC	VPC Network Peering
Across organizations	No	Yes
Within project	No	Yes
Network administration	Centralized	Decentralized

Shared VPC vs. VPC peering

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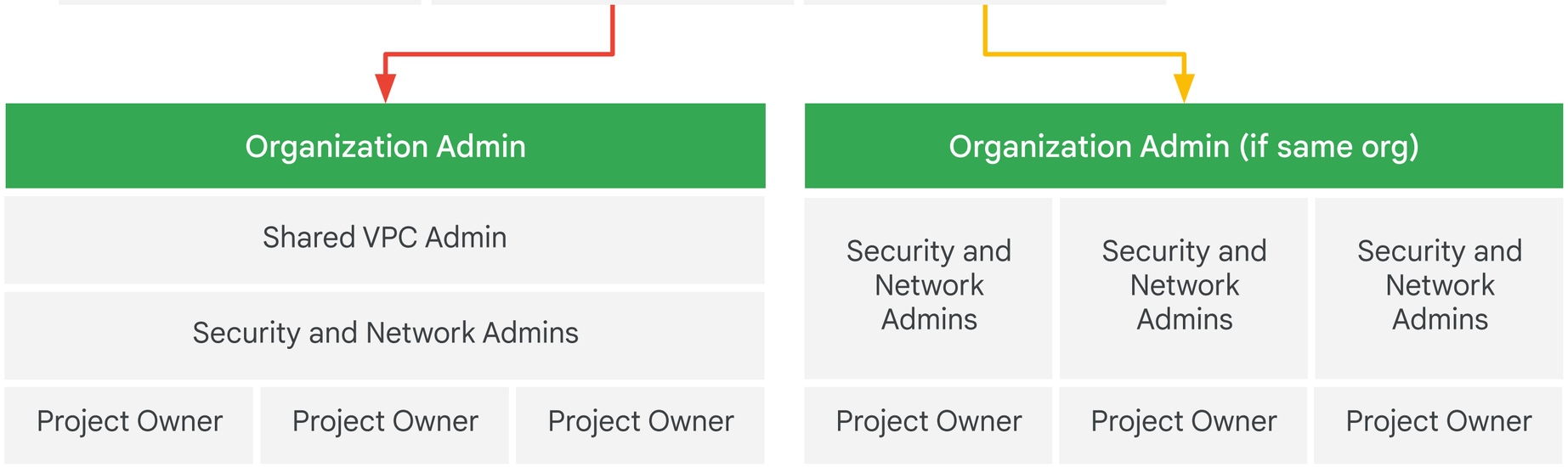
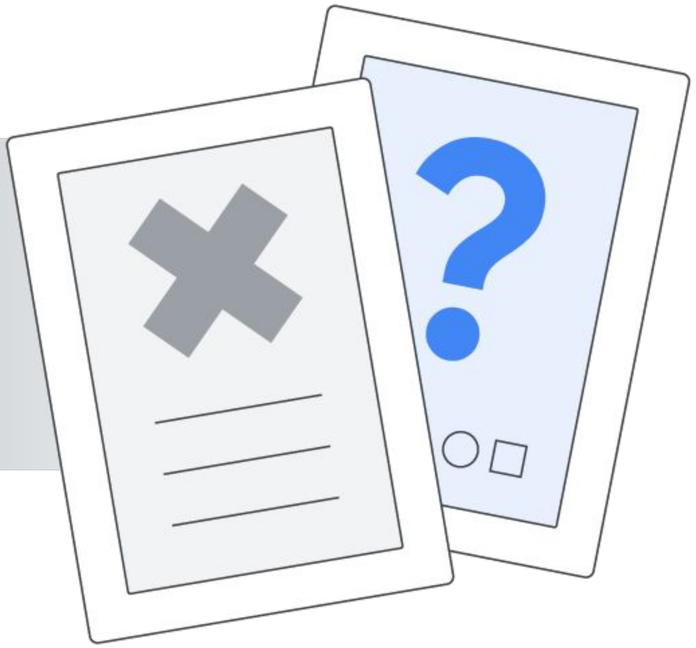
Across organizations	No	Yes
Within project	No	Yes
Network administration	Centralized	Decentralized





Quiz

Question #1

Question

What is the purpose of virtual private networking (VPN)?

A. It is a method to detect intruders at the edge of a network boundary

B. VPNs are also called access control lists, or ACLs, and they limit network access

C. To enable a secure communication method (a tunnel) to connect two trusted environments through an untrusted environment, such as the internet

D. The main purpose is to encrypt data so that it can be stored in an encrypted format

Question #1

Answer

What is the purpose of virtual private networking (VPN)?

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Question #2

Question

Which Google Cloud Interconnect service requires a connection in a Google Cloud colocation facility and provides 10 Gbps per link?

A. Cloud VPN

B. Dedicated Interconnect

C. Partner Interconnect

D. Direct Peering

E. Carrier Peering

Question #2

Answer

Which Google Cloud Interconnect service requires a connection in a Google Cloud colocation facility and provides 10 Gbps per link?

A. Cloud VPN

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C. Partner Interconnect

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E. Carrier Peering

Question #3

Question

If you cannot meet Google’s peering requirements, which network connection service should you choose to connect to Google Workspace and YouTube?

A. Dedicated Interconnect

B. Partner Interconnect

C. Direct Peering

D. Carrier Peering

Question #3

Answer

If you cannot meet Google’s peering requirements, which network connection service should you choose to connect to Google Workspace and YouTube?

A. Dedicated Interconnect

B. Partner Interconnect

C. Direct Peering

D. Carrier Peering

Question #4

Question

Which of the following approaches to multi-project networking, uses a centralized network administration model?

A. VPC Network Peering

B. Shared VPC

C. Cloud VPN

Question #4

Answer

Which of the following approaches to multi-project networking, uses a centralized network administration model?

A. VPC Network Peering

B. Shared VPC 

C. Cloud VPN

Review:
Interconnecting Networks