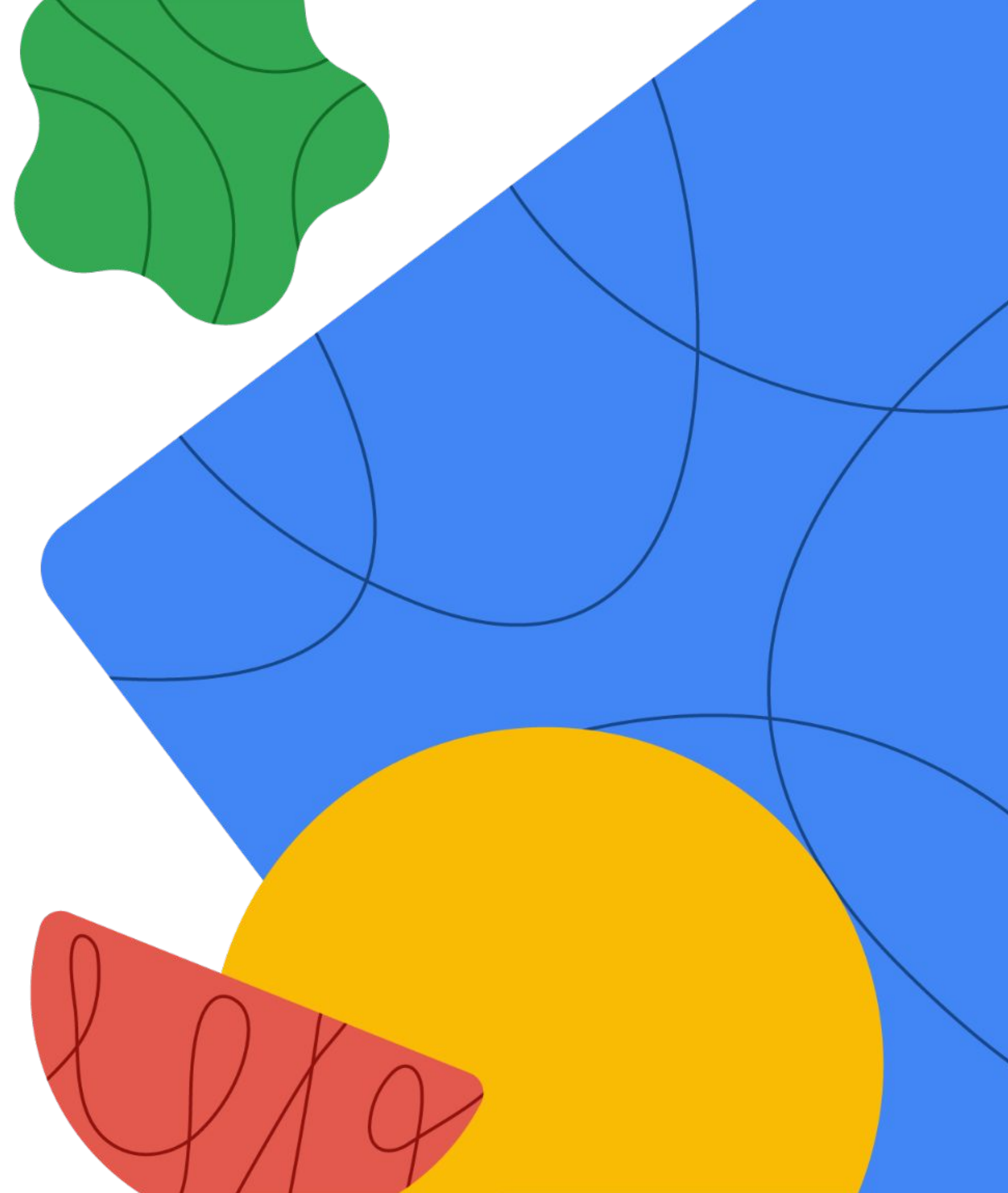


Network in Google Cloud

Network Topologies





Today's agenda



- 01 [Hub-and-spoke topology](#)
- 02 Lab: Implement a Hub-and-Spoke Network Using Network Connectivity Center
- 03 Other topologies
- 04 Getting topology data
- 05 Best practices
- 06 Quiz

Needed: a simple topology for centralized control



Nur, a network engineer at Cymbal Corporation, faces challenges managing a growing network.



Expanding remote offices and cloud-based applications require a scalable and manageable solution.



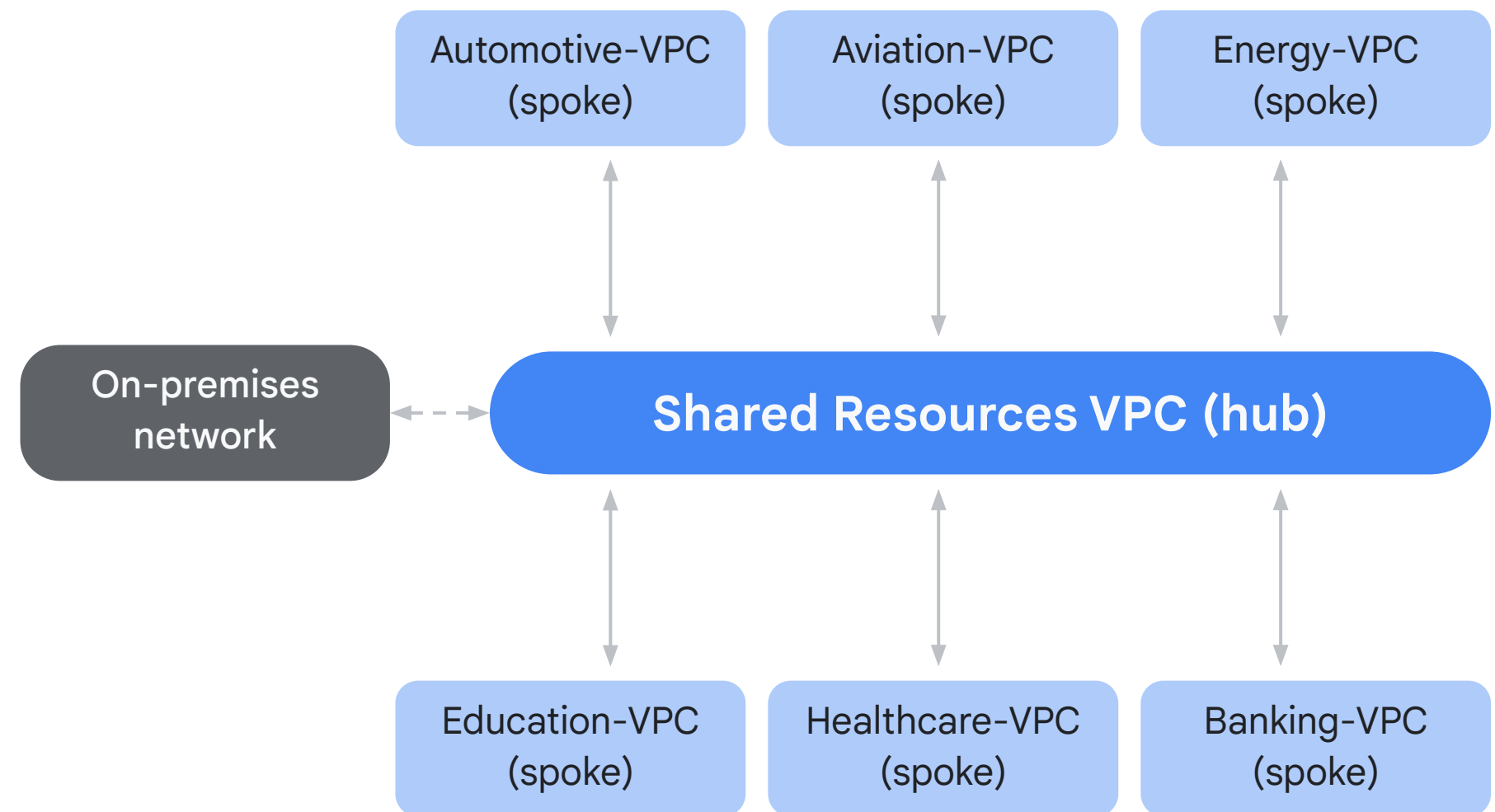
Nur seeks a simple network topology for centralized control and efficient data management.



Solution: Hub-and-spoke topology

NCC

- ✓ Nur chooses a hub-and-spoke topology, where a central hub connects to multiple network devices or spokes.
- ✓ The hub acts as a central point of control for managing and monitoring the entire network.
- ✓ Spoke devices can be diverse, including remote offices, cloud instances, and on-premises data centers.



Solution: Hub-and-spoke topology

A hub-and-spoke topology features:



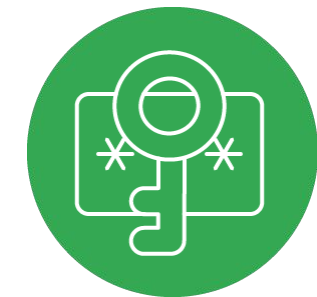
A centralized point of
control



Simplified network
administration



Scalability

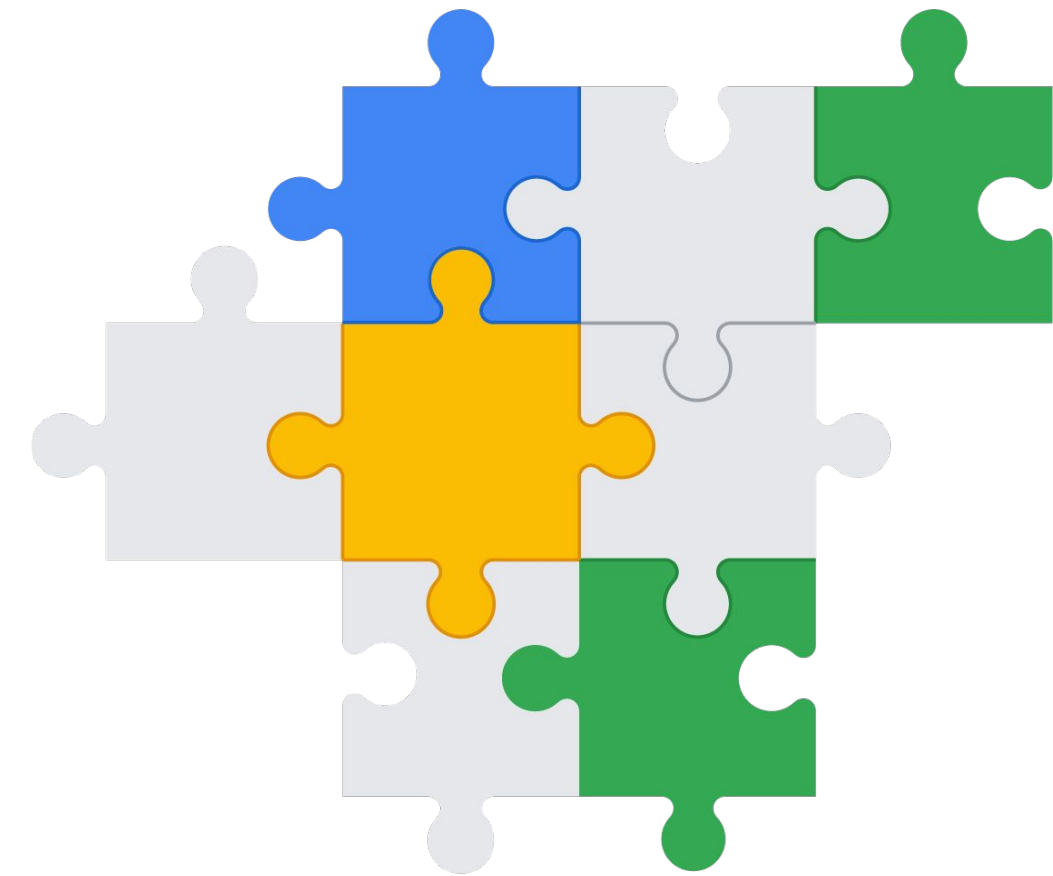


Improved security

Possible implementations

There are multiple ways to implement a hub-and-spoke topology, for example:

- ✓ VPC Network Peering *only VPCs*
- ✓ Cloud VPN
- * ✓ Network Connectivity Center



Implement a hub and spoke using Network Connectivity Center

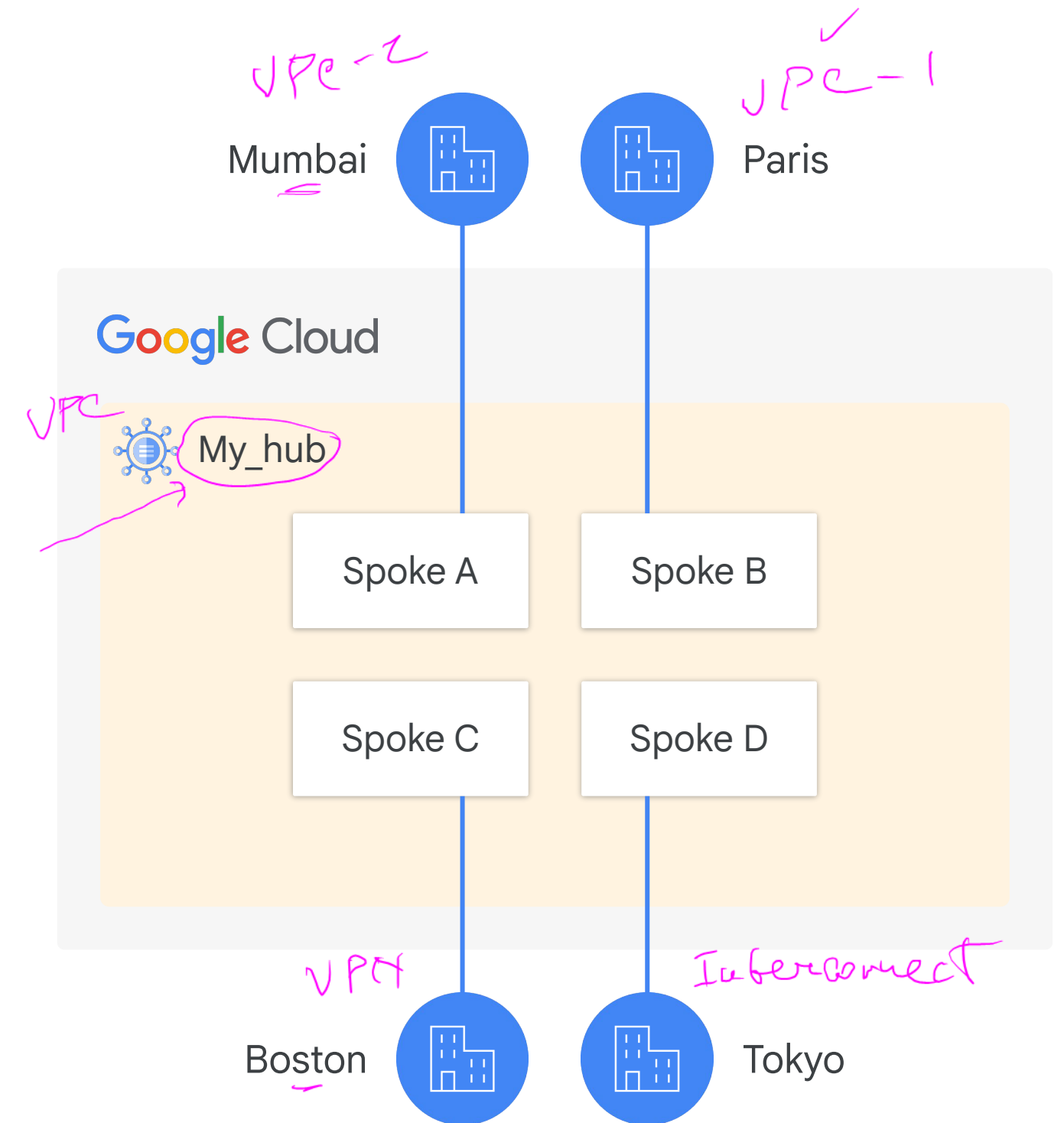
- Spoke types include:

- ① ○ A VPC network
- ② ○ Hybrid Spoke — on prem
 - HA VPN tunnels
 - Cloud Interconnect VLAN attachments
 - Router appliance spokes

default

① site to site ✓ API

② site to cloud ✓ API
GC S...

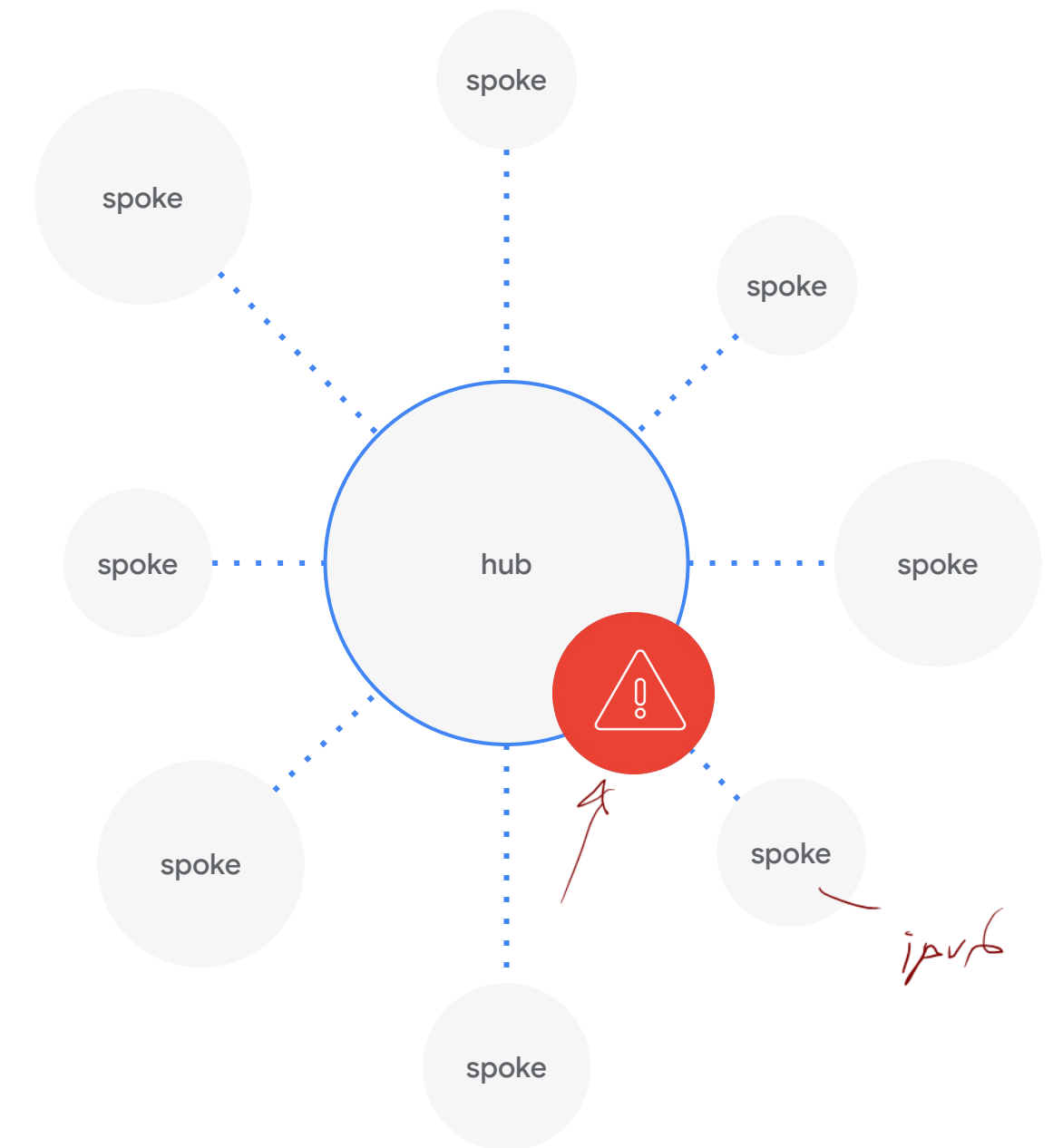


Additional considerations

01 Ensure that IP address spaces between the hub, spoke, and on-premises networks don't overlap.

02 IPv6 addressing isn't supported.

03 Privately-used public IP addresses (PUIs) aren't supported.





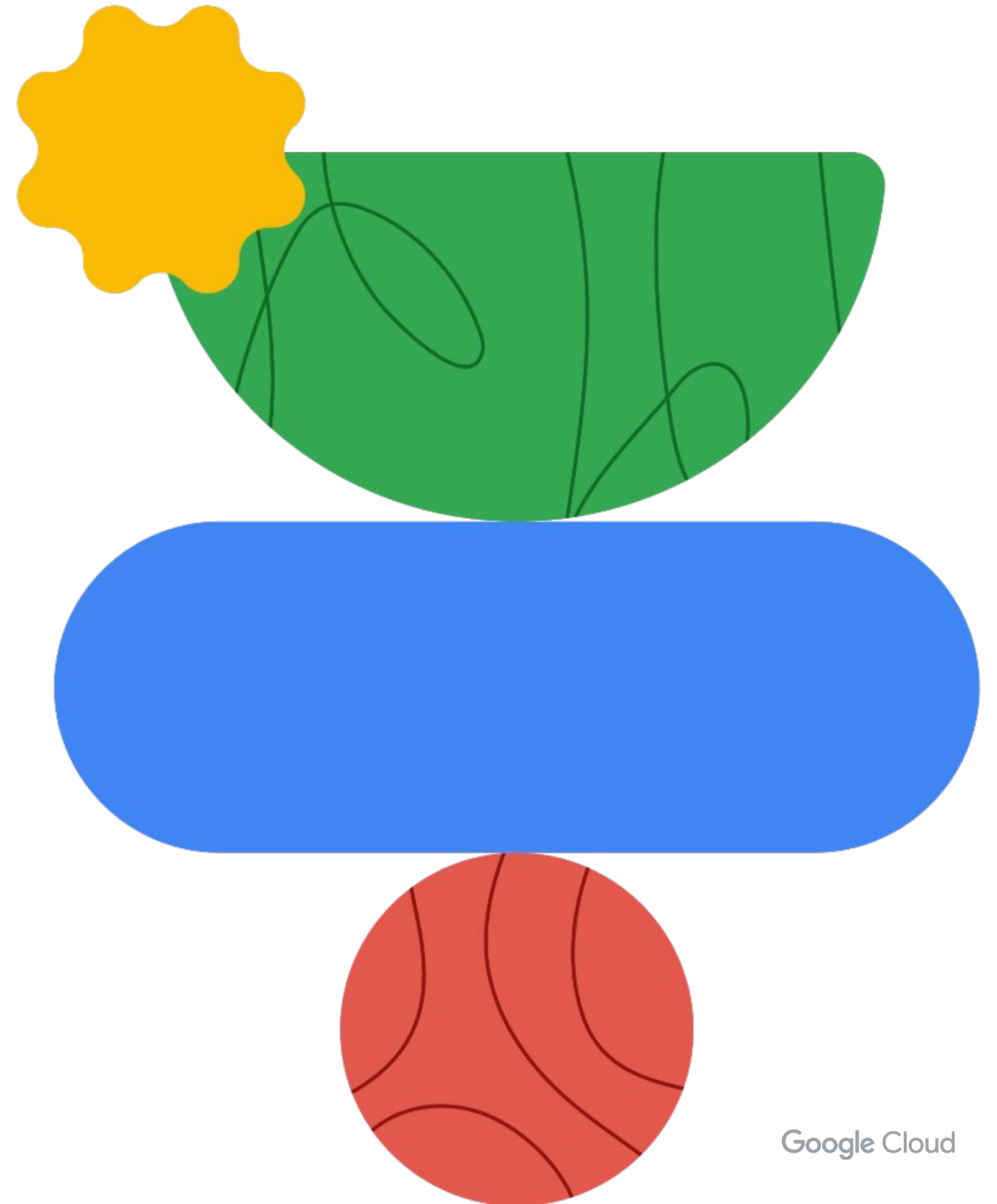
Today's agenda



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Lab intro

Implement a Hub-and-Spoke
Network Using Network
Connectivity Center



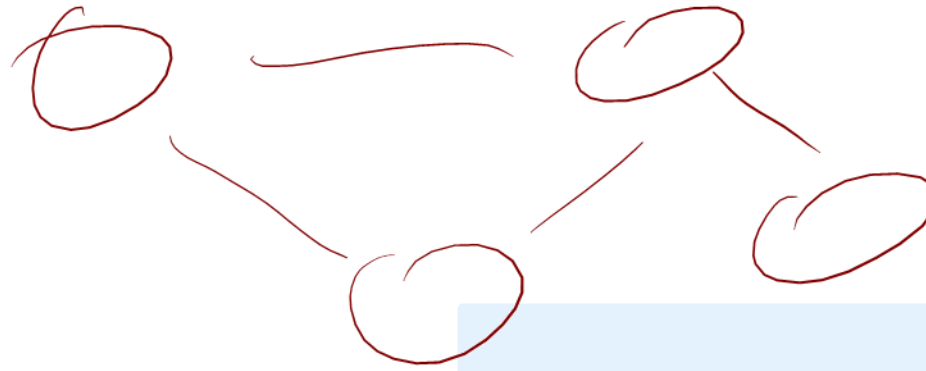


Today's agenda

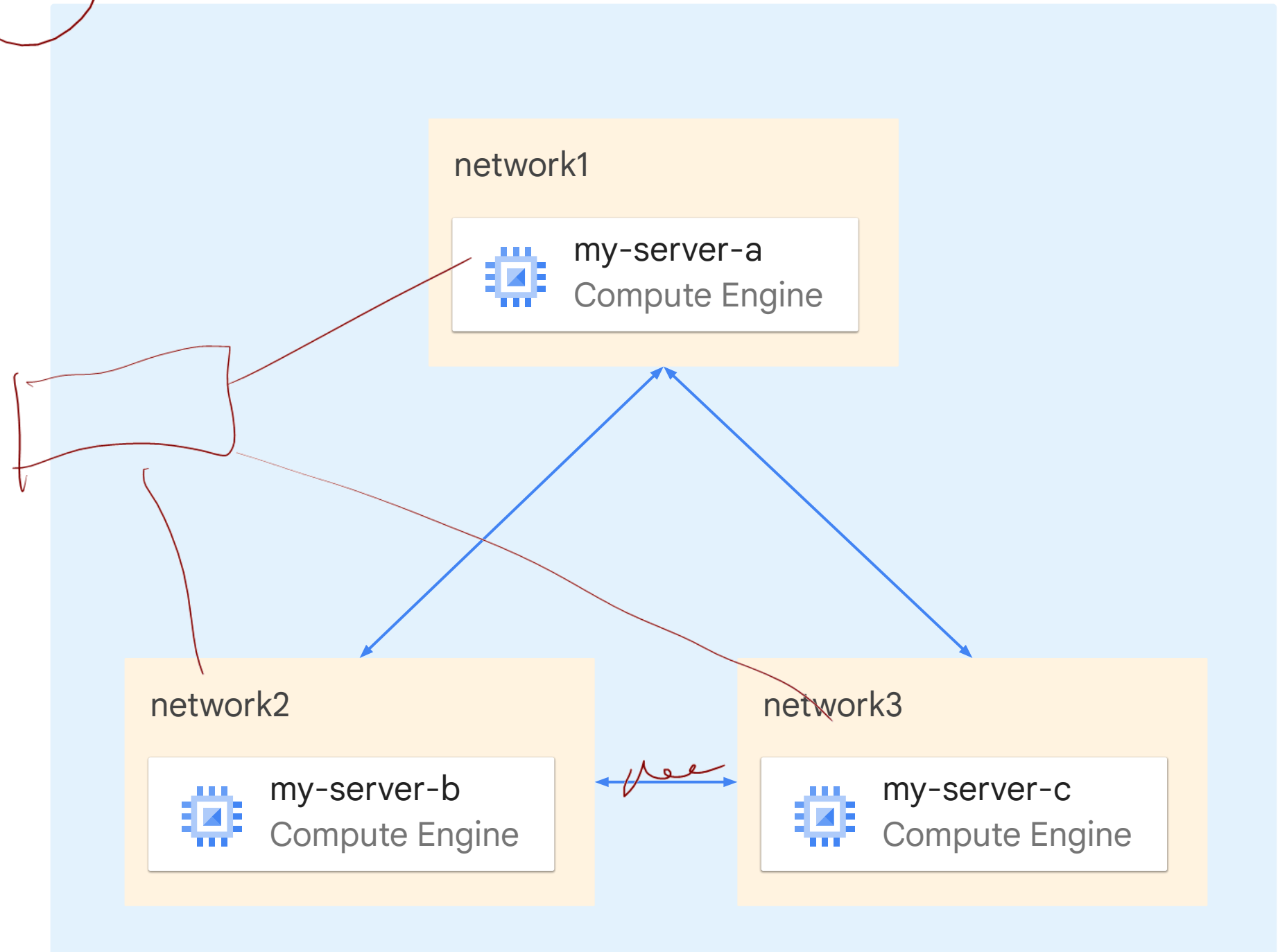


- 01 Hub-and-spoke topology
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Mesh topology



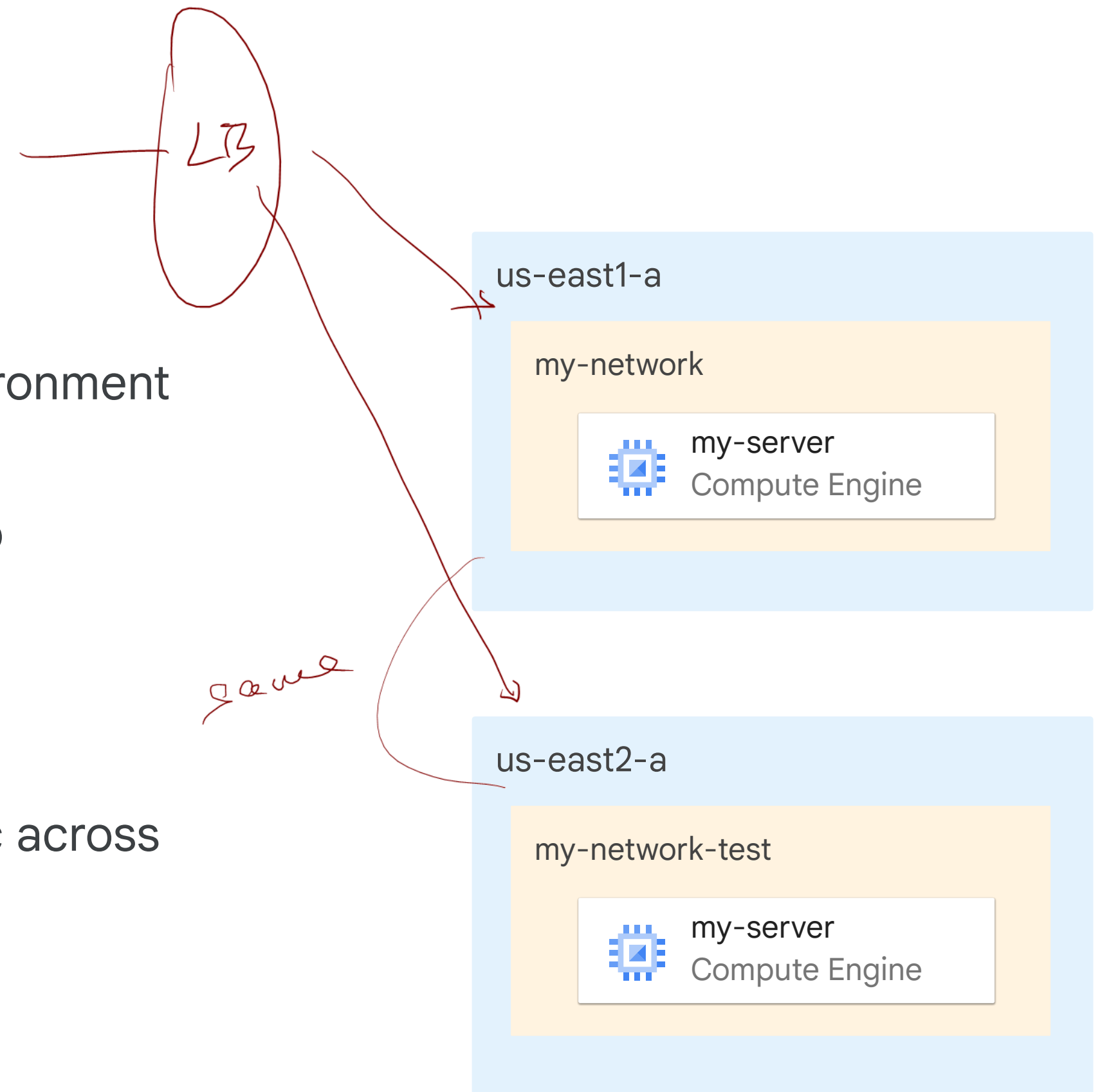
- In a mesh topology, devices or network nodes have multiple interconnected links.
- There are two main types of mesh topology:
 - Full mesh: Every node is connected to every other node.
 - Partial mesh: There is a strategic connection between selected nodes.
- Mesh topologies can work well for applications with many internally connected microservices, such as GKE Enterprise.



Mirrored topology

A mirrored topology replicates your network environment for different use cases:

- Disaster recovery: provides a failover region to minimize downtime.
- Testing and development: creates isolated environments for experimentation.
- Global workload distribution: distributes traffic across regions for better performance.



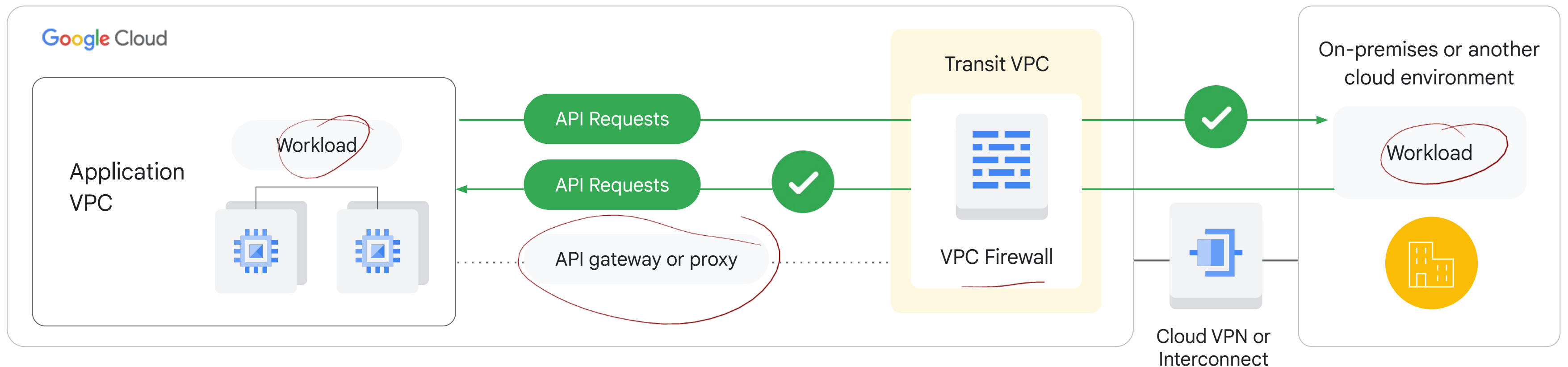
Gating topologies

fw

Gating topologies are great for securing traffic flow due to their fire-grained manner of exposing traffic and services.

There are three types of topologies that restrict access:

- Gated egress: Controls outbound traffic from the cloud.
- Gated ingress: Controls inbound traffic to the cloud.
- Gated ingress and egress: Controls inbound and outbound traffic between hybrid and multi-cloud environments.





Today's agenda

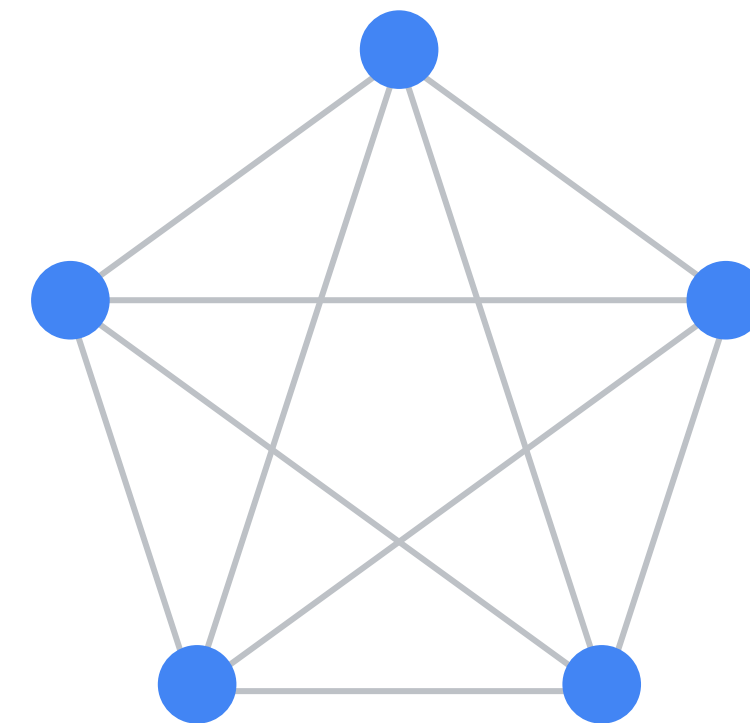
- 01 Hub-and-spoke topology
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Network topology overview

Shows the topology of the network infrastructure.

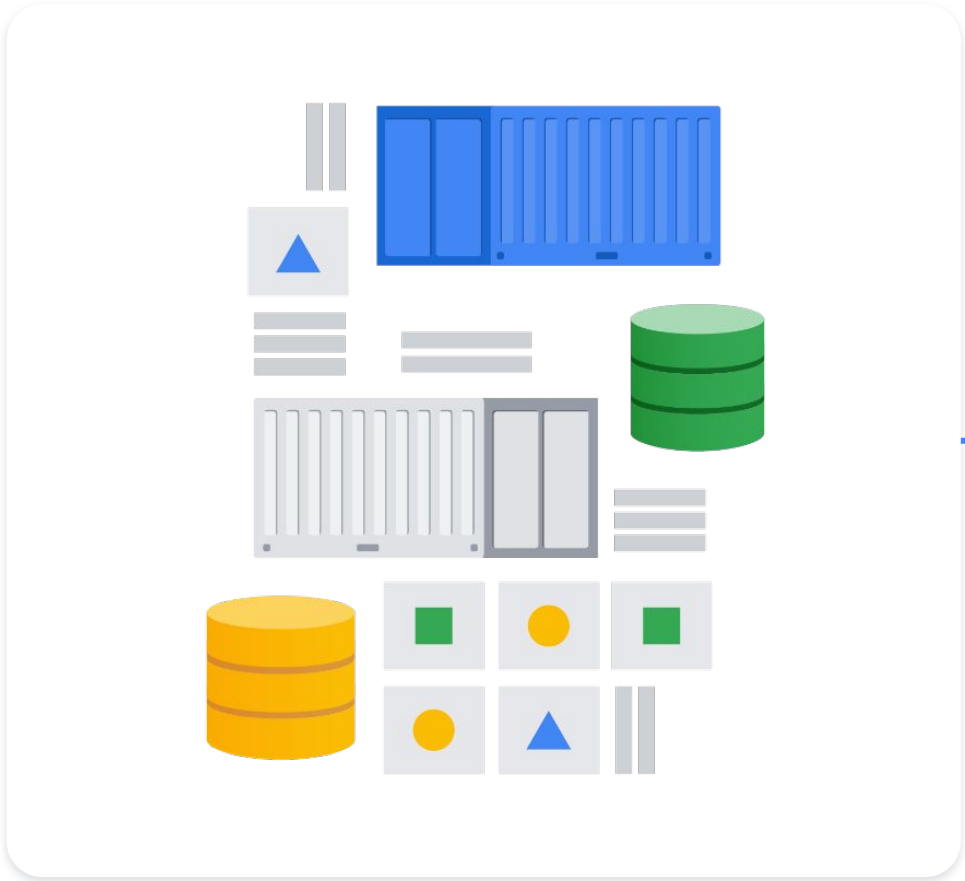
Presents a graph format where nodes represent the entities and lines represent connections.

Simplifies understanding of complex network relationships and bottlenecks, optimizing traffic flows and troubleshooting network issues.



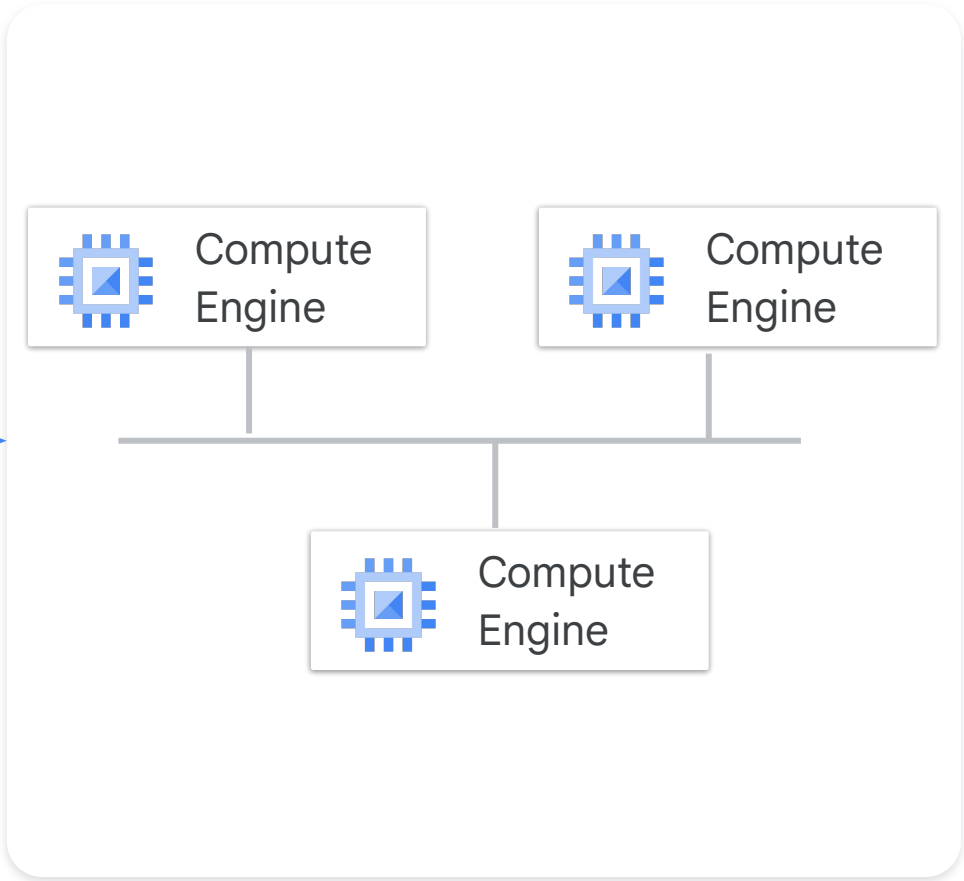
How it works

telemetry + configuration
webrice logs
JPC Flow



Google network infrastructure

Collect telemetry and configuration data from Google infrastructure

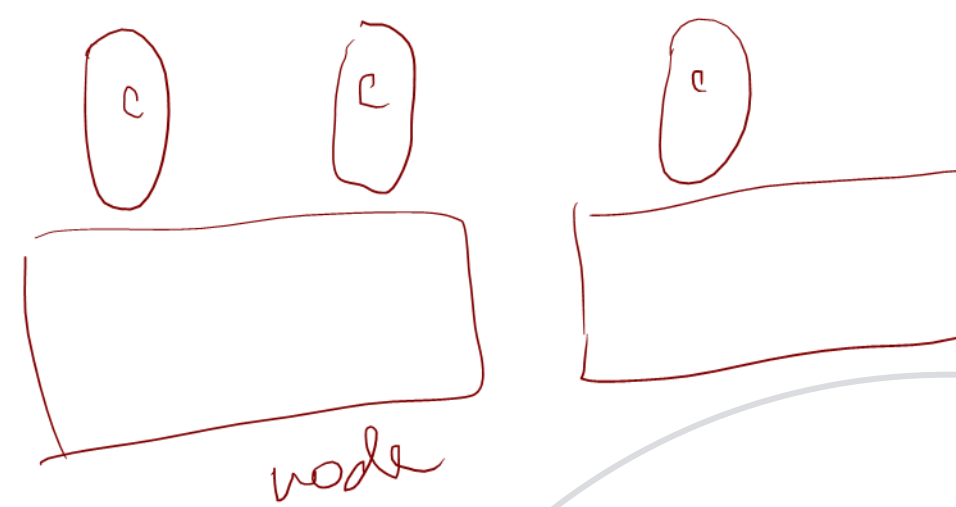


Topology

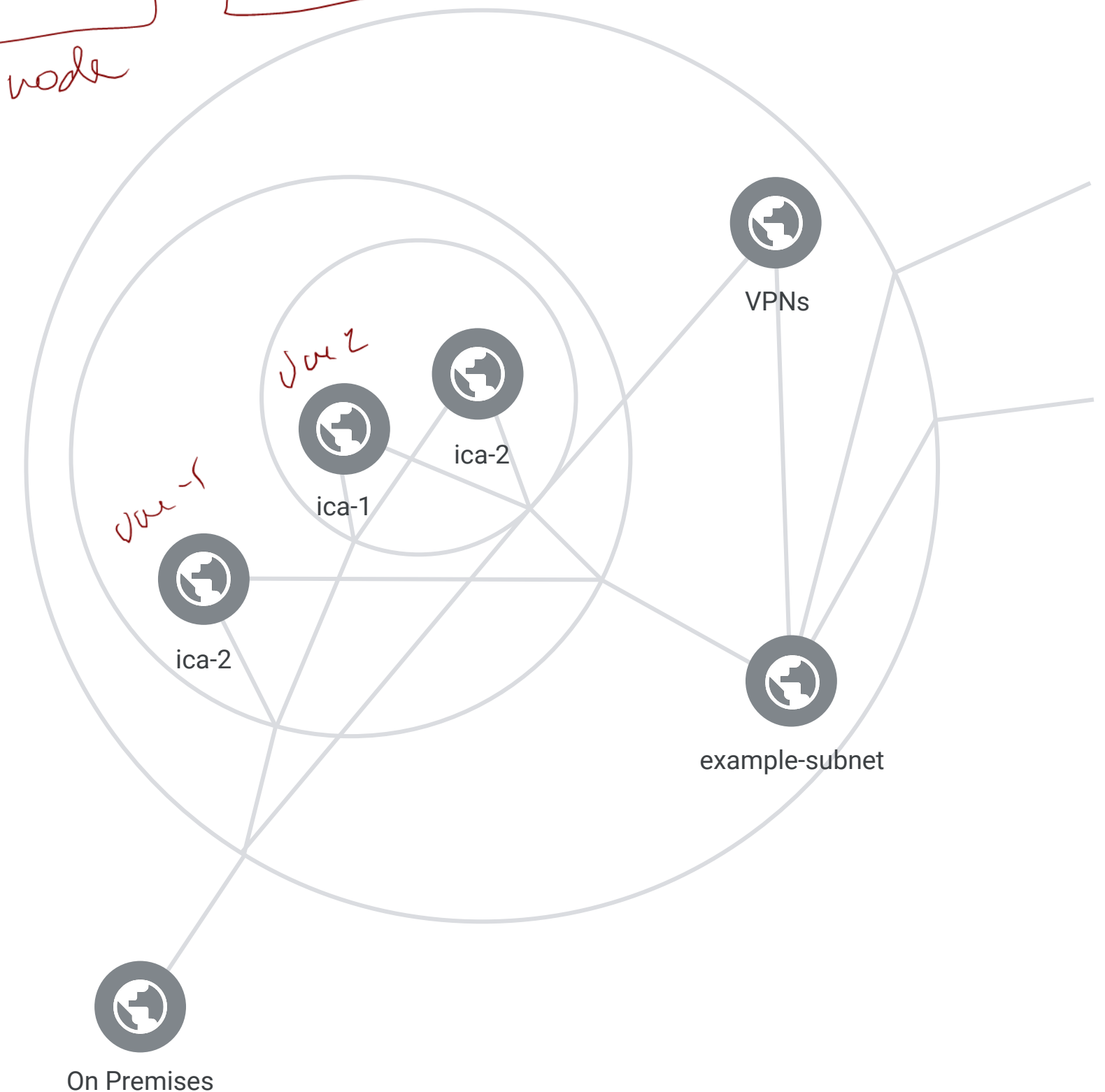
- Maintains 6 weeks of history
- History is divided into hourly snapshots

Network topology tools representation

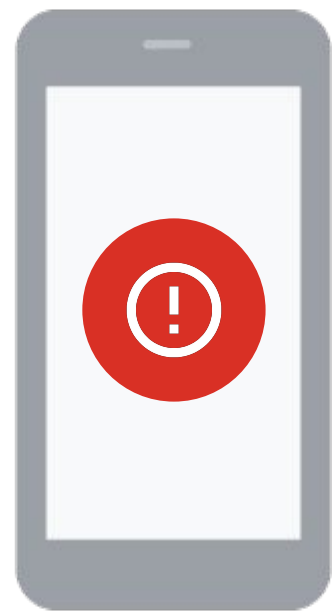
GKE



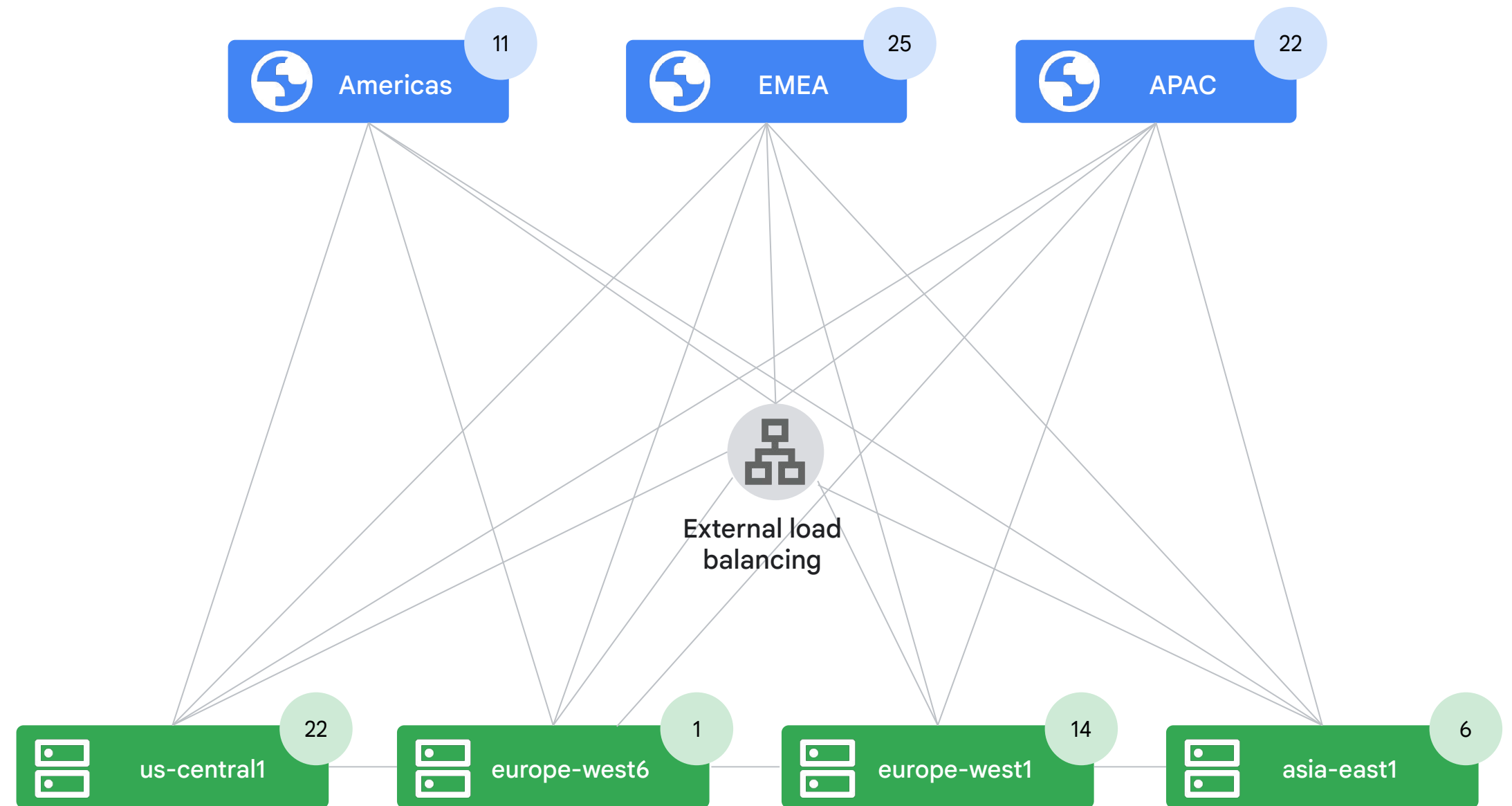
- Entities represent individual resources capable of direct network communication.
- To simplify the visualization of complex networks, base entities are aggregated into hierarchical entities that can be expanded.
- Traffic between entities is represented as lines, connecting entities if at least one side is sending traffic.



Use case: Troubleshoot network connectivity



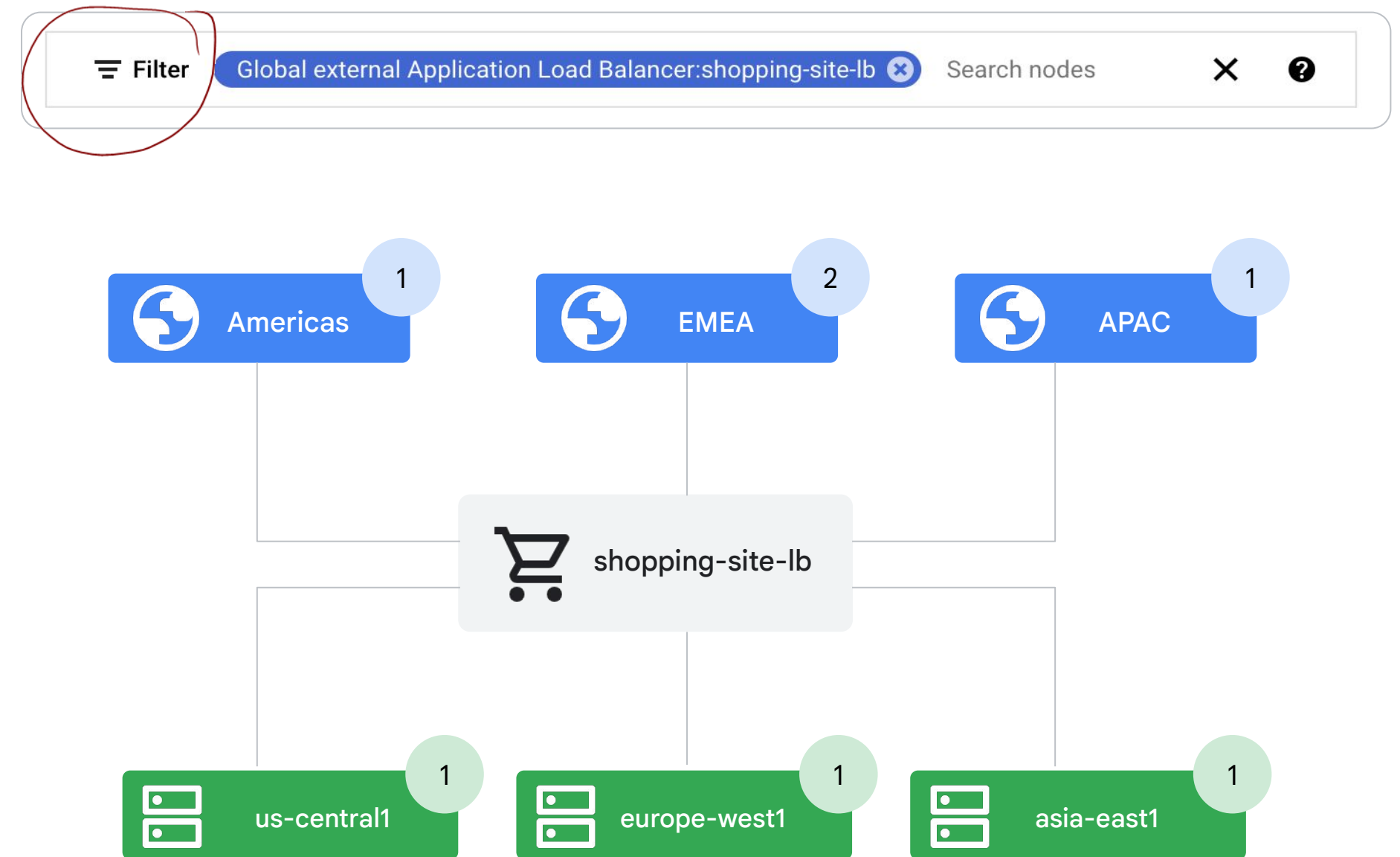
Latency issue causing mobile application to slow down and time out



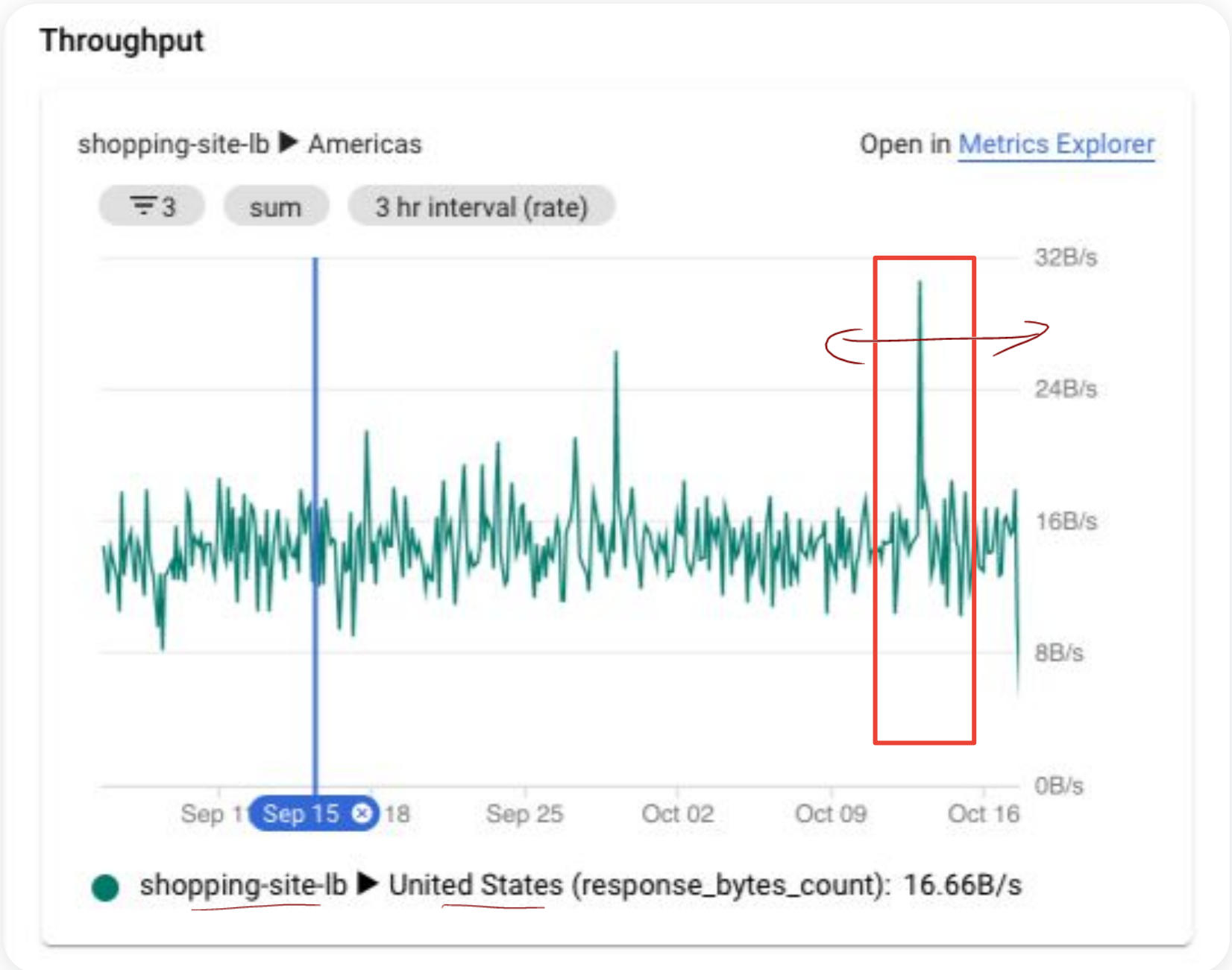
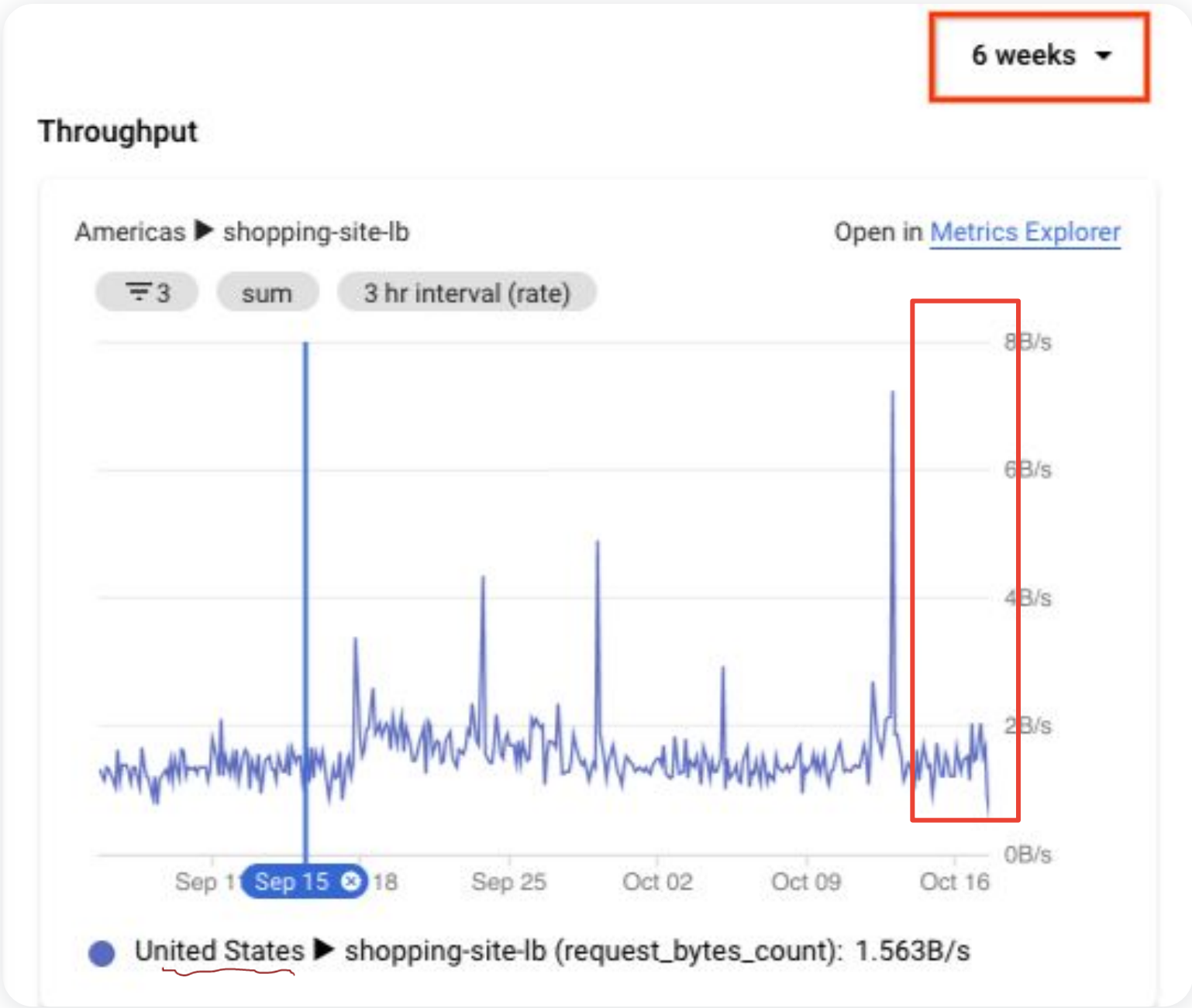
Filter to view specific traffic

By filtering the Network Topology view to specifically display traffic for the shopping-site-lb load balancer, you isolate the connections related to the load balancer.

This reveals potential issues in the backend.



Review traffic metrics and extend the time series





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Best practices for hybrid cloud environment

01

Ensure solution meets the required SLA for performance and uptime

02

Scale hub-and-spoke architectures with centralized hybrid connectivity

03

Expose applications through APIs using an API gateway or load balancer.

Api gate

04

When using Cloud Load Balancing utilize its application capacity optimization capabilities.

05

Use two authoritative DNS systems for private Google Cloud environments.

Let's ask Gemini ✨

Describe a scenario where a <topology_name> would be the best choice.

What are the advantages and disadvantages of a mesh topology?



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Quiz | Question 1

Question

You are designing a Google Cloud network for a large financial services company with strict security requirements. The network needs to isolate sensitive customer data from other resources and limit communication between specific network segments. Which of the following network topologies would be most suitable for this scenario?

- A. Hub-and-spoke
- B. Gated ingress and egress
- C. Mirrored
- D. Mesh

Quiz | Question 1

Answer

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Quiz | Question 2

Question

You are migrating a large ecommerce company's existing on-premises data center to Google Cloud. The on-premises network consists of geographically dispersed regional offices, each with its own network segment requiring secure isolation. However, central management and communication between all regional offices are critical for business operations. Which network topology would *most* effectively address these requirements in Google Cloud?

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- B. Mesh
- C. Mirrored
- D. Gated ingress and egress

Quiz | Question 2

Answer

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Debrief

