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Autonomous Infrastructure Provisioning In AWS

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Abstract: *Cloud computing platforms are becoming a popular platform for dispersed research and engineering applications. It provides a dynamic and adaptable architecture for hosting computer resources and delivering them as a service on demand, among other things. Most of the customers are looking for an easy way to automate the cloud services to make process simple and easy. Traditionally the process like development, deployment, testing, and configuration management was a time-consuming and manual process and it often involves repeated task. So automation came into existence that replaces It professional manual work and repeated task. Automated process can increase It productivity and reduce human error. so this paper summarizes a solution that can automate the infrastructure deployment according to client need. The environment gets provisioned automatically with all the required resources by collecting all the infrastructure details form the user.*

Key Word: *cloud computing, Infrastructure Provisioning, Cloud Formation, Template, Stack.*

I.INTRODUCTION

As per the problem statement, the customers are looking to automate some of the Cloud services to make the process simple and easy for the end users. Traditionally, deploying and operating enterprise workloads was a time consuming and manual process. It often involved repetitive tasks. So they came up with a solution called Automation. Cloud Automation can Automate manual administrative tasks or repeated processes that replaces an IT professional's manual work such as deployments, development & test workflows, container management, and configuration management. Automated processes can increase IT productivity and efficiency and reduce human error.

A. Cloud

The phrase "cloud" refers to Internet-accessible servers, as well as the software and databases that run on them. Cloud servers are spread across the globe in data centres. Cloud computing allows users and companies to avoid managing physical servers and executing software applications on their own PCs. Because the computing and storing takes place on servers in a data centre rather than locally on the user device, users can access the same files and programmes from nearly any device via the cloud. This is why, if a user's old phone breaks, they can log in to their Instagram account on a new phone and find that their old account is still intact, complete with all of their photos, videos, and chat history. It is compatible with cloud email providers such as Gmail and Microsoft Office 365, as well as online storage services such as Dropbox and Google Drive. Switching to cloud computing saves businesses money by reducing IT costs and overhead. They won't have to upgrade or manage their own servers, for example, because the cloud vendor will handle it for them. This has a big impact on small businesses that may not be able to afford their own internal infrastructure but can outsource it to the cloud for a cheap price. The cloud can make it easier for organisations to operate internationally because staff and consumers can access the same data and applications from any location.

B. Cloud Computing

Cloud computing is a broad word that refers to any method of delivering hosted services over the internet. Infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS) are the three primary categories or types of cloud computing (SaaS).There are two sorts of clouds: private and public clouds. Anyone with access to the web can buy services from a public cloud. a personal cloud could be a closed network or data centre that gives hosted services to a tiny low group of individuals with restricted access and rights. Cloud computing, whether private or public, aims to form computer resources and IT services more accessible and scalable. Cloud infrastructure involves the hardware and software components required for proper implementation of a cloud computing model. Utility computing or on-demand computing are other terms for cloud computing. Cloud computing works by enabling client devices to access data and cloud applications over the internet from remote physical servers, databases and computers.

C. Infrastructure as a Service (IaaS)

IaaS allows businesses to use storage, servers, and networking services without having to buy and operate large private server rooms that consume a lot of energy and space. As a result, one of the primary reasons companies adopt IaaS is to cut capital expenditures and convert them to operational expenses.

Most IaaS providers include policy-driven services, which allow users to automate and coordinate important infrastructure functions. Users can, for example, employ policies to automate load balancing in order to maintain application performance and availability. Business expansion that exceeds infrastructure capacity.

D. Infrastructure as Code (IaaC)

Infrastructure as code is a method for providing and managing cloud resources by generating a template file that is both human and machine accessible. AWS Cloud Formation is the default infrastructure as code option for AWS cloud development. You can write a description of the resources you wish to build on your AWS account using AWS Cloud Formation, and then ask AWS Cloud Formation to turn that description into reality. The YAML template excerpt below, for example, describes how to build an AWS ECS service resource:

```
Service:
  Type: 'AWS::ECS::Service'
  DependsOn: 'ServiceDiscoveryService'
  Properties:
    ServiceName: 'app'
    Cluster: 'production'
    DeploymentConfiguration:
      MaximumPercent: 200
      MinimumHealthyPercent: 75
    DesiredCount: 5
    TaskDefinition: !Ref 'TaskDefinition'
    ServiceRegistries:
      - RegistryArn: !GetAtt ServiceDiscovery
        ContainerPort: 3000
        ContainerName: 'myapp'
```

Fig1: Cloud formation template

II.EXISTING SYSTEM

A. Configuration management

Ansible/Chef are tools that idem potently configure programmes on the server. Configuration management tools are mostly used to set up the server. To put it another way, we utilise tools like Ansible and Chef to automate the installation and configuration of an application (such as Nginx) on a server. The configuration drift can be managed with the use of these tools. It ensures that all of the servers are configured in the same way as the ansibleplaybook or a chef cookbook specifies. If someone makes a manual change to the server configuration using an agent-based chef/puppet, the chef cookbook restores it to the desired state as specified in the cookbook.

B. Provisioning Management

Provisioning refers to the steps involved in controlling data and resource access as well as ensuring the availability of systems and users. It also includes the configuration of IT infrastructure. The current sophisticated hybrid network architectures are essential and the way forward, according to the industry. When the cloud was first introduced as a strategy a decade ago, the majority of IT experts immediately jumped on board. Processor power, scalability, and service-based charges were the driving forces behind this. It was sensible in terms of performance, cost, and security.

However, it is becoming clear that some applications will be unable to benefit from the benefits of cloud computing. Hybrid IT infrastructure, which mixes colocation, on premise, and public cloud services, is becoming increasingly popular among, businesses. Despite the fact that both are phases in the same process, provisioning is different from configuration.

III.PROPOSED SYSTEM

A. Use Case

The use case is about a customer who wishes to automate the Infrastructure Lifecycle's Design, Build, Operate, and Optimize phases. The overall goals of the Autonomous Infrastructure are to increase business agility and remove manual intervention while managing the application's whole lifecycle. Configure the Word Press application stack (two servers, one ELB) (1-LB, 1-Apache PHP, 1MySql), Create self-healing automation that monitors the Apache-PHP and MySQL processes and restarts or terminates them if they aren't running or hung. Add an Apache-PHP server if CPU use exceeds 70-80 percent. All of the relevant resources should be automatically created in the environment. As a result, we needed to devise a system to automate the processes.

B. Development Process

We've decided to use a Google Form to collect infrastructure information because cost efficient and customisable and we'll create a template that will build the major AWS public cloud constructs: VPC, SG, RT, LB, Apache-PHP, and MYSQL. After a user submits a form, data is saved in a spreadsheet, which google app script then collects and delivers to the AWS API Gateway

via a POST API call. The API Gateway will enable AWS Lambda (serverless computing), after which the Lambda function will be invoked, which contains a python script that will create a template based on the details provided by the user and calls the cloud formation and creates stack by using boto3 methods and all of the resources specified in the template will be provisioned automatically. And then user can check the resources in the stack console. Finally email will be send to the user using simple email services .The template of a stack is a declaration of the AWS resources it uses. You can save the template if you want to do so.

IV.CONCLUSION

Every infrastructure automation solution has its own set of advantages and disadvantages, as well as its own set of learning curves. When it comes to selecting a tool, you'll want to choose one that best suits your project's and team's demands. Cloud vendor-built tools may be the most convenient method to get started with your cloud migration, especially if you're seeking for a "one-stop shop."

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