



Just IT

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Apprenticeships | Training | Recruitment

Data Technician

Week 5

Fundamentals of Azure

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Day 1: Task 1

Please research and complete the below questions relating to key concepts of cloud. Be prepared to discuss the below in the group following this task.

What can cloud computing do for us in the real-world?

Cloud computing has a wide range of real-world applications and benefits that make it integral to our daily lives and businesses. Here's how it helps in the real world:

Data Storage and Accessibility: Cloud services like Google Drive, Dropbox, and iCloud allow individuals and businesses to store vast amounts of data online, making it accessible from any device with an internet connection. This eliminates the need for physical storage hardware and allows for seamless access to files anytime, anywhere.

Collaboration: Cloud-based tools like Microsoft 365, Google Workspace, and Slack enable real-time collaboration. Teams can work together on documents, spreadsheets, presentations, and even video calls, no matter where they are located. This has been especially helpful for remote work and global teams.

Cost Savings: Businesses can avoid large upfront costs for hardware and software by using cloud services on a pay-as-you-go basis. This is particularly beneficial for startups or small businesses that need to manage their budgets effectively. Companies also save on maintenance costs since cloud providers handle that.

Scalability: Cloud computing allows businesses to scale up or down based on their needs. For example, an e-commerce site can handle spikes in traffic during sales events without needing to invest in additional infrastructure. The cloud can adjust resources dynamically to meet demand.

Disaster Recovery: Cloud services often include backup and disaster recovery options. If something happens to a business's physical infrastructure, cloud backups can restore systems, ensuring that critical data is never lost and minimizing downtime.

Software as a Service (SaaS): Many applications are available through the cloud, such as Salesforce, Zoom, and Spotify. Users can access the latest version of the software without worrying about updates or installation. SaaS provides users with access to powerful tools and software without the complexity of managing them.



Improved Security: Cloud providers often have advanced security measures that small businesses or individuals might not be able to afford on their own. They employ encryption, firewalls, and other protections to safeguard sensitive data. Additionally, they can quickly respond to security threats.

Machine Learning and AI: Many cloud platforms offer machine learning and AI capabilities, which businesses can use to analyse large datasets, build predictive models, and improve customer experiences. Google Cloud, AWS, and Azure provide these capabilities for industries like healthcare, finance, and retail.

Internet of Things (IoT): The cloud is essential for IoT devices to function. From smart home devices to connected industrial machinery, the cloud enables the collection, analysis, and storage of data generated by these devices, making them more efficient and responsive.

Entertainment: Services like Netflix, Spotify, and YouTube rely heavily on the cloud to stream content to users globally. The cloud allows them to store massive media libraries and deliver content efficiently to millions of users.

Global Access and Mobility: Cloud computing makes it easier for people to access their work, applications, and data from multiple devices, whether at home, the office, or on the go. This flexibility supports increased productivity and a better work-life balance.

Environmental Impact: By consolidating resources in data centres that are optimized for energy efficiency, cloud computing can help reduce the carbon footprint compared to companies running their own on-site servers.

In short, cloud computing has transformed industries, enabling better collaboration, access to powerful tools, cost efficiencies, and improved security. It's become the backbone of many technologies we rely on daily, from business operations to personal entertainment.

How can it
benefit a
business?

Cloud computing offers businesses numerous benefits, helping them streamline operations, reduce costs, and improve flexibility. Here's how it can benefit a business:

1. Cost Efficiency



- **Reduced IT Costs:** Cloud computing eliminates the need for purchasing expensive hardware, maintaining servers, and paying for software licenses. Businesses can pay only for what they use, saving money on infrastructure, utilities, and personnel for managing hardware.
- **Pay-as-you-go Pricing:** With cloud services, businesses can scale their resources up or down depending on their needs, ensuring they only pay for the services they actually use, rather than overcommitting to resources they don't need.

2. Scalability and Flexibility

- **Adapt to Business Growth:** Cloud computing allows businesses to easily scale up (or down) their storage, computing power, or software needs. For example, during peak sales seasons, companies can increase server capacity to handle higher traffic and then reduce it when demand normalizes.
- **Elastic Resources:** Cloud services like AWS, Microsoft Azure, and Google Cloud offer flexible resources that businesses can adjust as needed, making it easier to meet fluctuating demand.

3. Improved Collaboration

- **Real-Time Collaboration:** Cloud-based tools like Google Workspace, Microsoft 365, and Slack make collaboration easy across teams, regardless of their location. Employees can work together on documents, share files, and communicate in real time, boosting productivity and efficiency.
- **Access Anywhere, Anytime:** With cloud computing, employees can access work documents and applications from any device with an internet connection, whether they're at the office, home, or traveling. This flexibility improves work-life balance and productivity.

4. Increased Productivity

- **Automatic Software Updates:** Cloud service providers manage and regularly update the software, meaning businesses don't have to worry about manual updates or system upgrades. This reduces downtime and ensures employees always use the latest tools.
- **Faster Deployment:** Cloud services enable quicker deployment of new applications and services compared to



traditional on-premises setups. Businesses can roll out new systems or features rapidly without lengthy installation processes.

5. Disaster Recovery and Business Continuity

- **Data Backup and Recovery:** Cloud platforms typically provide automatic backups and disaster recovery solutions, ensuring that in the event of a data loss (e.g., accidental deletion, hardware failure, or cyberattack), businesses can quickly restore lost information and minimize downtime.
- **Business Continuity:** In the event of a disaster, cloud computing allows businesses to continue operations seamlessly by accessing systems and data from remote locations, avoiding significant disruptions.

6. Enhanced Security

- **Enterprise-Level Security:** Leading cloud providers invest heavily in robust security protocols, including encryption, firewalls, and access controls. They typically have dedicated security teams working to protect sensitive data, which might be out of reach for smaller businesses.
- **Compliance:** Many cloud providers comply with industry-specific regulations and certifications (such as GDPR, HIPAA, and PCI-DSS), helping businesses meet legal requirements for data protection and privacy.

7. Improved Customer Experience

- **Faster Service Delivery:** Cloud computing enables businesses to quickly deploy new services, updates, or features to customers, improving customer satisfaction and staying ahead of competitors.
- **Data Insights:** By using cloud-based analytics tools, businesses can analyse customer behaviour, preferences, and trends more effectively, allowing them to deliver personalized services and improve customer experiences.

8. Mobility and Remote Work

- **Remote Work Enablement:** Cloud computing empowers businesses to implement remote work policies by providing employees with secure access to company systems and



documents from any location, which has become especially important in the era of flexible and hybrid work models.

- **Global Teams:** Teams spread across the world can easily access the same resources, tools, and files in real-time, fostering collaboration despite geographic differences.

9. Innovation and Agility

- **Faster Time to Market:** With cloud computing, businesses can test and launch new products or services more quickly. Cloud platforms offer a range of services (e.g., AI, machine learning, data analytics) that help businesses innovate and stay competitive without heavy investment in infrastructure.
- **Access to Cutting-Edge Technologies:** Cloud platforms often offer advanced technologies such as machine learning, AI, and big data analytics that may otherwise be difficult or expensive for businesses to develop and implement on their own.

10. Environmental Sustainability

- **Energy Efficiency:** Cloud providers operate massive data centres that are optimized for energy efficiency and use renewable energy sources. By leveraging cloud infrastructure, businesses contribute to reducing their carbon footprint compared to maintaining their own on-site servers.

11. Competitive Advantage

- **Focus on Core Competencies:** By outsourcing IT infrastructure management to cloud providers, businesses can focus on their core competencies and strategic goals instead of IT maintenance and resource management.
- **Innovation-Ready:** Cloud computing enables businesses to stay up-to-date with the latest technologies, giving them the flexibility to adopt new tools, improve operations, and offer better services, keeping them competitive in the market.

12. Access to Advanced Tools

- **AI & Machine Learning:** Cloud providers offer easy access to artificial intelligence and machine learning tools, which businesses can use for predictive analytics, automation, and enhanced customer insights. This reduces the complexity and cost of integrating these technologies.



What's the
alternative
to cloud
computing?

In short, cloud computing empowers businesses to be more efficient, cost-effective, and flexible. By utilizing cloud services, businesses can enhance collaboration, improve security, scale quickly, and foster innovation, all while reducing overhead costs and risks.

The main alternative to cloud computing is **on-premises computing**, which involves maintaining IT infrastructure and data storage within a company's own facilities. This can include:

1. On-Premises Servers and Infrastructure:

Description: With on-premises computing, businesses buy, manage, and maintain their own servers, storage, and network infrastructure within their physical premises.

Pros:

Full control: Businesses have complete control over their hardware, software, and data, which can be important for sensitive information or custom configurations.

Security: Some companies prefer on-premises setups for the perceived security benefit of having direct control over their environment.

Customization: Businesses can tailor their infrastructure to their specific needs.

Cons:

High upfront costs: Purchasing servers, storage devices, and network equipment requires significant capital investment.

Maintenance: The company is responsible for ongoing maintenance, upgrades, and troubleshooting, which can require dedicated IT staff and resources.

Limited scalability: Scaling up or down can be more difficult and costly, requiring additional hardware purchases or complex configurations.

2. Colocation (Colo)

Description: Colocation involves renting space in a data centre to house a company's physical servers and hardware. The business owns the hardware, but the data centre provides the space, power, cooling, and network connectivity.

Pros:



Infrastructure support: The data centre provides physical infrastructure and security, while the company maintains control over its hardware.

Scalability: Companies can lease additional space as needed.

Cons:

Cost: The company still faces significant capital expenses for purchasing hardware and paying for the data centre space.

Management: The business is still responsible for managing and maintaining its own infrastructure, which can be resource-intensive.

3. Private Hosting

Description: In this model, a business rents dedicated hosting services from a provider, where they have exclusive use of a server or a set of servers. The infrastructure is managed by the hosting company but is typically more customizable than shared hosting.

Pros:

More control: The company can configure the server as needed, while the hosting provider manages the physical infrastructure.

Isolation: The server is dedicated to one customer, offering more privacy and fewer resource-sharing concerns than shared hosting.

Cons:

Higher cost: Private hosting tends to be more expensive than shared hosting or cloud services, especially when factoring in maintenance and management costs.

Limited scalability: While more flexible than on-premises hardware, scaling still requires manual adjustments and potential hardware purchases.

4. Hybrid Cloud

Description: A hybrid cloud is a combination of on-premises infrastructure and cloud computing, allowing businesses to run certain applications or store data in the cloud, while maintaining others in their own data centres.

Pros:

Flexibility: Allows businesses to enjoy the benefits of cloud computing while retaining control over sensitive data or mission-critical systems.



Scalability: Businesses can scale the cloud components as needed while managing the on-premises infrastructure.

Cons:

Complexity: Managing both on-premises and cloud environments can be complex and require specialized tools and expertise.

Cost: Managing two environments (on-prem and cloud) may increase operational costs, especially if both are heavily used.

5. Edge Computing

Description: Edge computing involves processing data closer to where it's generated (e.g., on devices or local servers) instead of sending it to centralised cloud data centres. This is often used for real-time, low-latency applications, such as in the Internet of Things (IoT).

Pros:

Faster data processing: Data can be processed immediately at the source, reducing latency and speeding up response times.

Reduced bandwidth usage: By processing data locally, less data needs to be transmitted to centralized servers, reducing bandwidth costs.

Cons:

Limited scalability: Edge computing is suitable for certain use cases (like IoT), but it may not be able to handle the large-scale workloads that cloud computing can.

Management complexity: It requires distributed infrastructure and local management, which may add complexity for businesses.

6. Virtual Private Servers (VPS)

Description: A VPS is a virtualized server environment that provides some benefits of dedicated hosting without the full cost of a physical server. It's typically managed by a hosting provider but gives businesses more control than shared hosting.

Pros:

Cost-effective: VPS hosting is cheaper than dedicated hosting while providing more control.

Customizable: The business can install and configure software to meet specific needs.



Cons:

Resource limitations: The server is still shared with other users, so performance may not be as reliable as on a dedicated server.

Maintenance: Businesses may need to manage certain aspects of the server, depending on the service agreement.

Key Differences Between Cloud Computing and Alternatives:

- **Cost:** Cloud computing typically offers a lower initial investment and a pay-as-you-go model, while alternatives like on-premises setups require significant upfront capital expenditures.
- **Maintenance and Management:** Cloud providers handle maintenance and upgrades, while on-premises or colocation solutions place the responsibility on the business.
- **Scalability:** Cloud computing is highly scalable and flexible, whereas scaling on-premises infrastructure can be slow and costly.
- **Security:** Cloud providers invest in advanced security, but on-premises solutions can offer more direct control over security practices.
- **Accessibility:** Cloud services are accessible from anywhere, while on-premises setups are limited to a specific location.

While cloud computing offers flexibility, scalability, and cost benefits, on-premises alternatives like colocation or private hosting may still be preferred by businesses that need more control, have regulatory requirements, or handle sensitive data. The best solution depends on the business's specific needs, goals, and resources

What cloud providers can we use, what are their features and functions?

There are several major cloud providers that businesses and individuals can use, each offering a wide range of services, features, and functions to meet different needs. Below are the most prominent cloud providers, along with a summary of their key offerings:

1. Amazon Web Services (AWS)

Overview: AWS is one of the largest and most widely used cloud platforms in the world. It provides a comprehensive suite of cloud services for computing, storage, databases, machine learning, analytics, networking, and more.



Key Features and Functions:

- **Elastic Compute Cloud (EC2):** Provides scalable compute capacity in the cloud to run applications.
- **Simple Storage Service (S3):** Object storage service for storing and retrieving any amount of data.
- **Amazon RDS:** Managed relational database service supporting several database engines (e.g., MySQL, PostgreSQL).
- **Amazon Lambda:** Serverless computing service that lets you run code without provisioning or managing servers.
- **Machine Learning (SageMaker):** A platform for building, training, and deploying machine learning models.
- **Virtual Private Cloud (VPC):** Allows users to create isolated networks within AWS for more secure and controlled environments.
- **Content Delivery (CloudFront):** Content delivery network (CDN) service to distribute content globally with low latency.

Target Audience: AWS is suitable for businesses of all sizes, from startups to enterprises, especially those needing highly scalable infrastructure and a wide variety of services.

2. Microsoft Azure

Overview: Microsoft Azure is a leading cloud platform that integrates with many Microsoft services and tools. It provides a range of cloud computing services, including virtual machines, databases, and AI.

Key Features and Functions:

- **Azure Virtual Machines (VM):** Virtualized compute resources for running applications.
- **Azure Blob Storage:** Object storage for storing unstructured data, such as documents, images, and videos.
- **Azure SQL Database:** Managed relational SQL database service.
- **Azure Functions:** Serverless computing that allows you to run code in response to events without managing servers.
- **Azure Active Directory (AD):** Identity and access management for securing apps and services.
- **Azure AI and Machine Learning:** Tools for building, training, and deploying AI models.



- **Azure Kubernetes Service (AKS):** Managed Kubernetes service for deploying and managing containerized applications.
- **Azure DevOps:** Suite of tools for continuous integration and continuous delivery (CI/CD), project management, and code collaboration.

Target Audience: Azure is ideal for businesses using Microsoft products (e.g., Office 365, Windows Server), and it is widely used by enterprises, especially for hybrid cloud solutions.

3. Google Cloud Platform (GCP)

Overview: Google Cloud is known for its strengths in data analytics, machine learning, and big data solutions. GCP provides a wide range of infrastructure services, as well as advanced tools for building and scaling applications.

Key Features and Functions:

- **Google Compute Engine (GCE):** Scalable virtual machine instances for running applications.
- **Google Cloud Storage:** Scalable object storage with high availability.
- **BigQuery:** Serverless, highly scalable data warehouse for analytics and big data processing.
- **Google Kubernetes Engine (GKE):** Managed Kubernetes service for deploying and managing containers.
- **Google Cloud Functions:** Serverless computing for building and deploying event-driven applications.
- **AI and Machine Learning:** Pre-trained machine learning models and TensorFlow for custom ML model creation.
- **Cloud Pub/Sub:** Messaging service for real-time event ingestion and analytics.

Target Audience: GCP is a great fit for businesses with heavy data processing needs, especially those interested in machine learning and big data analytics. It's also popular with tech startups and organizations focused on innovation.

4. IBM Cloud

Overview: IBM Cloud offers both public and private cloud services, with an emphasis on enterprise solutions, AI, and cognitive computing.



Key Features and Functions:

- **IBM Cloud Virtual Servers:** Scalable compute instances for running virtual machines.
- **IBM Cloud Object Storage:** Object storage service optimized for high durability and scalability.
- **IBM Watson AI:** Powerful AI and machine learning tools, including natural language processing and cognitive services.
- **IBM Cloud Functions:** Serverless computing for event-driven applications.
- **IBM Cloud Kubernetes Service:** Managed Kubernetes service for deploying containerized applications.
- **IBM Blockchain:** Platform for building and managing blockchain applications.
- **IBM Cloud Databases:** Managed databases including PostgreSQL, MongoDB, and more.

Target Audience: IBM Cloud is ideal for enterprises and organizations in industries like finance, healthcare, and government, where security, compliance, and AI capabilities are crucial.

5. Oracle Cloud

Overview: Oracle Cloud specializes in providing enterprise-level cloud services, with a strong focus on databases, ERP, and enterprise applications.

Key Features and Functions:

- **Oracle Cloud Infrastructure (OCI):** Provides compute, storage, networking, and database services for large-scale applications.
- **Oracle Autonomous Database:** A self-driving, self-securing, and self-repairing database.
- **Oracle Cloud Applications:** Enterprise applications for ERP, CRM, and HCM (human capital management).
- **Oracle Kubernetes Engine:** Managed Kubernetes service for running containerized applications.
- **Oracle Cloud Analytics:** Suite of analytics tools for business intelligence, data visualization, and reporting.
- **Oracle Cloud Security:** Advanced security features, including identity and access management, encryption, and threat detection.



Target Audience: Oracle Cloud is well-suited for large enterprises, particularly those in need of high-performance databases, ERP solutions, and other enterprise applications.

6. Alibaba Cloud

Overview: Alibaba Cloud is the leading cloud provider in China and has a growing presence globally. It offers a wide range of cloud services focused on computing, data storage, and AI.

Key Features and Functions:

- **Elastic Compute Service (ECS):** Scalable compute service for running virtual machines.
- **Object Storage Service (OSS):** High-performance object storage for data archiving and backup.
- **Alibaba Cloud Database Services:** Managed databases including MySQL, SQL Server, and NoSQL solutions.
- **AI and Machine Learning:** Alibaba Cloud offers AI tools and APIs for vision, speech, and language processing.
- **Alibaba Cloud CDN:** Content delivery network to accelerate content delivery worldwide.
- **Container Service for Kubernetes:** Managed Kubernetes service for containerized application deployment.

Target Audience: Alibaba Cloud is particularly popular in Asia and is a good choice for businesses looking to expand into the Chinese market or needing a cloud platform with competitive pricing in the APAC region.

7. Salesforce

Overview: Salesforce is a cloud-based customer relationship management (CRM) platform with a suite of applications for sales, customer service, marketing, and analytics.

Key Features and Functions:

- **Salesforce CRM:** Cloud-based solution for managing customer relationships, sales, and marketing.
- **Salesforce Service Cloud:** Customer service management platform with case tracking, live chat, and knowledge base capabilities.
- **Salesforce Marketing Cloud:** Digital marketing tools for email marketing, social media, and customer journeys.
- **Salesforce Einstein:** AI-powered tools for predictive analytics, lead scoring, and automation.



- **AppExchange:** Marketplace for third-party applications that integrate with Salesforce.

Target Audience: Salesforce is primarily used by sales, marketing, and customer service teams. It's ideal for businesses that need a robust CRM platform with built-in AI capabilities.

Summary of Cloud Providers:

- **AWS:** Wide variety of services, scalability, and flexibility for businesses of all sizes.
- **Microsoft Azure:** Best for companies relying on Microsoft products and hybrid cloud solutions.
- **Google Cloud:** Excellent for big data, machine learning, and analytics-focused businesses.
- **IBM Cloud:** Focus on enterprise AI, blockchain, and cognitive computing.
- **Oracle Cloud:** Specialized in enterprise databases, ERP, and cloud applications.
- **Alibaba Cloud:** Strong in Asia-Pacific, with competitive services in cloud computing and AI.
- **Salesforce:** Primarily for CRM, sales, marketing, and customer service applications.

Each cloud provider offers unique strengths depending on your business needs, whether you're looking for flexibility, powerful analytics, AI capabilities, or specialized enterprise applications.

Day 1: Task 2

Please research the below cloud offerings, explain what they are and examples of use cases.

Cloud Offerings	Explain what it is	When / how might you use this service in the real-world?
IaaS (Infrastructure as a service)	Infrastructure as a Service (IaaS) is a cloud computing model that provides virtualised computing resources over the internet. With IaaS, businesses can rent computing infrastructure, including virtual machines, storage,	IaaS is commonly used for: Hosting websites or applications: Hosting servers, databases, and applications in the cloud. Scalable computing power: Easily adjusting resources based on demand, like scaling up during high traffic times.



	<p>networks, and other essential resources, on a pay-as-you-go basis. In IaaS, the service provider manages and maintains the physical hardware, while users can install and manage their operating systems, applications, and data.</p>	<p>Data storage: Storing and backing up data in the cloud, without the need for on-site infrastructure. Popular IaaS providers include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP).</p>
<p>PaaS (Platform as a service)</p>	<p>Platform as a Service (PaaS) is a cloud computing model that provides a platform and environment for developers to build, deploy, and manage applications without having to worry about the underlying infrastructure. PaaS offers a higher level of abstraction compared to Infrastructure as a Service (IaaS), as it focuses more on providing tools, services, and a development environment that streamline the application development process.</p>	<p>With PaaS, developers can focus on writing code and developing applications while the platform handles things like:</p> <p>Operating systems: PaaS provides the necessary OS environment, so developers don't need to manage or configure it.</p> <p>Databases: Managed database services are often included, saving developers the trouble of setting up and managing databases.</p> <p>Development tools: PaaS providers often offer integrated development environments (IDEs), version control, and other tools for efficient app development.</p> <p>Security and scaling: PaaS platforms typically manage security patches, automatic scaling, and load balancing. This model is ideal for developers who need to build web applications, mobile backends, or software solutions quickly without getting bogged down by infrastructure concerns.</p>

		Examples of popular PaaS providers include Google App Engine, Heroku, Microsoft Azure App Service, and Red Hat OpenShift.
SaaS (Software as a service)	Software as a Service (SaaS) is a cloud computing model where software applications are delivered over the internet on a subscription or pay-per-use basis. Instead of installing and maintaining software on individual computers or servers, users access the software through a web browser. The software is hosted, managed, and maintained by the service provider, meaning users don't have to worry about installation, maintenance, updates, or infrastructure.	<p>SaaS applications are typically ready-to-use, providing complete functionality for users without the need for additional customization or configuration.</p> <p>Some key features of SaaS include:</p> <p>Accessibility: Accessible from anywhere with an internet connection, often via a web browser.</p> <p>Automatic Updates: The provider takes care of updates, patches, and new feature releases, so users always have the latest version.</p> <p>Scalability: Many SaaS solutions can easily scale up or down based on usage or the number of users.</p> <p>Subscription-Based: Users usually pay on a subscription basis, such as monthly or annually, which can be cost-effective compared to traditional software licensing.</p> <p>Examples of popular SaaS applications include:</p> <p>Google Workspace, Microsoft 365, Salesforce, Dropbox, Slack.</p> <p>SaaS is commonly used for collaboration, communication, customer relationship management (CRM), accounting, project management, and more.</p>

Day 1: Task 3

Please research the below terms and explain what they are, when they would be appropriate and a real-world example of where it could be implemented (i.e. what type of organisation).

Public Cloud

Public cloud refers to a cloud computing model where computing resources like servers, storage, and applications are provided by third-party service providers and are made available to the general public over the internet. These resources are shared among multiple organizations (often called *tenants*) but are securely isolated, meaning each tenant's data and applications are separate from others.

Key Characteristics of Public Cloud:

- **Owned and Operated by Third-Party Providers:** Popular public cloud providers include **Amazon Web Services (AWS)**, **Microsoft Azure**, and **Google Cloud Platform (GCP)**.
- **Scalable and Elastic:** Resources like computing power and storage can be easily scaled up or down as per demand, making it cost-efficient.
- **Cost-Effective:** With a pay-as-you-go pricing model, you only pay for the resources you use, making it an affordable option for businesses of all sizes.
- **No Maintenance:** The cloud service provider manages hardware, security, and updates, so businesses don't need to worry about infrastructure maintenance.

A public cloud is most appropriate in the following scenarios:

1. **Cost Efficiency:** When a business doesn't want to invest heavily in physical infrastructure (servers, storage, etc.), public cloud services offer an affordable and flexible option.
2. **Scalability Needs:** Organizations with fluctuating demands for compute power or storage can benefit from the cloud's ability to scale up or down based on current needs (e.g., handling peak traffic or seasonal increases).
3. **Less Strict Security Requirements:** While public clouds are secure, they are shared environments. Organizations with



less sensitive data or regulatory compliance needs may opt for the public cloud.

4. **Collaboration and Accessibility:** Businesses that require remote access, flexibility, or team collaboration tools can benefit from cloud-hosted software like Google Workspace or Microsoft 365.
5. **Disaster Recovery and Backup:** Public clouds are a good fit for organizations seeking affordable backup solutions and disaster recovery without maintaining their own hardware.

Example: A Startup Tech Company

Imagine a **small startup** in the tech space developing a mobile app. This company may not have the capital to invest in its own servers or data centres, and they need to be agile to scale quickly as users begin to grow. The startup can use a **public cloud** for:

1. **Hosting their app:** The app's backend can be hosted on cloud servers, making it available globally without the need to manage physical hardware.
2. **Database storage:** The public cloud can store user data, logs, and other information in a highly scalable, secure, and cost-efficient way.
3. **Development tools:** They can use cloud-based development tools like AWS Lambda, GitHub, or Google Cloud's App Engine to build and deploy the app quickly.
4. **Scaling during growth:** As user numbers increase, the company can scale their cloud resources without downtime or hardware limitations, paying for just the additional capacity needed.

In this case, a **public cloud** helps the startup save on infrastructure costs and focus on their product without worrying about maintaining servers or dealing with complex IT management. This flexibility would be critical for any organization needing to grow fast and cost-effectively without upfront capital investment in physical hardware.

Conclusion:



Public clouds are best suited for businesses that need flexibility, cost efficiency, and the ability to scale rapidly without managing physical infrastructure. Examples of suitable organizations include startups, small to medium-sized businesses, and organizations with fluctuating demands for computing power.

Private Cloud

Private cloud refers to a cloud computing model where the infrastructure is dedicated to a single organization. It can be hosted either on-premises (within the organization's own data centre) or by a third-party provider but is still isolated from other organizations. The organization has more control over the infrastructure, security, and customization, which is a key difference from a public cloud, where resources are shared among multiple tenants.

Key Characteristics of Private Cloud:

- **Dedicated Infrastructure:** The cloud resources (servers, storage, etc.) are reserved exclusively for one organization.
- **Increased Control:** The organization has greater control over configuration, security, and maintenance.
- **Security and Compliance:** Private clouds are often chosen for industries with strict data privacy and regulatory requirements, such as healthcare, finance, or government.
- **Customization:** The infrastructure can be tailored to meet the specific needs of the organization.

A private cloud is appropriate in the following situations:

1. **Security and Compliance Needs:** Organizations that handle sensitive data or are subject to strict regulatory compliance (e.g., healthcare, finance, government) often opt for private clouds to ensure control over their infrastructure and data.
2. **Customization Requirements:** If a business needs specific configurations or has complex workloads, a private cloud allows for more tailored solutions.
3. **Dedicated Resources:** Organizations that require dedicated resources (rather than shared resources) for performance or regulatory reasons may prefer a private cloud.
4. **Legacy Systems and Integration:** Organizations that have legacy systems or applications that need to be integrated with modern cloud-based solutions may use a private cloud for easier compatibility and control.



5. **Data Sovereignty:** Some companies must store data within specific geographic boundaries due to legal reasons, making a private cloud more suitable.

Example: A Financial Institution (Bank)

A **bank** that handles sensitive financial data, such as personal account information and transaction records, would likely implement a **private cloud** for several reasons:

1. **Security and Compliance:** Banks must comply with strict regulations like **GDPR**, **PCI DSS**, and **SOX**, which dictate how financial data should be protected. A private cloud provides the bank with the control needed to ensure all security measures are in place to meet these requirements.
2. **Performance:** The bank may require high-performance computing power for tasks like fraud detection, transaction processing, or risk analysis, which can be optimized in a private cloud environment.
3. **Data Sovereignty:** The bank may need to store data within specific jurisdictions due to local laws and regulations governing data privacy. A private cloud can be set up in a specific region or country, ensuring data sovereignty.
4. **Customization:** The bank may have specific applications or workflows that need to be customized or tightly integrated with other on-premises systems (such as ATMs, branch systems, or legacy databases). A private cloud offers the flexibility to meet these requirements.

In this example, the **private cloud** allows the bank to have full control over security, compliance, and performance, while still benefiting from cloud computing advantages like scalability and flexibility.

Conclusion:

A **private cloud** is best suited for organizations that need more control, enhanced security, compliance with regulations, and customization. Typical use cases include industries such as banking, healthcare, government, and large enterprises with complex IT needs. A private cloud provides these organizations with the ability to have cloud-like benefits while ensuring they meet their specific requirements.



Hybrid Cloud

Hybrid cloud is a cloud computing model that combines both **public** and **private** cloud environments, allowing data and applications to be shared between them. This gives organizations more flexibility and deployment options. With a hybrid cloud, businesses can leverage the public cloud for non-sensitive workloads and the private cloud for sensitive data or critical applications, providing the best of both worlds.

Key Characteristics of Hybrid Cloud:

- **Flexibility:** Organizations can decide which workloads should run in the private cloud (for higher security or compliance needs) and which should run in the public cloud (for cost efficiency or scalability).
- **Interoperability:** Hybrid clouds require the ability to seamlessly transfer data and workloads between the public and private clouds. This typically involves using integration tools, APIs, or a hybrid cloud management platform.
- **Scalability:** Businesses can scale up their private cloud with resources from the public cloud when needed, such as during spikes in demand.
- **Security and Compliance:** Hybrid cloud setups allow organizations to maintain secure, private infrastructure while taking advantage of the scalability and cost savings of public cloud.

A hybrid cloud is appropriate in the following scenarios:

1. **Variable Workloads:** If an organization has fluctuating needs for computing resources, it can run its critical and sensitive workloads on a private cloud and burst to the public cloud during peak demand.
2. **Compliance and Security:** Organizations that need to store sensitive data (e.g., healthcare or finance) in a private cloud due to regulatory or security requirements can use the public cloud for less-sensitive workloads.
3. **Legacy System Integration:** When organizations want to integrate their existing on-premises systems (legacy IT infrastructure) with cloud-based solutions, hybrid cloud can provide a bridge.
4. **Cost Optimization:** A hybrid cloud enables businesses to avoid overpaying for private cloud resources by running



less-critical workloads on the public cloud, thus optimizing costs.

5. **Disaster Recovery:** A hybrid cloud can also be used as part of a disaster recovery solution, with data backed up to the public cloud while critical data and operations are kept on-premises or in a private cloud.

Example: A Healthcare Organization

Imagine a **healthcare organization** that stores sensitive patient data, conducts medical research, and runs critical applications, such as Electronic Health Records (EHR) systems. This organization could implement a **hybrid cloud** for the following reasons:

1. **Data Sensitivity and Compliance:** Due to regulations like **HIPAA** (Health Insurance Portability and Accountability Act), the healthcare organization must keep patient records highly secure and ensure privacy. They could store patient data and EHR systems in a **private cloud**, which offers greater control and security.
2. **Scalability for Research Data:** On the other hand, the organization might need to analyse large amounts of medical research data or run data-heavy workloads like genome sequencing, which requires massive computing power. For this, they could use a **public cloud** to scale quickly and cost-effectively without the need for maintaining expensive on-premises infrastructure.
3. **Disaster Recovery:** If the private cloud experiences downtime or hardware failure, the organization could quickly shift non-critical operations or data backups to the **public cloud**, ensuring continuity and data availability.
4. **Cost Efficiency:** The organization can optimize its resources by running less-sensitive or non-essential workloads in the public cloud while reserving the private cloud for highly confidential and mission-critical applications.

This hybrid approach allows the healthcare provider to balance security, compliance, cost, and scalability while maintaining the flexibility to meet their unique IT needs.

Conclusion:

A **hybrid cloud** is ideal for organizations that need a combination of the **security and control** offered by private clouds, alongside the **scalability and cost-efficiency** of public clouds. It is



Community Cloud

particularly useful in industries with complex or fluctuating IT needs, like healthcare, finance, government, and large enterprises. Hybrid clouds provide organizations with the flexibility to meet their specific requirements while maintaining seamless integration between on-premises, private, and public cloud resources.

Community cloud is a cloud computing model where infrastructure is shared by several organizations with similar interests, needs, or regulatory requirements. It can be hosted by a third-party provider or managed internally, but the key aspect is that the cloud is used by multiple organizations with a shared goal, often for collaboration, security, or compliance purposes. The resources are dedicated to a specific community, and the costs are shared among the members of that community.

Key Characteristics of Community Cloud:

- **Shared Infrastructure:** Unlike a public cloud (shared by many different organizations), a community cloud is designed specifically for a group of similar organizations with shared needs or objectives.
- **Collaboration:** Community clouds foster collaboration among organizations with common goals (e.g., government entities, universities, healthcare providers) while maintaining a level of data isolation and security.
- **Compliance and Security:** The community cloud model often supports specific compliance, regulatory, or security requirements that are important to the organizations in the community.
- **Cost Sharing:** Because resources are shared, the financial burden of maintaining the cloud infrastructure is spread across the participating organizations, making it more cost-effective than a private cloud for each organization individually.

A community cloud is appropriate in the following situations:

1. **Shared Interests or Goals:** When several organizations need to collaborate on projects or share resources for a common purpose, a community cloud enables them to do so efficiently.
2. **Compliance and Regulatory Needs:** Organizations with shared regulatory or compliance requirements (e.g.,



healthcare, finance, government) can benefit from the specific security and data privacy measures implemented in a community cloud.

3. **Cost-Effective for Smaller Organizations:** Smaller organizations or entities with similar needs can leverage a community cloud to access advanced infrastructure and resources without the full cost of a private cloud.
4. **Collaboration Among Similar Organizations:** When groups of organizations (e.g., universities, government agencies, or healthcare providers) need to share research data, resources, or infrastructure securely, a community cloud makes sense.
5. **Data Sovereignty:** If organizations within the same community need to store data in specific regions or comply with regional laws, a community cloud can help meet these requirements while maintaining shared resources.

Example: Government Agencies

Consider a group of **government agencies** within a specific region or country that have shared needs for secure communication, data storage, and processing. These agencies could include police departments, health departments, transportation authorities, and local regulatory bodies. A **community cloud** could be implemented in this scenario for the following reasons:

1. **Shared Security and Compliance:** All the agencies must adhere to strict security and regulatory standards. A community cloud can be designed to meet specific governmental security standards (e.g., data encryption, access control) and comply with laws such as **GDPR** or **FISMA**.
2. **Cost Sharing:** By pooling resources, smaller agencies can share the cost of maintaining and operating the cloud infrastructure, making it more affordable compared to each agency setting up its own private cloud.
3. **Collaboration:** The agencies need to share data (e.g., crime statistics, health data, infrastructure data) securely and in real time. The community cloud allows them to collaborate while keeping sensitive information secure and private.
4. **Custom Compliance Requirements:** The community cloud can be configured to meet the specific legal and compliance



requirements of each agency. For example, public health data may need to be stored separately from criminal justice data to meet differing regulations.

In this case, the **community cloud** provides a secure, cost-effective way for government agencies to collaborate, share data, and meet regulatory requirements without the expense and complexity of managing individual cloud infrastructures.

Conclusion:

A **community cloud** is most suitable for organizations that share common interests, goals, or regulatory compliance needs. It allows multiple organizations to access shared infrastructure, resources, and services while benefiting from cost savings, collaboration, and specialized security measures. Typical examples include government agencies, research institutions, healthcare providers, and educational institutions. A community cloud helps these organizations share resources efficiently and securely while adhering to their specific compliance requirements.



Day 2: Task 1

Describe, with examples, the **three** major areas that the Computer Misuse Act deals with.

The **Computer Misuse Act 1990** is a UK law designed to address various types of computer-related crime. It covers three major areas, each of which is aimed at protecting individuals, organisations, and public infrastructure from malicious activities. Here's a breakdown of the three major areas, along with examples:

Area	Description	Example
Unauthorised Access to Computer Material	This area deals with hacking or accessing a computer system or data without permission. It includes unauthorised access to files, networks, or systems.	A person hacks into a company's server to access sensitive information like personal data or trade secrets without authorisation.
Unauthorised Access with Intent to Commit or Facilitate the Commission of Further Offences	This involves gaining unauthorised access to computer systems or data with the intention of committing other criminal acts, such as fraud or theft.	A hacker breaks into an online banking system to steal money from users' accounts or to install malware for later access.
Unauthorised Modification of Computer Material	This area criminalises the act of altering, deleting, or modifying computer data or programs without authorisation, potentially causing damage or harm.	A cybercriminal deletes important files from a government database or installs malicious software that corrupts a company's network.

These areas are aimed at preventing a wide range of cybercrimes, from hacking to data manipulation, ensuring the security of computer systems and the information they store.

The computer misuse act 1990 is an act where an individual can be criminalised because of computer related offense. Describe three extra powers that the Police and Justice Act 2006 (Computer Misuse) has added.

Description
Unlawful Possession of Articles for Use in Computer Misuse Offenses: The Act introduced an offense for the possession of articles (such as hacking tools or malware) with the intent to use them for committing computer misuse offenses. This provision enables law enforcement to take action against individuals even before an actual crime is committed, targeting the tools that could facilitate computer crimes.
Amendment to Sentences for Computer Misuse Offenses: The Act increased the severity of penalties for certain computer-related offenses. For example, it introduced harsher sentencing for those convicted of committing unauthorised access or damage with the intent to cause serious harm. This includes a potential life sentence in the most severe cases.
Offense of Unauthorised Access with Intent to Commit or Facilitate Further Offenses: A new offense was created under the Act that targets individuals who access computer systems without authorisation, intending to commit or facilitate another criminal act (such as fraud or terrorism). This power extends the scope of the Computer Misuse Act, making it easier to prosecute individuals whose actions might aid or prepare other criminal activities.

Look at the below website to answer the questions:

<https://www.gov.uk/personal-data-my-employer-can-keep-about-me>

Write down three items of data which a company can store about an employee.
Personal Identification Information: This includes details like the employee's full name, date of birth, address, and contact information (phone number and email). This data is essential for HR purposes, communication, and legal compliance.
Employment History and Job Details: This covers information such as job title, department, work history within the company, salary, performance reviews, and dates of employment. It helps track an employee's role and progression within the company.
Payroll and Tax Information: This includes salary, bonuses, tax information (e.g., National Insurance number in the UK, tax withholding details), and banking information for salary deposits. It is used for compensation, benefits, and tax purposes.

Give three more examples of data that an employer can only store if they first get the employee's permission.

Health and Medical Information:

Any data related to the employee's physical or mental health, such as medical conditions, disability status, or sick leave records, typically requires explicit consent from the employee. This information is often sensitive and governed by strict data protection regulations.

Biometric Data:

If an employer collects biometric information (e.g., fingerprints, facial recognition data, or retina scans) for security or attendance purposes, the employee's permission is necessary. This type of data is considered particularly sensitive.

Personal or Sensitive Social Media Information:

If an employer seeks to access or store personal social media profiles or activities (for example, to monitor an employee's online presence), explicit consent must be given by the employee. This can also extend to any personal data gathered through public online activity that is unrelated to the job.

Conduct further research to answer the below questions.

Question	Answer
Provide one example of: Copyright infringement	A person downloads and distributes a pirated version of a movie without permission from the copyright holder. This act violates the copyright laws of the original creators, as they have exclusive rights to distribute, reproduce, and sell copies of their work. By sharing the unauthorised copy, the individual is infringing upon the copyright owner's rights.
Provide one example of: Plagiarism	A student submits a research paper for a class, copying large sections of text directly from an online article without giving proper credit to the original author. The student presents the work as their own, failing to cite the source of the copied material. This is plagiarism because the student is using someone else's ideas or words without acknowledgment, violating academic integrity rules.
What are two consequences of copyright infringement and software piracy?	Legal Penalties: Individuals or businesses found guilty of copyright infringement or software piracy may face significant legal consequences, including fines and lawsuits . In some cases, copyright holders can seek damages through civil lawsuits, and criminal cases could result in imprisonment . For example, software piracy could lead to hefty fines and jail time, depending on the scale of the infringement.

	<p>Financial Losses and Damaged Reputation:</p> <p>Copyright infringement and software piracy can result in financial losses for creators or companies due to lost sales or royalties. Additionally, businesses or individuals caught engaging in piracy may suffer from a damaged reputation, which can undermine consumer trust, harm brand image, and lead to loss of future opportunities or partnerships. This can be especially damaging in industries reliant on intellectual property, like media, technology, and entertainment.</p>
<p>Give three possible consequences for individuals when using pirated software</p>	<p>Legal Consequences:</p> <p>Using pirated software is illegal and can result in fines or even criminal charges. Individuals caught using or distributing pirated software can be held liable for copyright infringement, potentially facing costly legal action.</p> <p>Security Risks:</p> <p>Pirated software often comes with malware or viruses that can compromise the security of a user's device. These malicious programs may steal personal data, corrupt files, or damage the system, leading to potential data breaches or identity theft.</p> <p>Lack of Support and Updates:</p> <p>Pirated software does not receive official updates or technical support from the software developer. This means that the software may become outdated, vulnerable to security issues, and lack essential features or fixes, ultimately affecting its performance and functionality.</p>



Listed below are some laws which we have covered today:

1. Computer Misuse Act 1990
2. Police and Justice Act 2006 (Computer Misuse)
3. Copyright, Designs and Patents Act 1988
4. Copyright (Computer Programs) Regulations 1992
5. The Health and Safety (Display Screen Equipment) Regulations 1992
6. Data Protection Act 2018
7. Consumer Rights Act 2015

- Insert a number in the first column of each row to match each of the statements with one of the above Acts.
- One of statements is incorrect and not illegal. For this statement, write 'Not illegal'.

Act number	Clause
3	With some exceptions, it is illegal to use unlicensed software
7	Any product, digital or otherwise, must be fit for the purpose it is supplied for
1	Unauthorised modification of computer material is illegal
Not Illegal	It is illegal to create or use a hacking tool for penetration testing
6	Personal data may only be used for specified, explicit purposes
5	Employers must provide their computer users with adequate health and safety training for any workstation they work at
1	It is illegal to distribute hacking tools for criminal purposes
3	It is illegal to distribute an illicit recording
6	Personal data may not be kept longer than necessary
1	Gaining unauthorised access to a computer system is illegal
5	Employers must ensure that employees take regular and adequate breaks from looking at their screens
1	It is illegal to prevent or hinder access (e.g. by a denial-of-service attack) to any program or data held in any computer
6	Personal data must be accurate and where necessary kept up to date

Day 3: Task 1

Please complete the below lab (1) 'Explore relational data in Azure' and paste evidence of the completed lab in the box provided.



Explore relational data in Azure

Learning Path 02 (CSS)

Duration: 2 Hours, 15 Minutes
Lab Series: DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform: Hyper-V
RAM: 6.5GB
Cloud Platform: Azure
Content Version: 2
Is Exam: No
Status: Not Running

Launch

Complete
d lab

AdventureWorks (sqlserver48775359) | Query editor (preview)

Query 1

```
1 SELECT p.ProductID, p.Name AS ProductName,
2       c.Name AS Category, p.ListPrice
3 FROM SalesLT.Product AS p
4 JOIN [SalesLT].[ProductCategory] AS c
5 ON p.ProductCategoryID = c.ProductCategoryID;
```

ProductID	ProductName	Category	ListPrice
771	Mountain-100 Silver,...	Mountain Bikes	3399.9
772	Mountain-100 Silver,...	Mountain Bikes	3399.9
773	Mountain-100 Silver,...	Mountain Bikes	3399.9
774	Mountain-100 Silver,...	Mountain Bikes	3399.9
775	Mountain-100 Black,...	Mountain Bikes	3374.9
776	Mountain-100 Black,...	Mountain Bikes	3374.9

Query succeeded | 0s

13. Replace the SELECT statement with the following code, and then select > Run to run the new query and review the results (which includes only the ProductID, Name, ListPrice, ProductCategoryID columns):

```
sql
SELECT ProductID, Name, ListPrice,
FROM SalesLT.Product;
```

14. Now try the following query, which uses a JOIN to get the category name from the SalesLT.ProductCategory table:

```
sql
SELECT p.ProductID, p.Name AS ProductName,
c.Name AS Category, p.ListPrice
FROM SalesLT.Product AS p
JOIN [SalesLT].[ProductCategory] AS c
ON p.ProductCategoryID = c.ProductCategoryID;
```

15. Close the query editor pane, discarding your edits.

Tip: If you've finished exploring Azure SQL Database, you can delete the resource group that you created in the previous lab.



Explore relational data in Azure (Expected Duration 2 hours, 15 minutes)

DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided], Learning Path 02 (CSS)

Required: Yes

Started: 26 February 2025 10:21 (GMT Standard Time)

Ended: 26 February 2025 11:41 (GMT Standard Time)

Launch

9 of 10 launch attempts remaining



Day 3: Task 2

Please complete the below lab (2) 'Explore non-relational data in Azure' and paste evidence of the completed lab in the box provided



Explore non-relational data in Azure

Learning Path 03 (CSS)

Duration:	2 Hours, 15 Minutes
Lab Series:	DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform:	Hyper-V
RAM:	6.5GB
Cloud Platform:	Azure
Content Version:	2
Is Exam:	No
Status:	Not Running

Launch

Completed
lab

The screenshot shows the Azure Data Explorer interface. On the left, the 'Data Explorer' sidebar is visible with 'SampleDB' selected. The main pane shows a query editor with the following SQL query:

```
SELECT *
FROM c
WHERE CONTAINS(c.name, 'Helmet')
```

The 'Results' pane displays a single JSON document:

```
{
  "id": "47E93C3B-C285-4587-94E5-386847442631",
  "categoryid": "1A43A05D-59EA-4863-A389-67887783886",
  "categoryname": "Accessories, Helmets",
  "name": "Sport-100",
  "description": "The product called 'Sport-100 Helmet, Black'",
  "tags": [
    {
      "id": "12345678-4567-420F-9643-F1376C087931",
      "name": "Tag-22"
    }
  ]
}
```

On the right, a 'Completed lab' sidebar is visible, showing the lab title 'Explore non-relational data in Azure' and a list of instructions for the lab.

2



Explore non-relational data in Azure (Expected Duration 2 hours, 15 minutes)

DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided], Learning Path 03 (CSS)

Required: Yes

Started: 26 February 2025 13:30 (GMT Standard Time)

Ended: 26 February 2025 14:10 (GMT Standard Time)

Launch

7 of 10 launch attempts remaining



Day 3: Task 3

Please complete the below lab (3) 'Explore data analytics in Azure' and paste evidence of the completed lab in the box provided.



Explore data analytics in Azure

Learning Path 04 (CSS)

Duration: 3 Hours
Lab Series: DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform: Hyper-V
RAM: 6.5GB
Cloud Platform: Azure
Content Version: 2
Is Exam: No
Status: Not Running

Launch

Complete
d lab

Explore data analytics in Azure
2 Hr 22 Min Remaining

Instructions Resources Help

Choose from preconfigured task flows or add a task to build one yourself.
Task flows are a series of steps that you can use to build one yourself.

Thanks waiting here get
Add something new or change existing one

Create a lakehouse

Now that you have a workspace, it's time to create a data lakehouse for your data files.

1. In the home page for the workspace, create a new **Lakehouse** with a name of your choice.

After a minute or so, a new lakehouse will be created:

Get data to your lakehouse

Upload files
Add with copy tool
New dataset
New ingestion job

Previous Next

Real-Time hub

Data sources

Connect data source

Configure connection settings

new-source → new_event_stream

Sample data

Source name: new-source

Stream details

Workspace: dp
Eventstream name: new_event_stream
Stream name: new_event_stream-stream

What is this?

Next

Tip: The first time you use the Real-Time Hub, some getting started tips may be displayed. You can close these.

1. In the menu bar on the left, select the **Real-Time** hub.

The real-time hub provides an easy way to find and manage sources of streaming data.

2. In the real-time hub, in the **Connect** section, select **Data sources**.

3. Find the **Yellow taxi** sample data source and select **Connect**. Then in the **Connect** wizard, name the source **[T] Taxi**, and edit the default eventstream name to change it to **[T] Taxi-data**. The default stream associated with this data will automatically be named taxi-data-stream.



OneLake

Monitor

Real-Time

forkloads

Create

dp

...

Real-Time Intelligence

Find insights, track progress, and make decisions faster.

Eventhouse

Rapidly load structured, unstructured and streaming data for querying.

KQL Queryset

Run queries on your data to produce shareable tables and visuals.

Real-Time Dashboard

Visualize key insights to share with your team.

Activator

Monitor datasets, queries, and event streams for patterns to trigger actions and alerts.

Power BI

Use data to find insights, track progress, and make decisions faster.

Unable to create this item

To create a Eventhouse, you need a free Microsoft Fabric trial capacity. Unfortunately, your Microsoft tenant has reached the maximum number of available free trial capacities. Go to the documentation to see your options. [Learn more](#)

OK

File

Home

Insert

Modeling

View

Optimize

Help

Get data

Excel

OneLake

SQL Server

Enter data

Dataverse

Recent sources

Transform data

Refresh data

Queries

New visual

Text box

More visuals

New visual calculation

New measure

Quick measure

Visualizations

Share

Copilot

Sales Report

Sum of Revenue by Category

Sum of Quantity by Category

Visualizations

Build visual

Files

Values

Add data fields here

Drill through

Cross-report

Keep all filters

Add drill-through fields here

Data

Search

customers

City

CountryRegion

CustomerID

Name

PostalCode

orders

CustomerID

OrderDate

ProductID

Quantity

Revenue

products

Categorized Product

Category

ProductID

ProductLine

Explore data analytics in Azure

59 Minutes Remaining

Instructions

Resources

Help

12. In the map, note that you can drag, double-click, use a mouse-wheel, or pinch and drag on a touch screen to interact. Then select a specific city, and note that the other visualizations in the report are modified to highlight the data for the selected city.

13. On the File menu, select Save. Then save the file with an appropriate .pbix file name. You can open the file and explore data modeling and visualization further at your leisure.

If you've a Power BI service subscription, you can sign into your account and publish the report to a Power BI workspace.

3

🔬

Explore data analytics in Azure

(Expected Duration 3 hours)

DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided], Learning Path 04 (CSS)

Required: Yes

Started: 26 February 2025 18:01 (GMT Standard Time)

Ended: 26 February 2025 20:05 (GMT Standard Time)

Launch

8 of 10 launch attempts remaining

Data Technician | Workbook | v1.

Page 36 of 43

Day 4: Task 1

In your teams, complete the Azure DP-900 practice exam and paste your result below – this is open book and please research and discuss your answers as a team.

6

Practice Assessment: DP-900T00-A Microsoft Azure Data Fundamentals
Practice Assessment for Microsoft Certifications for DP-900T00-A

Additional Details
Required: No
Available Instructor-Led: Yes
Available Self-Paced: Yes

Microsoft
EXAM

Practice Assessment for Exam DP-900: Microsoft Azure Data Fundamentals

It took you 34 minutes to complete this assessment.

Overall Results

To be better prepared for the exam, aim to achieve a score of 80% or higher in multiple attempts.

Score: 78%

Show My Answers

Performance by assessment section

To further strengthen your skills in the following areas, refer to the Customized Learning Material section below.

Describe core data concepts

Identify considerations for relational data on Azure

Describe considerations for working with non-relational data on Azure

Describe an analytics workload on Azure

Result

☒ 4

Practice Assessment: DP-900T00-A Microsoft Azure Data Fundamentals Details

Required: No
Started: 26 February 2025 20:11 (GMT Standard Time)

Launch

Day 4: Task 2

1. Scenario Background

"Paws & Whiskers" is a growing pet shop that aims to improve its business by analysing sales, customer information, and inventory data. Currently, the data is collected manually or stored in spreadsheets. Management is interested in transitioning to Microsoft Azure to streamline data storage, analysis, and reporting, enabling them to make data-driven decisions.

2. Data Laws and Regulations

Identify and explain the data laws and regulations relevant to handling customer data within the proposal. Ensure you cover the following points:

- **GDPR Compliance:** Highlight the importance of adhering to the General Data Protection Regulation (GDPR), particularly as it relates to storing and processing customer information.
- **Data Protection Act (DPA) 2018:** Outline how the DPA 2018 may affect the way "Paws & Whiskers" collects and stores data, ensuring compliance with UK laws on data privacy.
- **Other Industry Standards:** Research any additional data protection standards or regulations that may apply to pet shop data, particularly if they involve sensitive or payment information.

3. Azure Service Recommendations

Recommend Microsoft Azure services that would suit the company's data analysis needs and explain why these services are suitable. Your recommendations should include:

- **Data Storage:** Identify suitable storage options, such as **Azure Blob Storage** or **Azure SQL Database**, and discuss the benefits of each for storing large datasets, including inventory, sales transactions, and customer details.
- **Data Analysis Tools:** Recommend tools such as **Azure Machine Learning** for customer behaviour analysis or **Azure Synapse Analytics** for analysing sales trends.
- **Data Integration and Automation:** Explain how services like **Azure Data Factory** could automate data collection and integration processes, improving efficiency.

4. Data Types and Data Modelling

Define the types of data "Paws & Whiskers" will need to work with and describe your approach to data modelling:

- **Data Categories:** Identify key data types, such as customer demographics, transaction history, pet inventory, and product categories.



- **Data Modelling Approach:** Outline how you would structure this data using a relational model or a data warehouse approach, considering factors like tables, entities, relationships, and primary keys.

5. Data Storage Formats and Structures in Azure

Discuss how you would store data within Azure and the formats you would recommend:

- **Data Formats:** Specify recommended formats (e.g., CSV for raw data imports, JSON for structured data, Parquet for analytics) and explain why these formats are suitable for specific data types.
- **Data Security and Encryption:** Include recommendations for securing data using Azure's built-in encryption features and access controls to ensure compliance with data privacy regulations.

6. Additional Considerations

Provide any other considerations that might enhance data handling and efficiency in Azure, such as:

- **Backup and Disaster Recovery:** Outline a backup plan using **Azure Backup** or **Azure Site Recovery** to safeguard against data loss.
- **Data Visualisation:** Discuss potential use of **Power BI** within Azure for creating dashboards that provide management with real-time insights into sales and customer trends.
- **Future Scalability:** Comment on how Azure services can scale as the business grows, accommodating larger datasets and more complex analyses.

Submission Guidelines:

1. **Structure:** Ensure your report is well-organised, with sections for each task (e.g., Data Laws, Azure Services, Data Types, etc.).
2. **Formatting:** Include headings, bullet points where appropriate, and any visuals or diagrams that support your explanations.
3. **References:** Cite any resources or regulations referenced in the report.
4. **Length:** Aim for 1500-2000 words.



Data Management and Analysis Strategy for "Paws & Whiskers" Using Microsoft Azure

Paws & Whiskers is a pet shop that is looking to transition from manual data management and spreadsheets to a more advanced, data-driven approach. This transition is aimed at improving sales tracking, customer insights, and inventory management through Microsoft Azure. By doing so, the business will gain the ability to analyse large datasets, optimise business decisions, and ultimately enhance operational efficiency.

1. Data Laws and Regulations:

When handling customer data, especially sensitive information such as personal identification or payment details, it is crucial for "Paws & Whiskers" to adhere to legal and regulatory frameworks. The company must ensure that it collects, processes, and stores data in compliance with applicable laws, including:

a) GDPR Compliance (General Data Protection Regulation)

The **General Data Protection Regulation (GDPR)** is a comprehensive data protection law that applies to any company that processes the personal data of EU citizens, regardless of the company's location. Since "Paws & Whiskers" will likely deal with customer information (names, addresses, payment details), GDPR compliance is critical.

Key aspects of GDPR relevant to the company include:

- **Data Minimisation:** Only collect necessary data.
- **Transparency:** Clearly inform customers on how their data will be used.
- **Data Access and Portability:** Customers must be able to access their data and request a copy.
- **Data Retention:** Personal data should not be stored longer than necessary.
- **Data Security:** Data must be encrypted and securely stored.

Azure's **Azure Security Centre** and **Azure Key Vault** can help ensure compliance by providing tools for data encryption, secure access controls, and audit logs.

b) Data Protection Act (DPA) 2018

The **Data Protection Act 2018** governs the collection, storage, and handling of personal data within the UK. The DPA works in alignment with the GDPR but includes additional provisions specific to the UK. For example, the DPA establishes rules for the processing of criminal conviction data and provides specific rights for individuals to access their data.

"Paws & Whiskers" will need to ensure that all customer data is:

- **Processed fairly and lawfully.**
- **Used for the purposes it was collected** (e.g., not for marketing without consent).
- **Stored securely**, with proper data encryption and controlled access.

The company can use Azure's **Role-Based Access Control (RBAC)** and **Data Loss Prevention (DLP)** features to help meet these requirements.



c) Other Industry Standards

There may also be additional industry standards and regulations that apply depending on the types of data collected. For example:

- **PCI DSS (Payment Card Industry Data Security Standard):** If the shop handles payment card information, it must comply with PCI DSS to ensure that credit card details are stored, processed, and transmitted securely.
- **ISO 27001:** A widely recognised standard for managing information security risks, particularly relevant if the business stores sensitive customer data.

2. Azure Service Recommendations:

To meet "Paws & Whiskers" needs, the following Microsoft Azure services can be recommended:

a) Data Storage Options

1. **Azure Blob Storage:** Ideal for storing large amounts of unstructured data, such as inventory lists, customer data, and sales records.
Benefits: Highly scalable and cost-effective, with built-in redundancy across regions. It also supports advanced security features such as encryption at rest and secure access through Azure Active Directory.
2. **Azure SQL Database:** Suitable for storing structured data like customer information, transactions, and pet product inventory.
Benefits: Provides powerful querying capabilities, transactional consistency, and seamless integration with Azure services for analytics. It also includes automatic backups and high availability.

b) Data Analysis Tools

1. **Azure Machine Learning:** To build predictive models and analyse customer behaviour, such as predicting repeat purchase behaviour or identifying buying patterns.
Benefits: It supports various algorithms and frameworks to train models and integrates easily with Azure services to automate analysis and deployment.
2. **Azure Synapse Analytics:** For analysing large volumes of sales data and trends across time periods, helping management identify high-demand products and forecast future sales.
Benefits: It offers integrated big data and data warehousing capabilities, and can handle both structured and unstructured data, providing a unified analytics platform.

c) Data Integration and Automation

Azure Data Factory: Automates the ETL (Extract, Transform, Load) process for integrating various data sources, such as online store data, inventory systems, and customer feedback.

Benefits: It offers a visual interface for creating data workflows, supports data integration from various sources, and automates data pipelines to keep data updated for analysis.

3. Data Types and Data Modelling:

a) Key Data Types

1. **Customer Data:** Personal details such as name, address, contact information, and purchase history.
2. **Transaction Data:** Sales transactions, including product IDs, quantities, prices, and payment methods.
3. **Inventory Data:** Information on pet products, including pet types, product categories, prices, and stock levels.
4. **Product Categories:** Data related to pet categories such as food, toys, grooming products, etc.

b) Data Modelling Approach

Given the variety of data types, a **relational data model** or **data warehouse** approach would be appropriate for organising and structuring data:

1. **Entities:**
 - **Customers:** Entity with fields like Customer ID, Name, Address, etc.
 - **Transactions:** Entity with fields such as Transaction ID, Customer ID, Product ID, Amount.
 - **Products:** Entity with fields such as Product ID, Product Name, Category, Stock Level.
2. **Relationships:**
 - A **one-to-many relationship** exists between **Customers** and **Transactions**.
 - A **many-to-one relationship** exists between **Transactions** and **Products**.
3. **Primary Keys:** Each entity will have a unique **primary key** (e.g., Customer ID, Transaction ID, Product ID) to ensure data integrity.

4. Data Storage Formats and Structures in Azure:

a) Data Formats

- **CSV (Comma Separated Values):** Best for importing raw data into Azure Blob Storage. CSV is simple and widely used for flat data.
- **JSON:** A flexible format suitable for storing structured data like customer records. It allows for easy integration with NoSQL databases or Azure SQL Database.
- **Parquet:** An efficient format for storing large datasets, especially for analytics workloads. It is ideal for storing sales transactions and inventory data in Azure Synapse Analytics.

b) Data Security and Encryption

Azure provides a range of security options to protect customer data:

- **Encryption at Rest:** Data is automatically encrypted using Azure Storage Service Encryption (SSE) to ensure that sensitive data, such as customer details is protected while stored.
- **Role-Based Access Control (RBAC):** Defines who has access to what data, ensuring only authorised users can access specific datasets.
- **Azure Key Vault:** Secures and controls access to encryption keys and secrets used for applications that require sensitive data protection.



5. Additional Considerations:

a) Backup and Disaster Recovery

- **Azure Backup:** It is essential to regularly back up data to protect against loss. Azure Backup offers cloud-based, automated backup solutions that ensure business continuity.
- **Azure Site Recovery:** In the case of a major data loss event, Azure Site Recovery can replicate data and services to another region, ensuring minimal downtime.

b) Data Visualisation

- **Power BI:** Power BI can be used to create interactive dashboards that provide real-time insights into customer behaviour, sales trends, and inventory levels. By integrating Power BI with Azure SQL Database or Azure Synapse Analytics, management can make informed decisions quickly.

c) Future Scalability

As "Paws & Whiskers" grows, Azure services provide the scalability required to handle increased data volumes. Azure's elastic capabilities, such as scaling the Azure SQL Database and Blob Storage, ensure that as the business collects more data, the infrastructure can scale accordingly without interruption.

Conclusion:

By leveraging Microsoft Azure's suite of services, "Paws & Whiskers" can ensure a seamless transition to a data-driven business model. With proper attention to data laws and security, Azure provides the scalability, automation, and analysis capabilities that can propel the business forward.

Course Notes

It is recommended to take notes from the course, use the space below to do so, or use the revision guide shared with the class:

We have included a range of additional links to further resources and information that you may find useful, these can be found within your revision guide.

END OF WORKBOOK

Please check through your work thoroughly before submitting and update the table of contents if required.

Please send your completed work booklet to your trainer.

