PDF 6: Streaming & Real-Time Analytics

Subjective Case Study Questions and Answers

Q1. Real-Time IoT Analytics
Scenario: IoT sensors stream temperature readings into Azure.
Answer: Use Azure Stream Analytics to ingest real-time data from IoT Hub, process and filter events, and output to Synapse or Power BI. Define temporal windows for aggregations.

Q2. Detecting Anomalies in Streaming Data
Scenario: Monitor temperature spikes in factories.
Answer: Use Stream Analytics functions to calculate moving averages and thresholds. Trigger alerts using Azure Functions or Logic Apps when anomalies occur.

Q3. Scalability in Streaming Pipelines
Scenario: Hundreds of thousands of events per second.
Answer: Partition inputs, scale Stream Analytics job units, and use Event Hub throughput units for parallel ingestion. Optimize query patterns and avoid complex joins.

Q4. Integrating Streaming and Batch Data
Scenario: Combine IoT streaming data with historical sales data.
Answer: Store historical data in Synapse, use Stream Analytics reference inputs to join streaming and batch data for enriched insights. Use Power BI for dashboards combining both sources.

MCQs

1. Real-time data ingestion service for IoT?
   Answer: B. Azure IoT Hub — streams sensor events.
2. Processing large event streams?
   Answer: C. Azure Stream Analytics — scalable real-time processing.
3. Trigger alerts on anomalies?
   Answer: A. Azure Functions/Logic Apps — automate notifications.
4. Scaling Stream Analytics job?
   Answer: B. Increase streaming units and partitioning.
5. Temporal aggregations in streams?
   Answer: C. Tumbling/Sliding windows — group events by time.
6. Joining streaming with batch data?
   Answer: B. Reference data in Stream Analytics — enrich streams.
7. Avoiding performance bottlenecks?
   Answer: C. Minimize complex joins in streaming queries.
8. Visualizing real-time events?
   Answer: A. Power BI streaming dataset — near real-time dashboard.