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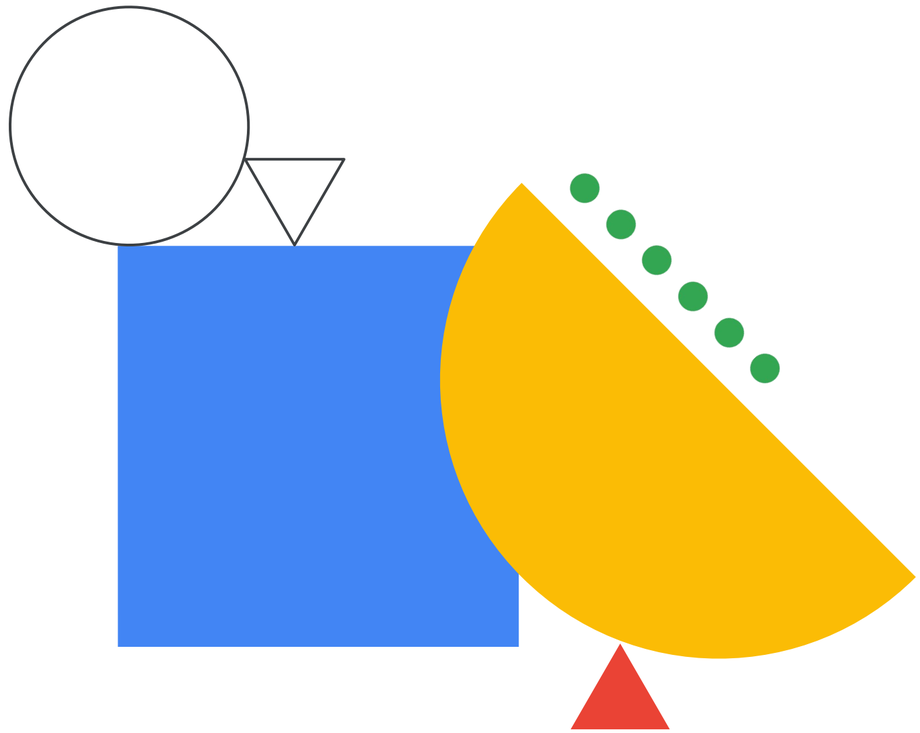
Google Cloud

Resource Management



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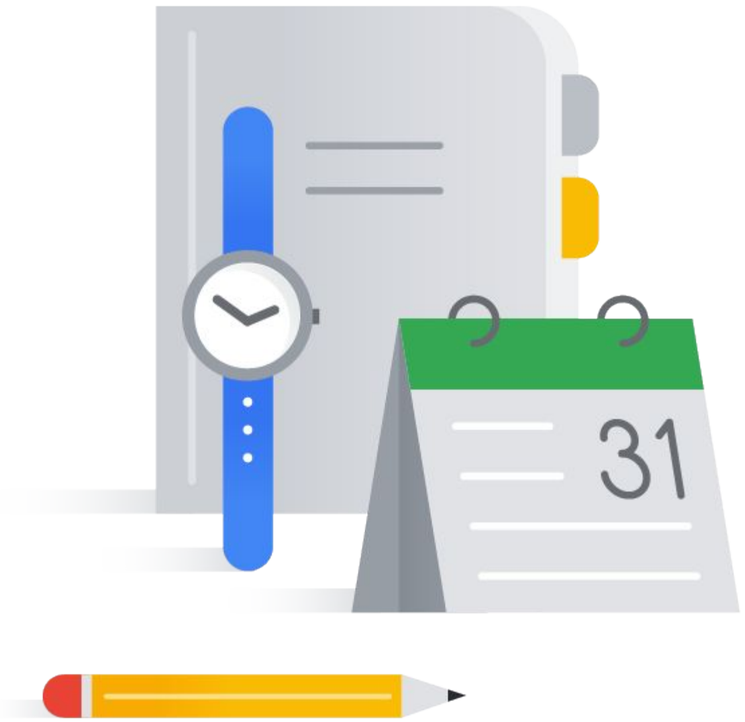
Agenda

01	Resource Manager
02	Quotas
03	Labels
04	Billing
	Lab: Examining Billing Data with BigQuery



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Resource Manager

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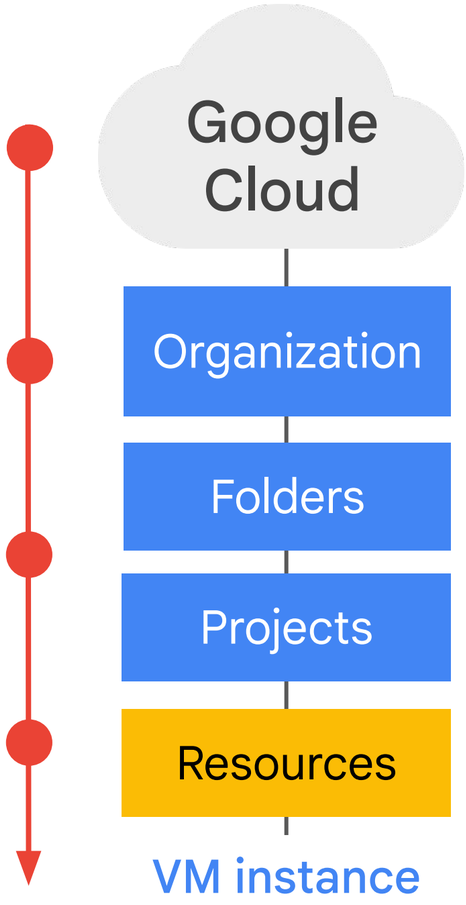
Resource Manager lets you hierarchically manage resources

Identity and Access Management

IAM Allow and Deny Policies



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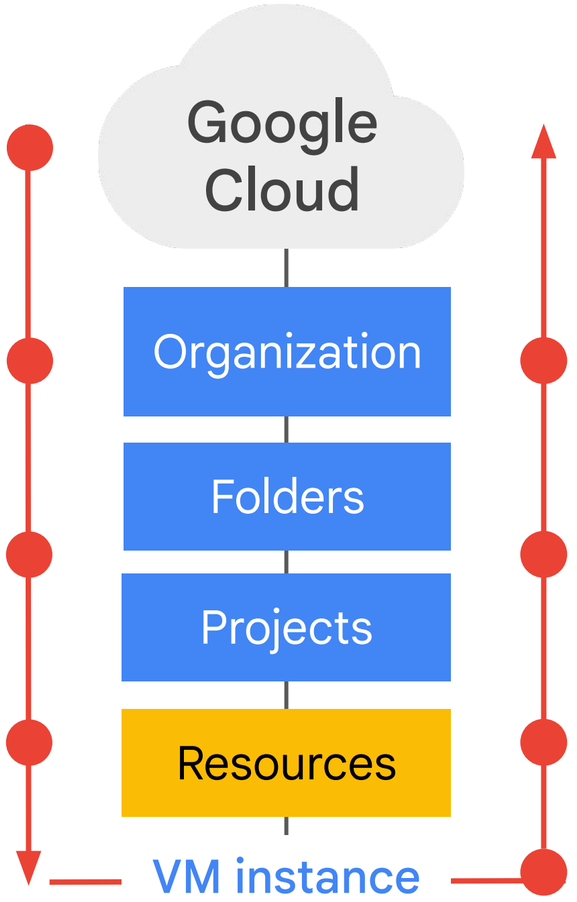

Billing and Resource Monitoring

Organization contains all billing accounts

Project is associated with one billing account

A resource belongs to one and only one project

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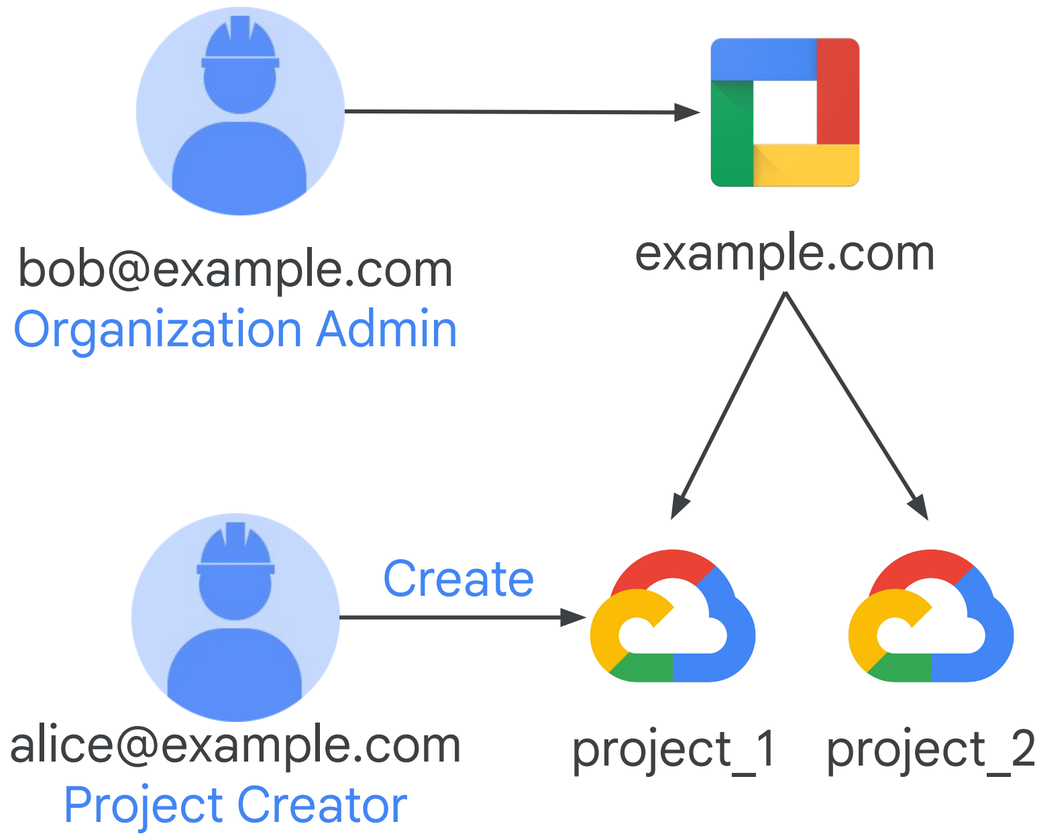
Organization node is root node for Google Cloud resources



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Project accumulates the consumption of all its resources

- Track resource and quota usage
  - Enable billing
  - Manage permissions and credentials
  - Enable services and APIs
- Projects use three identifying attributes:
  - Project Name
  - Project Number
  - Project ID, also known as Application ID

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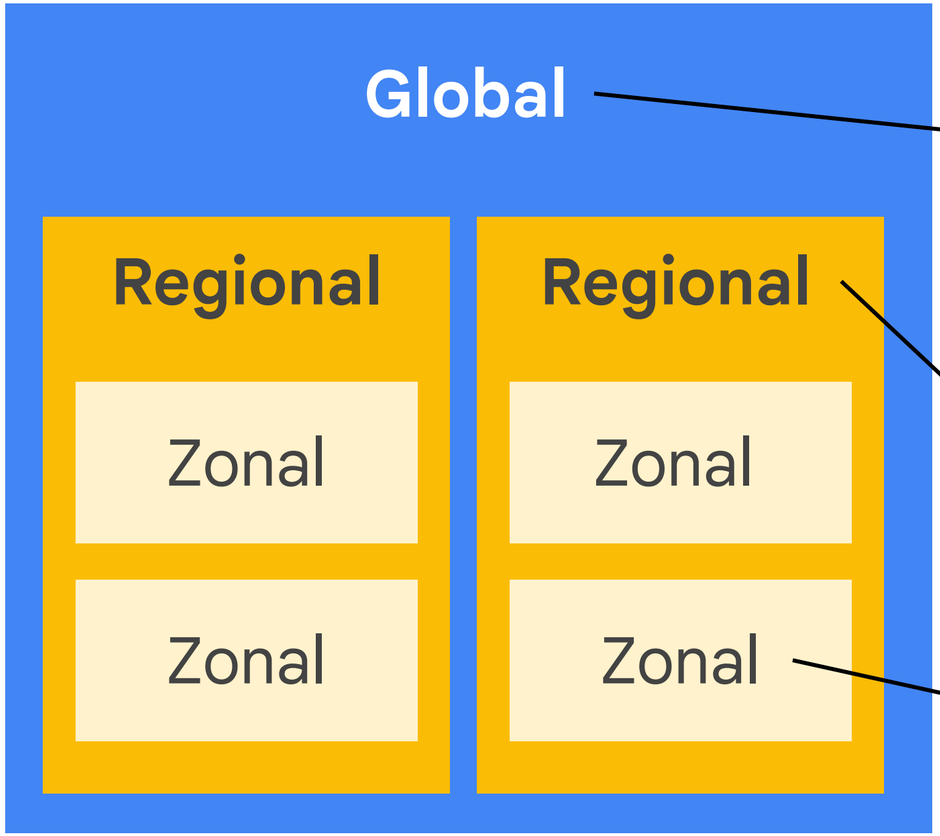
Resource hierarchy

Resources are global, regional, or zonal.

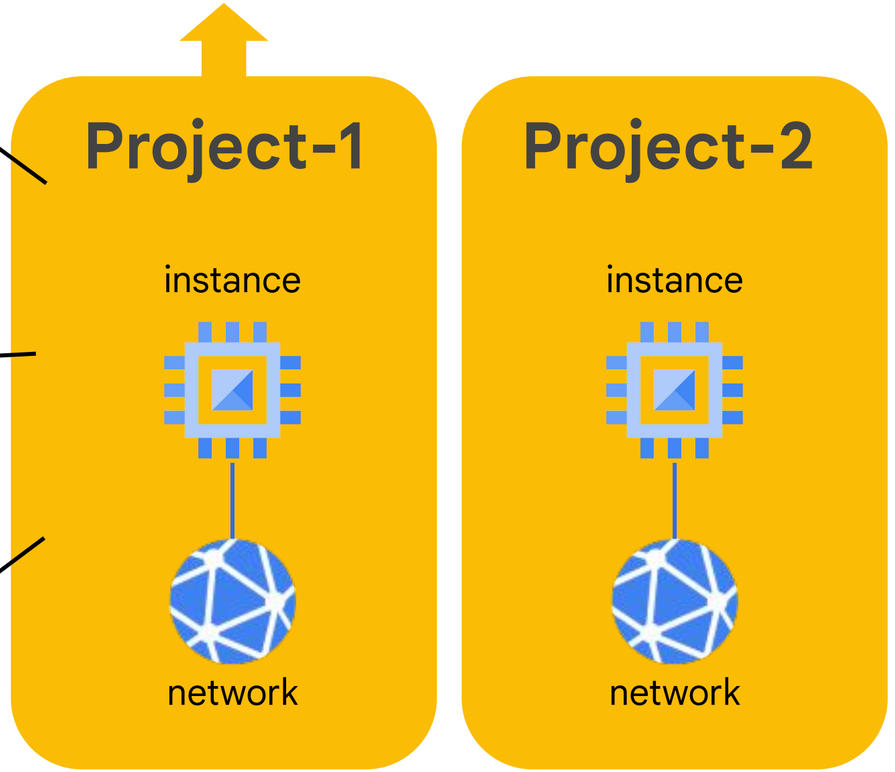


- Images
- Snapshots
- Networks

- External IP addresses

- Instances
- Disks

Billing and reporting is per project.



Physical organization

Logical organization

Google Cloud

Quotas

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All resources are subject to project quotas or limits

- How many resources you can create per project
  - *15 VPC networks/project*
- How quickly you can make API requests in a project: rate limits
  - *5 admin actions/second (Spanner)*
- How many resources you can create per region
  - *24 CPUs region/project*

Increase: Quotas page in the Google Cloud console or a support ticket

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Why use project quotas?

- Prevent runaway consumption in case of an error or malicious attack
- Prevent billing spikes or surprises
- Forces sizing consideration and periodic review

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Labels

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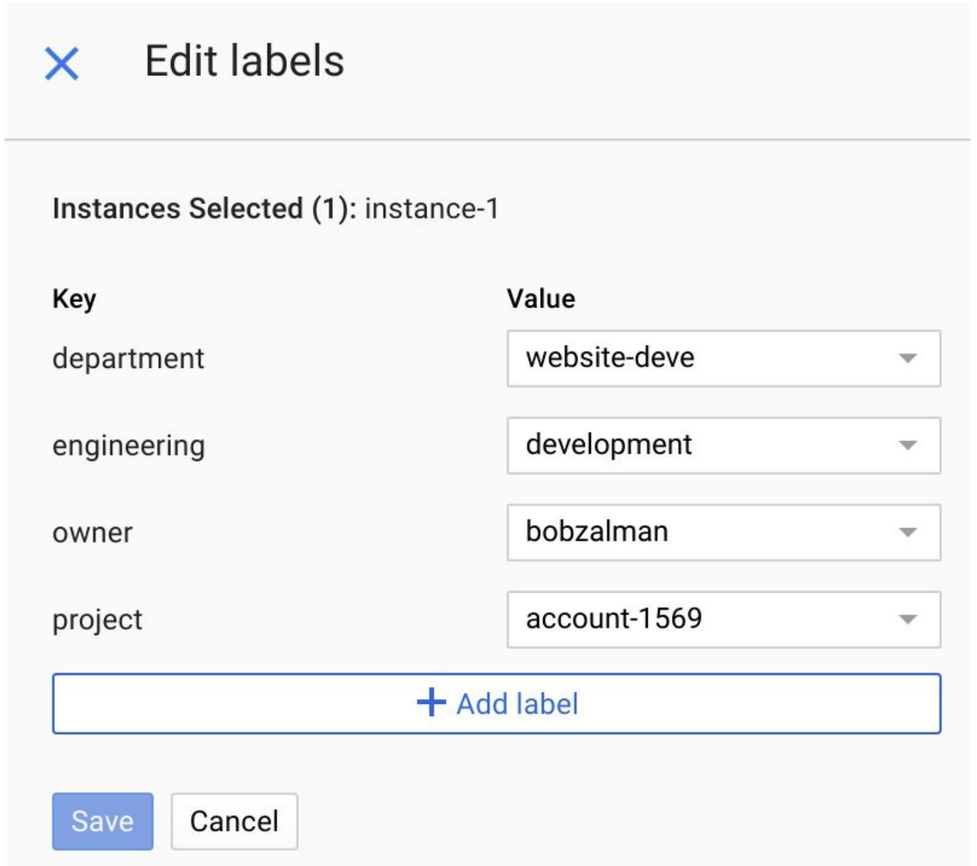
Labels are a utility for organizing Google Cloud resources

- Attached to resources: VM, disk, snapshot, image
  - Google Cloud console, `gcloud`, or API
- *Example uses of labels*:
  - Inventory
  - Filter resources
  - In scripts
    - Help analyze costs
    - Run bulk operations



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Use labels for ...

- Team or Cost Center

  `team:marketing`
  `team:research`

- Components

  `component:redis`
  `component:frontend`

- Environment or stage

  `environment:prod`
  `environment:test`

- Owner or contact

  `owner:gaurav`
  `contact:opm`

- State

  `state:inuse`
  `state:readyfordeletion`

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Comparing labels and network tags

Labels are a way to organize resources across Google Cloud

- Disks, image, snapshots...
- User-defined strings in `key-value` format
- Propagated through billing

Network tags are applied to instances only

- User-defined strings
- Tags are primarily used for networking (applying firewall rules)

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Billing

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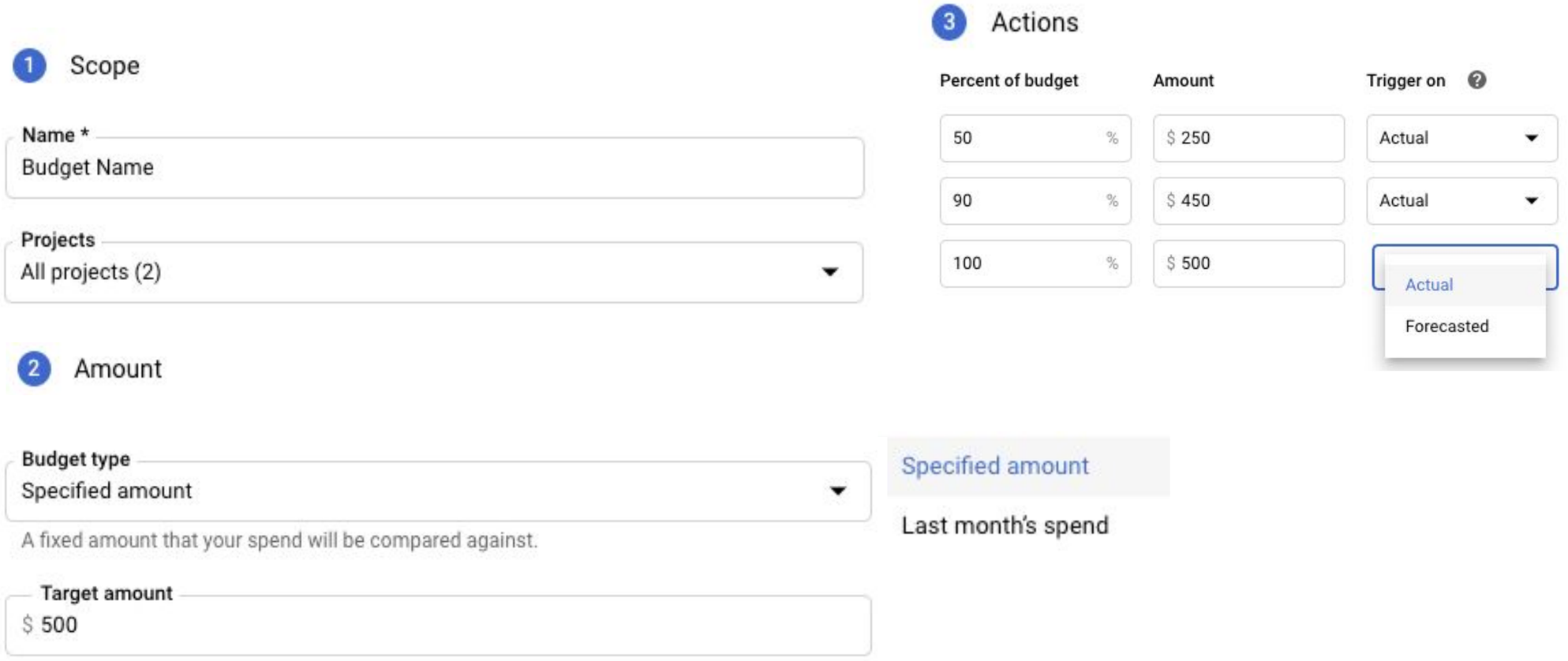
Budgets and email alerts



Programmatic Budgets: Pub/Sub → Cloud Run functions

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Example budget alert email

Billing Alert Notification

Dear Google customer,

You are receiving this email because you are a Google Cloud, Firebase, or API customer.

This is an automated notification to inform you that the project: **arch-gce** has exceeded **50%** of the monthly budget of **$500.00**.

You are receiving this message because there is an alert configured on this project's budget. To disable this alert or modify the budget's threshold, please edit your budget.

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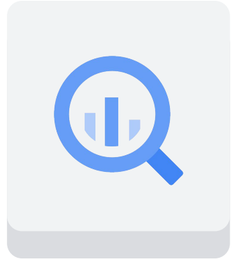
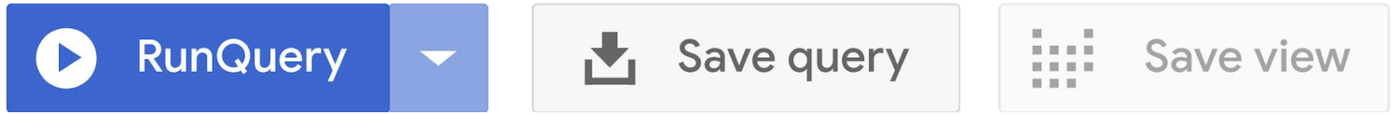
Labels can help you optimize Google Cloud spend



BigQuery

```
1  SELECT
2    TO_JSON_STRING(labels)as labels,
3    sum(cost) as cost
4  FROM `project.dataset.table`
5  GROUP BY labels;
```



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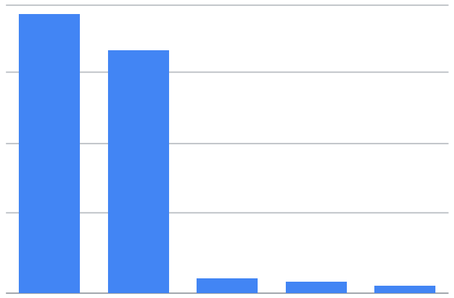
Visualize Google Cloud spend with Looker Studio

Billing Dashboard

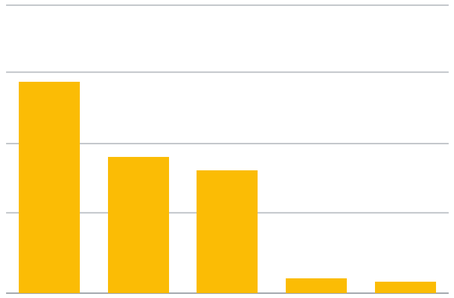
Daily View

Today's Spend by Service



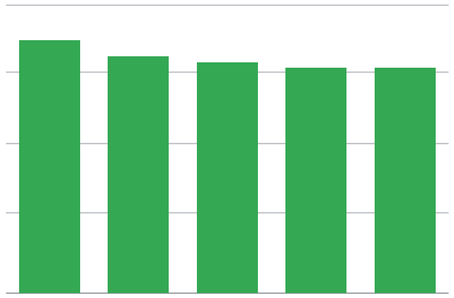
Monthly View

Month-to-Date Spend by Service



Overall

Month-to-Date Spend by Project



Looker Studio

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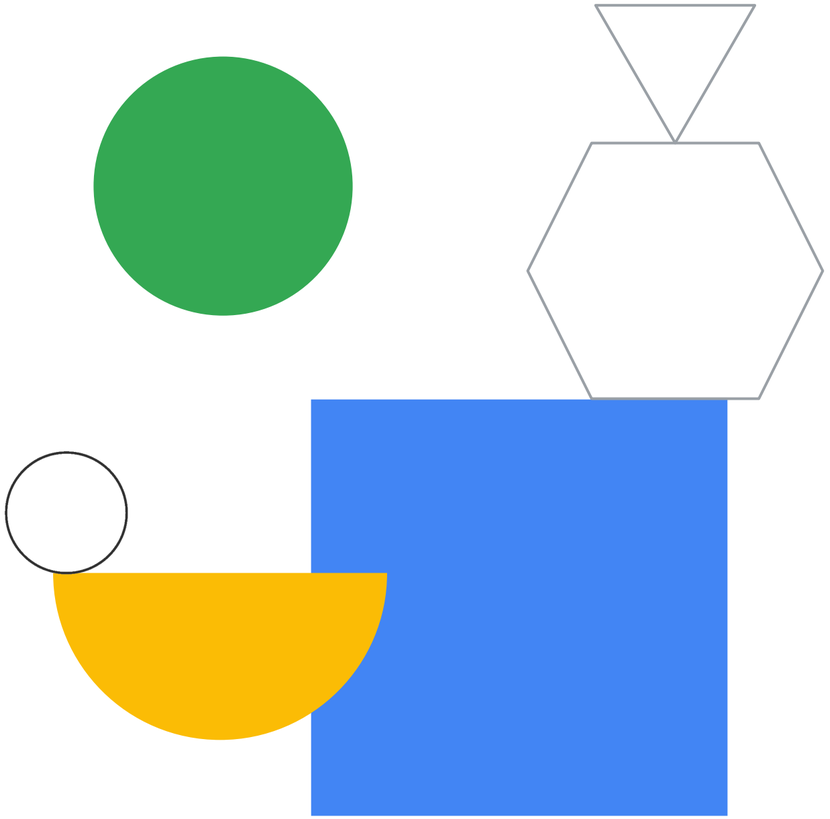
Lab Intro

Examining Billing Data with BigQuery



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Lab objectives

01 Sign in to BigQuery from the Google Cloud console

02 Create a dataset

03 Create a table

04 Import data from a billing CSV file stored in a bucket

05 Run complex queries on a larger dataset

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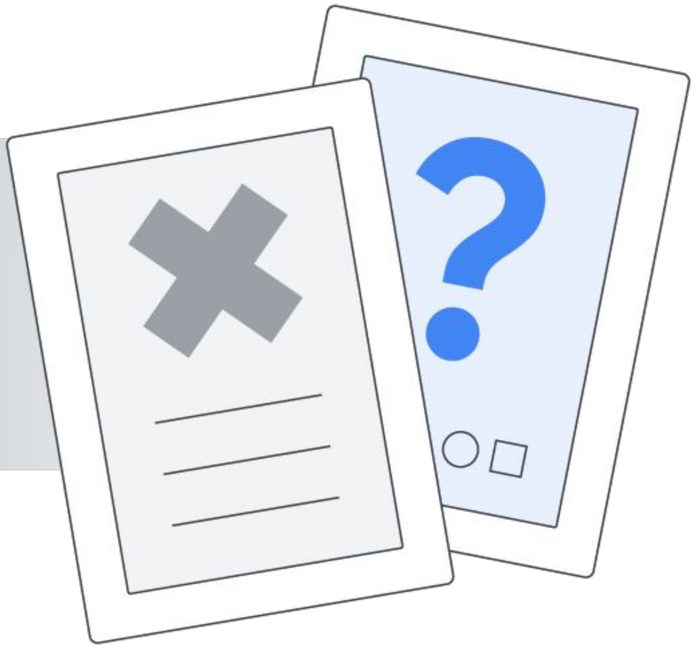

Quiz

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Question #1

Question

No resources in Google Cloud can be used without being associated with...

A. A user

B. A virtual machine

C. A bucket

D. A project

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Question #1

Answer

No resources in Google Cloud can be used without being associated with...

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B. A virtual machine

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Question #2

Question

A budget is set at $500 and an alert is set at 100%. What happens when the full amount is used?

A. Everything in the associated project is suspended because there is not more budget to spend

B. A notification email is sent to the Billing Administrator

C. You have a 4-hour courtesy period before Google shuts down all resources

D. Nothing. There is no point to sending a notification when there is no budget remaining

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Question #2

Answer

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Question #3

Question

How do quotas protect Google Cloud customers?

A. By preventing resource use in too many zones in a region

B. By preventing resource use by unknown users

C. By preventing resource use of too many different Google Cloud services

D. By preventing uncontrolled consumption of resources

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Question #3

Answer

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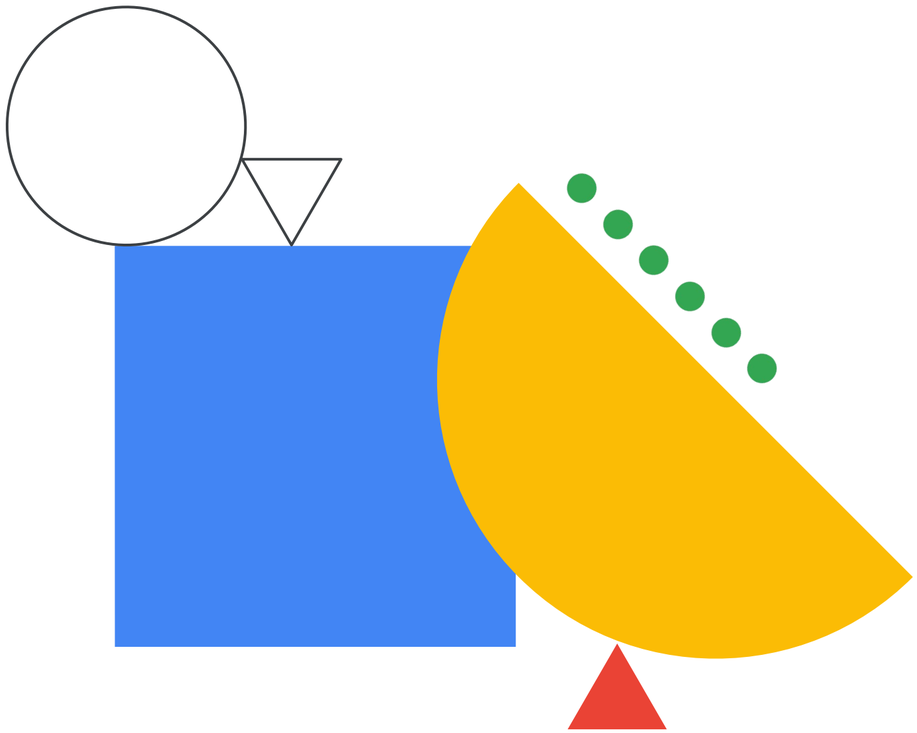
Review:
Resource Management