DevFest

ਜਲੰਧਰ | Jalandhar

"From Static to Dynamic: Leveraging Short-Lived Credentials for Better Security in GCP

Sakshi Nasha
Learner

Google Developer Groups

$whoami

Learner
Innovator : SIH Winner, UIA
Public speaker
Athlete at heart :
🏃‍♀️🏀⚽🏸
Off the grid? Catch me just soaking up **nature** to recharge for the next big idea.

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ki tuhanu neend aa rahi hai

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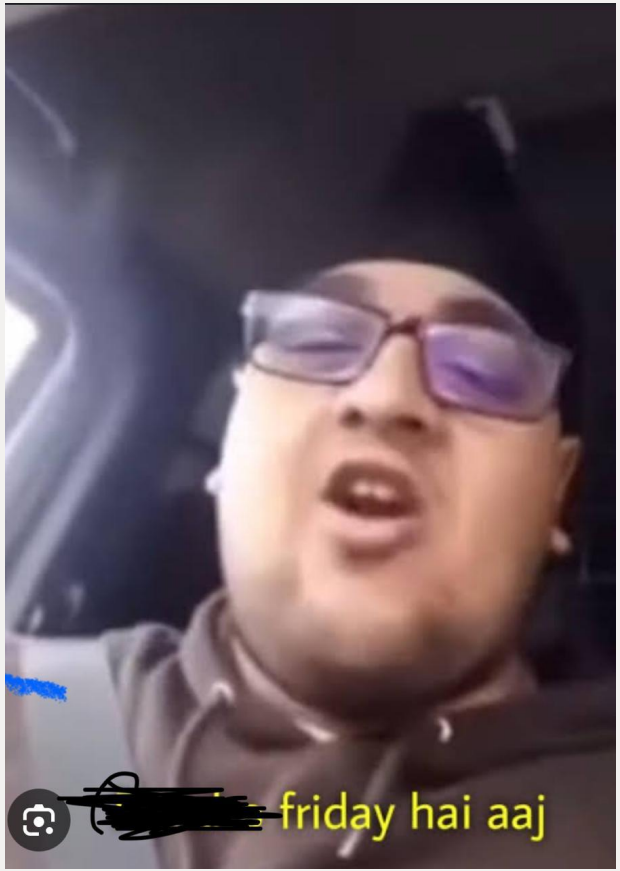

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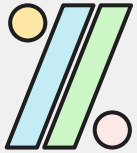
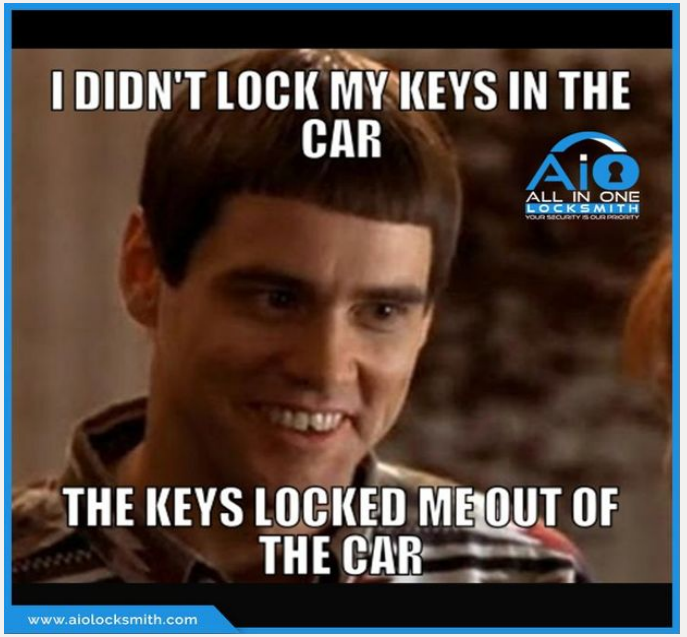


AGENDA

1. What is Security and Authentication
2. Service Account in GCP
3. Access Control: Granting Roles
4. What is Static Creds and Dynamic Creds
5. Generate Short-Lived Credentials in GCP
6. Short Lived Credentials - Game Changer

What is Security ?



Authentication v/s Authorization

Authentication v/s Authorization

AUTHENTICATION

Who are you?

Verify the user's identity

AUTHORIZATION

What are you allowed to do?

Determine user permissions

Authentication in GCP

- identity is confirmed through the use of some kind of credential.
- WHO AM I
- Proving that you are who you say you are.
- gcloud auth login

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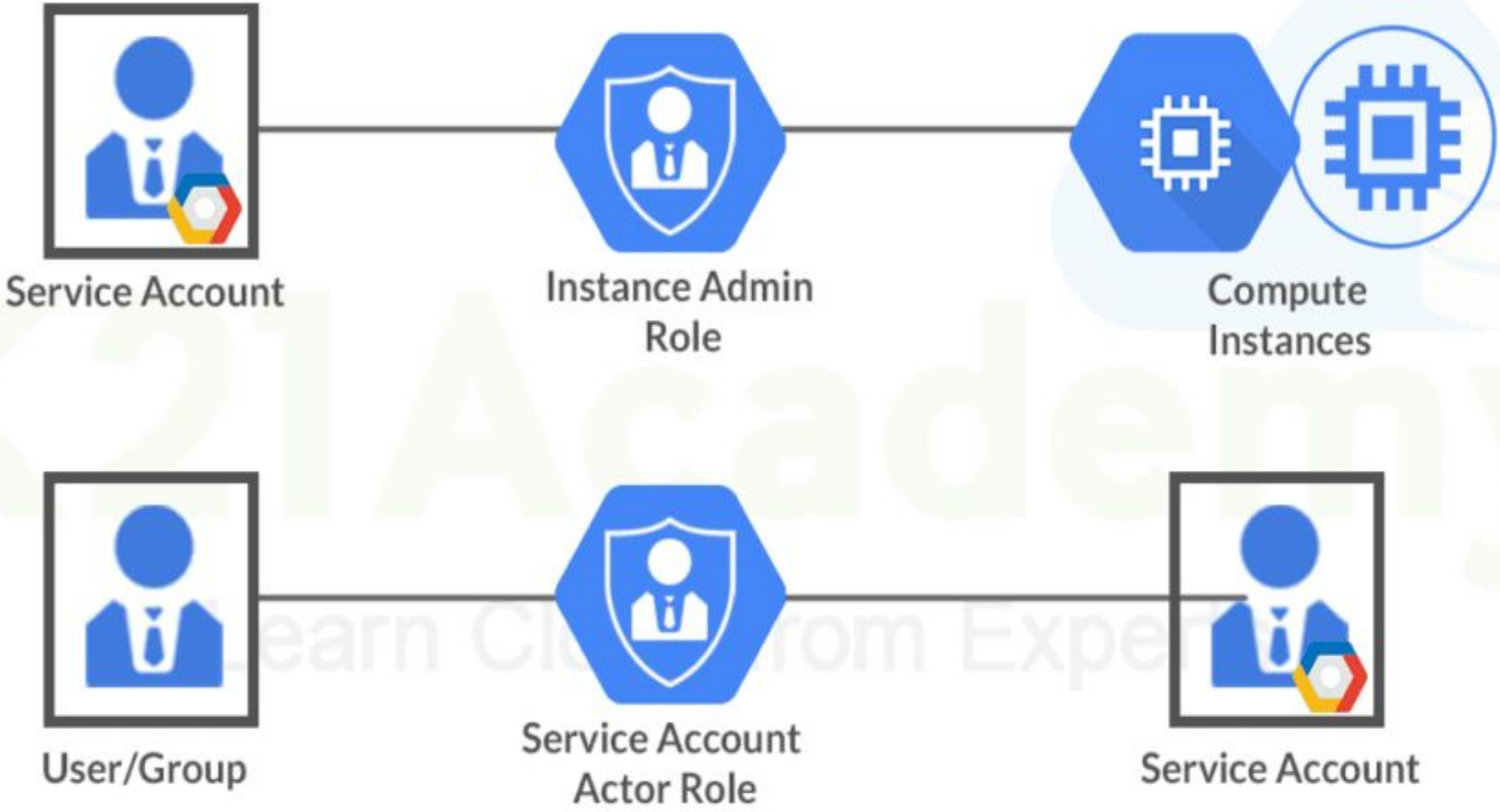
Service Account in GCP

- special type of Google account that grant permissions to virtual machines instead of end users.
- Ensure authorized API calls by authenticating itself
- When an application authenticates as a service account, it has access to all resources that the service account has permission to access.

GRANTING ROLES : **Storage Object Viewer role**

let a service account access resources in your project by granting it a role


Service Account
Instance Admin Role
Compute Instances
User/Group
Service Account Actor Role
Service Account

Static v/s Dynamic Creds

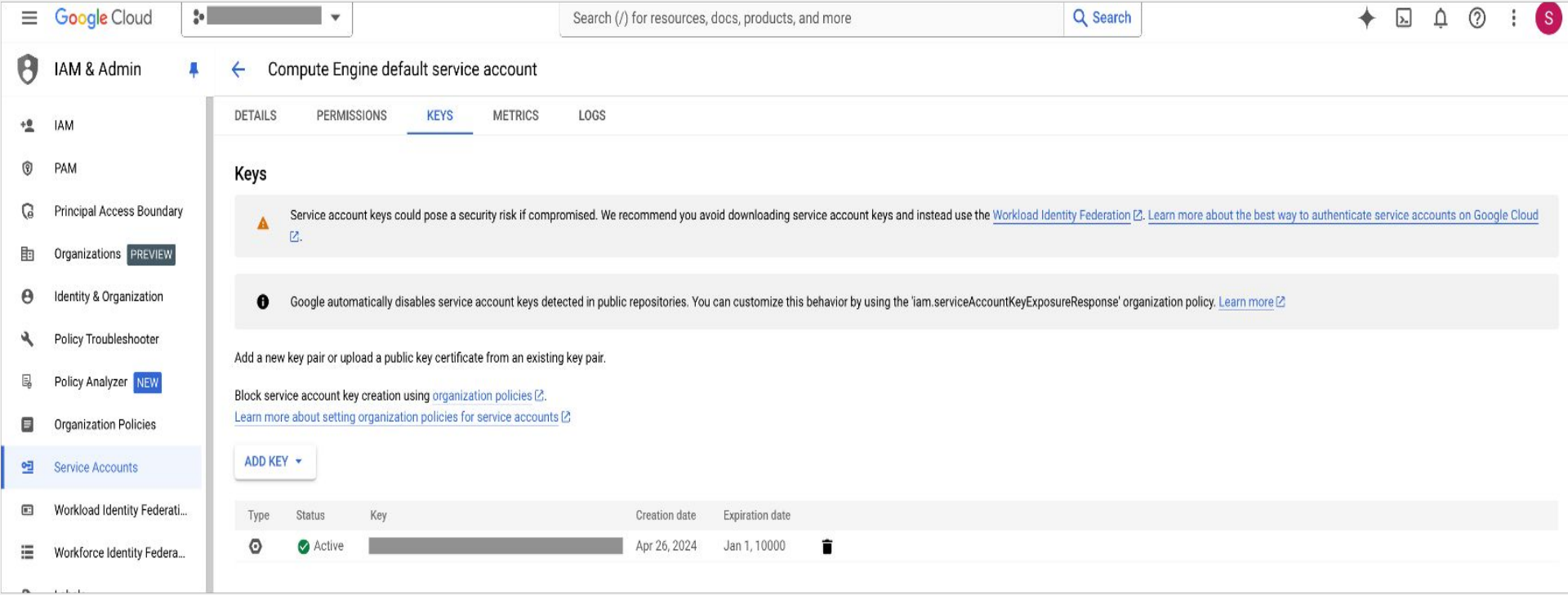
- **Static secrets** are secrets that are pre-defined and do not change unless explicitly modified by an administrator or authorized user.

  Examples: API keys, database passwords, or encryption keys unless intentionally rotated.

- **Dynamic secrets** are credentials or tokens that are generated programmatically and have a short lifespan. They are typically generated on-demand and automatically revoked after a specified time period or usage.

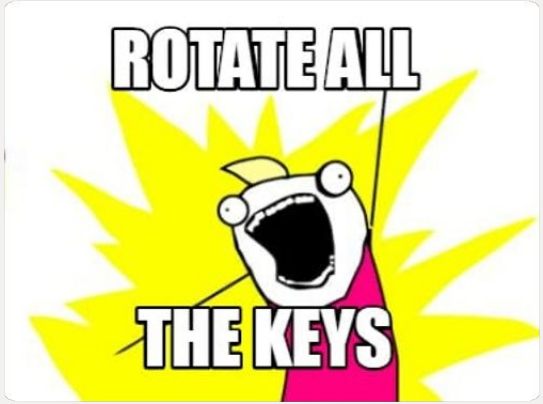
  Examples : Temporary Access, Session Token or Short-lived tokens

Creating a Credential (Access key) with the GCP Service Accounts



Current Challenges faced with managing and storing secrets

- Leakage, unauthorized access to secrets
- Balancing - Cost, Flexibility, Scalability : licensing fees, operational expenses.
- Manual Processes : key rotation, redistribution
- Integration Complexity : diverse ecosystem

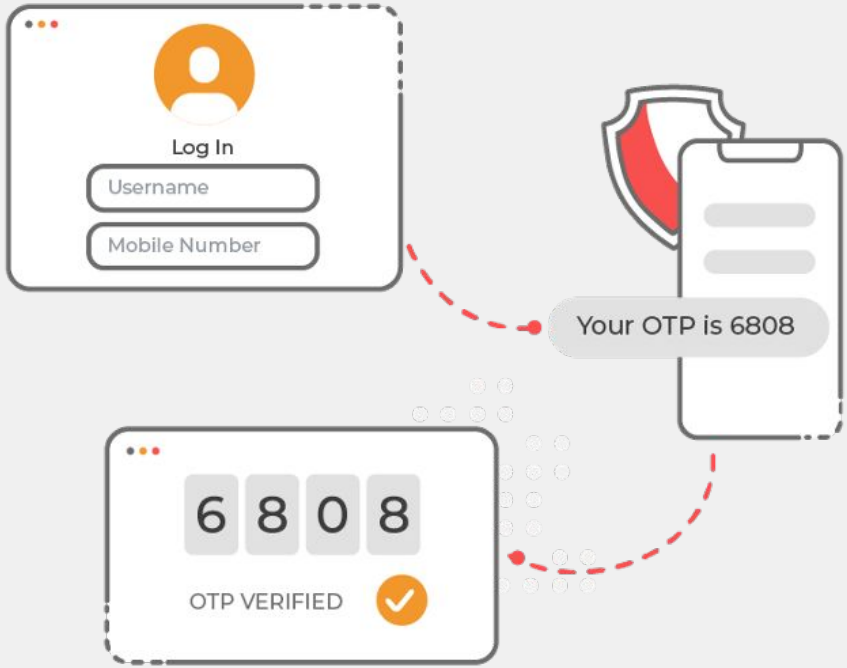


Hard coding credentials

main.go

```go
package main

import (
    "fmt"
    "os"
)

func main() {
    databaseName := "53CR3TD4T4B453"
    secretKey := "5UP3R53CR3T"
    secretPhrase := "Always know where your towel is. - Douglas Adams, The Hitchhiker's Guide to the Galaxy"

    var dbName string
    var dbPass string

    fmt.Println("Please enter database name:")
    fmt.Scanf("%s", &dbName)

    fmt.Println("Please enter database password:")
    fmt.Scanf("%s", &dbPass)

    if dbName == databaseName && dbPass == secretKey {
        fmt.Println("Welcome to the database!")
        fmt.Println("Your secret phrase is: ", secretPhrase)
        os.Exit(0)
    }
    fmt.Println("Sorry, wrong database name or password")
}
```

TODAY, we will generate a short-lived token for GCP application



Create short-lived credentials for a service account

- You can generate an OAuth 2.0 access token by using the gcloud CLI, the REST API, or the Cloud Client Libraries.
- We will leverage use of The Security Token Service STS : creates short-lived access token to Google Cloud resources.

Create short-lived credentials for a service account

- POST https://sts.googleapis.com/v1/token
  - Response :

    { "access_token": "**********",

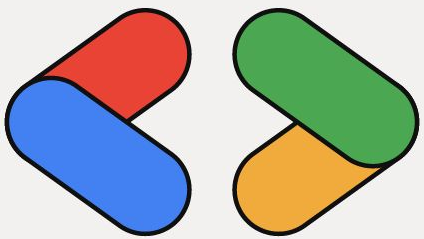
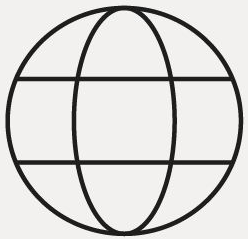
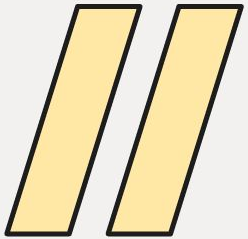
    "issued_token_type": "urn:ietf:params:oauth:token-type:access_token",

    "token_type": "Bearer",

    "expires_in": 3216

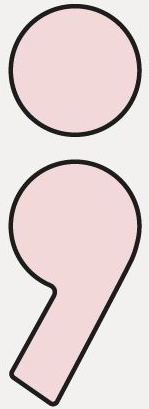
    }

The lifetime of the token is min = 1 hour (3,600 seconds) to max = 12 hours (43,200 seconds)


HOW Dynamic Creds is a Game Changer ?

- Examples : Financial applications (ICICI Bank, HDFC Bank), Reset Password Link, Gmail Login



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Perks of using Short lived Tokens

1

Enhancing Security

- Short-lived tokens have a **limited lifespan**, reducing the exposure window for potential attacks.
- Regular token expiration forces users to **re-authenticate**, ensuring better security.

2

Mitigating Token Abuse

- By making tokens short lived, we limit the time an attacker can use to abuse a stolen token.
- Thus, **minimizing** the **risk window** significantly

3

Least Privilege Principle

- A user should only have access to what they absolutely **need** and not what they want.
- When permissions **change** (e.g., user roles or access levels), short-lived tokens automatically reflect the updates upon renewal.

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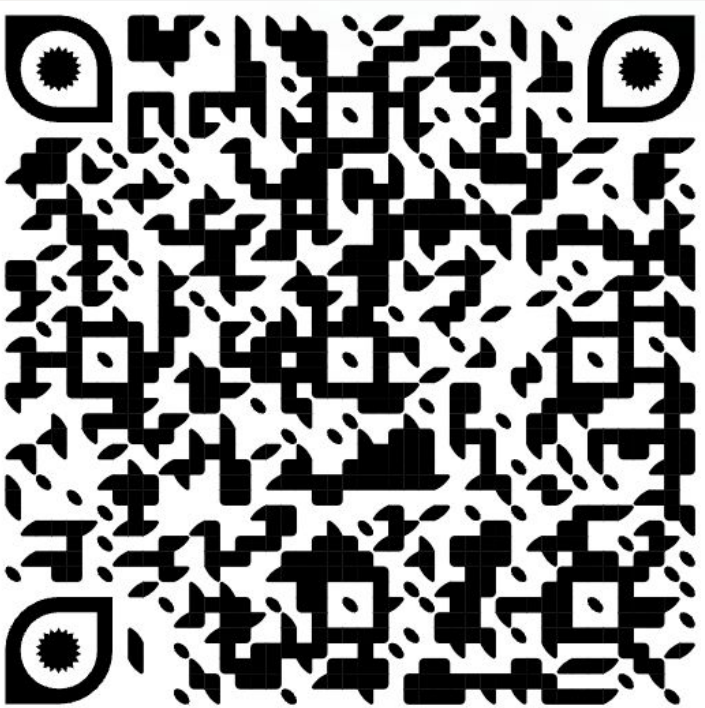
“DREAM, BELIEVE and Make it happen”


BHAI KYA KAR
RAHA HAI TU?

“Asli punjabi jithe vi jaave chhaa jave”

Thank you all for joining! ✨

https://bit.ly/SakshiFeed



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Future References

Github Repo

(DOWNSCOPE the short-lived credential)

My Blog


TUSSI NA JAO

Smart India Hackathon Winner

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“GDG jalandhar nu invite kita tuhada dhanvad, Vada changa laga si”

Janta : tuhada dhanvad