

AZ-220^{Q&As}

Microsoft Azure IoT Developer

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QUESTION 1

You create an Azure IoT hub by running the following command.

```
az iot hub create --resource-group MyResourceGroup --name MyIotHub --sku B1 --location westus --partition-count 4
```

What does MyIotHub support?

- A. Device Provisioning Service
- B. cloud-to-device messaging
- C. Azure IoT Edge
- D. device twins

Correct Answer: A

The Device Provisioning Service is included in the Basic Tiers (such as B1).

Incorrect Answers:

B, C, D: The Standard tier is needed for cloud-to-device messaging, Azure IoT Edge, and device twins.

Reference:

<https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-scaling>

QUESTION 2

You have an Azure IoT solution that includes multiple Azure IoT hubs in different geographic locations and a single Device Provision Service instance. You need to configure device enrollment to assign devices to the appropriate IoT hub based on the following requirements:

1.

The registration ID of the device

2.

The geographic location of the device

The load between the IoT hubs in the same geographic location must be balanced.

What should you use to assign the devices to the IoT hubs?

- A. Static configuration (via enrollment list only)
- B. Lowest latency
- C. Evenly weighted distribution
- D. Custom (Use Azure Function)

Correct Answer: A

Set the Device Provisioning Service allocation policy

The allocation policy is a Device Provisioning Service setting that determines how devices are assigned to an IoT hub. There are three supported allocation policies:

Lowest latency: Devices are provisioned to an IoT hub based on the hub with the lowest latency to the device.

Evenly weighted distribution (default): Linked IoT hubs are equally likely to have devices provisioned to them. This is the default setting. If you are provisioning devices to only one IoT hub, you can keep this setting.

Static configuration via the enrollment list: Specification of the desired IoT hub in the enrollment list takes priority over the Device Provisioning Service-level allocation policy.

Reference:

<https://docs.microsoft.com/en-us/azure/iot-dps/tutorial-provision-multiple-hubs>

QUESTION 3

You have an Azure subscription that contains an Azure IoT hub and two Azure IoT Edge devices named Device1 and Device2.

You need to ensure that the IoT hub only accepts connections from Device1 and Device2.

What should you configure?

- A. a private endpoint connection
- B. Azure API Management
- C. Azure Active Directory (Azure AD) Identity Protection
- D. a gateway device

Correct Answer: A

Ingress connectivity to IoT Hub using Azure Private Link. A private endpoint is a private IP address allocated inside a customer-owned VNet via which an Azure resource is reachable. Through Azure Private Link, you can set up a private endpoint for your IoT hub to allow services inside your VNet to reach IoT Hub without requiring traffic to be sent to IoT Hub's public endpoint. Similarly, your on-premises devices can use Virtual Private Network (VPN) or ExpressRoute peering to gain connectivity to your VNet and your IoT Hub (via its private endpoint). As a result, you can restrict or completely block off connectivity to your IoT hub's public endpoints by using IoT Hub IP filter or the public network access toggle. This approach keeps connectivity to your Hub using the private endpoint for devices.

Reference: <https://docs.microsoft.com/en-us/azure/iot-hub/virtual-network-support>

QUESTION 4

You have an Azure IoT solution that includes an Azure IoT hub, 100 Azure IoT Edge devices, and 500 leaf devices.

You need to perform a key rotation across the devices.

Which three types of entities should you update? Each correct answer presents part of the solution.

NOTE: Each correct selection is worth one point.

- A. the \$edgeHub module identity
- B. the \$edgeAgent module identity
- C. the leaf module identities
- D. the IoT Edge device identities
- E. the iothubowner policy credentials
- F. the leaf device identities

Correct Answer: ADF

To get authorization to connect to IoT Hub, devices and services must send security tokens signed with either a shared access or symmetric key. These keys are stored with a device identity in the identity registry.

An IoT Hub identity registry can be accessed like a dictionary, by using the deviceId or moduleId as the key.

Reference:

<https://docs.microsoft.com/bs-latn-ba/azure/iot-dps/how-to-control-access>

<https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-identity-registry>

QUESTION 5

You develop a custom Azure IoT Edge module named temperature-module.

You publish temperature-module to a private container registry named mycr.azurecr.io

You need to build a deployment manifest for the IoT Edge device that will run temperature-module.

Which three container images should you define in the manifest? Each correct answer presents part of the solution.

NOTE: Each correct selection is worth one point.

- A. mcr.microsoft.com/azureiotedge-simulated-temperature-sensor:1.0
- B. mcr.microsoft.com/azureiotedge-agent:1.0
- C. mcr.microsoft.com/iotedge-dev:2.0
- D. mycr.azurecr.io/temperature-module:latest
- E. mcr.microsoft.com/azureiotedge-hub:1.0

Correct Answer: BDE

Each IoT Edge device runs at least two modules: \$edgeAgent and \$edgeHub, which are part of the IoT Edge runtime. IoT Edge device can run multiple additional modules for any number of processes. Use a deployment manifest to tell

your device which modules to install and how to configure them to work together.

Reference: <https://docs.microsoft.com/en-us/azure/iot-edge/module-composition>

QUESTION 6

Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while

others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are developing a custom Azure IoT Edge module.

The module needs to identify the device ID of the local device.

Solution: You configure the module to read the IOTEDGE_DEVICEID environment variable.

Does this meet the goal?

A. Yes

B. No

Correct Answer: B

The Azure ID of the current device is available on the IOTEDGE_DEVICEID environment variable.

Instead read the device ID of the device twin.

Note: Device twins are JSON documents that store device state information including metadata, configurations, and conditions. Azure IoT Hub maintains a device twin for each device that you connect to IoT Hub.

Device identity properties. The root of the device twin JSON document contains the read-only properties from the corresponding device identity stored in the identity registry.

Reference:

<https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-device-twins>

QUESTION 7

DRAG DROP

You are troubleshooting device connections to and disconnections from an Azure IoT hub.

You configure diagnostic logging for the IoT hub to send to Log Analytics.

You need to generate a report that displays the device connection and disconnection events.

How should you complete the query? To answer, drag the appropriate values to the correct targets. Each value may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

NOTE: Each correct selection is worth one point.

Select and Place:

Values

- Category ==
- ObjectName ==
- Operation ==
- ResourceProvider ==
- ResourceType ==

Answer Area

AzureDiagnostics

| where "MICROSOFT.DEVICES" and

"IOTHUBS"

| where "Connections" and OperationName == "deviceConnect"

Correct Answer:

Values

Answer Area

AzureDiagnostics

```
| where ResourceProvider == "MICROSOFT.DEVICES" and ResourceType ==  
"IOTHUBS"  
| where Category == "Connections" and OperationName == "deviceConnect"
```

Box 1: ResourceProvider ==

Query to monitor your IoT hub connectivity Errors: Identify device connection errors.

AzureDiagnostics

```
| where ResourceProvider == "MICROSOFT.DEVICES" and ResourceType == "IOTHUBS"
```

```
| where Category == "Connections" and Level == "Error"
```

Box 2: ResourceType ==

Box 3: Category ==

Reference:

<https://docs.microsoft.com/en-us/azure/iot-hub/monitor-iot-hub>

QUESTION 8

You have an IoT device that has the following configurations:

Hardware: Raspberry Pi

Operating system: Raspbian

You need to deploy Azure IoT Edge to the device.

Which two actions should you perform? Each correct answer presents part of the solution.

NOTE: Each correct selection is worth one point.

- A. Update the IoT Edge runtime.
- B. Install the IoT Edge security daemon.
- C. Run the Deploy-IoTEdge PowerShell cmdlet on the IoT Edge device.
- D. Install the container runtime.

Correct Answer: AB

The Azure IoT Edge runtime is what turns a device into an IoT Edge device. The runtime can be deployed on devices as small as a Raspberry Pi or as large as an industrial server.

The IoT Edge security daemon provides and maintains security standards on the IoT Edge device. The daemon starts on every boot and bootstraps the device by starting the rest of the IoT Edge runtime.

Reference:

<https://docs.microsoft.com/en-us/azure/iot-edge/how-to-install-iot-edge>

QUESTION 9

HOTSPOT

You are writing code to provision IoT devices by using the Device Provisioning Service.

Which two details from the Overview blade of the Device Provisioning Service are required to provision a new IoT client device? To answer, select the appropriate detail in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:

Answer Area

All services > Device Provisioning Services > contosodps

contosodps Device Provisioning Service

Search (Ctrl+/) Move Delete Refresh

Resource group (change) contosoorg	Service endpoint contosodps.azure-devices-provisioning.net
Status Active	Global device endpoint global.azure-devices-provisioning.net
Location East US	ID Scope One00098F73
Subscription (change) Free Trial	Pricing and scale tier S1
Subscription ID fea9f87-1546-43c4-a4d0-3d04db60a598	
Tags (change) Click here to add tags	

Correct Answer:

Answer Area

All services > Device Provisioning Services > contosodps

contosodps Device Provisioning Service

Search (Ctrl+/) Move Delete Refresh

Resource group (change) contosoorg	Service endpoint contosodps.azure-devices-provisioning.net
Status Active	Global device endpoint global.azure-devices-provisioning.net
Location East US	ID Scope One00098F73
Subscription (change) Free Trial	Pricing and scale tier S1
Subscription ID fea9f87-1546-43c4-a4d0-3d04db60a598	
Tags (change) Click here to add tags	

Box 1: ID Scope

In the Azure portal, select the Overview blade for your Device Provisioning service and copy the ID Scope value. The ID Scope is generated by the service and guarantees uniqueness. It is immutable and used to uniquely identify the

registration IDs.

Box 2: Global device endpoint

The `global_prov_uri` variable, which allows the IoT Hub client registration API `IoTHubClient_LL_CreateFromDeviceAuth` to connect with the designated Device Provisioning Service instance.

Example code:

```
static const char* global_prov_uri = "global.azure-devices-provisioning.net";  
  
static const char* id_scope = "[ID Scope]";
```

Reference:

<https://docs.microsoft.com/en-us/azure/iot-dps/tutorial-set-up-device>

QUESTION 10

Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while

others might not have a correct solution.

After you answer a question in this question, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have devices that connect to an Azure IoT hub. Each device has a fixed GPS location that includes latitude and longitude.

You discover that a device entry in the identity registry of the IoT hub is missing the GPS location.

You need to configure the GPS location for the device entry. The solution must prevent the changes from being propagated to the physical device.

Solution: You add the desired properties to the device twin.

Does the solution meet the goal?

A. Yes

B. No

Correct Answer: A

Device Twins are used to synchronize state between an IoT solution's cloud service and its devices. Each device's twin exposes a set of desired properties and reported properties. The cloud service populates the desired properties with values it wishes to send to the device. When a device connects it requests and/or subscribes for its desired properties and acts on them.

Reference: <https://azure.microsoft.com/sv-se/blog/deep-dive-into-azure-iot-hub-notifications-and-device-twin/>

QUESTION 11

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have an Azure IoT solution that includes an Azure IoT hub, a Device Provisioning Service instance, and 1,000 connected IoT devices.

All the IoT devices are provisioned automatically by using one enrollment group.

You need to temporarily disable the IoT devices from connecting to the IoT hub.

Solution: You disconnect the Device Provisioning Service from the IoT hub.

Does this meet the goal?

A. Yes

B. No

Correct Answer: B

Instead, from the Device Provisioning Service, you disable the enrollment group, and you disable device entries in the identity registry of the IoT hub to which the IoT devices are provisioned.

Reference: <https://docs.microsoft.com/bs-latn-ba/azure/iot-dps/how-to-unprovision-devices>

QUESTION 12

You have an Azure IoT hub.

You need to check whether the IoT hub was affected by an outage.

What should you select in the Azure portal? To answer, select the appropriate option in the answer area.

NOTE: Each correct selection is worth one point.

A. Resource health

B. Metrics

C. Alerts

D. Diagnostic settings

Correct Answer: A

<https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-azure-service-health-integration>

QUESTION 13

HOTSPOT

You have an Azure IoT hub.

You plan to deploy 1,000 IoT devices by using automatic device management.

The device twin is shown below.

```
{
  "deviceId": "ContosoHyperDriveEngine1",
  "etag": "AAAAAAAAAAw=",
  "deviceEtag": "MTYyNDk20kw",
  "status": "enabled",
  "statusUpdateTime": "0001-01-01t00:00:00Z",
  "connectionTime": "Disconnected",
  "lastActivityTime": "0001-01-01T00:00:00Z",
  "cloudToDeviceMessageCount": 0,
  "authenticationType": "sas",
  "x509Thumbprint": {
    "primaryThumbprint": null,
    "secondaryThumbprint": null
  },
  "version": 13,
  "tags": {
    "engine": {
      "warpCorVersion": "1.2.65b",
      "warpDriveType": "WM105a"
    }
  },
  "properties": {
    "desired": {
      "$metadata": {
        "$lastUpdated": "2019-10-17T18:43:33.7599556Z"
      },
      "$version": 1
    },
    "reported": {
      "$metadata": {
        "$lastUpdated": "2019-10-17T18:43:33.7599556Z"
      },
      "$version": 1
    }
  }
}
```

You need to configure automatic device management for the deployment.

Which target Condition and Device Twin Path should you use? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:

Answer Area

Target Condition:

	▼
properties.desired.warpDriveType='WM105a'	
properties.reported.warpDriveType='WM105a'	
tags.engine.warpDriveType='WM105a'	

Device Twin Path:

	▼
properties.desired.warpOperating	
properties.reported.warpOperating	
properties.warpOperating	

Correct Answer:

Answer Area

Target Condition:

	▼
properties.desired.warpDriveType='WM105a'	
properties.reported.warpDriveType='WM105a'	
tags.engine.warpDriveType='WM105a'	

Device Twin Path:

	▼
properties.desired.warpOperating	
properties.reported.warpOperating	
properties.warpOperating	

Box 1: tags.engine.warpDriveType=\\VM105a\\

Use tags to target twins. Before you create a configuration, you must specify which devices or modules you want to affect. Azure IoT Hub identifies devices and using tags in the device twin, and identifies modules using tags in the module

twin.

Box 2: properties.desired.warpOperating

The twin path, which is the path to the JSON section within the twin desired properties that will be set.

For example, you could set the twin path to properties.desired.chiller-water and then provide the following JSON content:

```
{ "temperature": 66, "pressure": 28 }
}
```

Reference: <https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-automatic-device-management>

QUESTION 14

DRAG DROP





You have an Azure IoT Central application.

You need to connect IoT devices that use SAS tokens to the application without first registering the devices.

In which order should you perform the actions? To answer, move all actions from the list of actions to the answer area

and arrange them in the correct order.

Select and Place:

Actions	Answer Area
Generate device SAS keys.	
Obtain the group primary key.	
Flash unique credentials to the devices.	   
Associate the devices to a template and approve the connections.	
Connect the devices to IoT Central.	

Correct Answer:

Actions	Answer Area
	Obtain the group primary key.
	Generate device SAS keys.
	Flash unique credentials to the devices.
	Connect the devices to IoT Central.
	Associate the devices to a template and approve the connections.

QUESTION 15

You are developing an Azure IoT solution for a shipping company. The company's ships will have sensors used for predictive maintenance. Some sensor devices will be MQTT-capable, and others will use Modbus.

Each ship has an internet connection that is available only when the ship is docked.

You create an Azure IoT hub.

You need to implement an IoT solution that uses Azure IoT Edge.

What should you do?

- A. Configure an IoT Edge gateway. Deploy an IoT Edge Modbus module. From the Azure portal, create IoT devices and add connection strings to the devices.
- B. Add the MQTT devices to the IoT hub and configure an IoT Edge gateway. From the IoT Edge gateway device, assign the MQTT devices as child devices of the gateway. Use the File upload feature of IoT Hub when internet connectivity is available.
- C. Add the MQTT devices to the IoT hub, configure an IoT Edge gateway, and set Enable connection to IoT Hub to Disable. From the IoT Edge gateway device, assign the MQTT devices as child devices of the gateway. Deploy the IoT Edge Modbus module.
- D. Add the MQTT devices to the IoT hub and configure an IoT Edge gateway. From the IoT Edge gateway device, assign the MQTT devices as child devices of the gateway. Deploy an IoT Edge Modbus module.

Correct Answer: C

<https://docs.microsoft.com/en-us/azure/iot-edge/deploy-modbus-gateway>

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