



DevFest 2023

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📍 Mangalore, India



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Fluent Networking

GCP Hybrid Network
Connectivity *Masterclass*

- International Tech Speaker (*KubeCon, PyCon*, EuroPython, GeoPython, Geekle, etc.*)
- Distinguished Guest Lecturer, Adjunct Professor, and Tech Panelist
- Conference Organizer (*EuroPython, GeoPython, PyCon*, etc.*)
- Represented India at reputed International Hackathons
- Deep Learning Researcher | Publications at International Journals
- **ALL STACK DEVELOPER**
- Mentor

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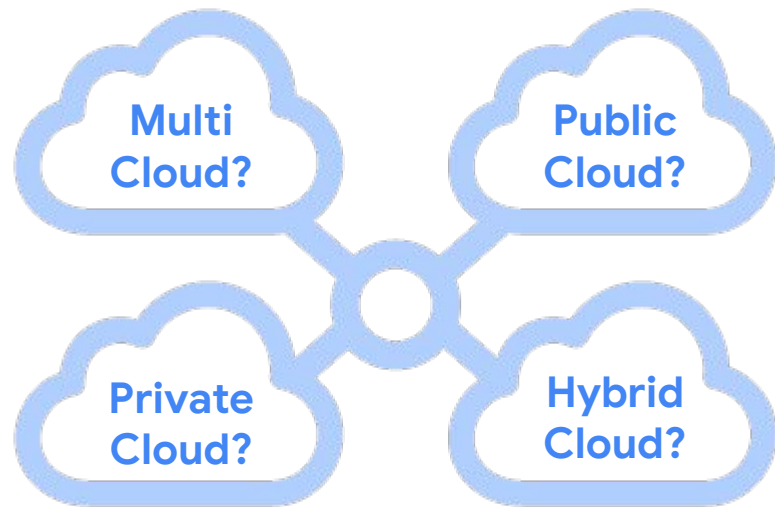


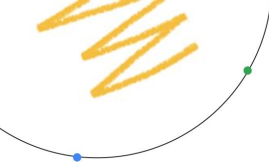
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The Buzzwords





What are Multi/Hybrid Deployments?



- Typically involve connecting two or more distinct infrastructure environments or regions to address a specific technical or operational need.
- The common scenarios for hybrid deployment are **Multi-Cloud Deployments** and **Fronting On-premise Data**.
- The focus areas while designing hybrid deployments are:
 - Hybrid Network Connectivity with Low Latency
 - High Availability and Disaster Recovery
 - Network Security
 - Data Residency and Data/Payload Exchange



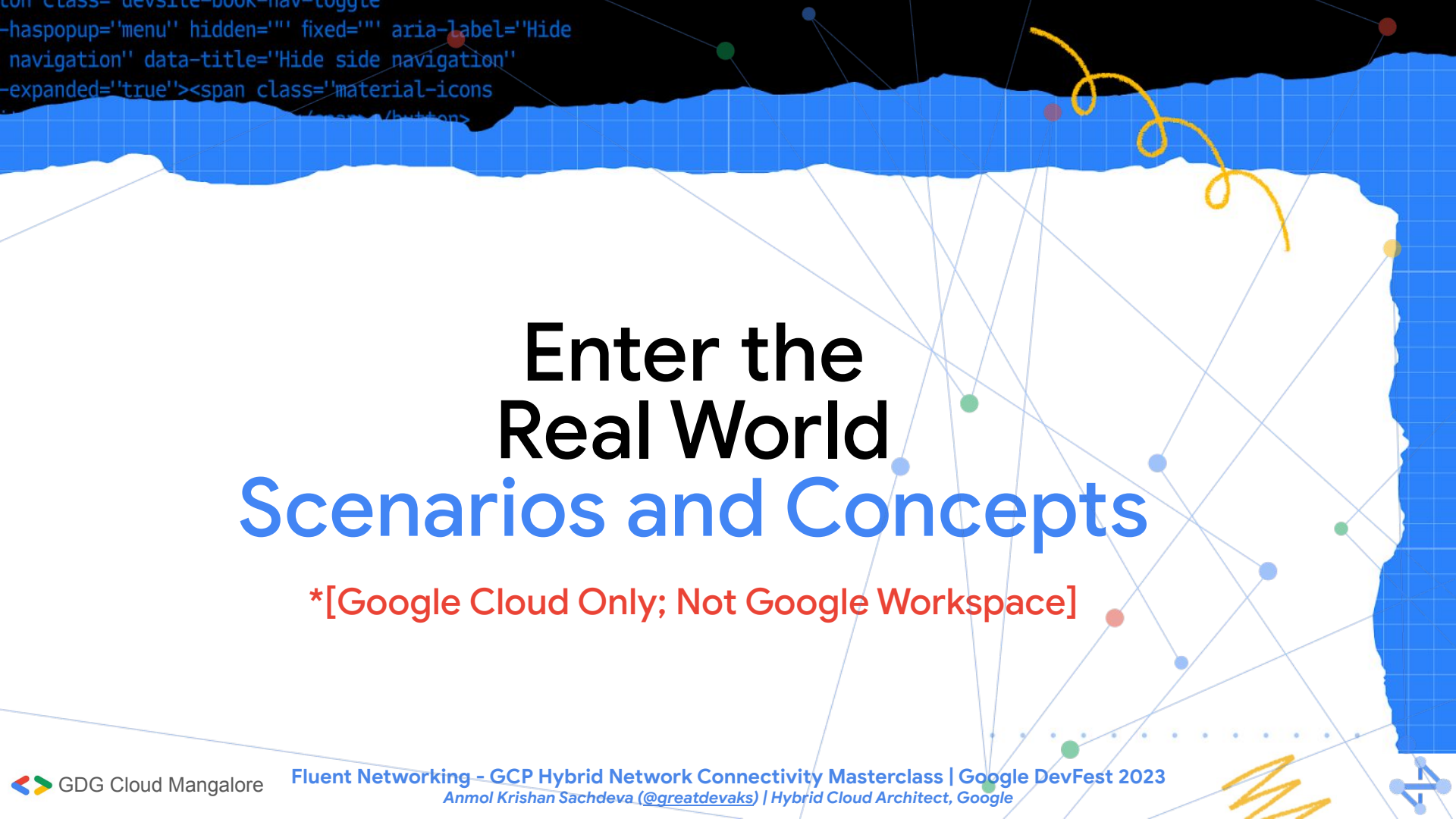


Why Multi/Hybrid Deployments?



- Digital Transformation and Innovation
- Seamless Operations and Scalability
- Overcome Overprovisioning/Underprovisioning Challenges
- Cost Efficiency and CapEx - ***Debatable?***
- Security, Compliance, and Regulations
 - Data Localization
- High Availability, Disaster Recovery, and Business Continuity
- Optimization and Vendor Lock-In
- Business Resiliency





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Enter the Real World Scenarios and Concepts

***[Google Cloud Only; Not Google Workspace]**


```
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class="descript
```

- Low Cost
- Low Bandwidth
- Encryption of Network Traffic
- Okay to Route over Internet

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The diagram illustrates a multi-region VPC network architecture connecting Google Cloud to an on-premises network. It is divided into three main sections: Google Cloud project, On-premises network, and Internet.

Google Cloud project:

- VPC network:** A single VPC network named "network-a" spans two regions: **us-west1** and **us-central1**.
- Subnets:**
 - us-west1:** Contains "subnet-a-west" (10.0.2.0/24) with "Google Cloud resources".
 - us-central1:** Contains "subnet-a-central" (10.0.1.0/24) with "Google Cloud resources".
- Routing:** "VPC routing" is shown as a central component connecting the subnets.
- Gateways:**
 - HA VPN gateway:** Labeled "ha-vpn-gw-a", it connects the VPC network to the Internet via "Interface 0" and "Interface 1" (both with "Regional external IP address").
 - Cloud Router:** Labeled "router-a (ASN 65001)", it connects the VPC network to the on-premises network.

On-premises network:

- Gateways:** Two "On-premises VPN Gateway" units (labeled "On-premises VPN Gateway 1" and "On-premises VPN Gateway 2") are shown. Each has an "External IP address and BGP IP address" (169.254.0.2 and 169.254.1.2 respectively).
- Subnets and Resources:** "On-premises subnets and resources (ASN 65002)" are shown, including "192.168.1.0/24" and "192.168.30.0/24".

Internet:

- VPN Tunnels:** Two tunnels are established: "VPN Tunnel 0 (encrypted traffic)" and "VPN Tunnel 1 (encrypted traffic)".
- BGP Sessions:** Two sessions are established: "BGP Session 0" (169.254.0.1) and "BGP Session 1" (169.254.1.1).
- Legend:**
 - Data plane:** Represented by solid lines.
 - Control plane:** Represented by dashed lines.



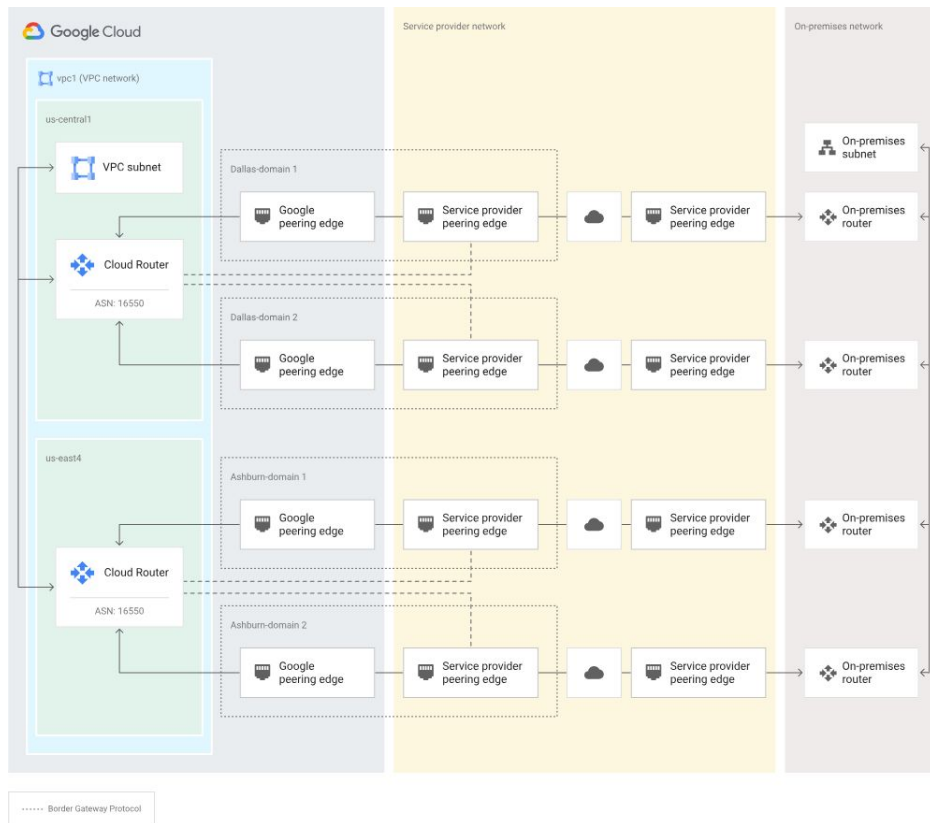
Case 2

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"class='description'>...

Drivers

- Enterprise-Grade
- Med. Bandwidth
 - 50 Mbps to 50 Gbps per VLAN Attach.
- No Encryption of Network Traffic
- Route Privately
- No CoLo Facility Nearby
- Okay to go with Partner Services

Partner Interconnect



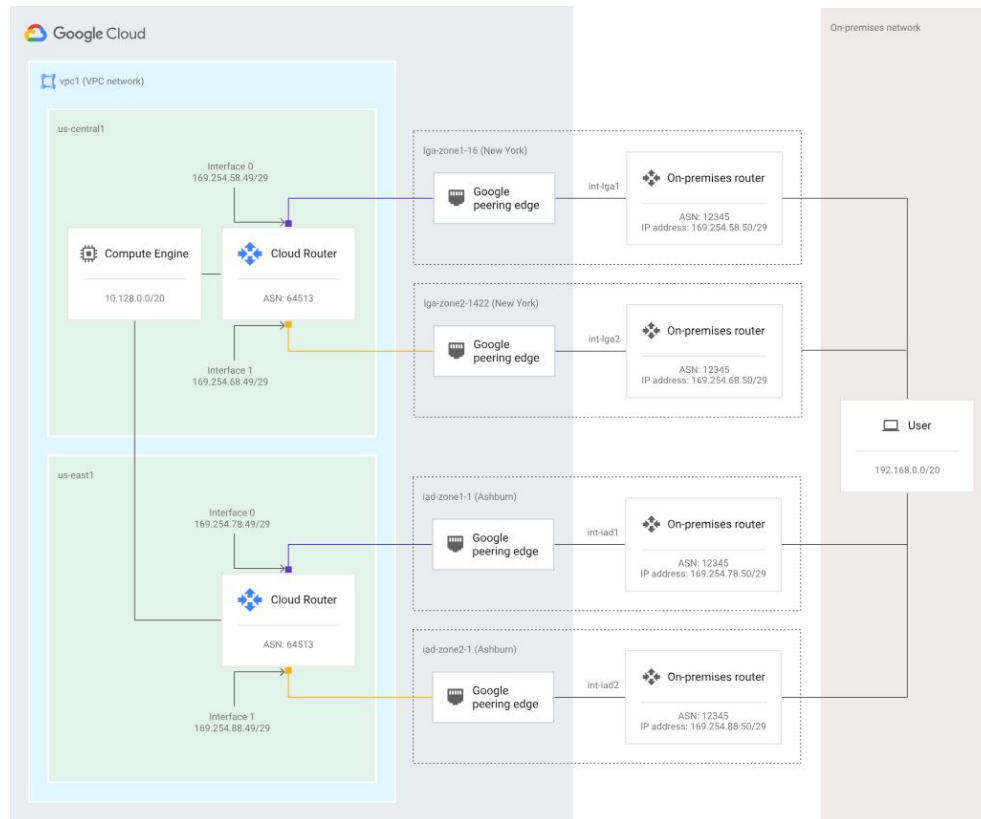
Case 3

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'class='talk-name'>...
'class='descript

Drivers

- Enterprise-Grade
- High Bandwidth
 - 10 Gbps to 100 Gbps per Circuit
- No Encryption of Network Traffic
- Route Privately
- Routing Equipment in CoLo

Dedicated Interconnect



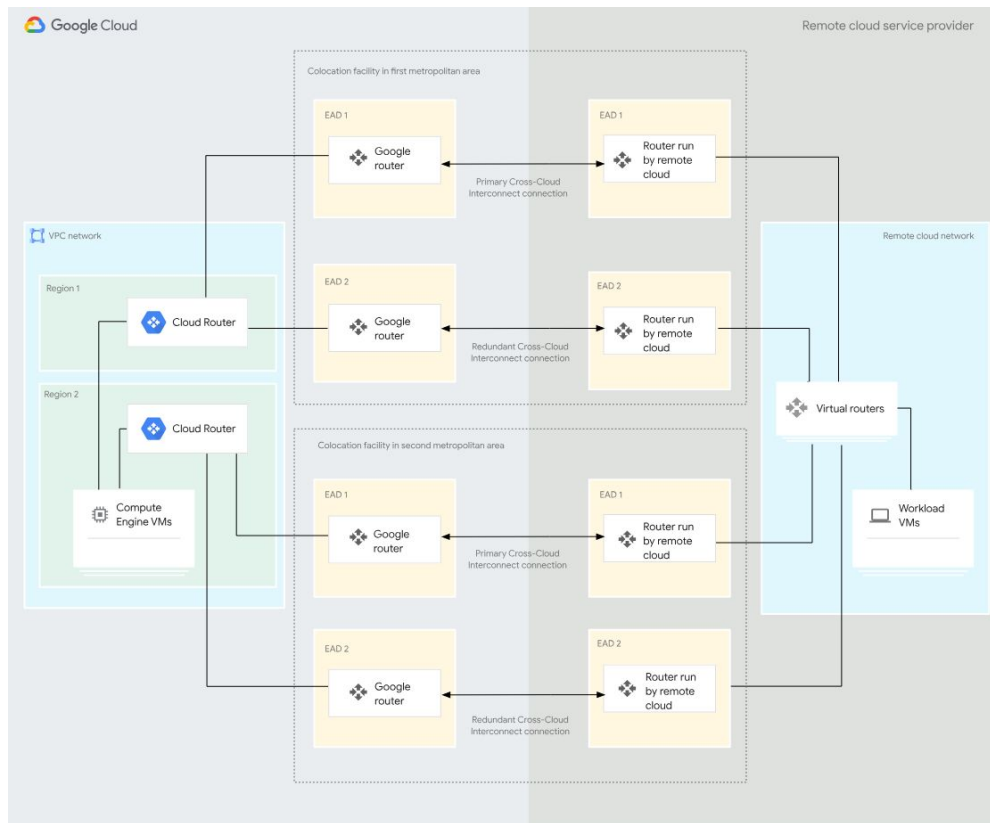
Case 4

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Drivers

- Enterprise-Grade
- High Bandwidth
 - 10 Gbps to 100 Gbps per Circuit
- No Encryption of Network Traffic
- Route Privately
- Dedicated Physical Link(s) with other Cloud Providers

Cross-Cloud Interconnect



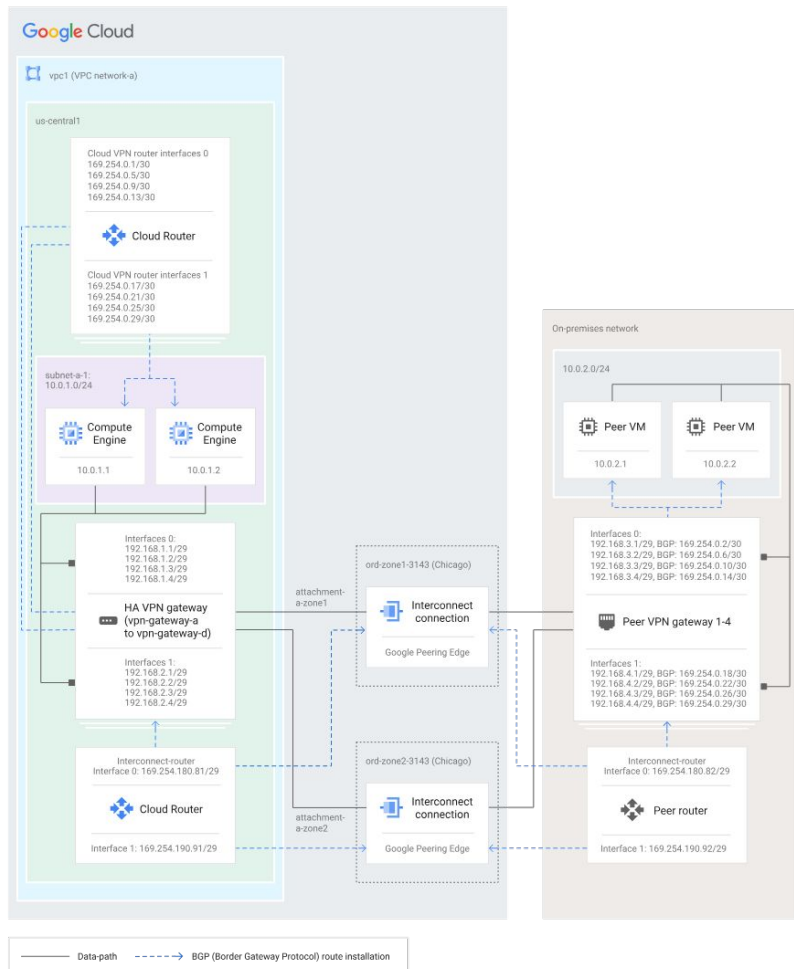
Case 5

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class="descript

Drivers

- Enterprise-Grade
- High Bandwidth
- Encryption of Network Traffic
- Route Privately
- Connect with On-Premises or other Cloud Providers

HA VPN over Cloud Interconnect



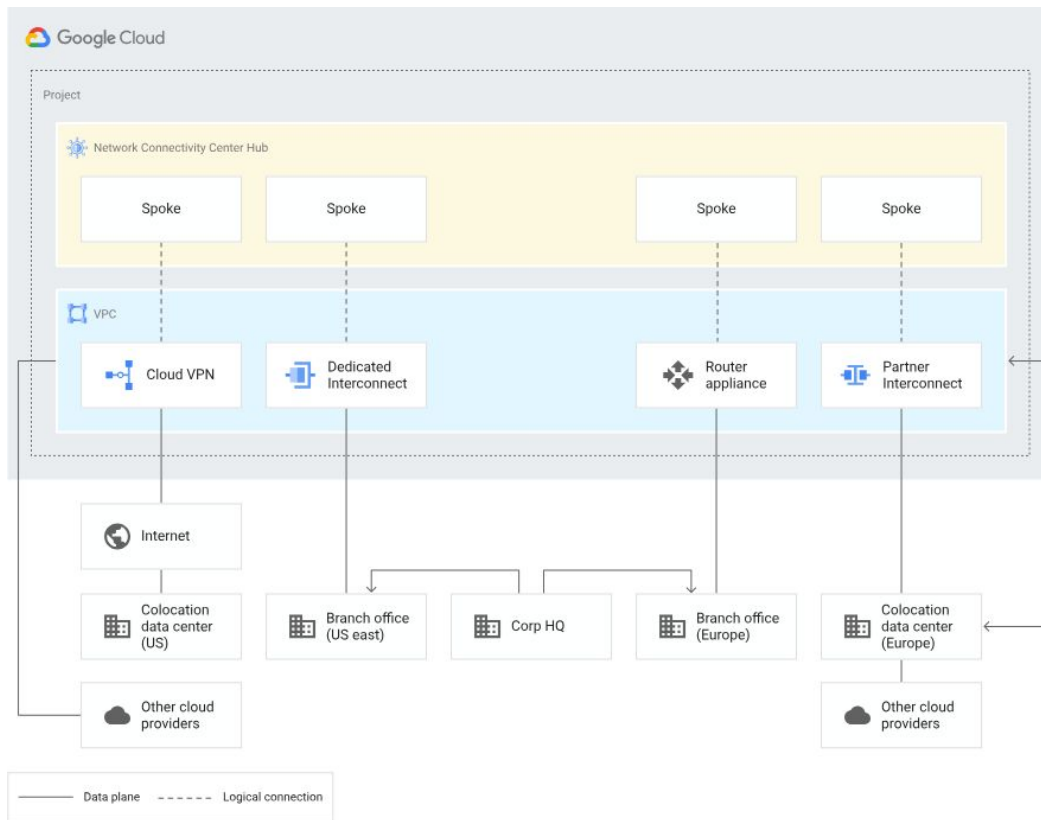
Case 6

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Drivers

- Centralized Connectivity Model; a.k.a. Hub
- Communication of Spokes via Hub
- Self-Managed Router Appliance (Peered with Cloud Router) Possible

Network Connectivity Center



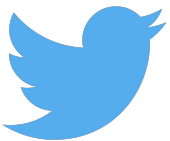


Thanks Everyone!

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Questions?