

UNIT 3 : Dynamic Interactions And Computing Architecture

NIST: National Institute of ~~Technology~~ Standards and Technology

→ develops guidelines and freeze the guidelines for cloud computing technology.

As per NIST:

Cloud computing is a model for enabling convenient on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interactions.

This cloud model is composed of five essential characteristics, three service models and four deployment models.

Essential Characteristics.

- On demand self-service :

A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.

- Broad - Network Access :

Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thick or thin client platforms (e.g. mobile phones, tablets, laptops and workstations)

• Resource pooling :

The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.

• Rapid elasticity :

Capabilities can be rapidly and elastically provisioned, in some cases automatically, to scale rapidly outward and inward commensurate with demand.

• Measured Services

Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts).

Service Models.

• Software as a Service (SaaS) is a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted. It is sometimes referred to as "on-demand software", and was formerly referred to as "software plus services" by Microsoft.

eg: Office 365, Google Apps, Salesforce, Citrix, GoTo-Meeting, ~~Cisco~~ Cisco WebEx and Netflix Accounting and Invoicing (used by enterprises).

Advantages.

- Lower up-front cost
- Quick set up and development
- Easy upgrades
- Accessibility.
- Scalability

Disadvantages.

- Lack of Control.
- Security and data concerns
- limited range of applications
- Connectivity Required
- Performance

Characteristics.

- Multitenant Architecture
- Easy Customization
- Better Access.
- SaaS Harnesses the Consumer Web
- SaaS Trends.

Challenges

- Hybrid IT infrastructure and its challenges
- Access challenges.
- Cost of integration
- Time Constraints
- Faulty integration

• Platform as a Service (PaaS) is a category of cloud computing services that provides a platform allowing customers to develop, run and manage applications without the complexity of building and maintaining the infrastructure typically associated with developing and launching an app.

PaaS can be delivered in 3 ways:

- as a public cloud service from a provider, where the consumer controls software deployment with minimal configuration options and the provider provides the network, servers, storage, operating system (OS), middle ware (eg. Java runtime, .NET runtime, integration, etc.), database and other services to host the consumer's application.
- as a private service (software or application) behind a firewall.
- as software deployed on a public infrastructure as a service.

Eg: AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos

Benefits

- Quick testing
- Dynamic allocation
- Increased focus on business and boost to internal entrepreneurship.

Drawback

- Data security
- Limited flexibility
- Customer captivity
- Problems of integration with in-house systems and applications.

Challenges

- Monitoring
- Access Control
- Backup
- Restore
- Geo-optimization of services.

• Infrastructure as a Service (IaaS) is an instant computing infrastructure, provisioned and managed over the Internet. The cloud computing service provider manages the infrastructure, while you purchase, install, configure and manage your own software - operating systems, middleware and applications.

Eg: Digital Ocean, Linode, Rackspace, AWS, Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE)

IaaS business scenarios

- Test and development
- Web Hosting
- Storage, backup and recovery
- Web apps
- High-performance computing
- Big data ~~analyse~~ analysis

Advantages

- eliminates capital expenses and reduces ongoing cost
- Improves business continuity and disaster recovery
- Innovate rapidly
- Respond quicker to shifting business conditions
- Focus on your core business.
- Increase stability, reliability and supportability
- Better security
- Get new apps to users faster

When to use SaaS

- If you are a startup or small company that needs to launch e-commerce quickly and don't have time for server issues or software.
- For short-term projects that require collaboration.
- If you use applications that aren't in-demand very often, such as tax software.
- For applications that need both web and mobile access.

When to use PaaS

- ~~They~~ If there are multiple developers working on the same development project, or if other vendors must be included as well, PaaS can provide great speed and flexibility to the entire process.
- If you wish to be able to create your own customised applications
- It greatly reduces cost and it can simplify some challenges that come up if you are rapidly developing or deploying an app.

When to use IaaS

- If you are a startup and a small company, you don't have to spend the time ~~and~~ or money trying to create hardware and software.
- It has complete control over their application and infrastructures, but are looking to only purchase

what is actually consumed or needed.

- For a rapidly growing company, IaaS can be good option as you don't have to commit to a specific hardware or software as your needs change and evolve.
- It also helps if you are unsure what demands a new application will need as there is a lot of flexibility to scale up or down as needed.