Research and Analysis of Different Cloud Storage Databases

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Abstract: *This is a study of the evolution of the cloud technologies in full stack development for storage purpose due to advancement of technology. It helps give you a better understanding of what full stack development was and how full stack development evolved, it shows a take on the fact that full stack development is not dead and has just evolved to better accommodate the user's needs.*

Keywords: Full Stack Development, Cloud Computing, Networking Model, Front-end Development, Back-end Development, Stack, Cloud, API, Development

I. INTRODUCTION

Cloud computing is a newly emerging technology for the future with it roots based on the rapidly increasing Demands on data centres that needs to be catered to. Cloud computing is defined as the use of computing Resources to access data over the internet, it means it is a mechanism to enhance the existing capabilities of Information technology by many folds. The terminology cloud comes from the fact that the data is not stored on your desktop or your device but is located far away similar to a cloud in literal terms, but despite of it being away its within your reach, you can access it irrespective of your geographical location using a Computing device via an internet. Cloud computing is a technology for the future and will change the entire Scenario of the IT industry, being a cost efficient approach, with reduced exigency of buying the software or the hardware resources. It is an on demand form of utility computing for those who have access to cloud .Recent web search trends have shown a paradigm shift in people's interest towards cloud. As per Google Search trends there has been an immense increase in people's interest towards cloud computing from 2015 to 2020.
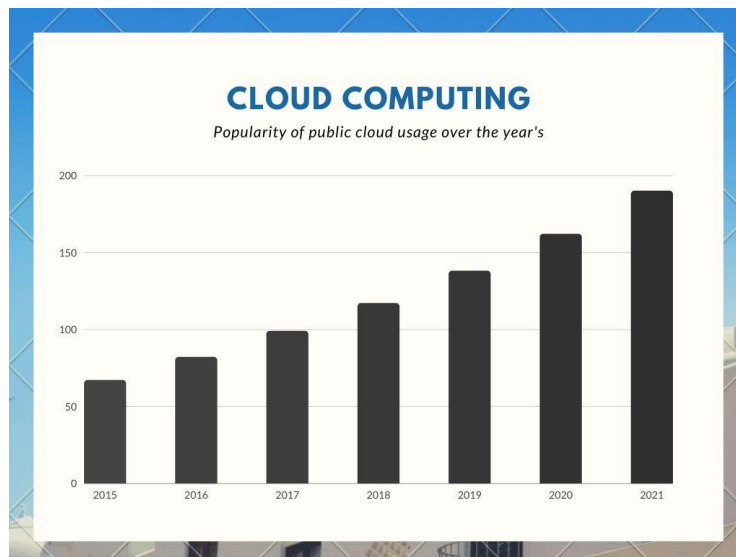

Figure: Graph of Popularity of public cloud over the years in per millions

II. FAMOUS CLOUD STORAGES

2.1 Firebase

Firebase: A Google platform that gives you access to a bunch of developer tools, most notably their real-time, NoSQL database, which allows you to modify the database through their website.

Express: A fast and minimalist web framework for building APIs.

React: An open-source, front-end JavaScript library for building user interfaces.

Node.js: An environment that allows you to write back-end code using JavaScript. As you can see, FERN makes it very easy to update your codebase and debug errors. This is what our stack looks like overlapping topics.

2.2 IBM DB2

Db2 is a family of data management products, including database servers, developed by IBM. They initially supported the relational model, but were extended to support object–relational features and non-relational structures like JSON and XML. The brand name was originally styled as DB/2, then DB2 until 2017 and finally changed to its present form.

In 2018 the IBM SQL product was renamed and is now known as IBM Db2 Big SQL (Big SQL). Big SQL is an enterprise-grade, hybrid ANSI-compliant SQL on the Hadoop engine delivering massively parallel processing (MPP) and advanced data query. Additional benefits include low latency, high performance, security, SQL compatibility and federation capabilities.

Big SQL offers a single database connection or query for disparate sources such as HDFS, RDMS, NoSQL databases, object stores and WebHDFS. Exploit Hive, or to exploit Hbase and Spark and whether on the cloud, on premises or both, access data across Hadoop and relational data bases.

Users (data scientists and analysts) can run smarter ad hoc and complex queries supporting more concurrent users with less hardware compared to other SQL options for Hadoop.[citation needed] Big SQL provides an ANSI-compliant SQL parser to run queries from unstructured streaming data using new APIs. Through the integration with the IBM Common SQL Engine, Big SQL was designed to work with all the Db2 family of offerings, as well as with the IBM Integrated Analytics System. Big SQL is a part of the IBM Hybrid Data Management Platform, a comprehensive IBM strategy for flexibility and portability, strong data integration and flexible licensing.

2.3 Microsoft Azure

Microsoft Azure is a collection of various cloud computing services, including remotely hosted and managed versions of proprietary Microsoft technologies, and open technologies, such as various Linux distributions deployable inside a virtual machine. Microsoft's cloud computing platform, launched in February 2010. In addition to traditional cloud offerings such as virtual machines, object storage, and content delivery networks (CDNs), Azure offers services that leverage proprietary Microsoft technologies. For example, Remote App allows for the deployment of Windows programs using a virtual machine, with clients on Windows, Mac OS, Android, or iOS using the program through a remote desktop connection.

The benefits of Azure extend beyond cost control, however. The task of administering certain technologies such as Windows Server, Active Directory, and SharePoint can be greatly eased with the combination of Azure and Office 365. This frees up IT staff to work on new projects, rather than spending time on general system upkeep

Platform	Programming Framework	Key Features	Services	Advantages
AbiCloud	Java, My SQL, Apache Tomcat, Network attached Servers	Suitable for building, integrating and management of public and private cloud, deep integration, powerful API, back office integration	IaaS	Provides its users with tools which can provide easy management, dynamic scaling of servers, and provisioning and re provisioning of servers. It also helps in saving costs of setting up datacenters.
Eucalyptus	Java, Hibernate, Axis2C and Axis2	Based on service level protocol	IaaS	Provides reduction in test costs, increased agility and availability, simplified process of performing software updates and improved image migration

Nimbus	Python and Jva	Provides infrastructure as a service to its users, support for best effort allocation, batch scheduling	IaaS	Specially designed for scientific community, provides user friendly concepts such as allowing virtual clusters on cloud provisioned resources.
Aneka	C# and .Net supported API's	Rapid deployment tools, provides support for multiple runtime environments simultaneously	PaaS	Dynamic scalability, provisioning of resources based on QoS or SLA, optimization of capital expenses
Open Nebula	Java, Ruby	Automatic orchestration of virtualized data centers, provides powerful schedulers for activities like load aware and packing	IaaS	Easily integrates with a wide variety of billing systems, provides hybrid cloud computing support through AWS connectors, Completely platform independent
Amazon EC2	Microsoft and Linux based, map Reduce	Persistent storage through simple storage services(S3), Amazon cloud watch, elastic IP addresses, automated scale, uses Xen virtualization	IaaS	Pay per use(hourly), dedicated IP addresses, good bandwidth, no hardware failures
Google Cloud	Python, Java, PHP and Go	Google cloud SQL, Modules, Map Reduce Sockets, Google Cloud Storage Client Library	PaaS	Easy startup, automatic scalability, high security
Microsoft Azure	ASP.Net, Node.js and PHP	Can run windows as well as Linux systems	PaaS, IaaS	Hosted cloud services including high density hosting of websites, high availability
Force.com	Apex Language (Database service), C#, .Net	Database is handled through fields of relationships	SaaS	Provides seamless integration with other applications, has multilayered security features

Table 1: Popular Cloud Computing Storage Platforms of 2021

III. SECURITY IN CLOUD COMPUTING

According to NIST cloud computing involves virtual environment which exposes the cloud data to several vulnerabilities and threats to users data privacy and security. Cloud computing though provides huge advantages but it also imposes a great amount of threat to security of data which is now stored to an off premise rather than an on-premise. There are a variety of attacks that can occur on cloud computing environment, Some of them are virtualization attacks such as VM escape and rootkit in hypervisor, man in middle attack, zombie attack phishing attacks and others. Some of the Top threats identified in cloud computing are:

- Data Loss/leakage
- Insecure API's
- Malicious Insiders
- Traffic Hijacking
- Abuse of cloud computing
- Unknown Risk profile
- Shared Technology vulnerabilities
- Distributed denial of services
- HTTP or XML based denial of service attack

Apart from these threats, lack of transparency between the cloud provider and clients can also be considered as a road block for people to move comfortably to the cloud. In a threat detection model has been proposed based on three goals detection of attacks; alert the parties and identification of type of attacks. Another security concern is data mining security

attack in which users data is analyzed for a long period of time and then this data is used for extracting information about users thereby threatening their privacy .Since a single method cannot fully eradicate the problem of security in cloud computing therefore many new strategies are required to ensure security in a cloud environment. A study of various security threats has been done by Shaikh and Haider and some of the most vulnerable threats have also been identified. Thus security is a major concern which is leveraged on cloud service providers and eradicating these threats to security is a matter of prime importance for cloud service providers in order to attract more and more probable clients. SACS, a security model based on hadoop map reduce framework is more stable in case of a security threat. Four indicators of vulnerabilities that are specific to cloud have been presented by Grobauer et al. Currently various challenges to cloud security are available. An SLA and accountability can be considered as the building blocks for security of data in cloud. In a rusted third party cryptography based solution is proposed which exploits the use of public key .Leakage prevention solutions in cloud can also be considered as an effective security framework. Multitenancy trusted computing environment model (MTCEM) is a model ensuring trusted cloud infrastructure to its customers developed on IAAS platform by Li et al Advanced Cloud protection system proposed by Lombardi and Pietro guarantees of an enhanced security against most of the existing known attacks and has been tested on eucalyptus cloud platforms.

IV. CONCLUSION

Hence we have researched few famous cloud storage platforms and learned how much growth cloud storage has got over the years and last but not least we have also seen the advantages of using cloud storage.

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