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Upgrading Industry Infrastructure over AWS Cloud Platform

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Abstract: ***Today when the whole world is suffering through the rapidly increasing "E-waste" the best way to get rid of it is to reuse the currently available resources and not buying new resources. Into this context one thing could be done, upgrading on premises resources to cloud based servers and workplace, setting services for industries over cloud platforms is a very revolutionary step and a very productive one. Since the already present resources are connected to Cloud and are given updates on their Virtual Hardware, a better environment for work can be achieved even without buying any new resource. To the very problem of 'E-waste' we are also getting through a pandemic, COVID-19. Due to COVID-19 pandemic most of the industries are closed people have lost jobs and most of the people are supposed to work from their houses but they are bound to do only the very basic things and most of the professional work is pending due to lack of software and hardware and in this scenario a cloud-based industry comes very handy. During this pandemic Cloud Market has bloomed and it will keep increasing very rapidly in the next few years also.***

This paper we are discussing how an Industry can be deployed on Cloud, where the whole resources for the industry are deployed using different resources over AWS platform. So, the basic requirements in an industry are computer server ("Instance" in cloud), storage (EBS), processors, operating system (AMI), monitoring tools, management tools. These services are way much less expensive than the traditional ones. We can select every sort of machine according to our need. We have to pay for the resources we are reserving or using only. We need very basic computer system hardware and with that we need high speed internet for proper functioning of the systems.

Keywords: AMI, EBS, IAM, Active Directory, Instance, VPC.

I. INTRODUCTION

The most important resources in an Industry is the hardware i.e., the servers and the machines itself, after concluding the hardware, software is needed in which the most important are the automation, monitoring and security software. For industry grade hardware a machine should have a very high-end hardware that includes the processor, the storage, RAM and other required parts. When the hardware has been combined the next step is to get the very professional software for monitoring and security.

After the hardware and the software are integrated the next step is the network between the devices present in the industry. The resources should be connected in such a manner that there isn't any leak of the data hence the security and there isn't any conflict between the devices in the network.

After the network has been created the next step is to establish an automated setup and for that some software can be used or simply by putting some effort in programming it can be done. One of the most important aspects in an industry is the monitoring. It can be done by using some software like P2 Power, Networx, Solarwind etc.

But getting an upgrade on the hardware or even starting a new industry costs a huge amount of money and over to that a huge pile of E-Waste is also created.

Into this context most of the industries nowadays use Cloud services in their offices, but most of them are limited to a few resources or services. This is due to lack of trust into the security of the Cloud. But this can be overcome by using a proper set of security in the resource and service management.

II. PROPOSED SYSTEM

Our project ensures that with the upgradation of the industry or while starting a new industry the production of E-Waste is reduced up to 0% with the recycling of the current resources present in the market, without any compromise on the work output, system speed and system update. It also ensures considerable cost efficiency. The only requirements are good internet speed, most basic computer systems and other hardware.

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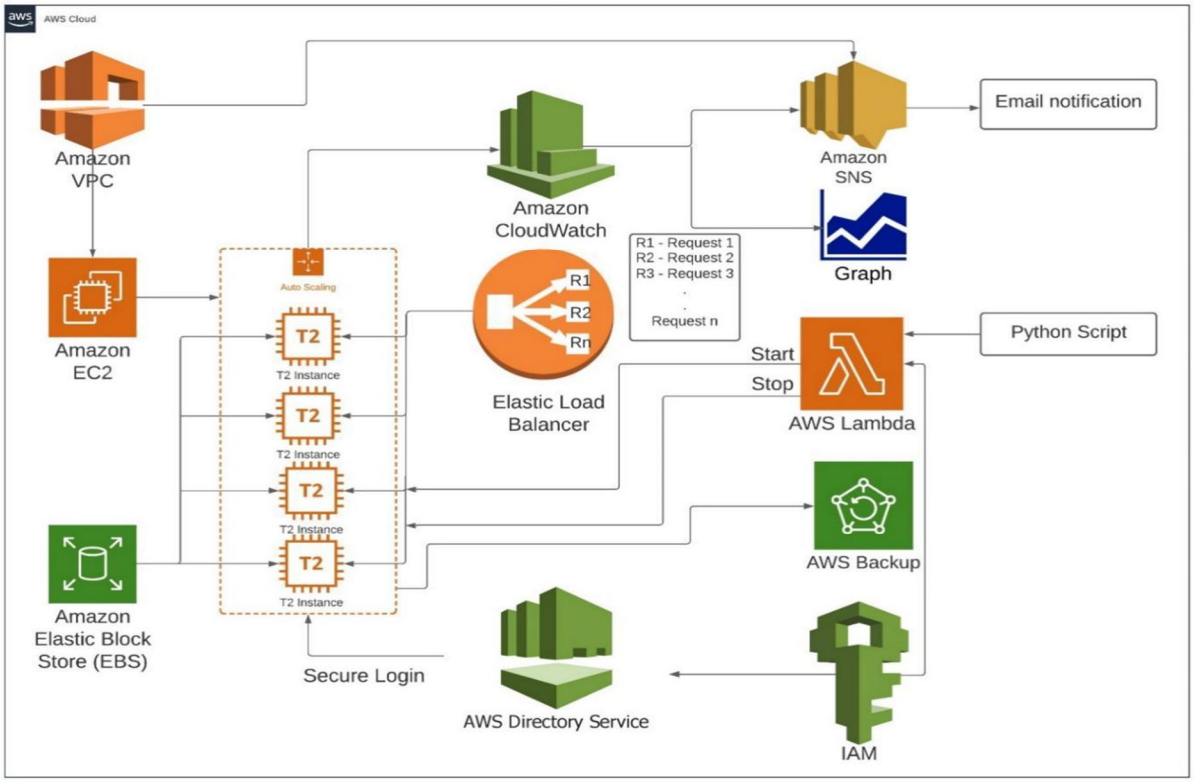
III. SCOPE OF THE WORK

Cloud computing is now becoming a business standard. It simplifies the user's accessibility. It provides a virtual storage space to the user which could be used without bothering about the details of the entire mechanism.

As per IBM, around 85% of new applications are being developed around Cloud Computing. There are huge growth opportunities for the cloud computing industry that is expected to grow. The worldwide public cloud services market is projected to grow 17.5 percent in 2019 to total $214.3 billion, up from $182.4 billion in 2018, according to Gartner, Inc. According to recent Gartner surveys, more than a third of organizations see cloud investments as among the top investment priorities.

Cloud is now an essential tool for start-ups where a huge amount of money and time is saved, a company could end up saving thousands by choosing this option.

IV. BLOCK DIAGRAM AND DESCRIPTION



V. DESCRIPTION

The centre of the infrastructure are the instances (VM), which are deployed by using Amazon EC2 service. The IP addresses for the instances are provided through the Amazon VPC (Virtual Private Cloud), which creates a virtual network over the cloud. The VMs are connected with extra storage i.e., EBS. IAM is used to make rules for the AWS Lambda Service and AWS AD. A secure login using a password is made using AD service. The automation part of the whole infrastructure has been made possible by using Python code deployed by AWS Lambda, which starts and stops the VMs with just one command. A website has been deployed using the VMs and the requests to the website are distributed to all the VMs by Elastic Load Balancer. The data collected from the servers and some other data can be stored in AWS Backup which are connected to the instances. All the activities being done in the infrastructure are monitored by the AWS CloudWatch Service. It collects data from the whole Infrastructure and can create an alarm for each situation separately and let the administrator know about the situation with email notification and through graphs. Altogether the services combined with each other creates a balanced system, easy to work and easy to monitor.

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VI. APPLICATIONS

1) *Saves Money:* You do not have to buy software and hardware. They are provided by the cloud. Hence you save costs such as office space rent, electricity, air conditioning, maintenance as well as operational expenses. Also, you pay only for the services that you use.
2) *Allows Companies To Focus On Their Core Areas Of Business:* Earlier, businesses had to allocate human resources, time, money, and effort to manage in-premises hardware. Cloud takes care of all the hardware and software aspects of businesses. This allows the business to concentrate on taking care of their domain areas.
3) *Swift Deployment:* The business system can be up and running in just a few minutes. This gives an early lead over companies using the traditional or conventional approach.
4) *Competitive Advantage:* Businesses leveraging the cloud have a strategic edge over those that don't. This is because they can start off quickly and have the latest hardware as well as software services.
5) *Employees Can Work From Any Place At Any Time:* Cloud services are available round the clock. Even if the office is closed work can go on. You can work at any time and from any geographical location as long as you have an Internet-enabled device.
6) *Superior Backup:* Compared to on premise technology where backup, as well as recovery, takes a lot of time you can easily and conveniently do backup and recovery on the cloud platform. There is less downtime involving cloud-based platforms. The latter provides quicker as well as relatively more accurate retrievals of information as well as applications.

VII. RESULT

All the required resources for a working Industry have been set up and properly integrated with each other. A proper set of working Instances for the process of requests and other processes has been deployed over the cloud. The Virtual Machines or the instances have a proper set of Virtual Hardware like CPU, RAM, STORAGE, Operating System (AMI). A secure login into the servers has been established by using IAM and Amazon ACTIVE DIRECTORY. All the requests are being processed and are being distributed to all the servers equally by using the ELB. Tools for Monitoring i.e., CLOUDWATCH and SNS are working properly, all the activities over the infrastructure are visible. The automation of the infrastructure using the AWS LAMBDA service is working properly, all the servers get ON and OFF with just one command.

VIII. CONCLUSION

Apart from these common services, cloud computing applications are much more diverse, and they are ever-expanding. Common people are using cloud services from their mobile devices so as to store important photos or videos. It is clear that cloud computing will be defining the future over the next few decades. Cloud computing has resulted in increasing the cost-effectiveness of several IT-based businesses by ensuring infrastructure flexibility. Cloud services have also made it possible for businesses to grow since they can engage in big data analysis and understand consumers better. Cloud computing applications, used in the right way, could pave a new path for the digital world.

IX. ADVANTAGES

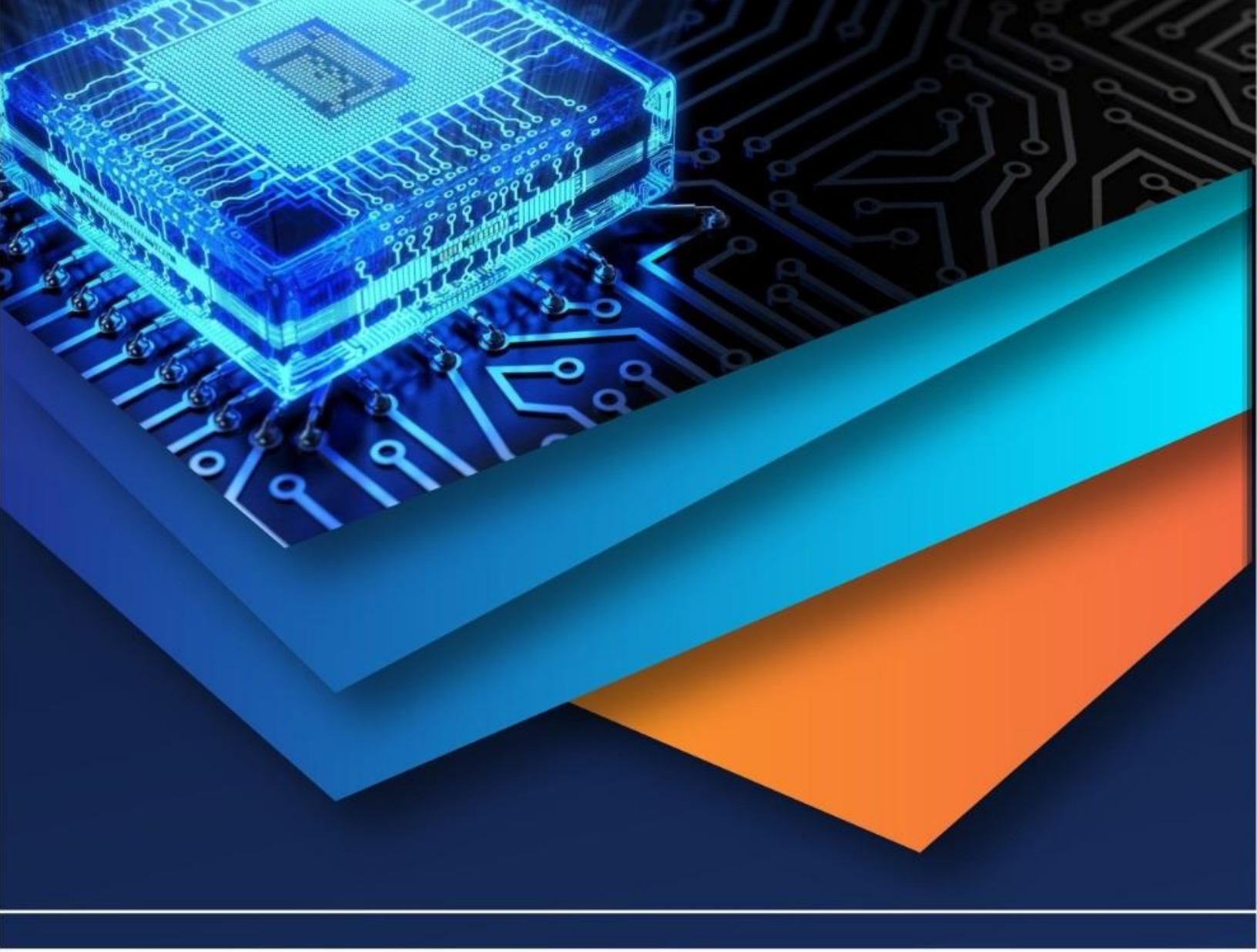
1) *Easy Implementation:* Cloud hosting allows businesses to retain the same applications and business processes without having to deal with the backend technicalities. Readily manageable by the Internet, a cloud infrastructure can be accessed by enterprises easily and quickly.
2) *Accessibility:* Access your data anywhere, anytime. An Internet cloud infrastructure maximizes enterprise productivity and efficiency by ensuring your application is always accessible. This allows for easy collaboration and sharing among users in multiple locations.
3) *No Hardware Required:* Since everything will be hosted in the cloud, a physical storage centre is no longer needed. However, a backup could be worth looking into in the event of a disaster that could leave your company's productivity stagnant.
4) *Cost Per Head:* Overhead technology costs are kept at a minimum with cloud hosting services, enabling businesses to use the extra time and resources for improving the company infrastructure.
5) *Flexibility for Growth:* The cloud is easily scalable so companies can add or subtract resources based on their needs. As companies grow, their system will grow with them.

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