Google Cloud

Introduction to Google Cloud Operations Suite

Objectives

01 Describe the purpose and capabilities of Google Cloud operations suite

02 Explain the purpose of Cloud Monitoring

03 Explain the purpose of Cloud Logging and Error reporting

04 Explain the purpose of Cloud Trace

Google Cloud
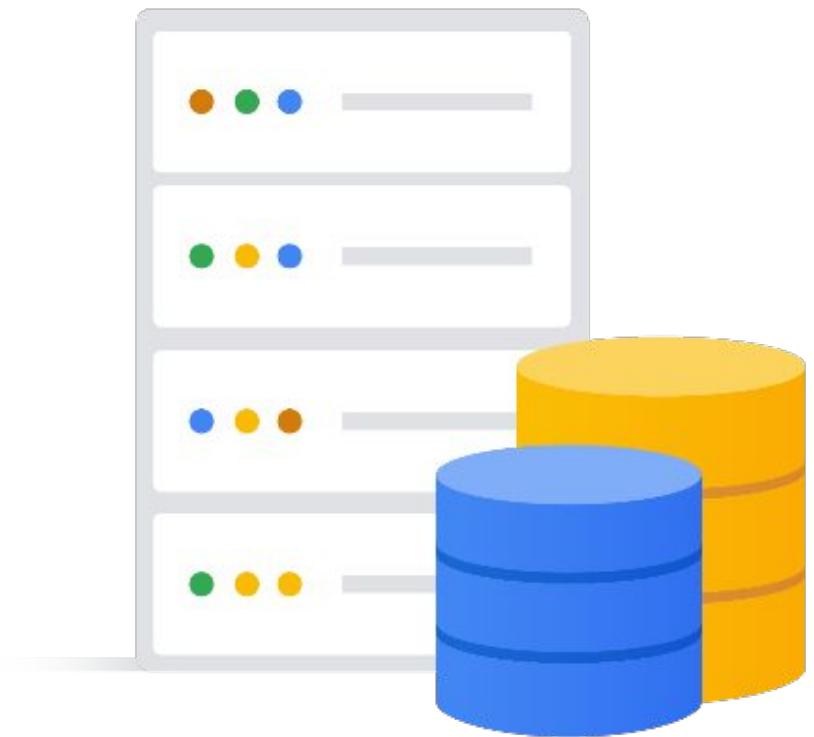
In this section, you explore
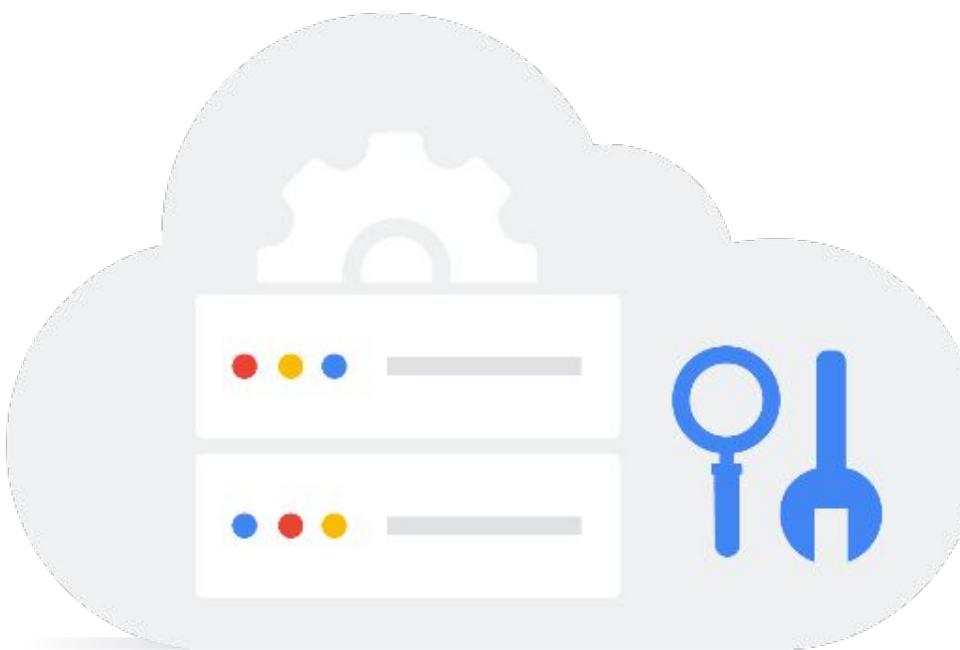
- ✓ **Need for Google Cloud observability**
- ✓ Cloud Monitoring
- ✓ Cloud Logging
- ✓ Error reporting
- ✓ Application Performance Management

Google Cloud

On-premises

Cloud

Physical check

Observability tools

Need for observability

| Visibility into system health	Error reporting and alerting	Efficient troubleshooting	Improve performance
Help me understand my application and tell me if its healthy	Bring my attention directly to problems	Help me fix it if its broken	Guide me to optimize it

Monitoring gives you real-time system information

Google's *Site Reliability Engineering* book

landing.google.com/sre/books

Collecting, processing, aggregating, and displaying **real-time quantitative data about a system**, such as:
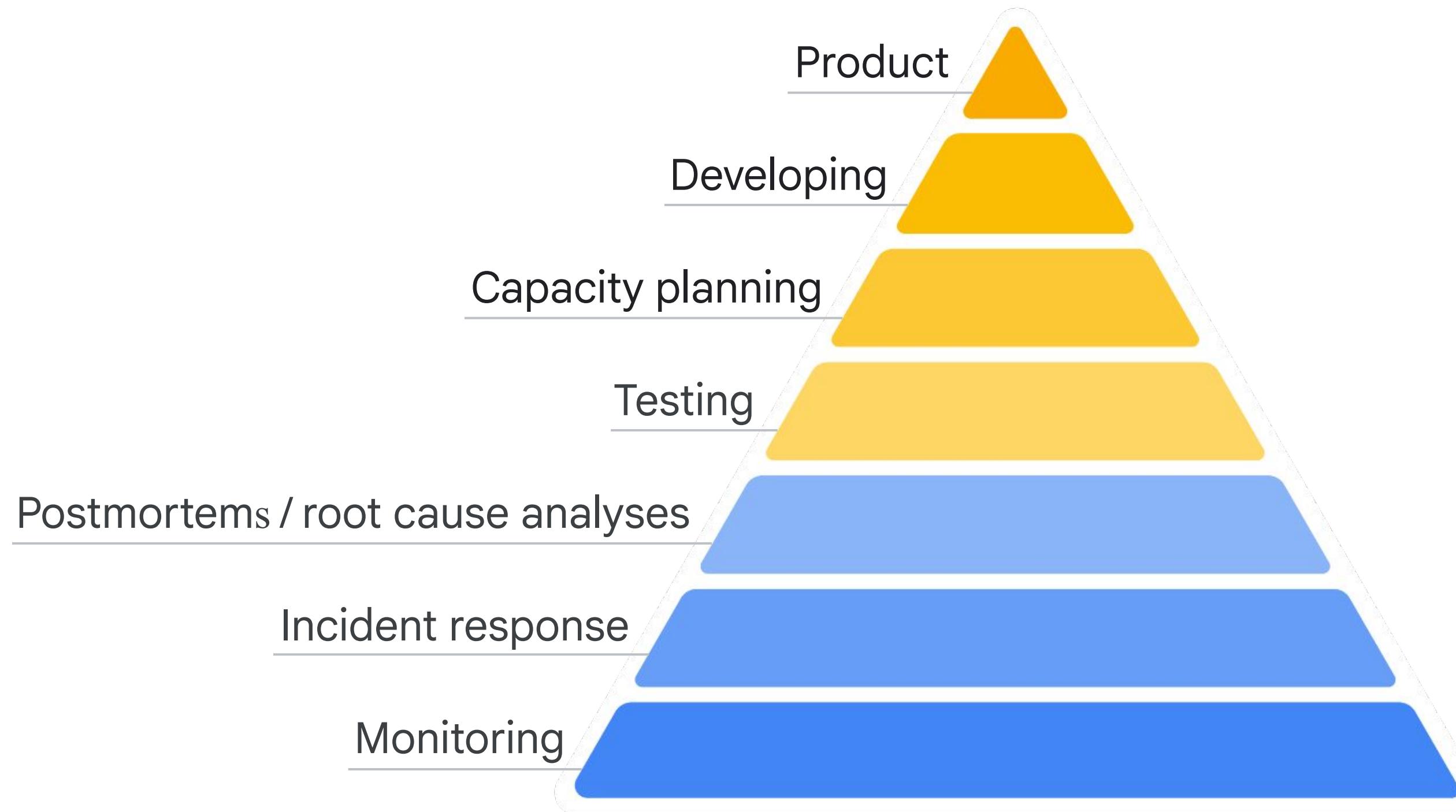
Query counts and types

Error counts and types

Processing times

Server lifetimes

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Monitoring is the foundation of product reliability

Product

Developing

Capacity planning

Testing

Postmortems / root cause analyses

Incident response

Monitoring

What's needed from products

Continual improvement

Dashboards
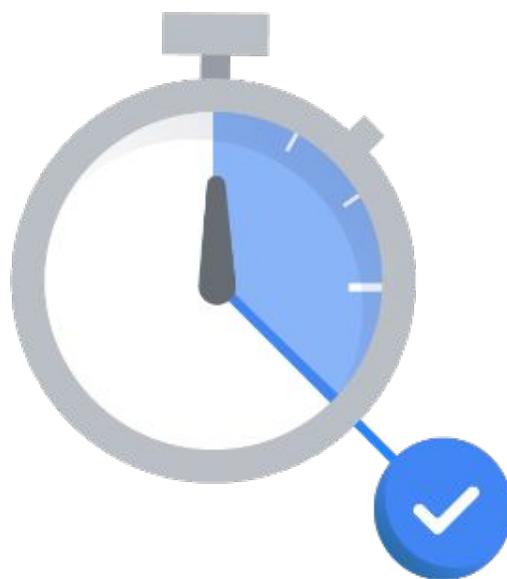
Automated alerts

Incident response

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Four Golden Signals

Latency

Traffic
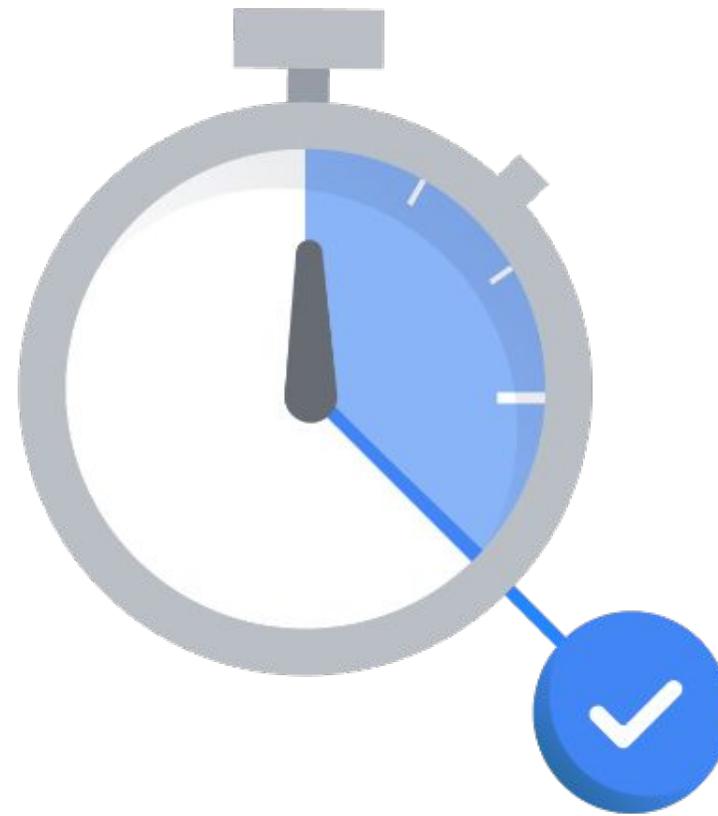

Saturation

Errors

The importance of latency

01 Changes in latency could indicate emerging issues.

02 Its values may be tied to capacity demands.
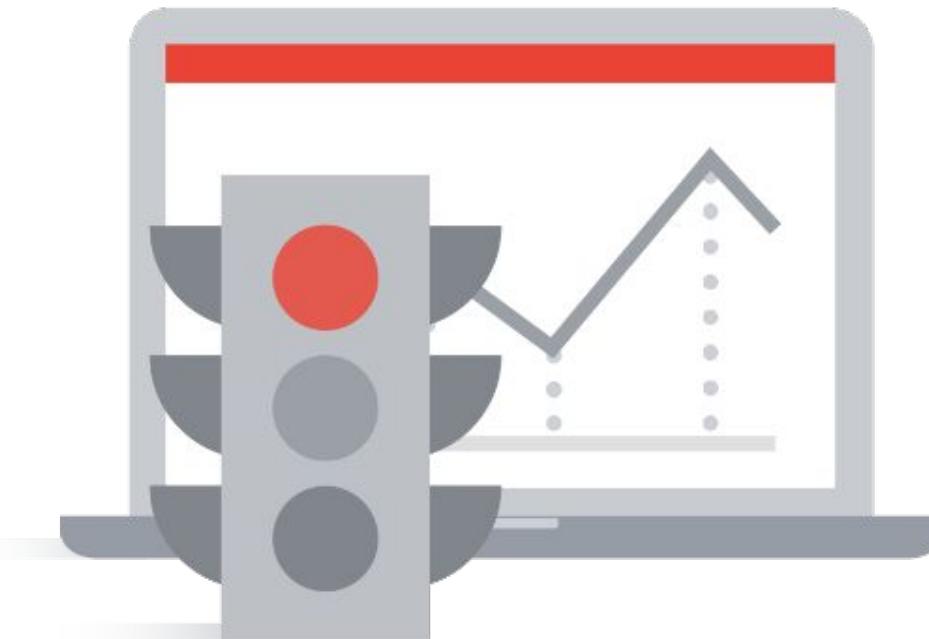
**03** It can be used to measure system improvements.

- Page load latency
- Number of requests waiting for a thread

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The importance of traffic

01 It's an indicator of current system demand.

02 Its historical trends are used for capacity planning.

03 It's a core measure when calculating infrastructure spend.

- # retrievals per second
- # active requests

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The importance of saturation

01 It's an indicator of current system demand

02 It focuses on the most constrained resources.
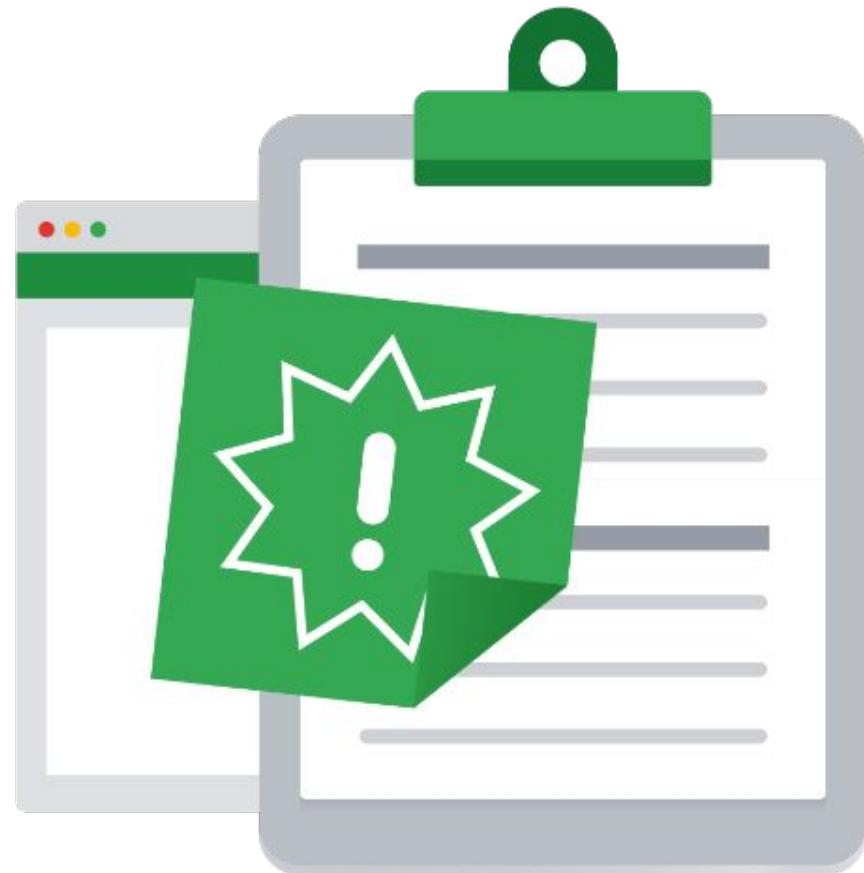
03 It's frequently tied to degrading performance as capacity is reached.

- % memory utilization
- % thread pool utilization

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The importance of errors

01 They may indicate configuration or capacity issues
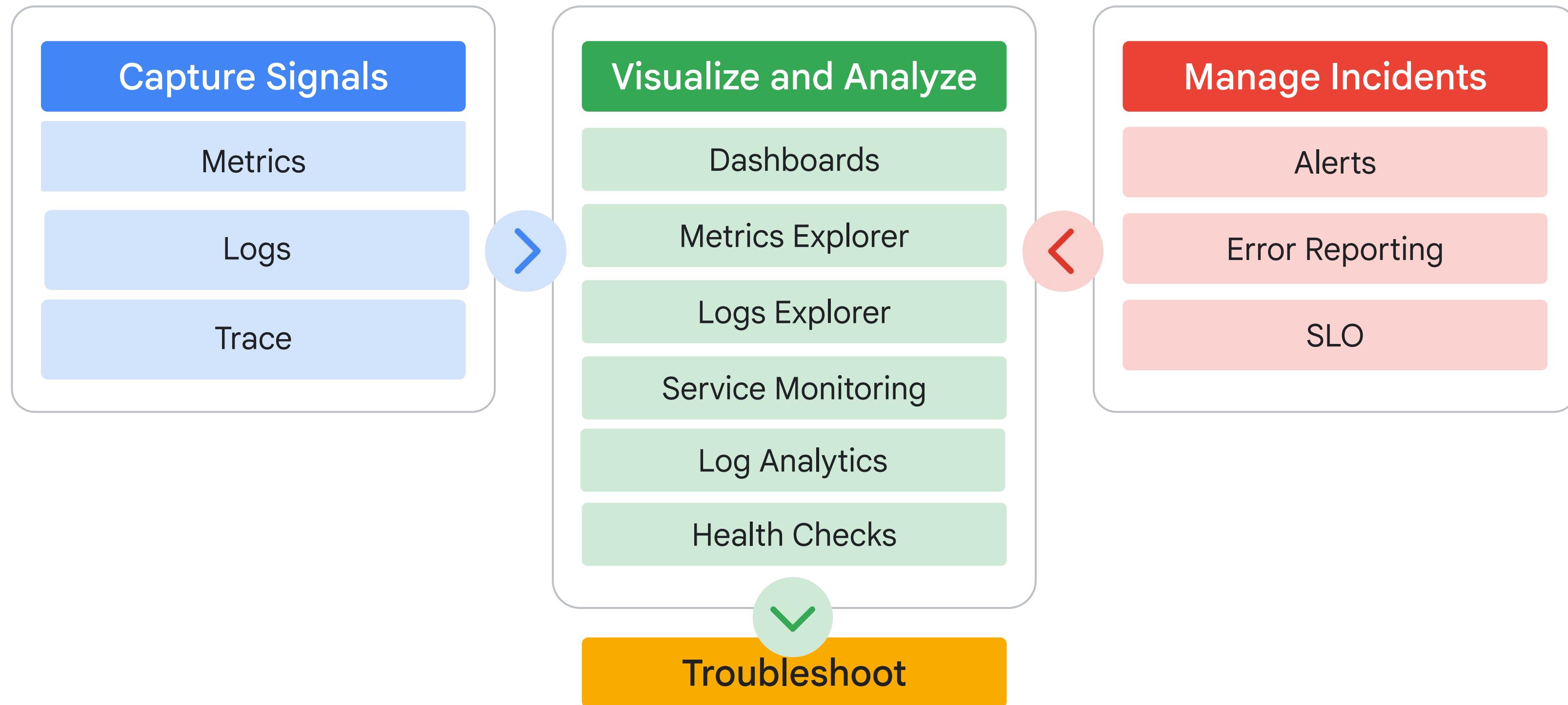
02 They can indicate service level objective violations

03 An error might mean it's time to send out an alert

- # failed requests
- # exceptions
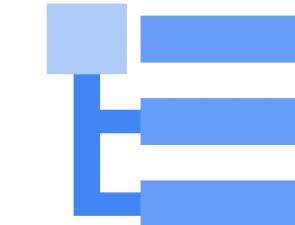
Google Cloud
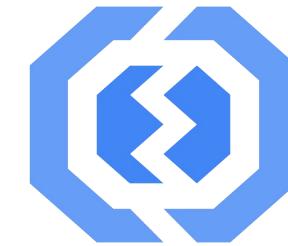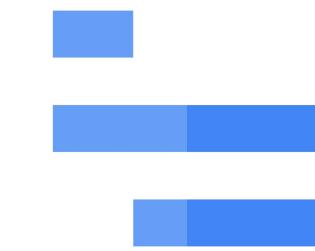
Capture Signals

Metrics

Logs

Trace

Visualize and Analyze

Dashboards

Metrics Explorer

Logs Explorer

Service Monitoring

Log Analytics

Health Checks

Manage Incidents

Alerts

Error Reporting

SLO

Troubleshoot

Google Cloud

Google Cloud Operations Suite
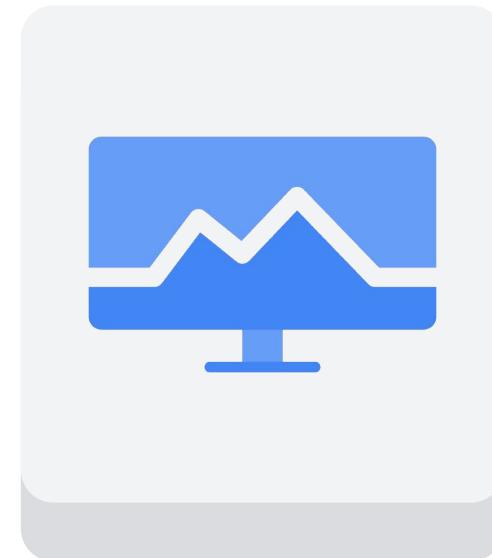
In this section, you explore

- ✓ Need for Google Cloud Observability
- ✓ **Cloud Monitoring**
- ✓ Cloud Logging
- ✓ Error reporting
- ✓ Application Performance Management

Google Cloud

Cloud Monitoring

- Provides visibility into the performance, uptime, and overall health of cloud-powered applications

- Collects metrics, events, and metadata from projects, logs, services, systems, agents, custom code, and various common application components

- Ingests that data and generates insights via dashboards, Metrics Explorer charts, and automated alerts

Cloud Monitoring Features

Automatic, free ingestion

On 100+ monitored resources services, over 1500+ metrics are immediately available with no cost
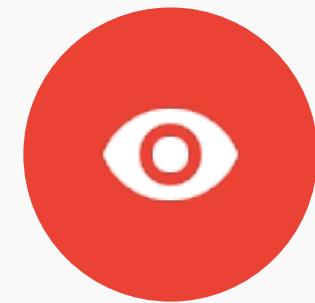
Open source standards

Leverage Prometheus and Open Telemetry to collect metrics across compute workloads

Customization 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

Google Cloud

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Google Cloud

Cloud Logging

✓ Allows users to collect, store, search, analyze, monitor, and alert on log entries and events.

✓ Provides automatic ingestion with simple controls for routing, storing, and displaying your log data

✓ Leverage tools like Log Analytics to view trends, or Error Reporting and Log Explorer to quickly examine problems

Google Cloud

Logging has multiple aspects

Collect
- Cloud events, configuration changes, and from customer services
- Logs at various level of the resource hierarchy

Analyze
- Log data in real time with the integrated Logs Explorer
- Exported logs from Cloud Storage or BigQuery

Export
- Export to Cloud Storage, or Pub/Sub, or BigQuery
- Logs-based metrics for augmented Monitoring

Retain
- Data access and service logs for 30 days and admin logs for 400 days
- Longer-term in Cloud Storage or BigQuery

Google Cloud

Developers use cases

Developers

Troubleshooting
Debugging

Get started quickly – Out-of-the-box collection of system metrics and logs

Use logging SDKs and library – Integration into popular SDKs to support rich log formatting

Analyze log in real-time: Analyze log data in real-time, debug code, troubleshoot your apps

Find errors quickly – Find errors via stack traces automatically with Error Reporting

Google Cloud

Operators use cases

Operators

SLO/alerting
Log management
Workload management
Cost management

Collect the right telemetry – Instrumentation for GCE, on-prem and other cloud providers

Centralize logs – Centralize logs for specific users, teams and/or organizations

Manage logs – Set retention periods, select supported regions for regional data storage

Set alerts – Understand log volume/cost, set alerts on important application metrics

Export logs – Export to Google Cloud for storage, analysis, integrate with 3rd parties

Google Cloud

Security operations use cases

SecOps Analyst

Primarily concerned with secure operations of the GCP fleet of resources. This persona uses the platform features to meet organizational security requirements.

Collect audit logs – Collect Google Cloud audit logs by default, advanced security logs such as data access logs

Collect network telemetry data – Collect and analyze VPC flow logs, GKE network, firewall, load balancer logs

Analyze logs for security events – View audit logs and other events to investigate possible security events

Google Cloud

In this section, you explore

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- ✓ **Error reporting**
- ✓ Application Performance Management

Error Reporting

Error Reporting **identifies, counts, analyzes, and aggregates** the crashes in your running cloud services.

Error Reporting features

Real time processing

Applications errors are processed and displayed within seconds

Quickly view and understand errors

A dedicated page displays the details of the error

Instant notification

You are notified when events occur

Error Reporting interface

Errors in the last 30 days

Resolution Status	Occurrences ⌄		Error	Seen in
✅ Resolved ▼		20,690	**NEW** **PermissionDenied: 403 The caller does not have permission** raise_from (/usr/lib/python2.7/dist-packages/six.py)	gke_instances
⊖ Open ▼		76	**NEW** **ServiceUnavailable: 503 Getting metadata from plugin failed with erro** raise_from (/usr/lib/python2.7/dist-packages/six.py)	gke_instances

Stack trace sample
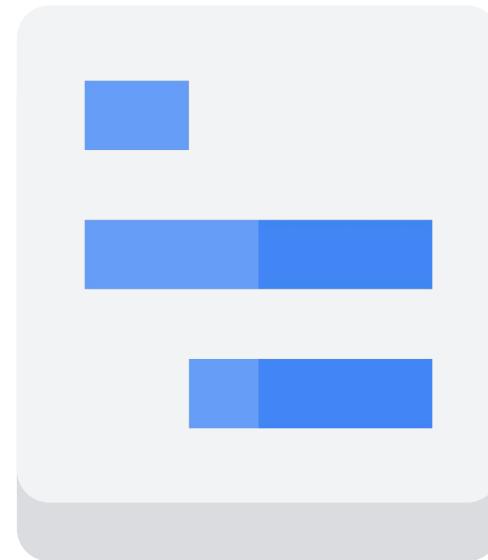
Parsed   Raw

```
PermissionDenied: 403 The caller does not have permission
    at raise_from (/usr/lib/python2.7/dist-packages/six.py:737)
    at error_remapped_callable (/usr/local/lib/python2.7/dist-packages/google/api_core/grpc_helpers.py:56)
    at __call__ (/usr/local/lib/python2.7/dist-packages/google/api_core/gapic_v1/method.py:139)
    at batch_write_spans (/usr/local/lib/python2.7/dist-packages/google/cloud/trace_v2/gapic/trace_service_client.py:18
```

gke_instances

gke_instances

gke_instances

In this section, you explore

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Cloud Trace
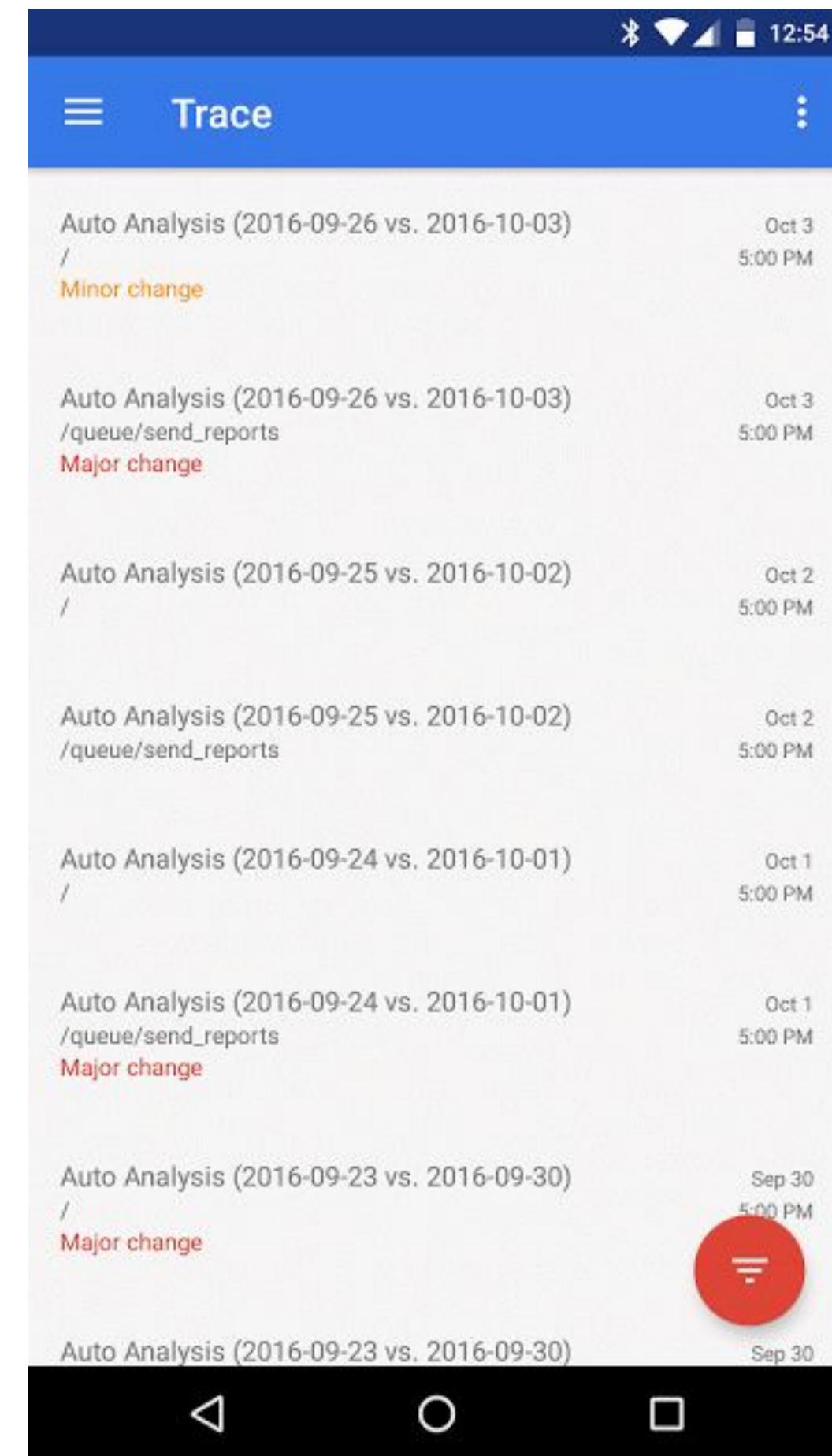
✓ Collects latency data from distributed applications and displays it in the Google Cloud console.
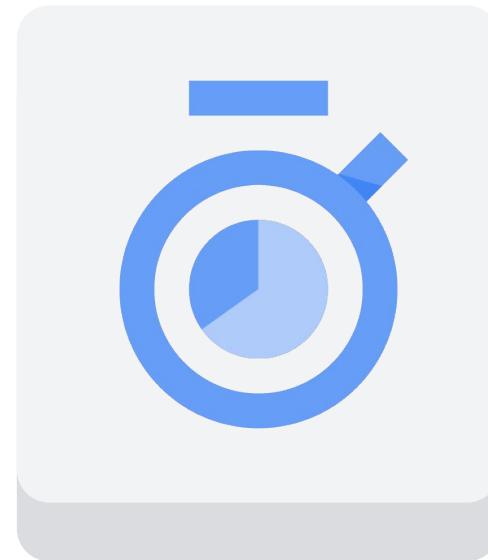
✓ Captures traces from applications deployed on App Engine flexible and standard environment, Compute Engine VMs, Google Kubernetes Engine containers, Cloud Run and non-Google Cloud environments.

Latency reports

- Provide performance insights in near-real time.
- Generate in-depth latency reports to surface performance degradations.
- Identify recent changes to application performance.

Cloud Profiler

✓ Uses statistical techniques and extremely low-impact instrumentation to provide a complete picture of an application.

✓ Allows developers to analyze applications running anywhere

✓ Presents the call hierarchy and resource consumption of the relevant function in an interactive flame graph.

Google Cloud Operation suite helps you explore the known and unknown issues

User Focused Products

Open, Flexible Foundations

Integrated for ease

Meaningful Analysis and Alerting

Understand a customer's journey with SLO monitoring, uptime checks, tracing and more.

Leverage popular open source projects like Prometheus, OpenTelemetry, and Fluentbit.
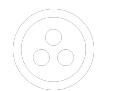
Automatically ingest log, connect data sets, collect in-context telemetry across Google Cloud service.

Use powerful analysis tools and leverage alerting for both automated and human-led resolutions.

Google Cloud

Knowledge Check

Quiz | Question 1

Question

You want a simple way to see the latency of requests for a web application you deployed to Cloud Run. What Google Cloud tool should you use?

A. Trace

B. Profiler

C. Metrics Explorer

D. Logs Explorer

Google Cloud

Quiz | Question 1

Answer

You want a simple way to see the latency of requests for a web application you deployed to Cloud Run. What Google Cloud tool should you use?

A. Trace ✅

B. Profiler

C. Metrics Explorer

D. Logs Explorer

Google Cloud

Quiz | Question 2

Question

You want to examine messages generated by running code. Which tool might be best for doing this?

A. Trace

B. Profiler

C. Metrics Explorer

D. Logs Explorer

Google Cloud

Quiz | Question 2

Answer

You want to examine messages generated by running code. Which tool might be best for doing this?

A.   Trace

B.   Profiler

C.   Metrics Explorer

D.   Logs Explorer   ✅

Quiz | Question 3

Question

Users have reported that an application occasionally returns garbage data instead of the intended results, but you have been unable to reproduce this problem in your test environment. Which tool might be of best help?

A. Trace

B. Profiler

C. Error Reporting

D. Logs Explorer

Quiz | Question 3

Answer

Users have reported that an application occasionally returns garbage data instead of the intended results, but you have been unable to reproduce this problem in your test environment. Which tool might be of best help?

A. Trace

B. Profiler

C. Error Reporting ✅

D. Logs Explorer

Quiz | Question 4

Question

You want to calculate the uptime of a service and receive alerts if the uptime value falls below a certain threshold. Which tool will help you with this requirement?

A. Cloud Monitoring

B. Profiler

C. Error Reporting

D. Logs Explorer

Quiz | Question 4

Question

You want to calculate the uptime of a service and receive alerts if the uptime value falls below a certain threshold. Which tool will help you with this requirement?

A. Cloud Monitoring ✅

B. Profiler

C. Error Reporting

D. Logs Explorer

Google Cloud

Recap

01 Describe the purpose and capabilities of Google Cloud operations suite

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Google Cloud