ProTech Professional Technical Services, Inc.

MOC 20777A Implementing Microsoft Azure Cosmos DB Solutions

Course Summary

Description

This course is aimed at database professionals who are looking to implement a Cosmos DB solution.

Objectives

By the end of this course, students will be able to:
- Describe the purpose and architecture of Azure Cosmos DB.
- Describe how to design documents and collections to meet business requirements, and how to use the SQL API to build applications that use these documents.
- Describe how to create user-defined functions, stored procedures, and triggers.
- Describe how to tune a database, and how to monitor performance.
- Describe how to create efficient Graph database models using Cosmos DB.
- Describe how to use Azure Search, HDInsight, Azure Databricks, and Power BI with Cosmos DB to query and analyze big data.
- Describe how to use Cosmos DB as a source and sink for streaming data.

Topics

- Introduction to Azure Cosmos DB
- Designing and Implementing SQL API
- Implementing Server Side Operations
- Optimizing and monitoring performance
- Designing and Implementing a Graph Database
- Querying and Analyzing Big Data with Cosmos DB
- Implementing Stream Processing with Cosmos DB

Audience

The primary audience for this course is database developers and architects (IT professionals, developers, and information workers) who plan to implement big data solutions on Azure using Cosmos DB.

Prerequisite

In addition to their professional experience, students who attend this training should already have the following technical knowledge:
- The fundamental concepts of partitioning, replication, and resource governance for building and configuring scalable applications that are agnostic of a Cosmos DB API.
- A basic working knowledge of the Cosmos DB SQL API.

Duration

Three Days

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Course Outline

I. *Introduction to Azure Cosmos DB*
   A. Describe the purpose and architecture of Cosmos DB.
   B. Review of NoSQL database structures
   C. Migrating data and applications to Cosmos DB
   D. Managing data in Cosmos DB
   Lab : Creating and using a SQL API database in Cosmos DB
   - Creating and configuring a Cosmos DB database
   - Migrating data from a Mongo DB database to Cosmos DB
   - Using the SQL API to access data
   - Protecting data in a Cosmos DB database

II. *Designing and Implementing SQL API*
   Database Applications
   This module describes how to design documents and collections to meet business requirements, and how to use the SQL API to build applications that use these documents.
   A. Document models in Cosmos DB
   B. Querying data in a SQL API database
   C. Querying and maintaining data programmatically
   Lab : Designing and implementing SQL API database applications
   - Design the document structure & partitioning strategy for the product catalog for the retail system
   - Importing product catalog data
   - Querying product catalog information
   - Maintaining stock levels in the product catalog

III. *Implementing Server Side Operations*
   Describe how to create user-defined functions, stored procedures, and triggers.
   A. Server-side programming with Cosmos DB

B. Creating and using stored procedures
C. Using triggers to maintain data integrity
Lab : Writing user-defined functions, stored procedures and triggers
- Design and implement the document and collection structure
- Implement the shopping cart functionality in the online retail system.
- Extend the online retail system to create orders from the items in a shopping cart.
- Extend the online retail system further to enable customers to view orders and backorders.

IV. *Optimizing and monitoring performance*
   Describe how to optimize a database, and how to monitor performance.
   A. Optimizing database performance
   B. Monitoring the performance of a database
   Lab : Tuning a database and monitoring performance
   - Gathering execution statistics
   - Examining how the different consistency models can impact throughput and latency
   - Investigate the effects of triggers on performance
   - Monitoring performance and tuning the partition key

V. *Designing and Implementing a Graph Database*
   This module describes how to create efficient graph database models using Cosmos DB.
   A. Graph database models in Cosmos DB
   B. Designing Graph database models for efficient operation
   Lab : Designing and implementing a Graph database

- Implementing a recommendations engine for customers
- Recording product purchase information
- Query a Graph database to obtain analytics

VI. *Querying and Analyzing Big Data with Cosmos DB*

This module describes how to use Azure Search and HDInsight with Cosmos DB to query and analyze big data.

A. Integrating Cosmos DB with Azure search to optimize queries
B. Analyzing data in a Cosmos DB database using Apache Spark
C. Visualizing data in a Cosmos DB database

Lab : Querying and Analyzing Big Data with Cosmos DB

- Extending product search capabilities
- Performing end-of-month processing
- Visualizing sales data
- Exploring sales data

VII. *Implementing Stream Processing with Cosmos DB*

This module describes how to use Cosmos DB as a source and sink for streaming data.

A. Working with the Cosmos DB change feed
B. Integrating Cosmos DB into streaming solutions

Lab : Using Cosmos DB with stream processing

- Handling orders
- Maintaining stock analytic data
- Displaying rolling revenue for a given time period