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The effect of Amazon Web Services (AWS) on Cloud-Computing

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1. Abstract:- Cloud Computing has become a very famous and successful drill with the current evolution of technology. It's becoming an increasingly famous enterprise model, in which the computing resources are made obtainable to the user as they needed. Cloud computing is the on-demand delivery of compute power, database, storage, applications, and other IT resources via the internet with pay-as-you-go pricing. These resources run on server computers that are located in large data centers in different locations around the world. Here, we will be studying about Amazon Web Services (AWS), which is one of the best cloud-service provider in the world. AWS is one of the most trusted and reliable sources of providing cloud-computing services. It provides a variety of services with a properly managed security as well. It is a secure cloud platform that offers a broad set of global cloud-based products. Because these products are delivered over the internet, you have on-demand access to the compute, storage, network, database, and other IT resources that you might need

for your projects—and the tools to manage them. You can immediately provision and launch AWS resources. The resources are ready for you to use in minutes. AWS offers flexibility. Your AWS environment can be reconfigured and updated on demand, temporarily or permanently. The billing for AWS services becomes an operational expense instead of a capital expense. AWS services are designed to work together to support virtually any type of application or workload. Think of these services like building blocks, which you can assemble quickly to build sophisticated, scalable solutions, and then adjust them as your needs change.

Keywords: Amazon Web Services (AWS), Cloud Computing, Reliability, Flexibility, Scalability, Compute, Database, Network

2. INTRODUCTION

Cloud computing is the on-demand delivery of compute power, database, storage, applications, and other IT resources via the internet with pay-as-you-go pricing. These resources run on server computers that are located in large data centers in different locations around the world. When you use a cloud service provider like AWS, that service provider owns the computers that you are using. These resources can be used together like building blocks to build solutions that help meet business goals and satisfy technology requirements.

2.1 Cloud Service Models:

There are three main cloud service models. Each model represents a different part of the cloud computing stack and gives you a different level of control over your IT resources:

- **Infrastructure as a service (IaaS):**

Services in this category are the basic building blocks for cloud IT and typically provide you with access to networking features, computers (virtual or on dedicated hardware), and data storage space. IaaS provides you with the highest level of flexibility and management control over your IT resources. It is the most similar to existing IT resources that many IT departments and developers are familiar with today.

- **Platform as a service (PaaS):**

Services in this category reduce the need for you to manage the underlying infrastructure (usually hardware and operating systems) and enable you to focus on the deployment and management of your applications.

- **Software as a service (SaaS):**

Services in this category provide you with a completed product that the service provider runs and manages. In most cases, software as a service refers to end-user applications. With a SaaS offering, you do not have to think about how the service is maintained or how the underlying infrastructure is managed. You need to think only about how you plan to use that particular piece of software. A common example of a SaaS application is web-based email, where you can send and receive email without managing feature additions to the email product or maintaining the servers and operating systems that the email program runs on.

2.2 Cloud Deployment Models:

There are three main cloud computing deployment models, which represent the cloud environments that your applications can be deployed in:

- **Cloud:**

A cloud-based application is fully deployed in the cloud, and all parts of the application run in the cloud. Applications in the cloud have either been created in the cloud or have been migrated from an existing infrastructure to take advantage of the benefits of cloud computing. Cloud-based applications can be built on low-level infrastructure pieces or they can use higher-level services that provide abstraction from the management, architecting, and scaling requirements of core infrastructure.

- **Hybrid:**

A hybrid deployment is a way to connect infrastructure and applications between cloud-based resources and existing resources that are not located in the cloud. The most common method of hybrid deployment is between the cloud and existing on-premises infrastructure. This model enables an organization to extend and grow their infrastructure into the cloud while connecting cloud resources to internal systems.

- **On-premises:**

Deploying resources on-premises, using virtualization and resource management tools, is sometimes called private cloud. While on-premises deployment does not provide many of the benefits of cloud computing, it is sometimes sought for its ability to provide dedicated resources. In most cases, this deployment model is the same as legacy IT infrastructure, but it might also use application management and virtualization technologies to increase resource utilization.

3. Literature Survey

It's been a sufficient time since cloud-computing was introduced and now, many service-providers are providing cloud services. However, problems still persist while using cloud-computing services in IT sector. Many people were not sure about its trustability since all the data of companies remain online on the cloud and anyone from anywhere can easily access that data, even leading to much damage. Before AWS was introduced, some issues with cloud computing were:

1. Privacy Concern
2. Compliance
3. Security Concern
4. Sustainability
5. Higher Cost
6. Lacking reliability in providing services

In order to solve these problems, AWS was introduced as a cloud-service provider in March, 2006. It provides highly secured infrastructure. Moreover, you don't need to worry about maintain data-centers as AWS manages that accordingly. It also provides a bunch of different services like compute, storage, database etc. We can also easily trade capital expenses for variable expenses. Auto-scaling also equips with guessing the capacity of data. Our speed and agility are also increased. Additionally, we can easily go global in minutes without spending money or running & maintain data-centers.

4. CURRENT REGIME

The current infrastructure of AWS provides services like compute, storage, databases, networking, security, analytics, android, automatic scaling & monitoring, etc. These services help the organizations to choose what is right for them, lowers infrastructure costs and easily scales. Efficiency is also increased by using these services. AWS Cloud Adoption Framework (CAF) provides guidance and best practices to help organizations identify gaps and processes. It also helps organizations build a comprehensive approach to cloud computing—both across the organization and throughout the IT lifecycle—to accelerate successful cloud adoption. Due to all it's benefits, AWS is trusted by the largest enterprisers and also the most blistering start-ups for storage, data analytics & processing, archiving data, etc.

5. CHALLENGES IN CLOUD-COMPUTING

1. It's too difficult to manage the large chunk of data that arrives from multiple sources to operate your business. The pain point here lies not only in management but also in identification of efficient infrastructure that will sort data and store accordingly.
2. Organizations have to pay even if they are not using cloud-computing services, even though cloud-computing is affordable.
3. The transfer of data from one system to another possesses serious risks, if not monitored and handled properly. Even if a technology is identified, it is still prone to hacking.
4. Assiduous supervision of passwords also plays a key role in cloud security. But, many people aware of your password will be easily able to access it and can retrieve your information.

6. TROUBLE-SHOOTING THE ISSUES OF CLOUD-COMPUTING USING AWS

1. **AWS Lake Formation-** AWS Lake Formation is a service that makes it easy to set up a secure data lake in days. A data lake is a centralized, curated, and secured repository that stores all your data, both in its original form and prepared for analysis. A data lake lets you break down data silos and combine different types of analytics to gain insights and guide better business decisions. Setting up and managing data lakes today involves a lot of manual, complicated, and time-consuming tasks. This work includes loading data from diverse sources, monitoring those data flows, setting up partitions, turning on encryption and managing keys, defining transformation jobs and monitoring their operation, reorganizing data into a columnar format, deduplicating redundant data, and matching linked records. Once data has been loaded into the data lake, you need to grant fine-grained access to datasets, and audit access over time across a wide range of analytics and machine learning (ML) tools and services.

2. **Billing & Cost Management Dashboard-** AWS Billing and Cost Management is the service that you use to pay your AWS bill, monitor your usage, and budget your costs. Billing and Cost Management enables you to forecast and obtain a better idea of what your costs and usage might be in the future so that you can plan ahead. You can set a custom time period and determine whether you would like to view your data at a monthly or daily level of granularity. With the filtering and grouping functionality, you can further analyze your data using a variety of available dimensions. The AWS Cost and Usage Report Tool enables you to identify opportunities for optimization by understanding your cost and usage data trends and how you are using your AWS implementation.

3. **AWS Migration HUB-** AWS Migration Hub provides a single location to track the progress of application migrations across multiple AWS and partner solutions. Using Migration Hub, you can view the migration progress of all the resources in the application. This allows you to quickly get progress updates across all of your migrations, easily identify and troubleshoot any issues, and reduce the overall time and effort spent on your migration projects. AWS Migration Hub provides a single place to monitor migrations in any AWS region where your migration tools are available. There is no additional cost for using Migration Hub. You only pay for the cost of the individual migration tools you use, and any resources being consumed on AWS.

4. **AWS Multi-Factor Authentication-** AWS Multi-Factor Authentication (MFA) is a simple best practice that adds an extra layer of protection on top of your username and password. With MFA enabled, when a user signs in to an AWS Management Console, they will be prompted for their username and password (the first factor—what they know), as well as for an authentication code from their AWS MFA device (the second factor—what they have). Taken together, these multiple factors provide increased security for your AWS account settings and resources. You can enable MFA for your AWS account and for individual IAM users you have created under your account. MFA can be also be used to control access to AWS service APIs.

7. CONCLUSION

From this, we can conclude that cloud-computing suffers from a number of problems like loss of data, account hijacking, insecure interfaces and API's, cost effectiveness and many more, but using AWS, we can effortlessly master all these problems. As of now, AWS offers over 200 fully featured services from data-centers globally. These services are used by following "pay-as-you-go" model of AWS, by which we only pay for those services we use. In addition to that, AWS offers variety of other services like scalability, which means AWS balances the size of the server accordingly, flexibility which indicates that you do not need to worry about processing, data storage, security & integrity. AWS also provides us with AWS Console initially for 1-year period to get user-oriented with its services. Thus, the reasons mentioned are more than enough to prove why AWS is the best among all the cloud-service providers.

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