CPD Lab 9: Consistency, Reliability and Scalability

Introduction

In this lab you will create a Redis cache and execute some commands using Redis-cli on an EC2 instance. You will complete a Qwiklab on Amazon CloudFront. In addition, you will refer to some documents on AWS.

Amazon ElastiCache https://aws.amazon.com/elasticache/

Tasks:

- Task 1: Getting Started with Amazon ElastiCache for Redis
- Task 2: Qwiklab – Introduction to Amazon CloudFront
- Task 3: Reference Reading Material
- Task 4: Releasing the allocated resources

Task 1: Getting Started with Amazon ElastiCache for Redis

Amazon ElastiCache is a managed service that is used to reduce the load on database and reduce the latency.

In this task you will cover the steps as listed in 'Getting Started with Amazon ElastiCache for Redis' on AWS. Complete the steps as listed below and refer to the source under 'Links' at the end of this document for further information.

Step 1: Launch a Cluster

- Under 'Services' search for 'ElastiCache'
- In the 'ElastiCache Dashboard' click 'Get Started Now'
- For 'Cluster Engine' two choices are provided: Redis and Memcached. Select Redis
- The Redis can be used as database, cache and message broker. As cache, it can also use 'Sharding' with replication through 'Cluster Mode enabled'. For this lab leave 'Cluster Mode enabled' as unchecked
- Redis Settings
    - Enter the 'Name' as 'MyRedisCache'
    - Leave all values at default but change 'Node type' to cache.t2.micro (0.5 GiB) and 'Number of Replicas' to 0
- Advanced Redis Settings
    - Let the 'Subnet group' as 'Create new'
    - Specify the 'Name' as 'MySubnet'
    - For 'VPC ID' select the default VPC which might already be selected
    - Under Subnets, select any one 'Subnet ID'
    - Under 'preferred availability zone(s), select 'Select zones' and then select a zone from the drop-down

- Security
  - For ‘Security groups’ select ‘default’
  - Leave ‘Encryption at-rest’ and ‘Encryption in-transit’ unchecked
- Import Data to Cluster
  - Leave ‘Seed RDB file S3 location’
- Backup
  - Uncheck ‘Enable automatic backups’
- Maintenance
  - Select ‘No preference’ for ‘maintenance window’ but do observe settings under ‘Specify maintenance window’ that shows how you can schedule the one hour/week maintenance window
  - For ‘Topic for SNS notification’, select ‘Disable notifications’
- Click ‘Create’

Step 2: Authorize Access

You can connect to the ElastiCache cluster only from an Amazon EC2 which is running in the same VPC as ElastiCache.

- Under ‘Services’ select EC2
- From the left navigation menu, select ‘Security Groups’ under ‘Network & Security’
- Select the security group named ‘default’
- Click the ‘Inbound rules’ tab below and click ‘Edit inbound roles’
- Click ‘Add rule’
- Under ‘Type’ select ‘Custom TCP’
- Under ‘Port range’ enter the default Redis port number 6379
- Under ‘Source’ select ‘Anywhere’ from the drop-down
- Click ‘Save rules’

Step 3: Create an EC2 instance

- Open EC2 Dashboard on AWS Console
- Click on ‘Launch Instance’
- 1: Choose an AMI
  - Click ‘Select’ in front of ‘**Amazon Linux 2 AMI (HVM), SSD Volume Type** - ami-04d5cc9b88f9d1d39 (64-bit x86) / ami-049456450f2873c0a (64-bit Arm)’
- 2: Choose an Instance type
  - Select t2.micro and click ‘Next: Configure Instance Details’
- 3: Configure instance details
  - Enter 1 for ‘Number of Instances’
  - For ‘Auto-assign Public IP’, select ‘Enable’ from the drop-down
  - Click ‘Next: Add storage’

- 4: Add storage
  - Click 'Next: Add Tags'
- 5: Add Tags
  - Click 'Next: Configure Security Group'
- 6: Configure Security Group
  - For 'Assign a security group' select 'Create a new security group'
  - For SSH, under 'Source' select 'My IP'
  - Click 'Review and Launch'
- 7: Review Instance Launch
  - Click 'Launch'
  - In 'Select an existing key pair or create a new key pair', choose an existing KeyPair or create a new one and click 'Launch Instance'

Step 4: Connect to a Cluster's Node

- Connect to the EC2 instance created in Step 3 using PuTTY
- After connecting to EC2, in the command window, enter:

```
sudo yum install gcc
```

- Download and compile the redis-cli utility. At the command prompt of EC2 , type the following commands in succession:
  - **wget** http://download.redis.io/redis-stable.tar.gz
  - **tar xvzf redis-stable.tar.gz**
  - **cd redis-stable**
  - **make distclean // Ubuntu systems only**
  - **make**

- At the command prompt of EC2 instance, type the following command replacing the endpoint with your cluster and port. The port was set as 6379 in Step 2 above and the cluster endpoint can be found by selecting 'MyRedisCache'

```
src/redis-cli -c -h
mycachecluster.eaogs8.0001.usw2.cache.amazonaws.com -p
6379
```

- The above command will result in a Redis command prompt (with MyRedisCache endpoint) as:

```
redis mycachecluster.eaogs8.0001.usw2.cache.amazonaws.com 6379>
```

- At this prompt, run the following Redis commands (shown in bold):

```
set a "hello"// Set key "a" with a string value and no
            expiration
OK
```

```
get a          // Get value for key "a"

"hello"

get b          // Get value for key "b" results in a miss

(nil)

set b "Good-bye" EX 5  // Set key "b" with a string value
       "Good-bye" and a 5 second expiration

OK

get b                  // Get value for key "b"

"Good-bye"
                       // wait >= 5 seconds
get b

(nil)                  // key has expired, nothing returned

quit                   // Exit from redis-cli
```

Step 4: Delete Resources

- Under 'Services' search for 'ElastiCache'
- Select the cluster 'MyRedisCache'
- Select 'delete' from 'Actions' and select 'No' for 'Create final backup?'
- In the confirmation, select 'Delete' to delete the cluster
- Delete the EC2 instance
    - Select the EC2 instance
    - Select Actions->Instance State->Terminate
    - Click 'Yes, terminate'

Task 2: Introduction to Amazon CloudFront

Amazon CloudFront is a content delivery service. This is a free lab of 55 minutes duration. You can search for this lab on Qwiklabs.com.

In this lab you will:

- Create a new Amazon CloudFront distribution
- Use your Amazon CloudFront distribution to serve an image file
- Delete your Amazon CloudFront distribution when it is no longer required

Task 3: Reference Reading Material

1. Amazon EBS addresses the challenge of the CAP Theorem at scale

https://www.amazon.science/blog/amazon-ebs-addresses-the-challenge-of-the-cap-theorem-at-scale

2. Distributed Data Management
   https://docs.aws.amazon.com/whitepapers/latest/microservices-on-aws/distributed-data-management.html

3. Reliability Pillar - AWS Well-Architected Framework
   https://d1.awsstatic.com/whitepapers/architecture/AWS-Reliability-Pillar.pdf

Task 4: Releasing the allocated resources

Make sure that you have released all the resources created in Task 1 above.

Links

The links below are for your reference only in case further information is required to help complete Task 1:

Task 1

Getting Started with Amazon ElastiCache for Redis
https://docs.aws.amazon.com/AmazonElastiCache/latest/red-ug/GettingStarted.html

Task 1, Step 2

Grant Access to Your Cluster or Replication Group
https://docs.aws.amazon.com/AmazonElastiCache/latest/red-ug/accessing-elasticache.html