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1 DP-201-Designing-an-Azure-Data-Solution

The following is a summary of the lab objectives for each module:

1.1 Lab 1 - Data Platform Architecture Considerations

The students will use the information gained in this module and apply it to a scenario that is defined in a case study about AdventureWorks. They will describe and provide examples of how the core principles for creating architectures will be applied to AdventureWorks.

This will include designing with security in mind. They will also provide specific examples of how to design performance and scalability within a solution. The students will also describe the availability and recoverability options that are needed by the organization. Finally, the student will identify the efficiency and operations opportunities that can be gained by the options

1.2 Lab 2 - Azure Batch Processing Reference Architectures

The students will use the case study to identify which business and technical requirements relate to a Lambda architecture from a batch mode perspective. The student will then architect an enterprise BI solution, and then add automation to the architecture. Finally, the students will attempt to design an AI architecture that focuses on the data stores that would be required to support such a solution

1.3 Lab 3 - Azure Real-Time Reference Architectures

The students will use the case study to identify which business and technical requirements relate to a Lambda architecture from a real-time perspective. The student will then architect a streaming pipeline with Azure Stream Analytics and Azure Databricks. Finally, the students will attempt to design an IoT architecture as it relates to the meeting of the AdventureWorks business requirements.

1.4 Lab 4 - Azure Data Platform Security Considerations

The students will explore the range of security options that are available to provide a defence in depth approach to securing the AdventureWorks environment. This will include investigating the available network protection options that are available, as well as the authentication mechanisms that are support by each service. The students will also understand the encryption options that are available and demonstrate an understanding of network level and application level protection.

1.5 Lab 5 - Designing for Scale and Resiliency

The students will explore a range of resiliency and scale issues that would have to be considered when defining a solution architecture for an organization. They will first look at how they will incorporate scale into a solution. They will follow this by looking into storage and database performance, and how solutions can be made highly available. Finally, the student will investigate the issue of disaster recovery.

1.6 Lab 6 - Design for Efficiency and Operations

The students will explore way in which they can maximise the efficiency of using a cloud environment and how they can monitor and analyze operational efficiencies from the Azure portal. They will also look at how automation can be used to reduce effort and error.

2 Case Study – AdventureWorks Cycles

AdventureWorks sells bicycles and bicycle parts directly to customers and distributors. The company currently has a single office in the Netherlands, and have been selling bicycles in the United States, Germany and Spain through a chain of distributors and through online sales on its website. The fulfilment of delivery is done by local distribution centers.

The company is planning to expand by establishing new offices because the sales growth in these countries has been increasing over the last 3 years. The locations are:

- Tokyo, Japan
- Seattle, USA
- Chicago, USA
- Berlin, Germany
- Barcelona, Spain
- Paris, France

In a highly competitive market, in which AdventureWorks has been in business for the last 15 years, it wants to become the most innovative bicycle company, providing both current and future bicycle owners with best in class technology and service that provides unique experiences.

The Research and Development department of AdventureWorks has successfully conceived the next wave of innovative products, and they are relying on Data Engineers, AI Engineers and Data Scientists to assist with both the design and implementation of the solution.

Given the increased level of sales and expansion at global scale, the existing data infrastructure won't meet the overall business requirements or the future growth that AdventureWorks aspires to. The Chief Information and Technology Officers have expressed the desire to abandon existing on-premises systems and move to the cloud to meet the growth expected. This is supported by the CFO as there has been a request for replacement hardware as the existing infrastructure comes to its end of life. The CFO is aware that the cloud could offer alternatives that are more cost efficient.

As a Senior Data Engineer, you will assist AdventureWorks in the solution design and implementation to meet the business, functional and technical requirements that the company has set forth to be successful for growth, expansion, and innovation strategies. You will execute this in a way that minimizes operational costs and can be monitored for effectiveness.

In a discovery workshop you ascertained the following information:

2.1 AdventureWorks Website

The web developers at AdventureWorks are transferring the existing website from an on-premises instance of IIS, to an Azure Web App. They have requested that a data store is made available that will hold the images of the products that are sold on the website.

2.2 Current Sales / Ordering system

The current software on which bicycle purchases are tracked, is a web-based application which directly stores order information into an on-premises SQL Server database named AdventureWorks2012. The current application is deployed with high-availability provided by SQL Server 2012 Always-on Availability groups. Due to global expansion and data governance requirements, AdventureWorks will transition this system to better serve their customers and will be looking for global availability of its application and data sales and ordering purposes, particularly during the months of November and December when demand for bikes grow ahead of the holiday period.

2.3 Data Analysis

The business reporting is currently being provided by a single on-premises database that is configured as a data warehouse, it holds a database named AdventureWorksDW which is used to provide historical reporting and descriptive analytics. In recent times, that server has been struggling to process the reporting data in a timely manner, as a result the organization has evaluated the data warehouse capabilities of Azure Synapse Analytics and want to migrate their on-premises data to this platform. Your team should ensure that access to the data is restricted.

In addition, AdventureWorks would like to take their data analytics further and start to utilize predictive analytics capabilities. This is currently not an activity that is undertaken. The organization understands that a recommendation or a text analytics engine could be built and would like you to direct them on what would be the best technology and approach to take in implementing such a solution that is also resilient and performant.

You are also assessing the tooling that can help with the extraction, load and transforming of data into the data warehouse, and have asked a Data Engineer within your team to show a proof of concept of Azure Data Factory to explore the transformation capabilities of the product

2.4 Customer Service / Presales

Customer service and pre-sales departments are currently experiencing scale issues due to the high call volumes. The organization wants to support the customer services staff in handling the call volumes through the implementation of chat bots in which future bicycle owners can:

- Find which bicycle is best for them:

- Through a set of questions with the chat bot, custom recommendations are given to potential bike owners, who then can take the recommendation and place an order, or can be redirect to a sales specialist to help them with their needs
- Check status on current orders:
 - Retrieve status on current orders, and estimated delivery times
- Find bicycle parts suitable for their existing bicycle:
 - Existing bicycle owners can find recommended bicycle parts and accessories based on the serial number or model number of their bicycle
 - Existing bicycle owners, can upload a picture of their bicycle or take a picture of the serial number of their bicycle to assist with the identification of their bicycle and have recommended bicycle parts

Over the last few years the customer services departments have observed an increase in calls from fraudulent customer who are asking for support for bikes that are no longer in warranty, or bikes that have not even been purchased at AdventureWorks. The department are currently relying on the experience of customer services agents to identify this. As a result, they would like to implement a system that can help the agents track in real-time who could be making a fraudulent claim.

Finally, given its global expansion, the customer service / presales chat bot needs to respond to requests for data in near real-time regardless of where the customer is located. The chatbot should also support multiple languages such as Dutch, German, French, English, Spanish, and Japanese. This work will be handled by the AI Engineers, but they have requested a platform is provided by the Data Engineer that enables them to store conversation history.

2.5 Social Media Analysis

In recent years, the marketing department at the organization have run a wide variety of twitter campaigns at various times of the year. They are keen to measure the impact of their work by tracking social media assets such as hashtags during those campaigns. They would like to have the capability of tracking any hashtag of any name.

2.6 Connected bicycle

AdventureWorks Bicycles can be equipped with an innovate built-in bicycle computer which consist of automatic locking features of the bicycle, as well as operational status. Information captured by this bicycle computer includes:

- Bicycle model, serial number and registered owner
- Bicycle location (latitude longitude)
- Current status (stationary, in motion)
- Current speed in kilometers per hours
- Bicycle Locked / Unlocked
- Bicycle parts and components information (on electrical bicycles)

First party and 3rd party applications can have access the information of the bicycle computer that must be secure and for the integration into mobile applications and real time display of location and bike ride sharing information.

Furthermore, daily summary data can be saved to flat files that include Bicycle model, serial number, registered owner and a summary of the total miles cycled per day and the average speed.

2.7 Bicycle Maintenance services

Existing bicycle owners can opt in to getting notifications on when their bicycle needs repair, based on:

- Telemetry from electrical bicycle based on sensor data
- Bicycle usage information coming from the built-in bicycle computers based on average mileage / wear and tear

This predictive maintenance scenario is a service in which bike owners can opt-in, offered as a paid service.

Finally, all services that are proposed should have a comprehensive business continuity that meets the corporate objective of minimizes restore times when recovering the data for a given service.

3 DP 201 - Designing an Azure Data Platform Solution

4 Lab 1 - Azure Architecture Considerations

Estimated Time: 60 minutes

Pre-requisites: It is assumed that the case study for this lab has already been read.

Lab files: The files for this lab are located in the *Allfiles\Labfiles\Starter\DP-201.1* folder.

4.1 Lab overview

The students will use the information gained in this module and apply it to a scenario that is defined in a case study about AdventureWorks. They will describe and provide examples of how the core principles for creating architectures will be applied to AdventureWorks. This will include designing with security in mind. They will also provide specific examples of how to design performance and scalability within a solution. The students will also describe the availability and recoverability options that are needed by the organization. Finally, the student will identify the efficiency and operations opportunities that can be gained by the options

4.2 Lab objectives

After completing this lab, you will be able to:

1. Design with Security in Mind
2. Design for Performance and Scalability
3. Design for Availability and Recoverability
4. Design for Efficiency and Operations

4.3 Scenario

You have recently been hired as a senior data engineer at AdventureWorks and are working with a consultant and architects to design a cloud data platform solution that meets the organizations technical and business requirements.

Working in a group, you will be performing a discovery exercise – via a case study - with the consultant and architects. Firstly, to understand AdventureWorks organizational goals. Secondly to articulate and provide examples of the architectural aspects that the team must be aware of as they construct the solution architectures. The architectural aspects include security, performance, scalability, availability, recoverability, efficiency and operations.

At the end of this lab, you will have:

1. Design with Security in Mind
2. Design for Performance and Scalability
3. Design for Availability and Recoverability
4. Design for Efficiency and Operations

Note: This lab is in two parts. This is part 1 where you work as a group to answer the questions. The timings of each exercise is at the discretion of the group. The entire lab should be completed within 60 minutes. In Part 2, the instructor will drive a discussion with the group about their learnings and findings about the Lab.

Resources: As well as the using the course case study for this lab, you use also use resources such a [Microsoft Documentation](#), the [Azure Reference Architecture Site](#) and the [Microsoft Customer Stories Site](#) to help inform you in answering questions in this lab.

4.4 Exercise 1: Design with Security in Mind

Group exercise

The main task for this exercise is as follows:

1. From the case study, identify the security requirements of AdventureWorks.

4.4.1 Task 1: Identify the security requirements of AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01.docx** from the **Allfiles\Labfiles\Starter\DP-201.1** folder.
2. As a group, spend **15 minutes** discussing and listing the security requirements that your group has identified within the case study document. Evidence should be provided from the case study.

Result: After you completed this exercise, you have created a Microsoft Word document that shows a table of security requirements for AdventureWorks.

4.5 Exercise 2: Design for Performance and Scalability

Group exercise

The main task for this exercise are as follows:

1. Determine the performance and scalability requirements as identify from the case study.

4.5.1 Task 1: Identify the performance and scalability requirements of AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01.docx** from the **Allfiles\Labfiles\Starter\DP-201.1** folder.
2. As a group, spend **15 minutes** discussing and listing the performance and scalability requirements that your group has identified within the case study document. Evidence should be provided from the case study.

Result: After you completed this exercise, you have added to the Microsoft Word document that shows a table of requirements for AdventureWorks.

4.6 Exercise 3: Design for Availability and Recoverability

Group exercise

The main task for this exercise are as follows:

1. Determine the availability and recoverability requirements as identify from the case study.

4.6.1 Task 1: Identify the availability and recoverability requirements of AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01.docx** from the **Allfiles\Labfiles\Starter\DP-201.1** folder.
2. As a group, spend **15 minutes** discussing and listing the availability and recoverability requirements that your group has identified within the case study document. Evidence should be provided from the case study.

Result: After you completed this exercise, you have added to the Microsoft Word document that shows a table of requirements for AdventureWorks.

4.7 Exercise 4: Design for Efficiency and Operations

Group exercise

The main task for this exercise are as follows:

1. Determine the efficiency and operations requirements for AdventureWorks.

4.7.1 Task 1: Identify the efficiency and operations requirements of AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01.docx** from the **Allfiles\Labfiles\Starter\DP-201.1** folder.
2. As a group, spend **15 minutes** discussing and listing the efficiency and operations requirements that your group has identified within the case study document. Evidence should be provided from the case study.

Result: After you completed this exercise, you have added to the Microsoft Word document that shows a table of requirements for AdventureWorks.

4.8 Lab Review

After approximately 60 minutes, the instructor will bring a close to this lab. The class will discuss the findings of each group.

5 DP 201 - Designing an Azure Data Platform Solution.

6 Lab 2 - Azure Batch Processing Reference Architectures.

Estimated Time: 60 minutes

Pre-requisites: It is assumed that the case study for this lab has already been read.

Lab files: The files for this lab are located in the *Allfiles\Labfiles\Starter\DP-201.2* folder.

6.1 Lab overview

The students will use the case study to identify which business and technical requirements relate to a Lambda architecture from a batch mode perspective. The student will then architect an enterprise BI solution, and then add automation to the architecture. Finally, the students will attempt to design an AI architecture that focuses on the data stores that would be required to support such a solution

6.2 Lab objectives

After completing this lab, you will be able to:

1. Design an Enterprise BI solution in Azure
2. Automate enterprise BI solutions in Azure
3. Architect an Enterprise-grade conversational bot in Azure

6.3 Scenario

You are the senior data engineer of AdventureWorks. You are designing and architecting a solution that will deal with the batch mode processing of data. You have been advised that the solution architecture should take a holistic view of all the business requirements and your proposal should be presented in a Word document.

You will first define which aspect of the AdventureWorks requirements fits into batch mode processing of a Lambda architecture. You will then provide an architecture for an enterprise BI solution in Azure and think of ways that the solution can be automated. You will also design a first pass on an AI architecture.

At the end of this lab, you will have:

1. Design an Enterprise BI solution in Azure
2. Automate enterprise BI solutions in Azure
3. Architect an Enterprise-grade conversational bot in Azure

Note: This lab is in two parts. This is part 1 where you work as a group to answer the questions. The timings of each exercise is at the discretion of the group. The entire lab should be completed within 60 minutes. In Part 2, the instructor will drive a discussion with the group about their learnings and findings about the Lab.

Resources: As well as the using the course case study for this lab, you use also use resources such as a [Microsoft Documentation](#), the [Azure Reference Architecture Site](#) and the [Microsoft Customer Stories Site](#) to help inform you in answering questions in this lab.

6.4 Exercise 1: Design an Enterprise BI solution in Azure

Group exercise

The main task for this exercise is as follows:

1. From the case study, identify the requirements that would form part of the Batch mode processing of data in an Enterprise BI solution in AdventureWorks.
2. Build a high level Architecture that reflects the Enterprise BI solution in AdventureWorks.

6.4.1 Task 1: List batch mode processing requirements for AdventureWorks

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab02__Ex01__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.2** folder.
2. As a group, spend **15 minutes** discussing and listing the requirements that would form part of the Enterprise BI solution in AdventureWorks. Evidence should be provided from the case study.

Result: After you completed this exercise, you have created a Microsoft Word document that shows a table of security requirements for AdventureWorks.

6.4.2 Task 2: Build a high level Architecture that reflects the Enterprise BI solution in AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01__Ex01__Ta02.docx** from the **Allfiles\Labfiles\Starter\DP-201.2** folder.
2. As a group, spend **20 minutes** discussing and diagraming the architectures that would form part of the Enterprise BI solution in AdventureWorks. You can use the png files in the icon folder to build your architecture.

Result: After you completed this exercise, you have created architectures that would form part of the Enterprise BI solution in AdventureWorks.

6.5 Exercise 2: Automate enterprise BI solutions in Azure

Group exercise

The main task for this exercise is as follows:

1. Amend a high level Architecture to include automation of an Enterprise BI solution in AdventureWorks.

6.5.1 Task 1: Amend a high level architecture to include automation of an Enterprise BI solution in AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01__Ex02__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.2** folder. Read the document and review the example.
2. As a group, spend **15 minutes** reviewing the architectures that you have defined as part of the Enterprise BI solution in AdventureWorks in the document **DP-201-Lab01__Ex01__Ta02.docx**. Add the Data Factory icon to the workflows that would be automated by Data Factory. You can use the png files in the icon folder to build your architecture.

Result: After you completed this exercise, you have amended an architecture to include automation of an Enterprise BI solution in AdventureWorks.

6.6 Exercise 3: Conversational bot solutions in Azure

Group exercise

The main task for this exercise is as follows:

1. Amend a high level Architecture to include automation of a conversational bot solution in AdventureWorks.

6.6.1 Task 1: Architect an Enterprise-grade conversational bot in Azure

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab01__Ex03__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.2** folder. Read the document and review the example.
2. As a group, spend **10 minutes** discussing and diagraming the architectures that would form part of an Enterprise-grade conversational bot in AdventureWorks. You can use the png files in the icon folder to build your architecture.

Hint: Only a simple architecture that deals with bot conversations is required

Result: After you completed this exercise, you have created an architecture to include an Enterprise-grade conversational bot in Azure.

6.7 Lab Review

After approximately 60 minutes, the instructor will bring a close to this lab. The class will discuss the findings of each group.

7 DP 201 - Designing an Azure Data Platform Solution.

8 Lab 3 - Azure Real-Time Reference Architectures.

Estimated Time: 60 minutes

Pre-requisites: It is assumed that the case study for this lab has already been read.

Lab files: The files for this lab are located in the *Allfiles\Labfiles\Starter\DP-201.3* folder.

8.1 Lab overview

The students will use the case study to identify which business and technical requirements relate to a Lambda architecture from a real-time perspective. The student will then architect a streaming pipeline with Azure Stream Analytics and Azure Databricks. Finally, the students will attempt to design an IoT architecture as it relates to the meeting of the AdventureWorks business requirements.

8.2 Lab objectives

After completing this lab, you will be able to:

1. Architect a stream processing pipeline with Azure Stream Analytics
2. Design a stream processing pipeline with Azure Databricks.
3. Create an Azure IoT reference architecture

8.3 Scenario

You are the senior data engineer of AdventureWorks. You are designing and architecting a solution that will deal with the real-time processing of data. You have been advised that the solution architecture should take a holistic view of all the business requirements and your proposal should be presented in a Word document.

You will first identify which AdventureWorks requirements fits into real-time processing of a Lambda architecture. You will then provide an architecture for a stream processing pipeline with Azure Stream Analytics and Azure Databricks. You will also design a first pass on an IoT architecture.

At the end of this lab, you will have:

1. Architect a stream processing pipeline with Azure Stream Analytics.
2. Design a stream processing pipeline with Azure Databricks.
3. Create an Azure IoT reference architecture.

Note: This lab is in two parts. This is part 1 where you work as a group to answer the questions. The timings of each exercise is at the discretion of the group. The entire lab should be completed within 60 minutes. In Part 2, the instructor will drive a discussion with the group about their learnings and findings about the Lab.

Resources: As well as the using the course case study for this lab, you use also use resources such as a [Microsoft Documentation](#), the [Azure Reference Architecture Site](#) and the [Microsoft Customer Stories Site](#) to help inform you in answering questions in this lab.

8.4 Exercise 1: Architect a stream processing pipeline with Azure Stream Analytics.

Group exercise

The main task for this exercise is as follows:

1. From the case study, identify the requirements that would form part of the real-time processing of data in AdventureWorks.
2. Build a high level Architecture that reflects a stream processing pipeline with Azure Stream Analytics.

8.4.1 Task 1: List real-time processing requirements for AdventureWorks

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab03_Ex01_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.3** folder.
2. As a group, spend **15 minutes** discussing and listing the requirements that would form part of a real-time solution in AdventureWorks. Evidence should be provided from the case study.

Result: After you completed this exercise, you have created a Microsoft Word document that shows a table real time processing requirements for AdventureWorks.

8.4.2 Task 2: Build a high level architecture that reflects a stream processing pipeline with Azure Stream Analytics.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab03_Ex01_Ta02.docx** from the **Allfiles\Labfiles\Starter\DP-201.3** folder.
2. As a group, spend **20 minutes** discussing and diagraming the architectures that would form part of the Enterprise BI solution in AdventureWorks. You can use the png files in the icon folder to build your architecture.

Result: After you completed this exercise, you have created architectures that would form part of the Enterprise BI solution in AdventureWorks.

8.5 Exercise 2: Design a stream processing pipeline with Azure Databricks.

Group exercise

The main task for this exercise is as follows:

1. Create a high level Architecture to include a stream processing pipeline with Azure Databricks solution in AdventureWorks.

8.5.1 Task 1: Create a high level architecture to include a stream processing pipeline with Azure Databricks solution in AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab03_Ex02_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.3** folder. Read the document and review the example.
2. As a group, spend **15 minutes** creating an architecture that meets the requirements of the predictive maintenance of bicycles.

Result: After you completed this exercise, you have created a stream processing pipeline with Azure Databricks solution in AdventureWorks.

8.6 Exercise 3: Create an Azure IoT reference architecture.

Group exercise

The main task for this exercise is as follows:

1. Confirming which architecture created would form part of an Azure IoT reference architecture.

8.6.1 Task 1: Create an Azure IoT reference architecture.

1. As a group, spend **5 minutes** discussing and confirming which architecture that you have created so far that would form part of an Azure IoT reference architecture.

Result: After you completed this exercise, you have created an architecture to include an Azure IoT reference architecture in Azure.

8.7 Lab Review

After approximately 60 minutes, the instructor will bring a close to this lab. The class will discuss the findings of each group.

9 DP 201 - Designing an Azure Data Platform Solution.

10 Lab 4 - Azure Data Platform Security Considerations

Estimated Time: 50 minutes

Pre-requisites: It is assumed that the case study for this lab has already been read.

Lab files: The files for this lab are located in the *Allfiles\Labfiles\Starter\DP-201.4* folder.

10.1 Lab overview

The students will explore the range of security options that are available to provide a defence in depth approach to securing the AdventureWorks environment. This will include investigating the available network protection options that are available, as well as the authentication mechanisms that are support by each service. The students will also understand the encryption options that are available and demonstrate an understanding of network level and application level protection.

10.2 Lab objectives

After completing this lab, you will be able to:

1. Defense in Depth Security Approach
2. Identity Management

10.3 Scenario

You have recently been hired as a senior data engineer at AdventureWorks and are working with a consultant and architects to design a security approach for cloud data platform solution that meets the organizations technical and business requirements.

Working in a group, you will be performing a security assessment of the architectures that have been defined so that there is a defense in depth approach to securing the environment. Firstly, you will create a document to show the aspects of the architecture that require securing. You will then specify the identity management approach that is required.

It is important that you should be able to justify your choices as a team, and you are encouraged to use references from Microsoft such as Microsoft documentation, or blogs from Microsoft to provide evidence that supports your choices.

At the end of this lab, you will have defined:

1. Defense in Depth Security Approach
2. Identity Management

Note: This lab is in two parts. This is part 1 where you work as a group to answer the questions. The timings of each exercise is at the discretion of the group. The entire lab should be completed within 60 minutes. In Part 2, the instructor will drive a discussion with the group about their learnings and findings about the Lab.

Resources: As well as the using the course case study for this lab, you use also use resources such a [Microsoft Documentation](#), the [Azure Reference Architecture Site](#) and the [Microsoft Customer Stories Site](#) to help inform you in answering questions in this lab.

10.4 Exercise 1: Defense in Depth Security Approach

Group exercise

The main task for this exercise is as follows:

1. From the case study, identify the security requirements that are required by AdventureWorks.
2. List any additional security requirements that should be covered and have been missed by AdventureWorks.

10.4.1 Task 1: List the security requirements for AdventureWorks

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab04_Ex01_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.4** folder.
2. As a group, spend **15 minutes** discussing and listing the security requirements for AdventureWorks. Evidence should be provided from the case study.

Result: After you completed this exercise, you have created a Microsoft Word document that shows security requirements for AdventureWorks.

10.4.2 Task 2: List any additional security requirements that should be covered

1. In the existing file **DP-201-Lab04_Ex01_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.4** folder, spend **15 minutes** listing additional security requirements that should be covered by AdventureWorks

Result: After you completed this exercise, you have added to the Microsoft Word document that shows security requirements for AdventureWorks.

10.5 Exercise 2: Identity Management

Group exercise

The main task for this exercise is as follows:

1. Define the primary authentication mechanism for each technology used to meet AdventureWorks requirements.

10.5.1 Task 1: Define the primary authentication mechanism for each technology used to meet AdventureWorks requirements.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab04_Ex02_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.4** folder.
2. As a group, spend **20 minutes** listing the primary authentication mechanism for each technology used to meet AdventureWorks requirements as per the case study.

Result: After you completed this exercise, you will create a of the primary authentication mechanism for each technology for each of the AdventureWorks requirements.

10.6 Lab Review

After approximately 50 minutes, the instructor will bring a close to this lab. The class will discuss the findings of each group.

11 DP 201 - Designing an Azure Data Platform Solution.

12 Lab 5 - Designing for Scale and Resiliency.

Estimated Time: 60 minutes

Pre-requisites: It is assumed that the case study for this lab has already been read.

Lab files: The files for this lab are located in the *Allfiles\Labfiles\Starter\DP-201.5* folder.

12.1 Lab overview

The students will explore a range of resiliency and scale issues that would have to be considered when defining a solution architecture for an organization. They will first look at how they will incorporate scale into a solution. They will follow this by looking into storage and database performance, and how solutions can be made highly available. Finally, the student will investigate the issue of disaster recovery.

12.2 Lab objectives

After completing this lab, you will be able to:

1. Adjust Workload Capacity by Scaling
2. Design for Optimized Storage and Database Performance
3. Design a Highly Available Solution
4. Incorporate Disaster Recovery into Architectures

12.3 Scenario

You have recently been hired as a senior data engineer at AdventureWorks and are working with a consultant and architects to design a resilience and scale approach for a cloud data platform solution that meets the organizations technical and business requirements.

Based on the case study about AdventureWorks, you have been asked by the board to produce a short report that address their concerns regarding the resilience and scaling of the services to meet with the websites ability to process sales and the customers demand for service. The report should confirm the concerns that has been raised, and your report should propose how the issues are to be dealt with.

You should also address the concerns of how the organization should maintain operations in the event of intermittent failures. It should also address a disaster recovery approach to ensure the data is protected.

At the end of this lab, you will have:

1. Adjust Workload Capacity by Scaling
2. Design for Optimized Storage and Database Performance
3. Design a Highly Available Solution
4. Incorporate Disaster Recovery into Architectures

Note: This lab is in two parts. This is part 1 where you work as a group to answer the questions. The timings of each exercise is at the discretion of the group. The entire lab should be completed within 60 minutes. In Part 2, the instructor will drive a discussion with the group about their learnings and findings about the Lab.

Resources: As well as the using the course case study for this lab, you use also use resources such a [Microsoft Documentation](#), the [Azure Reference Architecture Site](#) and the [Microsoft Customer Stories Site](#) to help inform you in answering questions in this lab.

12.4 Exercise 1: Adjust Workload Capacity by Scaling

Group exercise

The main task for this exercise is as follows:

1. From the case study, list out the services that would benefit from scaling and how the scale units are measured per service.

12.4.1 Task 1: List the scaling requirements for AdventureWorks

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab05__Ex01__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.5** folder.
2. As a group, spend **15 minutes** discussing and documenting the services that would benefit from scaling for AdventureWorks. Provide justification for the decision and evidence should be provided from the case study.
3. Define how the scale units are measured per service.

Result: After you completed this exercise, you have created a Microsoft Word document that shows scale requirements for AdventureWorks.

12.5 Exercise 2: Design for Optimized Storage and Database Performance

Group exercise

The main task for this exercise is as follows:

1. Define service feature that can be used to optimize storage and database performance.

12.5.1 Task 1: Define the primary authentication mechanism for each technology used to meet AdventureWorks requirements.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab05_Ex02_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.5** folder.
2. As a group, spend **15 minutes** listing the features of the services identified in exercise one that can fulfill the business requirements.

Result: After you completed this exercise, you will create a document that defines service feature that can be used to optimize storage and database performance.

12.6 Exercise 3: Design a Highly Available Solution

Group exercise

The main task for this exercise is as follows:

1. Define service feature that provide high availability where possible.

12.6.1 Task 1: Define service feature that provide high availability where possible.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab05_Ex03_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.5** folder.
2. As a group, spend **15 minutes** listing the features of the services identified in exercise one that can fulfill the business requirements. Also note any services that cannot provide availability.

Result: After you completed this exercise, you will create a document that defines service feature that provide high availability.

12.7 Exercise 4: Incorporate Disaster Recovery into Architectures

Group exercise

The main task for this exercise is as follows:

1. Outline the Disaster Recovery approach for the data services used by AdventureWorks.

12.7.1 Task 1: Outline the Disaster Recovery approach for the data services used by AdventureWorks.

1. From your machine, start **Microsoft Word**, and open up the file **DP-201-Lab05_Ex04_Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.5** folder.
2. As a group, spend **15 minutes** documenting the disaster recovery requirements for AdventureWorks using the case study as reference.

Result: After you completed this exercise, you will create a document that defines the disaster recovery requirements for AdventureWorks.

12.8 Lab Review

After approximately 60 minutes, the instructor will bring a close to this lab. The class will discuss the findings of each group.

13 DP 201 - Designing an Azure Data Platform Solution.

14 Lab 6 - Designing for Efficiency and Operations.

Estimated Time: 60 minutes

Pre-requisites: It is assumed that the case study for this lab has already been read.

Lab files: The files for this lab are located in the *Allfiles\Labfiles\Starter\DP-201.6* folder.

14.1 Lab overview

The students will explore way in which they can maximise the efficiency of using a cloud environment and how they can monitor and analyze operational efficiencies from the Azure portal. They will also look at how automation can be used to reduce effort and error.

14.2 Lab objectives

After completing this lab, you will be able to:

1. Maximize the Efficiency of your Cloud Environment
2. Use Monitoring and Analytics to Gain Operational Insights
3. Use Automation to Reduce Effort and Error

14.3 Scenario

You have recently been hired as a senior data engineer at AdventureWorks and are working on building a cloud data platform solution that meets the organizations technical and business requirements.

The Chief Financial Officer (CFO) has expressed concerns that she does not want the costs of running the infrastructure to “spiral out of control”. She would like assurances that the information services team are operating the supporting services as efficiently as possible and she would like to know what steps are being taken to get information that provides evidence of how the environment is being used.

In addition, the CIO wants to gain an understanding how the team can monitor the systems and work efficiently through automation and would like an overview of what can be done to ensure that administrative effort can be reduced through automation.

At the end of this lab, you will have:

1. Maximize the Efficiency of your Cloud Environment
2. Use Monitoring and Analytics to Gain Operational Insights
3. Use Automation to Reduce Effort and Error

14.4 Exercise 1: Maximize the Efficiency of your Cloud Environment.

Group exercise

The main task for this exercise are as follows:

1. Provide a link to the Azure Price Calculator and a list of best practise that the IS department should follow to minimize costs.

14.4.1 Task 1: Provide a link to the Azure Price Calculator and a list of best practises to minimize costs.

1. From the lab virtual machine, start **Microsoft Word**, and open up the file **DP-201-Lab06-Ex01__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.6** folder.
2. As a group, spend **20 minutes** discussing and listing the best practise that the IS department should follow to minimize costs.

Result: After you completed this exercise, you have created a Microsoft Word document that provides a link to the Azure Price Calculator and a list of best practises to minimize costs.

14.5 Exercise 2: Use Monitoring and Analytics to Gain Operational Insights

Group exercise

The main task for this exercise are as follows:

1. Draft a monitoring and analytics strategy that should be adopted by AdventureWorks

14.5.1 Task 1: Provide a link to the Azure Price Calculator and a list of best practises to minimize costs.

1. From the lab virtual machine, start **Microsoft Word**, and open up the file **DP-201-Lab06-Ex02__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.6** folder.

2. As a group, spend **20 minutes** discussing and drafting a monitoring and analytics strategy that should be adopted by AdventureWorks.

Result: After you completed this exercise, you have created a Microsoft Word document that provides a monitoring and analytics strategy that should be adopted by AdventureWorks.

14.6 Exercise 3: Use Automation to Reduce Effort and Error

Group exercise

The main task for this exercise are as follows:

1. List the options for automation languages and approaches

14.6.1 Task 1: Provide a link to the Azure Price Calculator and a list of best practises to minimize costs.

1. From the lab virtual machine, start **Microsoft Word**, and open up the file **DP-201-Lab06-Ex0__Ta01.docx** from the **Allfiles\Labfiles\Starter\DP-201.6** folder.
2. As a group, spend **20 minutes** list the options for automation languages and approaches. Describe the difference between imperative and declarative automation.

Result: After you completed this exercise, you have created a Microsoft Word document with a list the options for automation languages and approaches.