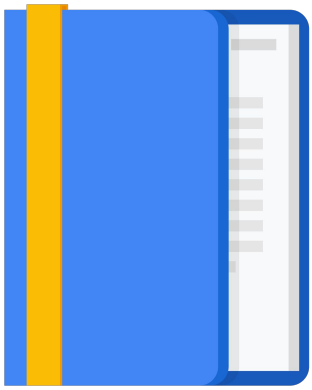

Configuring Access
and Security

Agenda

Section 5.1 - Managing Identity and Access Management (IAM)

Section 5.2 - Managing Service Accounts

Section 5.3 - Viewing audit logs for Project and Managed Services



Google Cloud

Exam Guide: Section 5.1

5.1 Managing Identity and Access Management (IAM).

Tasks include:

- Viewing account IAM assignments.
- Assigning IAM roles to accounts or Google Groups.
- Defining custom IAM roles.

Cloud IAM overview

In Cloud IAM, you grant access to **members**. Members can be of the following types:

- Google account
- Service account
- Google group
- Google Workspace domain
- Cloud Identity domain

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- A **Google account** represents a developer, an administrator, or any other person who interacts with Google Cloud.
- A **service account** is an account that belongs to your application instead of an individual end user.
- A **Google group** is a named collection of Google accounts and service accounts and each has a unique email address that is associated with that group.
- A **Google Workspace domain** represents a virtual group of all the Google accounts that have been created in an organization's Workspace account.
- A **Cloud Identity domain** is like a Workspace domain because it represents a virtual group of all Google accounts in an organization - however, Cloud Identity domain users *do not* have access to Workspace applications and features.

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5.1 Managing Identity and Access Management (IAM).

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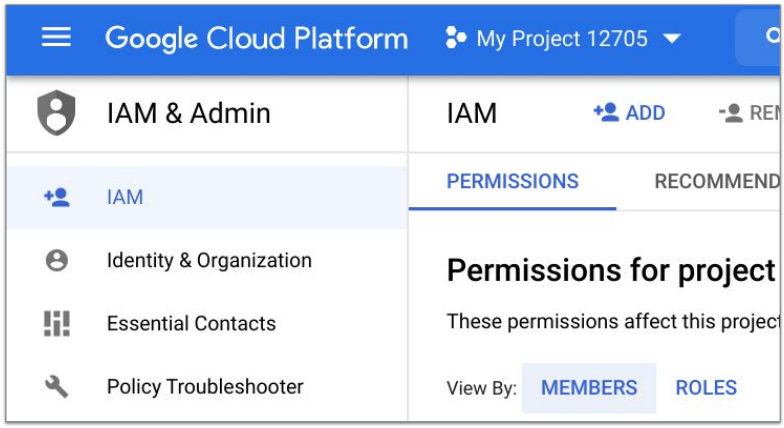
Viewing IAM assignments



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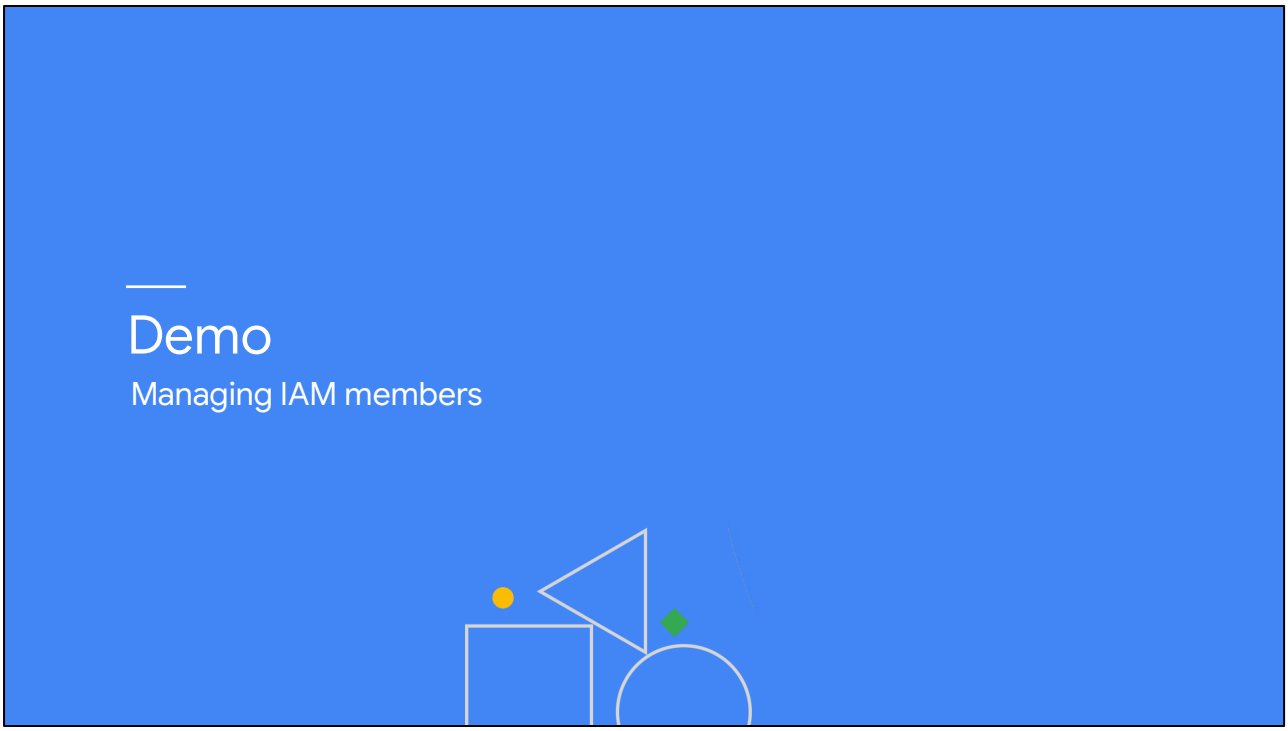
Viewing IAM assignments is easy. Open the IAM page in the Cloud Console, click **Select a Project**, and then click **Open**. The page will then display a list of members of that project and their roles.



https://cloud.google.com/iam/docs/granting-changing-revoking-access

To add a team member to a project and grant them a Cloud IAM role:

1. Open the IAM page in the Cloud Console.
   OPEN THE IAM PAGE
2. Click **Select a project**, choose a project, and click **Open**.
3. Click **Add**.
4. Enter an email address. You can add individuals, service accounts, or Google Groups as members, but every project must have at least one individual as a member.
5. Select a role. Roles give members the appropriate level of permission. We recommend giving the member the least amount of privilege needed. Members with Owner-level permissions are also project owners and can manage all aspects of the project, including shutting it down.
6. Click **Save**.

To grant a role to a member for more than one project:

1. Open the IAM & Admin Projects page in the Cloud Console.
   OPEN THE IAM & ADMIN PROJECTS PAGE
2. Select all the projects for which you want to grant permissions.
3. Click the **Show Info Panel**, followed by the **Permissions** tab.
4. Enter an email address in the **Add members** field, and select the desired role

1. from the dropdown menu.
2. Click the **Add** button. The member will be granted the selected role in each of the selected projects.

Revoke access to a project

1. Open the **IAM** page in the Cloud Console.
   OPEN THE IAM PAGE
2. Click **Select a project**.
3. Select a project and click **Open**.
4. Locate the member for whom you want to revoke access, and then click the **Edit** button on the right.
5. Click the **Delete** button for each role you want to revoke, and then click **Save**.

You can also use the gcloud command set to do this on the command line.

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5.1 Managing Identity and Access Management (IAM).

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- **Defining custom IAM roles.**

Creating custom Cloud IAM roles

To create a custom role, you:

- Must know what permissions are available for that resource.
- May want to get the role metadata, which includes the role ID and permissions contained in the role.
- Must possess `iam.roles.create` permission on your account, which generally means you must be owner of the project or its organization.

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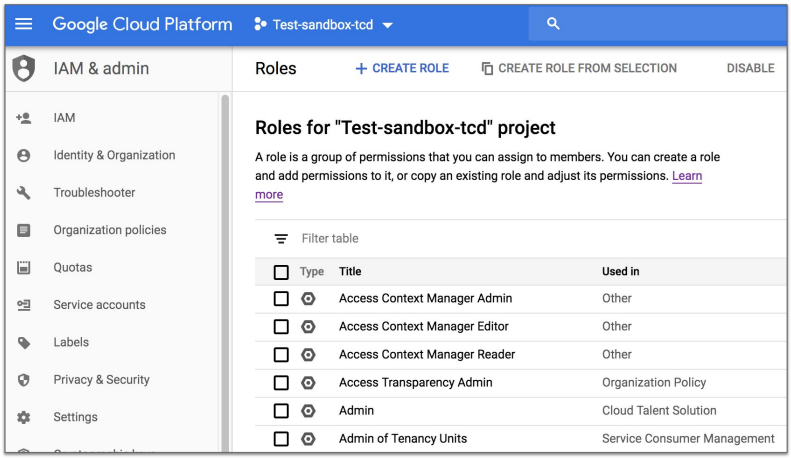
In addition to the predefined roles, Cloud IAM also provides the ability to create customized Cloud IAM roles. You can create a custom Cloud IAM role with one or more permissions and then grant that custom role to users who are part of your organization. Cloud IAM provides a UI and API for creating and managing custom roles.

Role metadata can be found by using the Cloud Console or the IAM API.

Creating custom Cloud IAM roles



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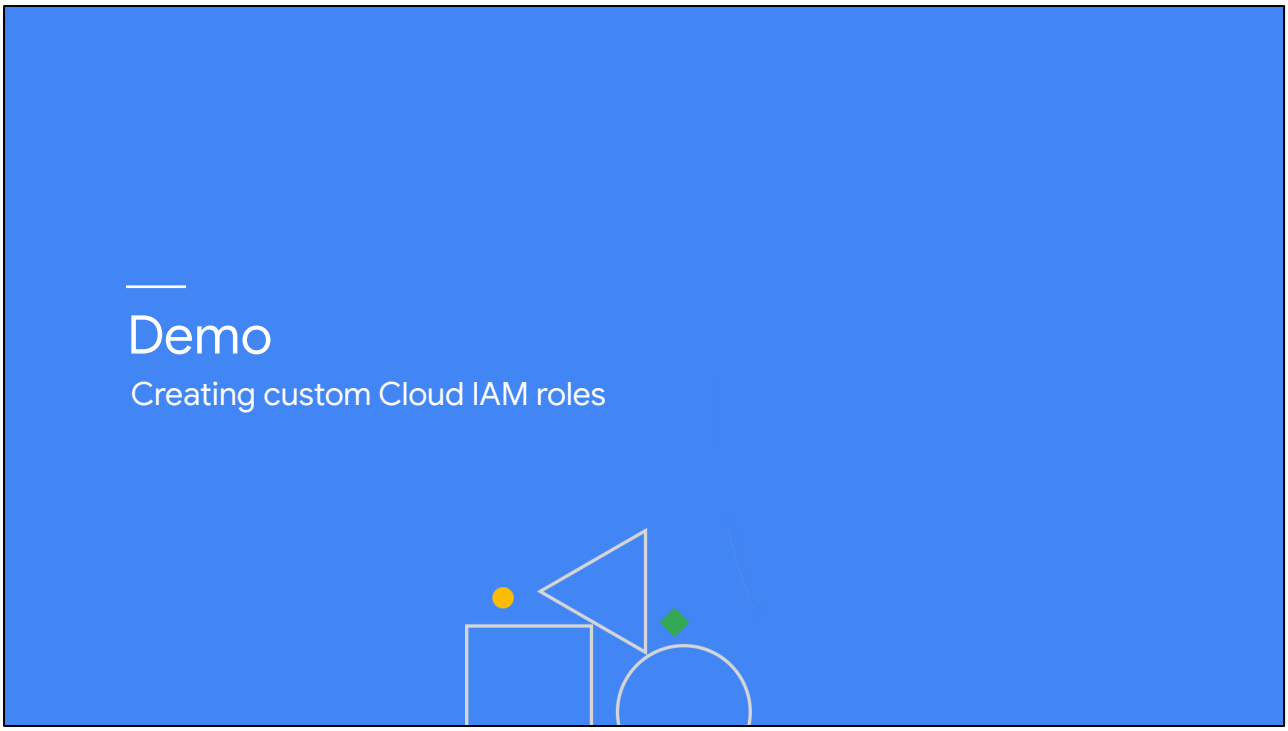
Once you have decided what to call your role, and what permissions to give it, creating the role and adding permissions is fairly simple. You can also create a custom role using a “curated role” as its base. This means you take a role that is similar to the one you need to create, and then add or remove permissions from a copy of that role until it meets your needs exactly.



https://cloud.google.com/iam/docs/creating-custom-roles

1. Go to the Roles page in the Cloud Console.
   OPEN THE ROLES PAGE
2. Select your project from the drop-down at the top of the page.
3. Select the checkbox for a resource's admin role to view all the permissions that you can apply on that resource. For example, when you select the Compute Instance Admin role, the right side panel displays all the permissions that you can apply on a Compute Engine instance.

Before you create a custom role, you might want to get the metadata for both predefined and custom roles. Role metadata includes the role ID and permissions contained in the role. You can view the metadata using the Cloud Console or the IAM API.

1. Go to the Roles page in the Cloud Console.
   OPEN THE ROLES PAGE
2. Select your organization or project from the drop-down at the top of the page.
3. Select the checkbox for one or more roles to view the role permissions. The right side panel displays the permissions contained in the role(s), if any.

The icons beside the role indicate if it's a custom role ("factory" icon) or a predefined role (hexagon icon).

To create a custom role, a caller must possess `iam.roles.create` permission. By

default, the owner of a project or an organization has this permission and can create and manage custom roles.

Users who are not owners, including organization admins, must be assigned either the Organization Role Administrator role, or the IAM Role Administrator role.

To create a new custom role from scratch:

1. Go to the Roles page in the Cloud Console.
   OPEN THE ROLES PAGE
2. Select your organization from the **Organization** drop-down.
3. Click **Create Role**.
4. Enter a **Name**, a **Title**, and **Description** for the role.
5. Click **Add Permissions**.
6. Select the permissions you want to include in the role and click **Add Permissions**. Use the **All Services** and **All Types** drop-downs to filter and select permissions by services and types.

Creating a custom role based on an existing curated role:

1. Go to the Roles page in the Cloud Console.
   OPEN THE ROLES PAGE
2. Select your organization from the **Organization** drop-down.
3. Select the roles on which you want to base the new custom role.
4. Click **Create Role from Selection**.
5. Enter a **Name**, a **Title**, and **Description** for the role.
6. Uncheck the permissions you want to exclude from the role.
7. Click **Add Permissions** to include any permissions.
8. Click **Create**.

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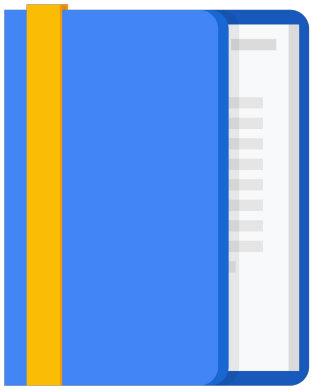

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5.2 Managing service accounts.

Tasks include:

- Managing service accounts with limited scopes.
- Assigning a service account to VM instances.
- Granting access to a service account in another project.

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Tasks include:

- **Managing service accounts with limited scopes.**
- Assigning a service account to VM instances.
- Granting access to a service account in another project.

Service accounts...

- Are a special account that belongs to a Virtual Machine (VM) or an application.
- Allow applications and VMs to call on the API of a service without a user being involved.
- Are always associated with a key pair.
- Come in two types: user-managed, and Google-managed.
- Is also a type of resource, which has IAM policies attached to it.
- Make use of both IAM roles, and *scopes*.

Google Cloud

First, let's go over what a "service account" is.

A service account is a special Google account that belongs to your application or a virtual machine (VM), instead of to an individual end user. Your application uses the service account to call the Google API of a service, so that the users aren't directly involved.

For example, a Compute Engine VM may run as a service account, and that account can be given permissions to access the resources it needs. This way the service account is the identity of the service, and the service account's permissions control which resources the service can access.

A service account is identified by its email address, which is unique to the account.

Service account access scopes

- Access scopes are a legacy means of assigning permissions for your VMs.
- They are no longer required for setting VM permissions - IAM roles now fill most of those functions.
- They are still required for configuring instances to act as service accounts.

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Access scopes are the legacy method of specifying permissions for your VM. Before the existence of IAM roles, access scopes were the only mechanism for granting permissions to service accounts.

Although they are not the primary way of granting permissions now, you must still set access scopes when configuring an instance to run as a service account.

In addition, the permissions granted in the role and with a scope must agree - if they do not, the service account will not be able to perform the function you need it to.

Service account access scopes

- Scopes take the form of a URL.
- An example of a scope is:
  https://www.googleapis.com/auth/bigquery.insertdata
- The scope consists of the base URL up to the “auth” section, plus a specific permission being granted.
- Scope can also be set on the command line using set-scopes with the gcloud command.

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An VM instance can only perform operations that are allowed by the roles assigned to the service account **and** the scopes that have been defined on the instance - and those permissions cannot contradict.

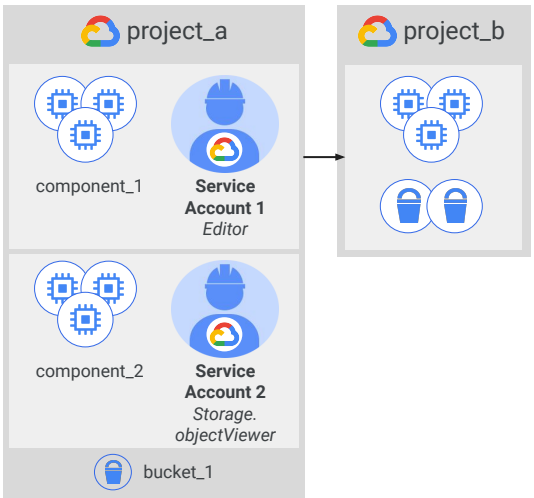
For example, if a role only grants view only access to a resource, but a scope allows edit access, then the instance will not be able to edit that resource.

To enable edit access to the resource, the role would need to be modified so that it agreed with the permissions granted in the scope - in other words, it would need to be changed to allow editing.

If you need to change access scopes on an instance, you will need to stop that instance first, and then restart it for the changes to take effect.

Example: Service accounts and IAM

- VMs running component_1 are granted **Editor** access to project_b using Service Account 1.
- VMs running component_2 are granted **objectViewer** access to bucket_1 using Service Account 2.
- Service account permissions can be changed without recreating VMs.



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You can grant different groups of VMs in your project different identities. This makes it easier to manage different permissions for each group. You also can change the permissions of the service accounts without having to recreate the VMs.

Here's a more complex example. Say you have an application that's implemented across a group of Compute Engine virtual machines. One component of your application needs to have an editor role on another project, but another component doesn't. So you would create two different service accounts, one for each subgroup of virtual machines. Only the first service account has privilege on the other project. That reduces the potential impact of a miscoded application or a compromised virtual machine.

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5.2 Managing service accounts.

Tasks include:

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- **Assigning a service account to VM instances.**
- **Granting access to a service account in another project.**

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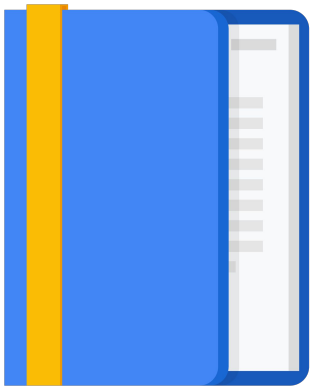

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5.3 Viewing audit logs for project and managed services.

Google Cloud

Cloud Audit Logs

Three types of audit logs are kept for each of your projects:

- Admin Activity
- System Events
- Data Access

```
projects/[PROJECT_ID]/logs/cloudaudit.googleapis.com%2Factivity
projects/[PROJECT_ID]/logs/cloudaudit.googleapis.com%2Fdata_access
projects/[PROJECT_ID]/logs/cloudaudit.googleapis.com%2Fsystem_event

folders/[FOLDER_ID]/logs/cloudaudit.googleapis.com%2Factivity
folders/[FOLDER_ID]/logs/cloudaudit.googleapis.com%2Fdata_access
folders/[FOLDER_ID]/logs/cloudaudit.googleapis.com%2Fsystem_event

organizations/[ORGANIZATION_ID]/logs/cloudaudit.googleapis.com%2Factivity
organizations/[ORGANIZATION_ID]/logs/cloudaudit.googleapis.com%2Fdata_access
organizations/[ORGANIZATION_ID]/logs/cloudaudit.googleapis.com%2Fsystem_event
```

Google Cloud

Cloud Audit Logs maintains three audit logs for each project, folder, and organization: **Admin Activity**, **System Event** and **Data Access**.

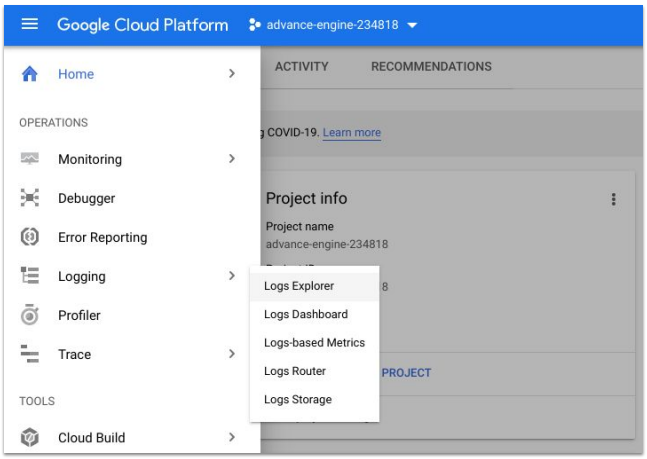
Google Cloud services write audit log entries to these logs to help you answer the questions of "who did what, where, and when?" within your Google Cloud projects.

These logs contain the following information:

- **Resource**: Each audit log entry includes a resource of some type. For example, you can view audit log entries from a single Compute Engine VM instance or from all VM instances.
- **Service**: Services are individual Google Cloud products, such as Compute Engine, Cloud SQL, or Pub/Sub. Each service is identified by name: Compute Engine is `compute.googleapis.com`, Cloud SQL is `cloudsql.googleapis.com`, and so forth.

Viewing cloud audit logs in Operations

Cloud audit logs can be viewed through the Operations interface from the main Cloud Console menu.

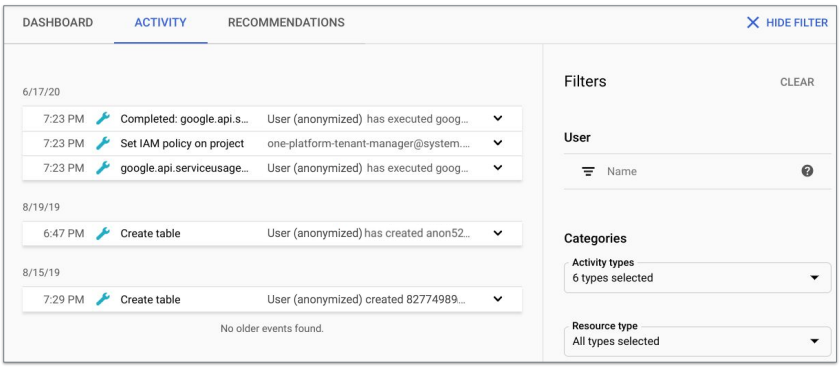


Google Cloud

To view audit logs on a VM instance within a project, navigate to the Operations section of the main Google Cloud menu. You will see options for Operations components listed under the main heading. Choose “Logging” and then “Logs Explorer” to view log entries for your instance.

Viewing Cloud Audit Logs in the Activity menu

You can also access abbreviated versions of your activity logs via the **Activity** link on the Home screen.



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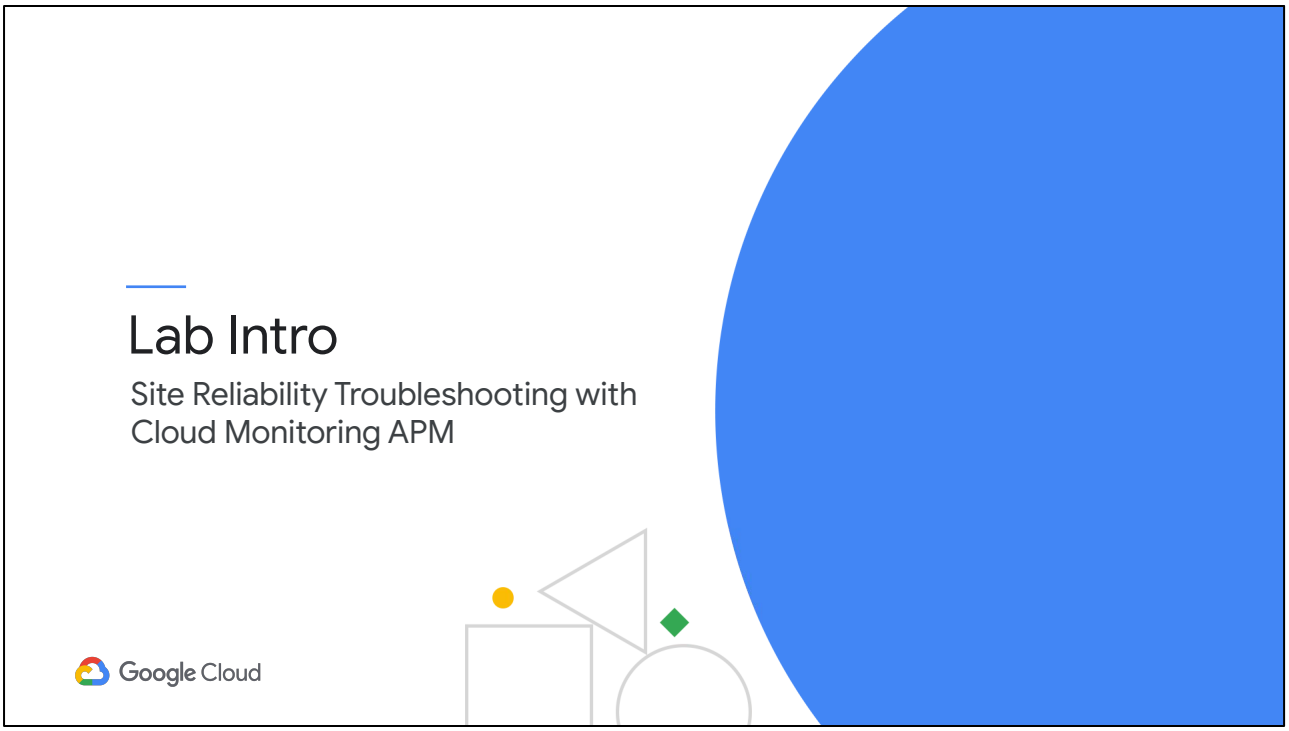
You can view abbreviated, project-level audit log entries in your project's **Activity** page in the Cloud Console. Navigate to the **Home > Activity** page, and then use **Filter** to select the entries you want to see. As mentioned, these entries are abbreviated, so the actual audit log entries might contain more information than you see in the **Activity** page.



The objective of this lab is to familiarize yourself with the specific capabilities of Cloud Monitoring to monitor GKE cluster infrastructure, Istio, and applications deployed on this infrastructure.

In this lab you:

- Create a GKE cluster
- Deploy a microservices application to it
- Define latency and error SLIs and SLOs for it
- Configure Cloud Monitoring to monitor your SLIs
- Deploy a breaking change to the application and use Cloud Monitoring to troubleshoot and resolve the issues that result
- Validate that your resolution addresses the SLO violation

This lab is part of the Qwiklabs Cloud Architecture Quest.

Suggested study resources for this section

Cloud IAM: https://cloud.google.com/iam/docs/

Security and Identity Fundamentals Quest: https://www.qwiklabs.com/quests/40

Cloud IAM Overview: https://cloud.google.com/iam/docs/overview

Understanding IAM roles: https://cloud.google.com/iam/docs/understanding-roles

Understanding IAM custom roles: https://cloud.google.com/iam/docs/understanding-custom-roles

Granting or changing access in IAM:
https://cloud.google.com/iam/docs/granting-changing-revoking-access

Understanding service accounts: https://cloud.google.com/iam/docs/understanding-service-accounts

Service accounts: https://cloud.google.com/iam/docs/service-accounts

Cloud Audit Logs overview: https://cloud.google.com/logging/docs/audit/

Google services with audit logs: https://cloud.google.com/logging/docs/audit/services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