

[Networking Products](https://cloud.google.com/products/networking/) (https://cloud.google.com/products/networking/)

[Network Service Tiers](https://cloud.google.com/network-tiers/) (https://cloud.google.com/network-tiers/)

[Documentation](https://cloud.google.com/network-tiers/docs/) (https://cloud.google.com/network-tiers/docs/) [Guides](#)

Overview

Google Cloud Network Service Tiers lets you optimize connectivity between systems on the Internet and your Google Cloud instances. Premium Tier delivers traffic via Google's premium backbone, while Standard Tier uses regular ISP networks.

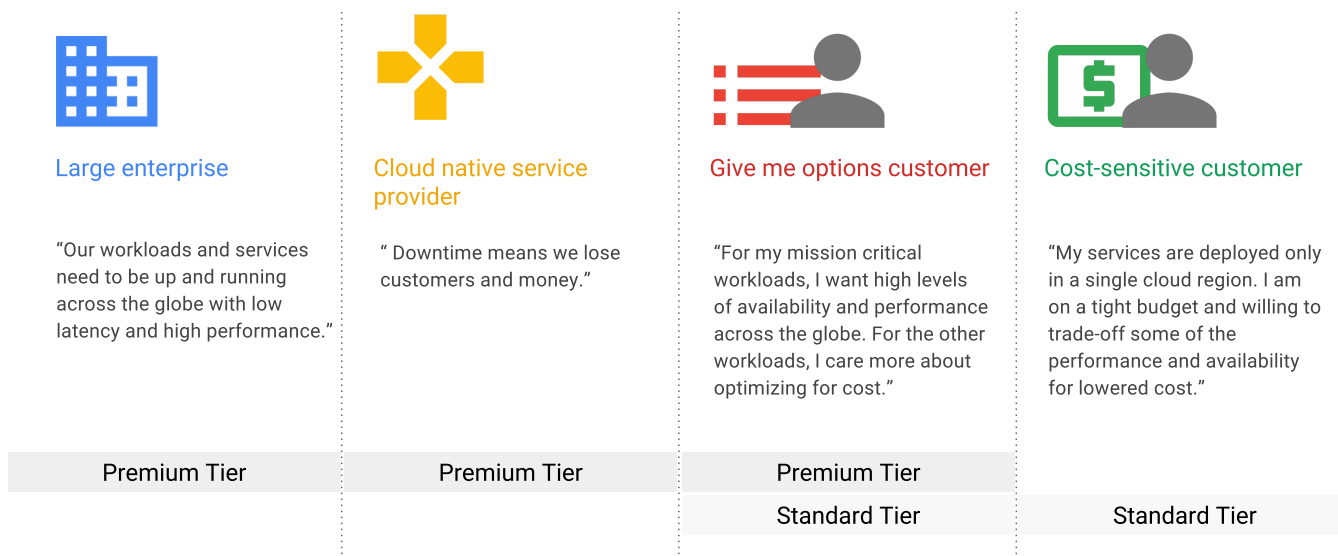
Overview

Use Premium Tier to optimize for performance and Standard Tier to optimize for cost:

Premium Tier	Standard Tier
<ul style="list-style-type: none">• Highest performance: Traffic between the Internet and VM instances in your VPC network is routed by keeping it within Google's network as much as possible.• For services that need global availability• Unique to Google Cloud• Premium Tier is the default unless you make configuration changes (#configuring).	<ul style="list-style-type: none">• Cost optimized: Traffic between the Internet and VM instances in your VPC network is routed over the Internet in general.• For services hosted entirely within a region• Performance is comparable to other Cloud providers.

Egress pricing for each of the Network Service Tiers is different. See [Network Service Tiers Pricing](https://cloud.google.com/network-tiers/pricing) (https://cloud.google.com/network-tiers/pricing) for details.

This diagram illustrates recommended use cases for Standard Tier and Premium Tier.



(<https://cloud.google.com/network-tiers/images/tiers-use-cases-icons.svg>)

Network Service Tier use cases (click to enlarge)

Network Service Tiers and Google Cloud resources

This table describes how Network Service Tiers apply to Google Cloud resources and what type of external IP address must be used. Google Cloud has two types of external IP addresses:

- A *global external IP address* is only available for HTTP(S), TCP Proxy, and SSL Proxy Load Balancing, and it is Premium Tier by definition. Global external IP addresses are publicly routable anycast IP addresses.
- A *regional external IP address* is also a publicly routable IP address, but it's designated for use by Google Cloud resources that fit within a single Google Cloud region. Regional external IP addresses are Premium Tier by default; when used with eligible resources, a regional external IP can be Standard Tier.

Regardless of which tier you use, the network is designed to keep traffic between VMs that are in the same region on Google's network, including when a load balancer is on the path. This is true whether the traffic uses publicly or privately routable IP addresses.

Note: Regional external IP addresses can be contacted from anywhere on the Internet. The term "regional" simply indicates that the Google Cloud resources must all be in a Google Cloud region. The tier you choose for a regional external IP address only affects the *path* that network traffic from the Internet takes when contacting the Google Cloud resource.

Google Cloud resource	Premium Tier	Standard Tier
HTTP(S) Load Balancing SSL Proxy Load Balancing TCP Proxy Load Balancing	Yes, requires a global external IP	Yes, requires a regional external IP
Network Load Balancing	Yes, requires a regional external IP	Yes, requires a regional external IP
Internal Load Balancing	Yes, always	No, internal IP addresses in a VPC network are always Premium Tier.
VM instances, including GKE node VMs	Yes, requires a regional external IP	Yes, requires a regional external IP
Cloud VPN gateways	Yes, requires a regional external IP	Not supported
Cloud NAT gateways	Yes, requires a regional external IP	Not supported

The following table illustrates how Network Service Tiers apply to Cloud Storage and Cloud CDN:

Google Cloud service	Premium Tier	Standard Tier
Cloud Storage	By default, access to Cloud Storage buckets is considered Premium Tier, whether or not the bucket is used as a backend for an HTTP(S) load balancer.	Standard Tier is an option only if you use a Cloud Storage bucket as a backend for a HTTP(S) load balancer. More information... (#tiers-gfe-lb-cloud-storage)
Cloud CDN	Cloud CDN is always Premium Tier.	You cannot use Standard Tier with Cloud CDN.

Regions supporting Standard Tier

Standard Tier is available only to resources that use regional external IP addresses in the following Google Cloud regions. To use Standard Tier for Cloud Storage buckets acting as backends for HTTP(S) Load Balancing, the HTTP(S) load balancer must use a regional external IP address and also select Standard Tier.

- `asia-east1`
- `asia-east2`
- `asia-northeast1`

- `asia-south1`
- `asia-southeast1`
- `us-west1`
- `us-west2`
- `us-central1`
- `us-east1`
- `us-east4`
- `northamerica-northeast1`
- `eu-west1`
- `eu-west2`
- `eu-west3`
- `eu-west4`

Note: Premium Tier has no regional restriction. Before the introduction of Network Service Tiers, all external connectivity was handled as if it had been Premium Tier.

Traffic routing

This table summarizes the differences in routing for each of the Network Service Tiers:

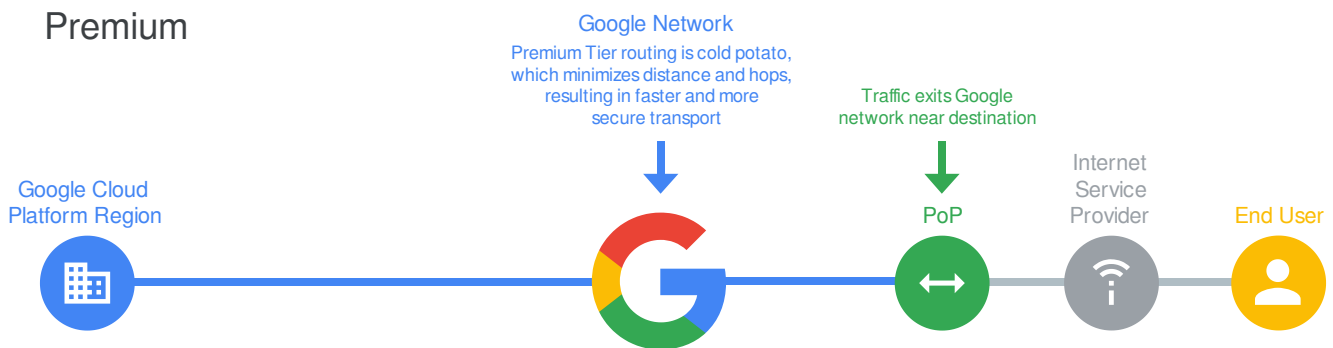
Traffic	Premium Tier	Standard Tier
Ingress to Google Cloud	Traffic from your users enters Google's network at a location nearest to them.	Traffic from your users enters Google's network through peering, ISP, or transit networks in the region where you have deployed your Google Cloud resources.
Egress from Google Cloud	<p>cold potato routing (https://wikipedia.org/wiki/Hot-potato_and_cold-potato_routing#Cold-potato_routing)</p> <p>Egress traffic is sent through Google's network backbone, leaving at a global edge peering or transit network local to the POP closest to your users.</p>	<p>hot potato routing (https://wikipedia.org/wiki/Hot-potato_and_cold-potato_routing#Hot-potato_routing)</p> <p>Egress traffic is sent to the Internet via a peering or transit network local to the POP closest to your users.</p>

Google Cloud region from which it originates.

Premium Tier

Premium Tier delivers traffic from external systems to Google Cloud resources using Google's low latency, highly reliable global network. This network consists of the most extensive private fiber network with over 100 points of presence (POPs) (<http://peering.google.com/>) around the globe. This network is designed to tolerate multiple failures and disruptions while still delivering traffic.

Premium Tier supports both regional external IPs and global external IPs for VM instances and load balancers. All global external IP addresses must use Premium Tier. Applications that require high performance and availability, such as those that use HTTP(S), TCP Proxy, and SSL Proxy load balancers with backends in more than one region, require Premium Tier. Premium Tier is ideal for customers with users in multiple locations worldwide who need the best network performance and reliability.



(<https://cloud.google.com/network-tiers/images/tiers-premium.svg>)

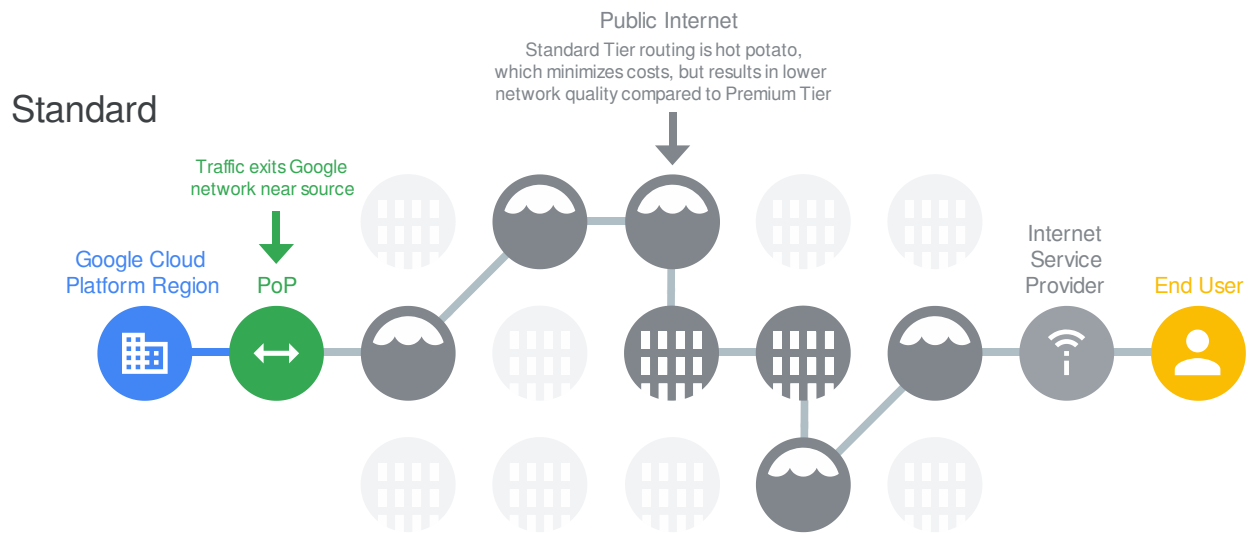
Routing path for Premium Tier (click to enlarge)

With Premium Tier, incoming traffic from systems on the Internet enters Google's high-performance network at the POP closest to the sending system. Within Google's network, traffic is routed from that POP to the VM in your VPC network or closest Cloud Storage bucket. Outbound traffic is sent through Google's network, exiting at the POP closest to its destination. This routing method minimizes congestion and maximizes performance by reducing the number of hops between end users and the POPs closest to them.

Standard Tier

Standard Tier delivers traffic from external systems to Google Cloud resources by routing it over the Internet. It leverages the double redundancy of Google's network only up to the point where Google's data center connects to a peering metro. Packets that leave Google's network are delivered using a transit provider, and are subject to the reliability of that ISP. Standard Tier provides network quality and reliability comparable to that of other Cloud providers.

Regional external IP addresses can use either Premium Tier or Standard Tier.



(<https://cloud.google.com/network-tiers/images/tiers-standard.svg>)

Routing path for Standard Tier (click to enlarge)

Standard tier is priced lower than Premium Tier because traffic from systems on the Internet is routed over transit (ISP) networks before being sent to VMs in your VPC network or regional Cloud Storage buckets. Standard tier outbound traffic normally exits Google's network from the same region used by the sending VM or Cloud Storage bucket, regardless of its destination. In rare cases, such as during a network event, traffic may not be able to travel out the closest exit and may be sent out another exit, perhaps in another region.

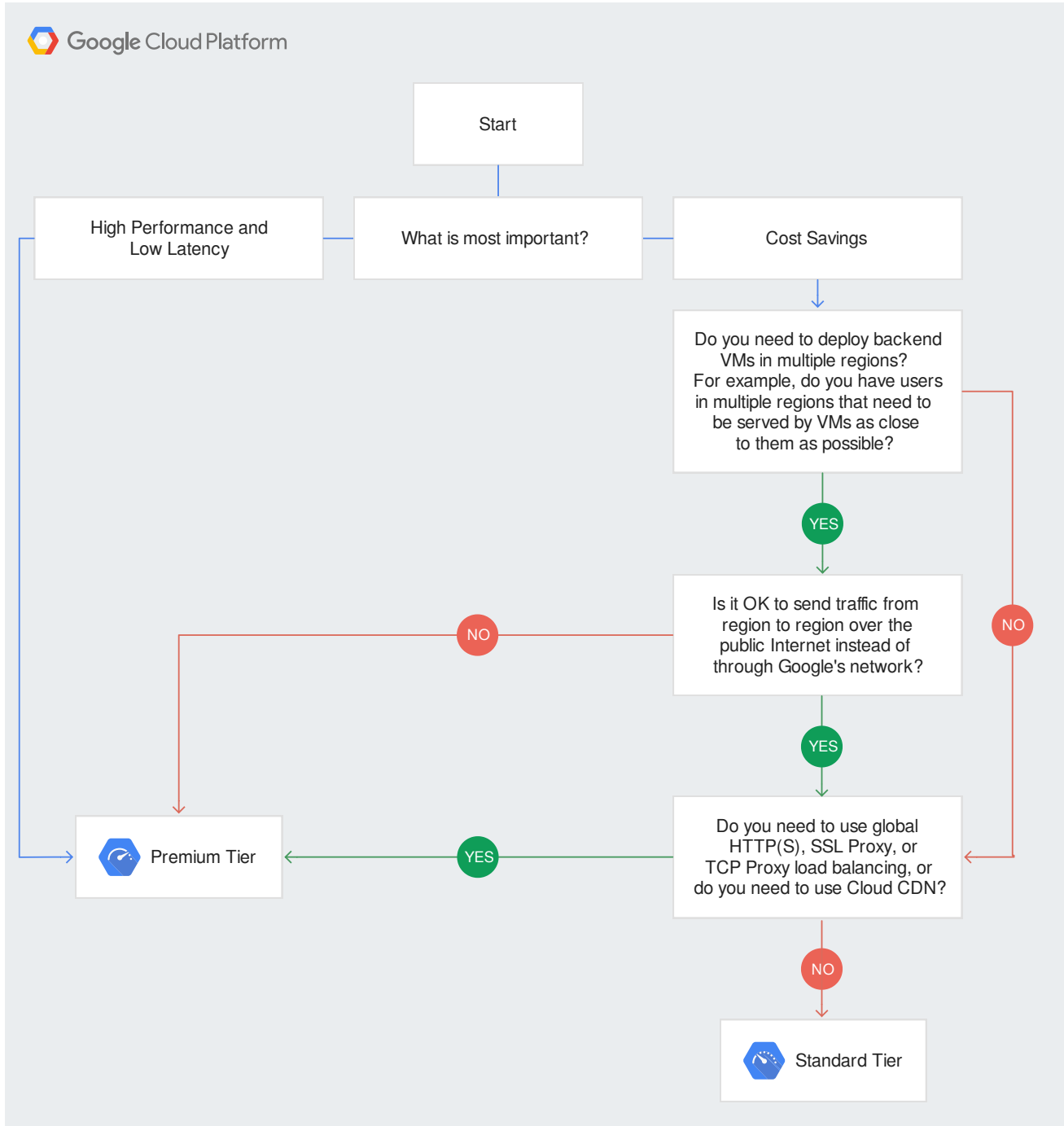
Standard Tier offers a lower-cost alternative for these use cases:

- You have applications that are not latency or performance sensitive
- You're deploying VM instances or using Cloud Storage that can all be within a single region

Choosing a tier

It is important to use the right tier to meet your needs.

The following decision tree can help you decide which of the Network Service Tiers is right for your use case. Because you choose a tier at the resource level – such as the external IP address for a load balancer or VM – you can use Standard Tier for some resources and Premium Tier for others. If you are not sure what tier to use, choose Premium Tier, which is the default.



(<https://cloud.google.com/network-tiers/images/tiers-choosing.svg>)

Network Service Tiers decision tree (click to enlarge)

- **Project-level (Default: Premium Tier)**
 - Specify tier at the project level
- **Resource-level (Default: Premium Tier)**

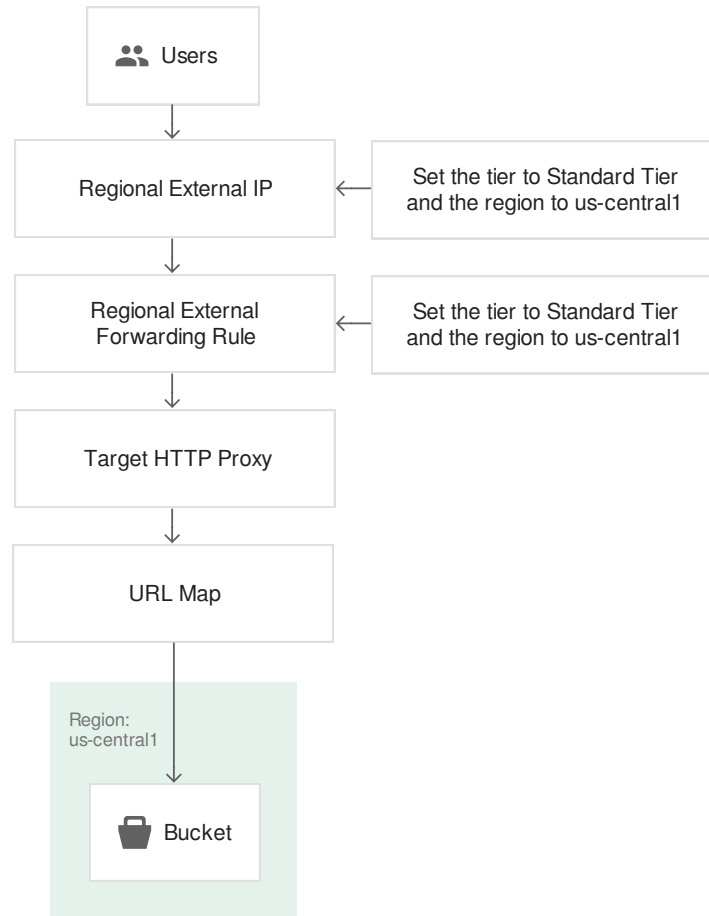
- Load Balancing: Enable for a forwarding rule
- Instance: Enable for a VM or instance template
- Other resource-level knobs in the future

The final tier for a resource is determined as follows:

- If a tier is configured for either a resource or the project in which the resource resides, then that tier applies to the resource.
- If tiers are configured for both the project and the resource, then the resource-level tier takes precedence for that resource.

Using the Standard Service Tier with Cloud Storage

To use the Standard Service Tier with Cloud Storage, you must configure your storage bucket as the backend of the cloud load balancer. The Cloud Storage bucket must be in the same region as the forwarding rule. If they are in different regions, requests to the bucket produce an error. To use multi-regional Cloud Storage buckets as backends, you must use Premium Tier.



(<https://cloud.google.com/network-tiers/images/tiers-storage.svg>)
 Cloud Storage and load balancing (click to enlarge)

Upgrading resource from Standard to Premium Tier

We designate separate pools of public, external IP addresses for Premium and Standard Tier. Each pool is a separate contiguous range of IPs.

When an IP address is configured for an instance or load balancer, it is allocated from either of these two pools based on the Network Service Tier in effect for that resource.

Two separate pools for Premium and Network Service Tiers entail the following:

- If you change the tier of an instance with an ephemeral IP address, the IP address of the instance changes as well.
- An IP from one pool cannot be moved to the other pool.

- IP addresses in the Standard Tier in one region can not be moved to another region even if the tier remains the same.

Configuring Standard Tier for load balancing

Configuring Standard Tier for TCP/UDP Network Load Balancing

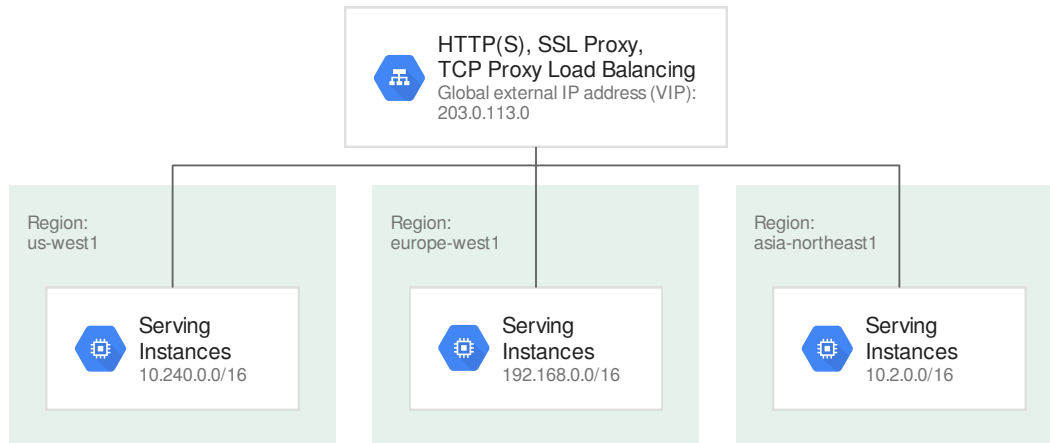
To configure a network load balancer to use the Standard Tier, specify the Standard Tier when creating the [address](#) (#creating-static-external-addresses) and [forwarding rule](#) (#creating-forwarding-rules) for the load balancer.

If you want to change an existing load balancer from Premium Tier (the default) to Standard Tier, or vice versa, you must delete the existing load balancer forwarding rule, then create a new one that points to the existing target pool. You must also use a Standard Tier address with the Standard Tier forwarding rule.

Configuring Standard Tier for HTTP(S) LB and TCP/SSL Proxy

If you do not specify a network tier, your load balancer defaults to using the Premium Tier. All load balancers which existed prior to the introduction of Network Service Tiers use the Premium Tier. The Premium Tier enables global load balancing, where a single IP address can point to backends in regions around the world. The Standard Tier is a regional service only. In order to use the Standard Tier, your load balancer must meet the following criteria:

- it must use a Standard Tier regional IP [address](#) (#creating-static-external-addresses)
- it must use a Standard Tier regional [forwarding rule](#) (#creating-forwarding-rules)
- it can have backends in the region that contains the forwarding rule only.



(<https://cloud.google.com/network-tiers/images/tiers-global-lb-premium.svg>)

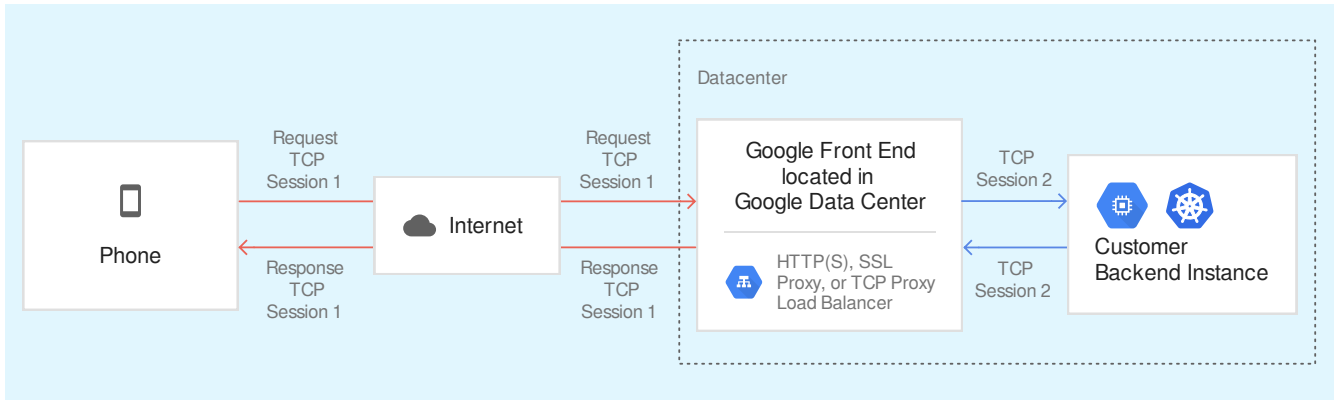
Premium Tier global load balancer (click to enlarge)

Standard Tier HTTP(S), SSL Proxy, and TCP Proxy Load Balancing

To use Standard Tier with a HTTP(S), SSL Proxy, or TCP Proxy load balancer, you must decide upon a **single** Google Cloud region, then use a *regional external IP address* and a *regional forwarding rule*, both configured for Standard Tier, to point to the appropriate target HTTP(S) proxy, target SSL proxy, or target TCP proxy.

The IP address of the load balancer is still external, so clients from anywhere on the Internet can send traffic to it, but all of your backends must be located in the region you chose.

With Standard Tier, traffic sent to the load balancer traverses the Internet until it reaches a transit peering point at the Google Cloud region you have chosen for the load balancer. A GFE acts as the proxy, terminating HTTP(S), SSL, or TCP, then contacting backends in your chosen region. Because all of your backend VMs are located in one region, the traffic from the original client to the GFE is subject to additional hops and potential latency.

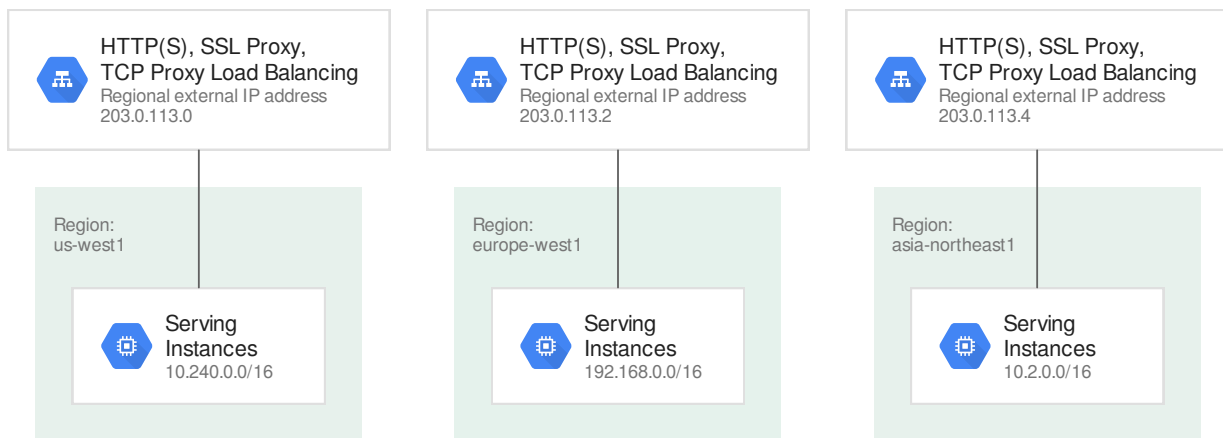


(<https://cloud.google.com/network-tiers/images/tiers-edge-backbone.svg>)

Standard Tier TCP sessions (click to enlarge)

Important: Standard Tier changes the behavior of HTTP(S), SSL Proxy, and TCP Proxy load balancers so that they operate like those of other Cloud providers. Standard Tier eliminates the ability for these types of load balancers to operate in multiple Google Cloud regions.

The following diagram illustrates the regional nature of HTTP(S), SSL Proxy, or TCP Proxy load balancers when configured using Standard Tier. Three separate load balancers manage traffic for backends each in a single region. Each load balancer has its own regional external IP address. The region used for that IP address and forwarding rule matches the region where the backend VMs are located.



(<https://cloud.google.com/network-tiers/images/tiers-regional-lb-standard.svg>)

Standard Tier regional load balancer (click to enlarge)

When creating a regional address resource in the Standard Tier, you must specify the network tier of the regional external IP as Standard. Once the network tier is set to Standard, it cannot be updated to Premium. To change a load balancer to Premium Tier, you must reserve a new Premium Tier address.

If you want to change an existing load balancer from Premium Tier (the default) to Standard Tier, you must do the following:

1. Remove any backends that are in regions other than the one that will contain your forwarding rule the existing load balancer
2. Delete the existing forwarding rule and address, then create new Standard Tier regional ones that points to the existing target proxy.

Upgrading large volumes of traffic from Standard to Premium tier

It is important to correctly identify and use the tier that best suits your requirements.

Here are two important restrictions you should factor into your selection:

- You cannot use Premium networking as a backup for Standard. If during an outage for Standard networking (for example, due to a fiber cut) you reclassify your traffic as Premium, it will be treated as Standard for the duration of the outage.
- If you plan on moving significant amounts of traffic (>5Gbps) from Standard to Premium independent of an outage, you will need to contact your account manager.

Premium and Standard Tiers Recap

	Premium	Standard
Use Case	Performance optimized Global Network Global Network Services	Cost optimized Regional Network Regional Network Services
NetworkRouting	Inbound: Traffic across the globe enters Google's Global network at a location near your user.	Inbound: Traffic enters Google's network via peering or transit only in the region you have deployed the destination Google Cloud resources in.

	<p>Outbound: cold potato</p> <p>Your traffic rides Google's high-quality global backbone network to egress at Google's global edge POP closest to your user.</p>	<p>Outbound: hot potato</p> <p>Traffic is sent to the internet via peering or transit that is local to the Google Cloud region where the traffic originates.</p>
Network HTTP(S) Services Load Balancing	<ul style="list-style-type: none"> • Global • Supports backend VMs in any region • Global anycast - uses a single IP address worldwide • Terminates TCP close to the user as possible, worldwide 	<ul style="list-style-type: none"> • Regional (new) • Supports backend VMs in a single region • To support multiple regions, requires DNS and multiple Google Cloud load balancers (one Google Cloud load balancer per region) • Terminates TCP in the destination region
TCP Proxy and SSL Proxy	<ul style="list-style-type: none"> • Global • Supports backend VMs in any region • Global anycast - uses a single IP address worldwide • Terminates TCP close to the user as possible, worldwide 	<ul style="list-style-type: none"> • Regional (new) • Supports backend VMs in a single region • To support multiple regions, requires DNS and multiple Google Cloud load balancers (one Google Cloud load balancer per region) • Terminates TCP in the destination region
Network Load Balancing (TCP/UDP)	Regional Network Load Balancing + Premium Tier	Regional Network Load Balancing + Standard Tier (new)
Internal TCP/UDP Load Balancing	Regional	Standard Tier is not available for internal TCP/UDP load balancers.
CDN	Only Premium Tier	Standard Tier is not available for Cloud CDN.
Pricing	\$/GB based on usage	\$/GB based on usage
	Premium costs more than Standard	Standard is priced lower than Premium
	Pricing details https://cloud.google.com/network-tiers/pricing	Pricing details https://cloud.google.com/network-tiers/pricing

FAQ

Q. Which network tier does Google recommend using for my network services on GCP?

We recommend the Premium Tier so you can deliver your services on Google's high-quality network and leverage premium cloud network services such as Global Load Balancing and Cloud CDN. If you do not explicitly select a Network Tier, you will use Premium Tier by default.

Q. How can I switch from Standard Tier back to Premium Tier for my load balancer?

You should first create a new Load Balancer forwarding rule using a Premium Tier IP. You can then use DNS to slowly migrate traffic from your current Standard Tier IP(s) to the new Premium Tier IP. Once the migration is complete, you can release the Standard Tier IP(s) and the regional Load Balancer(s) associated with them. You do not need to change your backends since you can have multiple Load Balancers pointing to the same backends.

Q. What are the relative costs of using Premium Tier vs. Standard Tier?

Standard tier is priced lower than Premium Tier for \$/GB. Review pricing details [here](https://cloud.google.com/network-tiers/pricing) (<https://cloud.google.com/network-tiers/pricing>).

Q. Will there be additional tiers in the future?

Google Cloud currently offers two tiers, and this documentation will be updated if we decide to launch additional tiers.

Q. I want to test the performance of Premium and Standard. Which configuration do you recommend testing with?

You can test performance with either tier, depending on your needs.

Q. Can I apply Standard Tier to internal (RFC 1918) traffic within a VPC network?

You can enable Standard Tier for Internet-facing traffic on external (public) IP addresses. Standard Tier doesn't support traffic within a Google Cloud VPC network. VM instances that communicate using internal IP addresses within VPC networks always use Premium Tier.

What's next

- See [Using Network Service Tiers](#) (<https://cloud.google.com/network-tiers/docs/using-network-service-tiers>) for instructions on using Network Service Tiers.

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