A review paper on Gauge Technique Cloud Computing

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   ABSTRACT:The paper comprises of deploying whole web application and its related services in cloud platform using PaaS, here major concern is to secure the data and maintain the data flow in a streamlined manner. Methodology adopted here is using virtualization technique and utilizing resource developing platform as a service platform and it is used as a service. Online art gallery is the search engine friendly content management system in which user and admin interact with each other. Here the application is being deployed in Amazon AWS and PaaS used is Appfog which is build of cloud foundry, the open platform as a service and the database used is MySQL.
Keywords
Cloud Computing, Appfog, Wordpress, Amazon Web Services, Cloudnary, Cloudflare.

1. INTRODUCTION

Applications that share photos or support critical operations of business require rapid access to flexible low cost IT resources. Cloud computing is a scenario of on demand delivery of IT resources with pay as you go pricing. Cloud Computing offers following benefits they are as follows [1].

a. No Upfront management

Building an on premise infrastructure is slow and expensive we need expensive hardware's which are to be ordered, paid for, installed and configured which is required to be done long before we actually need them , with cloud computing we pay as we need resources in accordance to our requirement.

b. Low Ongoing cost

Massive economy of scaling and efficiency improvement allow a continually lowering of prices It derives down upfront and ongoing IT labor cost and gives an access to the fully distributed and featured services to the customer.

c. Flexible

It eliminates the guessing of the infrastructure needs .Decisions of capacity prior to deploying an application seems to be unpredictable as sometime we may require more or sometimes we may lack resources so it offers capacity as we require in accordance to the application.

d. Speed and Agility

 With traditional architecture it require a weeks to get server procured, delivered and running. With cloud computing, resources can be used on demand hence increasing speed of deploying and developing applications.

e. Apps not Ops

Cloud computing allows to focus over the application by providing complete infrastructure requirements.

For large potential users across the globe it provide an adequate and efficient services which is impossible with traditional infrastructure which employ many organizations to focus over a specific infrastructure for there accessibility.

1.1 Definition of Cloud computing

Cloud computing is a mechanism which describes many variety of computing concepts that include:

a. Software as a service (SaaS)

These are on demand software which is priced on demand based; here cloud providers provide complete application software to the customers according to their requirements. Eg Google Apps, Microsoft office 365

b. Platform as a service(PaaS)

Cloud providers delivers complete computing platform including operating systems, programming language execution environment and web server. Eg: Cloud foundry, Google App engine.

c. Infrastructure as a service (IaaS)

Cloud providers provide physical or the virtual machines to the customer on pay as peruse bases. Eg: Amazon EC2, Windows azure, Google compute engine.
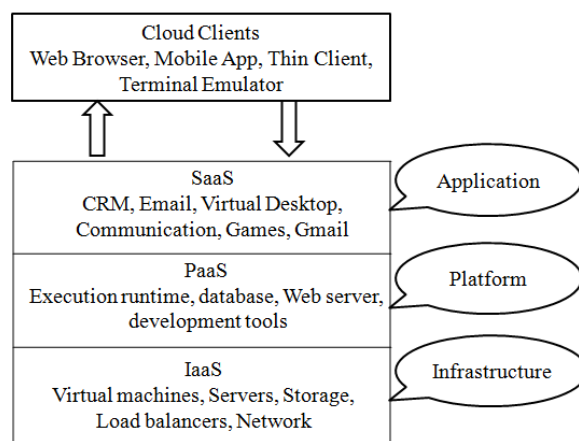

Fig 1 : Cloud computing service model

2. APPFOG (PaaS)

Appfog is a simple cloud platform for deploying web applications it is based on cloud foundry the open source platform as a service project for php, Ruby, Node.js and java. Working with Appfog involves following Steps [2].

Step 1: Sign up at www.appfog.com

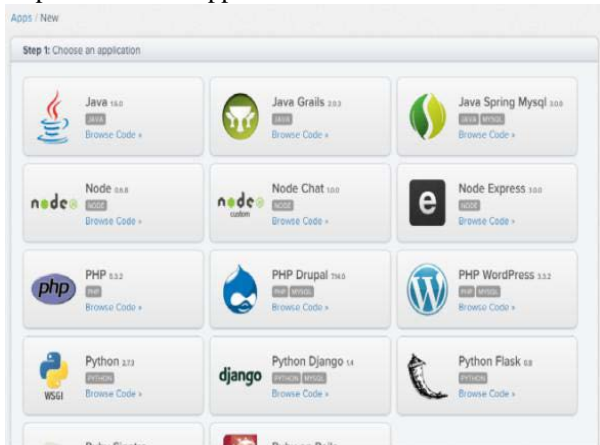**Step 2:** Select the application or framework

Fig.2: diagram of appfog

a.:Appfog provides following functionalities a. Services:

It provides support to various services like Mongo DB (The scalable, open source document based database), My SQL (The open source relational database), Redis (The open key value data structure server), Rabbit MQ (Reliable and portable messaging for applications), vFabric Postgres (Relational database based on Postgre SQL).etc

b. Languages:

Appfog supports many different languages like Php, Java

3. WORDPRESS (CMS)

A content management system is a computer program which allows editing, modifying and publishing of the content as well as maintenance from central interface [5]. Wordpress is a blogging tool free available over internet and a content management system based on php and MySQL, with thousands of plug-in, widgets, themes [3].

a. Themes

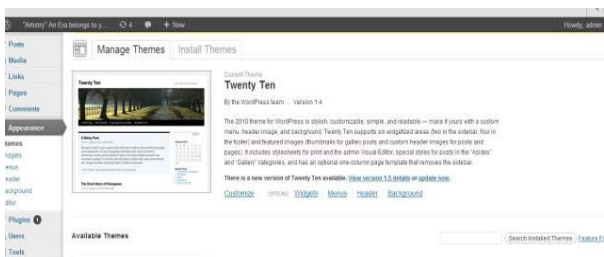Word press users can install and customize theme according to their needs

Fig.3:diagram of theme

4. AMAZON WEB SERVICES

Amazon web services provides an efficient, flexible, cost effective, easy accessible cloud computing platform which is suitable for user in accordance to their requirements [4]

Fig 4 : Services offered by AWS

It's easy to use Amazon services via internet as it allows user to pay as peruse according to the requirement they can use maximal and minimal amount of resources. Amazon web services allow users to have IT resources on lease, thereby becoming infrastructure tenants rather than owners. With Amazon web services the user pay only as they use .Here we have used Amazon web services in our application and in the context below complete description of the services running behind the applications is done
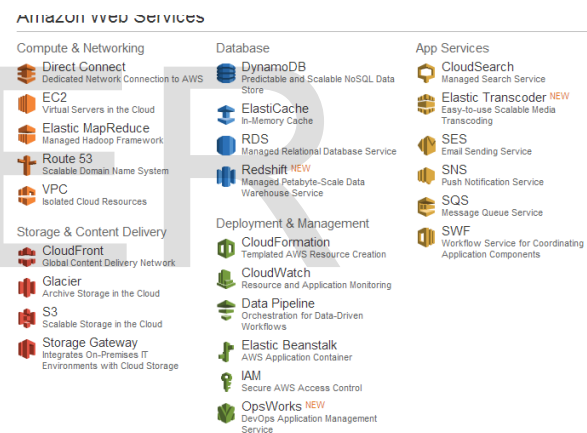

Fig 5 : Amazon Web Services

As given in above figure (Fig-8) we can see block representation of the services offered to the applications by Amazon which include

4.1 Management and Administration

a. Web Interface:
AWS management console provide an user interface for the services

b. Identity and Access:
IAM i.e. AWS Identity and Access management is a web service that enables managing users and user's access permissions .The service provide an aid to the organizations which have multiple user scenario. Without IAM the organizations must either create multiple AWS accounts each with different billing and subscription, or employees were required to share the security credential with one another,

without IAM there is no control over the task of any particular user and what a system can do and how many resources to be used.

Thus IAM provides mechanisms where multiple users can access AWS account with different security credentials all are controlled by and billed to a common account. In this a user is allowed to do what is actually required as a part of their job.

c. Deployment and Automation

i. AWS Cloud formation

It provides the developers and system administrators an easy way to create, manage, update, and provisioning of the AWS resources in an orderly and predictable manner.

It provides sample templates or user can create their own customized one to describe AWS resources and any associated dependencies or run time parameters.

Once an application is deployed it can be modified and updated very easily using cloud formation. A template is deployed using AWS management console [5].

ii. AWS Elastic Beanstalk

Using AWS Elastic Beanstalk user can quickly deploy the applications and mange them efficiently without concerning the infrastructure running beyond the applications. Here we simply need to upload the application and the Beanstalk handles capacity provisioning, load balancing, scaling, application health monitoring. It uses highly scalable and reliable services that are present

4.2 Applications platform services

a. Amazon Cloud Front

Amazon Cloud Front allows user to develop an easy of distributing content among end users with low latency and high data transfer speed. It is used to deliver static, dynamic and streaming content using global network of the edge locations, Request of the users object is easily automatically routed to the nearest edge locations hence content is delivered to the users with best performance. It is also optimized to work with other AWS services like Amazon S3, Amazon EC2, Amazon Elastic load balancing and Amazon Route 53 It can also work seamlessly with the non AWS origin

b. Messaging

i. Amazon Simple Queue Services

Amazon SQS provides a highly reliable, Scalable message queue services that enables asynchronous message based communication between distributed components of an application. The components can be two computers or Amazon EC2 instances or combination of both. Using Amazon SQS one can send any number of messages to an Amazon SQS queue at any time from any component and messages can be retrieved from same component

5. SECURITY PRIVACY AND COMPLIANCE CHALLENEGES

5.1 Traditional client server security issues

In Traditional centralized systems the operating system of the host performs the necessary processing for the operation on that system all screen handling, performing logical checks, validations etc.

In these paradigms where the data is distributed across multiple servers and sites , each having its own administrator it is impractical to have centralized security services , and thus avails more opportunities for the intruders to access the system in an unauthorized manner. Thus it becomes essential to have security individually sustained over each component of the architecture which may include Client, Server, and Network. This increases many overheads and also becomes unreliable in terms of cost and efficiency, Also has many more overheads to secure data.
employed.

5.2 AWS Infrastructure Security [12]

AWS infrastructure provision a number of basic computing resources like processing and storage. Its infrastructure includes facilities, network, hardware along with some operational software's (host OS, Virtualization software etc) that support access of these resources in a secured manner.

a. AWS Compliance program

It enables the user to understand the robust security and have many standards in order to provide security, like SOC 1, SOC 2, ISO 27001, PCI DSS Level-1, ITAR, FIPS 140-2, and HIPPA.

b. Physical and environmental security

Location of the datacenter is generally not available to every individual user and some legitimate business centric user can only acknowledge locations under number of security considerations. It also provide Fire detection and suppression, Uninterruptable power supply, Climate and temperature control, monitoring of electrical, mechanical and life support systems and preventative maintenance of equipments for continued operability.

5.3 Network security

AWS provide security in relevance to the workload

a. Secure network architecture

Many network devices like firewall and other boundary devices are placed in order to perform control and monitoring over external boundaries and key internal boundaries within network, and these boundary devices employs set of rules called as ACL (Access Control lists) whose policies are managed by the Amazon Information Security.

b. Secure Access Points

AWS has limited number of access points to the cloud in order to provide comprehensive monitoring of the inbound and outbound communications and network traffic. The access points of the user are called API which allow secure HTTP access, which thereby enables users to establish a secure communication session.AWS provides a redundant connection to multiple communication service at internet facing edge of AWS network

c. Amazon Corporate segregation

AWS production network is logically segregated from AWS corporate network by means of complex set of network security or segregation devices If the developers and the administrator need to interact one another they are first required to have permission from the AWS ticket owner all the requests are reviewed and then approved by the applicable service provider. The approved personal can connect to the AWS network though bastion host that restricts access to the network devices. The bastion host requires SSH Public key authentication.

d. Fault Tolerant Design
AWS has designed the system in such a way that it is can easily tolerate system and hardware failure without imposing any impact over the customer.
There are cluster of datacenters which are placed in the global regions and all the datacenters are function none of them is in cold state and whenever any failure occurs at any datacenter then the deployed applications are shifted to n+1 configuration in order to handle the capacity so that traffic can be load balanced to the remaining sites.

e. Network Monitoring and Protection
AWS provide protection against traditional network security issues as following
i. Distributed Denial of service attack: Here Proprietary DDOS migration techniques and there is enough diversity of internet as they are multi hosted.
ii. Man in Middle attack: All the AWS API are available via SSL protection thus preventing Man in middle attack
iii. IP Spoofing: Host based firewall structure does not allow any instance to send traffic via IP address o MAC address.
iv. Port Scanning: Amazon EC2 does not perform unauthorized port scan by customers.

5.4 Auto Scaling Security
Scaling the capacity of Amazon EC2 automatically in accordance to the conditions defined by the user comes under auto scaling. In auto scaling every request made to its control API is required to be authenticated by HMAC SHA-1 signature calculated among request and users private key

5.5 Amazon Virtual Private cloud
Every Amazon EC2 a user launched has randomly assigned public IP address in the Amazon EC2 address space, Amazon EC2 allows user to create their own choice address space in cloud with their own ranges of IPs, and it basically provides an isolated space on Amazon Cloud. An individual can create their own subnets within the VPC, can perform grouping of similar kind of instances based on their IP range and then rout them, impose security in order to control flow of traffic.[13]

5.6 Amazon Cloud Front Security
Amazon Cloud Front requires that every request must be authenticated by HMAC SHA-1 signature calculated from the request and user's private key.
And also this API is accessible by SSL encrypted endpoints It also provides an ability to transfer the content over encrypted connection HTTPs.

v. Packet sniffing of other tenants: Virtual instances running in the promiscuous mode cannot receive traffic which is intended for another virtual instance.

a. The Hypervisor
Amazon EC2 utilizes Xen Hypervisor taking advantage of Para virtualization as the Para virtualized guests rely on the hypervisor which require privileged access and the guest OS has no elevated access to the CPU.

b. Instance Isolation
Different Instances running on the same machine are isolated from each other via Xen Hypervisor. AWS firewall resides in hypervisor layer which is in between physical network interface and instance virtual interface. Here physical RAM is also separated by the same mechanism.

c. Host Operating System
Administrator with business need is required to have multi factor authentication for the purpose build administrative host.

d. Guest Operating System
Virtual Instances are completely under control of the user and the amazon has no control over it. User can employ privilege escalation mechanism with logging per user bases. User can control updating and patching of the guest OS including the security updates.

e. Firewall
Amazon EC2 have complete firewall solution which is mandatory inbound firewall configured in the deny all mode and Amazon EC2 customer must open the ports explicitly in order to allow inbound traffic. The firewall requires X.509 certificate
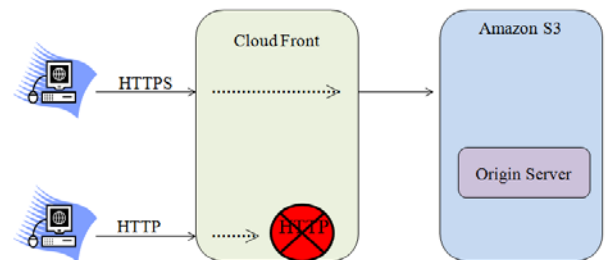

Fig 6 : Amazon Cloud Front Security

6. CONCLUSIONS
a. Study of cloud computing scenario its benefits, PaaS, working with Appfog and Word press.
b. Study of different Amazon services
c. Complete discussion of the Security concerns in traditional and an improved secure system offered by Amazon web services including various
security credentials over each and every services offered by Amazon cloud.
d. Successful deployment of cloud based "Online Art gallery" on cloud using Appfog as PaaS and Word press as Content Management System.
e. Amazon Web Services are successfully managed.
f. Integrations of Add-ons like speechify, Cloudmalin, Iron maker, Cloud nary,
g. Video integration over the web application in order to allow a better aid to the user.

7. REFERENCES

[1] aws.amazon.com/what- is-cloud-computing/

[2] www.appfog.com/docs/getstartes

[3] wordpress.org.com/docs

[4] docs.aws.amazon.com/gettingstarted/latest/awsgsg-intro/intro.html

[5] aws.amazon.com/documentation/cloudformation

[6] aws.amazon.com/documentation/cloud beanstalk

[7] aws.amazon.com/documentation/cloudfront

[8] aws.amazon.com/documentation/sqs

[9] aws.amazon.com/documentation/sns

[10] aws.amazon.com/documentation/ses

[11] aws.amazon.com/documentation/cloudsearch

[12] AWS_Security_whitepaper march 2013.

[13] aws.amazon.com/security

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