# Cloud Computing

**Certified DevOps Foundation Workshop**

# Agenda | Cloud Computing

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- Topics Covered in Workshop
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- DevOps Foundation Certification
  - Registration for the Exam
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  - Certification Exam format
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# What is Cloud Computing?

Following are the key details about Cloud Computing:

Cloud computing is on-demand platform of computer system resources, data storage and computing power, without direct active management by the user.

The term is generally used to describe data centers available to many users over the Internet.

Cloud computing is a method for delivering information technology (IT) services in which resources are retrieved from the Internet through web-based tools and applications, as opposed to a direct connection to a server.

# Cloud

## What is Cloud Computing?

Rather than keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database.

The availability of high-capacity networks, low-cost computers and storage devices as well as the widespread adoption of hardware virtualization, service-oriented architecture, and autonomic and utility computing has led to growth in cloud computing.

# •Cloud Services

- A cloud service is any service made available to users on demand via the Internet from a cloud computing provider's servers as opposed to being provided from a company's own on-premises servers.

- Cloud services are designed to provide easy, scalable access to applications, resources and services, and are fully managed by a cloud services provider.

- A cloud service can dynamically scale to meet the needs of its users.

# •Cloud Services

- The usage of cloud services has become closely associated with common cloud offerings, such as software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS).

- Examples of cloud services include online data storage and backup solutions, Web-based e-mail services, hosted office suites and document collaboration services, database processing, managed technical support services and more.

# •Cloud Advantages

- Cost Savings: The most significant cloud computing benefit is in terms of IT cost savings. Businesses, no matter what their type or size, exist to earn money while keeping capital and operational expenses to a minimum. With cloud computing, you can save substantial capital costs with zero in-house server storage and application requirements.

- Reliability: With a managed service platform, cloud computing is much more reliable and consistent than in-house IT infrastructure. Most providers offer a Service Level Agreement which guarantees 24/7/365 and 99.99% availability.

# •Cloud Advantages

- Manageability: Cloud computing provides enhanced and simplified IT management and maintenance capabilities through central administration of resources, vendor managed infrastructure and SLA backed agreements. IT infrastructure updates and maintenance are eliminated, as all resources are maintained by the service provider.

- Quality Control: In cloud based system, all documents and code is place in single location. Everyone accesses this information in constant manner leaving no scope for any human errors.

# •Cloud Disadvantages

- Downtime: As cloud service providers take care of a number of clients each day, they can become overwhelmed and may even come up against technical outages. This can lead to your business processes being temporarily suspended.

- Security: Although cloud service providers implement the best security standards and industry certifications, storing data and important files on external service providers always opens up risks. Using cloud-powered technologies means you need to provide your service provider with access to important business data.

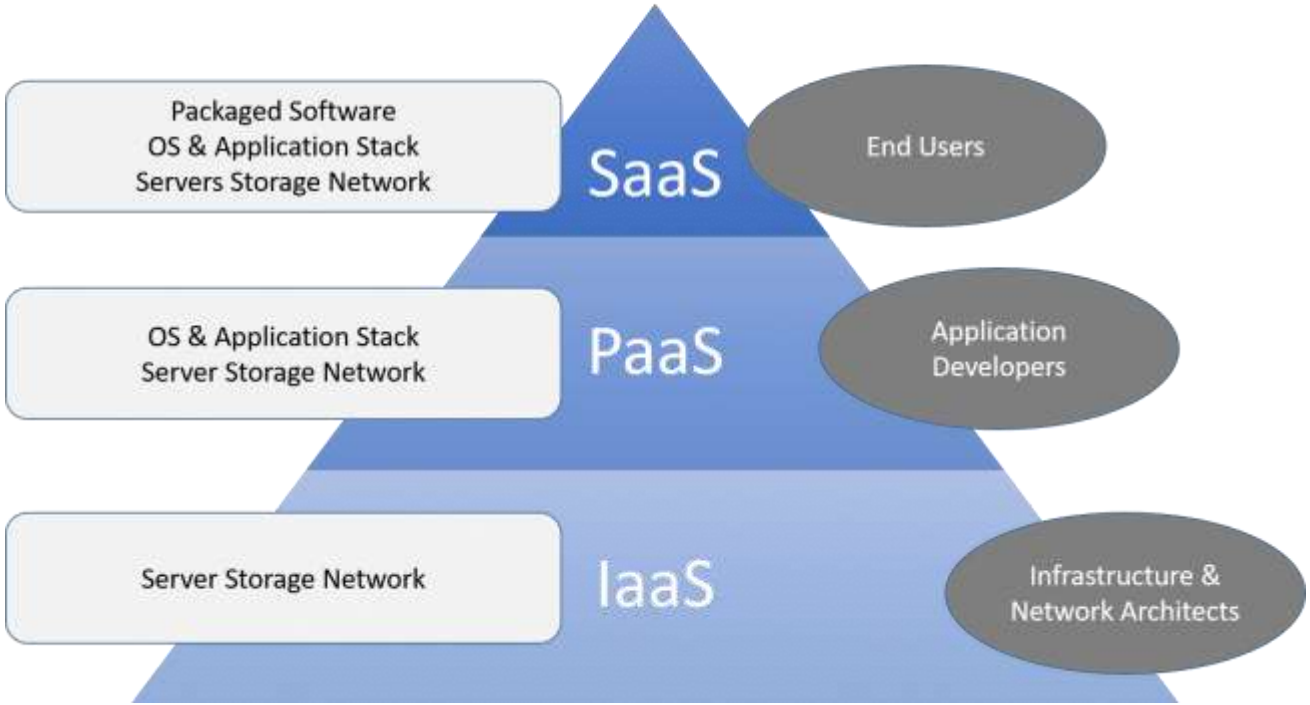
# •Cloud Disadvantages

- Limited Control: Since the cloud infrastructure is entirely owned, managed and monitored by the service provider, it transfers minimal control over to the customer. The customer can only control and manage the applications, data and services operated on top of that, not the backend infrastructure itself.

- Lower Bandwidth: Many cloud storage service providers limit bandwidth usage of their users. So, in case if your organization exceeds the given quota, additional charges will be applicable for extra bandwidth.

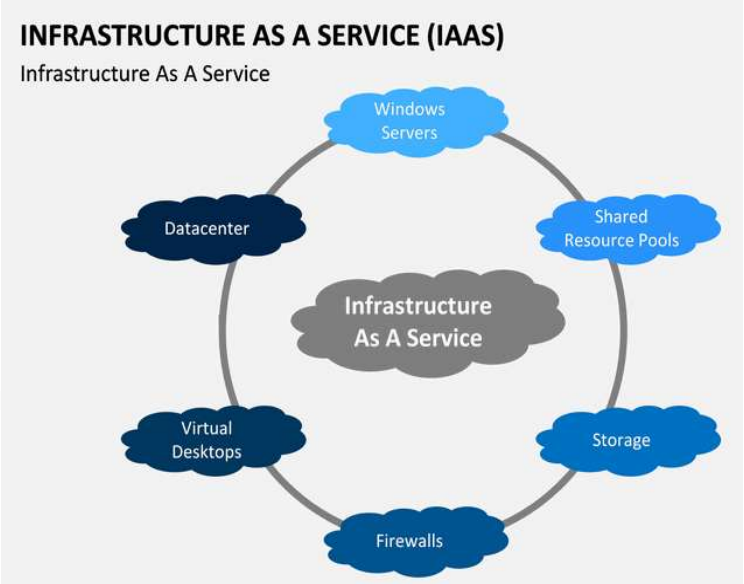
# •Cloud Service Models

Cloud Computing provides various service models using which we can implement cloud computing in our organization.



# •IaaS

- Infrastructure as service also commonly referred as IaaS, is a cloud service that delivers computing resources, network resources and storage resources.
- These resources can be procured on-demand and on a pay-as-you-go basis.
- IaaS is an combination of both physical and virtual resou depending on cloud providers.
- With these services IT team gets lot of help in automating administrative tasks across the vast infrastructure.




Source: sketchbubble.com

# •IaaS Features

Below are some of the features of using IaaS in Cloud Computing:

- Automated administrative tasks
- Dynamic scaling
- Platform virtualization technology
- GUI and API-based access
- Internet connectivity

# •IaaS

- This service provides cost-efficient infrastructure which reduces huge burden in buying and managing infrastructure.

- IaaS is considered as one of the basic layer in cloud computing model.

- Some of the examples of IaaS service by various cloud providers are as below:
  - ✓Amazon EC2
  - ✓Windows Azure
  - ✓Rackspace
  - ✓Google Compute Engine

# •PaaS

- Platform as a service is a service in which cloud provider delivers hardware and software both, which means developers don't have to worry about infrastructure components.
- PaaS components can be easily accessible over inter
- PaaS provides reliable and optimized environment c which developers can quickly setup/deploy their ap
- With PaaS we don't have to focus on how to creating and managing infrastructure.


Source: nicepng.com

# •PaaS Features

PaaS supports some key features which helps us to easily deploy our applications on various platforms.

- Easy Development
- Flexibility
- Scalability, Load balancing and fail over
- On demand platform
- Container Based PaaS

# •PaaS

- It helps developers to design applications quickly and efficient.
- PaaS is an layer on top IaaS, which means in addition to core infrastructure resources we also get middleware, databases and other development tools.
- PaaS platform's are available for public, private and hybrid clouds.
- Some of the cloud providers who provides PaaS services are listed below:
  - ✓AWS Elastic Beanstalk
  - ✓Google App Engine
  - ✓Azure App Service
  - ✓Pivotal Cloud Foundry

# •SaaS

- Software as a service is one of the service model in cloud computing in which we don't have to install any software or any application.
- SaaS allows user to use the application as per usage without buying any dedicated licenses.
- User just have to access application over internet without performing any installation or configuration.
- Startups or small companies don’t have to waste time on creating infrastructure.


Source: medium.com

# •SaaS Features

SaaS provides lot of features using which we can share software with multiple users.

- Scalability
- Interoperability
- Identity management
- Redundancy
- Configurability
- Analytics
- Ease of use

# •SaaS

- SaaS is an new layer on top of PaaS, in which we don't even have to perform any task.

- We can use these applications without any technical expertise and once our work is done we can simply discard them.

- Below are some of the applications provided as SaaS:
  - ✓Google GSuite (Apps)
  - ✓Dropbox
  - ✓Salesforce
  - ✓Cisco WebEx
  - ✓GoToMeeting

# •Cloud Deployment Model

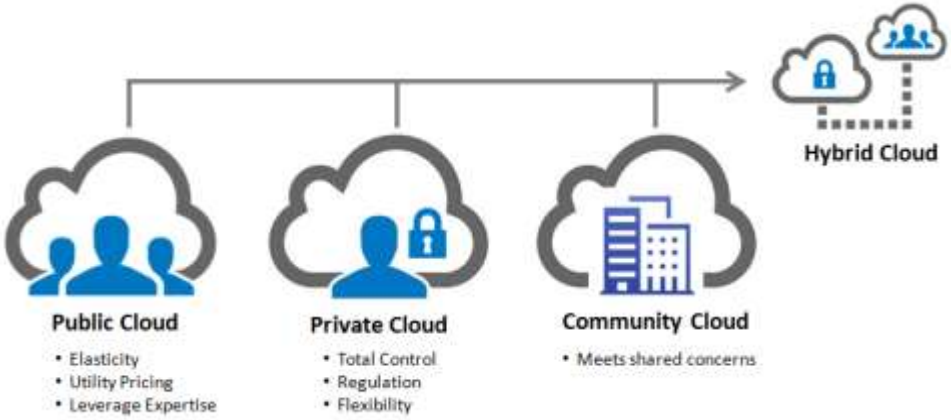
- A cloud deployment model represents a specific type of cloud environment, primarily distinguished by ownership, size, and access.

- There are mainly three types of cloud implementation and depending on our project we can implement any deployment model.

✓Public Cloud

✓Private Cloud

✓Hybrid Cloud



# •Public Cloud

- In a public cloud deployment model, the services which are deployed are open for public use and generally public cloud services are free.
- With public cloud there are some risks with security but if we implement it correctly it will provide security similar to most of private clouds.
- Unlike private cloud, public cloud offers much cheaper computing resources which helps organizations to reduce expenses.
- Public cloud are quiet easy to access which makes application releases faster and efficient.
- Examples: AWS Cloud, Azure Cloud, Google Cloud

# •Private Cloud

- Private Cloud is infrastructure which is implemented and used by an single organization only.
- This infrastructure can only be accessed in office premises since its not exposed over internet.
- These are more expensive as compared to public cloud since we deploy this cloud on our local infrastructure.
- Private provides much better security and privacy concerns as compared to public cloud.
- Examples: VMware, Oracle, Dell EMC, IBM, Red Hat.

# •Hybrid Cloud

- Hybrid cloud is an hybrid setup of interconnected public and private cloud infrastructure.
- Its an mixture of on-premises, public and third party cloud services implemented in single organization.
- We can create some critical environments on private cloud and non critical environment on public cloud.
- With hybrid we can get benefits of multiple cloud deployment model at once.
- With hybrid cloud organizations can look up for both security and agility also. They don't have much efforts in procuring physical infrastructure.

# •Cloud Providers

- Cloud providers are the vendors who deals in cloud computing.
- These cloud providers are providing various cloud services like IaaS, PaaS, SaaS.
- Cloud provides various automations which helps us to create reliable, cheap and flexible infrastructure.
- Below are some of the reliable cloud providers which provides cloud computing.
  - ✓Amazon Web Services (AWS)
  - ✓Microsoft Azure
  - ✓Google Cloud Platform
  - ✓OpenStack Cloud
  - ✓Digital Ocean Cloud

# •Amazon Web Services(AWS)

- AWS is a subsidiary of Amazon that provides flexible, reliable, scalable and cost effective cloud computing solutions.
- AWS provides various cloud services like IaaS, PaaS, SaaS which helps organizations to reduce there efforts in managing infrastructure components.
- AWS was first launched in 2006 and still is one of the leader in cloud computing solutions.
- Using AWS we can create compute resources, storage resources, network resources, databases, load balancers, domain name and lot more.
- AWS offers right now more than 100 cloud services to its user.

# •Microsoft Azure

- Azure is an cloud platform provided by Microsoft for creating infrastructure on Microsoft-based data centers.
- Azure was initially announced in 2008 but officially it was released in 2010 as Windows Azure.
- Initially azure was not that much popular as compared to well established clouds like AWS. But around 2014 it was rebranded as Microsoft Azure which helps azure to gain popularity.
- Azure provides lot of CI/CD services which is used to automate DevOps implementations in organization.

# •Google Cloud

- Google cloud platform is one of the leading Cloud Computing services which are offered by Google and it runs on the same infrastructure that Google uses for its end-user products.
- The Google cloud platform is basically used for Google search and YouTube.
- Google Cloud was announced in 2008 for deploying applications in google-managed infrastructure.
- There are various services offered by Google Cloud such as data analysis, machine learning, and data storage.
- As of 2019, Google Cloud Platform is available in 20 regions and 61 zones.

# •Open Stack Cloud

- OpenStack is a free and open-source software platform for cloud computing, mostly implemented to avail infrastructure-as-a-service (IaaS) using which we can create computing resources.
- Open stack initially began in 2010 as joint project of Rackspace and NASA to develop this open source cloud platform.
- Open stack helps users to deploy virtual machines and other resources which can be used to deploy applications.
- Since its not owned by single organization, sometimes it becomes difficult to get information regarding open stack.

# •Digital Ocean Cloud

- Digital ocean like other clouds provides cloud solutions to developers so that they can quickly deploy applications.
- Launched in 2011, digital ocean has currently 9 data centers across globe.
- Digital ocean cloud offerings is one of the cheapest offerings which we have as compared to other clouds.
- As compared to AWS, digital ocean does not provide resources like load balancers, databases and configuration management.
- Digital ocean can be managed using a web interface or using doctl command line.

# AWS Services

# AWS Compute Services

# AWS Storage Services

## AWS: Storage Choices

### Amazon S3

Durable object storage for all types of data

### Amazon Glacier

Archival storage for infrequently accessed data

### Amazon EBS

Block storage for use with Amazon EC2

### Amazon EFS

File storage for use with Amazon EC2

**Economics**

Pay as you go

No upfront investment
No commitment

**Easy to Use**

Self service administration

SDKs for simple integration

**Reduce risk**

Durable and Secure

Avoid risks of physical media handling

**Agility, Scale**

Reduce time to market

Focus on your business, not your infrastructure

# AWS Database Services

## Amazon Database Services

**Amazon RDS**

- Managed commercial and open source databases
- Database engine options - Amazon Aurora, Oracle, Microsoft SQL Server, PostgreSQL, MySQL and MariaDB

**Amazon Aurora**

- MySQL and PostgreSQL compatible
- 5X the throughput of standard MySQL and 3X the throughput of standard PostgreSQL
- 1/10th the cost of commercial databases

**Amazon DynamoDB**

- DynamoDB is a fully managed, non-relational database service
- Delivers consistent, fast performance at any scale for all applications

# THANK YOU