Design, Provision and Monitor AWS Infrastructure at Scale

Tuesday, 16 November 2021 9:51 PM

Design Infrastructure Solution

GITHUB Repository: https://github.com/chvallej/aws_infrastructure-at-scale

CRITERIA

Develop a schematic for the application development project

MEET SPECIFICATIONS

★ The infrastructure includes:

- Infrastructure in the following regions: `us-east-1`
- Users and Client machines
- One VPC
- Two Availability Zones
- Four Subnets (2 Public, 2 Private)
- A NAT Gateway
- A CloudFront distribution with an S3 Bucket
- Web servers in the Public Subnets
- Application Servers in the Private Subnets
- DB Servers in the Private Subnets
- Web Servers Load Balanced and Autoscaled
- Application Servers Load Balanced and Autoscaled
- A Master DB in AZ 1 with a read replica in AZ2

All services in the diagram include a label to indicate the type of service and any necessary parameters (e.g. size, location)
Visible lines represent all network connections

Check below document attached

Udacity_Diagram_1.pdf

Udacity_Diagram_1.pdf

CRITERIA

Develop a schematic for a Serverless AWS infrastructure application development project

MEET SPECIFICATIONS

★ The infrastructure includes:

- A user and client machine
- AWS Route 53
- A CloudFront Distribution
- AWS Cognito
- AWS Lambda
- API Gateway
- DynamoDB
- S3 Storage

All services in the diagram include a label to indicate the type of service and any necessary parameters (e.g. size, location)
Visible lines represent all network connections.

Check below document attached

Udacity_Diagram_2.pdf

Estimate Costs

CRITERIA

Estimate the monthly cost of the planned infrastructure for Diagram 1

MEET SPECIFICATIONS

★ The monthly cost is between $8,000-10,000 using the AWS Pricing Calculator

Check Initial_Cost_Estimate.csv file

CRITERIA

Modify the infrastructure to reduce the monthly cost

MEET SPECIFICATIONS

★ The infrastructure includes all required services to run properly
The monthly cost is $6,500 or below using the AWS Pricing Calculator
A rationale is provided to explain which services were changed or removed

In order to reduce the cost, the below actions were executed:

- Change the pricing model for EC2 Instances from OnDemand to EC2 Instance Saving Plan for 1 year with Partial pay up front
- Reduce the capacity for the replica database. It reduces the cost for the replica database instances keeping the same functionality affecting the performance.

Check Reduced_Cost_Estimate.csv file

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Modify the infrastructure to increase performance and redundancy

MEET SPECIFICATIONS

★ Infrastructure has been re-designed for increased performance and redundancy
The monthly cost is between $18,000-20,000 using the AWS Pricing Calculator
A rationale is provided to explain which services were changed or removed

Taken in advantage the new budget the below actions were executed:

- Increase the size for the RDS instance, improving the performance and the capacity.
- Increase the number EC2 instances from 6 to 8 instances, in order to improve the availability.
- Increase the traffic supported by Load Balancer and Nat Gateways, improving the capacity.
- It is added a WAF to protect the infrastructure

Check Increased_Cost Estimate.csv file

Infrastructure as Code with Terraform

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Provision AWS Infrastructure as Code with Terraform

MEET SPECIFICATIONS

★ AWS Console EC2 screenshot `Terraform_1_1` shows:
- 4 AWS t2.micro EC2 instances named Udacity T2
- 2 m4.large EC2 instances named "Udacity M4"

Updated AWS Console EC2 screenshot `Terraform_1_2` shows:
- 4 AWS t2.micro EC2 instances named "Udacity T2"

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Deploy an AWS Lambda function using Terraform

MEET SPECIFICATIONS

★ Infrastructure includes:
- A lambda.py file
- A main.tf file
- An outputs.tf file
- A variables.tf file

AWS CloudWatch log screenshot `Terraform_2_3` shows the CloudWatch

log entry that correlates to the lambda function

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Delete and Destroy AWS Infrastructure Resources with Terraform

MEET SPECIFICATIONS

- All infrastructure provisioned with Terraform is deleted/ destroyed using the *.tf configuration files

Check Terraform_destroyed.png file