

Building Web Application using Cloud Computing

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Abstract - Nowadays, there is a buzz about Cloud Computing in the IT industry. Most of the industries, irrespective of their size are moving towards Cloud-based solutions. Cloud computing has been buzzing around the industry because of its characteristics such as low-cost storage, on-demand computing resources, pay as you use, availability of data at any time and any place and ease in maintenance, etc.

Cloud technology provides high availability, scalability, elasticity, pay as you go, and on-demand computing resources. There are various Cloud service providers available in the market such as AWS, Microsoft Azure, Google Cloud, etc. Here, we are using AWS as a cloud service provider and apply a different approach to develop a web portal, which is different from the traditional approach.

This paper demonstrates how to develop any web application, provide multiple interfaces to it, and how to choose appropriate services from Amazon Web Services for an application.

Key Words: Cloud Computing, Scalability, Elasticity, Web Portal, Amazon Web Services

1. INTRODUCTION

1.1 Web Development

Web Development comprehensively refers to the tasks associated with developing online portals for hosting via the internet or intranet. The web development process incorporates website composition, web content development, customer-side/server-side scripting, system security setup, and other associated tasks. It empowers site functionalities according to the proprietor's prerequisites. Web Portal development ranges from making plain content pages to complex electronic applications, informal community applications, and electronic business applications.

It follows a certain degree of the progressive system i.e.: -

1. Customer side Coding
2. Server-side Coding
3. Database Innovation.

1.2 Cloud Computing

Cloud Computing refers to the idea of on-demand, pay as you go, IT services that are delivered over the internet.

The main benefits of cloud computing include:

- On-demand
- Pay-As-You-Go
- Scalability
- Delivered over the internet
- Highly Automated

Cloud Computing is an innovation that utilizes one remote server and the web to look after various information and applications. Cloud Computing gives significant financially savvy IT assets as a cost on request IT-dependent on the real use of the client. Because of fast development, numerous organizations can't deal with their IT necessity much after having an in-house data center.

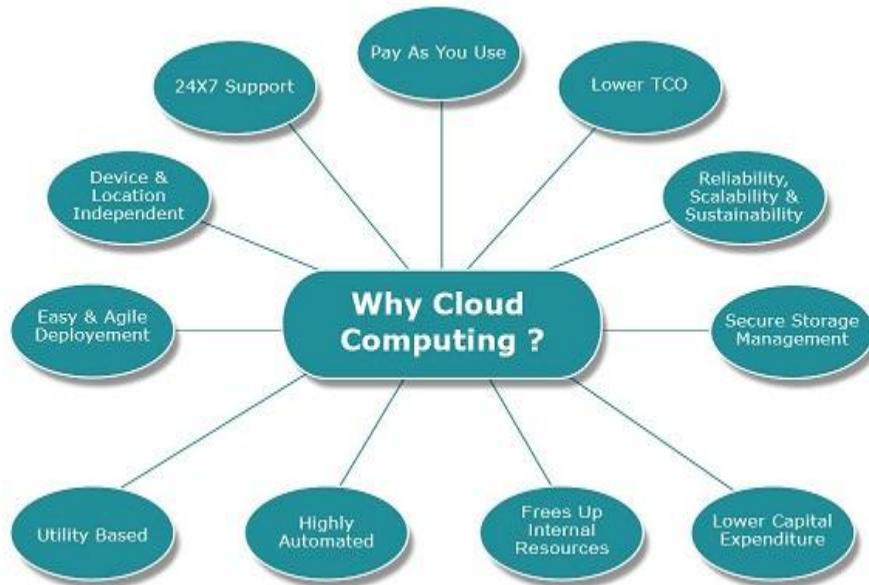


Fig -1: Why Cloud Computing?

Cloud Services are utilized to improve IT capacities without putting huge sums in new data centers. This innovation helps organizations with substantially more proficient computing by centralizing processing, storage, memory, and bandwidth.

Here, we apply an alternative way to deal with build up a site, which is not quite the same as the traditional approach of site improvement and depends on cloud computing and its uses. Especially, here we use the AWS model of computing which is financially savvy and best of the model of cloud computing.

1.3 Amazon Web Services

Amazon Web Services (AWS) is a cloud service provider available in the market. It provides on-demand cloud computing platforms and APIs to people, organizations, and governments, on a metered pay-as-you-go premise. It gives a lot of crude unique specialized frameworks and distributed computing building blocks and tools.

The most common services incorporate Amazon Elastic Compute Cloud (EC2), Amazon Simple Storage Service (S3), Route 53, Elastic Load Balancing, and AWS Autoscaling. Most of the services are not presented directly to end clients, however, they offer usefulness through APIs for engineers to use in their applications. Amazon Web Services contributions are gotten to over HTTP, utilizing the REST engineering style and SOAP convention.

The AWS technology is executed at server farms executed all through the world and kept up by the Amazon auxiliary. It contained a wide extent of services including computing, storage, memory, networking, analytics, database, management, auto-scaling, deployment, application services, developer, and automation tools.

AWS provides subscribers as a way of obtaining large scale computing capacity more quickly and cheaper than building an actual physical server farm. All services are billed based on usage in various ways.



Fig -2: Amazon Web Services

2. LITERATURE SURVEY

2.1 Introduction

Cloud Computing fundamentals characteristics such as on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service, made the cloud helpful for programming frameworks organizations and programming conveyance as a help. Systems deployed on the cloud are often referred to as Software as a Service (SaaS).

To profit the most from the cloud, programming must be structured with the thought that it will run on the cloud. Applications created in such a way are generally called cloud-native or cloud-ready applications and once in a while cloud-aware.

For as long as barely any years a cloud-native term is industrialized by companies like VMware or Pivotal and is utilized to characterize containerized applications or applications created utilizing small scale services.

2.2 Literature Review

Widely picked software architecture assists with beating potential issues and permits to take points of interest gave by the cloud. For the cloud software engineer or designer, it is essential to understand what cloud-ready application is and what requirements it must meet.

This systematic literature review aims to summarize the information available in studies related to cloud-ready applications architecture development by answering to the following research questions: -

Question 1. What is the cloud-ready application and how it differs from conventional applications?

Question 2. What non-functional requirements are raised for the cloud-ready applications?

Question 3. What architectures are currently used for cloud-ready application?

In short, cloud computing empowers a move from the computer to the client, from applications to tasks, and from isolated data to data that can be accessed from anywhere and shared with anyone. The client no longer needs to assume the task of data management, he doesn't even have to that the data is in the cloud, and thus immediately available to that user and other authorized users.

2.2.1 What is the cloud-ready application and how it differs from conventional applications?

A cloud-ready application is an application that has been specifically designed to run in a cloud environment. A cloud-native application is a distributed, elastic, and horizontal scalable system composed of services that isolate state in a minimum of

stateful components. Automation and elasticity can be treated as fundamental qualities of a cloud-ready application and which recognize it from the traditional applications.

2.2.2 What non-functional requirements are raised for the cloud-ready applications?

In this section, we discuss what non-functional requirements are raised for cloud-ready applications. The most common ones are scalability, elasticity, automated deployment, vendor lock-in avoidance. Among other requirements were loose coupling, statelessness, fault-tolerance. Even though, analyzed studies were raising a need for vendor lock-in avoidance and unobstructed migration between cloud providers. It merits referencing that these prerequisites were normally given in a type of rules or standards for the cloud-ready applications development.

2.2.3 What architectures are currently used for cloud-ready application?

Cloud-ready applications use microservice architecture as their architecture. Solutions like Docker or Rocket containers together with Docker Swarm, Mesos, or Kubernetes automated container management currently act as enablers of this architectural style. A microservice architectural style is an approach to developing a single application as a suite of small services, each running in its process and communicating with lightweight mechanisms, often an HTTP resource API. These services are built around business capabilities and independently deployable by fully automated deployment machinery.

3. INFERENCES FROM LITERATURE

3.1 Inferences Drawn out of Literature Survey

Cloud Computing is a new technological development that can have an incredible effect on the world. It has numerous advantages that it gives to its clients and organizations. For example, a portion of the advantages that it gives to organizations is that it diminishes operating cost by spending less on maintenance and software upgrades and focus more on the businesses itself. But there are many more challenges the cloud computing must overcome. Individuals are exceptionally incredulous about whether their information is secure and private. There are no guidelines or regulations around the world that provided data through cloud computing. Europe has data protection laws yet the US, being one of the most technologically advanced countries, doesn't have any data protection laws. Clients moreover stress over who can reveal their information and have responsibility for information. But once, there are measures and guidelines around the world, cloud computing will revolutionize the future.

4. TRADITIONAL SYSTEM

The traditional or conventional web applications use three layers: - Presentation, Application, and Database.

In a traditional domain, we would initially need to gauge what amount of register limit we are going to require, purchase the essential equipment to help that limit, and hold up the computers or servers to run our application on.

Once we deploy our application to these servers, we must maintain that server from the physical maintenance perspective as well as from a software perspective.

In addition to building out and maintaining computer infrastructure in a traditional on-premise environment, what happens if our initial estimate for capacity was not enough or too much?

If we under-provision resources, our users will feel the effects of a slow application or service. Latency leads to user dissatisfaction which could impact our business.

To remedy this, we have to go out, buy more servers, and follow a similar procedure of introducing, setting up, and keeping up those physical servers.

On the flip side, if we over-provision, well we are going to be paying for those idle resources and driving up costs unnecessarily.

5. PROPOSED SYSTEM

In contrast, when we are building cloud-native applications, we can shift to using a compute as a service, which allows us to provision and consume raw compute or server capacity over the internet with pay-as-you-go pricing.

This would take away the burden of standing up and maintaining those physical servers, while still allowing us to have the control over what type of hardware we need to run and the software that runs on top of it.

Also, AWS compute services can easily eliminate the pain of under-provisioning or over-provisioning resources by offering flexible, scalable, and configurable computing resources in the cloud to meet our specific needs.

5.1 Methodology

In the beginning, we need to sign up for Amazon Web Services. Then to run our system, we need the following services: -

EC2 Server: Amazon Elastic Compute Cloud (Amazon EC2) is a web-based service that allows businesses to run application programs in the AWS public cloud. Amazon EC2 provides scalable computing capacity in the AWS cloud. EC2 enables us to scale up and scale down the instance.

Amazon Machine Image (AMI): An Amazon Machine Image (AMI) is a master image for the creation of virtual servers (known as EC2 instances) in the AWS environment.

Elastic Load Balancing (ELB): ELB distributes the web traffic to the available servers and results in achieving higher fault tolerance. It detects unfit instances and automatically reroutes traffic to fit instances. It increases the availability of our application.

Amazon S3 (Simple Storage Service): S3 is a storage for the internet. It has a simple web services interface for the simple storage and retrieving of any amount of data, anytime from anywhere on the internet.

Route 53: Amazon Route 53 is a highly available and scalable Cloud Domain Name System (DNS) web service.

6. CONCLUSION

Here, we have discussed what cloud computing is, what are its benefits, how it is different from traditional applications, and what architectural approaches could be used to develop applications for the cloud. Traditionally, application development involves various processes such as developing an application, hosting using a third-party mechanism, developing and maintaining whole server architecture. But cloud-ready architecture provides all solutions in one go. Cloud-ready application is developed as a distributed system that uses loosely coupled components, is designed to be horizontally scalable, and run on an automated and elastic platform. Ideally, it should be possible to migrate these applications between various cloud platforms without service interruptions. Automation and elasticity can be treated as fundamental qualities of a cloud-ready application and which recognize it from the traditional applications.

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