Microsoft IoT Developer Certification (AZ-220)

1.Microsoft Learn - IoT Learning Path

Microsoft is doing amazing job with its learning platform.
You don't need test environment, Microsoft creates one for you during the training.

[Introduction to Azure IoT](#) (8 modules)
[Securely connect IoT devices to the cloud](#) (6 modules)
[Build the intelligent edge with Azure IoT Edge](#) (3 modules)
[Develop IoT solutions with Azure IoT Central](#) (3 modules)

2.Microsoft IoT Development Kit

I bought myself a Development Board certified by Microsoft to make Learning experience a little bit more fun. Of course, it is not necessary as you can simply use web-based simulators:

Microsoft IoT DevKit Simulator: https://azure-samples.github.io/iot-devkit-web-simulator/
RapsberyPi Simulator: https://azure-samples.github.io/raspberry-pi-web-simulator/

If you want to follow my route, here is the link to Kit I bought: https://microsoft.github.io/azure-iot-developer-kit/

Here is mine in action:
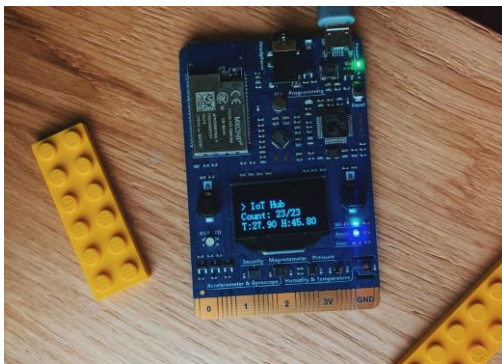
3.Microsoft Docs AZ-220 study guide resources divided into skills measured in the exam:

 Implement the IoT solution infrastructure (15-20%)

Create and configure an IoT Hub

create an IoT Hub

- [Create an IoT hub using the Azure portal](#)
- [Create an IoT hub using the Azure CLI](#)
- [Create an IoT hub using the New-AzIotHub cmdlet](#)

register a device

- [Understand the identity registry in your IoT hub](#)
- [Get started with device management (.NET)](#)

configure a device twin

- [Understand and use device twins in IoT Hub](#)

configure IoT Hub tier and scaling

- [Choose the right IoT Hub tier for your solution](#)
- [Auto-scale your Azure IoT Hub](#)

Build device messaging and communication
build messaging solutions by using SDKs (device and service)

- [Understand and use Azure IoT Hub SDKs](#)
- [Send device-to-cloud and cloud-to-device messages with IoT Hub](#)
- [Quickstart: Send telemetry from a device to an IoT hub and read it with a back-end application (.NET)](#)

implement device-to-cloud communication

- [Device-to-cloud communications guidance](#)

implement cloud-to-device communication

- [Cloud-to-device communications guidance](#)
- [Send messages from the cloud to your device with IoT Hub (.NET)](#)

configure file upload for devices

- [Upload files with IoT Hub](#)
- [Upload files from your device to the cloud with IoT Hub (.NET)](#)

Configure physical IoT devices
recommend an appropriate protocol based on device specifications

- [Best practices for device configuration within an IoT solution](#)
- [Reference – choose a communication protocol](#)
- [Support additional protocols for IoT Hub](#)

configure device networking, topology, and connectivity

- [IoT Hub support for virtual networks](#)
- [IoT Hub IP addresses](#)
- [IoT Hub Device Streams (preview)](#)

Provision and manage devices (20-25%)

Implement the Device Provisioning Service (DPS)
create a Device Provisioning Service

- Provisioning devices with Azure IoT Hub Device Provisioning Service
- Quickstart: Set up the IoT Hub Device Provisioning Service with the Azure portal

create a new enrollment in DPS

- How to manage device enrollments with Azure Device Provisioning Service SDKs
- How to manage device enrollments with Azure Portal

manage allocation policies by using Azure Functions

- How to use custom allocation policies

link an IoT Hub to the DPS

- az iot dps linked-hub

Manage the device lifecycle
provision a device by using DPS

- Tutorial: Provision the device to an IoT hub using the Azure IoT Hub Device Provisioning Service
- Tutorial: Enroll the device to an IoT hub using the Azure IoT Hub Provisioning Service Client (.NET)

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 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
- Get started with device twins (.NET)

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](#)

set up Automatic Device Management of IoT devices at scale

- [Automatic IoT device and module management using the Azure portal](#)
- [Import and export IoT Hub device identities in bulk](#)

Build a solution by using IoT Central
define a device type in Azure IoT Central

- [What is Azure IoT Central?](#)
- [Define a new IoT device type in your Azure IoT Central application](#)
- [Quickstart: Add a simulated device to your IoT Central application](#)

configure rules and actions in Azure IoT Central

- [Configure rules](#)
- [Quickstart: Configure rules and actions for your device in Azure IoT Central](#)

define the operator view

- [Tutorial: Customize the operator dashboard and manage devices in Azure IoT Central](#)

add and manage devices from IoT Central

- [Manage devices in your Azure IoT Central application](#)

monitor devices

- [Monitor device connectivity using Azure CLI](#)
- [Quickstart: Use Azure IoT Central to monitor your devices](#)

Implement Edge (15-20%)

Set up and deploy an IoT Edge device
create a device identity in IoT Hub

- [Understand the identity registry in your IoT hub](#)
- [Use the IoT extension for Azure CLI for Azure IoT Hub device management](#)
- [Glossary of terms for Azure IoT Edge](#)

deploy a single IoT device to IoT Edge

- [What is Azure IoT Edge](#)
- [Quickstart: Deploy your first IoT Edge module to a virtual Windows device](#)
- [Quickstart: Deploy your first IoT Edge module to a virtual Linux device](#)

create a deployment for IoT Edge devices

- [Learn how to deploy modules and establish routes in IoT Edge](#)
- [Understand IoT Edge automatic deployments for single devices or at scale](#)

install container runtime on IoT devices

- [Use the Windows ML container Insider Preview with Azure IoT Edge Runtime](#)
- [Install the Azure IoT Edge runtime on Debian-based Linux systems](#)
- [Install the Azure IoT Edge runtime on Windows](#)

define and implement deployment manifest

- [Learn how to deploy modules and establish routes in IoT Edge](#)

update security daemon and runtime

- [Azure IoT Edge security manager](#)
- [Security standards for Azure IoT Edge](#)

Develop modules
create and configure an Edge module

- [Develop your own IoT Edge modules](#)

deploy a module to an Edge device

- [Deploy Azure IoT Edge modules from the Azure portal](#)
- [Deploy Azure IoT Edge modules with Azure CLI](#)
- [Deploy Azure IoT Edge modules from Visual Studio Code](#)

publish an IoT Edge module to an Azure Container Registry

- [Use the Windows ML container Insider Preview with Azure IoT Edge Runtime](#)

Configure an IoT Edge device
select and deploy an appropriate gateway pattern

- [How an IoT Edge device can be used as a gateway](#)

implement module-to-module communication

- [Understand the Azure IoT Edge runtime and its architecture](#)

implement and configure offline support

- [Understand extended offline capabilities for IoT Edge devices, modules, and child devices](#)

Process and manage data (15-20%)

Configure routing in Azure IoT Hub
implement message enrichment in IoT Hub

- [Tutorial: Use Azure IoT Hub message enrichments](#)

configure routing of IoT Device messages to endpoints

- [Tutorial: Use the Azure CLI and Azure portal to configure IoT Hub message routing](#)
- [Tutorial: Use the Azure CLI to configure IoT Hub message routing](#)
- [Tutorial: Use an Azure Resource Manager template to configure IoT Hub message routing](#)

define and test routing queries

- [IoT Hub message routing query syntax](#)

integrate with Event Grid

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

Configure stream processing
create ASA for data and stream processing of IoT data

- [Process real-time IoT data streams with Azure Stream Analytics](#)

process and filter IoT data by using Azure Functions

- [Processing data from IoT Hub with Azure Functions](#)

configure Stream Analytics outputs

- [Azure Stream Analytics on IoT Edge](#)

Configure an IoT solution for Time Series Insights (TSI)
Implement solutions to handle telemetry and time-stamped data

- [Time series solutions](#)

create an Azure Time Series Insights (TSI) environment

- [Tutorial: Create an Azure Time Series Insights environment](#)

connect the IoT Hub and the Time Series Insights (TSI)

- [Add an IoT hub event source to your Time Series Insights environment](#)

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

Configure health monitoring

configure metrics in IoT Hub

- [Tutorial: Set up and use metrics and diagnostic logs with an IoT hub](#)

set up diagnostics logs for Azure IoT Hub

- [Tutorial: Set up and use metrics and diagnostic logs with an IoT hub](#)

query and visualize tracing by using Azure monitor

- [Trace Azure IoT device-to-cloud messages with distributed tracing (preview)](#)

Troubleshoot device communication
establish maintenance communication

- [Tutorial: Use a simulated device to test connectivity with your IoT hub](#)

verify device telemetry is received by IoT Hub

- [Quickstart: Send telemetry from a device to an IoT hub and read it with a back-end application (.NET)](#)

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 disconnects with Azure IoT Hub](#)

Perform end-to-end solution testing and diagnostics
estimate the capacity required for each service in the solution

- [Choose the right IoT Hub tier for your solution](#)

conduct performance and stress testing

- [Accelerating IoT solution development and testing with Azure IoT Device Simulation](#)
- [Azure IoT Hub StressTest](#) (GitHub)

set up device D2C message tracing by using Azure Distributed Tracing

- [Trace Azure IoT device-to-cloud messages with distributed tracing (preview)](#)

Implement security (15-20%)

Implement device authentication in the IoT Hub
choose an appropriate form of authentication

- [IoT device authentication options](#)

- [Security practices for Azure IoT device manufacturers](#)

manage the X.509 certificates for a device

- [Device Authentication using X.509 CA Certificates](#)

manage the symmetric keys for a device

- [Quickstart: Provision a simulated device with symmetric keys](#)

Implement device security by using DPS
configure different attestation mechanisms with DPS

- [How to use different attestation mechanisms with Device Provisioning Service Client SDK for C](#)

generate and manage x.509 certificates for IoT Devices

- [Device Authentication using X.509 CA Certificates](#)

configure enrollment with x.509 certificates

- [Quickstart: Enroll X.509 devices to the Device Provisioning Service using C#](#)

generate a TPM endorsements key for a device

- [Quickstart: Enroll TPM device to IoT Hub Device Provisioning Service using C# service SDK](#)
- [Device provisioning: Identity attestation with TPM](#)

configure enrollment with symmetric keys

- [How to provision legacy devices using symmetric keys](#)

Implement Azure Security Center (ASC) for IoT
enable ASC for IoT in Azure IoT Hub

- [Quickstart: Onboard Azure Security Center for IoT service in IoT Hub](#)

create security modules

- [Quickstart: Create an azureiotsecurity module twin](#)

configure custom alerts

- [Quickstart: Create custom alerts](#)

Good Luck! 😊

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