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External Attack Surface for Initial Access in GCP Cloud

CyberWarFare Labs

CW Labs is a renowned UK based Ed-tech company specializing in cybersecurity cyber range labs. They provide on-demand educational services and recognize the need for continuous adaptation to evolving threats and client requirements.

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The company has two primary divisions :

1. **Cyber Range Labs**
2. **Up-Skilling Platform**

About Speaker:

Parth Agrawal

(Security Intern @CWL)

Is a cloud security enthusiast with a keen interest in the intricacies of cloud services offered by AWS, Azure, and GCP. Possessing a comprehensive understanding of these platforms, they are particularly drawn to exploring Red Team methodologies. Interested in Red Team methodologies, focusing on vulnerability testing and detection across external attack surfaces.

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Google Cloud Services

GCP Bucket, BigQuery Dataset, KMS Keys, VM Image, SQL Database Instances

GCP Bucket

- A GCP bucket refers to a Google Cloud Storage bucket.
- It is a fundamental component of Google Cloud Platform's object storage service, which allows you to store and access large amounts of unstructured data.
- They can handle a large volume of data and scale as needed.

GCP BigQuery Dataset

- A GCP BigQuery dataset is a container that organizes and manages tables and views in Google BigQuery, Google's fully managed, serverless data warehouse service.
- It helps organize and manage data within BigQuery.
- It is used for running SQL-like queries on large datasets efficiently.

GCP KMS Keys

- ➢ GCP KMS (Key Management Service) keys are cryptographic keys used to manage encryption and decryption in Google Cloud Platform.
- ➢ It can work with other GCP services like Cloud Storage, BigQuery, and Compute Engine for data encryption.
- ➢ GCP KMS keys help in securing data at rest and in transit, ensuring that only authorized entities can access or manipulate the encrypted data.

GCP VM Image

- A GCP VM image is a virtual machine image used to create instances in Google Compute Engine.
- It contains the operating system and optional additional software pre-installed.
- GCP VM images are essential for quickly deploying standardized environments, ensuring consistency and efficiency in creating and managing virtual machine instances.

GCP SQL Database Instances

- ➢ GCP SQL database instances are managed relational database services provided by Google Cloud, supporting popular database engines like MySQL, PostgreSQL, and SQL Server.
- ➢ GCP SQL database instances are ideal for running traditional relational databases in a cloud environment with the benefits of management, scalability, and security provided by Google Cloud.

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Public URLs

For Available Services

GCP Services	Sample Public URL
GCP Bucket	http://BUCKET_NAME.storage.googleapis.com/OBJECT_NAME OR http://storage.googleapis.com/BUCKET_NAME/OBJECT_NAME
Cloud Functions	https://<region>-<project-gcp-name>.cloudfunctions.net/<func_name>
Compute Engine (VM Instance)	https://compute.googleapis.com/compute/v1/projects/{project}/zones/{zone}/instances/{instance}
GCP BigQuery	https://bigquery.googleapis.com/bigquery/v2/projects/{project}/datasets/{dataset}/tables/{table}
GCP Cloud Pub/Sub	https://pubsub.googleapis.com/v1/projects/{project}/topics/{topic}

Scenario 1: OSINT

RECON

GCP Bucket

CLI-based Recon:

- Cloud Enum:

```
./cloud_enum.py -k <KEYWORD> --disable-azure --disable-aws
```

- S3 Scanner:

```
./s3scanner -bucket <KEYWORD> -enumerate -json
```

GCP Bucket

Web-based Recon:

- Bucket search:
  - https://osint.sh/buckets
  - https://buckets.grayhatwarfare.com
  - https://builtwith.com/
  - https://s3browser.com/
- Dorks:
  - GitHub Dorks:

```
site:storage.googleapis.com
```

GCP Bucket

Web-based Recon:

- Dorks:
    - More Google Dorks:

```
site:console.cloud.google.com/storage/browser/_details
```

```
site:console.cloud.google.com/storage/browser
```

GCP BigQuery Dataset

Web-based Recon:

- Dorks:
  - Google Dorks:

```
site:cloud.google.com "BigQuery dataset"
```

```
site:*.cloud.google.com inurl:bigquery "dataset"
```

GCP KMS Keys

Web-based Recon:

- Dorks:
  - Google Dorks:

```
inurl:"keyRing" inurl:"cryptoKey" intext:"Google Cloud"
```

```
site:cloud.google.com "KMS" "keys"
```

```
filetype:pdf "kms" "keyRing" "cryptoKey"
```

```
filetype:pdf "bindings" "role" "serviceAccount" "kms"
```

GCP VM Image

Web-based Recon:

- Dorks:
  - Google Dorks:

```
intitle:"Google Cloud" inurl:"compute" "vm image"
```

```
site:github.com "google cloud" "vm image" filetype:yaml
OR filetype:json
```

```
inurl:"compute/docs/images" intitle:"Google Cloud"
```

GCP VM Image

Web-based Recon:

- Dorks:
  - GitHub Dorks:

```
filename:*.yaml "image:" "gce-vm-image"
```

```
filename:*.tf "source_image" "google_compute_instance"
```

```
filename:*.yml "hosts:" "tasks:" "google_compute"
```

GCP SQL Database Instances

Web-based Recon:

- Dorks:
  - Google Dorks:

```
intitle:"Google Cloud SQL" inurl:docs "instance"
```

```
site:*.com filetype:sql "google_cloud_sql"
```

```
site:github.com "google cloud sql" filename:*.tf
```

GCP SQL Database Instances

Web-based Recon:

- Dorks:
  - GitHub Dorks:

```
filename:.env "sql_password" OR "db_password"
```

```
filename:credentials.json "type":"service_account"
"sqladmin.googleapis.com"
```

```
filename:*.json "databaseVersion"
"google_sql_database_instance"
```

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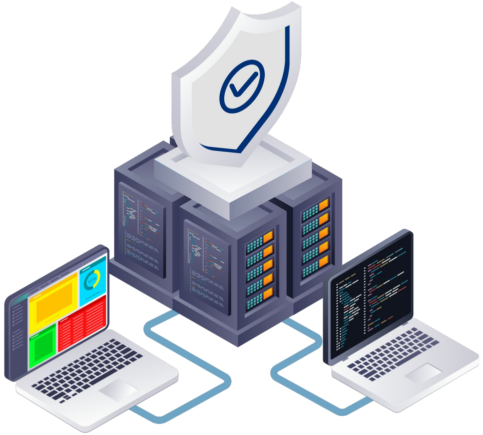
Scenario 2: Unauthenticated Enumeration

Enum



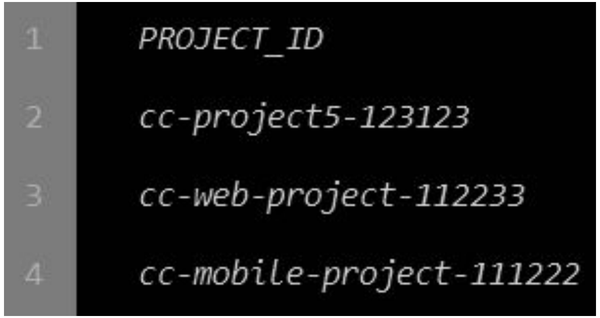
GCP Bucket Recon

CLI-based Recon:

- ➢ To list the IDs of all the Google Cloud Platform (GCP) projects available in your cloud account

```
gcloud projects list --format="table(projectId)"
```

★ **OUTPUT**



```
PROJECT_ID
cc-project5-123123
cc-web-project-112233
cc-mobile-project-111222
```

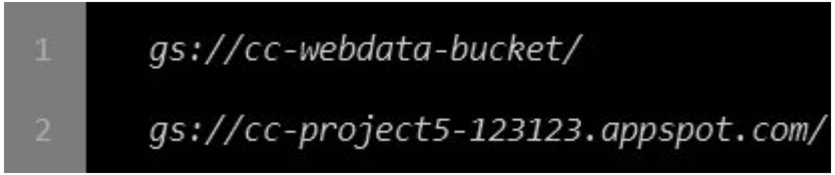
GCP Bucket Recon

CLI-based Recon:

➢ To list the identifier (name) of each storage bucket created for the specified GCP project.

```
gsutil ls -p <Project_ID>
```

★ **OUTPUT**



```
gs://cc-webdata-bucket/
gs://cc-project5-123123.appspot.com/
```

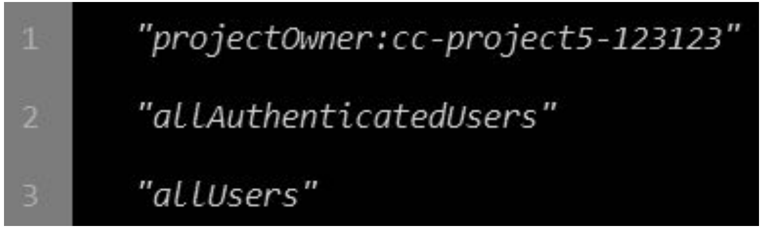
GCP Bucket Recon

CLI-based Recon:

➢ To determine name of the IAM member(s) associated with the selected bucket.

```
gsutil iam get gs://cc-webdata-bucket/
--format=json | jq '.bindings[].members[]'
```

➔ **"allUsers"** and/or **"allAuthenticatedUsers"** means the selected Google Cloud Storage bucket is publicly accessible.



```
"projectOwner:cc-project5-123123"
"allAuthenticatedUsers"
"allUsers"
```

★ **OUTPUT**

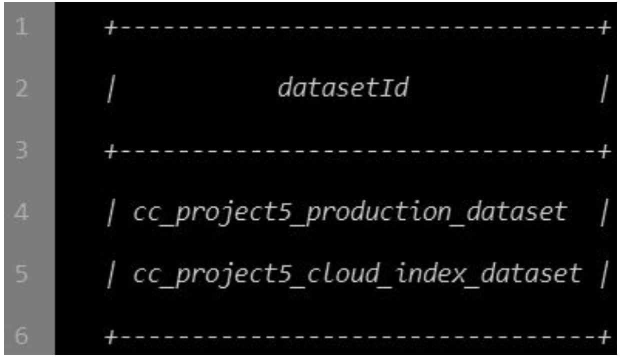
BigQuery Dataset Recon

CLI-based Recon:

➢ To list the identifier (name) of each BigQuery dataset created for the specified Google Cloud project.

```
bq ls --project_id cc-project5-123123 --format=pretty
```

★ **OUTPUT**



```
+------------------------------+
|           datasetId          |
+------------------------------+
| cc_project5_production_dataset  |
| cc_project5_cloud_index_dataset |
+------------------------------+
```

BigQuery Dataset Recon

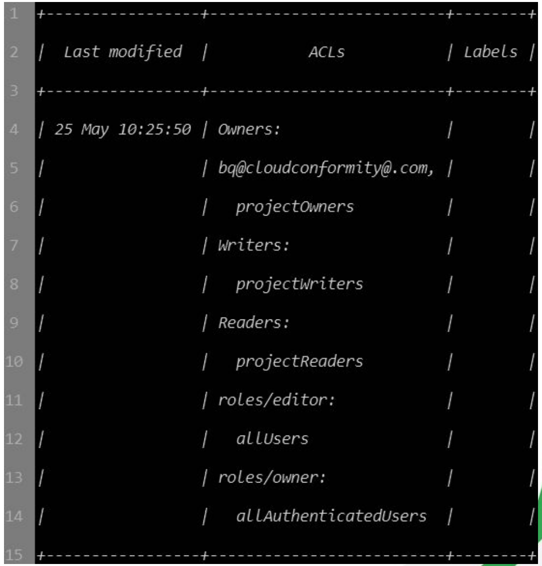
CLI-based Recon:

➢ To list the identifier (name) of each storage bucket created for the specified GCP project.

```
bq show --format=pretty
cc-project5-123123:cc_project5_production_dataset
```

➔ If one or more roles are using the "**allUsers**" and/or "**allAuthenticatedUsers**" members, the selected Google Cloud BigQuery dataset is publicly accessible.

★ **OUTPUT**



```
+----------------+-------------------------+--------+
|  Last modified |           ACLs          | Labels |
+----------------+-------------------------+--------+
| 25 May 10:25:50 | Owners:                |        |
|                | bq@cloudconformity@.com, |      |
|                |   projectOwners         |        |
|                | Writers:                |        |
|                |   projectWriters        |        |
|                | Readers:                |        |
|                |   projectReaders        |        |
|                | roles/editor:           |        |
|                |   allUsers              |        |
|                | roles/owner:            |        |
|                |   allAuthenticatedUsers |        |
+----------------+-------------------------+--------+
```

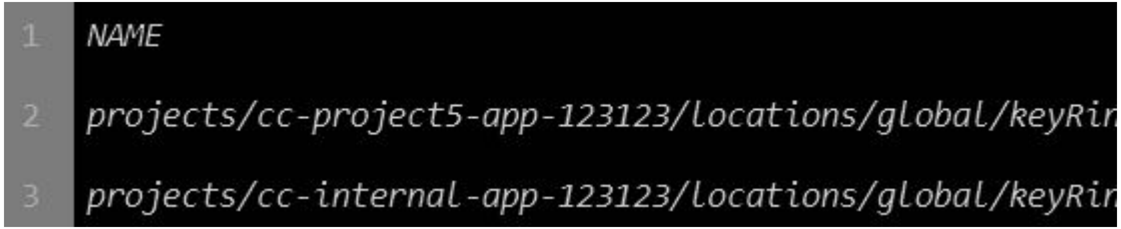
KMS Keys Recon

CLI-based Recon:

➢ To list the IDs of all the KMS key rings available in your GCP account.

```
gcloud kms keyrings list --location=global
```

★ **OUTPUT**



```
NAME
projects/cc-project5-app-123123/locations/global/keyRin
projects/cc-internal-app-123123/locations/global/keyRin
```

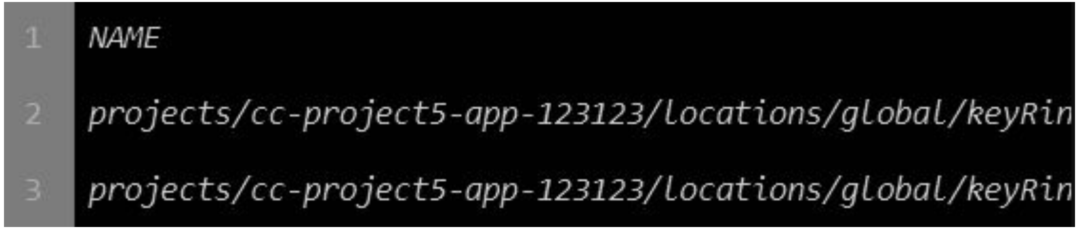
KMS Keys Recon

CLI-based Recon:

- ➢ To list the resource ID of each KMS cryptographic key created for the selected key ring.

```
gcloud kms keys list
--keyring=projects/cc-project5-app-123123/locations/global/keyRi
ngs/cc-project5-key-ring
--location=global --format="table(name)"
```

★ **OUTPUT**



```
NAME
projects/cc-project5-app-123123/locations/global/keyRin
projects/cc-project5-app-123123/locations/global/keyRin
```

KMS Keys Recon

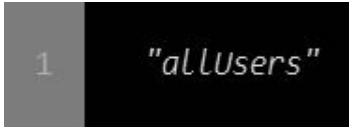
CLI-based Recon:

➢ To list the identifier (name) of each storage bucket created for the specified GCP project.

```
gcloud kms keys get-iam-policy
projects/cc-project5-app-123123/locations/global/keyRings/cc-pro
ject5-key-ring/cryptoKeys/cc-prod-cryptokey
--keyring=projects/cc-project5-app-123123/locations/global/keyRi
ngs/cc-project5-key-ring
    --location=global --format=json | jq '.bindings[].members[]'
```

➔ "**allUsers**" or "**allAuthenticatedUsers**", means the selected Google Cloud Platform (GCP) KMS key is publicly accessible to the Internet.

★ **OUTPUT**



```
"allUsers"
```

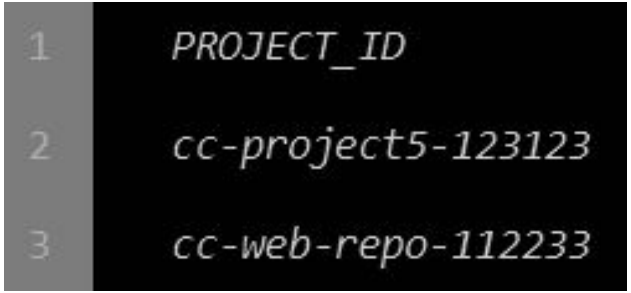
VM Image Recon

CLI-based Recon:

➢ To list the IDs of all the Google Cloud Platform (GCP) projects available in your Google Cloud account.

```
gcloud projects list --format="table(projectId)"
```

★ **OUTPUT**



```
PROJECT_ID
cc-project5-123123
cc-web-repo-112233
```

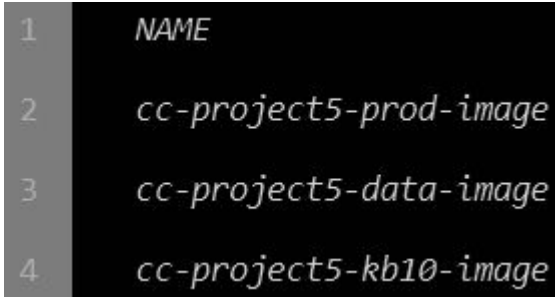
VM Image Recon

CLI-based Recon:

➢ To list all the virtual machine (VM) disk images available for the selected project.

```
gcloud compute images list --project <project_id>
     --no-standard-images --format="table(name)"
```

★ **OUTPUT**



```
NAME
cc-project5-prod-image
cc-project5-data-image
cc-project5-kb10-image
```

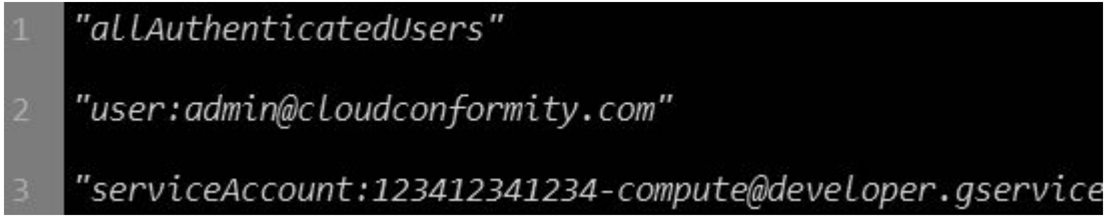
VM Image Recon

CLI-based Recon:

➢ To describe name of the IAM member(s) associated with the selected image.

```
gcloud compute images get-iam-policy prod-instance-image
--format=json
```

★ **OUTPUT**



```
"allAuthenticatedUsers"

"user:admin@cloudconformity.com"

"serviceAccount:123412341234-compute@developer.gservice
```

➔ If the command output include "**allAuthenticatedUsers**", the selected virtual machine (VM) disk image is publicly shared with all other Google Cloud accounts.

VM Image Recon

CLI-based Recon:

- To Create a new image of it.

```
gcloud compute images create stage-instance-image
--source-image=<Image_Name>
--source-image-project=long-base-324712
```

- To view image.

```
gcloud compute images list
```

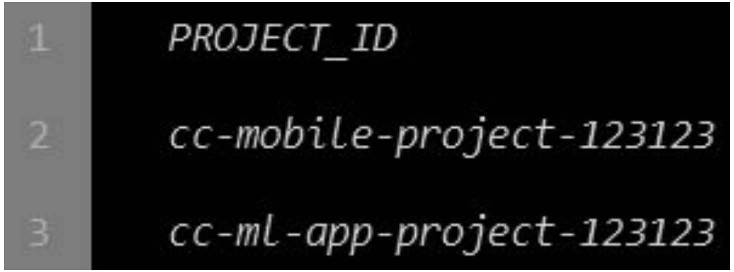
SQL Database Instances Recon

CLI-based Recon:

➢ To list the IDs of all the Google Cloud Platform (GCP) projects available in your Google Cloud account.

```
gcloud projects list --format="table(projectId)"
```

★ **OUTPUT**



```
PROJECT_ID
cc-mobile-project-123123
cc-ml-app-project-123123
```

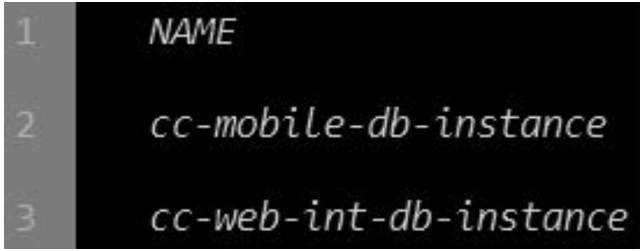
SQL Database Instances Recon

CLI-based Recon:

➢ To describe the name of each Cloud SQL database instance provisioned for the selected Google Cloud project.

```
gcloud sql instances list --project cc-mobile-project-123123
--format="(NAME)"
```

★ **OUTPUT**



```
NAME
cc-mobile-db-instance
cc-web-int-db-instance
```

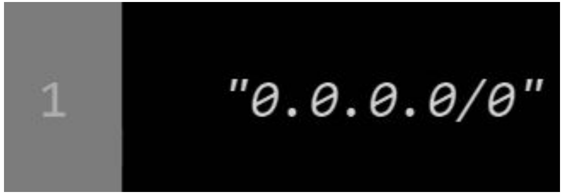
SQL Database Instances Recon

CLI-based Recon:

➢ To describe name of the IAM member(s) associated with the selected image.

```
gcloud sql instances describe cc-mobile-db-instance --format=json
    | jq '.settings.ipConfiguration.authorizedNetworks[].value'
```

★ **OUTPUT**



```
"0.0.0.0/0"
```

➔ If output contains "**0.0.0.0/0**", there is at least one authorized network that allows database access to anyone on the Internet, therefore the selected Google Cloud SQL database instance is publicly accessible.

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Thank You

For Professional Red Team / Blue Team / Purple Team / Cloud Cyber Range labs / Trainings please contact

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To know more about our offerings, please visit: **https://cyberwarfare.live**

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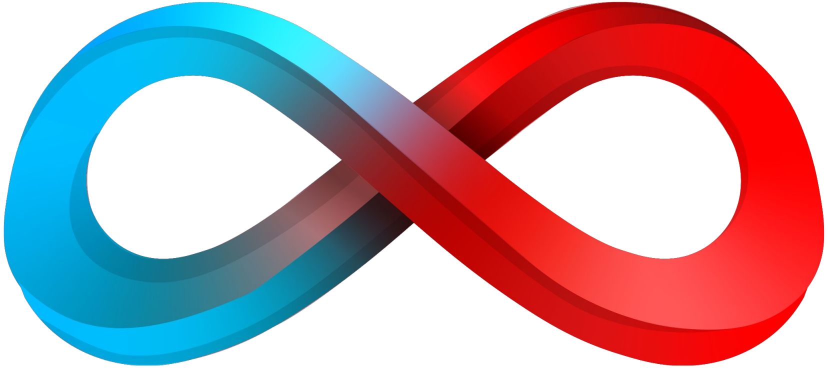

URL🔗: https://infinity.cyberwarfare.live/

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