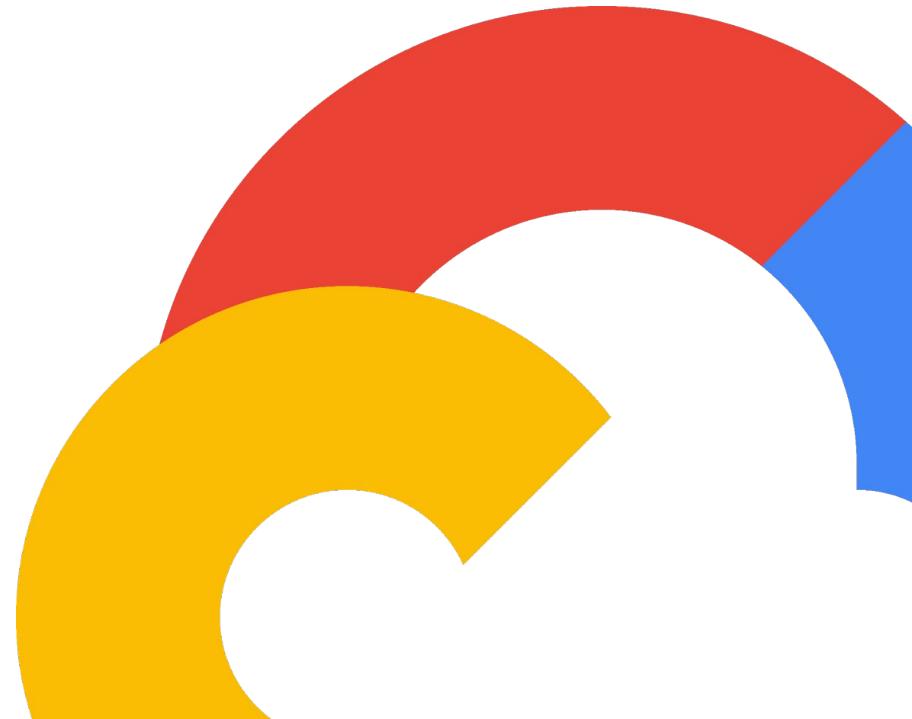


Observability

2025



Google Cloud

Contents

Overview	01
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Logs	03
Monitoring	04
Alerting	05
Dashboards	06



01

Overview

Cloud Ops: Observability in GCP & Beyond



Cloud Monitoring

Time series metrics for 60+ GCP services and beyond, synthetic monitoring, SLO measurements and easy dashboard creation



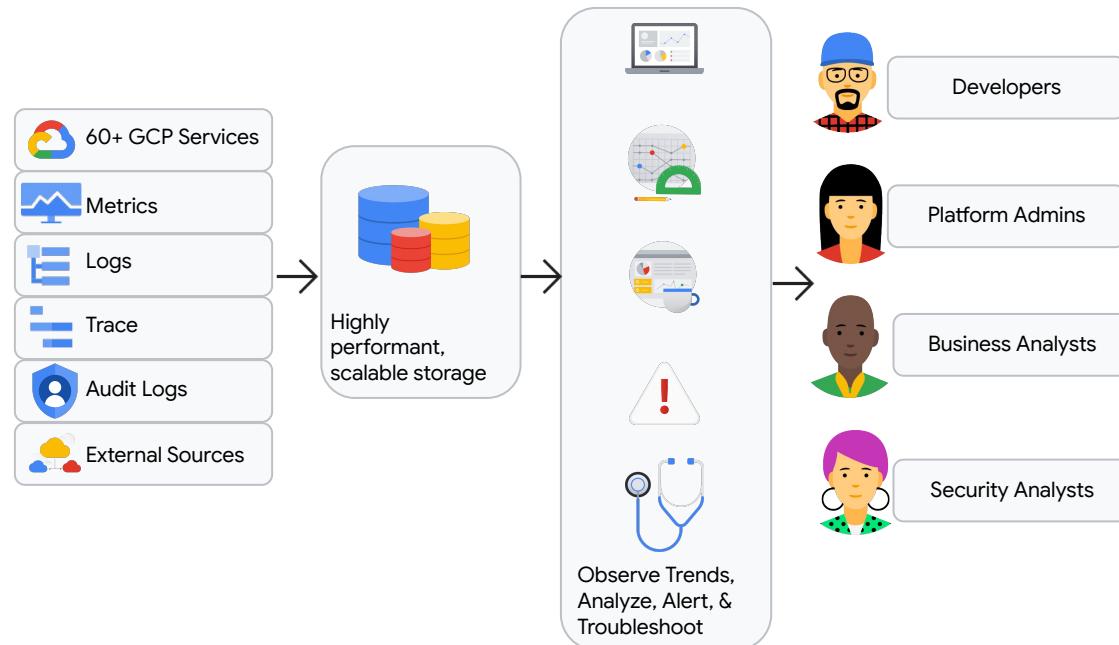
Cloud Logging

Logs and events from GCP sources and beyond, flexible routing, compliant storage, and exploratory tools for trends and insights



Additional Features

Tracing for end to end visibility, and flexible alerting



Cloud Monitoring



Automatic, free ingestion

On 60+ GCP services, over 5,000 metrics are immediately available with no cost



Open Source Standards

Leverages Prometheus and Open Telemetry to collect metrics across compute workloads



Customizable for key workloads

Tune with Managed Service for Prometheus on GKE and Cloud Ops Agent on GCE



In-context visualizations & alerts

View relevant telemetry data alongside your workloads across GCP

Cloud Logging



Automatic, easy log ingestion

Immediate ingestion from GCP services across your stack



Gain insight quickly

Tools like Error Reporting, Log Explorer, and Log Analytics let you quickly focus from large sets of data



Customize routing & storage

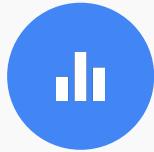
Route your logs to the region or service of your choice for additional compliance or business benefits



Compliance Insights

Leverage audit and app logs for compliance patterns and issues

Cloud Trace



Fast, automatic issue detection

Continuously gather & analyze trace data from your project; diagnose latency issues and errors quickly



Open Source Standards

Cloud Trace is compatible with Open Telemetry with popular language support



Prioritize your bottlenecks

Recognize where your customers are most impacted, and prioritize your team's focus

Google Cloud Service Health

<https://status.cloud.google.com/>

Overview Americas (regions) Europe (regions) **Asia Pacific (regions)** ⚙

Check status by region and product in Asia Pacific.

Available Service information Service disruption Service outage

Products	asia-east1 Taiwan	asia-east2 Hong Kong	asia-northeast1 Tokyo	noi
Access Context Manager	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Agent Assist			<input checked="" type="checkbox"/>	
AI Platform	~	~	~	



Service Health API

[Google](#)

Gain visibility into service disruptions impacting Google Cloud products.

ENABLE



Service Health

Google Cloud Incidents

[PREVIEW](#)

Displaying incidents for the "cloud-ops-sandbox-399003" project.

Filter Filter events

Event state ↑ Detailed state ? Relevance ? Title Impacted products

No rows to display

<https://cloud.google.com/service-health>

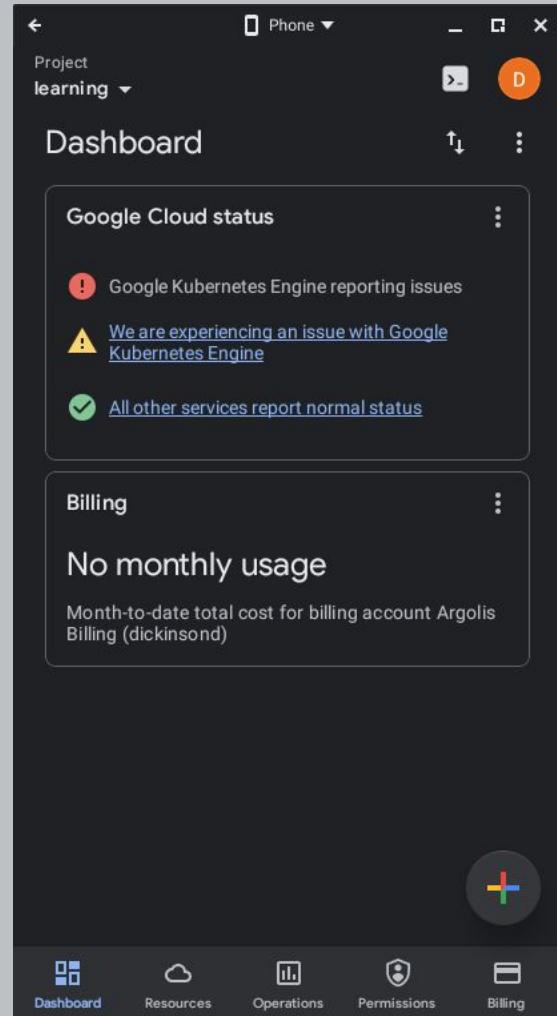
Google Cloud App

Quickly access your cloud environment

- Service status
- Billing
- Operations and Alerts
- Manage resources

<https://cloud.google.com/app>

Google Cloud





Labs

This learning path guides you through a curated collection of on-demand courses, labs, and skill badges that provide you with real-world, hands-on experience using Google Cloud technologies essential to the DevOps Engineer role. Once you complete the path, check out the Google Cloud DevOps Engineer certification to take the next steps in your professional journey.

<https://www.cloudskillsboost.google/parts/20>



02 Costs

Cost optimization

[Cost optimization for Google Cloud's operations suite](#)

Consider elements such as:

- Application-level logging
- Log retention
- Excluding/filtering logs
- Volume of metrics
- Sampling for Trace (Open Telemetry)

Review billing reports as part of your DevFinOps

Cloud Logging

See Appendix for Scenarios

Feature	Price ¹	Free allotment per month
Logging ingestion	\$0.50/GiB	First 50 GiB/project/month
Logging retention	\$0.01/GiB for logs retained past 30 days	Logs retained for the default retention period don't incur a retention cost.

Cloud Monitoring

Feature	Price ¹	Free allotment per month
Monitoring data <small>Except for data ingested by using Managed Service for Prometheus</small>	\$0.2580/MiB: 150–100,000 MiB \$0.1510/MiB: 100,000–250,000 MiB \$0.0610/MiB: >250,000 MiB	All non-chargeable Google Cloud metrics ² First 150 MiB per billing account for chargeable metrics
Monitoring API calls	\$0.01/1,000 Read API calls (Write API calls are free)	First 1 million Read API calls included per billing account
Google Cloud Managed Service for Prometheus	\$0.06/million samples†: first 0-50 billion samples ingested# \$0.048/million samples: next 50-250 billion samples ingested \$0.036/million samples: next 250-500 billion samples ingested \$0.024/million samples: >500 billion samples ingested	NA
Execution of Monitoring uptime checks	\$0.30/1,000 executions	1 million executions per Google Cloud project
Execution of Monitoring Synthetic Monitors	\$1.20/1,000 executions (+ other service costs such as Cloud Functions)	100 executions per billing account

Google Cloud 1. <https://cloud.google.com/stackdriver/pricing#binary-units>.
2. <https://cloud.google.com/stackdriver/pricing#monitoring-costs>

Monitoring - non-chargeable metrics

Metric data from Google Cloud, GKE Enterprise, and Knative isn't chargeable.

Non-chargeable (free) metrics include the following:

- [Google Cloud metrics](#). For additional information, see [Footnote 2](#).
- [GKE Enterprise metrics](#). For additional information, see [Footnote 2](#).
- [Istio metrics](#)
- [Knative metrics](#)
- [Google Kubernetes Engine system metrics](#)
- [agent.googleapis.com/agent/ metrics](https://agent.googleapis.com/agent/metrics)

Alerting policies

Price	Free allotment per month
\$1.50 per month for each condition in an alerting policy	NA
\$0.35 per 1,000,000 time series returned by the query of a metric alerting policy condition	

Cloud Trace

Feature	Price	Free allotment per month
Trace ingestion	\$0.20/million spans	First 2.5 million spans

Cloud Profiler

Cost

There is no cost associated with using Cloud Profiler



03 Logs



Logging

Cloud Logging automatically collects logs from Google Cloud resources.

You can also collect logs from your applications, on-prem resources, and resources from other cloud providers.

Ops Agents is used in GCE instances for collecting:

- Logs via fluentbit
- Metrics via OpenTelemetry

GKE deploys a per-node logging agent (fluentbit) that reads container logs, adds helpful metadata, and then stores them in Cloud Logging.

- GKE Standard: You can run a customized fluentbit agent - e.g. removing sensitive data from your logs.
- Autopilot:
 - System logs
 - Workload logs
 - Admin Activity audit logs
 - Data Access audit logs

Routing

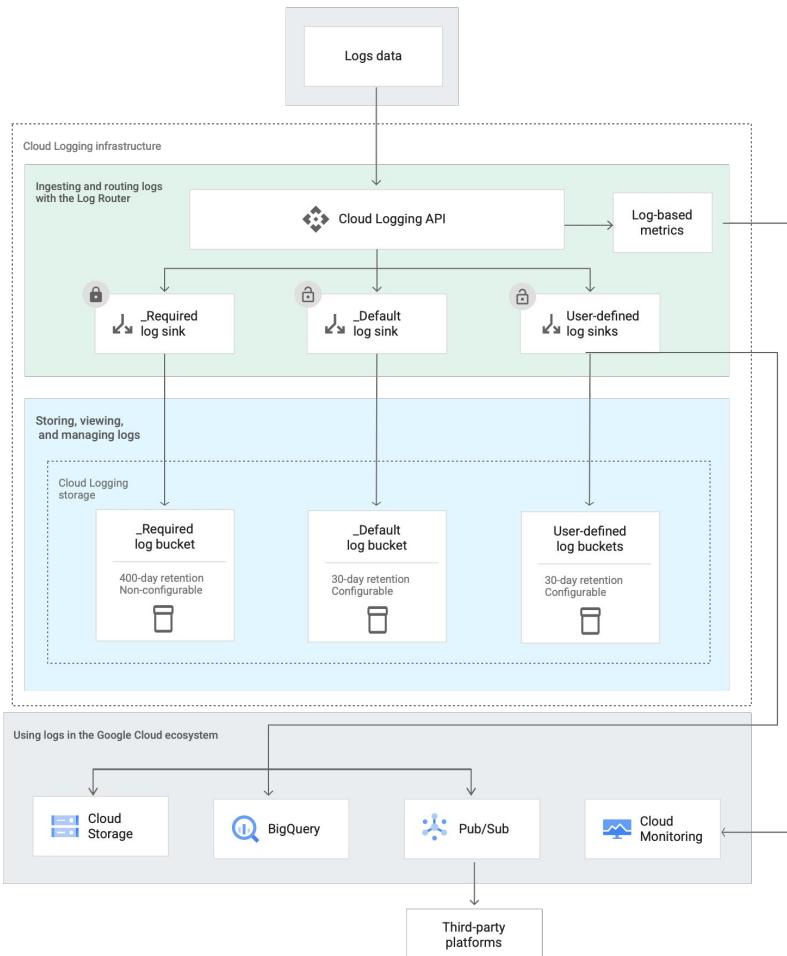
Logs can be routed to a variety of sinks:

- Cloud Storage
- BigQuery
- PubSub topic

Two predefined sinks for each Cloud project, billing account, folder, and organization:

- Required (400 days, change not allowed)
- Default (30-day default; Custom retention between 1 day and 3650 days)

Use inclusion/exclusion filters to specify what's routed



Structured logging

Log using JSON-based log entries to improve queriability

Structured logging refers to log entries that use the jsonPayload field to add structure to their payloads - rather than textPayload - so content is indexed

You can use the Cloud Logging client libraries ...or log to stderr/stdout with a logging package from your programming language - e.g.

- Go: [slog](#)
- Python: [structlog](#)



The structlog mascot

```
{  
  "insertId": "42",  
  "jsonPayload": {  
    "message": "There was an error in the application",  
    "time": "2019-10-12T07:20:50.52Z"  
  },  
  "httpRequest": {  
    "requestMethod": "GET"  
  },  
  "resource": {  
    "type": "k8s_container",  
    "labels": {  
      "app": "my-app",  
      "version": "v1.0"  
    }  
  }  
}
```

Log-based metrics

Derive metric data from the content of log entries - e.g.

- Count the number of log entries that contain a particular message
- Extract latency information recorded in log entries

Data types:

- Counter: # of log entries in a period
- Distribution: collect into histogram buckets
- Boolean: True if query matches a log entry, false otherwise

User-defined metrics			
		 CREATE METRIC	 DELETE
Filter user-defined metrics			
Enabled	Name ↑	Type	
<input type="checkbox"/>	200Responses	Counter	
<input type="checkbox"/>	200Responses.dot.check		
<input type="checkbox"/>	404Errors		

 View metric details

 Edit metric

 Disable metric

 Delete metric

 View logs for metric

 View in Metrics Explorer

 Create alert from metric

Cloud Audit Logs

Google Cloud services write audit logs to help you answer the questions, "Who did what, where, and when?" within your Google Cloud resources.

The following types of audit logs are available for Logging:

- **Admin Activity audit logs:** actions that modify the configuration or metadata of resources
- **Data Access audit logs:** calls that read the configuration or metadata of resources
- **System Event audit logs:** are generated by Google systems
- **Policy Denied audit logs:** are recorded when a Google Cloud service denies access to a user or service account because of a security policy violation.

You can't disable Admin Activity, Policy Denied or System Event audit logs. To receive Data Access audit logs, you must explicitly enable them.

Audit log type	Configurable	Chargeable
Admin Activity audit logs	No; always written	No
Data Access audit logs	Yes	Yes
Policy Denied audit logs	Yes; you can exclude these logs from ingestion	Yes
System Event audit logs	No; always written	No

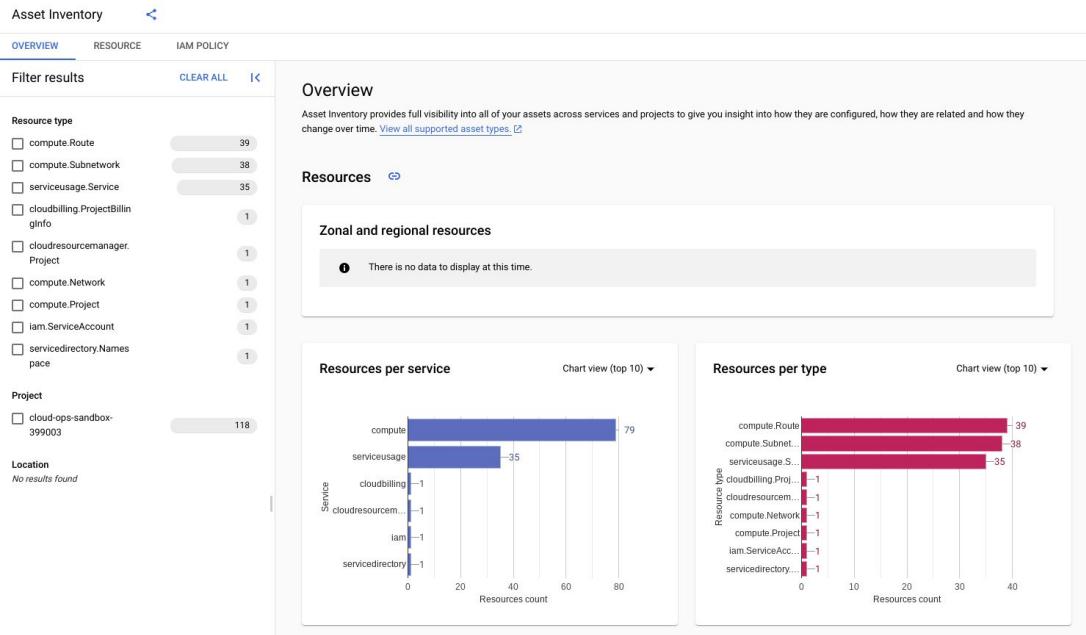
Asset Inventory

Cloud Asset Inventory provides inventory services based on a time series database.

Search assets and monitor asset changes

Export asset history to BigQuery or Cloud Storage

Data is kept for 35-days or the last asset status





Error Reporting

Error Reporting aggregates errors produced in your running cloud services

How?

- Errors reported by the Error Reporting API (e.g. via client libraries) or
- Log entries inferred to be errors when Error Reporting inspects for common text patterns such as stack traces

You can configure Error Reporting to send error notifications to selected Cloud Monitoring notification channels

The screenshot shows the Google Cloud Error Reporting interface. At the top, there are navigation links: OPEN, ACKNOWLEDGED, AUTO RELOAD, ALL SERVICES, ALL VERSIONS, and CONFIGURE NOTIFICATIONS. Below this is a search bar labeled "Filter errors". A time range selector shows "1 hour", "6 hours", "1 day" (which is checked), and "30 days". A legend indicates that red dots represent "OPEN" errors and black dots represent "ACKNOWLEDGED" errors. The main area lists three errors:

Resolution Status	Occurrences	Error	Seen In	Type	First Seen	Last Seen	Response Code	Issue Link
OPEN	15	IndexOutOfBoundsException: Index: 4, Size: 4 658 ArrayList.java.util.ArrayList.rangeCheck()	default:20160622135605	Application error	Feb 23, 2016	1 day ago	200	View Logs
OPEN	433	RuntimeException: Possible XSS attack: "1634954608607" javascript:xssdetected(2402... 51 MarkovTemplate.java:com.callbyref.demos.markov.MarkovTemplate.generate()	default:20160622135605	Application error	Jan 19, 2016	1 hour ago	200	View Logs
ACKNOWLEDGED	1117	ArrayIndexOutOfBoundsException: -1 162 MarkovServlet.java:com.callbyref.demos.markov.MarkovServlet.normalizeReq()	default:20160622135605	Application error	Jan 19, 2016	1 hour ago	200	View Logs

The screenshot shows the "Error Group Details" page for an "IndexOutOfBoundsException: Index: 4, Size: 4" error. At the top, there are navigation links: OPEN, AUTO RELOAD, ALL SERVICES, and ALL VERSIONS. Below this is a search bar labeled "Filter errors" and a time range selector showing "1 hour", "6 hours", "1 day", "7 days", and "30 days" (which is checked). The main area shows the error details: Resolution Status (Open), Occurrences (15), Seen In (default:20160622135605), Response Code (200), First Seen (Feb 23, 2016), and Last Seen (1 day ago). There is also a "Link to issue" button.

Below this is a timeline chart showing the occurrence of the error over time. The x-axis represents dates from Sat 09 to Fri 05. The y-axis represents the number of occurrences, ranging from 0 to 5. The chart shows a significant spike in errors on Feb 21.

Sample stack trace:

PARSED	RAW
java.lang.IndexOutOfBoundsException: Index: 4, Size: 4 at com.callbyreference.demos.markov.MarkovTemplate.generate (com.callbyreference.demos.markov.MarkovTemplate.java:76) at com.callbyreference.demos.markov.MarkovTemplate.generateBegin (com.callbyreference.demos.markov.MarkovTemplate.java:113) at com.callbyreference.demos.markov.Template.generate (com.callbyreference.demos.markov.Template.java:20) at com.callbyreference.demos.markov.Template.generate (com.callbyreference.demos.markov.Template.java:22) at com.callbyreference.demos.markov.Template.generate (com.callbyreference.demos.markov.Template.java:22) at com.callbyreference.demos.markov.Template.generate (com.callbyreference.demos.markov.Template.java:57) at com.callbyreference.demos.markov.MarkovTemplate.generate (com.callbyreference.demos.markov.MarkovTemplate.java:57) at com.callbyreference.demos.markov.MarkovTemplate.generate (com.callbyreference.demos.markov.MarkovTemplate.java:115)	SHOW ALL

Recent samples [Learn more](#)

11/4/21, 10:00 PM	IndexOutOfBoundsException: Index: 4, Size: 4	GET grimm-git.appspot.com/?seed=1636077404975&vote=http://metadata.google.inter... 200	View Logs ▾
11/2/21, 10:09 PM	IndexOutOfBoundsException: Index: 4, Size: 4	GET grimm-git.appspot.com/?seed=1635904565421&vote=meh 200	View Logs ▾
10/27/21, 10:25 PM	IndexOutOfBoundsException: Index: 4, Size: 4	GET grimm-git.appspot.com/?seed=1635386336944&vote=script:xssdetected(244272125... 200	View Logs ▾
10/26/21, 10:14 PM	IndexOutOfBoundsException: Index: 4, Size: 4	GET grimm-git.appspot.com/?seed=1635300015009&vote=lol 200	View Logs ▾
10/24/21, 10:25 PM	IndexOutOfBoundsException: Index: 4, Size: 4	GET grimm-git.appspot.com/?seed=1635128199164&vote=meh 200	View Logs ▾

Query Language

You query logs via the console and through the CLI

[Google API formal specifications for filtering](#)

[Sample queries](#)

The screenshot shows the Google Cloud Logs Explorer interface. At the top, there are navigation links: 'Logs Explorer', 'OPTIONS ▾', 'REFINE SCOPE' (with a scope icon), 'Project' (highlighted in blue), 'SHARE LINK', and 'LEARN'. Below the header, there are tabs for 'Query' (highlighted in blue), 'Recent (31)', 'Saved (46)', 'Suggested (11)', 'Library', and 'Clear query' (with a trash bin icon). To the right of these are 'Save' (with a save icon), 'Stream logs', and 'Run query' (highlighted in blue). Further down, there are buttons for 'Last 1 hour' (with a clock icon) and 'Search all fields' (with a magnifying glass icon). On the right, there are dropdown menus for 'Audited Resource' (with a dropdown arrow), 'Log name' (with a dropdown arrow), 'Notice' (with a dropdown arrow), and a 'Show query' toggle switch (which is turned on). Below these controls, the query text is displayed in two lines: '1 resource.type="audited_resource"' and '2 severity="notice"'. At the bottom left, it says 'Google Cloud', and at the bottom right, it says 'Proprietary & Confidential 27'.

Log Analytics

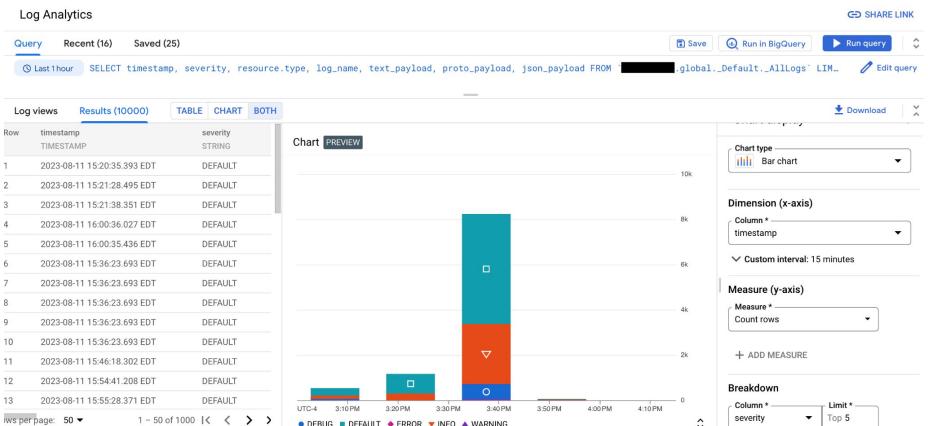
Logs Explorer doesn't support aggregate operations, like counting the number of log entries that contain a specific pattern.

To perform aggregate operations, enable analytics on the log bucket and then use Log Analytics SQL.

Log Analytics also let you use BigQuery to query your data

Double check the [restrictions](#)

[Sample SQL Queries](#)



[Charts feature is in preview](#)



04 Monitoring



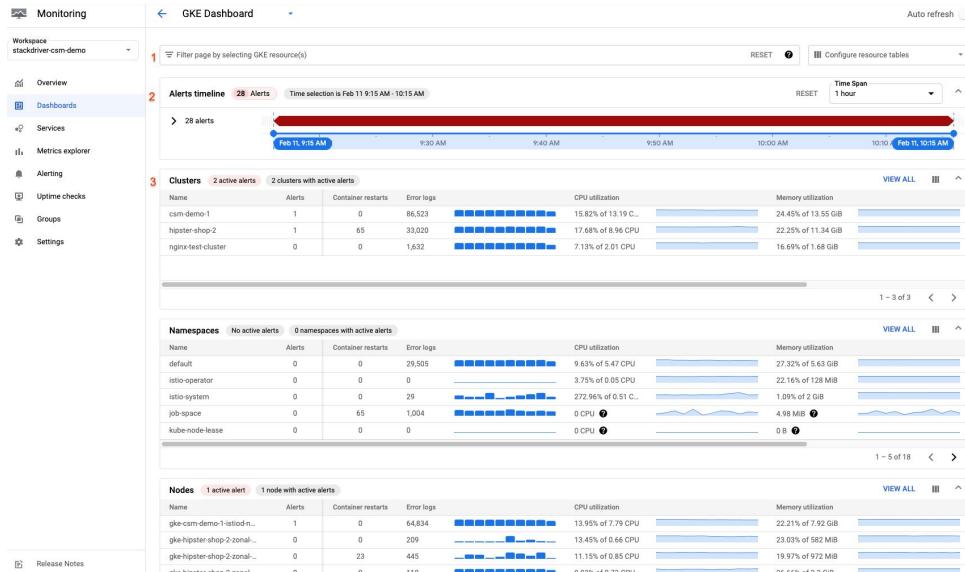
Monitoring

Cloud Monitoring collects metrics, events, and metadata from Google Cloud, Amazon Web Services (AWS), hosted uptime probes, and application instrumentation.

Using the BindPlane service, you can also collect this data from over 150 common application components, on-premise systems, and hybrid cloud systems.

Features:

- Log-based metrics
- Charts and dashboards - predefined and custom
- View and monitor the time-series data for multiple Google Cloud projects and AWS accounts through a single interface, configure a multi-project metrics scope.
- [PromQL](#) provides an alternative to the Metrics Explorer menu-driven interfaces
- Alerting policies let you know when a service isn't meeting criteria



MQL → PromQL

On **October 22, 2024**, [Monitoring Query Language \(MQL\)](#) will no longer be a recommended query language for Cloud Monitoring.

- On October 22, 2024, certain usability features will be turned off.
- On July 22, 2025, MQL will no longer be available for new dashboards and alerts in the Google Cloud console, and Google Cloud customer support will end. Existing MQL dashboards and alerts will continue to work, and you will still be able to create MQL dashboards and alerts using the Cloud Monitoring API.

We recommend moving to [PromQL](#), the open-source standard for querying time series. PromQL offers similar functionality to MQL, with a wider user base and more community resources.

<https://cloud.google.com/stackdriver/docs/deprecations/mql>

Multi-project scopes

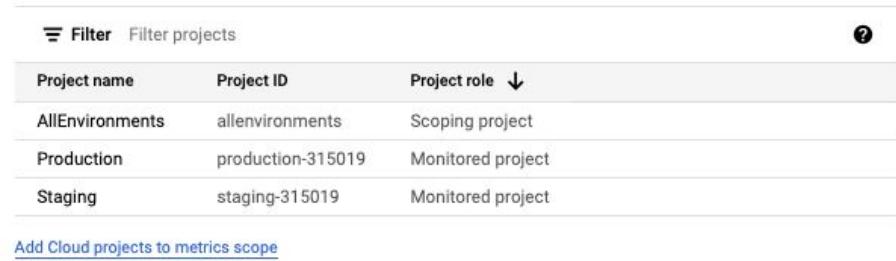
Monitoring lets you view and manage metrics in the following ways:

- For a single project
- For multiple projects within a single organization
- For multiple projects across multiple organizations
- For multiple Google Cloud projects and AWS accounts

A *scoping project* hosts a metrics scope.

Configure a project with no resources to host a multi-project scope

Metrics monitored by this project



The screenshot shows a table titled 'Metrics monitored by this project'. At the top left is a 'Filter' button and a 'Filter projects' dropdown. To the right is a help icon (question mark). The table has three columns: 'Project name', 'Project ID', and 'Project role'. The rows show three projects: 'AllEnvironments' (Project ID: allenvironments, Project role: Scoping project), 'Production' (Project ID: production-315019, Project role: Monitored project), and 'Staging' (Project ID: staging-315019, Project role: Monitored project). Below the table is a blue link: 'Add Cloud projects to metrics scope'.

Project name	Project ID	Project role
AllEnvironments	allenvironments	Scoping project
Production	production-315019	Monitored project
Staging	staging-315019	Monitored project

[Add Cloud projects to metrics scope](#)

The projects listed below can view this project's metrics

This project's metrics are visible only in this project

Resource Groups

Cloud Monitoring lets you [define a set of resources as a group](#).

Membership criteria can be based on labels, regions, applications, and other criteria.

Resources can belong to multiple groups.

When you create a group, Monitoring creates a dashboard for it.

You can create alerts specific to the group

Edit demo

Groups let you define alerts on a set of resources.

Name *
demo

Criteria

Name contains demo

Name contains sample

[ADD A CRITERION](#)

Combine criteria operator

AND
 OR

SAVE

CANCEL



Managed Service for Prometheus

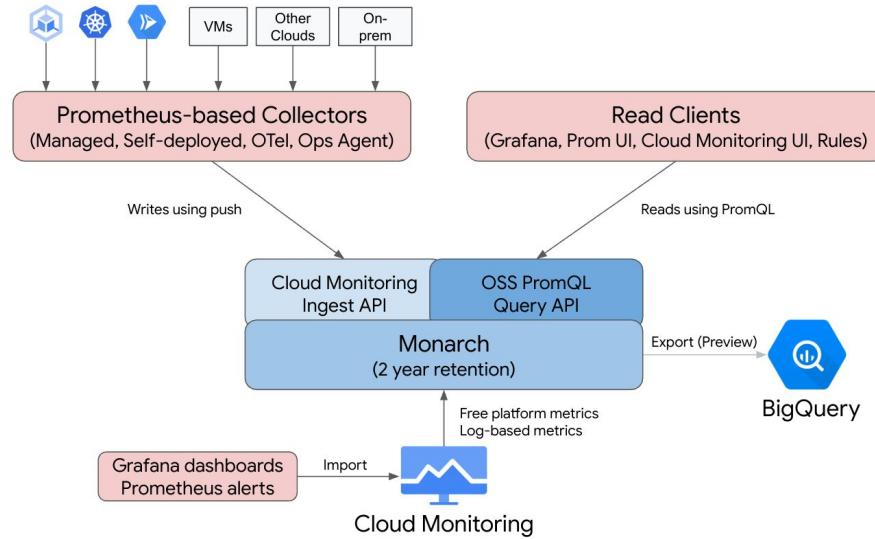
Managed Prometheus

Google Cloud's fully managed multi-cloud solution for Prometheus metrics. You can use PromQL to query and chart Cloud Monitoring data.

Same tool and SRE team used to monitor internal Google – Google Cloud uses a separate, dedicated Monarch instance

Can handle incredible scale:

- 65 quadrillion points on-disk
- Over 5 trillion time series in memory
- Monitors 178 billion resources
- Writes 4.2 TB/sec



Data collection

Managed data collection:

- Daemonset in K8s
- Recommended for all K8S environments

Self-deployed data collection: BYO for K8S

OpenTelemetry Collector: BYO - can also handle logs and traces

Ops Agent: For GCE VMs

For retention see https://cloud.google.com/monitoring/quotas#data_retention_policy

Metrics for Cloud Run

Prometheus sidecar

Google-recommended way to get Prometheus-style monitoring for Cloud Run services.

Add the Managed Service for Prometheus sidecar to a Cloud Run service (Gen1 or Gen2)

OpenTelemetry sidecar

For use with services writing OLTP metrics

Deploy a service to Cloud Run with the Google-Built OpenTelemetry Collector as a sidecar

Working with Grafana

Managed Service for Prometheus uses the built-in Prometheus data source for Grafana, meaning that you can keep using any community-created or personal Grafana dashboards without any changes.

You can also import Grafana dashboards into Cloud Monitoring

Other than the differences listed in [this document](#), the PromQL in Managed Service for Prometheus is at parity with the PromQL available in Prometheus version 2.44.



Grafana

Managed Prometheus pricing

- \$0.06/million samples[†]: first 0-50 billion samples ingested[#]
- \$0.048/million samples: next 50-250 billion samples ingested
- \$0.036/million samples: next 250-500 billion samples ingested
- \$0.024/million samples: >500 billion samples ingested

Cost controls

The number of samples ingested is the primary contributor to your cost.

- Use filters
- Set a reasonable sample rate

Refer to <https://cloud.google.com/stackdriver/pricing> for latest pricing

Metrics Management

Metrics Management

Send Feedback View Audit Logs View Billing Last 1 day DDUT

Metrics Excluded Metrics

Metrics Management helps you get the most from the billable metrics in your [Metrics Scope](#).

- See how your metrics are being used in queries, dashboards, and alert policies.
- Identify high-volume, low-value metrics and see which projects and namespaces are responsible for them.
- Manage costs by excluding metrics you don't need.

[Learn more](#)

Quick filters	I	+ Exclude metric	Filter	Filter or Search	?			
All	299	Metric	Bytes billable volume / Total	Samples billable volume / Total	Metric reads in the last 30 days	Alert Policies	Custom Dashboards	Domain
Metric Status		go_gc_duration_seconds/summary	N/A	6.5K samples / 8.62%	0	Create alert	Create chart	Prometheus
		grpc_client_attempt_duration/histogram	N/A	4.5K samples / 5.95%	0	Create alert	Create chart	Prometheus
Active		promhttp_metric_handler_requests_t...	N/A	3.9K samples / 5.17%	0	Create alert	Create chart	Prometheus
Inactive		target_info/gauge	N/A	2K samples / 2.61%	0	Create alert	Create chart	Prometheus
Metric Usage		bar_metric/counter	N/A	1.3K samples / 1.72%	6 / last read on Mar 25, 2025...	Create alert	Create chart	Prometheus
Used metrics		foo_metric/gauge	N/A	1.3K samples / 1.72%	4 / last read on Mar 25, 2025...	Create alert	Create chart	Prometheus
Unused billable metri...		go_gc_duration_seconds_count/summary	N/A	1.3K samples / 1.72%	0	Create alert	Create chart	Prometheus
		go_gc_duration_seconds_sum/sum...	N/A	1.3K samples / 1.72%	0	Create alert	Create chart	Prometheus

Managed Service for Prometheus Roadmap

Last updated
Feb 5, 2025

H1 2025	H2 2025	Beyond
<ul style="list-style-type: none">• OTLP metric ingestion (preview):<ul style="list-style-type: none">○ Delta metrics○ Unit and Description○ Dots in labels in PromQL• Workload and controller metadata labels• Pivoting from Prometheus metrics to related logs	<ul style="list-style-type: none">• Unfork collector:<ul style="list-style-type: none">○ Native Histograms○ Remote write support○ Arbitrary collector support• Replatform PromQL:<ul style="list-style-type: none">○ Faster performance○ Regex for INT labels○ Expand PromQL to have native Monarch functions (percentile)○ UTF-8 support• Faster metric lookup in large scopes• Convert prom-operator CRs	<ul style="list-style-type: none">• Backfill historical data• Managed OTel on GCP• Search metrics by labels• Search label values without metric• MQL->PromQL translator• Buffering & out of order writes



Service-level Objectives

SLOs

SLO Monitoring Framework

Back End

Same **planet-scale** core platform that powers **internal and Google Cloud** external observability

- >150 trillion metric points in memory
- >14 quadrillion metric points on disk
- >16 million queries per second
- 2.5 Exabytes / month logs

Built-in with **zero config** usage for all Google Cloud services

Day-zero observability support for new Google cloud services

API

Same API used both **internal and Google Cloud external** usage as well

Create, edit and delete SLOs at scale with the API

Supports **containerized** and **VMs** environments

Query support for SLO compliance and error budget computations

Front End

Automatic detection of microservices

Guided experience to define **custom “microservices”**

Auto-generated telemetry dashboards

SLO-based **“fast-burn” alerting** policies

SLO Monitoring

The core notions of service monitoring include the following:

- Selecting metrics that act as service-level indicators (SLIs).
- Using the SLIs to set service-level objectives (SLOs) for the SLI values.
- Using the error budget implied by the SLO to mitigate risk in your service.

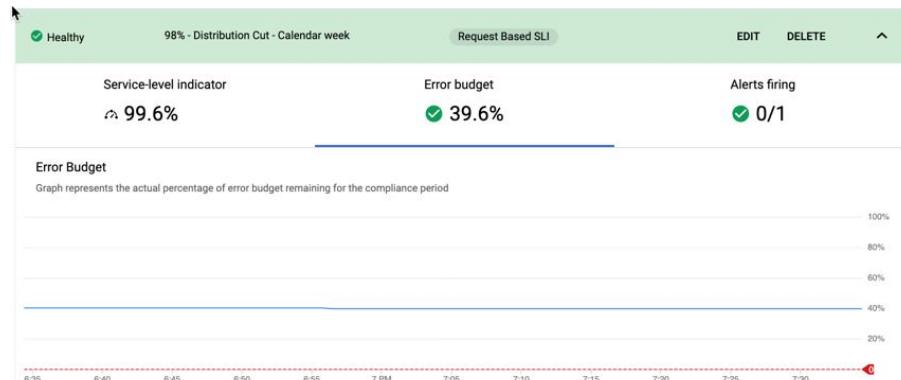
SLI ratio examples:

- An availability SLI is the ratio of the number of successful responses to the number of all responses.
 - “*The system must have 99% availability measured over a calendar week.*”
- A latency SLI is the ratio of the number of calls below a latency threshold to the number of all calls.
 - “*Latency can exceed 300 ms in only 5 percent of the requests over a rolling 30-day period.*”

The error budget stems from the observation that **100% is the wrong reliability target for basically everything**

Benjamin Treynor Sloss

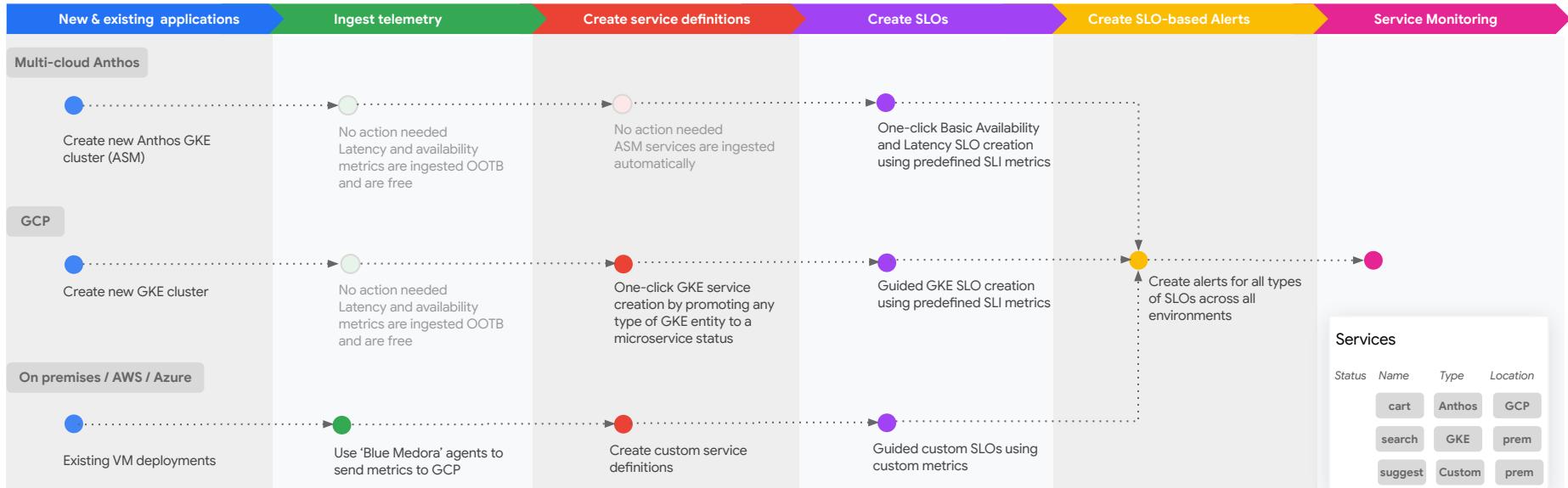
Vice President, Engineering, Google



Example error-budget dashboard

User Story:

As a developer, I want to monitor my service and its dependencies in a single dashboard



Uptime Checks

There are two types of uptime checks:

- *Public* uptime checks issue requests from multiple locations throughout the world to publicly available URLs or Google Cloud resources.
- *Private* uptime checks issue requests to internal IP addresses of Google Cloud resources (e.g. VMs or ILBs)

You can also monitor the availability of a resource by creating an alerting policy that creates an incident when the uptime check fails.

Uptime is good but tracing is better - how are your users experiencing the system?

Create Uptime Check

1 Target

2 Response Validation (optional)

3 Alert & notification (optional)

4 Review

CREATE

CANCEL

Select the resource to be monitored.

Protocol
HTTP

Resource type

URL

Internal IP

Kubernetes LoadBalancer Service

Cloud Run Service

App Engine

Instance

Elastic Load Balancer

Regions

- Global
- Asia-Pacific
- Europe
- South America
- United States Iowa
- United States Oregon
- United States Virginia

ICMP Pins

Display Name ↑	Asia Pacific	Europe	North America	South America	Policies	⋮
default	✓	✓	✓	✓	0	⋮
Testing check	✗	✗	✗	✗	0	⋮
Testing Check	✓	✓	✓	✓	3	⋮

Synthetic Monitoring

In preview

Synthetic monitors periodically issue simulated requests and then record whether those requests were successful, and they record additional data about the request such as the latency.

You can be notified when a test fails by creating an alerting policy to monitor the test results.

A NodeJS-based script is deployed to an HTTP-based Cloud Function

[← Create synthetic check](#)

Name *

Response timeout *
30 seconds

Check frequency
One minute

User labels
[+ ADD LABEL](#)

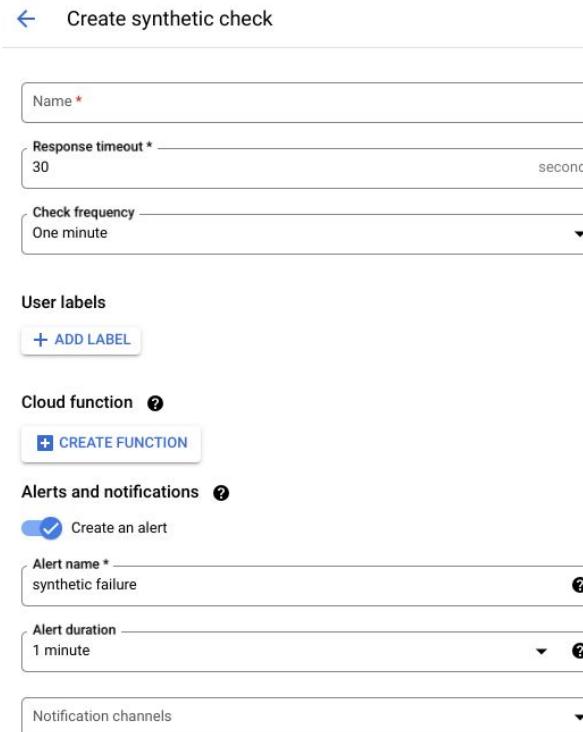
Cloud function [?](#)
[+ CREATE FUNCTION](#)

Alerts and notifications [?](#)
 Create an alert

Alert name *
synthetic failure

Alert duration
1 minute

Notification channels



Tracing

Use a sample-based approach to trace requests:

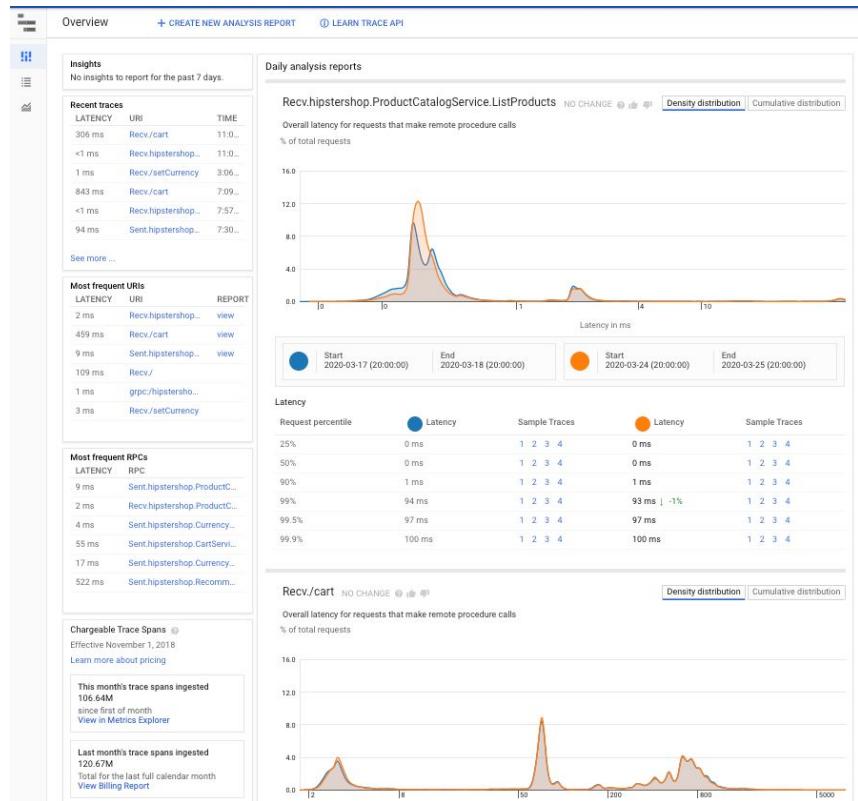
- How long do requests take?
- Where are we experiencing latency?
- What can be improved?

A trace describes the time it takes an application to complete a single operation.

- Each trace consists of one or more spans.
- A span describes how long it takes to perform a complete sub-operation.

Use OpenTelemetry (recommended) and OpenCensus (older) client libraries in your apps for even more observability

Automatic tracing: Cloud Functions and Cloud Run for incoming and outgoing HTTP requests, latency data is automatically collected.



Active Assist

Active Assist is a portfolio of tools that use data, intelligence, and machine learning to reduce cloud complexity and administrative work, helping enterprises to optimize the security, performance, manageability, and cost of their cloud.

Also check out:

- [Network Intelligence Centers](#)
- [Policy Simulator](#)
- [Policy Analyzer](#)
- [Policy Troubleshooter](#)
- [Firewall Insights](#)





05

Alerting

Alerts

Three aspects to [alerts](#):

- An alerting policy: *based on time-series or log data*
- Incidents
- Notification channel

Cloud Monitoring provides pre-built packages to let you create alerting policies for your Google Cloud services and third-party integrations.

Define alerting queries using [PromQL](#) or [MQL](#)

Select Alert Policy template(s) from the list below or customize for your personalized configuration.

CloudSQL - Instance in Failed State ⋮

This Alert fires when any CloudSQL Instance has stopped working and has entered an error state. The cause should be investigated and the instance should be restored from a backup. for more information around managing instances and troubleshooting failed instances visit:
<https://cloud.google.com/sql/docs/troubleshooting#managing-instances>

[▼ SHOW OPTIONS](#)

PostgreSQL - Slow Transactions ⋮

This Alert fires if the database is having trouble keeping up transactions. You should investigate performance improvements, such as increasing resources for CloudSQL, improving query efficiency, and more. For additional information visit
<https://cloud.google.com/sql/docs/postgres/diagnose-issues>.

[▼ SHOW OPTIONS](#)

Alerts

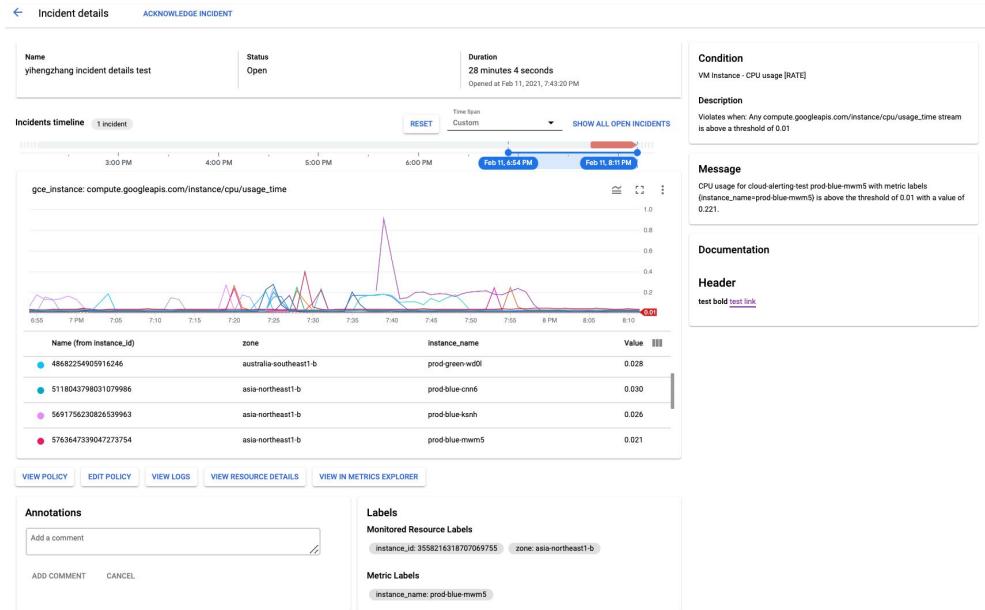
Types of alerting policies:

- Metric absence
- Metric threshold:
 - Rate-of-change conditions
 - Group-aggregate conditions
 - Uptime-check conditions
 - Process-health conditions
 - Metric-ratio conditions

Create documentation in an alerting policy to guide operators how to handle an alert

Notification channels:

- Google Cloud Mobile App
- PagerDuty, Slack
- Webhooks, PubSub
- SMS, Email



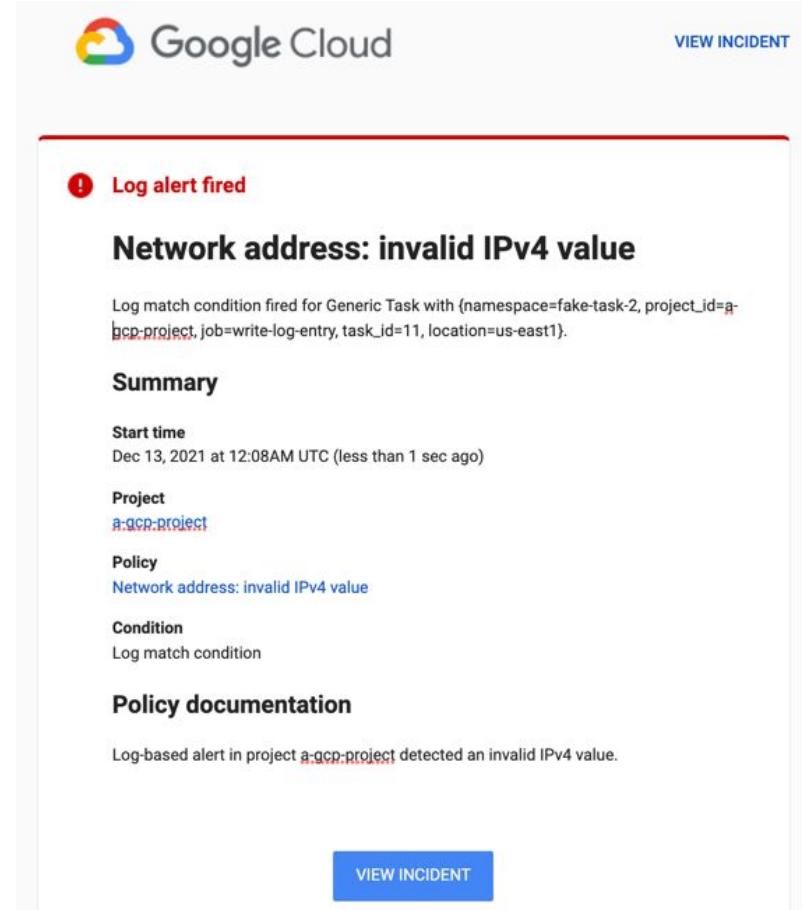
Log-based alerts

When you want a notification, in near real time, that a message has appeared in your logs, use a log-based alert.

You can also alert on audit logs

[Log-based alerts](#) don't operate on excluded logs.

You can't use log-based alerts to derive counts from your logs. To derive counts, you need to use log-based metrics instead.



The screenshot shows a Google Cloud log-based alert interface. At the top right is the Google Cloud logo and a "VIEW INCIDENT" button. Below it is a red horizontal bar. On the left, there's a circular icon with an exclamation mark and the text "Log alert fired". To the right, the title "Network address: invalid IPv4 value" is displayed in bold. Underneath, a detailed log entry is shown: "Log match condition fired for Generic Task with {namespace=fake-task-2, project_id=a-gcp-project, job=write-log-entry, task_id=11, location=us-east1}." Below this, several alert details are listed: "Summary", "Start time" (Dec 13, 2021 at 12:08AM UTC), "Project" (a-gcp-project), "Policy" (Network address: invalid IPv4 value), "Condition" (Log match condition), and "Policy documentation". At the bottom right of the alert card is another "VIEW INCIDENT" button.

Log alert fired

Network address: invalid IPv4 value

Log match condition fired for Generic Task with {namespace=fake-task-2, project_id=a-gcp-project, job=write-log-entry, task_id=11, location=us-east1}.

Summary

Start time
Dec 13, 2021 at 12:08AM UTC (less than 1 sec ago)

Project
[a-gcp-project](#)

Policy
[Network address: invalid IPv4 value](#)

Condition
Log match condition

Policy documentation

Log-based alert in project [a-gcp-project](#) detected an invalid IPv4 value.

[VIEW INCIDENT](#)

Alerts on log-based metrics	Log-based alerts	More information
Based on metrics derived from log entries	Based on strings in individual log entries	Log-based metrics and Log-based alerting
Used to notify you of trends over time	Used to notify you when a specific message appears in a log	Log-based metrics and Log-based alerting
<p>Calculated from</p> <ul style="list-style-type: none"> • Included logs (system-defined log-based metrics) • Included and excluded logs (user-defined log-based metrics) 	Match only included logs	Available logs
Operate on metrics from all projects in the metrics scope of the scoping project	Operate on logs in the scoping project only	Alerting across multiple projects
Triggered when the value of a metric meets a condition for a specified period	Triggered each time a specific log entry matches a filter	Incidents and notifications
Created and managed in Monitoring	Created in Logging; managed in Monitoring	Creating and managing alerting policies
Viewed in Monitoring	Viewed in Monitoring	Viewing alerting policies
Can use any notification channel supported in Monitoring	Can use any notification channel supported in Monitoring	Notification channels

Alerting tips

Review the [alerting policy examples](#)

You can [create an alerting policy](#) that triggers when your monthly Cloud Trace spans ingested exceeds a user-defined limit

[Snooze notifications and alerts](#)

Check out the [Behavior of metric-based alerting policies](#)

Alert on [Uptime Checks](#)

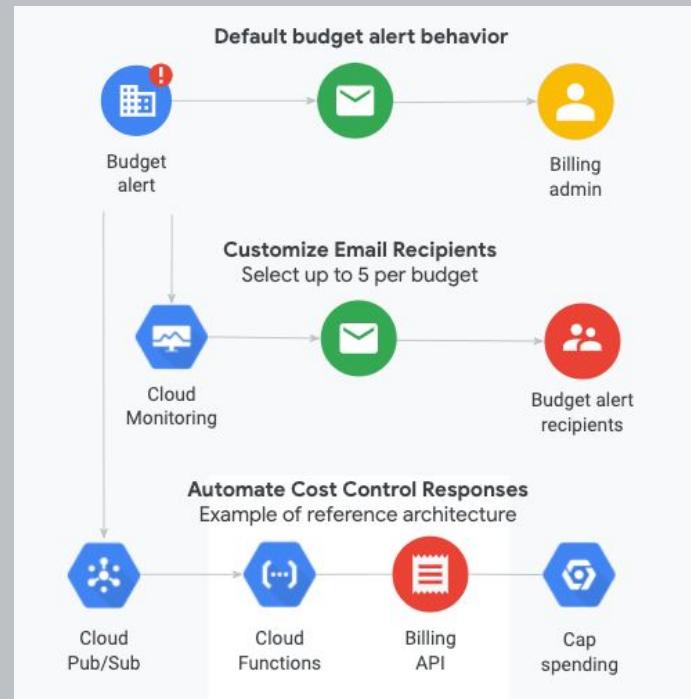
Budget (Billing) alerts

A [budget](#) enables you to track your actual Google Cloud costs against your planned costs.

After you've set a budget amount, you set budget alert threshold rules that are used to trigger email notifications.

PubSub notifications are also available.

 Setting a budget does not automatically cap Google Cloud or Google Maps Platform usage/spending.





06

Dashboards

Dashboards

Google Cloud services such as Compute Engine, provide dashboards that display information, including metrics, about those services. (Service-specific dashboards)

You can create custom dashboards

You can also install [dashboard templates](#) via the repo at [monitoring-dashboard-samples](#)

Remember: *dashboards aren't alerts - you don't want to spend your day staring at them.*

DASHBOARD LIST

SAMPLE LIBRARY

Categories	All Dashboards	LABI
Filter by category	<input type="checkbox"/> Filter	Filter Dashboards
 All	1	
 Recently Viewed	0	
 Favorites	0	
 Custom	0	
 GCP	1	
 Integrations	0	
 Other	0	
Labeled		

Integrations

Cloud Monitoring provides integrations with third-party applications.

These integrations let you collect telemetry from applications such as Apache Web Server, MySQL, Redis, and others for deployments running on Compute Engine and Google Kubernetes Engine.

Get started with Integrations

Integrations brings together metrics, logs, dashboards, and alerts to give you quick access to rich data for your application stack. Built on an open-source foundation, you can customize the data to fit your need.

Integrations	
Quick filters	
All	52
Deployment Platform	
Kubernetes Engine	32
Compute Engine	31
Status	
Available	52
Configured	0
Type	
3rd party services	49
 Cloud SQL	Cloud SQL is a fully-managed relational database service. Use Cloud SQL to store and manage your data. Many applications run on Google Cloud use Cloud SQL.
 Couchbase	The Couchbase integration collects bucket and ejections. The integration collects metrics from each node.
 Elasticsearch	Elasticsearch is an open-source search and analytics engine. It runs on a Java virtual machine on top of a pure Java library.

Custom dashboards

Custom dashboards support a variety of widget types, so that you can [choose the best way to display your metric data](#)

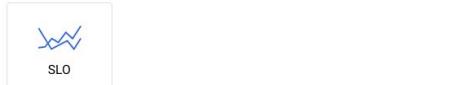
You can [copy](#) to another project and [share](#) dashboards with other users

Review [Select metrics for charts on dashboards](#) for details regarding data query, alignment and combination

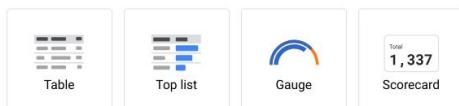
Use [filtering](#) to focus on specified criteria (such as labels)

Add widget X

Data



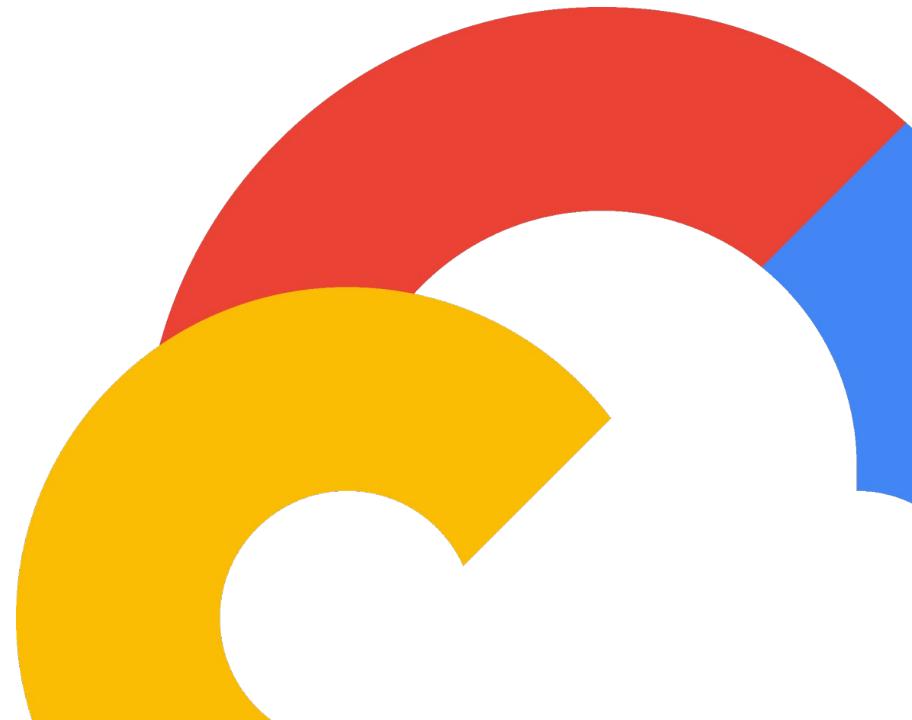
Visualization



Layout



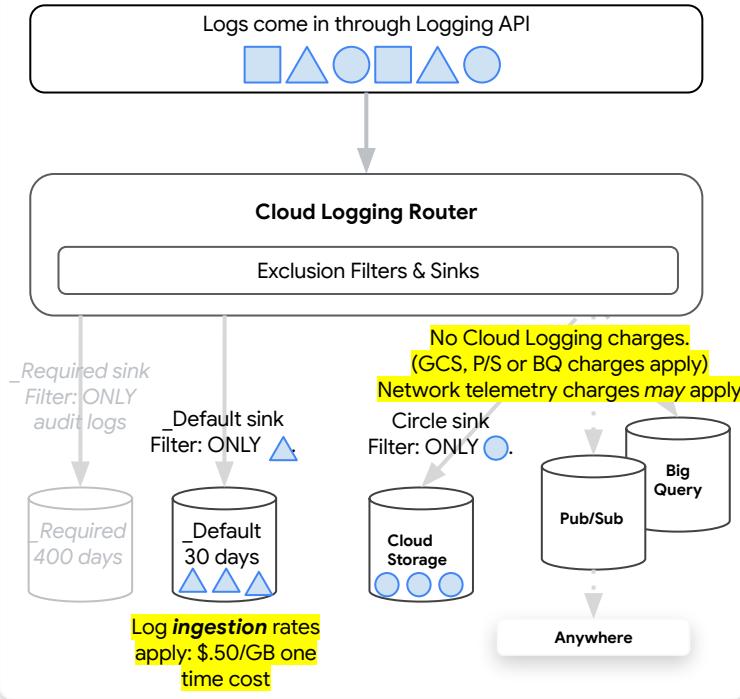
Thank you



Appendix

- - 100 TB / day
- - 10 TB / day
- △ - 1 TB / day

Project A



Scenario 1 - Cloud Logging costs - 30 day retention

Ingestion: \$15,360/mo - \$25 (free tier) = \$15,335/mo

○ - 100 TB sent / day but 0 TB ingested = \$0 (Cloud Storage charges apply)

□ - 10 TB sent / day but 0 TB ingested = \$0

△ - 1 TB sent / day and 1 TB ingested to _Default log bucket / day:
 $1024 \text{ GB/day} * 30 \text{ days/mo} * \$.5/\text{GB} = \$15,360/\text{mo}$
 (ignoring free tier of 50 GB and Required bucket volume which is free)

Storage: \$0/mo

_Required bucket: no charges for ingestion or storage

_Default bucket: 30 days retention = 30 days retention included = \$0

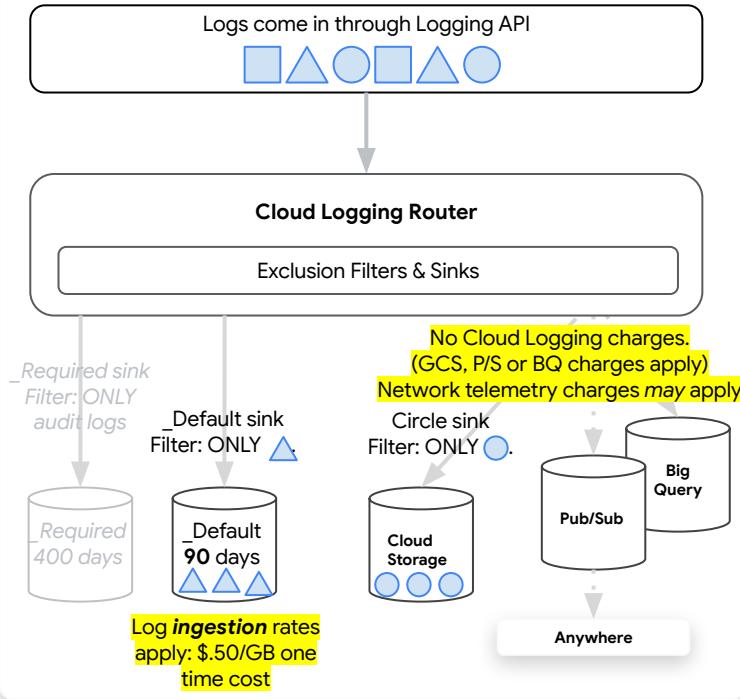
Cloud Logging total: \$15,335 / mo.

Note that logs can be excluded (not ingested) at no cost while still being sent to other destinations such as Cloud Storage, Pub/Sub or BigQuery. This is different than the competition. Cloud Storage rates would apply but are not listed here.



- - 100 TB / day
- - 10 TB / day
- △ - 1 TB / day

Project A



Scenario 2 - Cloud Logging costs - 90 day retention

Ingestion: \$15,360/mo - \$25 (free tier) = \$15,335/mo (SAME)

○ - 100 TB sent / day but 0 TB ingested = \$0 (Cloud Storage charges apply)

□ - 10 TB sent / day but 0 TB ingested = \$0

△ - 1 TB sent / day and 1 TB ingested to _Default log bucket / day: (30,720 GB/mo)
 $1024 \text{ GB/day} * 30 \text{ days/mo} * \$0.5/\text{GB} = \$15,360/\text{mo}$
 (ignoring free tier of 50 GB and Required bucket volume which is free)

Storage: \$614.40/mo (announced but not yet effective, will begin ~October 2022)

Required bucket: no charges for ingestion or storage

Default bucket: 90 days retention - 30 days retention included = 60 days retention:
 @ Steady State: 2 months data retained > 30 days (total 90 days retention)
 $2 \times 30,720 \text{ GB/mo} \times \$0.01/\text{GB/mo} = \$614.40 / \text{mo.}$

Cloud Logging total: \$15,949.40 / mo.

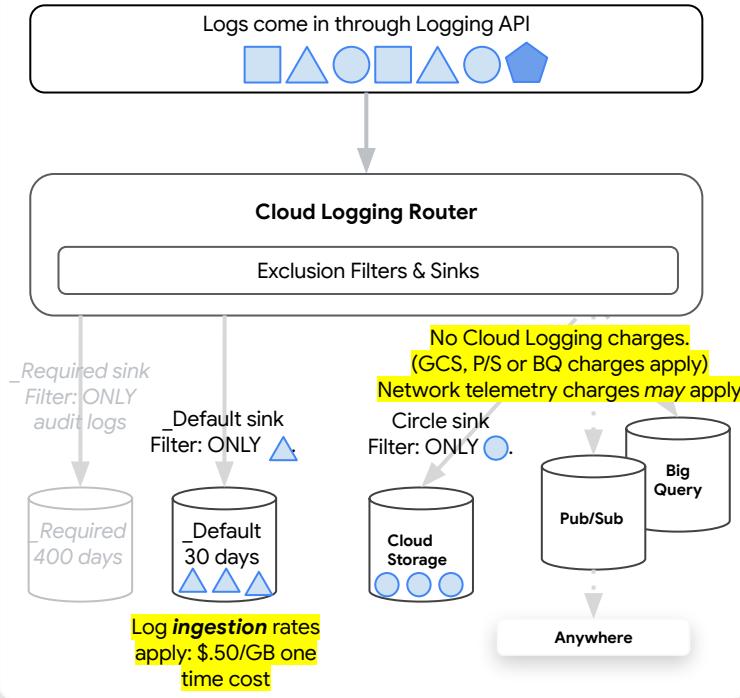
Note that cost for retention is modest (+4% vs. 30 day retention). This is different from ELK where costs are aligned with volume of data.



- - 100 TB / day
- 10 TB / day
- △ - 1 TB / day

- - 1 TB / day VPC flow logs

Project A



Scenario 3 - Cloud Logging costs - Network logs excluded

Ingestion: \$15,360/mo - \$25 (free tier) = \$15,335/mo (SAME)

○ - 100 TB sent / day but 0 TB ingested = \$0 (Cloud Storage charges apply)

- 10 TB sent / day but 0 TB ingested = \$0

△ - 1 TB sent / day and 1 TB ingested to _Default log bucket / day:
 $1024 \text{ GB/day} * 30 \text{ days/mo} * \$0.5/\text{GB} = \$15,360/\text{mo}$
 (ignoring free tier of 50 GB and Required bucket volume which is free)

○ - 1 TB sent / day but 0 TB ingested = \$0 (Network telemetry generation charges apply)

Storage: \$0/mo (SAME)

Cloud Logging total: \$15,335 / mo. (SAME for Cloud Logging)

Network telemetry generation: 30 TB: \$10,120

0-10TB @ \$.50/GB: $10 \times 1024 \times \$0.5 = \$5,120$
 10-30TB @ \$.25/GB: $20 \times 1024 \times \$0.25 = \$5,120$

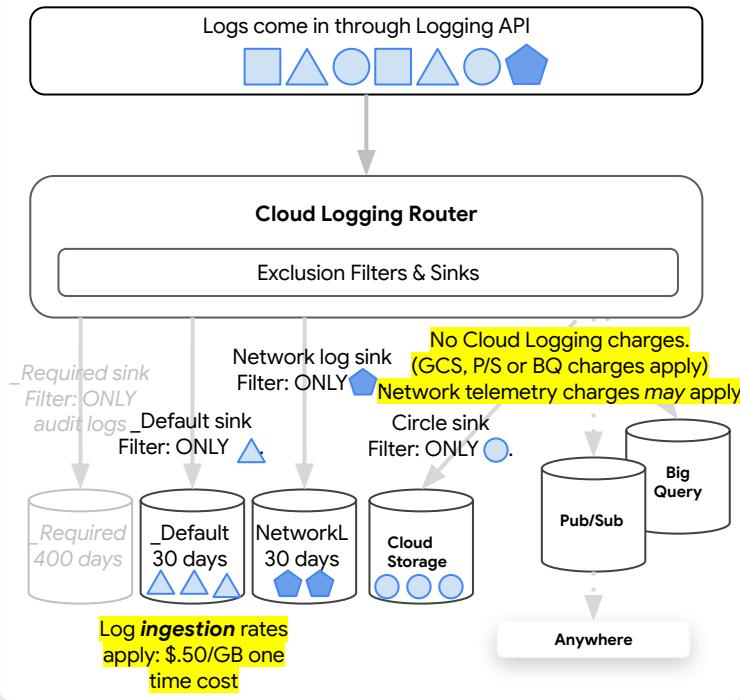
Note that the new charges are networking charges NOT Cloud Logging charges.
 The charges would be the same if sent to Pub/Sub or other non-logging destinations.



- - 100 TB / day
- - 10 TB / day
- △ - 1 TB / day

- - 100 TB / day
- - 10 TB / day
- △ - 1 TB / day
- pentagon - 1 TB / day VPC flow logs

Project A



Scenario 4 - Cloud Logging costs - Network logs ingested

Ingestion: $\$15,360/\text{mo} \times 2 - \$25 \text{ (free tier)} = \$30,695/\text{mo}$

○ - 100 TB sent / day but 0 TB ingested = \$0 (Cloud Storage charges apply)

□ - 10 TB sent / day but 0 TB ingested = \$0

△ - 1 TB sent / day and 1 TB ingested to _Default log bucket / day:
 $1024 \text{ GB/day} \times 30 \text{ days/mo} \times \$0.5/\text{GB} = \$15,360/\text{mo}$
 (ignoring free tier of 50 GB and Required bucket volume which is free)

Pentagon - 1 TB sent / day and 1 TB ingested to Networking log bucket / day:
 $1024 \text{ GB/day} \times 30 \text{ days/mo} \times \$0.5/\text{GB} = \$15,360/\text{mo}$

Storage: \$0/mo (SAME since retention is also 30 days)

Cloud Logging total: \$30,695 / mo. (60 TB / mo)

Network telemetry generation: waived due to Cloud Logging ingestion: \$0

Note that the network telemetry generation fee is waived when logs are ingested into any Cloud Logging log bucket so Cloud Logging is effectively available at a discount for these logs.



Even more scenarios for Cloud Logging pricing

Feature	Price ¹	Free allotment per month	Effective date
Logging ingestion	\$0.50/GiB	First 50 GiB/project	July 1, 2018
Logging storage	\$0.01/GiB for logs retained past 30 days	Logs retained for the default retention period don't incur a storage cost.	October 1, 2022

Scenario: Can I save costs by decreasing storage to less than 30 days?

No. The initial ingestion charge covers the first 30 days of storage but there is no discount for decreasing retention. Note that the full 30 days of retention is only \$.01/GB so there is little savings to be had.

Even more scenarios for Cloud Logging pricing

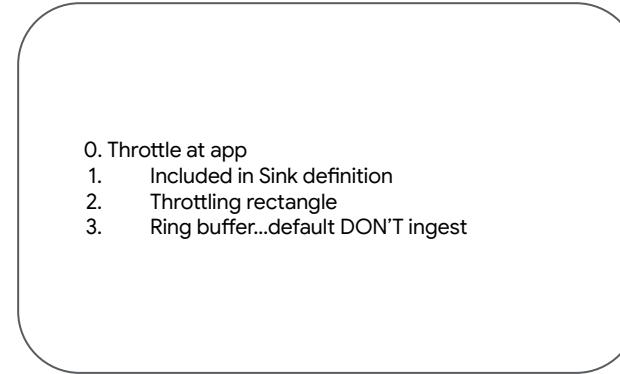
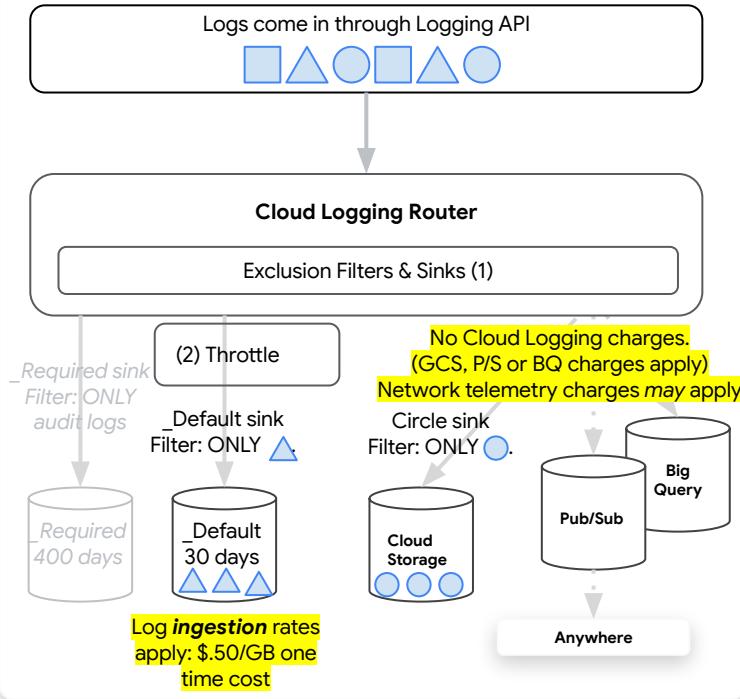
Feature	Price ¹	Free allotment per month	Effective date
Logging ingestion	\$0.50/GiB	First 50 GiB/project	July 1, 2018
Logging storage	\$0.01/GiB for logs retained past 30 days	Logs retained for the default retention period don't incur a storage cost.	October 1, 2022

Scenario: If I make a copy of the same logs in two different log buckets, will I be charged twice?

Yes. Like sending logs to BigQuery, Cloud Storage or Pub/Sub multiple times, the logs sent to multiple log buckets are treated independently and will be charged twice.

- - 100 TB / day
- 10 TB / day
- △ - 1 TB / day

Project A



Contents

- 01 Keep these
- 02 Short
- 03 Ipsum ase
- 04 Lorem ipsum
- 05 Doler sey
- 06 Amit lorems
- 07 Lorem

Agenda



2:00pm

Title here

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Agenda



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3:00pm **Event title here**

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01

Section title

Subhead Optional

01

Break slide with subheads

Subheading A



Subheading B



Subheading C



Subheading D



Subheading E



Subheading F



01

Break slide with subheads

Subheading A



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Subheading C



Subheading D



Subheading E



Subheading F



01

Break slide with subheads

Subheading A



Subheading B



Subheading C



Subheading D



Subheading E



Subheading F



01

Break slide with subheads

Subheading A



Subheading B



Subheading C



Subheading D



Subheading E



Subheading F



Single column

Remember, less is more. We don't want to overwhelm our audience with dense copy-heavy paragraphs.

Try to present information in manageable, bite-sized segments. It's better to present an idea over two slides, than to overwhelm the reader.

When possible, use this second paragraph to make a follow-up point. **Notice the width of this text column.**

Copy should stay within this length and these parameters.

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Speaker introduction



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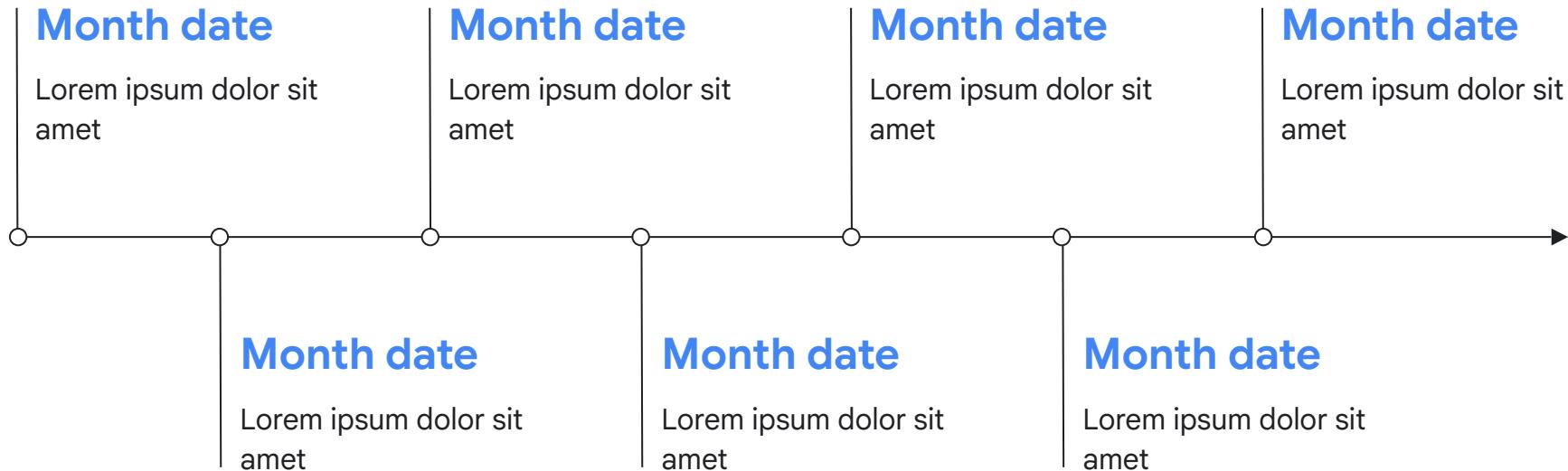


Firstname
Team Name



Firstname
Team Name

Timeline slide



Numbered items

01

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2 billion

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45,000

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150 million

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1 billion

lorem ipsum dolor

800,000

lorem ipsum dolor

2 billion

lorem ipsum dolor

Table A

CHART TITLE [UPPER CASE]

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Group 1	Group 2	Group 3
1500	2400	2000
0903	29034	9303
4789	93	3893
389	383	920
3784	389	8399
36	298	390
50	12	22

Table B

	Lorem Ipsum	Dolor Sit	Amet Con	Amet Con
	\$XXX M	\$XXX M	\$XXX M	XX%
	\$XXX M	\$XXX M	\$XXX M	XX%
	\$XXX M	\$XXX M	\$XXX M	XX%
	\$XXXM	\$XXX M	\$XXX M	XX%
	\$XXX M	\$XXX M	\$XXX M	XX%
Total	\$X,XXX M	\$X,XXX M¹	\$X,XXX M²	XXX%

1. Feugiat nisl pretium fusce id velit ut tortor pretium.

2. Enim ut tellus elementum sagittis.

Comparison



Lorem Ipsum

- Bullets should be clear & punchy
- Single lines when possible



Lorem Ipsum

- Bullets should be clear & punchy
- Single lines when possible



Lorem Ipsum

- Bullets should be clear & punchy
- Single lines when possible



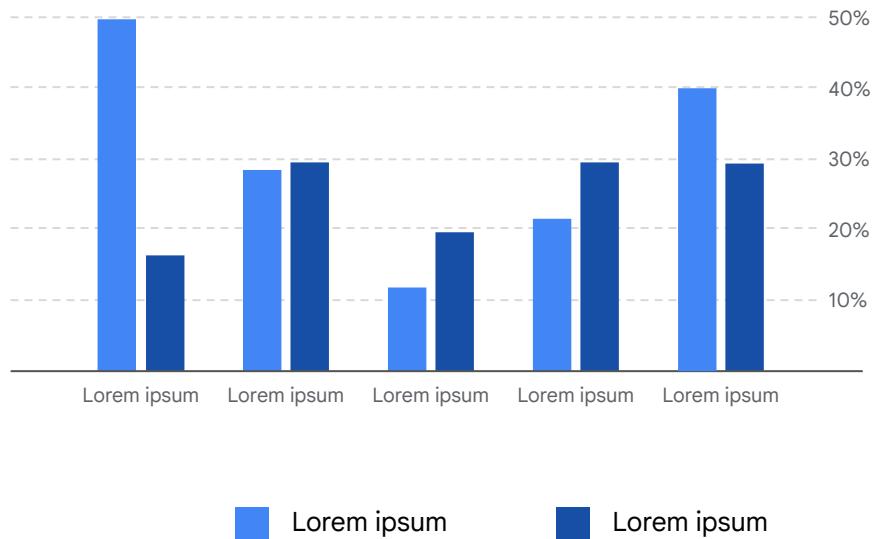
Lorem Ipsum

- Bullets should be clear & punchy
- Single lines when possible

Bar chart

CHART TITLE [UPPER CASE]

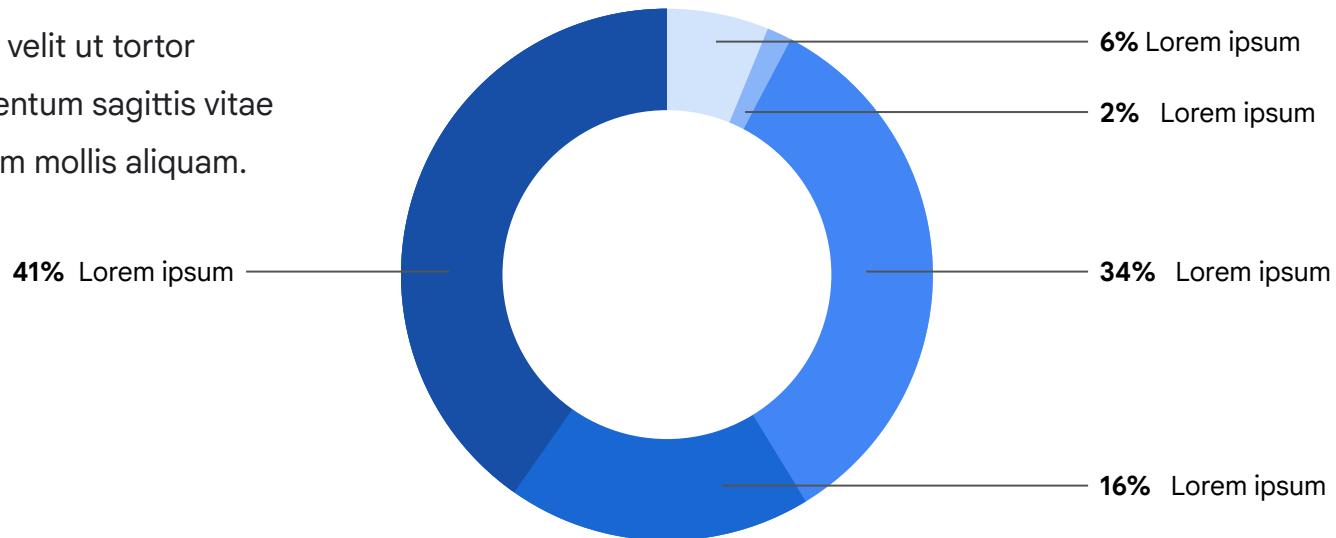
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Donut chart

CHART TITLE [UPPER CASE]

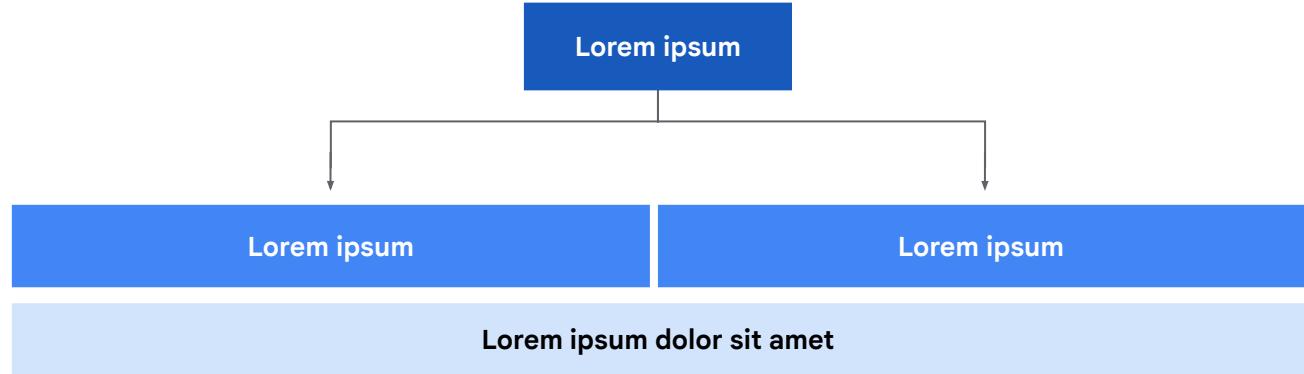
Feugiat nisl pretium fusce id velit ut tortor
pretium. Enim ut tellus elementum sagittis vitae
et leo duis ut. Nisi porta lorem mollis aliquam.



Flow chart

CHART TITLE [UPPER CASE]

Feugiat nisl pretium
fusce id velit ut tortor
pretium. Enim ut tellus
elementum sagittis vitae
et leo duis ut. Nisi porta
lorem mollis aliquam.



Bullets

- Bullets should be clear & punchy
- Use single lines when possible
- Cover all of your points
- Use no more than 6-8 bullets
- Don't punctuate bullet points
- Present bullets in logical order

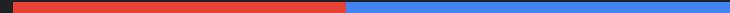
**Our hope is to provide you with
flexible, easy-access templates
and the guidance you need to
confidently create powerful,
memorable presentations aligned
with our Google Cloud brand.**



**Duis aute irure dolor in
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velit esse cillum dolore eu
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Excepteur sint occaecat
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**Duis aute irure dolor in
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“

**Duis aute irure dolor in
reprehenderit in voluptate
velit esse cillum dolore eu
fugiat nulla pariatur.”**

Jane Doe, CIO, *The Data People*

**Lorem ipsum dolor
sit amet est lorem.**

**Lorem ipsum dolor
sit amet est lorem.**

**Lorem ipsum
dolor sit amet
sin piaca.**

**Lorem ipsum
dolor sit amet
sin piaca.**



**Duis aute irure dolor in
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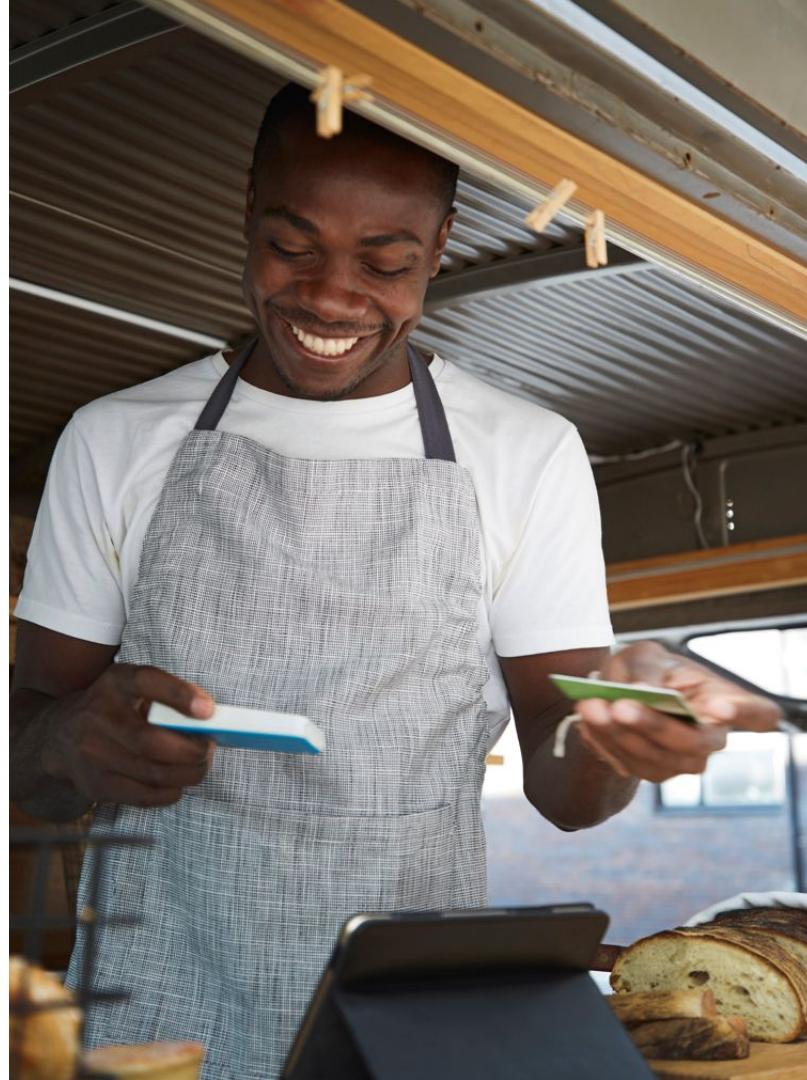
Single column with image

Images help do the heavy-lifting in a slide. This allows us to say less with the copy, or make reference to the image or graphic. Images can be used to illustrate, educate, or even entertain in ways that copy cannot. So give some thought to the image you choose.

Keep the copy to approximately this length. Be mindful that the copy aligns with the image you present, and make your point as concisely as possible.



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Bullets with image

- Bullets should be clear & punchy
- Single lines when possible
- Cover all of your points
- Image should relate to points
- Use no more than 6-8 bullets
- Don't punctuate bullet points



US Map

