Content from different reference book suggested "Cloud Computing Black book [Kailash Jayaswal,Jagannath Kallakurchi, Donald J. Houde, Dr. Deven Shah & Kogent Learning Solutions Inc.]" by Prof. Sujata Mam and mentioned in CC Syllabus file, Presentations, Notes provided in 2023

NOTES ON BASIS OF CHP 3 cloud computing services PPT

REFER PPT IN WHICH DIAGRAMS ARE THERE IMP CONTENT

NOTES

Cloud Computing Services

What is Cloud Computing?
- Cloud computing involves accessing online applications stored on the cloud and running them through a web browser on a user's machine.
- It's using the internet to access software hosted on remote servers with the associated hardware and infrastructure.
- Cloud services include Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

Cloud Computing Service Models:
1. Software as a Service (SaaS) - End Users:
   - Provides applications that can be accessed via the internet from anywhere.
   - Examples: Gmail, Yahoo Mail.
   - No need for additional hardware or software on the user's end.
   - Offers security features like SSL encryption.

2. Platform as a Service (PaaS) - Application Developers:
   - Delivers a computing platform and solution stack.
   - Developers can build their own applications using provided tools and resources.
   - Enables rapid development at a lower cost.
   - Examples: Salesforce, Windows Azure.

3. Infrastructure as a Service (IaaS) - Network Architects:
   - Provides computing power that can be rented for a limited time.
   - Allows existing applications to run on cloud provider's hardware.
   - Offers virtual machines, storage, firewalls, load balancers, and more.
   - Examples: Amazon Web Services (AWS), Google Cloud, Microsoft Azure.

Delivery Models:
- Cloud-based software services are maturing, while cloud platform and infrastructure offerings are still developing.
- Three main service models: SaaS, PaaS, and IaaS.

SaaS Pros and Cons:
- Pros: Accessible from any computer, facilitates collaboration.
- Cons: Generic applications may not suit all business needs.

PaaS Pros and Cons:
- Pros: Rapid development at a low cost, private or public deployment.
- Cons: Limited to provider's language and tools.

IaaS Pros and Cons:
- Pros: Dynamically choose resources, access vast computing power, eliminate IT hardware investment.
- Cons: Risk of data access by vendor, dependency on Internet availability.

Cloud Service Providers:
- Amazon, Google, Microsoft, Salesforce are examples of major providers for SaaS, PaaS, and IaaS.

Cloud Platform Providers:
1. Google Cloud Platform: Offers scalable and manageable apps with infrastructure similar to Google's applications.
2. Microsoft Azure: Provides a platform for web app creation, deployment, and management.
3. Salesforce: Empowers enterprise app development with ease and productivity.
4. Engine Yard: Offers rapid application innovation with powerful infrastructure orchestration.
5. AWS Elastic Beanstalk: Simplifies application deployment and management in AWS.
6. LongJump: Provides customizable web applications for business management.
7. OpenShift: Red Hat's PaaS for various programming languages.
8. Cloud Foundry: An open PaaS with cloud and developer framework choices.

Database as a Service (DBaaS):
- A shift from traditional, dedicated, on-premise databases to cloud-hosted, shared resources.
- Challenges include availability, elasticity, manageability, and cost.

Cloud Storage Comparison:
- Storage service comparison across providers like Amazon, Apple iCloud, and Box.

Cloud Computing Market Leaders:
- Amazon is a market leader for Mode 2 users and a thought leader with rich IaaS and PaaS features.
- Microsoft Azure appeals to both Mode 1 and Mode 2 users with integration and existing investments.

Google Cloud Platform and Microsoft Azure:
- AWS remains the leader, but Microsoft Azure is catching up and gaining market share.
- Google Cloud Platform is innovative but faces adoption concerns due to privacy.

These notes cover the basics of cloud computing, service models (SaaS, PaaS, IaaS), delivery models, pros and cons, key players, and challenges in database services and cloud adoption.

Cloud Computing Services: Detailed Notes

What is Cloud Computing?
- Cloud computing refers to the practice of using the internet to access and utilize remote resources, such as software, hardware, and storage, delivered as services over the network.

- Users can create an environment on their local machines by accessing online applications hosted on the cloud and running them through web browsers.
- It involves accessing someone else's software on someone else's hardware in data centers via the internet.

Cloud Computing Services
1. Software as a Service (SaaS): Targeted at End Users
   - Provides ready-to-use applications accessible over the internet.
   - Users access cloud-hosted applications without needing additional hardware or software.
   - Examples: Gmail, Yahoo Mail, Hotmail.
   - Offers security features like SSL encryption.
   - Pros: Accessibility, collaborative working; Cons: Generic applications not always suitable for business use.

2. Platform as a Service (PaaS): Aimed at Application Developers
   - Offers a computing platform for developers to build and deploy their own applications.
   - Includes OS, programming language environment, database, and web server.
   - Enables rapid development at lower cost.
   - Examples: Salesforce.com, Windows Azure.
   - Pros: Rapid development, deployment flexibility; Cons: Limited to provider's tools.

3. Infrastructure as a Service (IaaS): Intended for Network Architects
   - Provides virtualized computing resources over the internet.
   - Offers virtual machines, storage, networks, and other resources.
   - Allows running existing applications on cloud provider's hardware.
   - Examples: Amazon Web Services (AWS), Google Cloud, Microsoft Azure.
   - Pros: Dynamically choose resources, eliminates need for physical hardware; Cons: Vendor dependence, internet availability dependency.

Delivery Models
- While software services are mature, platform and infrastructure offerings are still evolving.
- SaaS, PaaS, IaaS form a hierarchy of cloud services, with increasing levels of control over resources.

SaaS Pros and Cons
- Pros: Free or subscription-based, accessible from any computer, promotes collaboration.
- Cons: May not be suitable for all business needs.

PaaS Pros and Cons
- Pros: Enables rapid development, private/public deployment.
- Cons: Limited to provider's tools and languages.

IaaS Pros and Cons
- Pros: Flexible resource configuration, vast computing power, reduced IT hardware investment.
- Cons: Data security risks, dependency on internet availability, limited privacy and customization.

Parameter Comparison - SaaS vs. PaaS vs. IaaS
- Control of Application: No (SaaS), Yes (PaaS/IaaS)

- Control of Operating System: No (SaaS/PaaS), Yes (IaaS)
- Networking Control: No (SaaS/PaaS), Yes (IaaS)
- Control of Hardware: No (SaaS/PaaS/IaaS)
- Programming Building Blocks: No (SaaS), Yes (PaaS), No (IaaS, typically)

Platform as a Service (PaaS) Providers
- Google's App Engine, Microsoft's Azure, Salesforce.com, Engine Yard, AWS Elastic Beanstalk, LongJump, OpenShift, Cloud Foundry.

Database as a Service (DBaaS)
- Shift from traditional dedicated databases to cloud-hosted, shared databases.
- Challenges: Availability, scalability, manageability, cost.

Database on Cloud - Paradigm Shift
- Cloud: Availability, stateless, limited control, expectations of reduced costs.
- Traditional Database: Mission-critical, stateful, usage patterns.

Database Challenges and Solutions
- Availability: Amazon RDS Multi Zone, Xeround.
- Scalability: Scale up vs. scale out, shared everything vs. shared nothing, Xeround, ScaleBase/dbShards, MySQL Cluster.
- Elasticity: Scaling up/down and in/out.
- Manageability: DBaaS features, self-serve, APIs.
- Cost: Achieving pay-per-use, resource sharing.

Cloud Storage Comparison
- Comparison of storage services based on provider and pricing tiers.

Key Players in Cloud Computing Platforms
- Amazon AWS, Microsoft Azure, Google App Engine, IBM, Salesforce.com.

Cloud Provider Rankings
- Amazon leads with a strong market presence, followed by Microsoft catching up.
- IBM's execution ability has fallen.
- Mode 1 vs. Mode 2 cloud adoption.

Amazon Web Services (AWS)
- Started as PaaS, moved to IaaS in 2013.
- Holds second place in market share.
- Microsoft Azure gaining traction.
- Partner ecosystem still developing.

Google Cloud Platform
- AWS still a market leader.
- Microsoft catching up and leading in the UK.
- Google's issue of "knows too much" syndrome affecting adoption.

Microsoft Azure
- Making progress, appeals to both Mode 1 and Mode 2 users.
- Integration with Microsoft technologies, leveraging existing investments.

Conclusion
- AWS remains the leader, Microsoft Azure is catching up.
- Google Cloud making strides but facing adoption issues.
- Cloud services continue to evolve and impact various industries.