Resource for AZ-220 Exam
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1. Implement the IoT Solution Infrastructure
    1. Create and Configure an IoT Hub
        1. * Create an IoT Hub
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-create-through-portal#create-an-iot-hub
        2. * Register a device
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-create-through-portal#register-a-new-device-in-the-iot-hub
        3. * Configure a device twin
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-device-twins
        4. * Configure IoT Hub tier and scaling
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-scaling
    2. Build device Messaging and Communication
        1. * Build messaging solutions by using SDKs (device and service)
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-sdks
        2. * Implement device-to-cloud communication
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-d2c-guidance
        3. * Implement cloud-to-device communication
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-csharp-csharp-c2d
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-c2d-guidance
        4. * Configure file upload for devices
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-configure-file-upload
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-configure-file-upload-powershell
    3. Configure Physical IoT Devices
        1. * Recommend an appropriate protocol based on device specifications
        https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-protocols
        2. * Configure device networking, topology, and connectivity
        https://docs.microsoft.com/en-us/azure/iot-hub/virtual-network-support
2. Provision and Manage Devices
    1. Implement the Device Provisioning Service (DPS)
        1. * Create a Device Provisioning Service
        https://docs.microsoft.com/en-us/azure/iot-dps/
        https://docs.microsoft.com/en-us/azure/iot-dps/quick-setup-auto-provision

    2. * Create a new enrollment in DPS https://docs.microsoft.com/en-us/azure/iot-dps/how-to-manage-enrollments
    3. * Manage allocation policies by using Azure Functions https://docs.microsoft.com/en-us/azure/iot-dps/how-to-use-custom-allocation-policies
    4. * Link an IoT Hub to the DPS https://docs.microsoft.com/en-us/azure/iot-dps/quick-setup-auto-provision#link-the-iot-hub-and-your-device-provisioning-service
2. Manage the Device Lifecycle
    1. * Provision a device by using DPS https://docs.microsoft.com/en-us/azure/iot-edge/how-to-auto-provision-x509-certs https://docs.microsoft.com/en-us/azure/iot-edge/how-to-auto-provision-symmetric-keys
    2. * Deprovision an autoenrollment https://docs.microsoft.com/en-us/azure/iot-dps/how-to-unprovision-devices
    3. * Decommission (disenroll) a device https://docs.microsoft.com/en-us/azure/iot-dps/how-to-revoke-device-access-portal
3. Manage IoT Devices by Using IoT Hub
    1. * Manage devices list in the IoT Hub device registry https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-identity-registry
    2. * Modify device twin tags and properties https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-device-twins
    3. * Trigger an action on a set of devices by using IoT Hub Jobs and Direct Methods https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-node-node-schedule-jobs https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-direct-methods
    4. * Set up Automatic Device Management of IoT devices at scale https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-automatic-device-management
4. Build a Solution by Using IoT Central
    1. * Define a device type in Azure IoT Central https://docs.microsoft.com/en-us/azure/iot-central/core/howto-set-up-template
    2. * Configure rules and actions in Azure IoT Central https://docs.microsoft.com/en-us/azure/iot-central/core/howto-configure-rules

https://docs.microsoft.com/en-us/azure/iot-central/core/quick-configure-rules

3. * Define the operator view
   https://docs.microsoft.com/en-us/azure/iot-central/core/howto-set-up-template
4. * Add and manage devices from IoT Central
   https://docs.microsoft.com/en-us/azure/iot-central/core/howto-manage-devices
5. * Monitor devices
   https://docs.microsoft.com/en-us/azure/iot-central/core/quick-monitor-devices
6. * Custom and industry-focused application templates
   https://docs.microsoft.com/en-us/azure/iot-central/core/concepts-app-templates
7. * Monitor application health using metrics
   https://docs.microsoft.com/en-us/azure/iot-central/core/howto-monitor-application-health

3. Implement Edge
   1. Set up and Deploy an IoT Edge Device
      1. * Create a device identity in IoT Hub
         https://docs.microsoft.com/en-us/azure/iot-edge/how-to-register-device
      2. * Deploy a single IoT device to IoT Edge
         https://docs.microsoft.com/en-us/azure/iot-edge/how-to-deploy-modules-portal
      3. * Create a deployment for IoT Edge devices *"above"*
      4. * Install container runtime on IoT devices
         https://docs.microsoft.com/en-us/azure/iot-edge/how-to-install-iot-edge-windows
      5. * Define and implement deployment manifest
         https://docs.microsoft.com/en-us/azure/iot-edge/module-composition#create-a-deployment-manifest
      6. * Update security daemon and runtime
         https://docs.microsoft.com/en-us/azure/iot-edge/how-to-update-iot-edge
      7. * provision IoT Edge devices with DPS
         https://docs.microsoft.com/en-us/azure/iot-edge/how-to-auto-provision-simulated-device-windows
      8. * IoT Edge automatic deployments
         https://azure.microsoft.com/fr-ca/blog/new-enhancements-for-azure-iot-edge-automatic-deployments/
         https://docs.microsoft.com/en-us/azure/iot-edge/module-deployment-monitoring
      9. * Deploy on constrained devices
         https://docs.microsoft.com/en-us/azure/iot-edge/production-checklist

10. * Secure IoT Edge solutions https://docs.microsoft.com/en-us/azure/iot-edge/security
11. * Deploy production certificates https://docs.microsoft.com/en-us/azure/iot-edge/production-checklist#install-production-certificates

2. Develop Modules
    1. * Create and configure an Edge module https://docs.microsoft.com/en-us/azure/iot-edge/tutorial-machine-learning-edge-06-custom-modules
    2. * Deploy a module to an Edge device https://docs.microsoft.com/en-us/azure/iot-edge/how-to-deploy-modules-portal
    3. * Publish an IoT Edge module to an Azure Container Registry https://docs.microsoft.com/en-us/azure/iot-edge/tutorial-deploy-function
3. Configure an IoT Edge Device
    1. * Select and deploy an appropriate gateway pattern https://docs.microsoft.com/en-us/azure/iot-edge/how-to-create-transparent-gateway
    2. * Implement Industrial IoT solutions with modules like Modbus and OPC https://docs.microsoft.com/en-us/azure/architecture/guide/iiot-guidance/iiot-architecture
    3. * Implement module-to-module communication https://docs.microsoft.com/en-us/azure/iot-edge/module-composition
    4. * Implement and configure offline support (including local storage) https://docs.microsoft.com/en-us/azure/iot-edge/offline-capabilities

4. Process and Manage Data
    1. Configure routing in Azure IoT Hub
        1. * Implement message enrichment in IoT Hub https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-message-enrichments-overview
        2. * Configure routing of IoT Device messages to endpoints https://docs.microsoft.com/en-us/azure/iot-hub/tutorial-routing
        3. * Define and test routing queries https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-routing-query-syntax
        4. * Integrate with Event Grid https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-event-grid
    2. Configure Stream Processing
        1. * Create ASA for data and stream processing of IoT data https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-get-started-with-azure-stream-analytics-to-process-data-from-iot-devices
        2. * Process and filter IoT data by using Azure Functions https://docs.microsoft.com/en-us/samples/azure-samples/functions-js-iot-hub-processing/processing-data-from-iot-hub-with-azure-functions/

        3. * Configure Stream Analytics outputs https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-define-outputs
    3. Configure an IoT Solution for Time Series Insights (TSI)
        1. * Implement solutions to handle telemetry and time-stamped data https://docs.microsoft.com/en-us/azure/time-series-insights/time-series-insights-overview
        2. * Create an Azure Time Series Insights (TSI) environment https://docs.microsoft.com/en-us/azure/time-series-insights/tutorial-create-populate-tsi-environment
        3. * Connect the IoT Hub and the Time Series Insights (TSI) https://docs.microsoft.com/en-us/azure/time-series-insights/how-to-ingest-data-iot-hub
5. Monitor, Troubleshoot, and Optimize IoT Solutions
    1. Configure Health Monitoring
        1. * Configure metrics in IoT Hub https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-metrics
        2. * Set up diagnostics logs for Azure IoT Hub https://docs.microsoft.com/en-us/azure/iot-hub/tutorial-use-metrics-and-diags
        3. * Query and visualize tracing by using Azure Monitor https://docs.microsoft.com/en-us/azure/azure-monitor/log-query/log-query-overview
        4. * Use Azure Policy definitions for IoT Hub https://docs.microsoft.com/en-us/azure/iot-hub/security-controls-policy
    2. Troubleshoot Device Communication
        1. * Establish maintenance communication https://docs.microsoft.com/en-us/azure/iot-accelerators/iot-accelerators-predictive-walkthrough
        2. * Verify device telemetry is received by IoT Hub https://docs.microsoft.com/en-us/azure/iot-hub/tutorial-connectivity
        3. * Validate device twin properties, tags and direct methods
        4. * Troubleshoot device disconnects and connects https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-troubleshoot-connectivity
    3. Perform End-to-end Solution Testing and Diagnostics
        1. * Estimate the capacity required for each service in the solution https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-scaling
        2. * Conduct performance and stress testing
6. Implement Security
    1. Implement Device Authentication in the IoT Hub
        1. * Choose an appropriate form of authentication https://azure.microsoft.com/en-ca/blog/iot-device-authentication-options/ https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-security

    2. * Manage the X.509 certificates for a device https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-security-x509-get-started
    3. * Manage the symmetric keys for a device https://docs.microsoft.com/en-us/azure/iot-dps/concepts-symmetric-key-attestation
2. Implement Device Security by Using DPS
    1. * Configure different attestation mechanisms with DPS https://docs.microsoft.com/en-us/azure/iot-dps/use-hsm-with-sdk
    2. * Generate and manage x.509 certificates for IoT Devices https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-security-x509-get-started
    3. * Configure enrollment with x.509 certificates https://docs.microsoft.com/en-us/answers/questions/34883/how-to-implement-iot-dps-x509-on-device.html
    4. * Generate a TPM endorsements key for a device https://docs.microsoft.com/en-us/azure/iot-dps/concepts-tpm-attestation
    5. * Configure enrollment with symmetric keys https://docs.microsoft.com/en-us/azure/iot-dps/how-to-legacy-device-symm-key
3. Implement Azure Security Center (ASC) for IoT
    1. * Enable ASC for IoT in Azure IoT Hub https://docs.microsoft.com/en-us/azure/defender-for-iot/overview https://docs.microsoft.com/en-us/azure/defender-for-iot/
    2. * Create security modules https://docs.microsoft.com/en-us/azure/defender-for-iot/quickstart-create-security-twin
    3. * Configure custom alerts https://docs.microsoft.com/en-us/azure/defender-for-iot/quickstart-create-custom-alerts