

## AZ-220: Microsoft Azure IoT Developer Exam Study Guide

May 22, 2022 by [manish](#)

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This Microsoft Azure IoT Developer AZ-220 course covers the concepts, development, and coding required to create and maintain an IoT solution at the edge and in the cloud. Besides configuring cloud services and maintaining the devices, the IoT Developer also sets up the physical devices. As part of the IoT developer role, you will have to maintain devices throughout their lifespan.

The topics covered in this blog are:

- [AZ-220 Certification Overview](#)
- [Who is Azure IoT Developer?](#)
- [Why Microsoft Azure IoT Developer Certification?](#)

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- [Who is this Certification for?](#)
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## AZ-220 Certification Overview

This exam tests an applicant's ability to write code, implement and manage an IoT solution both in the cloud and on the edge. The IoT Developer works with cloud services to configure and maintain devices and can also set up physical devices.

Upon passing the AZ-220 certification exam, you will be responsible for performing the following tasks as an IoT Developer:

- Perform design and implementation of IoT solutions, including device topology, connectivity, security, and debugging.
- Install, configure, and manage compute/containers.
- Manage data pipelines, including monitoring and transformation of data in the context of IoT.
- Works with data engineers and stakeholders to ensure the success of the business.
- Provides Azure services, such as data storage, analysis, and processing, as well as platform-as-a-service.
- Acknowledge and understand Azure IoT service configuration settings in the code section of an IoT solution, and perform specific IoT coding in at least one Azure supported language, such as C#, Node, C, or Python.





Azure IoT Developer  
Specialty

## Who is Azure IoT Developer?

Azure IoT Developer has subject matter expertise in implementing the configuration and coding tasks required to create and maintain the cloud and edge portions of an IoT solution.

They are responsible to deploy physical devices and configure and maintain them by using cloud services. In addition, they need to maintain and troubleshoot the configuration throughout their lifespan.

Also, they implement design specifications for IoT solutions, including device topology, connectivity, diagnostics, monitoring, and security.

These Certified Professionals develop and deploy modules and configure device networking for the Azure IoT Edge portion of the solution.

## Why Microsoft Azure IoT Developer Certification?

Modern organizations and potential employers can get the core technical skills they need through [Microsoft certification](#). The applicants understand certain tools and applications. In addition, their knowledge is approved by Microsoft.

Below is a list of advantages for Microsoft Certified Professionals,

- Microsoft Certified Professionals tend to get hired more by an organization.
- Applicants take up more responsibility and more opportunities for career development.
- With the intense knowledge and knowledge of technologies, they save time with higher efficiency.
- Moreover, a Microsoft-certified professional on average can earn up to USD 80,000 annually.

## Benefits of AZ-220 Certification

- With the AZ-220 certification candidates are hired more quickly by employers.
- The certification helps to set up physical devices and maintain the devices throughout the lifecycle.
- AZ-220 enables to implementation of designs for IoT solutions including debugging, connectivity, device topology, and security.
- With edge devices, you can also deploy compute/containers and integrate device networking, including various edge gateway implementations.
- Also, you will be working with data engineers and stakeholders to ensure a smooth business integration.

## Who is this Certification For?

This Certification is suitable for,

- Candidates that implement code or maintain [cloud](#) or edge components of IoT solutions
- If your job is to manage a device lifecycle from setup and

- configuration, maintain using cloud services
- Knowledge of designing IoT solutions including device topology, and connectivity.
- Managing, monitoring, and transforming data related to IoT

## AZ-220 Exam Details

<b>Exam Name</b> Exam AZ-220: Microsoft Azure IoT Developer	<b>Exam Duration</b> 180 Minutes
<b>Exam Type</b> Multiple Choice Questions	<b>Number of Questions</b> 110 Questions
<b>Exam Fee</b> \$165	<b>Eligibility/Pre-Requisite</b> None
<b>Retirement Date</b> None	<b>Exam Languages</b> English, Japanese, Chinese (Simplified), Korean

## Exam AZ-220 Skills Measured

<b>Set up the IoT solution infrastructure</b>	<b>10-15%</b>
<b>Provision and manage devices</b>	<b>15-20%</b>
<b>Implement IoT Edge</b>	<b>15-20%</b>
<b>Implement business integration</b>	<b>5-10%</b>
<b>Process and manage data</b>	<b>15-20%</b>
<b>Monitor, troubleshoot, and optimize IoT solutions</b>	<b>15-20%</b>
<b>Implement security</b>	<b>10-15%</b>

## How to Register for Azure AZ-220 Exam

You can register for the Microsoft Azure IoT Developer Exam (AZ-220) by going to the [Official Microsoft Page](#).

### Exam AZ-220: Microsoft Azure IoT Developer

**Languages:** English, Japanese, Korean, French, Spanish, Portuguese (Brazil), Russian, Arabic (Saudi Arabia), Chinese (Simplified), Italian, German, Chinese (Traditional)

**Retirement date:** none

This exam measures your ability to set up the IoT solution infrastructure; provision and manage devices; implement IoT Edge; process and manage data; monitor, troubleshoot, and optimize IoT solutions; and implement security.

United States

**\$165 USD\***

Price based on the country or region in which the exam is proctored.

Schedule exam >

## Pre-requisites for AZ-220 Certification

- Understanding of [Azure service](#) to develop an IoT solution such as data storage options, data analysis, data processing, and the Azure IoT PaaS versus SaaS options.
- Applicants should be able to recognize the Azure IoT configuration setting in the coding part of the IoT solution.
- Should have basic programming skills in at least one Azure-supported language including C#, C, Python, Node.js, or Java.

## AZ-220 Study Guide

### Set up the IoT solution infrastructure (10–15%)

#### Create and configure an IoT Hub

- Create an IoT Hub
  - [Create an IoT hub using the Azure portal](#)
- Register a device
  - [Register a new device in the IoT hub](#)

- Configure a device twin
  - [Get started with device twins \(.NET\)](#)
- Configure IoT Hub tier and scaling
  - [Choose the right IoT Hub tier for your solution](#)

## **Build device messaging and communication**

- Build messaging solutions by using SDKs (device and service)
  - [Azure IoT Hub SDKs](#)
- Implement device-to-cloud communication
  - [Use IoT Hub message routing to send device-to-cloud messages to different endpoints](#)
- Implement cloud-to-device communication
  - [Send messages from the cloud to your device with IoT Hub \(.NET\)](#)
- Configure file upload for devices
  - [Upload files from your device to the cloud with IoT Hub \(.NET\)](#)
- Optimize message size and scaling
  - [Choose the right IoT Hub tier for your solution](#)
- Connect to IoT Hub using TLS server certificates
  - [Transport Layer Security \(TLS\) support in IoT Hub](#)

## **Configure physical IoT devices**

- Recommend an appropriate protocol based on device specifications
  - [Choose a device communication protocol](#)
- Configure device networking, topology, and connectivity
  - [IoT Hub support for virtual networks with Private Link and Managed Identity](#)

**Provision and manage devices (15–20%)**

## **Set up an IoT Hub Device Provisioning Service (DPS)**

- Create a DPS instance
  - [Set up the IoT Hub Device Provisioning Service](#)
- Create a new enrollment in DPS
  - [Enroll individual device to IoT Hub Device Provisioning Service](#)
- Link an IoT Hub to the DPS instance
  - [az iot dps linked-hub](#)

## **Manage the device lifecycle**

- Provision a device by using DPS
  - [Set up a device to provision using the Azure IoT Hub Device Provisioning Service](#)
- Deprovision an autoenrollment
  - [How to deprovision devices that were previously auto-provisioned](#)
- Decommission (disenroll) a device
  - [How to disenroll a device from Azure IoT Hub Device Provisioning Service](#)

## **Manage IoT devices by using IoT Hub**

- Manage the devices list in the IoT Hub device registry
  - [Understand the identity registry in your IoT hub](#)
- Modify device twin tags and properties
  - [Understand and use device twins in IoT Hub](#)
- Configure a set of devices by using IoT Hub Automatic Device Management
  - [Automatic IoT device and module management using the Azure portal](#)
- Trigger an action on a set of devices by using IoT Hub Jobs and Direct Methods
  - [Schedule jobs on multiple devices](#)
  - [Understand and invoke direct methods from IoT Hub](#)
- Implement a device firmware update process by using device



- management primitives
  - [Device Update for Azure IoT Hub](#)
- Configure module identities
  - [Get started with IoT Hub module identity and module twin](#)

## Manage IoT devices by using Azure IoT Central

- Create a custom device template by using Azure IoT Central
  - [What are device templates?](#)
  - [How to Setup Template](#)
  - [How to Edit Template](#)
- Configure rules and actions in IoT Central
  - [Configure rules and actions for your device in Azure IoT Central](#)
- Customize the operator view
  - [Customize the dashboard and manage devices in Azure IoT Central](#)
- Add and manage devices from IoT Central
  - [Manage individual devices in your Azure IoT Central application](#)
- Troubleshoot device connections and data mapping
  - [Troubleshoot connections](#)
- Create an application based on an app template for an industry vertical
  - [Create an IoT Central application](#)
- Create and manage a new application based on a custom application template
  - [Create an IoT Central application](#)
- Upgrade and version a device template
  - [Edit an existing device template](#)
- Run IoT Central jobs
  - [Manage devices in bulk in your Azure IoT Central application](#)
- Interact with IoT Central devices using the REST APIs
  - [Azure IoT Central REST API reference](#)

**Implement IoT Edge (15–20%)**

## Set up an IoT Edge device

- Create a device identity in IoT Hub
  - [az iot hub device-identity](#)
- Set up an IoT device for IoT Edge
  - [Deploy your first IoT Edge module to a Windows device](#)
- Select and install container runtime on IoT devices
  - [Create and provision an IoT Edge device on Linux using symmetric keys](#)
- Implement module access to the host system
  - [Give modules access to a device's local storage](#)
- Update IoT Edge runtime
  - [Update IoT Edge](#)
- Provision IoT Edge devices by using DPS
  - [Create and provision IoT Edge devices at scale on Linux using symmetric key](#)

## Deploy an IoT Edge device

- Create and implement a deployment manifest
  - [Learn how to deploy modules and establish routes in IoT Edge](#)
- Create a deployment for a single IoT Edge device
  - [Understand IoT Edge automatic deployments for single devices or at scale](#)
- Create a deployment to target multiple devices
  - [Deploy IoT Edge modules at scale using the Azure portal](#)
- Create a continuous deployment by using Azure DevOps
  - [Continuous integration and continuous deployment to Azure IoT Edge devices](#)

## Develop IoT Edge modules

- Create and customize an IoT Edge module

- [Develop your own IoT Edge modules](#)
- Deploy a custom IoT Edge module to an IoT Edge device
  - [Deploy Azure IoT Edge modules from the Azure portal](#)
- Publish an IoT Edge module to Azure Container Registry
  - [Use the Windows ML container Insider Preview with Azure IoT Edge Runtime](#)
- Configure IoT Edge module routing
  - [Learn how to deploy modules and establish routes in IoT Edge](#)
- Configure environment for IoT Edge development; debug IoT Edge modules in the development environment
  - [Prepare your development and test environment for IoT Edge](#)

## Configure an IoT Edge device

- Select an appropriate gateway pattern
  - [How an IoT Edge device can be used as a gateway](#)
- Configure IoT Edge certificates
  - [Understand how Azure IoT Edge uses certificates](#)
  - [Manage certificates on an IoT Edge device](#)
- Implement and configure offline support (including local storage)
  - [Understand extended offline capabilities for IoT Edge devices, modules, and child devices](#)
- Create a layered hierarchy of IoT Edge devices
  - [Create a hierarchy of IoT Edge devices](#)

## Implement business integration (5–10%)

### Integrate with upstream and downstream systems

- Set up IoT Hub routing for triggering workflows
  - [Trigger an Azure Event Grid workflow from an IoT device](#)
- Test data interface integration
  - [Strategy to perform integration testing of Azure IoT modules](#)

- Develop Azure Digital Twins solutions
  - [Develop Azure Digital Twins \(ADT\) solutions](#)
- Create Azure Digital Twins models and digital twins
  - [Azure Digital Twins](#)
- Map IoT device data to Azure Digital Twins models and relationships
  - [Learn about twin models and how to define them in Azure Digital Twins](#)
- Ingest IoT device messages and translate messages to Azure Digital Twins
  - [Ingest IoT Hub telemetry into Azure Digital Twins](#)
- Configure routes and endpoints to trigger business logic and data processing
  - [Manage endpoints and routes in Azure Digital Twins](#)
- Query the Azure Digital Twins graph
  - [Query the Azure Digital Twins twin graph](#)
- Update properties on Azure Digital Twins entities in the graph
  - [Digital twins and their twin graph](#)
  - [Manage a graph of digital twins using relationships](#)
- Monitor and troubleshoot Azure Digital Twins
  - [Monitor Azure Digital Twins with diagnostics logs](#)

## Process and manage data (15–20%)

### Configure message routing in Azure IoT Hub

- Implement message enrichment in IoT Hub
  - [Use Azure IoT Hub message enrichments](#)
- Implement routing of IoT device messages to endpoints
  - [Use the Azure CLI and Azure portal to configure IoT Hub message routing](#)
- Define and test routing queries
  - [IoT Hub message routing query syntax](#)
- Configure IoT Hub as an Azure Event Grid source

- [React to IoT Hub events by using Event Grid to trigger actions](#)
- [Azure IoT Hub integration with Azure Event Grid](#)

## **Configure stream processing of IoT data**

- Create Azure Stream Analytics for data and stream processing of IoT data
  - [Process real-time IoT data streams with Azure Stream Analytics](#)
- Write user-defined functions and aggregations in Stream Analytics
  - [User-defined functions in Azure Stream Analytics](#)
- Consume Azure Machine Learning functions in Stream Analytics
  - [Integrate Azure Stream Analytics with Azure Machine Learning](#)
- Configure Stream Analytics outputs
  - [Azure Stream Analytics on IoT Edge](#)

## **Process real-time data by using Azure Time Series Insights**

- Create a Time Series Insights environment
  - [Create an Azure Time Series Insights Gen1 environment](#)
- Connect IoT Hub and the Time Series Insights environment
  - [Add a consumer group to your IoT hub](#)
- Create a reference data set for a Time Series Insights environment by using the Azure portal
  - [Create a reference data set for your Azure Time Series Insights Gen1 environment](#)
- Implement Time Series Model hierarchies, types, and instance fields
  - [Time Series Model in Azure Time Series Insights Gen2](#)
- Consume data by using Time Series Expression syntax
  - [Azure Time Series Insights Gen2 Time Series Expression syntax](#)

**Monitor, troubleshoot, and optimize IoT solutions (15–20%)**

## **Configure health monitoring**

- Configure metrics in IoT Hub
  - [Set up metrics](#)
- Set up diagnostics logs for IoT Hub
  - [Set up and use metrics and logs with an IoT hub](#)
- Configure IoT Hub scaling (SKU/unit) programmatically
  - [Manage and Auto-scale your IoT solution with a predictable IoT Cloud](#)
- Query and visualize tracing by using Azure Monitor
  - [Query and visualize](#)
- Apply Azure Policy definitions for IoT Hub
  - [Azure Policy built-in definitions for Azure IoT Hub](#)
- Gather IoT Edge metrics
  - [Collect and transport metrics](#)
- Retrieve diagnostics from IoT Edge
  - [Retrieve logs from IoT Edge deployments](#)

## **Troubleshoot device communication**

- Establish maintenance communication by using RDP or SSH
    - [Use a simulated device to test connectivity with your IoT hub](#)
  - Establish maintenance communication by using Azure Device Streams
    - [IoT Hub Device Streams](#)
  - Verify device telemetry is received by IoT Hub
    - [Send telemetry from an IoT Plug and Play device to Azure IoT Hub](#)
  - Validate device twin properties, tags, and direct methods
    - [Understand and use device twins in IoT Hub](#)
    - [Understand and invoke direct methods from IoT Hub](#)
  - Troubleshoot device disconnects and connects
    - [Monitor, diagnose, and troubleshoot Azure IoT Hub device connectivity](#)
  - Troubleshoot IoT Edge devices
    - [Troubleshoot your IoT Edge device](#)
-

## Implement security (10–15%)

### Implement security for IoT devices and services

- Implement device and gateway security
  - [Control access to IoT Hub](#)
- Ensure secure connections
  - [Security Recommendation](#)

### Implement Microsoft Defender for IoT

- Configure an Microsoft Defender for an IoT agent-based solution
  - [Configure Microsoft Defender for IoT agent-based solution](#)
- Implement Defender-IoT-micro-agents (security agents)
  - [Install the Defender for IoT micro agent \(Preview\)](#)
- Configure built-in and custom alerts for IoT Hub
  - [Defender for IoT Hub custom security alerts](#)
  - [Defender for IoT Hub security alerts](#)

## AZ-220 Exam Retake policy

The AZ-220 exam retake policy is as follows:

1. If a candidate fails on the first attempt, they must wait for 24 hours before retaking the exam.
2. If a candidate again fails on the second attempt, then the candidate will have to wait for 14 days.
3. A candidate will be given a maximum of five attempts to retake an exam in a year.

## Conclusion

Microsoft Certified Professionals can manage the device lifecycle, implement

designs for Azure IoT solutions and deploy Azure IoT Edge components and configure device networking on the edge with intense knowledge of AZ-220. Moreover, Microsoft Certification can help you to kickstart your journey to become a Microsoft-certified Azure IoT developer.

## Related/References

- [AZ-400: Microsoft Azure DevOps Engineer Expert Exam Study Guide](#)
- [AZ-104: Microsoft Azure Administrator Associate Exam Study Guide](#)
- [DP-203: Microsoft Azure Data Engineer Associate Exam Study Guide](#)
- [DP-100: Microsoft Azure Data Scientist Associate Exam Study Guide](#)
- [AZ-305: Microsoft Azure Solutions Architect Expert Exam Study Guide](#)



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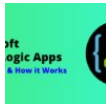
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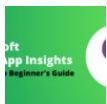
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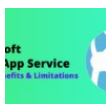
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