4. Monitor and troubleshoot Azure solutions
└─ **4.1 Monitor and troubleshoot solutions by using Application Insights**
└─ **4.1.1 Monitor and analyze metrics, logs, and traces**

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8. How can you track request dependencies and failures?
9. How do you correlate telemetry across distributed services?
10. What are performance counters and how are they monitored?

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1. What is Application Insights and what core telemetry does it collect?
Application Insights is an APM tool in Azure Monitor that automatically collects telemetry like requests, exceptions, dependencies, traces, custom events, and performance metrics from applications.

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2. What is the difference between metrics, logs, and traces in App Insights?

- Metrics: Numeric time-series data (e.g., CPU, request count)
- Logs: Structured records from telemetry (e.g., exceptions, requests)
- Traces: Developer-written debug/log messages for tracing app behavior

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3. How do you instrument code to send telemetry to Application Insights?

- Use SDKs like `Microsoft.ApplicationInsights.AspNetCore`
- Initialize `TelemetryClient` to send custom events
- Use auto-instrumentation via Application Insights extension in App Services or Azure Functions

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4. How do you configure Application Insights in an Azure App Service or Function?
Enable App Insights from the Azure Portal by turning on "Application Insights" in the Monitoring section. The connection string / instrumentation key is injected into the app's environment variables.

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5. How do you analyze telemetry data using the Azure portal?
Use the Application Insights blade to view built-in charts, failures, performance, and live metrics. Use "Logs" to query telemetry with KQL and "Failures" or "Performance" tabs for drill-down diagnostics.

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6. What is Kusto Query Language (KQL) and how is it used with App Insights?
KQL is a read-only query language for analyzing telemetry in Azure Monitor. You use it in the "Logs" section of Application Insights to query tables like `requests`, `exceptions`, `dependencies`, `traces`.

7. How do you filter and visualize logs using Log Analytics?
Use the "Logs" tab in Application Insights to write KQL queries (e.g., `requests | where duration > 1s`). Use the Chart button to visualize results and pin them to Azure dashboards.

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8. How can you track request dependencies and failures?
Use the "Application Map" and "Failures" tab in Application Insights. Dependency telemetry captures outbound calls (SQL, HTTP, etc.) with duration and result codes for diagnosing bottlenecks and errors.

9. How do you correlate telemetry across distributed services?
Application Insights uses operation_Id and parent_Id to link related telemetry. Use the "End-to-End Transaction Details" view or join telemetry tables in KQL using operation_Id.

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10. What are performance counters and how are they monitored?
Performance counters like CPU, memory, and request duration are automatically collected in supported environments. View them under the "Performance" tab or query the performanceCounters table via KQL.