Parul® University

NAAC A++ ACCREDITED UNIVERSITY

PARULINSTITUTEOF ENGINEERING &TECHNOLOGY
FACULTY OF ENGINEERING & TECHNOLOGY
PARULUNIVERSITY

Subject: Azure Fundamentals

Unit 1 : Cloud Concepts

Computer Science & Engineering

Mr. Mukesh Birla (Assistant Prof. PIET-CSE)

Parul® University

NAAC A++ ACCREDITED UNIVERSITY

DIGITAL LEARNING CONTENT

Azure Fundamentals Btech, 5th Semester

Prerequisite: Basic understanding of computer concepts and basic programming

Rationale: This course provides a broad introduction to Azure cloud , infrastructure , services, security and compliance ,also billing , pricing and support plans.

Introduction of Public, private, or hybrid Cloud

- As the shift to cloud computing accelerates across various sectors, including healthcare and content streaming, IT departments worldwide are increasingly debating the merits of public, private, and hybrid cloud solutions.

- The decision of whether to deploy a public, private, or hybrid cloud solution can be a difficult one for even the most experienced companies.

Introduction contd..

- What are the benefits and disadvantages of each cloud solution? Why might a business choose public over private cloud, or hybrid over public or private? Is there a “best” cloud solution?

Public Cloud

- The term public cloud means that all services are provided over the internet, usually on a **pay-per-use model.**
- The public cloud offers great levels of efficiency since resources can be shared throughout a network.
- Data created and submitted by users are stored on the servers of the third-party provider.

Benefits of Public Cloud:

1. **Cost Efficiency:**

   Pay-as-you-go model: Only pay for the resources you use.

   No upfront costs: Avoids the need for significant capital expenditure on hardware.

2. **Scalability:**

   Easily scalable: Quickly scale resources up or down based on demand.

   Elasticity: Ideal for businesses with variable workloads.

Benefits of Public Cloud:

3. Maintenance and Updates:

Managed services: Providers handle infrastructure maintenance and updates.

Latest technology: Access to the latest innovations and updates without additional cost.

4. Accessibility:

Remote access: Resources can be accessed from anywhere with an internet connection.

Collaboration: Facilitates collaboration across different geographical locations.

Disadvantages Of Public Cloud

1. **Security and Privacy:**

   Shared resources: Potentially less secure than private clouds.

   Compliance: May face challenges in meeting specific regulatory compliance requirements.

2. **Control and Customization:**

   Less control: Limited control over the underlying infrastructure.

   Customization limits: Less flexibility in customizing the environment to specific needs.

Disadvantages Of Public Cloud

3. **Latency:**

   Performance issues: Potential for higher latency compared to on-premises solutions.

Why Choose Public Cloud?

- **Cost Savings:** Ideal for startups and small businesses looking to minimize initial investment.
- **Flexibility:** Businesses with fluctuating resource demands benefit from the scalability.
- **Focus on Core Activities:** Companies can focus on their core activities without worrying about IT infrastructure maintenance.

Examples Of Public Cloud Vendors

- Google Cloud Engine
- Salesforce.com
- Amazon AWS
- Microsoft Office 365

Is public cloud the best option?

- The public cloud may be the optimal choice for businesses that prioritize cost efficiency, scalability, and ease of use.
- However, those with stringent security requirements or specific customization needs might find private or hybrid cloud solutions more suitable.
- Evaluating the unique needs and circumstances of your business will help determine the most appropriate cloud strategy.

Private Clouds

- A private cloud is a computing environment that offers cloud computing services within a private network, accessible only to a specific organization. Unlike public clouds, which serve multiple organizations, private clouds are dedicated solely to one entity, providing greater control, security, and customization.
- Private clouds are cloud infrastructures that are deployed for a single organization.
- These can be managed internally or externally, but all systems and infrastructure are for the purposes of the organization.
- When considering a private cloud, the biggest decision that a business needs to make is the scope of the needed investment to create the private cloud, as implementation can be very expensive.

Key Characteristics of Private Clouds

1. **Dedicated Resources:**

   All hardware, storage, and network resources are dedicated to a single organization.

2. **Enhanced Security:**

   Offers higher levels of security and privacy since the infrastructure is not shared with other entities.

3. **Customization:**

   Highly customizable to meet the specific needs and preferences of the organization.

4. **Control:**

   - Greater control over data, applications, and infrastructure.

Benefits of Private Clouds

1. **Security and Privacy:**

   Enhanced security protocols and isolated data storage protect sensitive information.

2. **Regulatory Compliance:**

   Easier to meet specific regulatory and compliance requirements due to dedicated resources.

3. **Performance:**

   High performance and low latency due to dedicated infrastructure.

4. **Customization:**

   Full control over the configuration and customization of resources to fit specific business needs.

Disadvantages Of Private Cloud

1. **Cost:**

   Higher upfront and ongoing costs compared to public clouds due to dedicated hardware and maintenance.

2. **Maintenance:**

   Requires in-house expertise to manage and maintain the infrastructure.

3. **Scalability:**

   Less scalable than public clouds; adding resources can be time-consuming and costly.

Components of a Private Cloud

1. **Hardware:**

   Servers, storage devices, and networking equipment dedicated to the organization.

2. **Virtualization:**

   Software to create virtual machines (VMs) and manage resource allocation.

3. **Management Software:**

   Tools for monitoring, managing, and automating cloud operations.

4. **Security:**

   Firewalls, encryption, and other security measures to protect data and applications.

Deployment Models of Private Clouds

1. **On-Premises:**

   The private cloud infrastructure is hosted within the organization's own data centers.

2. **Hosted Private Cloud:**

   The infrastructure is hosted by a third-party provider but is dedicated solely to one organization.

3. **Managed Private Cloud:**

   A third-party provider manages the private cloud infrastructure on behalf of the organization.

Use Cases for Private Clouds

1. **Healthcare:**

   Securely storing and processing sensitive patient data while complying with regulatory requirements.

2. **Financial Services:**

   Handling sensitive financial transactions and data with enhanced security.

3. **Government:**

   Managing confidential government information and services securely.

4. **Large Enterprises:**

   Customizing and controlling IT resources to meet specific business requirements.

Setting Up a Private Cloud: A Step-by-Step Guide

1. **Assess Requirements:**
   Determine the specific needs and goals of your organization, including performance, security, and compliance requirements.

2. **Design the Infrastructure:**
   Plan the hardware, networking, and software components needed for your private cloud.

3. **Choose the Right Technology:**
   Select virtualization, management, and security tools that best fit your requirements.

4. **Implement Virtualization:**
   Set up virtualization software to create and manage virtual machines.

Setting Up a Private Cloud: A Step-by-Step Guide

1. **Deploy Management Tools:**
   Install and configure cloud management software to monitor and control resources.

2. **Ensure Security:**
   Implement robust security measures, including firewalls, encryption, and access controls.

3. **Test and Optimize:**
   Conduct thorough testing to ensure everything is functioning correctly and optimize performance where necessary.

4. **Train Staff:**
   Provide training for IT staff to manage and maintain the private cloud effectively.

Is the private cloud the best option?

- Whether the private cloud is the best option depends on an organization's specific needs.
- It offers enhanced security, control, and customization, making it ideal for businesses with stringent regulatory requirements or sensitive data.
- However, it comes with higher costs and maintenance demands. For organizations prioritizing these factors over cost and scalability, the private cloud can be the optimal solution.
- Conversely, businesses seeking flexibility and lower costs might find public or hybrid clouds more suitable.

Hybrid Cloud

- A hybrid cloud is a computing environment that combines the benefits of both public and private clouds, allowing data and applications to be shared between them.

- This model provides businesses with greater flexibility and more deployment options, optimizing existing infrastructure, security, and compliance.

Key Characteristics of Hybrid Clouds

1. **Integration:**
   Seamless integration of public and private cloud resources.

2. **Flexibility:**
   Ability to move workloads between clouds as needs and costs change.

3. **Scalability:**
   Leverage the scalability of the public cloud while maintaining control over critical data in the private cloud.

4. **Cost Efficiency:**
   Optimize costs by using public cloud resources for non-sensitive workloads.

Benefits of Hybrid Clouds

1. **Agility and Flexibility:**
   Quickly respond to changing business needs with scalable resources.

2. **Cost Management:**
   Balance costs by utilizing public cloud for less sensitive, fluctuating workloads and private cloud for critical operations.

3. **Enhanced Security:**
   Keep sensitive data secure in a private cloud while using public cloud for general workloads.

4. **Business Continuity:**
   Improve disaster recovery and backup capabilities with a mix of on-premises and cloud-based resources.

Disadvantages of Hybrid Clouds

1. **Complexity:**
   Managing and integrating multiple cloud environments can be complex.

2. **Security Concerns:**
   Ensuring consistent security policies across both cloud types can be challenging.

3. **Cost Management:**
   Potential for higher costs due to the need for skilled personnel and management tools.

Components of a Hybrid Cloud

1. **Private Cloud:**
   On-premises or hosted cloud infrastructure dedicated to the organization.

2. **Public Cloud:**
   Cloud services provided by third-party providers like AWS, Google Cloud, or Azure.

3. **Hybrid Cloud Management Tools:**
   Solutions for managing, orchestrating, and automating hybrid cloud environments.

4. **Networking:**
   Secure and reliable network connections between the public and private clouds.

Deployment Models of Hybrid Clouds

1. **Cloud Bursting:**
   Running applications in a private cloud and "bursting" into a public cloud when demand spikes.

2. **Multi-Cloud:**
   Using multiple cloud services from different providers for specific tasks.

3. **Disaster Recovery:**
   Leveraging the public cloud for backup and disaster recovery solutions.

Use Cases for Hybrid Clouds

1. **Regulatory Compliance:**
   Storing sensitive data in a private cloud to meet compliance requirements while using public cloud for less sensitive operations.

2. **Scalable Workloads:**
   Handling seasonal or peak workloads by bursting into the public cloud.

3. **Development and Testing:**
   Using public cloud resources for development and testing while keeping production in a private cloud.

Setting Up a Hybrid Cloud: A Step-by-Step Guide

1. **Assess Requirements:**
   Understand business needs, workload characteristics, and compliance requirements.

2. **Design Architecture:**
   Plan the architecture, including integration points, data flow, and security measures.

3. **Select Providers and Tools:**
   Choose public and private cloud providers and hybrid cloud management tools that best fit your needs.

4. **Implement Networking:**
   Set up secure and reliable network connections between the clouds.

Setting Up a Hybrid Cloud: A Step-by-Step Guide

5. Deploy Management Tools:

Install and configure hybrid cloud management tools to monitor and control resources.

6. Ensure Security:

Implement consistent security policies and measures across both environments.

7. Test and Optimize:

Conduct thorough testing to ensure proper integration and performance. Optimize as needed.

8. Train Staff:

Provide training for IT staff to manage and maintain the hybrid cloud effectively.

Is hybrid cloud the best option?

- Hybrid cloud works best for businesses with websites that see unpredictable changes in visitor traffic, like e-commerce sites that have busy and slow periods throughout the day and year.
- It offers the security of a private cloud while also providing extra resources, making it ideal for meeting customer needs effectively.
- It's like getting the best of both private and public cloud benefits in one solution.

Parul® University

NAAC A++ ACCREDITED UNIVERSITY

DIGITAL LEARNING CONTENT

Cloud Concepts

Thank You!!!

DIGITAL LEARNING CONTENT

Parul® University

www.paruluniversi