Practical No.07

Aim: Study of GCP Console:

- Understanding Projects
- Billing in GCP
- Install and configure Cloud SDK

Theory:

- Google Cloud Platform (GCP) is a powerful and versatile cloud computing platform that offers a wide range of services and tools to help organizations build, deploy, and manage their applications and infrastructure.
- At the heart of GCP lies the GCP Console, a user-friendly web interface that serves as the central hub for controlling and interacting with GCP resources.
- The Google Cloud Platform (GCP) Console is a web-based interface provided by Google for managing and interacting with various cloud services and resources offered by GCP. It serves as a central control panel for developers, administrators, and businesses to access, configure, and monitor their cloud infrastructure and services.
- Whether you are a cloud enthusiast, a developer, or an IT professional looking to harness the capabilities of GCP, this study will equip you with the knowledge needed to navigate and utilize the GCP Console effectively.
- We will begin by exploring the concept of GCP projects, which are fundamental to organizing and isolating resources within the platform.
- Understanding how projects work and how to manage them is a crucial starting point. Next, we'll delve into the intricacies of billing within GCP, ensuring you grasp the pricing models, budgeting, and cost management aspects.
- One of the most practical aspects of this study is the installation and configuration of the Cloud SDK.

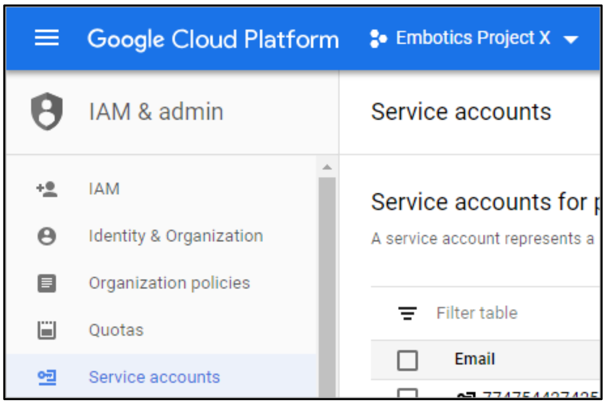


FIG. GCP Console

- You will learn how to set up this command-line tool, which is indispensable for interacting with GCP services and resources directly from your local environment.
- As we progress, we will delve into various facets of the GCP Console, including identity and access management, resource management, services, and products, monitoring and logging, security and compliance, and networking.
- Each section will provide insights and practical knowledge to help you navigate, configure, and optimize your GCP environment.
- Whether you are embarking on a cloud migration project, seeking to enhance your cloud computing skills, or preparing for GCP certification exams, this guide will serve as a valuable resource to master the GCP Console and harness the full potential of Google Cloud Platform.
- Here are some key features and functionalities of the GCP Console:
  1. **User-Friendly Interface**: The GCP Console is designed to be user-friendly, with an intuitive interface that allows users to navigate and manage cloud resources efficiently.
  2. **Resource Management**: Users can create, modify, and delete GCP resources such as virtual machines, databases, storage buckets, and more. The Console provides tools to organize and monitor these resources.
  3. **IAM (Identity and Access Management)**: Administrators can manage user access and permissions through IAM, controlling who can perform actions within GCP projects.
  4. **Billing and Cost Management**: The Console provides insights into usage and costs, allowing users to manage billing accounts, set budgets, and configure alerts to monitor spending.

5. **Deployment and Development**: Developers can deploy and manage applications using services like Google App Engine, Google Kubernetes Engine (GKE), and Cloud Functions directly from the Console.
6. **Monitoring and Logging**: GCP offers monitoring and logging tools to track the health, performance, and security of resources. The Console integrates with tools like Cloud Monitoring and Cloud Logging.
7. **Security and Compliance**: Users can configure security settings, set up firewalls, and enable encryption for data at rest and in transit. GCP offers various compliance certifications.
8. **Networking**: Networking features in the Console include the setup of Virtual Private Cloud (VPC), load balancers, and DNS management for routing traffic.
9. **Development Tools**: The Console provides access to development tools, including the Cloud SDK, which allows developers to interact with GCP resources via the command line.
10. **Big Data and Machine Learning**: Users can leverage GCP's big data and machine learning services, such as BigQuery and AI Platform, directly from the Console.
11. **Documentation and Support**: Access to comprehensive documentation, support resources, and community forums is available within the Console to help users troubleshoot issues and find answers to their questions.
12. **Integration with Other Google Services**: The Console seamlessly integrates with other Google services like Google Workspace, making it easier to manage and access resources across various Google platforms.
13. **Multi-Region and Global Infrastructure**: GCP offers data centers and regions worldwide, allowing users to deploy resources close to their target audience for improved performance and redundancy.

❖ ***Projects In GCP:***

In Google Cloud Platform (GCP), "Projects" are fundamental organizational units used to group and manage cloud resources. Understanding GCP Projects is crucial because they play a central role in resource isolation, access control, and billing. Here's a deeper look at GCP Projects:

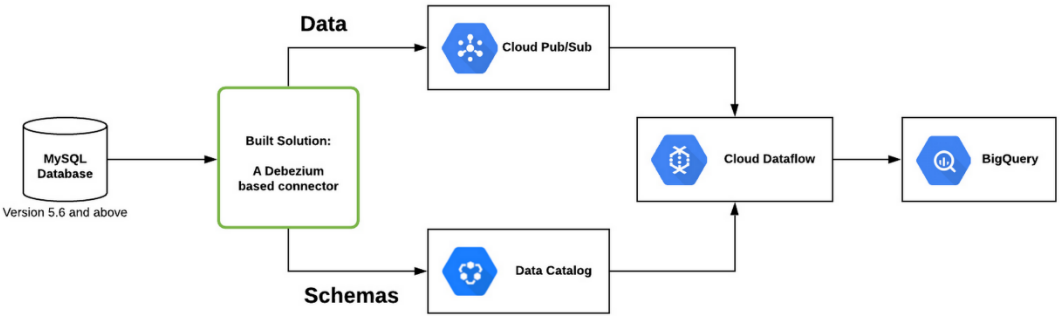


Fig. Project FlowChart In GCP

1. **Organizational Structure:**
   - In GCP, you create and manage cloud resources within Projects.
   - Each Project has a unique Project ID and a user-defined Project Name.
   - Projects can be thought of as containers that hold resources like virtual machines, databases, storage, and more.
2. **Resource Isolation:**
   - GCP Projects provide logical isolation for resources. Resources within one project are separate from resources in another project.
   - This isolation helps ensure that changes or issues in one project do not affect resources in another project.
3. **Access Control (IAM - Identity and Access Management):**

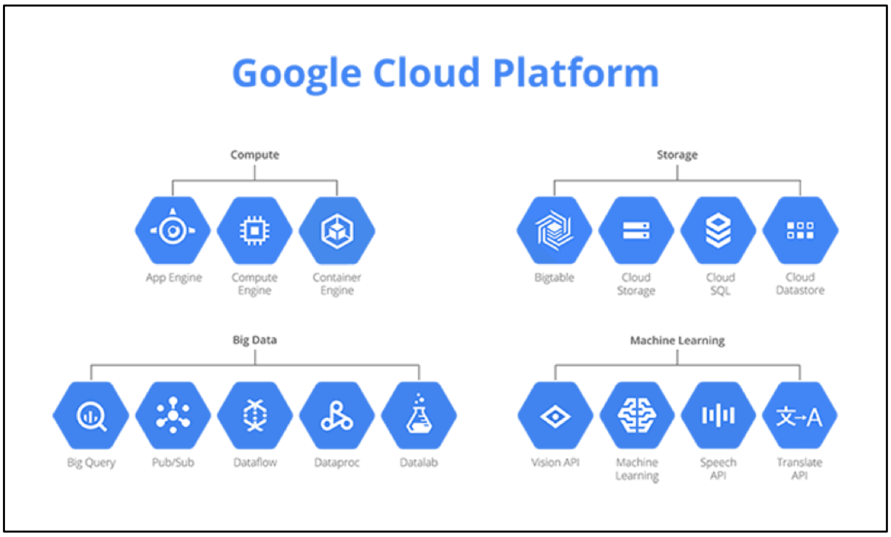
- IAM policies are attached to GCP Projects, allowing you to control who can access and perform actions within the Project.
- IAM roles (e.g., owner, editor, viewer) can be assigned to users, groups, and service accounts at the Project level.
- Fine-grained control over permissions is possible, ensuring the principle of least privilege.

4. **Billing and Cost Management:**
   - Each Project can have its billing configuration. You can associate billing accounts with Projects to manage costs separately.
   - This enables organizations to track and allocate costs to different departments, teams, or projects effectively.

5. **Default Project:**
   - When you create a GCP account, a default Project is automatically created for you. This Project serves as the default location for resources until you create new Projects.
   - You can use the default Project for experimentation or small-scale tasks, but it's advisable to create additional Projects for better resource organization.
6. **Project Switching:**
   - Users, especially those with multiple Projects, can easily switch between Projects within the GCP Console or via the Cloud SDK command-line tool.
   - This allows users to work with different sets of resources and configurations.
7. **Resource Management:**
   - Within a Project, you can create, configure, and manage various GCP resources like virtual machines, databases, storage buckets, and more.
   - Resource management, monitoring, and scaling are performed within the context of the Project.
8. **Project IDs:**
   - Each Project has a unique Project ID, which is a permanent identifier. The Project Name can be changed, but the Project ID remains constant.

   Multi-Project Environment:
   - Many organizations work with multiple Projects in separate environments, such as development, testing, and production.
   - Resource sharing and collaboration across Projects are possible, but they require appropriate IAM configurations.

- GCP Projects serve as the foundation for organizing, securing, and managing cloud resources in a structured manner.
- Understanding how to create, configure, and manage Projects is essential for effectively using GCP and ensuring that your cloud infrastructure is well-organized and secure.



- ***Billing in GCP:***

Billing in Google Cloud Platform (GCP) is a critical aspect of using cloud services. Properly managing billing allows you to control costs, track expenses, and optimize your cloud spending. Here is an overview of billing in GCP:

1. **Billing Account:**

   - To use GCP services, you need to set up a billing account. This account is linked to your GCP projects and is used to pay for the resources and services you use.

   - You can create a billing account when you sign up for GCP or associate an existing billing account with your GCP projects.

2. **Pricing Models:**

   - GCP offers various pricing models to suit different needs:

   - Pay-as-You-Go: You are billed based on your actual usage of resources, typically on an hourly or per-second basis, depending on the service.

   - Committed Use Contracts: You can commit to using specific resources for a defined period to get discounts.

   - Custom Pricing: Large enterprises can negotiate custom pricing with Google.

3. **Cost Tracking:**

   - GCP provides tools and features for tracking costs and usage:

   - Billing Reports: You can generate detailed billing reports to see how your expenses are distributed across different GCP services and regions.

   - Cost Explorer: This tool helps you visualize and analyze your costs over time.

   - Budgets: Set budgets to control spending and get alerts when your expenses approach or exceed the defined thresholds.

   - Labels and Labels-Based Budgets: You can label resources and allocate costs to specific teams or projects, making cost attribution easier.

4. **Invoicing and Payments:**

   - GCP provides options for monthly invoicing, automatic payments, and credit card billing, depending on your billing preferences.

   - You can view and manage your billing statements and payment methods within the GCP Console.

5. **Cost Optimization:**

   - GCP offers various tools and best practices for optimizing costs:

   - Rightsizing: Analyze your resource usage and adjust the size of instances or resources to match your actual needs.

   - Sustained Use Discounts: Automatically receive discounts when you use virtual machines continuously.

   - Preemptible Instances: Use low-cost preemptible instances for batch processing and fault-tolerant workloads.

   - Storage Class and Lifecycle Policies: Store data cost-effectively by choosing the right storage class and applying lifecycle policies.

6. **Compliance and Transparency:**

   - Google Cloud is committed to transparency and provides a comprehensive view of your usage and costs.

   - GCP has various compliance certifications, including SOC 2, ISO 27001, HIPAA, and more, which can be important for regulated industries.

7. **Cost Monitoring and Alerts:**

   - Implement alerting policies to receive notifications when your spending exceeds predefined thresholds, helping you manage costs proactively.

8. **Third-Party Cost Management Tools:**

- Many third-party cost management tools and solutions are available to enhance your cost tracking, optimization, and reporting capabilities.

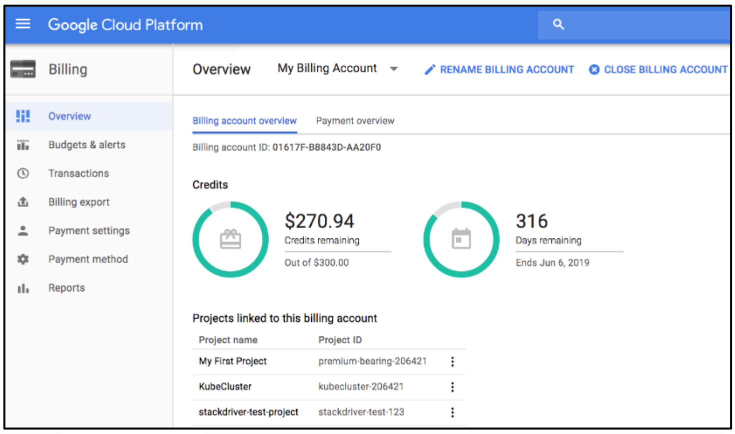
- Effectively managing billing in GCP is crucial to avoid unexpected costs and to ensure that your cloud spending aligns with your budget and organizational goals.
- Regularly monitoring your expenses, optimizing your resources, and leveraging budgeting and alerting features are essential steps in controlling costs.

❖ *Install and configure Cloud SDK:*

- Installing and configuring the Google Cloud SDK (Software Development Kit) is a crucial step for interacting with Google Cloud Platform (GCP) services and resources from your local development environment.
- The Cloud SDK provides a set of command-line tools for managing and deploying applications, managing resources, and more.
- Here's a step-by-step guide on how to install and configure the Google Cloud SDK:

Note: Before you begin, ensure that you have a GCP account and have created a GCP project. You'll need your GCP project ID during the configuration process.

1. **Installation:**
   - Download the Windows installer from the Google Cloud SDK website.
   - Run the installer and follow the on-screen instructions.



Billing account ID: 01617F-B8843D-AA20F0

Credits

$270.94
Credits remaining
Out of $300.00

316
Days remaining
Ends Jun 6, 2019

Projects linked to this billing account

Project name	Project ID
My First Project	premium-bearing-206421
KubeCluster	kubecluster-206421
stackdriver-test-project	stackdriver-test-123

2. **Initialization:**
   - After installation, you need to run "gcloud init" to initialize the SDK and configure it with your GCP project and credentials.
   - Follow the interactive prompts to log in with your GCP account, select your project, and choose a default configuration. The prompts will guide you through the setup process.

3. **Authentication:**
   - After initialization, you should be authenticated with your GCP account. The SDK stores your credentials locally.

4. **Configuration (Optional):**
   - You can configure various settings using '**gcloud config**' commands. For example, you can set the default project, region, and other options.
   - To set the default project:

```
gcloud config set project PROJECT_ID
```

5. **Verify Installation:**
   - To verify that the Cloud SDK is correctly installed and configured, you can run a simple command like **gcloud** version or **gcloud info** to see information about your configuration.

6. **Additional Components (Optional):**
   - The Cloud SDK includes additional components that you can install based on your needs. These components include '**kubectl'** (Kubernetes command-line tool) and various **app-engine-java, app-engine-python**, etc., components for specific development environments.

- To install additional components, you can use the **gcloud components and install the COMPONENT_NAME** command.

- With the Google Cloud SDK installed and configured on your local machine, you're ready to work with Google Cloud Platform services and resources from the command line, enabling seamless development and management of your cloud-based applications and infrastructure.

Conclusion: From this practical, we learned about Google Cloud Platform with their implementation. We have implemented the billing with their usage.