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Welcome to this session:
Managed and Unmanaged Services

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators answering questions.

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- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

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- For all **non-academic questions**, please submit a query: ***www.hyperiondev.com/support***
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- We would love your feedback on lectures: *Feedback on Lectures*
- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.

What is one benefit of using containers like Docker for cloud deployment?

A. Containers make applications portable across different environments.
B. Containers remove the need for system monitoring.
C. Containers prevent all security vulnerabilities.
D. Containers require a dedicated physical server.

Which of the following is a key advantage of cloud computing over deploying services on a single server?

A. Cloud services are always cheaper than traditional servers.
B. Cloud computing provides scalability, reliability, and automation.
C. Cloud platforms prevent all security risks.
D. Cloud services run only in a single location.

Learning Outcomes

- Define managed and unmanaged services and list common examples.
- Compare different cloud providers' managed services
- Explain the difference between IAAS, SAAS and PAAS
- Apply knowledge to recommend suitable services for specific business and technical requirements.

Deploying Services and Applications

- Deployment is the process of making applications available for users.
- The deployment process usually involves
  - Building and packaging software either through the use of compilers, bundlers or containerization
  - Testing the applications features
  - Releasing the application to the public
  - Monitoring the system and pushing updates

Approaches to Deployment

- There are a few approaches that can be taken to deploy solutions.
  - **Unmanaged (Self-hosted)** - Services are deployed on a virtual machine. All of the management operations must be carried out by the developers.
  - **Managed** - Services are made available by cloud providers. Developers can upload their code and/or custom configurations and the service will be managed by the cloud provider.
  - **Hybrid Approach** - Using a combination of managed and unmanaged services to deploy a distributed system.

Considerations

- Each approach will have it's pros and cons, it's up to the development team to weigh these up and choose an approach that works best for them.
  - **Unmanaged -** Usually the cheapest operation and provides teams with full control of their system, but it's complex to setup and manage
  - **Managed** - Doesn't require in-depth knowledge of servers and concepts like DevOps making it easy for developers to deploy, but it's usually more expensive to host an application this way.
  - **Hybrid** - Allows developers to weigh up the benefits of self-hosting certain services and using cloud services for others, helping to find a good balance.

Questions and Answers

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Understanding the Cloud

- Modern applications are built around the idea of being able to connect to the internet to perform most of their operations.
- In order to carry out these operations, the operations that the user attempts need to be resolved by some sort of server that is accessible over the internet.

Understanding the Cloud

- A **Data Center** is a facility that houses computer systems, servers, networking equipment and storage used to manage, process and store data.
- Data centers play a key role in cloud computing as they perform the operations that would otherwise need to be performed on the users device.
- There are 2 main types of data centers we can use to deploy applications
  - **On-Premise**
  - **Public Cloud**

On-premise

- Before we had services like AWS and Azure, everything was run locally
  - Businesses needed to invest in their own personal data centers
  - The business was responsible for purchasing, configuring and managing the data center
- Costs associated with on-premise
  - Buying the hardware is the most expensive
  - The company needs to hire a team to manage the services
  - There are extra costs like:
    - Rent for the physical space
    - High electric bills
    - Investing in different forms of security
- There are also added responsibilities
  - Ensuring that the data meets compliance requirements
  - Making sure that tools are running and up to date
  - Making sure that data is backed up
  - And more...

Public Cloud

- Provided by a cloud provider like AWS, Azure, GCP, etc.
- The cloud provider will
  - Handle the costs associated with acquiring, installing and managing hardware
  - Provide compute resources to people using a subscription model
  - Provide different tiers of services based on a customers technical ability.

Choosing the Right Approach

- Different businesses have different needs and need to weigh up the pros of the two approaches and choose the approach that works best for them.
- Pros of **on-premise**:
  - Easier to comply with regulations that require you to have full control of your data
  - Full control of the data center, from the hardware to the software
  - The costs are predictable
- Pros of **public cloud**:
  - Faster to increase the available resources on the fly
  - Cloud providers usually have servers around the world, so services can be closer to the users
  - No cost of buying the physical infrastructure and no need to hire people to manage


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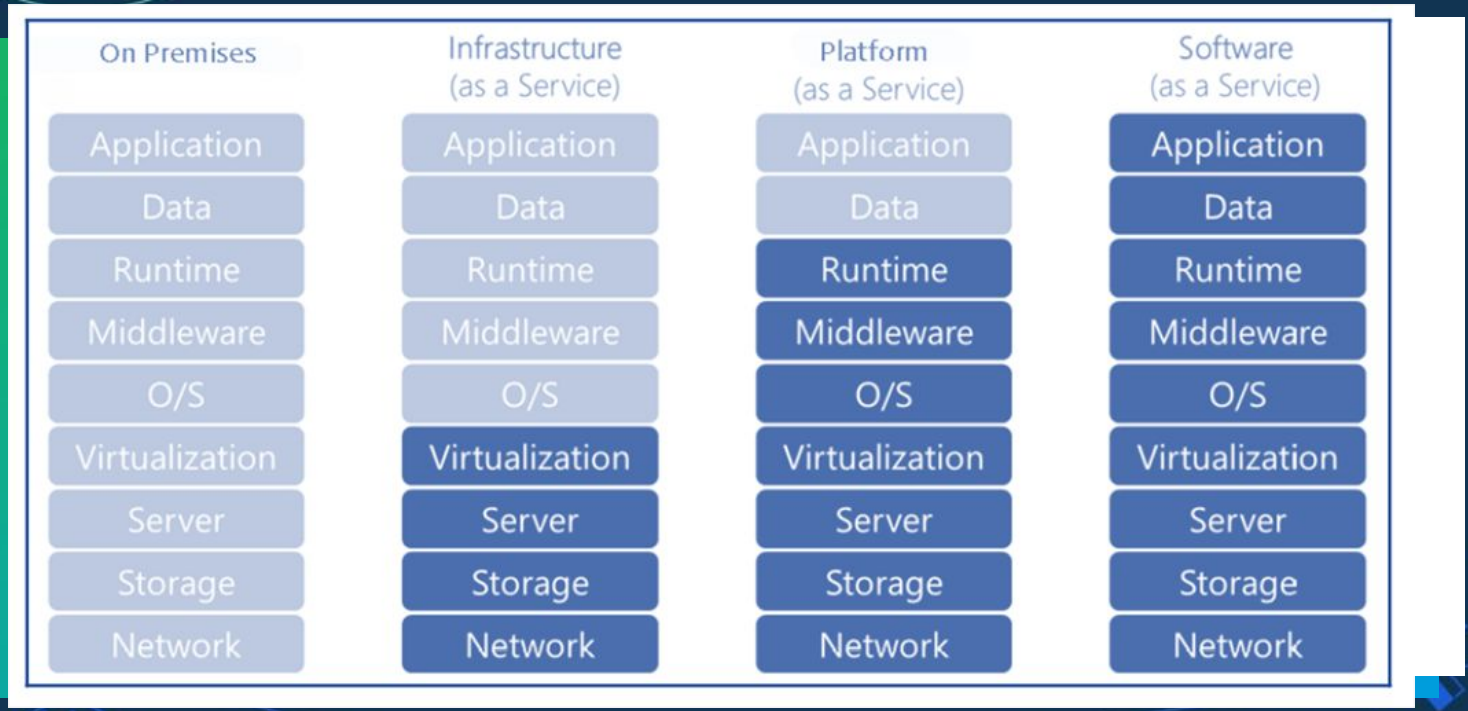
We will be back soon...
Feel free to leave your questions in the questions section

Cloud Service Model

- The **Cloud Service Model** refers to the different tiers of services that cloud service providers offer
- Each tier will see the customer and the cloud provider take up different levels of responsibility for the different layers of architecture.
  - **Infrastructure as a Service (IaaS)**
  - **Platform as a Service (PaaS)**
  - **Software as a Service (SaaS)**

Cloud Service Model



Infrastructure as a Service

- The cloud provider is responsible for managing the **physical infrastructure**
  - Purchasing, installing and managing the physical hardware
  - Ensuring the network is configured
  - Enabling virtualization on the systems.
- The customer has full control over the **logical infrastructure** that the system makes use of
  - Configuring and managing operating systems
  - Install and configure runtimes and middleware
  - Uploading and managing applications running on the system.
- Common examples of IaaS include
  - Virtual Machines (VM) - EC2 on AWS
  - Storage services - S3 on AWS
  - Virtual networks - VPC on AWS

Infrastructure as a Service

- IaaS can be categorized as the unmanaged tier for cloud deployments as the customer has full control over the logical infrastructure
- Who is IaaS for
  - Companies or individuals who have an understanding of how to manage infrastructure, but don't want to invest in physical infrastructure
  - Companies or individuals who want to save money by managing their own services
  - Companies or individuals who are running services that are not offered by their cloud providers.
- Issues with IaaS
  - Requires expert knowledge of how to deploy and manage services in a secure and scalable way.
  - Can be time consuming if rapid deployment is the goal

Platform as a Service

- The cloud provider is responsible for
  - All IaaS operations
  - Selecting an OS and installing middleware and tools
  - Providing a runtime environment for specific programming languages or tools.
- The customer is responsible for
  - Uploading their code of configurations to the service
- PaaS is the most common tier of services that you will find being offered by cloud providers, services include:
  - Databases - DynamoDB, RDS on AWS
  - App runners - Elastic Beanstalk, Fargate on AWS
  - Function as a Service - Lambda on AWS

Platform as a Service

- PaaS services are considered as **managed services** as the cloud provider is responsible for ensuring that the service is always available and able to scale.
- Who is PaaS for
  - Developers
  - Developers who have no experience deploying using unmanaged services
  - Developers who want to focus on development without the overhead of management.
- Drawbacks of PaaS
  - You're limited to the services and configurations that cloud provider offers
  - It's typically more expensive to use managed services, particularly databases

Software as a Service

- The cloud provider will
  - Handle the physical and logical infrastructure
  - Manage the middleware and runtimes
  - Install and configure the applications
- The customer will
  - Access the application over the internet to perform their operations.
- SaaS tools are usually used for performing basic operations and require no development knowledge, common SaaS tools include:
  - MS Word
  - Xero
  - Spotify

Software as a Service

- SaaS is considered managed as the user does not need to worry about how the application is running both in terms of logical and physical infrastructure
- Who is SaaS for
  - Business users who want to perform specific operations
  - Development teams who want to save time on development and deployment by using existing tools
- Problems with SaaS
  - The user has no control over anything, if the vendor offering the service takes it down, the customer has to find an alternative
  - The vendor has the power to increase prices as they wish, if the service is business crucial, the customer has to comply.

Questions and Answers

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Choosing Cloud Services

- When building a **cloud native** application, one needs to choose between different services for hosting the different parts of their application.
- It's common for applications to be built using a combination of managed and unmanaged services to get the most out of the cloud platforms offerings.
- It's important to consider the following:
  - **Scalability**
  - **Availability**
  - **Portability**
  - **Maintainability**

Which of the following best describes horizontal scaling in cloud computing?

A. Increasing the power (CPU/RAM) of an existing server.
B. Switching from one cloud provider to another.
C. Adding more instances of a service to handle increased load.
D. Upgrading from a virtual machine to a containerized system.

What is the primary difference between deploying a service on a traditional server vs using cloud infrastructure?

A. Cloud infrastructure automatically scales resources, while traditional servers require manual scaling
B. Traditional server are always faster than cloud infrastructure
C. Cloud services do not require any configuration
D. Cloud infrastructure does not allow remote access

Thank you for attending

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