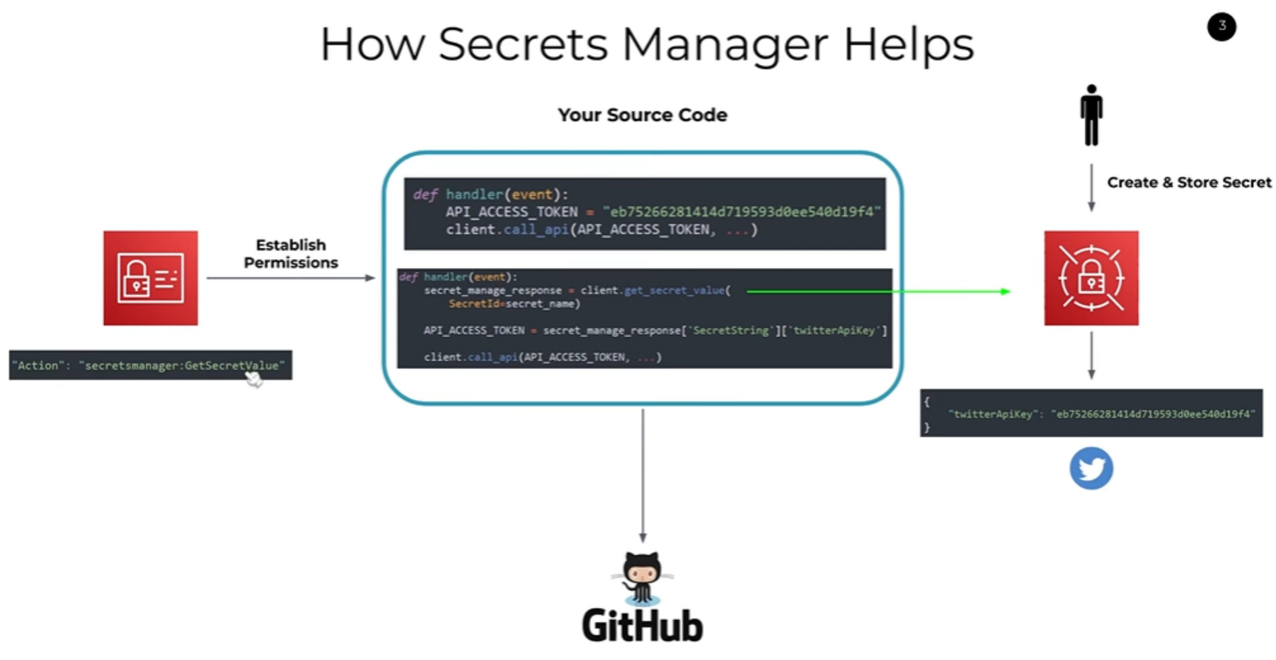
AWS Secrets Manager



```
def handler(event):
    API_ACCESS_TOKEN = "eb75266281414d719593d0ee540d19f4"
    client.call_api(API_ACCESS_TOKEN, ...)
```

```
def handler(event):
    secret_manage_response = client.get_secret_value(
        SecretId=secret_name)

    API_ACCESS_TOKEN = secret_manage_response['SecretString']['twitterApiKey']

    client.call_api(API_ACCESS_TOKEN, ...)
```

```
"Action": "secretsmanager:GetSecretValue"
```

```
{
    "twitterApiKey": "eb75266281414d719593d0ee540d19f4"
}
```

Overview

AWS Secrets Manager is a managed service that helps you protect access to your applications, services, and IT resources without the upfront cost and complexity associated with managing and rotating secrets manually.

Key Concepts and Features

1. **Secrets**: These are confidential data such as API keys, passwords, or any other sensitive information that you need to keep secure.
2. **Secrets Storage**: Secrets are stored securely within AWS Secrets Manager and can be accessed programmatically.
3. **Encryption**: All secrets are encrypted using AWS Key Management Service (KMS).
4. **IAM Integration**: Access to secrets is tightly controlled using AWS Identity and Access Management (IAM).
5. **Rotation**: Secrets can be rotated automatically at a specified interval to enhance security.
6. **Monitoring**: AWS CloudWatch and AWS CloudTrail can be used to monitor and log access to your secrets.

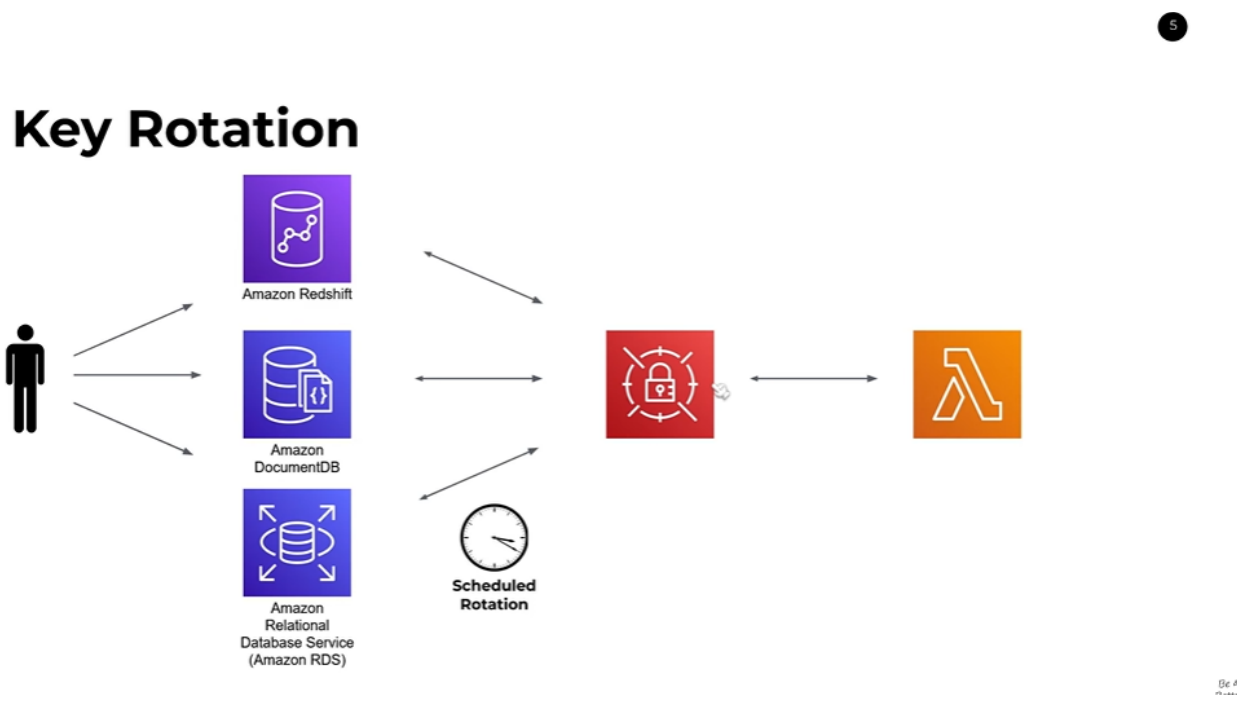
How AWS Secrets Manager Works

1. **Storing Secrets**:
    - Create and store secrets within Secrets Manager.
    - Secrets can be a simple key-value pair or a more complex JSON object.
2. **Accessing Secrets**:

- Use the AWS SDK or AWS CLI to programmatically retrieve secrets.
- Access is managed through IAM policies which define who or what can access the secrets.

3. **Encryption**:

   - Secrets are encrypted using AWS KMS.
   - You can either use the default AWS-managed KMS key or a customer-managed KMS key.



4. **Automatic Rotation**:

   - AWS Secrets Manager supports automatic rotation of secrets for certain AWS services like Amazon RDS, Redshift, and DocumentDB.
   - Custom rotation can be implemented using AWS Lambda functions for other types of secrets.

5. **Monitoring and Logging**:

   - Use CloudWatch to monitor API calls to Secrets Manager.
   - CloudTrail logs can be used to audit access to secrets.

Practical Example

- **Scenario**: An application needs to access the Twitter API using an access token.
- **Problem**: Storing the API token directly in the source code is insecure and can lead to unauthorized access if the source code is compromised.

Solution with AWS Secrets Manager

1. **Create a Secret**:

   - Store the Twitter API token in AWS Secrets Manager as a secret.
   - The secret is stored in encrypted form and can only be accessed by authorized entities.

2. **Access the Secret Programmatically**:

    - Modify the application to retrieve the Twitter API token from AWS Secrets Manager at runtime.
    - The application uses the AWS SDK to call `GetSecretValue` API and retrieves the secret value.

3. **Secure Access with IAM**:

    - Configure IAM policies to ensure that only the application or specific users have the permission to access the secret.
    - Apply the principle of least privilege to minimize the risk of unauthorized access.

4. **Example Code in Python**:

```python
import boto3
import json

def get_secret():
    secret_name = "my-twitter-api-key"
    region_name = "us-east-1"

    # Create a Secrets Manager client
    session = boto3.session.Session()
    client = session.client(service_name='secretsmanager',
region_name=region_name)

    try:
        get_secret_value_response =
client.get_secret_value(SecretId=secret_name)
    except Exception as e:
        raise e

    secret = get_secret_value_response['SecretString']
    secret_dict = json.loads(secret)
    return secret_dict['TwitterAPIKey']

# Example usage
api_key = get_secret()
print(api_key)
```

Detailed Steps for Setting Up Secrets Manager

1. **Create a Secret**:

    - Go to the AWS Management Console.
    - Navigate to AWS Secrets Manager.
    - Click on "Store a new secret".
    - Choose the secret type (e.g., Other type of secrets for API keys).
    - Enter the key-value pairs for the secret (e.g., `TwitterAPIKey: your_api_key`).

    - Specify the KMS key for encryption.
    - Click "Next", name your secret, and complete the setup.

2. **Set Up IAM Policies**:

    - Create a new IAM role or user.
    - Attach a policy that allows the `secretsmanager:GetSecretValue` action.
    - Example IAM policy:

    ```
    {
        "Version": "2012-10-17",
        "Statement": [
            {
                "Effect": "Allow",
                "Action": "secretsmanager:GetSecretValue",
                "Resource": "arn:aws:secretsmanager:us-east-
    1:123456789012:secret:my-twitter-api-key"
            }
        ]
    }
    ```

3. **Retrieve the Secret in Your Application**:

    - Use the AWS SDK in your application code to call Secrets Manager and retrieve the secret.

4. **Configure Rotation (Optional)**:

    - If using an AWS-supported service like RDS, enable automatic rotation.
    - For custom secrets, create an AWS Lambda function to handle the rotation and specify the rotation schedule in Secrets Manager.

Pricing

- **Free Tier**: 30 days free for each new secret.
- **After Free Tier**:
    - $0.40 per secret per month.
    - $0.05 per 10,000 API calls to retrieve secrets.

Best Practices

1. **Use IAM Policies**: Restrict access to secrets using fine-grained IAM policies.
2. **Enable MFA**: Use Multi-Factor Authentication (MFA) for AWS accounts to enhance security.
3. **Regularly Rotate Secrets**: Use the rotation feature to periodically update secrets.
4. **Monitor Access**: Set up CloudWatch alarms and CloudTrail logs to monitor and audit access to your secrets.
5. **Use Encryption**: Always use KMS to encrypt your secrets.

By implementing AWS Secrets Manager, you can significantly improve the security and management of sensitive information in your applications.

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