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Automation of Infrastructure Deployment using AWS

Dr. A.C. Santha Sheela [1]*, Ramya. G. Franklin [2]

[1] Associate Professor, [2] Assistant Professor, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai, India

[1] shantha.jasmine@gmail.com [2] mikella.prabu@gmail.com

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Abstract. Today in this present era where technological advances are at its vertex, everything is getting automated. In the process of Application Development there exists a need for the provisioning of compute, storage and networking resources for employees of a company for their daily responsibilities. For such scenarios employees acquire compute and storage resources from a third person who handles such issues, might be System Admin, DevOps Engineer or a Cloud Engineer. But it involves for checking the policies of resources, taking care of governance, complying with the rules to meet the industry standard, if a new employee takes incharge of such positions it's difficult to cope with all these things quickly. So, we came up with an idea to automate all this Infrastructure Deployment (IaaS) through WhatsApp using Amazon Web Services (AWS). This automation eliminates the manual and complex tasks involved in the deployment activities with far easier and user friendly manner which brings more agility/y regarding productivity in Technology.

Key Words: Automation of Infrastructure AWS, IAAS, PAAS, WhatsApp Bot, Elastic Compute Cloud.

1. Introduction

"Automation of Infrastructure using Cloud", the word automation itself defines that we are simplifying the things that eliminate tedious task and fastens the work to complete in an easy and perfect manner. Cloud Computing is a domain which follows the motive of "pay – as – you –go" service which says that pay money only for what you use. This eliminates the cost of establishing physical servers and data centres. This also reduces the efforts of maintenance of the servers thereby saves our money. We can access the resources like Computing power, Storage and Databases in according with our need and pay only for that usage of resources. There are many Cloud providers around the world such as Amazon Web Services, Google Cloud Platform, Microsoft Azure and Oracle Cloud etc., Infrastructure as a Service is a term used by the Cloud providers to provide all the computational resources, to get that resources we need an account in that respective cloud providers site and also have some knowledge of cloud computing to create, manage, run and terminate the instances. So, we are automating that all those steps to create and managing instances in a simple format of using a WhatsApp Bot. This Bot eliminates the complex tasks like installation of software's and steps to launch a compute instance in the cloud platform. In company prospective process eliminates the cost of investment for an employee.

A person who required to complete some technical work either simple tasks or complex tasks they

require a Computer, Storage, RAM, Processors etc., This requires a lot of money, research and Time to get the things done perfectly. They may depend on Internet centers to complete the work but it also may require some efforts. For a Student if they want to do some projects they may need a Machine of High End Configurations which may require more money to buy a laptop or a Computer with those configurations. Buying a computer with high-end configurations is not possible for all the people as they cannot afford that much money for some tasks. For employees in the technical field, getting the work done easier and faster in a perfect manner is the primary goal, so to achieve the goal they need a System with the requisite RAM, Memory, Processor and Software installed to complete the work in a fast manner. If we automate this process and provide all the prerequisites required for the work to be done, then employee can work on it directly and easily without any headache of installing Software and arrangements.

2. Literature Survey

Younus and et al proposed that Agile programming development is effective due to self-arranging groups, versatile arranging, an enjoyable climate regarding correspondence with customers and colleagues, little development cycles, ceaseless plan enhancements, nonstop conveyance and criticism of consumers. Cloud computing assists with decreasing expense, empowers adaptability and improves correspondence through its administrations. During this investigation they have proposed a system by combining Agile Development and Cloud Computing.

Butt and et al conducted a survey including seven IT professional Institutions on the topic of implementing the Agile methodology by combining with cloud to get an efficient software development with a faster response from the client. They also explained how the existing methodologies can affect agile-cloud implementation for efficient software development. Cloud computing has involved in several stages of software development life cycle in an efficient approach to give a right product to the client. Many reviews are presented in literature by many researchers with respect to ecommerce applications in different domain [15][16][17]. This analysis will surely enable the researchers with the idea of deep learning technique in different applications [18][19][20][21][22]. Different issues also discussed in machine learning applications[23][24].

3. Proposed System

The proposed work provides solutions for the problems stated above in a simple and easy manner with an idea to automate all these Infrastructure Deployment(IaaS) through WhatsApp using Amazon Web Services(AWS). This automation eliminates the manual and complex tasks involved in the deployment activities with far easier and more user friendly manner which brings more agility in terms of productivity in Technology.

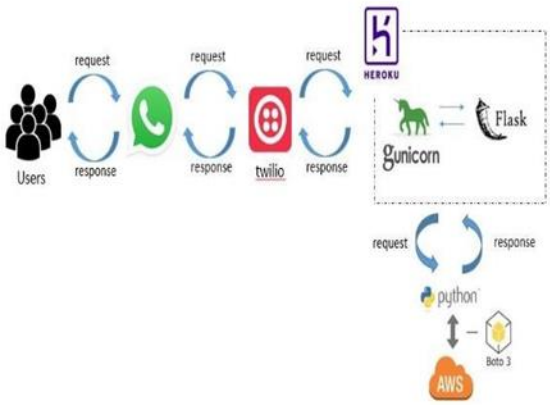

Fig. 1 Automation of infrastructure Deployment using AWS

We developed a WhatsApp bot to get a simple online virtual machine of desired configuration and which can be accessed through a browser by simple chat. Here user can give the requirements of his system he needed, like amount of RAM, Processors and the type of Operating System he want to use.

The main aim of the work is to build an enhanced Bot which automate the Infrastructure Deployment(IaaS) through WhatsApp using Amazon Web Services(AWS). This automation eliminates the manual and complex tasks involved in the deployment activities with far easier and more user friendly manner which brings more agility in terms of productivity in Technology and also more ease of doing work in Cost efficient way.

This system can be accustomed by any company to complete their projects in an easy and perfect manner. Employees while working on the projects Computing power and storage plays a key role in the rapidity of work, more the compute power more rapidly we can complete our work. Installation of required softwares is also a tedious task to do because it consumes lot of time and efforts which consumes our valuable time. These problems can be eliminated if it is automated, thereby saves lot of time and efforts.

This may also eliminate the syntactical errors and issues caused by the versioning differences among the team while working on the same project because if all the team members use the same Virtual Machine allotted to them which id pre- installed with the required software then there will be no kind of version difference and syntactical errors while merging the project. In the software field this plays a major role to fasten the work and deliver it on time to the client.

Ngrok:

Ngrok is a platform used for the developers to establish a Local Server by connecting to the internet with less efforts. Open source and Windows-friendly. Helpful instrument to test distant worker HTTP(S) callbacks. The Ngrok Services may just be utilized for legitimate purposes. Transmission, circulation, or capacity of any data, information or material infringing upon United States or state guideline or law, or by the customary law, is denied. The Services may not be utilized to encourage

encroachment of these laws in any capacity. Ngrok permits you to uncover a web worker running on your neighbourhood machine to the web. Simply tell Ngrok what port your web worker is tuning in on. In the event that you don't have the foggiest idea what port your web worker is tuning in on, it's most likely port 80, the default for HTTP. Ngrok can be extremely delayed on occasion since it needs to advance the traffic from your PC to the ngrok worker and afterward forward it from the ngrok worker to the host PC. Be that as it may, this is definitely not an extreme issue to settle. 37 organizations purportedly use ngrok in their tech stacks, including TACTFUL.ai, Devza Inc, and Platform Development Team.

Twilio

Twilio is an American cloud interchanges stage as an assistance organization situated in San Francisco, California. Twilio utilizes Amazon Web Services to have communication foundation and give availability among HTTP and the public exchanged phone organization (PSTN) through its APIs. Twilio follows a bunch of structural plan standards to ensure against surprising blackouts. It underpins the advancement of open-source programming and consistently makes commitments to the open-source local area. Twilio gives a straightforward passage point into the communication world, and assists your business with maintaining a strategic distance from a large number of the customary intricacies. Developers can rapidly get overall availability by communicating with Twilio utilizing normal web conventions and straightforward markup. When utilizing a preliminary venture with Twilio, all your utility costs are free. Zoom is the most quickly developing stage for video and sound conferencing while Twilio is the other more youthful cloud video conferencing administrations. 1164 organizations supposedly use Twilio in their tech stacks, including Uber, Airbnb, and Instacart.

Boto3

Boto gets its name from the Portuguese name given to sorts of dolphins local to the Amazon River. It permits Python engineers to compose programming. The boto bundle is the hand-coded Python library that has been around since 2006. Thus, boto3 is another variant of the boto library dependent on botocore. Boto3 is the name of the Python SDK for AWS. It allows you to make any kind of update, and erase AWS from your Python contents. Boto3 is worked on of a library called Botocore, which is shared by the AWS CLI.

AWS:

Amazon Web Services is a Cloud Platform which is subsidiary of Amazon founded by Jeff Bezos. AWS was established to solve many problems like provided flexibility in Operations, reduction in cost, increase in transparency, Enhanced risk management and improved Security etc., AWS was established in the year 2006 by launching Elastic Cloud EC2. This made the hosting and maintenance of websites in an easy, secured and at reduced costs. It reduced the Cost of establishing a private server for small Applications and made management of websites and other applications easier as it will be maintained by the AWS itself thereby reduces the risk and maintenance of the server. AWS also provides backup to the data hosted on the AWS platform.

Gunicorn:

It is regularly used to run Python web applications. It is delivered on 20 February 2010. The Gunicorn worker is extensively viable with different web structures, basically actualized, light on worker asset utilization, and genuinely quick. Features incorporate, Simple Python arrangement, Multiple laborer designs and Automatic specialist measure the board. Gunicorn is a pre-fork model worker, which implies that an expert cycle is begun and afterward a few laborer measures are forked from the expert. It operates on port 80 You can serve carafe applications with Gunicorn. By utilizing gunicorn, you'll have the option to serve your Flask application on more than one string. You can begin Gunicorn by running the order sudo systemctl empower gunicorn. administration to begin the assistance on framework startup. When you run the order a symlink to this document will be made in the catalog. 363 organizations apparently use Gunicorn in their tech stacks, includes Instagram, Reddit, and Accenture and so on Heroku.

It enables designers to fabricate, run, and work applications altogether in the cloud. Designers use Heroku to convey, oversee, and scale current applications. Hosted on the Amazon's server farms. It is a cloud application stage – another method of building and sending web applications. Heroku is best reasonable for Startups, Medium Businesses though AWS is for the most part centered around Medium Businesses and Large Enterprises. You don't have to consider framework since it oversaw naturally by the actual product. Heroku is claimed by Salesforce. Comparing with AWS, Heroku underpins less Geographical Regions. This distributed computing stage deals with fixing frameworks and keeping everything sound. It permits you to make another worker in only 10 seconds by utilizing the interface of Heroku Command Line. Offers top tier Developer Experience.

Python:

Python is an interpreted, object-oriented language. It has worked on linguistic structure and not convoluted, which gives more accentuation on normal language. Python codes can be effortlessly composed and executed a lot quicker than other programming dialects. Python is regularly utilized as a help language for programming engineers, for fabricate control and the executives, testing, and from numerous points of view. Most recent form of python will be Python 3.9 was delivered on October fifth, 2020. It is open-source, downloaded without any problem. There are 200+ libraries. Every library has its own capacity. The utilization of these capacities is no compelling reason to compose code separately we can utilize work.

Flask:

It is a web framework in python, used for building web applications. It represents Flux Advanced Security Kernal. It is named a microframework on the grounds that it does not require specific instruments or libraries. Intended to make beginning fast and simple, with a capacity to scale up complex applications. Quite possibly the most famous python web applications systems. 927 organizations supposedly use Flask in their tech stacks with incorporates Netflix, trivago and Lyft. Python, Sentry, Bugsnag, Airbrake and KeyCDN are a portion of the famous apparatuses that coordinate with jar.

3. Implementation:

WhatsApp Bot is provided to the user with the help of Twilio API to send and receive the requests so that we can interact in a user friendly manner.The requests from the WhatsApp Bot are transferred through Twilio API and redirected to the Flask Application.

Heroku is a PaaS platform in which the Flask and Gunicorn is hosted to handle the requests. Gunicorn is a Web Server Gateway Interface which synchronizes the requests coming from different users and sends it to the Flask one by one.

The Flask processes the request and sends the specific function to AWS Boto3 for provisioning resources in AWS Cloud.

AWS Boto3 will provision the requested resources using pre-existing baked Amazon Machine Images.
An EC2 Instance will be created using the configuration setup requested by the user.
Ex: If a user requests 1 GB of RAM then our flask application will assign “t2.micro” as an instance type accordingly.

The data sources of the Instance like AMI ID, Public IP address, DNS name, Instance id etc., can be fetched using boto3 SDK and returned back to the user.

- The IP Address of the Instance created in AWS will be returned to the user using WhatsApp bot
- Flask Transfers the IP Address to Twilio WhatsApp API as a response to the request asked.
- This IP Address will be received to the user as a response which can accessed by him to complete his work.

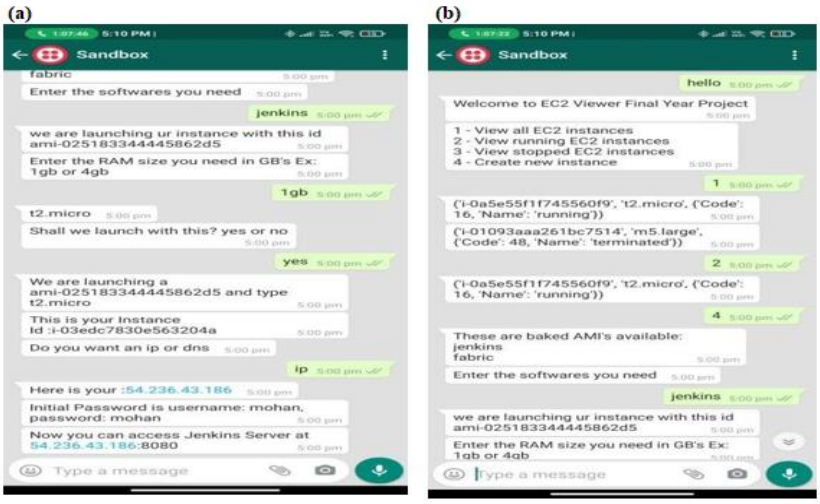

Fig 2 (a), (b) Implementation of whatsapp Bot with Twilio API

4. Conclusion

This work eliminated the tedious task of deployment of Infrastructure using cloud, and also automated the manual process of software installation and provided along with the Instance in a pre-installed format, this eliminates the Syntactical errors caused during the work merging phase. The proposed system will decrease the efforts of deployment of an instance and also the process of installation of the software's there by saves money, time and efforts for a robotic task and enables the developers to invest our time in a creative or logical work.

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