Build AI Apps with Azure Database for PostgreSQL Training

Duration: **1 Day**

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Modern AI applications need more than powerful models. They also require a capable data foundation that can manage traditional transactional workloads while supporting intelligent features such as semantic search, vector embeddings and responses grounded in relevant application data.

Build AI Apps with Azure Database for PostgreSQL explores how Azure Database for PostgreSQL can provide the data layer for modern AI-powered applications. Learners discover practical approaches for combining PostgreSQL's relational data capabilities with AI services to create intelligent application experiences.

Throughout the learning path, participants examine how PostgreSQL can be integrated with Azure AI services. Key topics include combining relational information with vector embeddings, performing similarity searches and using relevant database content to help AI models generate more contextual and grounded responses.

The program focuses strongly on practical developer scenarios. Learners explore architectures that bring together data access, retrieval, AI reasoning and real-time application workflows, providing a structured approach to extending conventional database applications with AI-powered capabilities.

The learning path also considers the requirements involved in moving beyond early prototypes. Performance, scalability, monitoring, security and reliability are introduced as important elements when preparing AI-enabled applications for production environments.

Prerequisites

Participants should ideally have:

- Basic application development experience
- Familiarity with relational databases and SQL concepts
- A general understanding of cloud platforms
- Basic knowledge of artificial intelligence concepts

Previous experience with APIs or backend development is useful but is not mandatory.

Who Should Attend

This learning path is designed for:

- Application developers creating modern, data-driven applications
- Software engineers working with cloud-native architectures
- AI engineers integrating data platforms with AI services
- Technical professionals developing intelligent application capabilities with Azure

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What You Will Learn

By the end of this learning path, learners will be able to:

- Explain the role of Azure Database for PostgreSQL within AI application architectures.
- Store, manage and query vector embeddings in PostgreSQL.
- Integrate PostgreSQL with Azure AI services and supporting tools.
- Develop AI-powered capabilities such as semantic search and retrieval.
- Design Retrieval-Augmented Generation (RAG) patterns using relational and vector data.
- Combine structured application data with AI workflows.
- Ground model responses using relevant information retrieved from the database.
- Recognise the key requirements for building scalable, production-ready AI applications.

Training Outline

1. Introduction to AI Application Architectures on Azure

This section introduces the architecture of modern AI applications and examines the role that data platforms play within these environments.

- Overview of modern AI application design patterns
- The role of data platforms in AI-powered solutions
- Combining transactional systems with AI workloads
- Common use cases for intelligent, data-driven applications
- Understanding the relationship between application, data and AI model layers

2. Azure Database for PostgreSQL as an AI-Ready Data Store

This section explores how PostgreSQL can support both established database requirements and modern AI use cases.

- Overview of Azure Database for PostgreSQL capabilities
- Supporting hybrid workloads with relational and vector data
- Managing structured and unstructured information for AI scenarios
- Working with different data types through a unified data layer
- Benefits of managed open-source databases on Azure

3. Working with Embeddings and Vector Data

This section introduces the vector-based techniques that allow AI applications to identify semantically related information.

- Introduction to vector embeddings
- Understanding the role of embeddings in AI applications
- Generating embeddings with Azure AI services
- Storing vector embeddings in PostgreSQL
- Performing vector queries
- Using similarity search to identify semantically relevant content

4. Integrating PostgreSQL with Azure AI Services

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Learners explore how database information and AI capabilities can operate together within the same application workflow.

- Connecting database applications with Azure AI services
- Using APIs and SDKs for AI integration
- Combining database query results with AI model outputs
- Designing workflows that incorporate AI reasoning
- Structuring integration between the data and model layers

5. Building AI-Powered Application Patterns

This section brings the individual components together through practical AI application patterns.

- Implementing semantic search across application data
- Building retrieval mechanisms
- Designing Retrieval-Augmented Generation (RAG) pipelines
- Combining relational and vector data within RAG workflows
- Grounding model responses with database content
- Enhancing user experiences through AI-driven capabilities

6. Designing Scalable and Production-Ready AI Applications

The final section considers how AI-enabled applications can be prepared for reliable operation in production environments.

- Designing architectures for scale and performance
- Managing data pipelines
- Optimising database and vector queries
- Monitoring and maintaining AI-enabled systems
- Applying security best practices
- Improving reliability across application and data layers
- Core principles for production-ready AI application design