AI-102 - Azure AI Engineer Study Guide

Skills measured as of October 31, 2024. Please check for exam updates regularly if you plan to take the exam in the next few months.

Study guide for Exam AI-102: Designing and Implementing a Microsoft Azure AI Solution | Microsoft Learn

Plan and manage an Azure AI solution (15–20%)

Select the appropriate Azure AI service

- Select the appropriate service for a computer vision solution
- Select the appropriate service for a natural language processing solution
- Select the appropriate service for a speech solution
- Select the appropriate service for a generative AI solution
- Select the appropriate service for a document intelligence solution
- Select the appropriate service for a knowledge mining solution

Plan, create and deploy an Azure AI service

- Plan for a solution that meets Responsible AI principles
    - Responsible AI Tools and Practices | Microsoft AI
- Create an Azure AI resource
- Determine a default endpoint for a service
- Integrate Azure AI services into a continuous integration and continuous delivery (CI/CD) pipeline
- Plan and implement a container deployment
    - Use Azure AI containers on-premises - Azure AI services | Microsoft Learn

Manage, monitor, and secure an Azure AI service

- Configure diagnostic logging
- Monitor an Azure AI resource
- Manage costs for Azure AI services
- Manage account keys
- Protect account keys by using Azure Key Vault
- Manage authentication for an Azure AI Service resource

Optional materials:

- Using Managed Identities to Access Azure Resources Securely | by Vaibhav Gujral | Medium

- Manage private communications

Optional materials:

- Configure Virtual Networks for Azure AI services - Azure AI services | Microsoft Learn
- Create a private endpoint for a secure connection - Azure AI Search | Microsoft Learn

Implement content moderation solutions (10–15%)

Create solutions for content delivery

- Implement a text moderation solution with Azure AI Content Safety
- Implement an image moderation solution with Azure AI Content Safety

Implement computer vision solutions (15–20%)

Analyze images

- Select visual features to meet image processing requirements
- Detect objects in images and generate image tags
- Include image analysis features in an image processing request
- Interpret image processing responses
- Extract text from images using Azure AI Vision
- Convert handwritten text using Azure AI Vision

Implement custom computer vision models by using Azure AI Vision

- Choose between image classification and object detection models
- Label images
- Train a custom image model, including image classification and object detection
- Evaluate custom vision model metrics

  Quickstart: Build an image classification model with the Custom Vision portal - Azure AI services | Microsoft Learn

- Publish a custom vision model

- Consume a custom vision model

Analyze videos

- Use Azure AI Video Indexer to extract insights from a video or live stream
- Use Azure AI Vision Spatial Analysis to detect presence and movement of people in video

Implement natural language processing solutions (30–35%)

Analyze text by using Azure AI Language

- Extract key phrases
- Extract entities
- Determine sentiment of text
- Detect the language used in text
- Detect personally identifiable information (PII) in text

Process speech by using Azure AI Speech

- Implement text-to-speech
- Implement speech-to-text
- Improve text-to-speech by using Speech Synthesis Markup Language (SSML)
- Implement custom speech solutions
- Implement intent recognition
- Implement keyword recognition

Translate language

- Translate text and documents by using the Azure AI Translator service
- Implement custom translation, including training, improving, and publishing a custom model
- Translate speech-to-speech by using the Azure AI Speech service
- Translate speech-to-text by using the Azure AI Speech service
- Translate to multiple languages simultaneously

Implement and manage a language understanding model by using Azure AI Language

- Create intents and add utterances

- Create entities
- Train, evaluate, deploy, and test a language understanding model
- Optimize a language understanding model
- Consume a language model from a client application
- Backup and recover language understanding models

Create a custom question answering solution by using Azure AI Language

- Create a custom question answering project
- Add question-and-answer pairs manually
- Import sources
- Train and test a knowledge base
- Publish a knowledge base
- Create a multi-turn conversation
- Add alternate phrasing
- Add chit-chat to a knowledge base
- Export a knowledge base
- Create a multi-language question answering solution

Implement knowledge mining and document intelligence solutions (10–15%)

Implement an Azure AI Search solution

- Provision an Azure AI Search resource
- Create data sources
- Create an index
- Define a skillset
- Implement custom skills and include them in a skillset
- Create and run an indexer
- Query an index, including syntax, sorting, filtering, and wildcards
- Manage Knowledge Store projections, including file, object, and table projections

Implement an Azure AI Document Intelligence solution

- Provision a Document Intelligence resource
- Use prebuilt models to extract data from documents
- Implement a custom document intelligence model
- Train, test, and publish a custom document intelligence model
- Create a composed document intelligence model
- Implement a document intelligence model as a custom Azure AI Search skill

Implement generative AI solutions (10–15%)

Use Azure OpenAI Service to generate content

- Provision an Azure OpenAI Service resource
- Select and deploy an Azure OpenAI model
- Submit prompts to generate natural language
- Submit prompts to generate code
- Use the DALL-E model to generate images
- Use Azure OpenAI APIs to submit prompts and receive responses
- Use large multimodal models in Azure OpenAI

Optimize generative AI

- Configure parameters to control generative behavior
- Apply prompt engineering techniques to improve responses
- Use your own data with an Azure OpenAI model
- Fine-tune an Azure OpenAI model

Additional resources

- **microsoft/ML-For-Beginners: 12 weeks, 26 lessons, 52 quizzes, classic Machine Learning for all**
- **A Beginner's Guide to Tokens, Vectors, and Embeddings in NLP | by Sascha Metzger | Medium**
- **Azure OpenAI Image Token Calculator**
- **Azure-Samples/azure-openai-rag-workshop: Create your own ChatGPT with Retrieval-Augmented-Generation workshop**
- **Mean Average Precision (mAP) Explained | Built In**
- **Azure updates | Microsoft Azure Product Updates**
- **Microsoft AI Literacy Starting Guide**