

Good Morning!

Networking in Google Cloud

VPC Networking Fundamentals





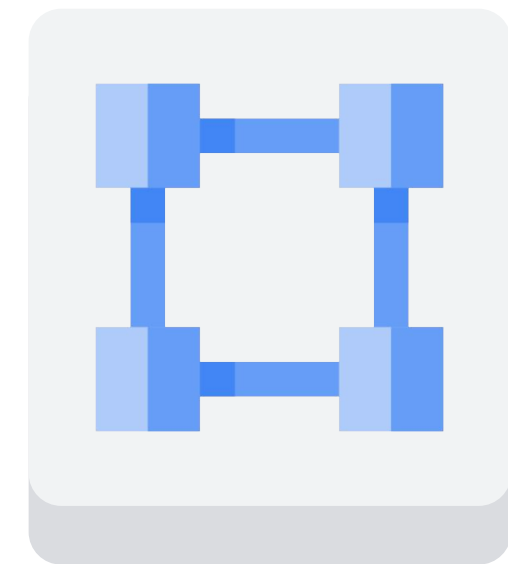
Today's agenda



- 01 VPC networks
- 02 Multiple network interfaces
- 03 Lab: Working with Multiple VPC Networks
- 04 Network Service Tiers
- 05 Quiz

A Virtual Private Cloud (VPC) network is a virtual version of a physical network that:

- ✓ Provides connectivity for your Compute Engine virtual machine (VM) instances.
- ✓ Offers built-in internal passthrough Network Load Balancers and proxy systems for internal Application Load Balancers.
- ✓ Distributes traffic from Google Cloud external load balancers to backends.



Virtual Private
Cloud Networks

VPC networks



Projects can contain multiple VPC networks.



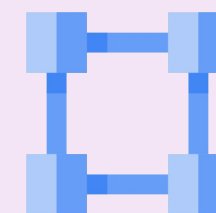
New projects start with a default network (an auto mode VPC network) that has one subnetwork (subnet) in each region.



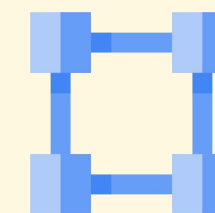
Google-recommended practice:
create a custom mode VPC network.

Project

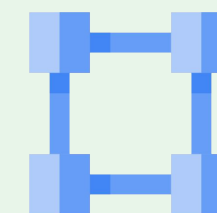
management_net



developer_net



office_net





Today's agenda



✓ 01

VPC networks

02

Multiple network interfaces

03

Lab: Working with Multiple VPC Networks

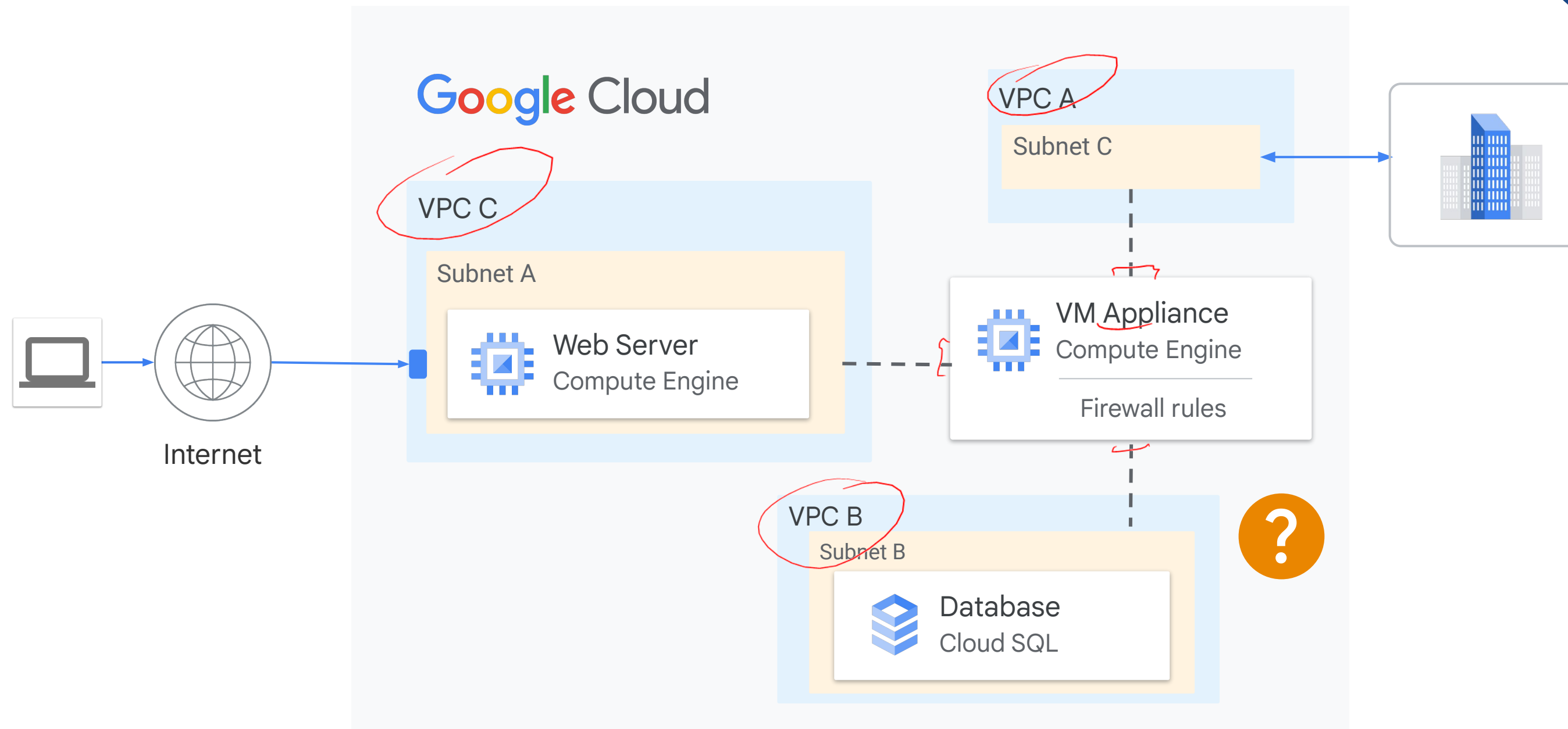
04

Network Service Tiers

05

Quiz

Use case: Interconnect multiple networks to a virtual appliance



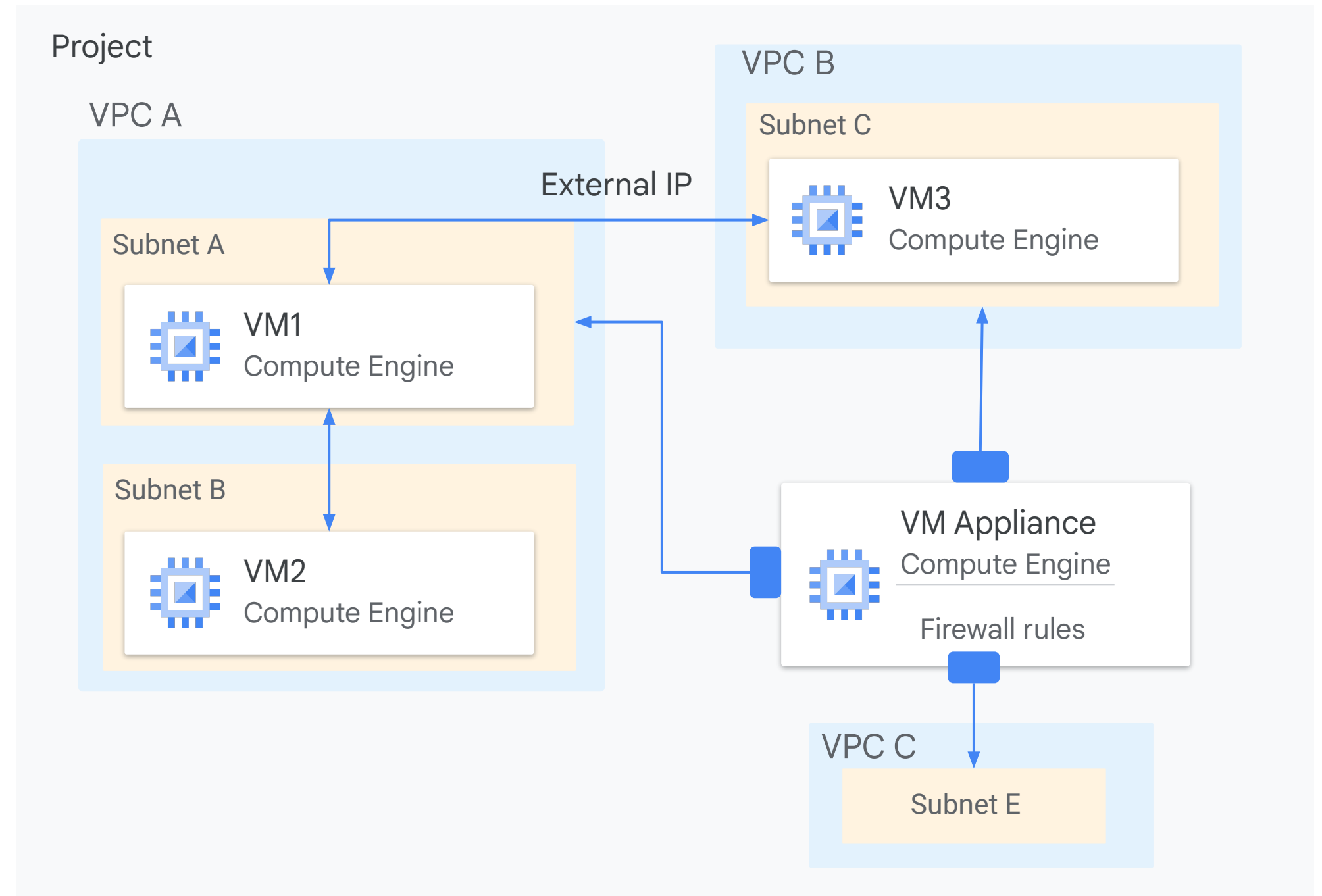
VPC networks are isolated by default

VPC networks

Use an internal IP to communicate within networks.

Use an external IP to communicate across networks.

Use multiple network interfaces when you need a single instance to act as a network appliance for tasks like load balancing, intrusion detection/prevention (IDS/IPS), and more.

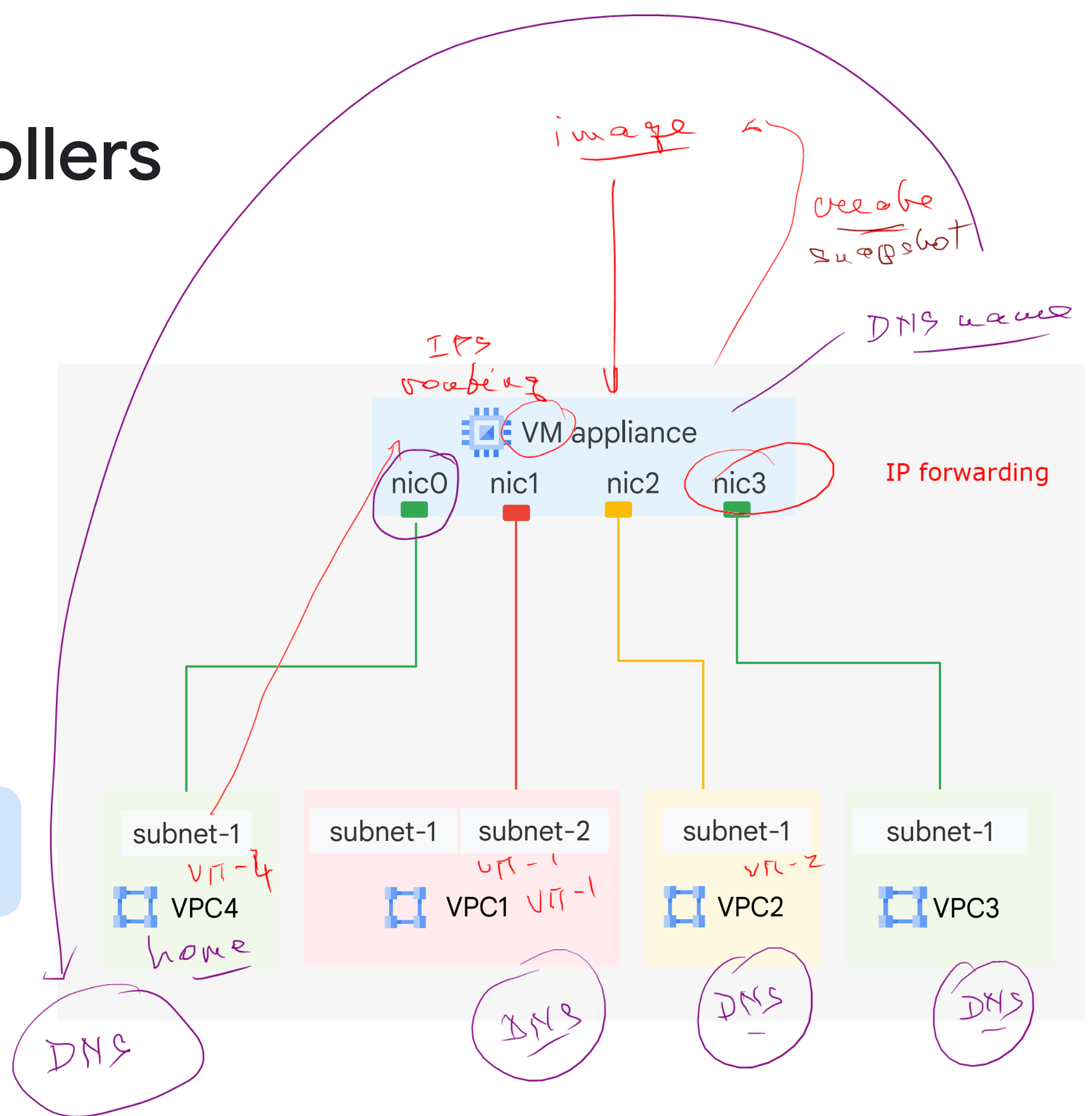


Network interface controllers


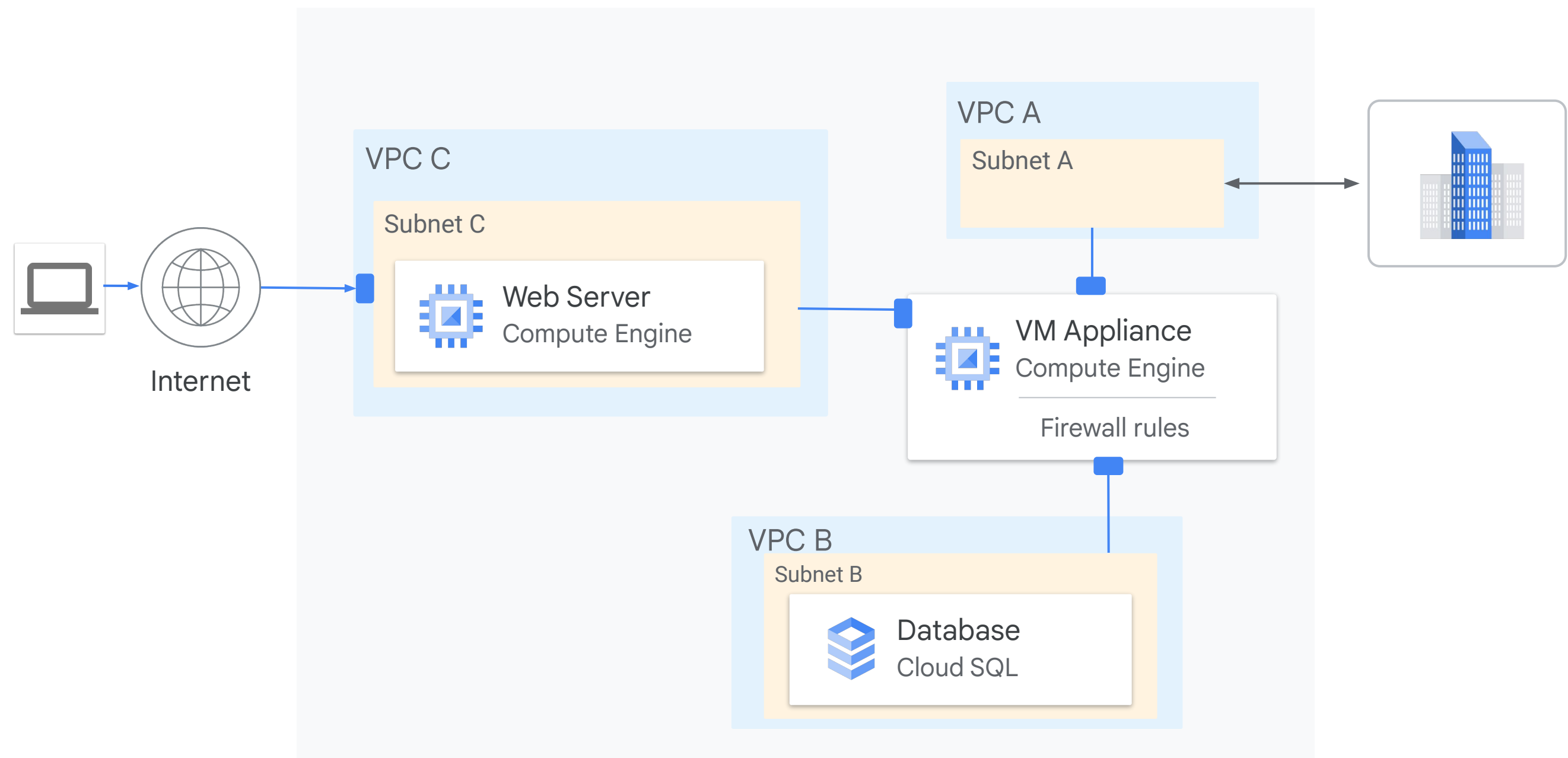
Each NIC:

- ✓ Is attached to a separate VPC network.
- ✓ Uses an internal IP to communicate across networks.

You cannot add or remove NICs once an instance is created.



What Sasha can do



?

Multiple NICs

Multiple network interface caveats

01

Network interfaces can only be configured when you create an instance.

02

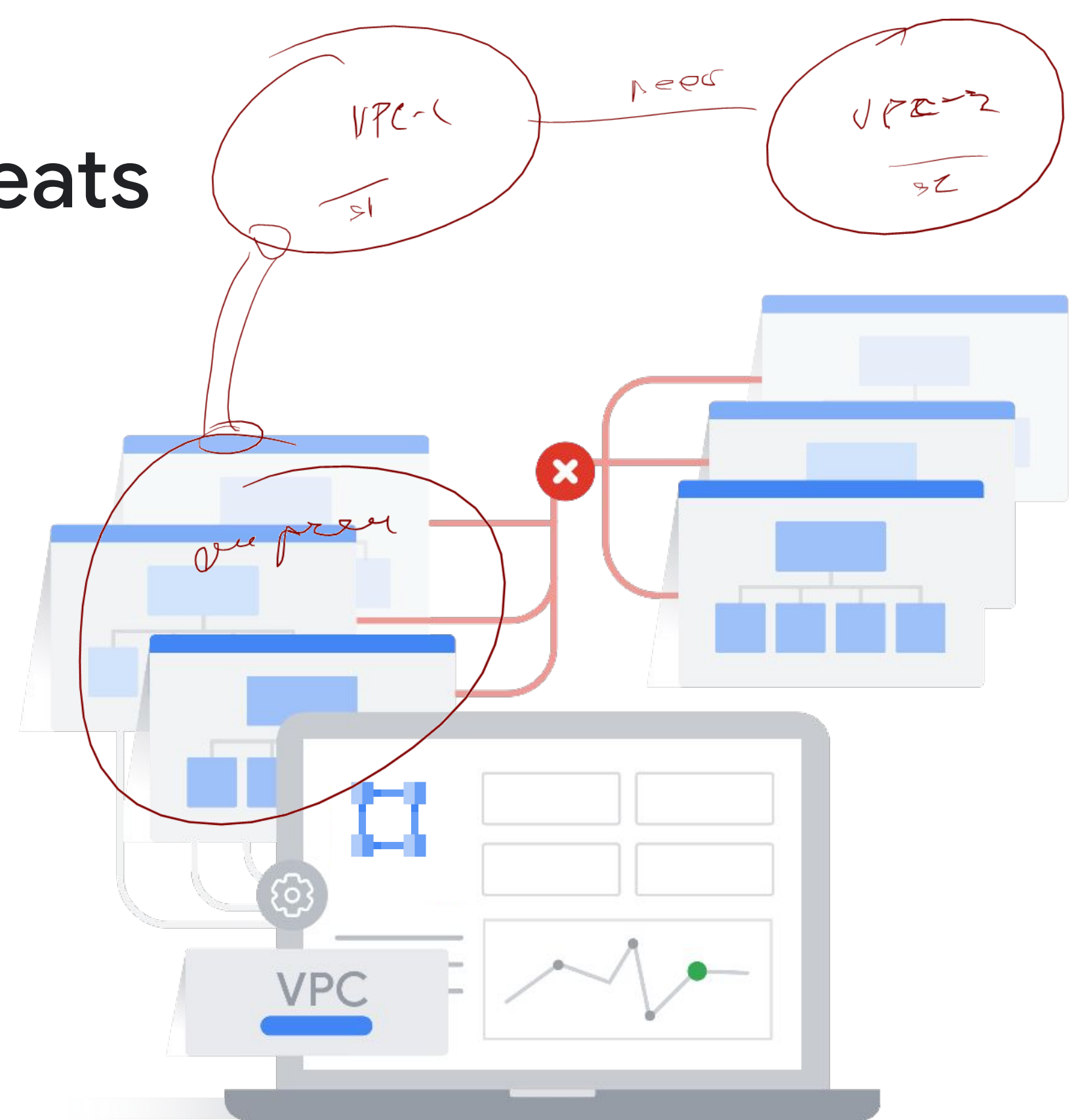
Each interface must be in a different network.

03

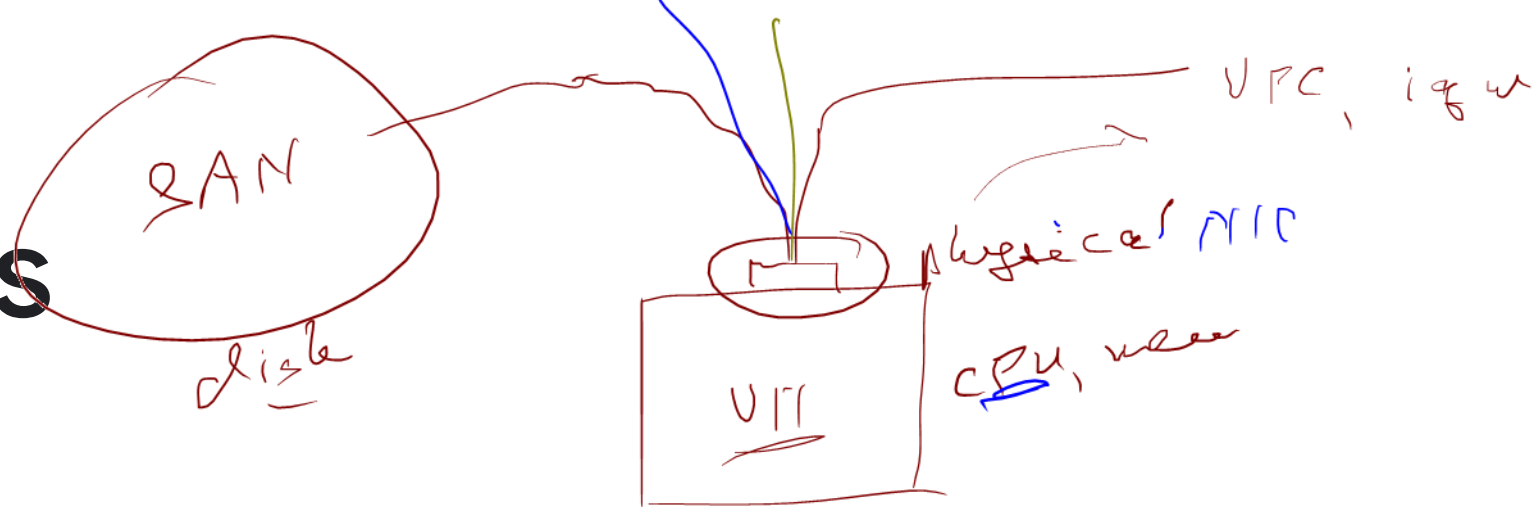
The network IP ranges cannot overlap. *

04

The networks must exist before you create the VM.



Multiple network interface caveats



You cannot delete an interface without deleting the VM.



The internal DNS (Domain Name System) is only associated to nic0.



You can have up to 8 NICs, depending on the VM.

Type of instance	Total # of <u>virtual NICs</u>
<u>VM <= 2 vCPU</u>	<u>2 NICs</u>
VM >2vCPU	<u>1</u> NIC per vCPU (Max: 8)



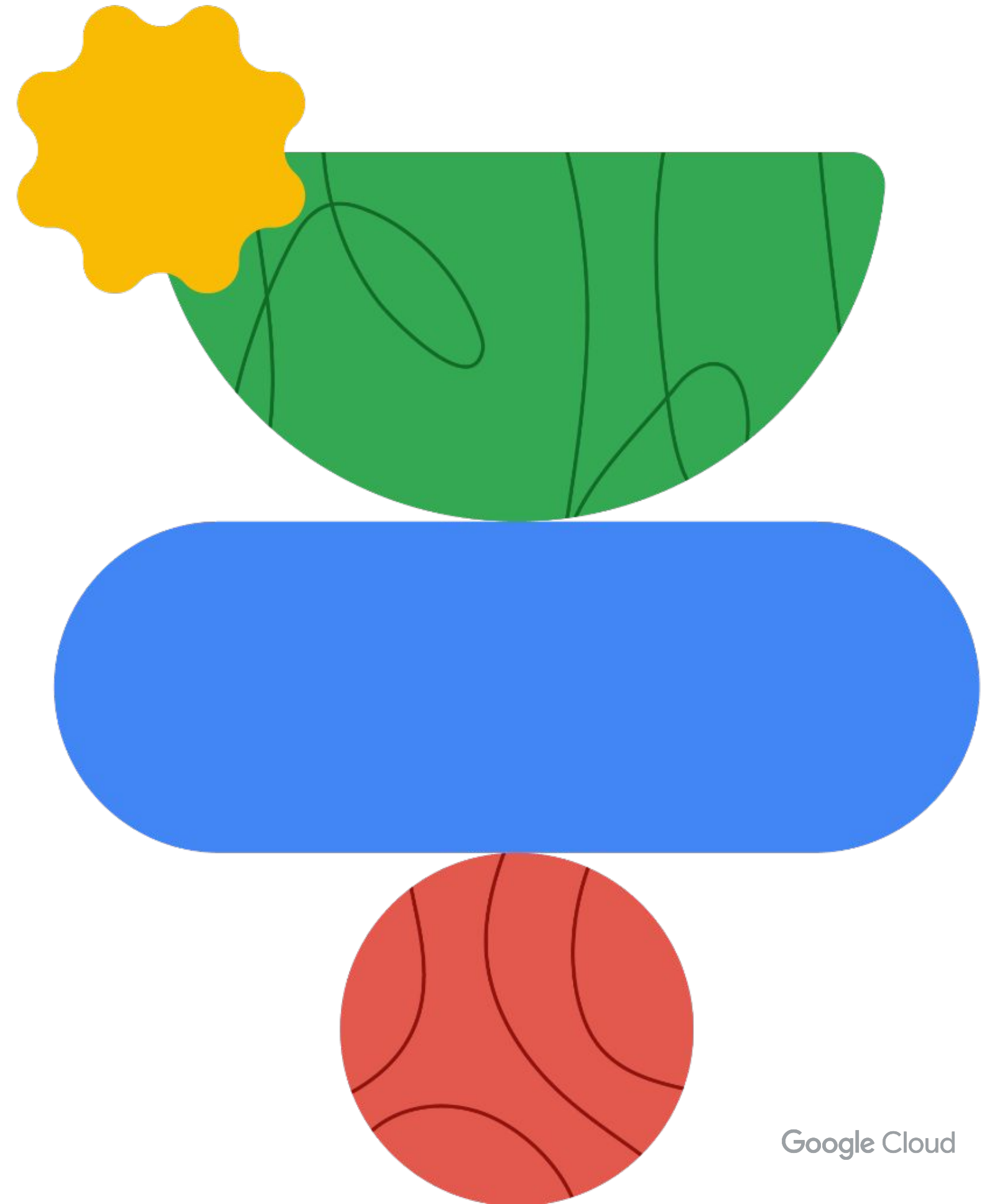
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- 03 [Lab: Working with Multiple VPC Networks](#)
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Lab intro

Working with Multiple VPC
Networks





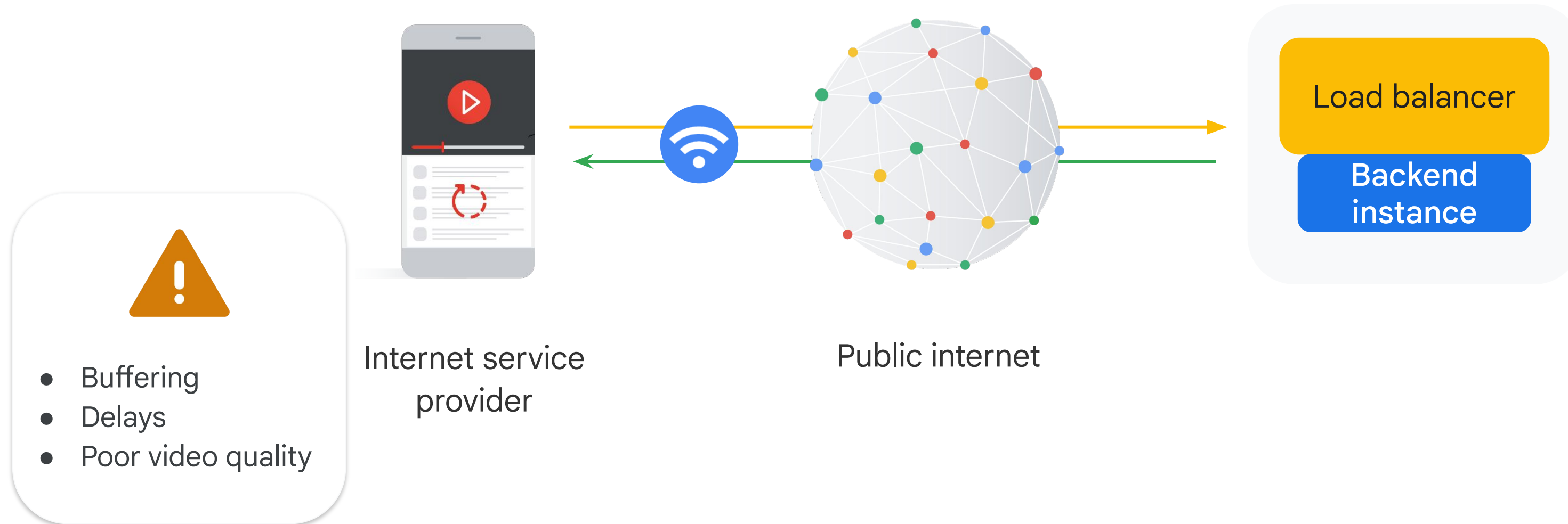
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Improve network performance

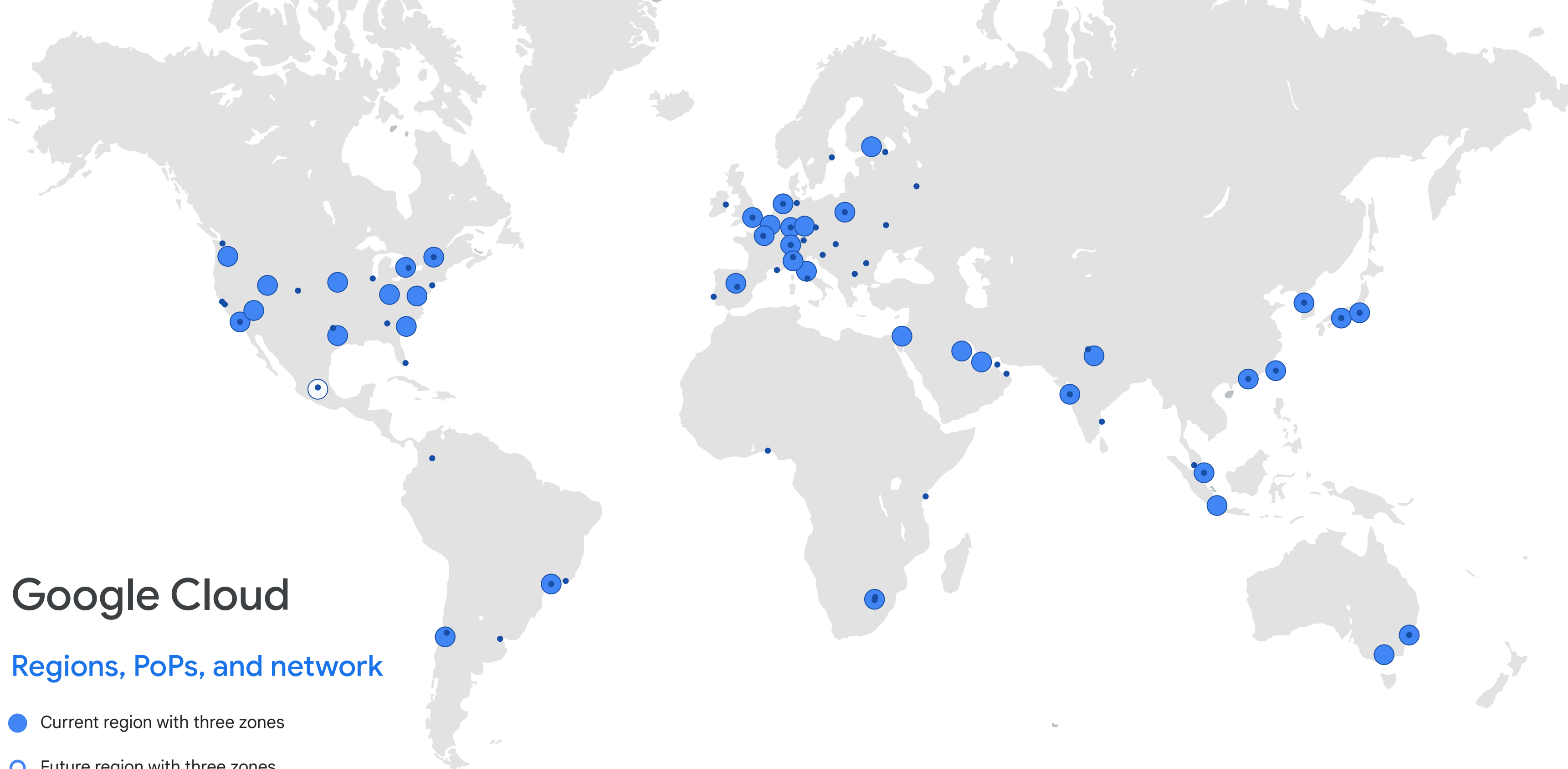
High latency and packet loss



Google Cloud

Regions, PoPs, and network

- Current region with three zones
- Future region with three zones
- Edge point of presence



Optimize performance with Premium Tier

Premium

Google Network
Premium Tier routing is cold potato,
which minimizes distance and hops,
resulting in faster and more secure
transport

Traffic exits
Google network
near destination

Google Cloud
Platform Region



app

fiber



PoP

Internet Service
Provider



End User



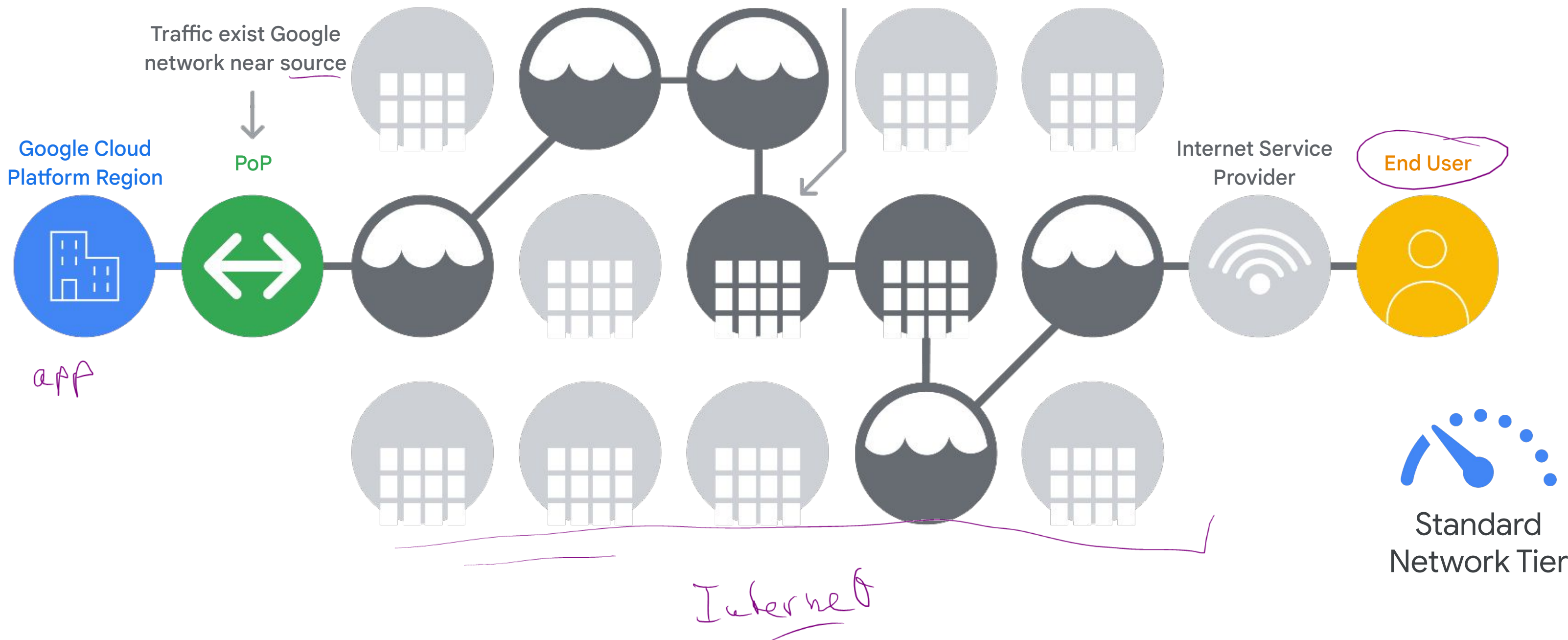
Premium
Network Tier

Optimize cost with Standard Tier

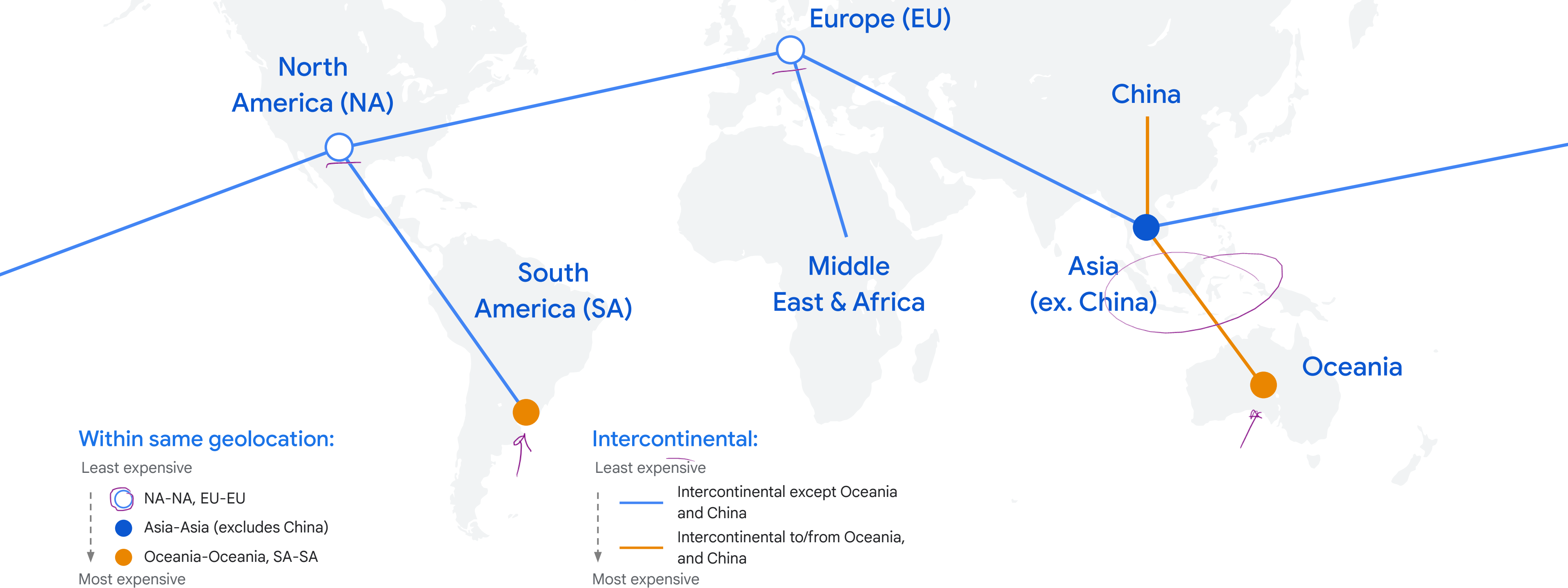
hot potato

trace route

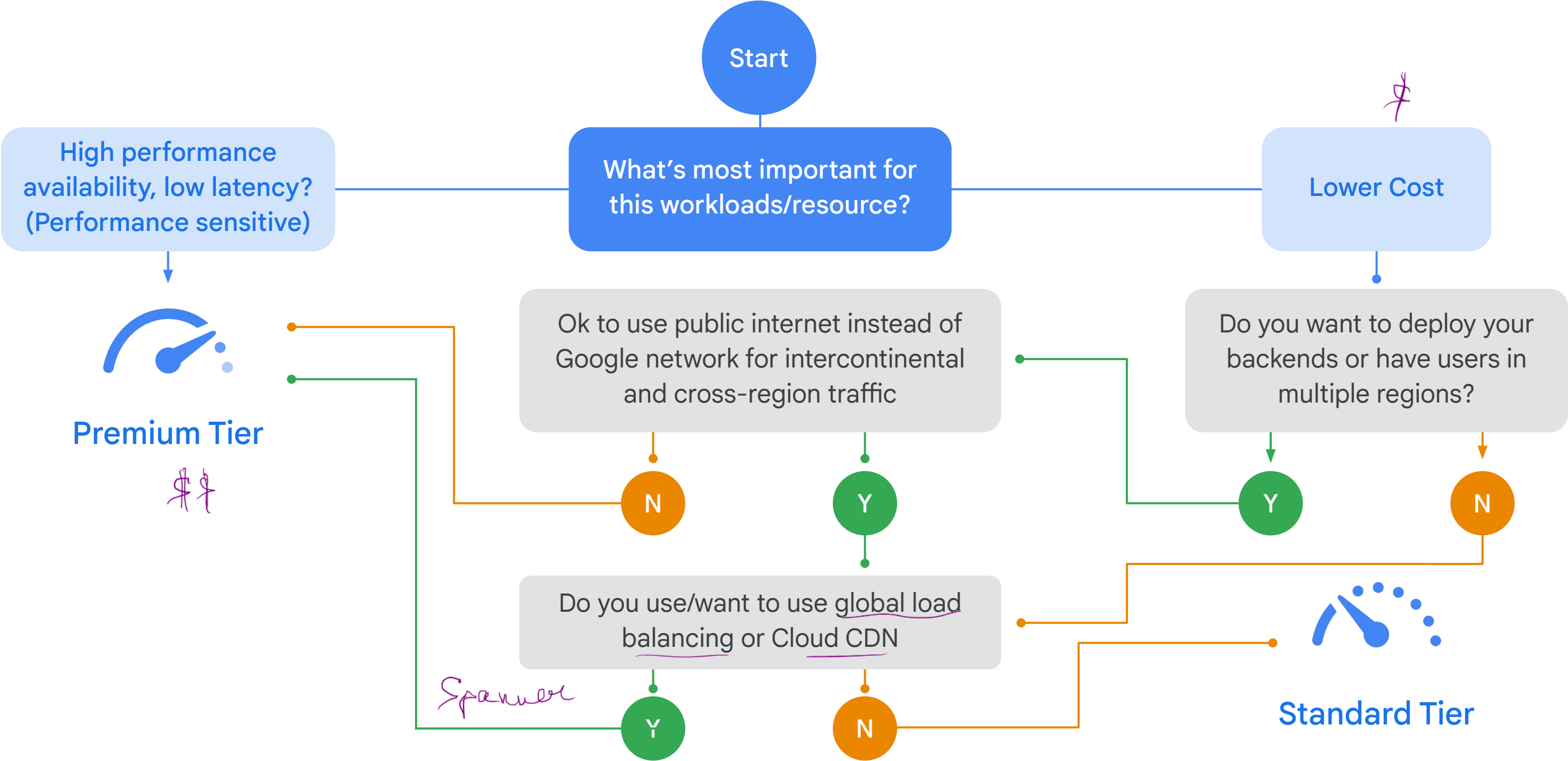
Standard routing is closest exit routing, resulting in lower costs but also lower quality than Premium Tier.



Network Service Tiers pricing



Network Service Tiers decision tree



Use Network Service Tiers to optimize your network for performance or cost

Premium Tier	Standard Tier
High performance routing (Google's network)	Lower price and performance than Premium Tier
Unique to Google Cloud	Comparable to other public cloud offerings
<u>99.99%</u> uptime	<u>99.9%</u> uptime
Regional and global external IPv4 and IPv6 addresses <i>anycast</i>	Regional external IPv4 addresses (not BYOIP)
External <u>global</u> and regional load balancer, VM instances including GKE nodes, Cloud NAT and <u>Cloud VPN</u>	Foundational feature set including Cloud NAT, Regional external Application Load Balancer, and External passthrough Network Load Balancer
Performance is main consideration	Cost is main consideration

Let's ask Gemini



How can I use gcloud to create my first VPC network in Google Cloud?



To create a VPC network using the gcloud CLI, follow these steps:

1. In the Google Cloud console, activate Cloud Shell.
2. Run the following command:

```
gcloud compute networks create NETWORK_NAME --subnet-mode=CUSTOM
```

Replace NETWORK_NAME with the name of your network

To create a subnet in your new VPC network, run the following command:

```
gcloud compute networks subnets create SUBNET_NAME \  
  --network=NETWORK_NAME \  
  --range=SUBNET_RANGE \  
  --region=REGION
```

*Gemini responses may vary



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Quiz | Question 1

Question

You are designing a virtual machine in the cloud to act as a network gateway between an external public network and a private internal network. To ensure strong security and traffic separation, what technology can you implement?

- A. Cloud VPN
- B. VLAN tagging within a single NIC
- C. Multiple Network Interface Cards (NICs)
- D. Premium Tier IPs

Quiz | Question 1

Answer

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- A. Cloud VPN
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- D. Premium Tier IPs



Quiz | Question 2

Question

You want to lower cloud networking cost and have no problem leveraging the public internet for cross-region traffic. Which network service tier is best for you?

- A. Premium Tier
- B. Standard Tier
- C. Pro version
- D. Prime tier

Quiz | Question 2

Answer

You want to lower cloud networking cost and have no problem leveraging the public internet for cross-region traffic. Which network service tier is best for you?

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Quiz | Question 3

Question

You want to improve network performance. You are not comfortable using the public internet to route traffic. Which service tier is the best fit?

- A. Premium Tier
- B. Standard Tier
- C. Pro version
- D. Prime tier

Quiz | Question 3

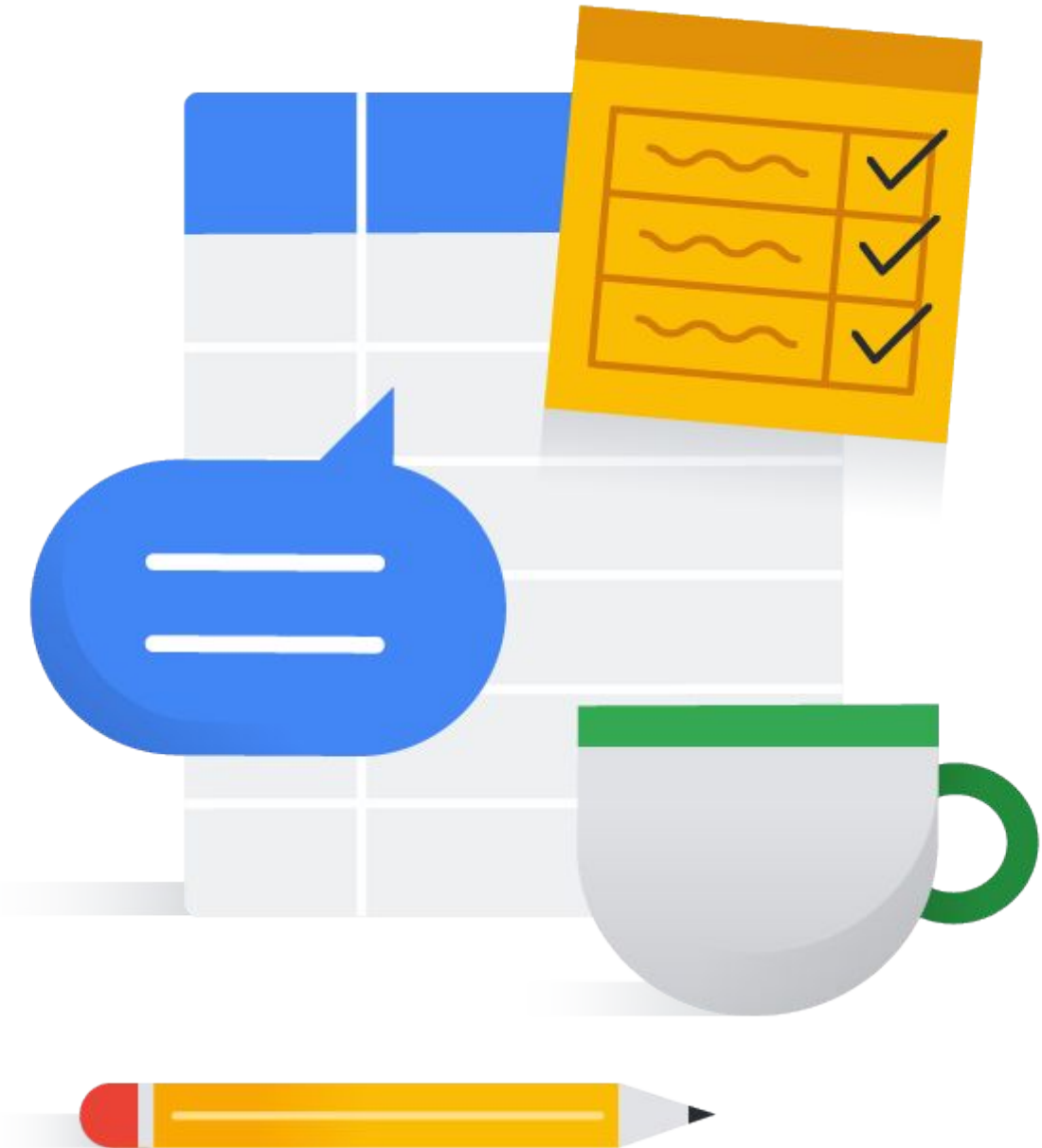
Answer

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Debrief





Thank you.