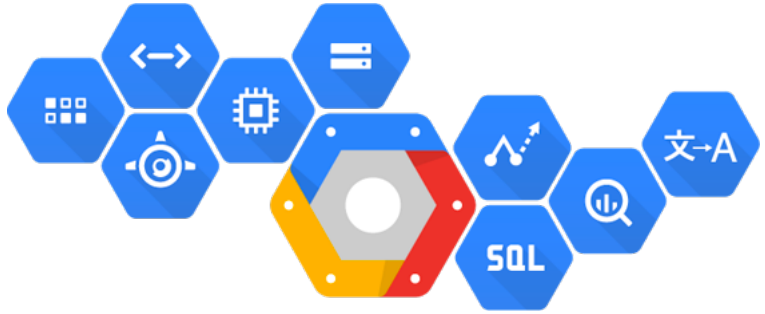


- **Virtual Private Cloud**
  - Region, Zones, Subnet, Routes & Firewall Rules
  - VPC Peering
  - Shared VPC

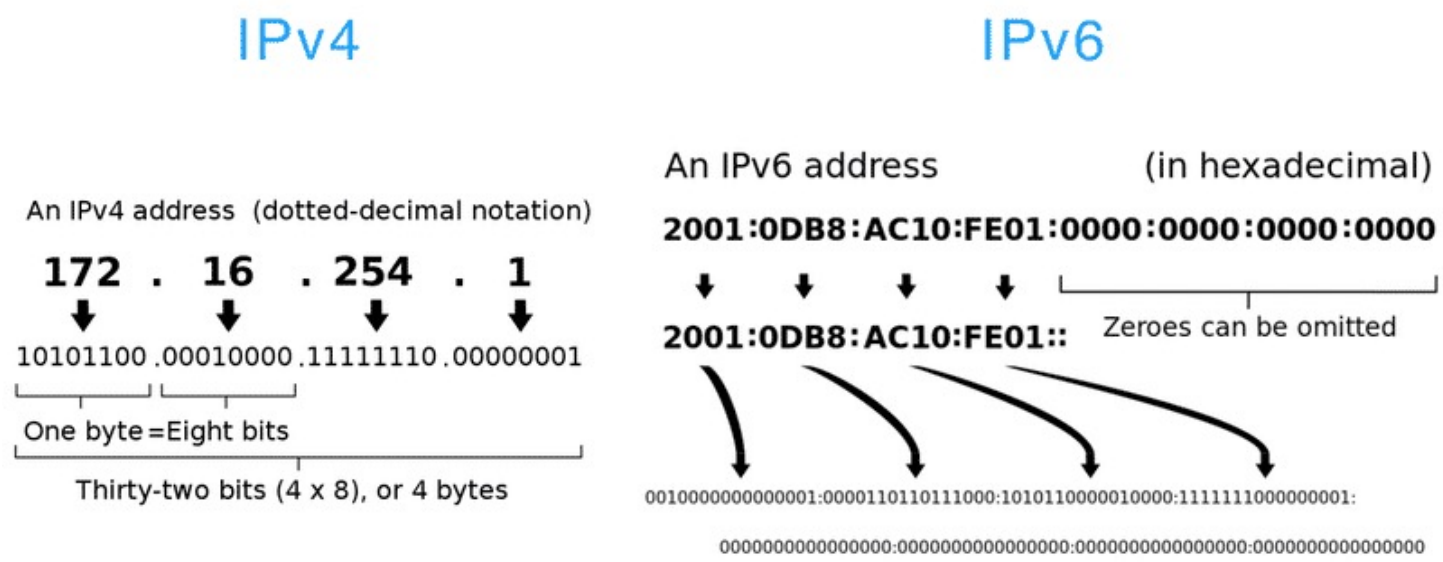
- **Load Balancing**
  - Global Load Balancer (HTTP(s) Load Balancer, SSL Proxy, TCP Proxy)
  - Regional Load Balancer (Network TCP/UDP, Internal TCP/UDP)

Network: IP Addressing & CIDR Block

Every location or device on a network must be **addressable**. In the TCP/IP model of network layering, it's referred as IP address.

Network Address Translation allows the addresses to be rewritten when packets traverse network borders to allow them to continue to their correct destination.

IPv4 – Four octets, 32 bit address, Each 8-bit segment is divided by a period and typically expressed as a number 0-255. ex- 192.168.20.10
IPv6 – 16 bit blocks, 128 bit address, 8 segments of four hexadecimal digits, double colon (::) is used for leading zeros. ex - 1203:8fe0:fe80:b897:8990:8a7c:99bf:323d



CIDR – Classless inter-domain routing:

CIDR notation of 192.168.0.15/24 means that the first 24 bits of the IP address given are considered significant for the network routing.

Source: https://cloud.google.com/docs, https://cloud.google.com/products

Network: Global Network Footprint

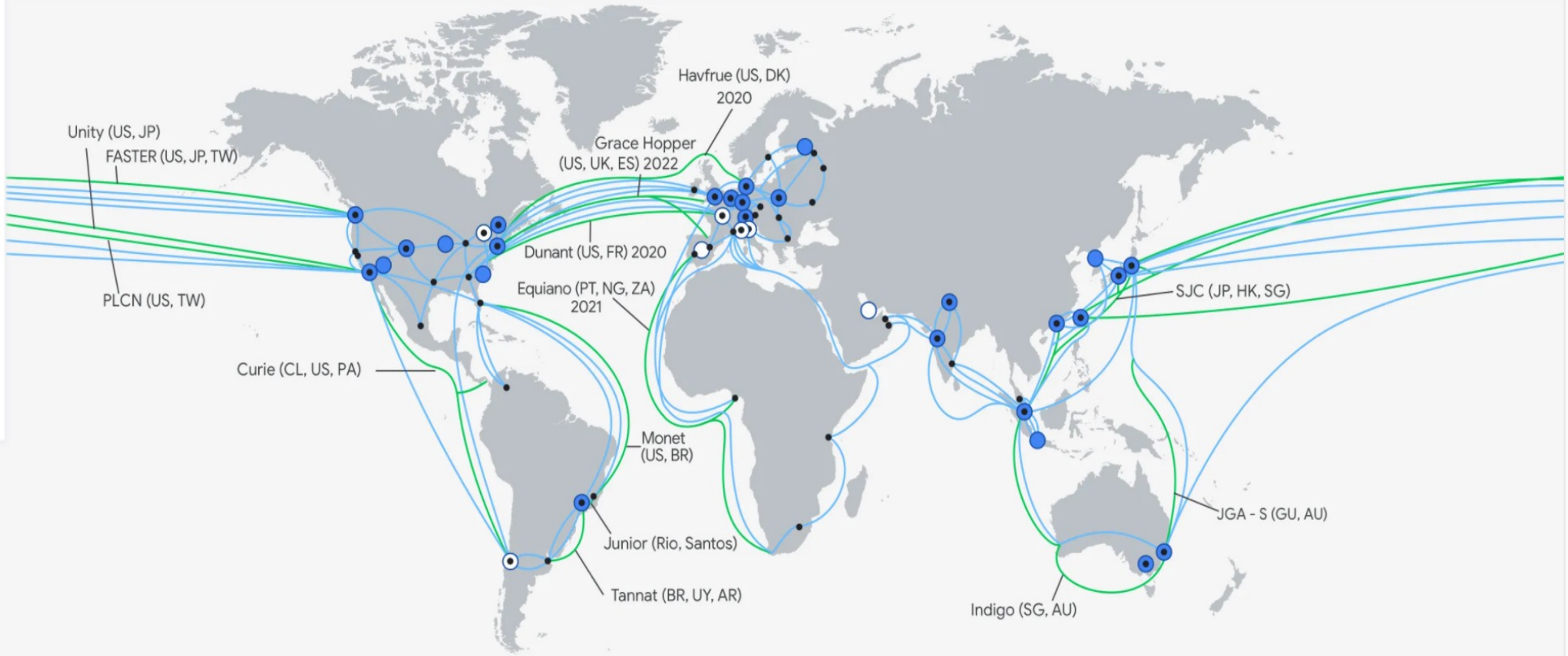
27
cloud regions

82
zones

146
network edge locations

AVAILABLE IN
200+
countries & territories

Learn about our infrastructure



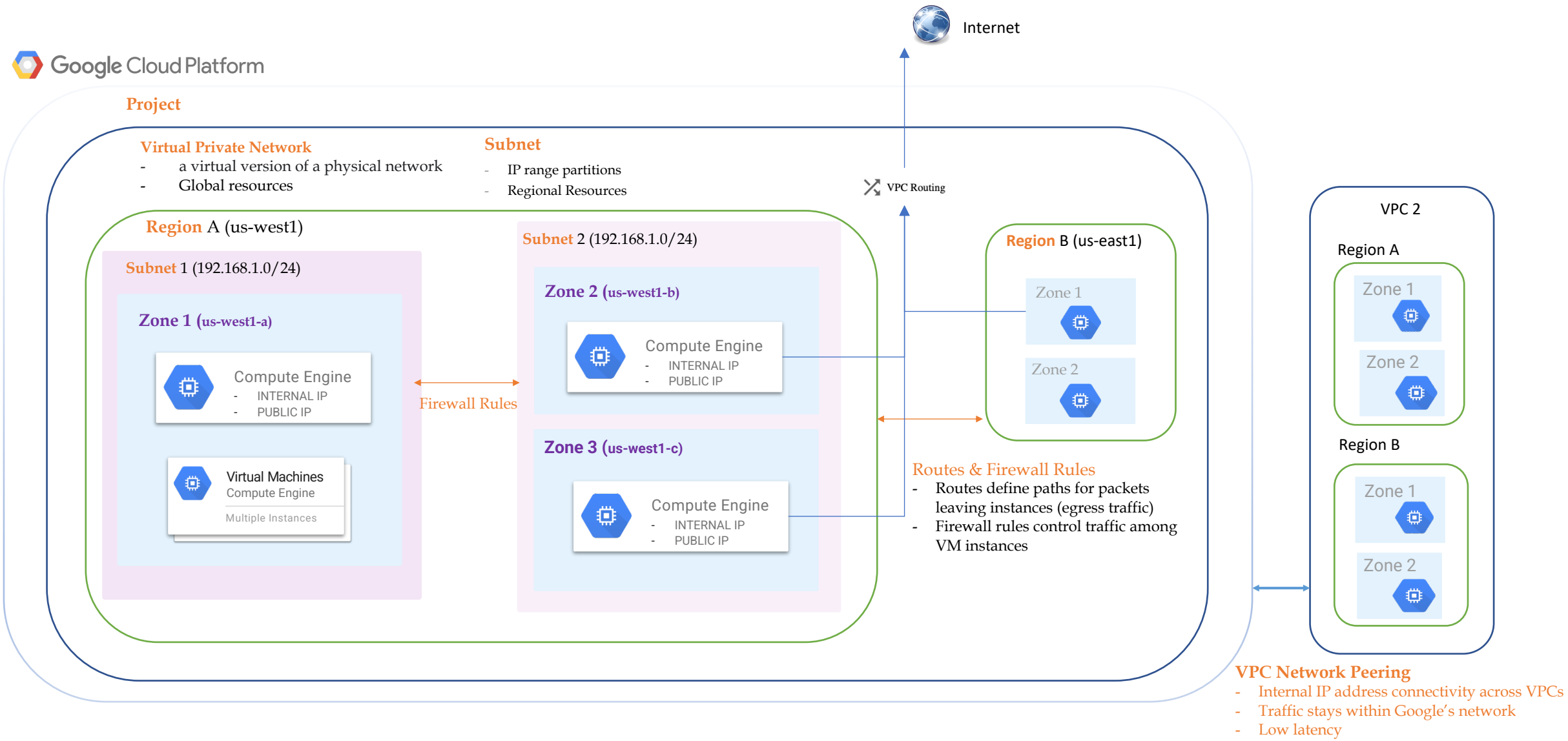
KEY

- Current network
- Submarine Cable investments
- Current region with 3 zones
- Future region with 3 zones
- Edge point of presence

COMING SOON! Google Cloud will continue expanding into the following regions: Doha (Qatar), Toronto (Canada), Paris (France), Milan (Italy), Santiago (Chile), Madrid (Spain) and Turin (Italy).

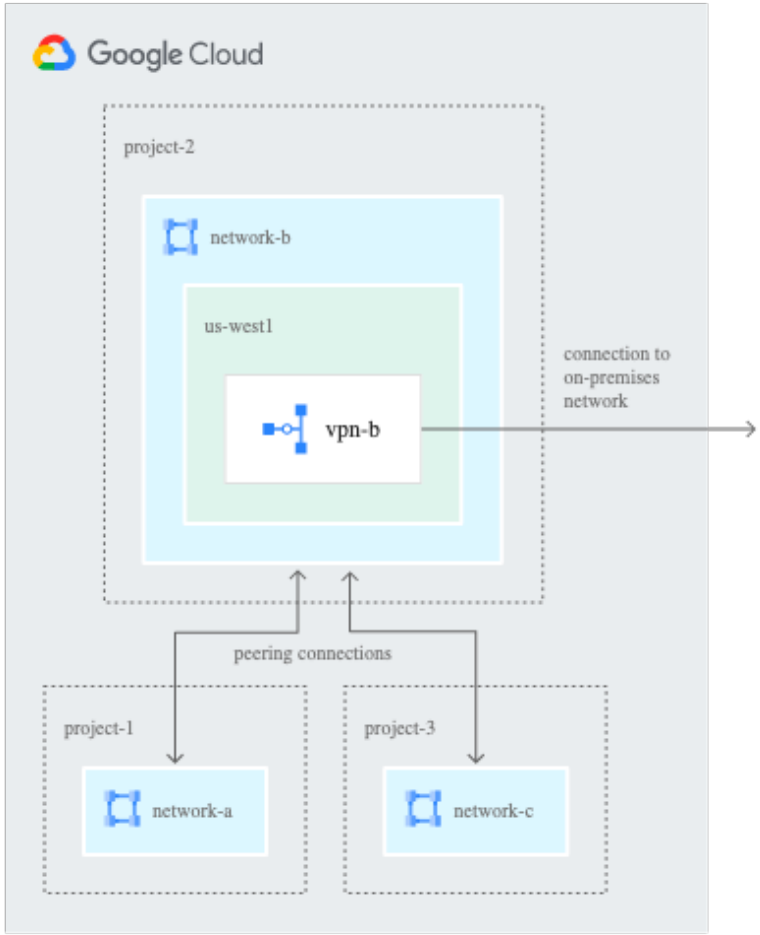
Source: https://cloud.google.com/docs, https://cloud.google.com/products

Architecture: Network > VPC



Source: https://cloud.google.com/docs, https://cloud.google.com/products

VPC Network Peering enables you to connect VPC networks so that workloads in different VPC networks can communicate internally.



Specifications:

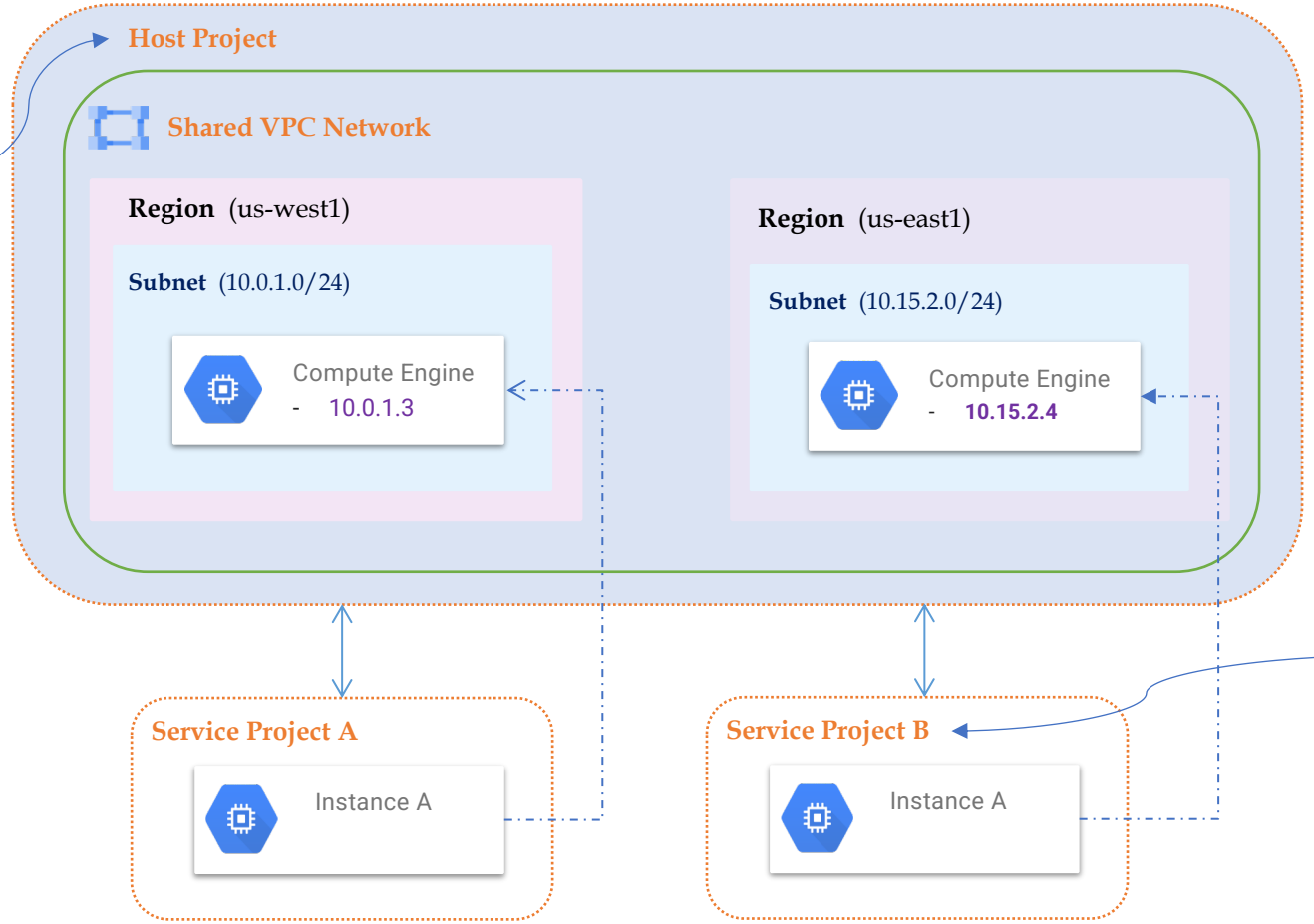
- ✓ Google Cloud VPC Network Peering allows internal IP address connectivity across two Virtual Private Cloud (VPC) networks regardless of whether they belong to the same project or the same organization.
- ✓ Traffic stays within Google's network and doesn't traverse the public internet.
- ✓ VPC Network Peering works with Compute Engine, GKE, and App Engine flexible environment.
- ✓ Peered VPC networks remain administratively separate. Routes, firewalls, VPNs, and other traffic management tools are administered and applied separately in each of the VPC networks.
- ✓ VPC Network Peering is useful in these environments:
  1. SaaS (Software-as-a-Service) ecosystems in Google Cloud
  2. Organizations with several network administrative domains
- ✓ VPC Network Peering gives you several advantages over using external IP addresses or VPNs to connect networks, including:
  1. Network Latency
  2. Network Security
  3. Network Cost (egress)

Source: https://cloud.google.com/docs, https://cloud.google.com/products

Shared VPC allows an organization to connect resources from multiple projects to a common Virtual Private Cloud (VPC) network, so that they can communicate with each other securely and efficiently using internal IPs from that network.

*A **host project** contains one or more Shared VPC networks.*

*A **Shared VPC network** is a VPC network defined in a host project and made available as a centrally shared network for eligible resources in service projects.*



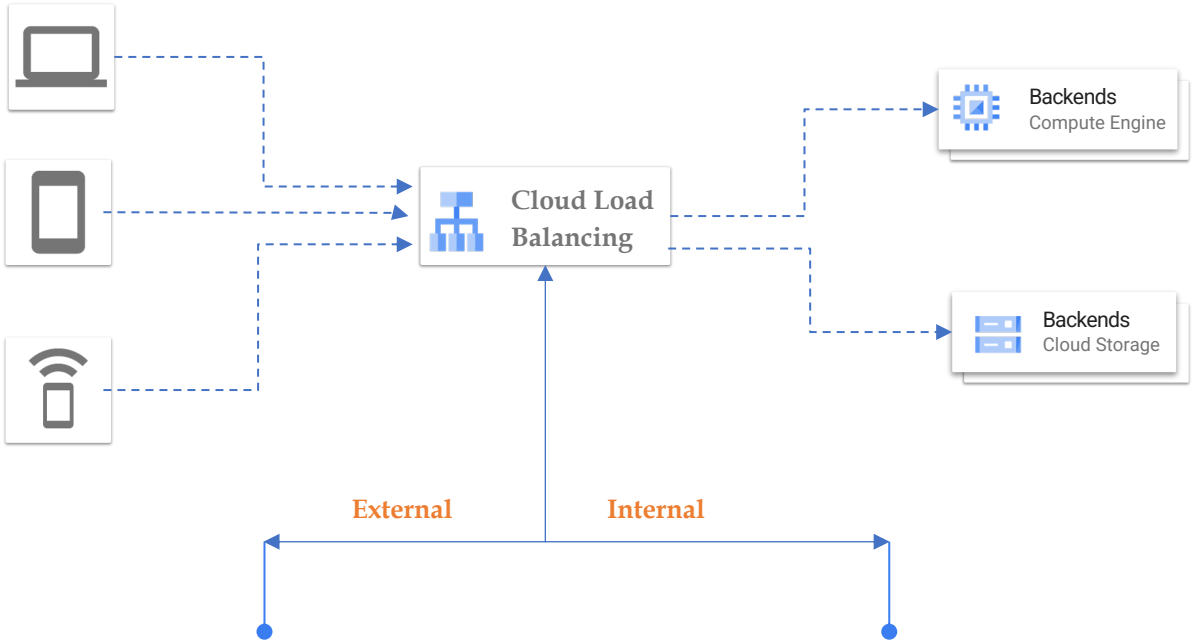
Project Requirements:

1. Delegate Administrative responsibilities for Networking
2. Hybrid Cloud & Transit Network

*A **service project** is any project that has been attached to a host project by a Shared VPC Admin.*

Source: https://cloud.google.com/docs, https://cloud.google.com/products

Cloud Load Balancing is a fully distributed, software-defined managed service, which distributes user traffic across multiple instances of applications.



External HTTP(S) Load Balancing
SSL Proxy Load Balancing
TCP Proxy Load Balancing
TCP/UDP Network Load Balancing

Internal HTTP(S) Load Balancing
Internal TCP/UDP Load Balancing

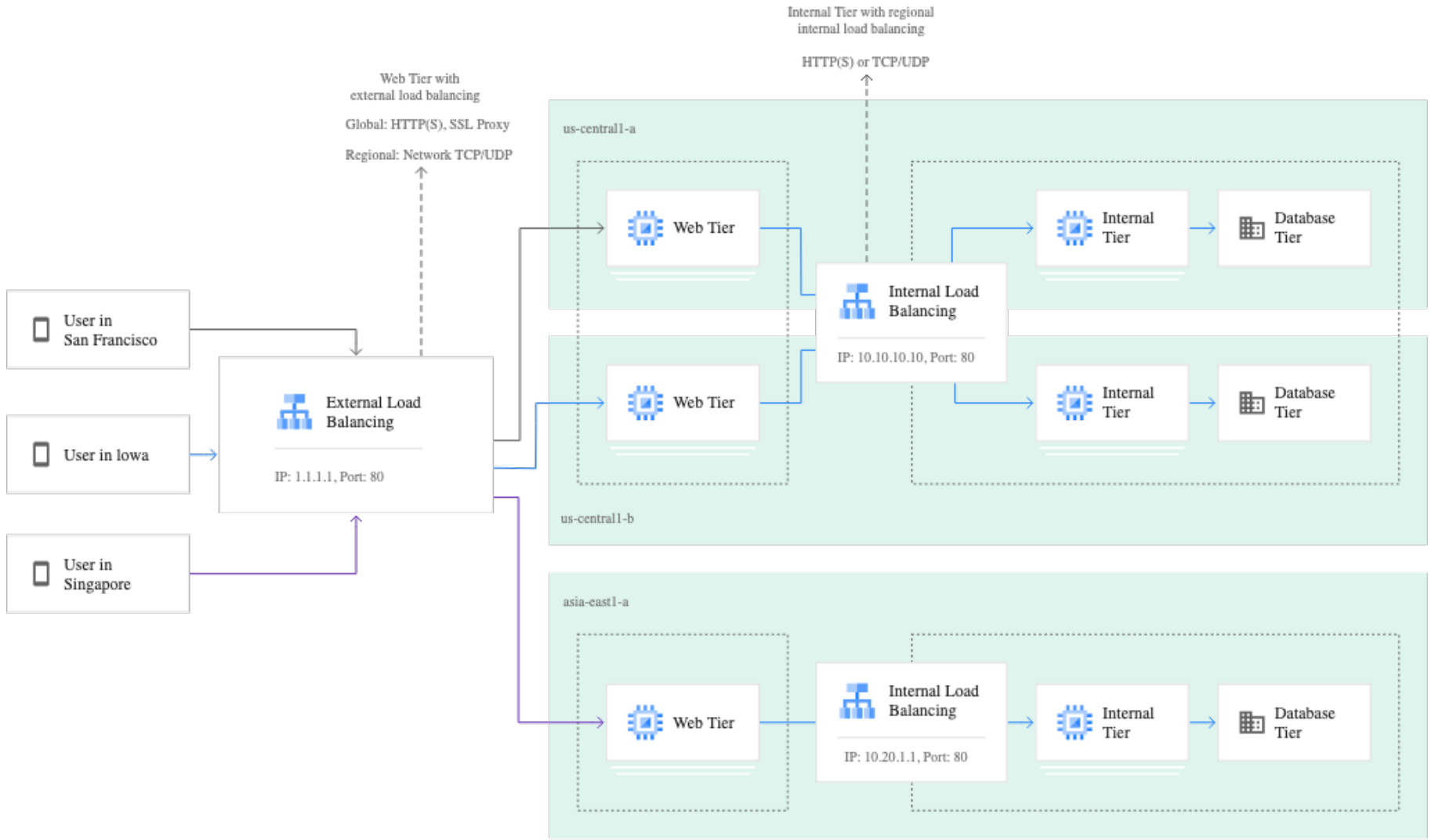
Google Cloud offers the following load balancing features:

- Single IP address to serve as the frontend
- Automatic intelligent autoscaling of the backends
- Layer 4-based load balancing to direct traffic based on data from network and transport layer protocols, such as IP address and TCP or UDP port
- Layer 7-based load balancing to add content-based routing decisions based on attributes, such as the HTTP header and the uniform resource identifier
- Integration with Cloud CDN for cached content delivery

Source: https://cloud.google.com/docs, https://cloud.google.com/products

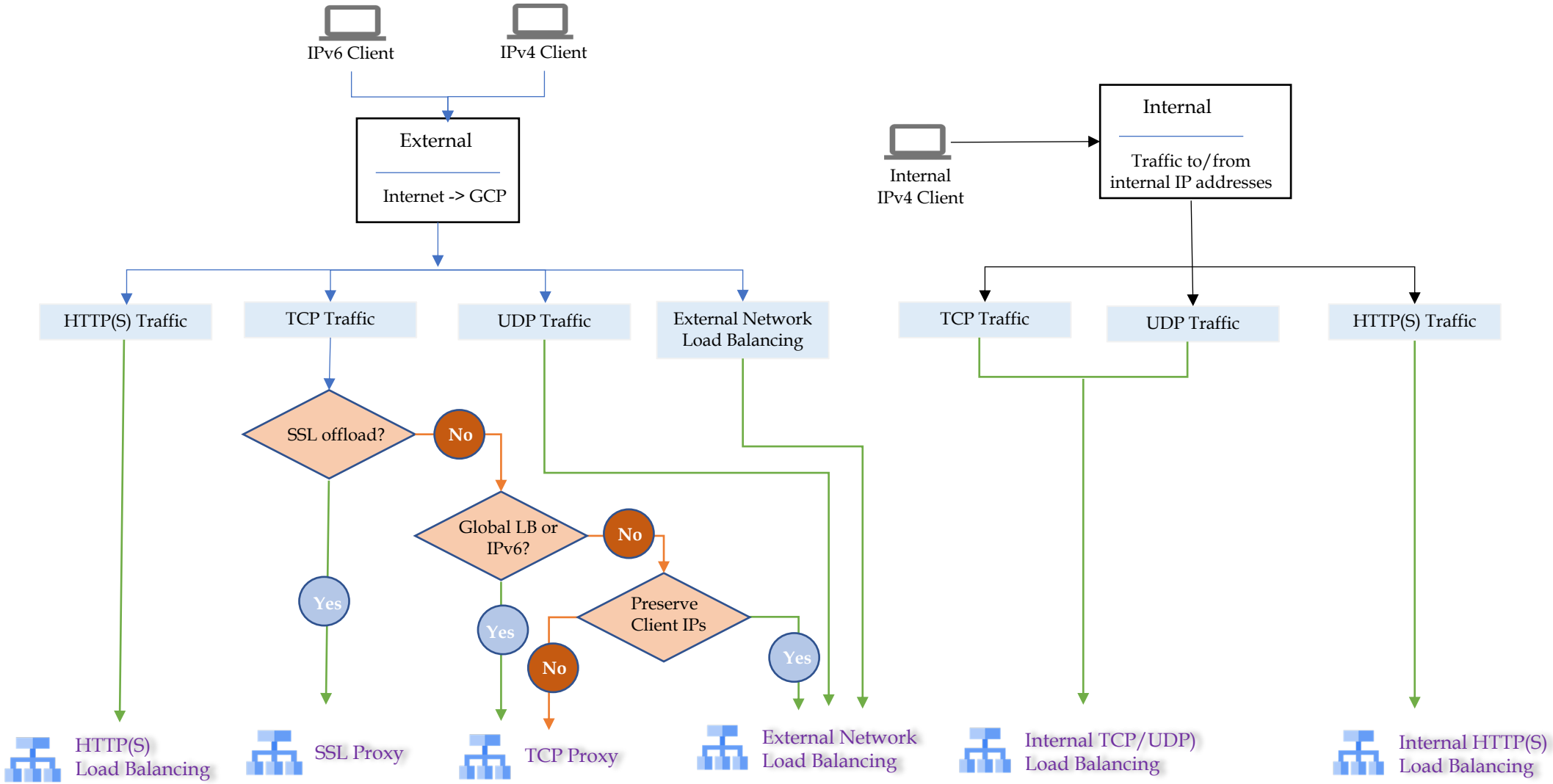
Network: Load Balancer > External vs Internal Load Balancing

The following diagram illustrates a common use case: how to use external and internal load balancing together.



Source: https://cloud.google.com/docs, https://cloud.google.com/products

Network: Load Balancer > Choosing a Load Balancer



Source: https://cloud.google.com/docs, https://cloud.google.com/products