

Summary

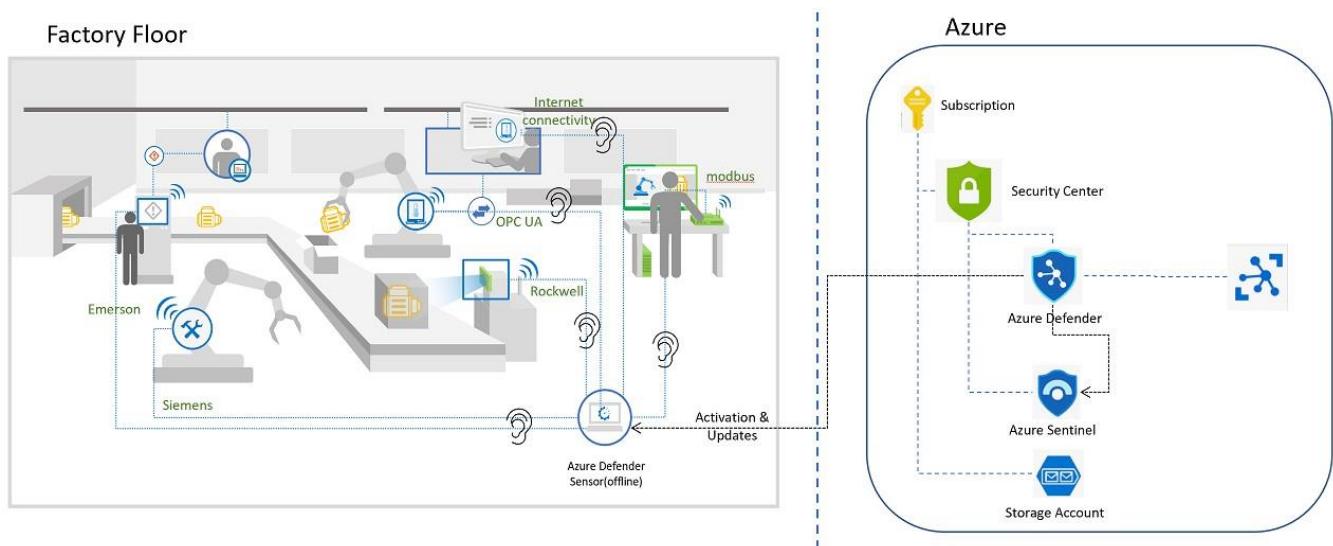
This Hands-on-Lab (HOL) will focus on securing your facilities. We will be simulating traffic by playing some Packet captures, visualizing and analyzing the data on the sensor console. Integrate our sensor with Microsoft Sentinel, to explore alert handling, and for writing queries to help with alert investigation.

Internet of Things - Microsoft Defender for IoT HOL

!! Since the PDF contains hyperlinks, please download the file before proceeding!!

Architecture Diagram

During this workshop we will be focusing on simulating traffic by playing some Packet captures, visualizing and analyzing the data on the sensor console. We will also integrate our sensor with Microsoft Sentinel, to explore alert handling, and for writing queries to help with alert investigation. This Hands-on-Lab (HOL) will focus on securing your facilities. The scenario below is one of many you would apply these lessons to, other scenarios are Oil, Gas, Utility, and Energy companies.



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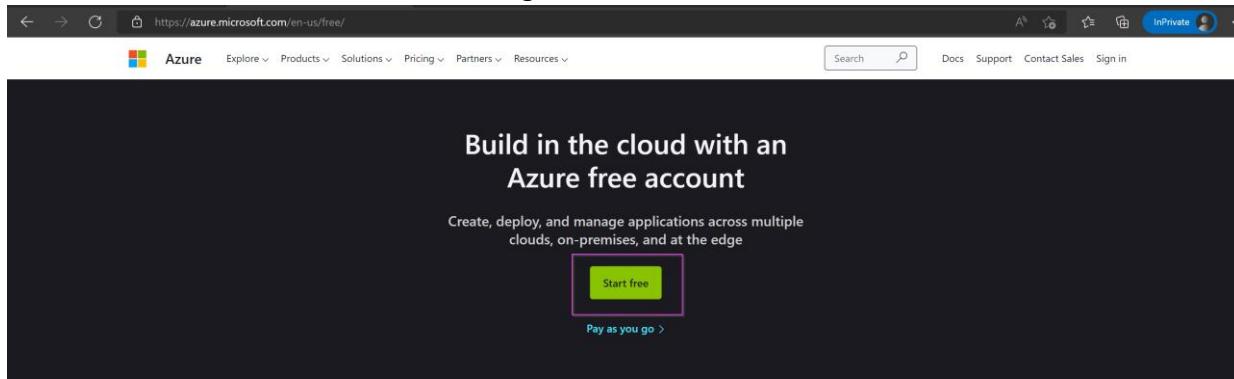
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Exercise 1: Enabling Defender

Task 1: Create an Azure Subscription

1. Use this link to set up your free trial: <https://azure.microsoft.com/en/free/>.
2. Click on “Start Free” as shown in the image



3. Follow the prompts to **Create your Account** and **Sign in**.
4. On the Azure Portal, go to type “Subscriptions” on the search bar on top.

A screenshot of the Microsoft Azure portal at https://portal.azure.com/#home. The search bar at the top contains the text "Subs". The main area displays a list of subscriptions. One subscription, "Visual Studio Enterprise Subscription", is highlighted with a red box. Other visible subscriptions include "Event Hubs Clusters", "Notification Hubs", "Device Update for IoT Hubs", and "Azure Synapse Analytics (private link hubs)". The left sidebar shows "Recent" resources like "Sentinel" and "AppGW". The bottom navigation bar includes links for "Subscriptions", "Resource groups", "All resources", and "Dashboard".

5. Your subscription will show up on the list of “Subscriptions”.

The screenshot shows the Microsoft Azure Subscriptions page. At the top, there are filter options: 'Subscriptions == global filter', 'My role == all', 'Status == all', and '+ Add filter'. Below the filters, a table lists one subscription: 'Visual Studio Enterprise Subscription' with Subscription ID 21311d18-92b6-4c80-b327-917e1b90517a, My role 'Account admin', Current cost CA\$11.29, Secure Score 41%, Parent management group 'None', and Status 'Active'. The 'Visual Studio Enterprise Subscription' row is highlighted with a red box.

Task 2: Enabling Microsoft Defender for IoT on the Subscription

1. In the [Azure Portal](#), search for **Microsoft Defender for IoT**. Select **Microsoft Defender for IoT** in the popup window, to open the Microsoft Defender for IoT Page.

The screenshot shows the Microsoft Azure search results for 'Microsoft Defender for IoT'. The search bar at the top contains 'Microsoft Defender for IoT'. Below the search bar, there are tabs for 'All', 'Services (27)', 'Documentation (99+)', 'Azure Active Directory (1)', 'Resources (0)', and 'Resource Groups (0)'. The 'Services' tab is selected. Under the 'Services' heading, the 'Microsoft Defender for IoT' service card is highlighted with a red box. Other services listed include 'IoT Hub', 'Microsoft Sentinel', 'Form recognizers', and 'Power Platform'. To the left, there is a sidebar titled 'Recent resources' listing various Azure resources like 'mdfilesmst01', 'rg-md4iot-mst01', etc.

2. On the Defender for IoT page, in the **Getting Started** section, select **Pricing**.

The screenshot shows the Microsoft Defender for IoT Pricing page. The top navigation bar includes 'Home > Defender for IoT | Pricing' and a note 'Showing subscription "Visual Studio Enterprise Subscription"'. Below the navigation is a search bar and a message about partial data due to limited permissions. The main content area is divided into sections: 'General' (with 'Getting started', 'Device inventory (Preview)', 'Alerts (Preview)', and 'Workbooks (Preview)'), 'Management' (with 'Sites and sensors', 'Pricing' highlighted with a purple box, and 'Settings (Preview)'), and 'No subscriptions onboarded' (with a magnifying glass icon). A large blue button 'Onboard subscription' is visible. At the bottom, there is a note about device coverage and a link to the 'Pricing page'.

3. On the **Pricing** page, select **+Add Plan**.

The screenshot shows the Microsoft Defender for IoT Pricing page. At the top, there's a search bar, refresh button, and a '+ Add plan' button. Below the header, there are sections for General (Getting started, Device inventory (Preview), Alerts (Preview), Workbooks (Preview)) and Management (Sites and sensors, Pricing, Settings (Preview)). The 'Pricing' section is currently selected. A large central area displays a magnifying glass icon over a document, with the text 'No subscriptions onboarded'. Below this, it says 'Define committed device coverage or work with the trial.' and features a blue 'Onboard subscription' button. A note at the bottom states: 'For more information on Microsoft Defender for IoT pricing, visit the [Pricing page](#)'.

4. In the popup screen, select:

- Purchase Method:** Trail
- Subscription:** pick the trial subscription you created
- Click "**I accept the terms**", followed by "**Save**".

The screenshot shows a Microsoft Azure Purchase dialog for Microsoft Defender for IoT. On the left, the main navigation menu is visible, including 'Home', 'Defender for IoT', 'Pricing', and 'Settings (Preview)'. The 'Pricing' item is highlighted. On the right, the 'Purchase' dialog is open. It has sections for 'Payment details' (with a dropdown set to 'Trial') and 'Subscription' (with a dropdown set to 'Customer Intent Terms - Registration'). Below these, there's a note about a 30-day free trial for 1,000 committed devices. At the bottom, there's a checkbox labeled 'I accept the terms' with a checked box, and a 'Save' button.

You now have a valid Microsoft Defender for IoT Trial with **1000 committed devices**. These devices represent all those equipment/sensors connected to your network in the facility you are analyzing. This configuration allows you a **30-day trial for free**.

Exercise 2: Deploy the Sensor in Azure

Task 1: Create a Resource group to automatically deploy your sensor, storage account and network security group to

For the deployment, a **VHD file is used**. Please send a request via [this form](#) for a link for the IoT sensor installation. You will receive an email with the link once your request has been received.

It might go to your Junk/Spam by default. Please search for an email from ServiceUserMS@secxpnninja.onmicrosoft.com. It should look like this.

ServiceUserMS <ServiceUserMS@secxpnninja.onmicrosoft.com>
To: Vishakha Ghosh
Hello Vishakha Ghosh

Thank you for choosing to trial Defender for IoT. The following process will assist you in deploying the trial service on your existing Azure subscription.
If you do not have one already, please proceed to setup on using the following link: [Create Azure Subscription](#)

Once an Azure subscription is setup, please note the following resources which are used by the subscription in order to complete the deployment of the trial service and use it:

- Storage account v2 LRS standard – with VHD size for 128GB
- VM - D4s (4 CPUs, 16 GB memory) – with disk of 128GB
- One Public IP - If choosing a public IP option in the deployment

<https://sensorimages.blob.core.windows.net/sensor/sensor-22.1.3.vhd?sv=2021-04-10&st=2022-11-20T18%3A36%3A32Z&se=2022-12-20T18%3A36%3A32Z&sr=b&sp=r&sig=KXJUulgG4xTjg0A%2BTzLl7Jppze8gK9GJRnU9ulw7w%3D>

Please note - This link is private and will expire in 5 days.
The installation instructions as well as important information can be found in the following link: <https://github.com/Azure/-Microsoft-Defender-for-IoT/blob/main/Hands%20On%20Lab%20Documents/Microsoft%20Defender%20for%20IoT%20HOL.pdf>
For any questions on deployment please contact HOL_D4IOT@microsoft.com

Thank you,
D4IOT - CXE Team

[Reply](#) [Forward](#)

Please note - This link is private and will expire in 5 days.

1. Click the link below to generate a template deployment installation

<https://ms.portal.azure.com/#create/Microsoft.Template/uri/https%3A%2F%2Fraw.githubusercontent.com%2FAzure%2F-Microsoft-Defender-for-IoT%2Fmain%2FHands%2520on%2520Lab%2520Documents%2FAzureDeploy.json>

2. You will be taken to a custom deployment page that looks like the image below:

Home >

Custom deployment

Deploy from a custom template

Select a template [Basics](#) [Review + create](#)

Template

[Customized template](#) 4 resources

Edit template [Edit parameters](#) [Visualize](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ① [BuildEnv](#)

Resource group * ② [Create new](#)

Instance details

Region * ③ [East US](#)

Location ④ [\[resourceGroup\(\).location\]](#)

Deploy Public IP ⑤ [true](#)

Put Password To Key Vault ⑥ [true](#)

Source VHDURL * ⑦

Sensor Count 1

- 1) Please select your **Subscription** linked to the trial service.
- 2) Please create a new **Resource Group** (Use the hyperlink below the box). We recommend creating a new one to easily identify the relevant resources of the trial service.
- 3) Please select the **Region** (Time zone) to which you are deploying the trial service to.

- 4) Please leave the **Location** box with its default value, no need to change it.
 - 5) **[OPTIONAL]** Set the **Public IP** option to "true". **However, doing this will open your sensor to the internet. If you have alternate ways to publish the sensor to end users, then just use the internal ip by setting "Deploy Public IP" to "false".**
 - 6) Set this field to true if you want to store your secrets in keyvault.
 - 7) Please paste the link of the **VHD** copied from the email into the **Source VHDURL** field. **Please make sure there are no extra spaces after the link when you paste it.**
3. Once complete please click on the **Review + Create** button Upon validation completion, proceed to click on the **Create** button to initiate the process. The process runs for approx. 30 to 60 minutes.

The screenshot shows the 'Custom deployment' page in the Microsoft Azure portal. At the top, a green bar indicates 'Validation Passed'. Below it, the 'Review + create' tab is selected. The 'Create' button at the bottom left is highlighted with a red box. Other buttons like '< Previous' and 'Next >' are also visible.

Task 2: Access your Virtual Machine.

Option #1: If you deployed with Keyvault

1. Once the deployment is complete, click on "Go to resource group" as shown in the image below.

The screenshot shows the 'Resource Group Overview' page for a deployment named 'Microsoft.Template-2022071314358'. The 'Deployment' section displays a green checkmark and the message 'Your deployment is complete'. Below it, the 'Deployment details' table lists four resources: 'Reset-password0', 'Post-Deploy0', 'VMDeployment', and 'copyVhd', all in 'OK' status. In the 'Next steps' section, a blue button labeled 'Go to resource group' is highlighted with a pink box.

2. Go to the keyvault resource from the list.

The screenshot shows the Azure portal interface for a resource group named 'KeyVaultTest'. The left sidebar contains navigation links for Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Deployments, Security, Policies, Properties, Locks, Cost Management, Cost analysis, Cost alerts (preview), Budgets, Advisor recommendations, Monitoring, Insights (preview), and Alerts. The main content area displays the 'Essentials' section with a search bar, filter options, and a table of resources. One resource, 'SOC-KVuq63gjmwvo2do-Play', is highlighted with a red box.

Name	Type	Location	Actions
customxx24k5pt7ngp2	Storage account	West US	...
SOC-KVuq63gjmwvo2do-Play	Key vault	West US	...
SOC-NSo24k5pt7ngp2-Play	Network security group	West US	...
SOC-vmsidentity24k5pt7ngp2-Play	Managed identity	West US	...
SOC-vm24k5pt7ngp2-Play-image	Image	West US	...
SOC-vm24k5pt7ngp2-Play-nft10	Regular Network Interface	West US	...
SOC-vm24k5pt7ngp2-Play-pip0	Public IP address	West US	...
SOC-vm24k5pt7ngp2-Play-Pay	Virtual machine	West US	...
SOC-vm24k5pt7ngp2-Play_disk1_loadbalancer5fe3de7491e16910574360	Disk	West US	...
SOC-vm24k5pt7ngp2-Play_disk1_loadbalancer5fe3de7491e16910574360	Virtual network	West US	...

3. Select the application and click on "Access Policies" -> "+Create".

The screenshot shows the 'Access policies' blade for the 'SOC-KVuq63gjmwvo2do-Play' key vault. The left sidebar includes 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Access policies' (which is selected and highlighted with a red box), and 'Events'. The main area displays a table of access policies. One policy, 'SOC-vmsidentityuq63gjmwvo2do-Play', is highlighted with a pink box.

Name	Email	Key Permissions
SOC-vmsidentityuq63gjmwvo2do-Play		

4. Under "Permissions" select "Key & Secret Management" template.

Home > Resource groups > KeyVaultTest > SOC-KVuq63gjmwo2do-Play | Access policies >

Create an access policy ...

SOC-KVuq63gjmwo2do-Play

① Permissions **② Principal** **③ Application (optional)** **④ Review + create**

Configure from a template
Key & Secret Management

Key permissions	Secret permissions	Certificate permissions
Key Management Operations <input checked="" type="checkbox"/> Select all <input checked="" type="checkbox"/> Get <input checked="" type="checkbox"/> List <input checked="" type="checkbox"/> Update <input checked="" type="checkbox"/> Create <input checked="" type="checkbox"/> Import <input checked="" type="checkbox"/> Delete <input checked="" type="checkbox"/> Recover <input checked="" type="checkbox"/> Backup <input checked="" type="checkbox"/> Restore	Secret Management Operations <input checked="" type="checkbox"/> Select all <input checked="" type="checkbox"/> Get <input checked="" type="checkbox"/> List <input checked="" type="checkbox"/> Set <input checked="" type="checkbox"/> Delete <input checked="" type="checkbox"/> Recover <input checked="" type="checkbox"/> Backup <input checked="" type="checkbox"/> Restore	Certificate Management Operations <input type="checkbox"/> Select all <input type="checkbox"/> Get <input type="checkbox"/> List <input type="checkbox"/> Update <input type="checkbox"/> Create <input type="checkbox"/> Import <input type="checkbox"/> Delete <input type="checkbox"/> Recover <input type="checkbox"/> Backup <input type="checkbox"/> Restore <input type="checkbox"/> Manage Contacts <input type="checkbox"/> Manage Certificate Authorities <input type="checkbox"/> Get Certificate Authorities <input type="checkbox"/> List Certificate Authorities <input type="checkbox"/> Set Certificate Authorities <input type="checkbox"/> Delete Certificate Authorities
Cryptographic Operations <input type="checkbox"/> Select all <input type="checkbox"/> Decrypt <input type="checkbox"/> Encrypt <input type="checkbox"/> Unwrap Key <input type="checkbox"/> Wrap Key <input type="checkbox"/> Verify <input type="checkbox"/> Sign	Privileged Secret Operations <input type="checkbox"/> Select all <input type="checkbox"/> Purge	Privileged Certificate Operations <input type="checkbox"/> Select all

Previous **Next**

5. Under "Principle" select a principle

Home > Resource groups > KeyVaultTest > SOC-KVuq63gjmwo2do-Play | Access policies >

Create an access policy ...

SOC-KVuq63gjmwo2do-Play

① Permissions **② Principal** **③ Application (optional)** **④ Review + create**

Only 1 principal can be assigned per access policy.
Use the new embedded experience to select a principal. The previous popup experience can be accessed here. [Select a principal](#)

Search by object ID, name, or email address

	John Doe	John.Doe@contoso.com
	Jane Doe	Jane.Doe@contoso.com
	Bob Smith	Bob.Smith@contoso.com
	Mike Johnson	Mike.Johnson@contoso.com
	Emily Davis	Emily.Davis@contoso.com
	David Wilson	David.Wilson@contoso.com

Selected item
No item selected

6. You can skip over "Application".

Home > Resource groups > KeyVaultTest > SOC-KVuq63gjmwvo2do-Play | Access policies >

Create an access policy ...

SOC-KVuq63gjmwvo2do-Play

Permissions Principal Application (optional)

Authorizes this application to perform the specified permissions on the User's or Group's behalf.
Use the new embedded experience to select an application. The previous popup experience can be accessed here. [Select an application](#)

Search by object ID, name, or email address

The list shows several application entries, each with a small blue square icon and a unique GUID string:

- 5d62bf487ee14fb8884e0582 f29be8e1-977f-4fa3-bf83-957308750ffb
- AcmeDnsValidator-ting0113im0 604fb01b-9fe8-4926-b954-b922680cbf40
- aksdemoSP-20200512091755 b59a0f98-632d-403b-987c-c68a88ccf81c0
- amafsf 7056827c-0953-418c-9426-f6890b29e79
- aml-94dec3a3-89b7-402c-a6a6-3db32f3b2d40 b179cab-f3fc-4162-a465-eca5e6f54087
- aml-9f876ca0-654b-468b-8d6b-abf6aa26fce0 90534bd9-e88b-46f0-adf8-c7cef00a9954

Selected item

No item selected

Previous

Next

7. Click on "Create".

Home > Resource groups > KeyVaultTest > SOC-KVuq63gjmwvo2do-Play | Access policies >

Create an access policy ...

SOC-KVuq63gjmwvo2do-Play

Permissions Principal Application (optional)

Review + create

Key Permissions

Key Management Operations	All selected
Cryptographic Operations	None selected
Privileged Key Operations	None selected
Rotation Policy Operations	All selected

Secret Permissions

Secret Management Operations	All selected
Privileged Secret Operations	None selected

Certificate Permissions

Certificate Management Operations	None selected
Privileged Certificate Operations	None selected

Principal

Principal name	Vishakha Ghosh
Object ID	4d53f3b7-e555-4354-a330-193b4cd1ef28

Application

Authorized application	None selected
Object ID	None selected

Previous

Create

8. Go back to your resource group and select the Virtual Machine resource.

The screenshot shows the Azure portal interface for the 'KeyVaultTest' resource group. The 'Resources' section displays a list of 10 items, with one item, '-Play', highlighted in pink. The highlighted item is a 'Virtual machine' located in 'West US'. Other resources listed include Storage account, Key vault, Network security group, Managed identity, Image, Regular Network Interface, Public IP address, Virtual machine, and Disk.

9. Make a note of the Public IP address.

The screenshot shows the Azure portal details for the virtual machine '-Play'. Under the 'Networking' tab, the 'Virtual machine' section shows the computer name as 'Sensor' and the operating system as 'Linux (ubuntu 18.04)'. The 'Networking' section highlights the 'Public IP address' (20.124.23.178) and the 'Private IP address' (10.10.10.1).

Option #2: If you deployed without Keyvault.

1. Once the deployment is complete, go to "Reset-password0" by clicking the button.

The screenshot shows the Azure portal deployment details for 'Microsoft.Template-20220630145822'. The 'Deployment details' table lists four resources: 'Reset-password0', 'Post-Deploy0', 'VMdeployment', and 'copyvhd', all in 'OK' status. The 'Reset-password0' resource is highlighted with a pink box.

- Copy the system generated random password from the "Password" field and make a note of the VMName.

The screenshot shows the 'Outputs' section of a deployment named 'Reset-password0'. The 'vmObject' output is highlighted with a pink border, showing its JSON value: { "VMName": "SOC-vmw7ne3eaow5oxw0-Play", "Password": "KChR9dMLp3VFkar2Yp8I99PM2V8=", "Status": true }. There is a 'Copied' message next to a clipboard icon.

- Click "go to resource group" from the previous screen.

The screenshot shows the 'Overview' page for a deployment named 'Microsoft.Template-20220630145822'. It displays a green checkmark indicating the deployment is complete. Below it, there's deployment details: Deployment name: Microsoft.Template-20220630145822, Subscription: BuildEnv, Resource group: Vghosh_IoTSensor. The start time is 6/30/2022, 2:58:25 PM. Under 'Deployment details', four resources are listed: Reset-password0, Post-Deploy0, VMdeployment, and copyvhdl, all in OK status. In the 'Next steps' section, there is a blue button labeled 'Go to resource group' which is highlighted with a pink border.

- Select the virtual machine from the list of resources in the group.

The screenshot shows the 'Resource groups' blade for a resource group named 'XXX'. The 'Essentials' section shows the subscription (move) to 'BuildEnv', location 'East US', and deployment count '13 Succeeded'. The 'Resources' section lists several resources: copyvhdl (Deployment Script, East US), customfici6u5atkwu (Storage account, East US), SOC-NSGfici6u5atkwu-Play (Network security group, East US), and SOC-vmfici6u5atkwu-Play (Virtual machine, East US). The last item, 'SOC-vmfici6u5atkwu-Play', is highlighted with a red border.

- Make a note of the Public IP address.

SOC Virtual machine

Essentials

- Resource group: (move)
- Status: Running
- Location: East US
- Subscription: (move)
- Subscription ID:
- Tags: (edit) azsecpack : nonprod

Properties Monitoring Capabilities (7) Recommendations Tutorials

Virtual machine

Computer name	Sensor
Health state	-
Operating system	Linux (ubuntu 18.04)
Publisher	-
Offer	-
Plan	-

Networking

Public IP address	20.124.23.178
Public IP address (IPv6)	-
Private IP address	10.10.10.4
Private IP address (IPv6)	-
Virtual network/subnet	SOC- default
DNS name	Not configured

Task 3: Access your sensor via the console

1. Proceed to access the console by using the selected networking method IP (Public or IP) using <https://> as shown in the image and sign in with the IP you copied in the previous step. Username is **cyberx_host** and the password is what you copied in step 2.

Not secure | https://xxx.xxx.xxx.xxx /login

Microsoft | Defender for IoT sensor

Sensor Sign in

User name

Password

Forgot password? (for admin users only)
[Reset](#)

Login

2. Upon successful login please proceed immediately to change the password by clicking on the username on the top right corner and selecting **Sign out**.

3. After signing out, please return to the Azure portal and navigate to "**Defender for IoT**". Select "**Sites and sensors**".
4. Click on "Onboard OT sensor".

Step 3: Register this sensor with Microsoft Defender for IoT

Sensor name *

Subscription *

Cloud connected ⓘ

Automatic Threat Intelligence updates

Sensor version *

Site *

Resource name *

No subscription has been selected
Create site

Display name *

Tags

Zone *

No subscription has been selected
Create zone

Add in a name for your sensor and pick your subscription from the dropdown. You can choose to cloud connect it. Pick your Resource name from the dropdown, give it a display name and a zone. This automatically initiates the download for the activation file.

5. Select your sensor from the list and click on "**Recover my password**".

Defender for IoT | Sites and sensors

Showing subscription 'BuildEnv'

General

Management

Sites and sensors (highlighted)

Pricing

Sensor name	Sensor type	Zone	Subscription ...	Sensor version	Sensor status	Last connect...	Threat Intelli...	Threat Intelli...	Threat...
D4IOTsensor-TT	EIoT	default	BuildEnv	22.1.3.4162	Unavailable	--	--	--	...
sensor-Cyber	OT cloud co...	default	BuildEnv		Disconnected	A week ago	5/25/2022	Automatic	...

Context menu options (highlighted):

- Edit
- Push Threat Intelligence update
- Recover my password (highlighted)
- Download activation file
- Delete sensor

6. You will see this prompt asking for the "secret identifier".

Defender for IoT | Sites and sensors

Showing subscription 'BuildEnv'

General

Management

Sites and sensors (highlighted)

Pricing

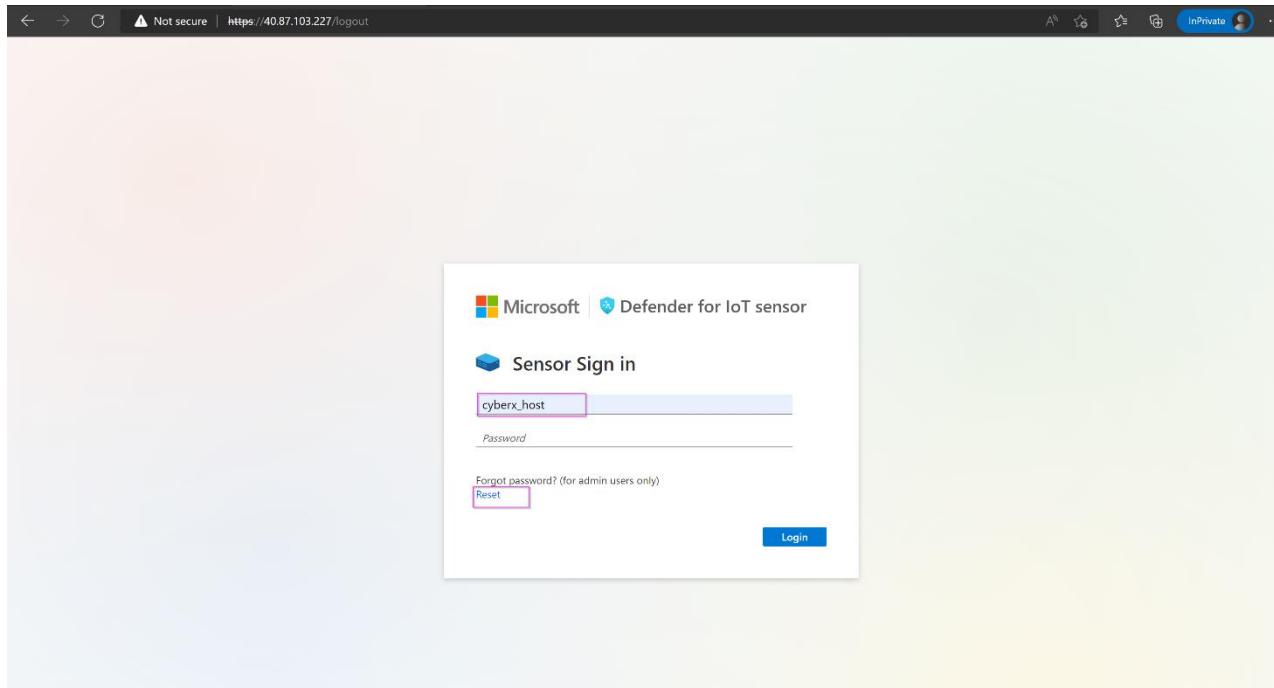
Recover

Insert secret identifier *

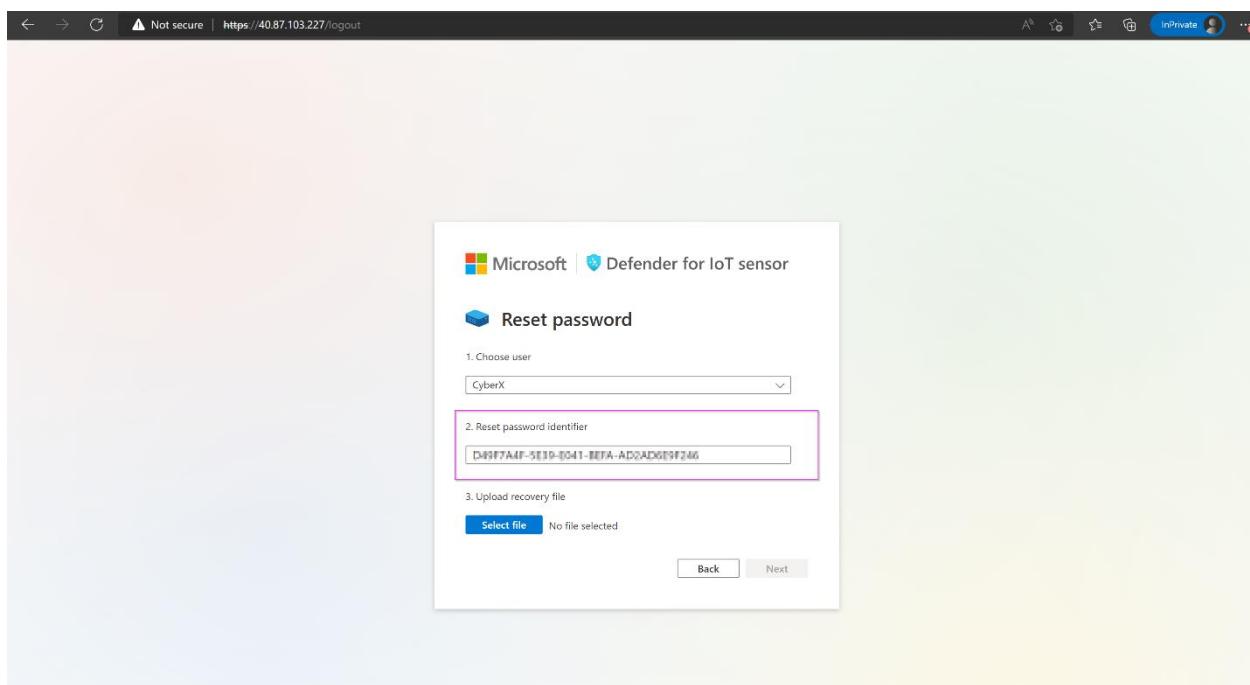
Sub0001-777-0e57-88h12

Recover Cancel

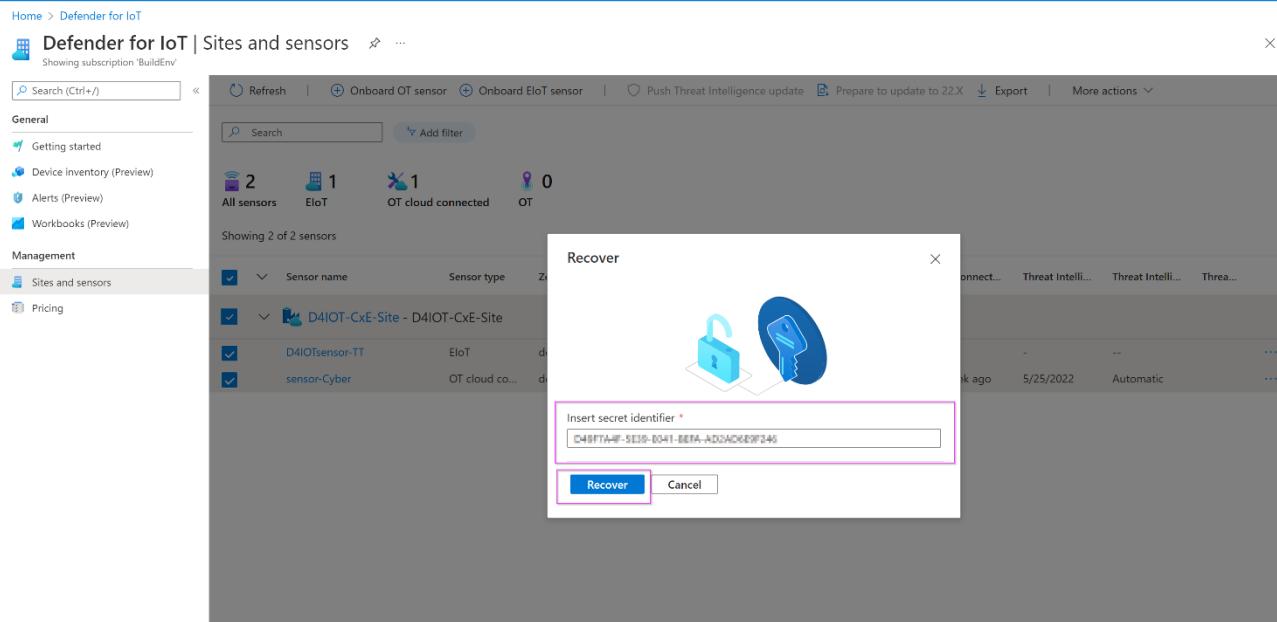
7. Return to the sensor console and type in the username followed by "Reset" as shown.



8. Copy the identifier.

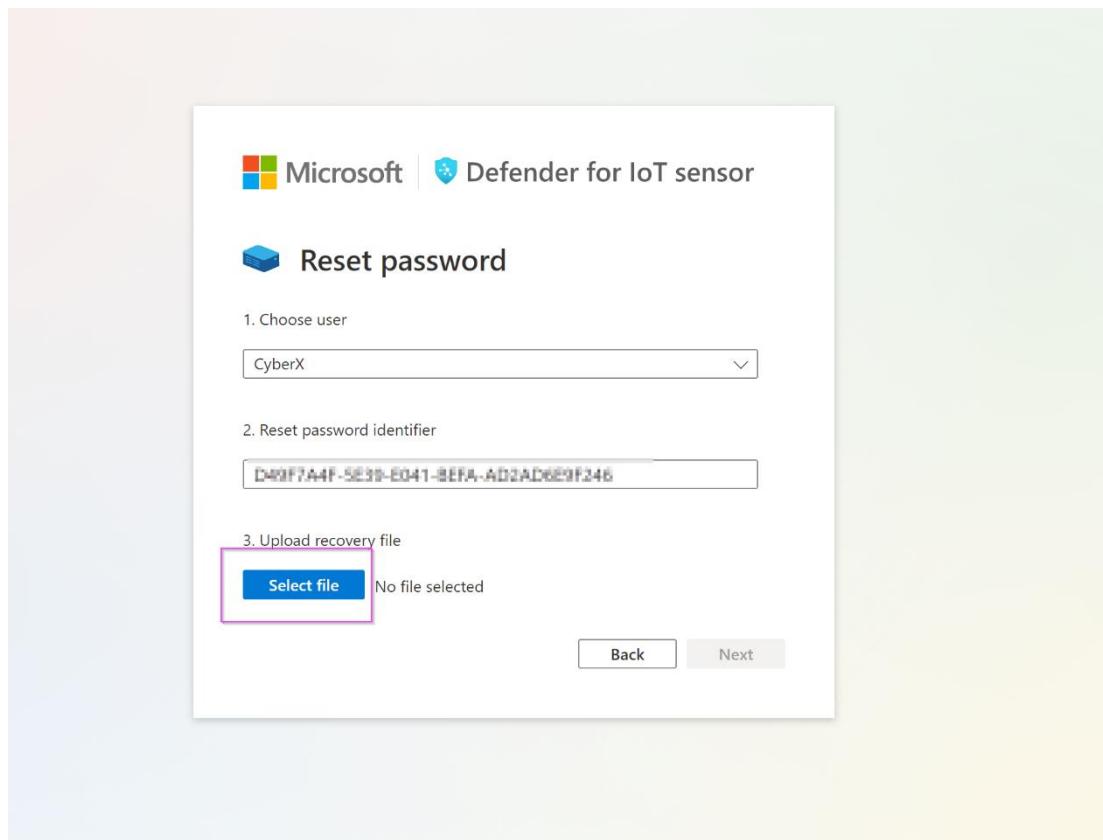


9. Paste in the box on the Defender for IoT Azure window. Click "**Recover**".



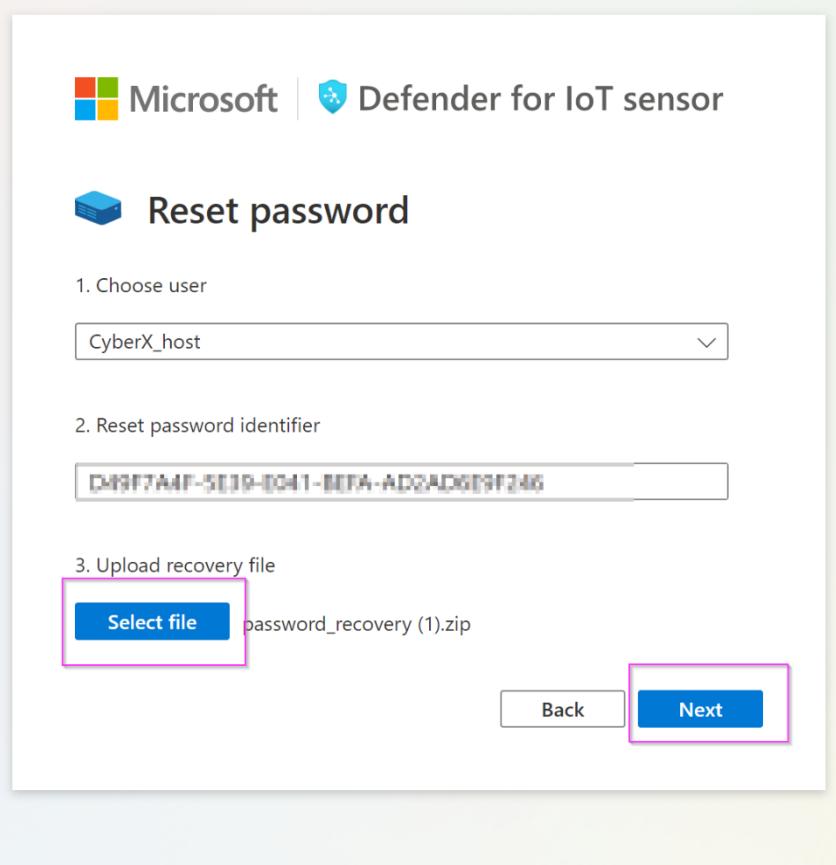
The screenshot shows the Microsoft Defender for IoT interface. On the left, there's a navigation sidebar with 'General' and 'Management' sections. Under 'Management', 'Sites and sensors' is selected. In the main area, there's a summary bar with icons for 2 All sensors, 1 EIoT, 1 OT cloud connected, and 0 OT. Below this, a table lists two sensors: 'D4IOT-CxE-Site - D4IOT-CxE-Site' and 'D4IOTsensor-TT'. A modal window titled 'Recover' is open, prompting for a secret identifier. The identifier 'D49F7A4F-5E39-E041-BEFA-AD2AD6E9F246' is entered into the input field.

10. The “*password_recovery*” file download starts. Once the download is complete, return to the sensor console and click on “**Upload recovery file**”. **Do not unzip the folder**.



The screenshot shows the 'Reset password' wizard. Step 1: Choose user dropdown set to 'CyberX'. Step 2: Reset password identifier input field containing 'D49F7A4F-5E39-E041-BEFA-AD2AD6E9F246'. Step 3: Upload recovery file section with a 'Select file' button highlighted by a pink box. Below it, a message says 'No file selected'. At the bottom are 'Back' and 'Next' buttons.

11. Click on “**Next**”.



Microsoft | Defender for IoT sensor

Reset password

1. Choose user

CyberX_host

2. Reset password identifier

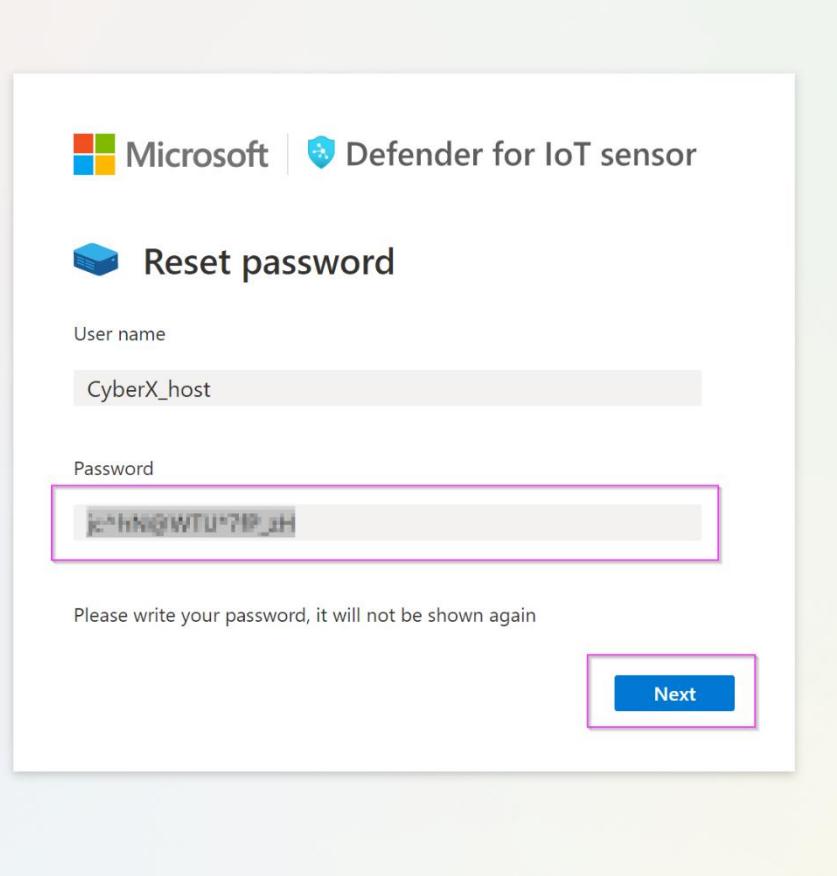
D9F7A4F-5E19-0411-BFA-AD2AD619F246

3. Upload recovery file

Select file password_recovery (1).zip

Back Next

12. After uploading the file, you will be shown a temporary password on the screen. Please note it down.



Microsoft | Defender for IoT sensor

Reset password

User name

CyberX_host

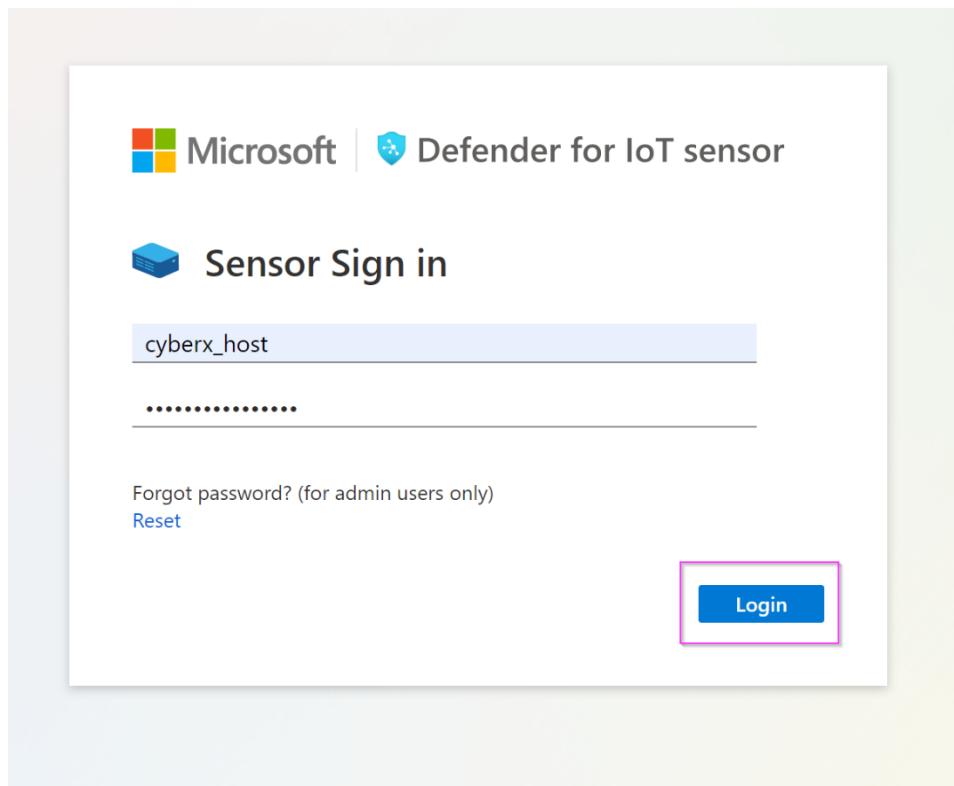
Password

j^<hn@WTU*7IP_jH

Please write your password, it will not be shown again

Next

13. Log in with the new password.



14. Repeat this step for all the usernames.

Exercise 3: Perform an Upgrade

Task 1: Download the Upgrade ISO file

1. Go to the Azure portal and navigate to the Defender for IoT page.
2. Go to "Getting Started" -> "Sensor" -> Download the latest recommended upgrade version.

Home >

Defender for IoT | Getting started Showing 3 subscriptions

Search Get started Windows IoT Enterprise (Preview) **Sensor** On-premises management console Updates

General

- Getting started**
- Device inventory (Preview)
- Alerts (Preview)
- Recommendations (Preview)
- Workbooks

Management

- Sites and sensors
- Plans and pricing
- Settings (Preview)

Troubleshooting + Support

- Diagnose and solve problems

Version 22.2.9 supports a new cloud connectivity model that requires sensor reactivation when updating from 10.5.X. [Learn more](#)

Use the information here to help you purchase hardware and install software.

Buy preconfigured appliance

Buy a preconfigured appliance from Arrow. The appliance will be delivered to your facility. Contact Arrow directly by mail to purchase the appliance.

[Identify required appliances](#) [Install software](#) [Set up your network](#)

Contact vendor to get a price quote

[Contact](#)

Purchase an appliance and install software

The solution runs on certified physical and virtual appliances. Acquire an appliance and download the ISO image to install the sensor.

[Identify required appliances](#) [Install software](#) [Set up your network](#)

Select version

22.2.9 (Latest) - recommended

MDS Hash - 5a2dbb762791112af562b643d980920f

[Download](#)

Task 2: Upgrade your sensor

1. On the sensor, go to "System Settings" -> "Sensor Management" -> "Software Update".

The screenshot shows the Microsoft Defender for IoT dashboard. On the left, there's a navigation sidebar with sections like Discover, Analyze, and Manage. Under Manage, the 'System settings' option is selected and highlighted with a pink box. In the main content area, under 'Discover', there's a 'Network monitoring' section. Within this, a 'Sensor management' dropdown is open, showing options like 'Software Update' and 'Threat Intelligence'. The 'Software Update' box is also highlighted with a pink box. Other sections visible include 'Subscription & Activation Mode', 'Backup & Restore', 'System Health Check', and 'SNMP MIB Monitoring'.

2. Click on "Upload File" and upload the iso file you downloaded.

This screenshot is identical to the one above, showing the Microsoft Defender for IoT dashboard with the 'System settings' section selected. The 'Software Update' section is again highlighted with a pink box, indicating where the user should click to upload the ISO file.

3. Verify the version on the dashboard.

The screenshot shows the Microsoft Defender for IoT dashboard with the 'Overview' section selected. At the top, there's a status bar with 'Microsoft' and 'VishalvitaDemo - 22.2.8'. Below it, the 'Discover' section has 'Overview' selected. The main content area shows summary metrics: 0 PPS, 124 Devices, and 32 Alerts. Under 'General Settings', the 'Version:' field is shown as '22.2.8.20-r-3bd7f37', which is also highlighted with a pink box.

Exercise 4: Simulate Data in your sensor.

Task 1: Enabling the PCAP Player

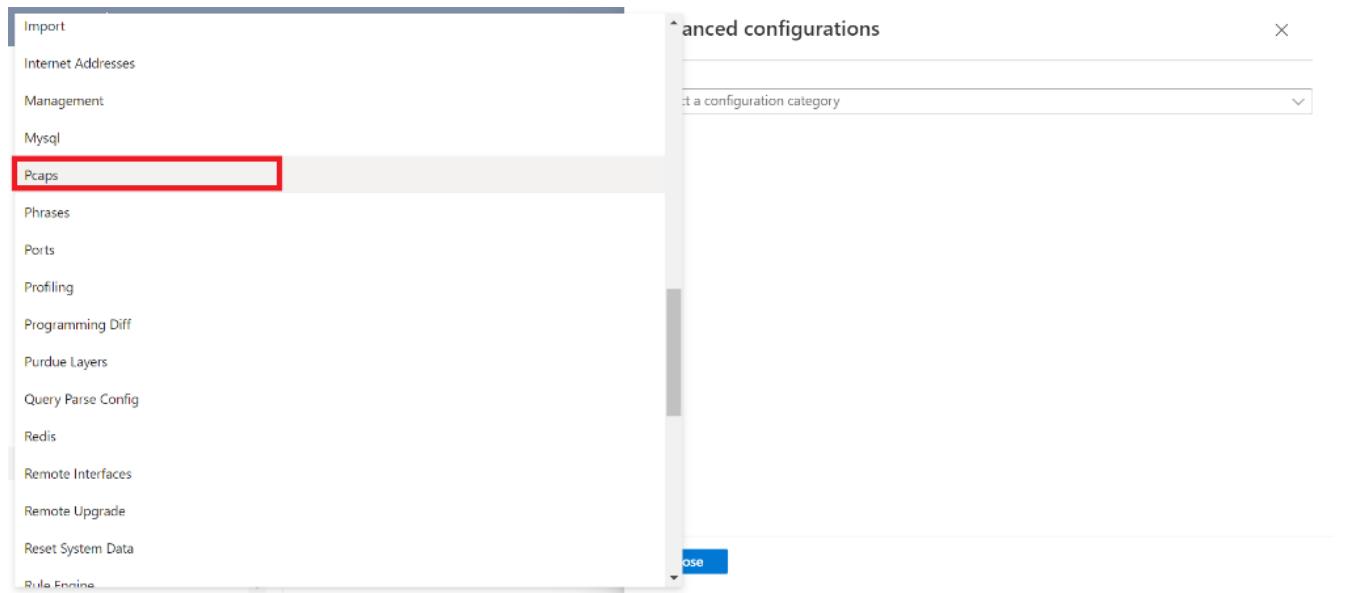
1. The PCAP player needs to be enabled to be visibly available for use in the UI. To do so, please select the "**System settings**" option from the scrolled down left side menu.

The screenshot shows the Microsoft Defender for IoT interface. The left sidebar has a 'Manage' section with 'System settings' highlighted by a red box. The main area is titled 'Basic' under 'Sensor Setup' and contains four cards: 'Sensor Network Settings', 'Connection to Management Console', 'Time & Region', and 'Subnets'.

2. Scroll down to locate the "**Advanced Configuration**" option (Shown in the image below in the red square).

The screenshot shows the Microsoft Defender for IoT interface. The left sidebar has a 'Manage' section with 'System settings' highlighted by a red box. The main area is titled 'Health and troubleshooting' and contains four cards: 'Backup & Restore', 'System Health Check', 'SNMP MIB Monitoring', and 'Advanced Configurations', which is highlighted with a red box.

3. From "Select a Configuration Category", select Pcaps.



4. Scroll down to locate the "enabled" variable and set it to 1. Click **Save** and approve to commit the change.

The screenshot shows the Microsoft Defender for IoT interface. The left sidebar includes sections like Home, System settings, Defender for IoT (with sub-options like Alerts, Analyze, Event timeline, Data mining, Risk assessment, Trends & statistics, Attack vector), Manage, and System settings (with sub-options like Custom alert rules, Users, Forwarding). The 'System settings' section is currently selected. In the center, there are cards for 'Backup data and restore the latest backup' and 'SNMP MIB Monitoring'. To the right, a modal window titled 'Advanced configurations' is open, specifically for the 'Pcaps' category. It displays configuration parameters including 'cache.should.save.pcap=1', 'archive.cache.dir...', 'player.max_size=1000', 'player.max_amount=20', 'player.params=', and 'enabled_0'. A red box highlights the 'Save' button at the bottom of the modal. Below the modal, there are 'Close' and 'Import settings' buttons.

Task 2: Play PCAP files

1. Use [this](#) link to download the holcaps.zip folder.
2. Unzip the folder.
3. Scroll all the way down to the bottom to locate if the PCAP Player is enabled (Shown in the image below in the red top square) or not. If the PCAP player is not shown, proceed to click on the arrow next to the **Sensor Management** button (Shown in the image below in the red lower square).

Microsoft | Microsoft Defender for IoT - 22.1.3

Home > System settings

Defender for IoT | System settings

Analyze

- Event timeline
- Data mining
- Risk assessment
- Trends & statistics
- Attack vector

Manage

- System settings (highlighted)
- Custom alert rules
- Users
- Forwarding

SSL/TLS Certificate

Manage SSL/TLS certificates installed on this sensor

Play PCAP

Upload and play PCAP files

Sensor management (highlighted)

Network monitoring

Integrations

Import settings

4. Click on “Upload” and select your Pcap files from the unzipped folder.

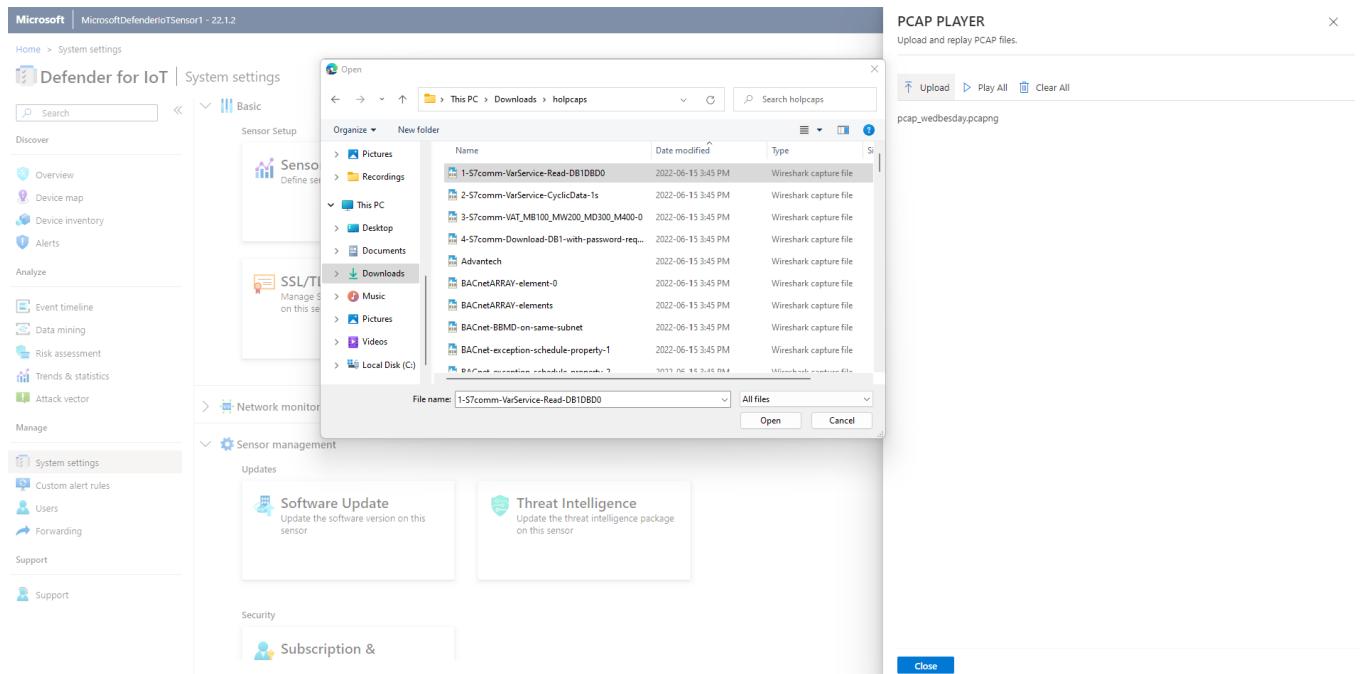
Advanced configurations

Pcaps

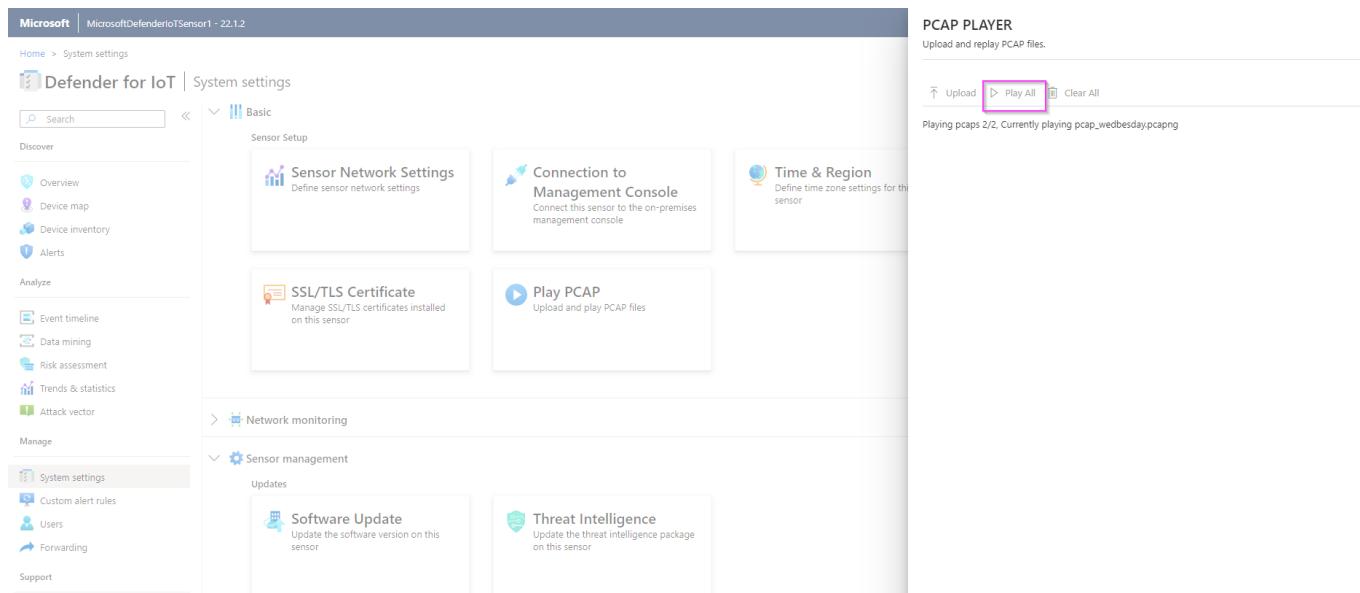
```
size.megabytes.max=44032  
archive.size.megabytes.max=  
size.megabytes.min=17408  
archive.size.megabytes.min=  
cache.should.save.pcap=1  
archive.cache.dir=  
filtered.cache.dir.size.megabytes.max=7168  
filtered.cache.dir.size.megabytes.min=3072  
filtered.archive.dir.size.megabytes.max=  
filtered.archive.dir.size.megabytes.min=  
filtered.archive.dir=  
player.max_size=10000  
player.max_amount=200  
player.params=-M 20 #runs the pcaps faster in the UI  
player.enabled=1  
virtual.lan.hierarchy.depth.support=1  
filtered.timeout.seconds=10
```

Save

Close



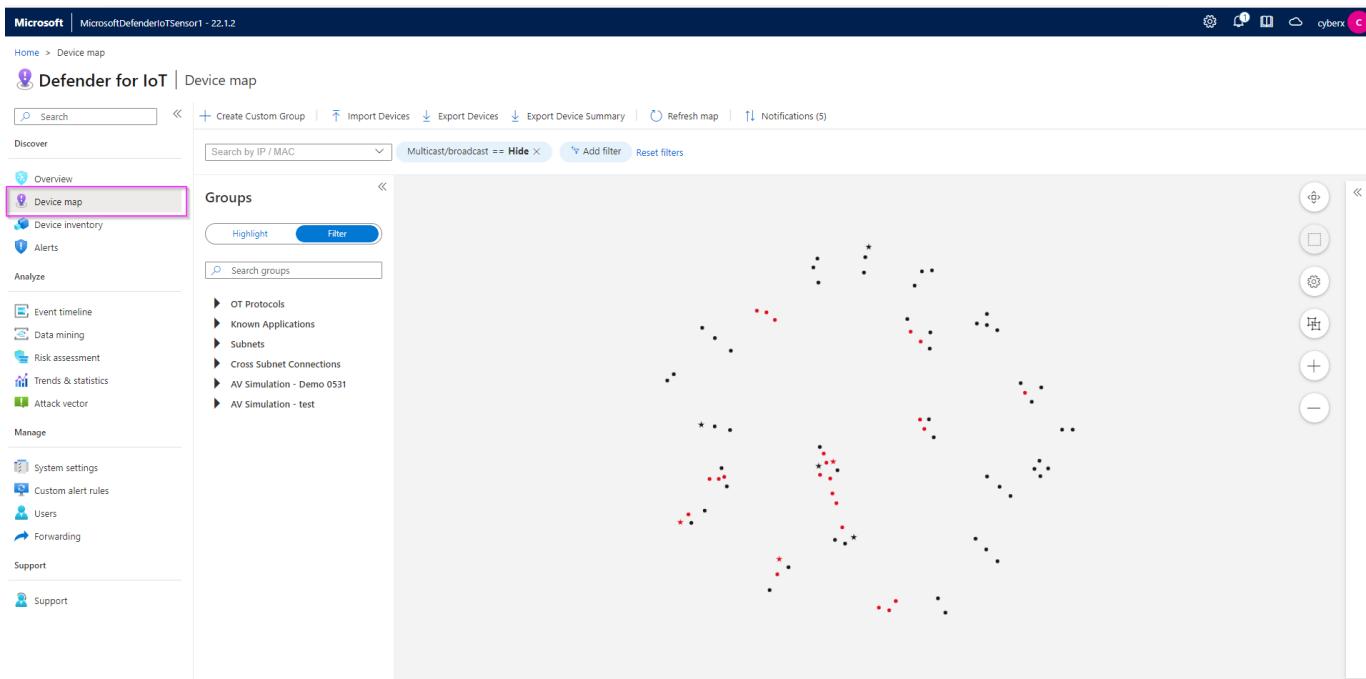
5. Click "Play All" to play the Pcaps.



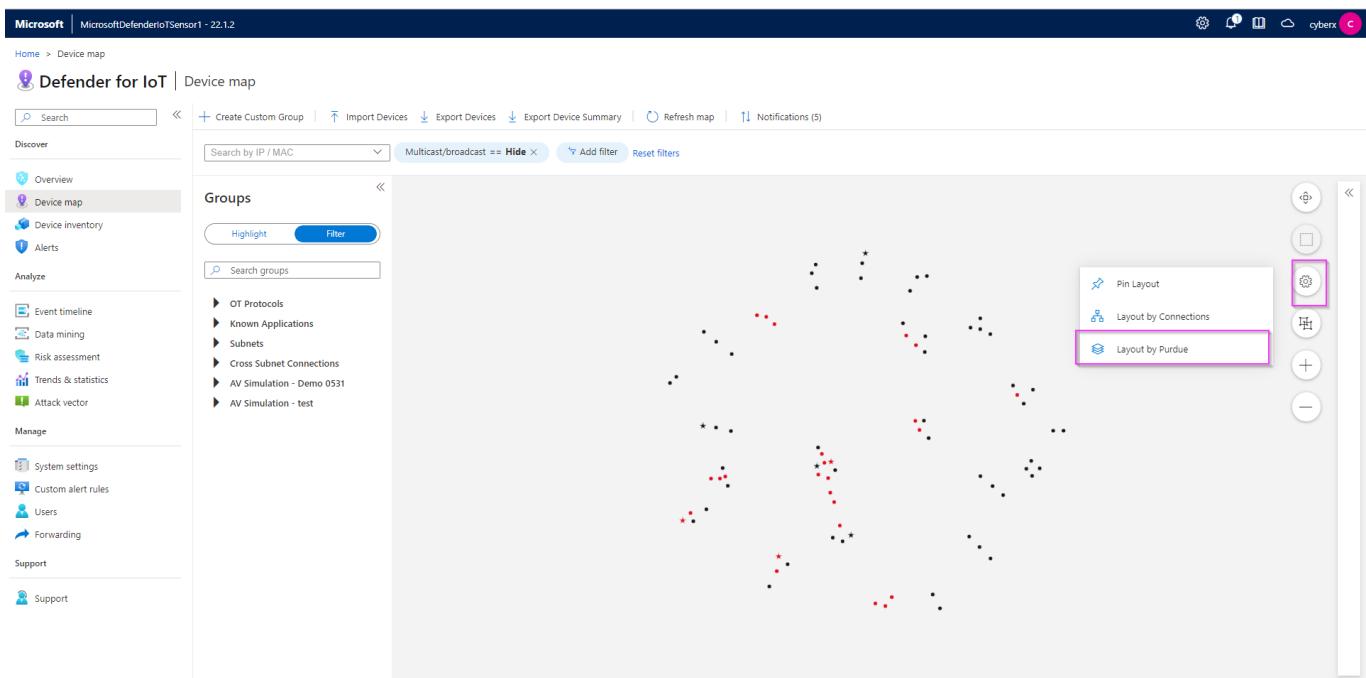
Exercise 5: Analyzing the Data

Task 1: Visualize on the Device Map

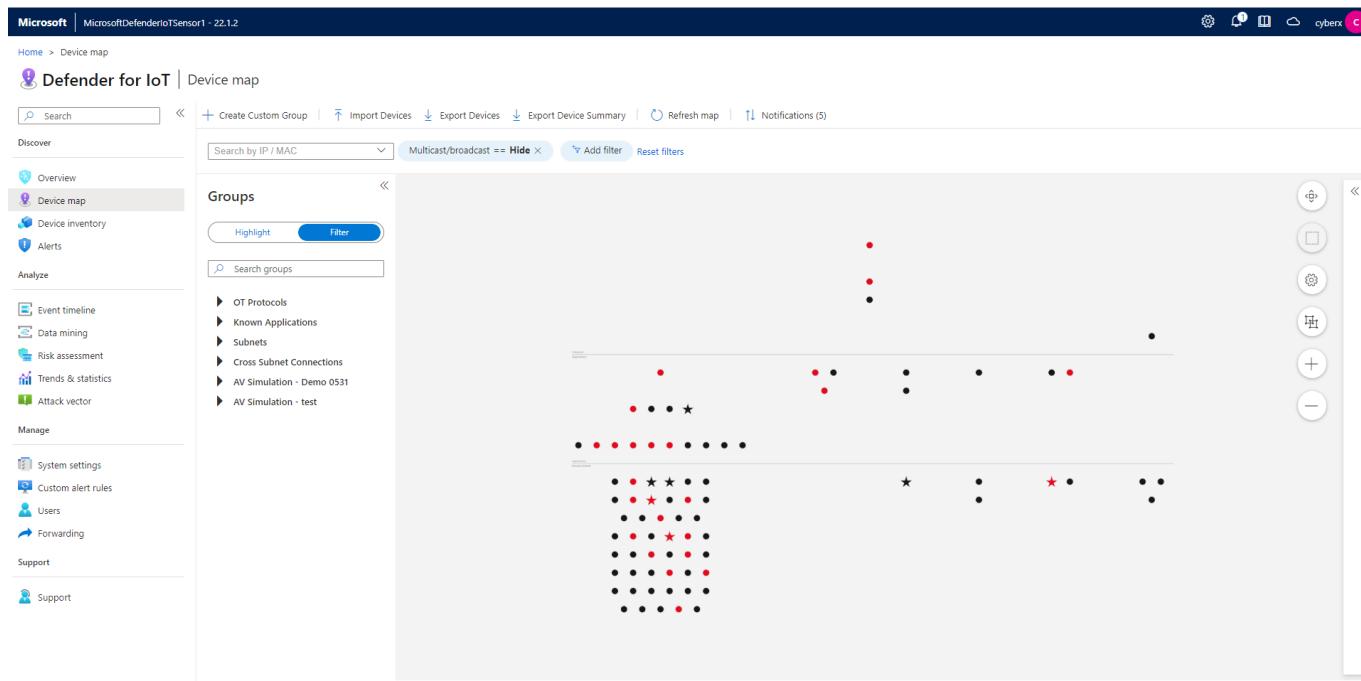
1. Click on “Device Map” from the menu on the left side.



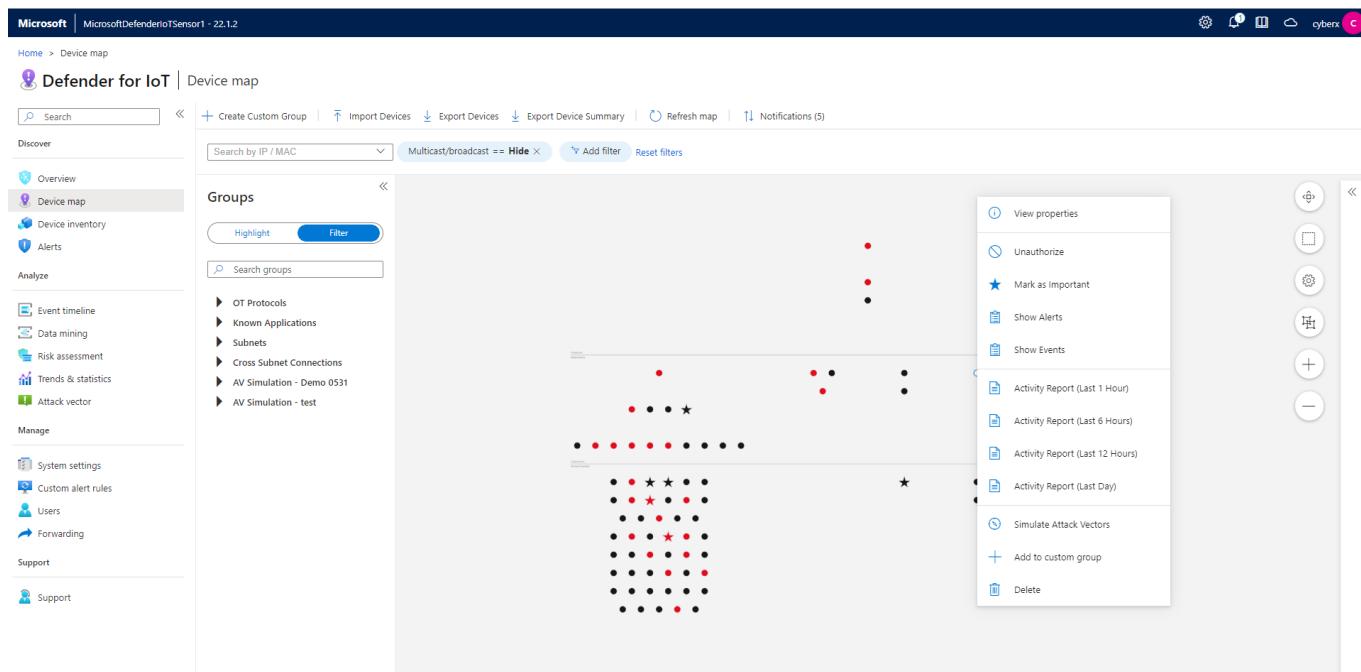
2. Click on the “Settings” option and select **Layout by Purdue** which will allow you to see the different layers between Corporate IT and site operations.



3. Once you confirm the changes, you will see the devices laid out as shown in the image below.



4. Right click on any device (represented by a dot) to view properties, show related events, alerts, reports or simulate attack vectors.



5. To filter by OT Protocols, expand the arrow, and pick the protocol you want to filter by. The console will display the devices that match the filter.

The screenshot shows the Microsoft Defender for IoT Device map interface. On the left, a sidebar lists various categories: Discover, Overview, Device map (which is selected and highlighted in grey), Device inventory, Alerts, Analyze, Manage, and Support. Under the 'Analyze' section, there are links for Event timeline, Data mining, Risk assessment, Trends & statistics, Attack vector, System settings, Custom alert rules, Users, Forwarding, and Support. The main area displays a network diagram with three nodes: 192.168.109.1, 192.168.109.21, and 192.168.109.2. Each node has an alert icon. To the right of the nodes is a vertical toolbar with icons for zoom, refresh, and other navigation functions. On the far right, there is a large vertical sidebar containing a list of OT protocols: BACNet (4), BACNet (NPDU) (4), CIP (7), DNP3 (8), DeltaV (3), Emerson ROC (3), EtherNet/IP (7), Foxboro I/A (6), Honeywell FDA Diagnostics (2), MMS (4), MODBUS (3), Mitsubishi MELSEC (3), and Omron FINS (2). The 'MODBUS' entry is highlighted with a pink rectangle.

Task 2: View the associated Alerts

1. Right click on any device that has an Alert associated with it and click on "Show Alerts".

This screenshot shows the Microsoft Defender for IoT Device map interface, similar to the previous one but with a different network topology. It features four nodes: 192.168.110.2, 192.168.110.1, 192.168.110.4, and 192.168.110.10. The node 192.168.110.10 has an alert icon. A context menu is open over this device, listing options: View properties, Unauthorized, Mark as Important, Show Alerts (which is highlighted with a pink rectangle), Show Events, Activity Report (Last 1 Hour), Activity Report (Last 6 Hours), Activity Report (Last 12 Hours), Activity Report (Last Day), Simulate Attack Vectors, Add to custom group, and Delete. The sidebar on the left and the vertical toolbar on the right are identical to the first screenshot.

2. The Alerts page helps you identify some important data about the alert, like Alert Severity, Engine, Detection time, as well as the Source Device IPs. It also displays general information about the type of device, network interfaces and protocols.

This screenshot shows the Microsoft Defender for IoT Device map interface. On the left, there's a sidebar with navigation links like Home, Device map, and Alerts. The main area displays a device card for 'Device | 192.168.110.21'. The card includes sections for General Information (Type: Engineering Station, Vendor: INTEL CORPORATE, Location: Automatic), Network Interfaces (IP: 192.168.110.21, MAC: acfdce:ccbbdd), and Protocols (SSH, EtherNet/IP, TDS, FTP, CIP). Below the card is an 'Edit Properties' button. At the top right, there are tabs for Map View, Alerts (which is selected), and Event Timeline. A search bar and filter options are also present. The main content area shows a table of alerts with columns for Severity, Name, Engine, Detection time, Status, and Source Device. Two alerts are listed: 'Unauthorized Internet Connectivity Detected' (Critical, Policy Violation, 2 weeks ago, New, 192.168.110.21) and 'EtherNet/IP Encapsulation Protocol Command Failed' (Major, Operational, 2 months ago, New, 192.168.110.2). A 'Group by' dropdown menu is visible at the top right of the alert table.

3.To view more details about the Alert and/or to take remediation actions, select the Alert by checking the box beside it, and picking either “**View Full Details**” or “**Take Action**”.

This screenshot shows the Microsoft Defender for IoT Alerts page. The left sidebar has links for Discover, Device inventory, Alerts (which is selected), Analyze, Manage, and Support. The main area shows a table of alerts with columns for Severity, Name, Engine, Detection time, Status, and Source Device. Two alerts are listed: 'Unauthorized Internet Connectivity Detected' (Critical, Policy Violation, 2 weeks ago, New, 192.168.110.21) and another identical entry. To the right of the table, a detailed view of the first alert is shown. It includes a summary box with the alert ID (53), status (New), and detection time (2 weeks ago). Below this is a 'Description' section stating: 'A device defined in your internal network is communicating with addresses on the internet. These addresses have not been learned as valid addresses.' It also notes that 'Device 192.168.110.21 communicated with addresses shown in External Addresses. Verify that this device is properly configured.' Further down are sections for 'Related Devices' (Source device: 192.168.110.21, Destination device: Internet (37.142.39.186)) and two buttons at the bottom: 'View full details' and 'Take action'.

4.You can view all the alerts on your sensor by clicking on the **Alerts** option on the menu on the left. Make sure all the filters are removed. You can group the alerts by picking an option from the “**Group by**” dropdown.

Showing 22 of 22 alerts

Severity	Name	Engine	Detection time	Status	Source Device
Critical	Unauthorized Internet Connectivity Detected	Policy Violation	2 weeks ago	New	192.168.110.21
Critical	Unauthorized Internet Connectivity Detected	Policy Violation	2 weeks ago	New	192.168.110.23
Critical	Port Scan Detected	Anomaly	2 weeks ago	Closed	192.168.110.21
Major	EtherNet/IP Encapsulation Protocol Command Failed	Operational	2 months ago	New	192.168.110.2
Critical	Unauthorized PLC Programming	Policy Violation	2 months ago	Closed	192.168.122.1
Critical	No Traffic Detected on Sensor Interface	Operational	2 months ago	New	192.168.100.8
Critical	Unauthorized Internet Connectivity Detected	Policy Violation	2 months ago	New	192.168.110.8
Warning	Traffic Detected on Sensor Interface	Operational	2 months ago	New	192.168.110.1
Major	EtherNet/IP Encapsulation Protocol Command Failed	Operational	3 months ago	Closed	192.168.117.23
Critical	Excessive SMB login attempts	Anomaly	3 months ago	New	192.168.117.23
Major	Event Buffer Overflow in Outstation	Operational	3 months ago	New	192.168.117.23
Warning	Controller Reset	Operational	3 months ago	New	192.168.117.23
Warning	Controller Reset	Operational	3 months ago	New	192.168.117.23
Warning	An S7 Stop PLC Command was Sent	Operational	3 months ago	New	192.168.118.22
Warning	An S7 Stop PLC Command was Sent	Operational	3 months ago	New	192.168.118.11
Major	GE SRTP Command Failure	Operational	3 months ago	New	192.168.109.1
Major	Modbus Exception	Protocol Violation	3 months ago	New	192.168.109.2
Major	Modbus Exception	Protocol Violation	3 months ago	New	192.168.108.2
Major	Honeywell Firmware Version Changed	Policy Violation	3 months ago	New	192.168.108.2

Task 3: Device Inventory

1. This view allows you to see all the devices connected to your sensor as a list. To filter, click on "Add filter" on the top. For example: the "**Is Authorized**" will show you devices that are either authorized or unauthorized depending on value (True or False) you choose.

Showing 100 of 291 items

IP Address	Name	Last Activity	Type	Protocols	MAC Address	Vendor	Firmware Version	Model	Operating System	Rack	Slot
192.168.100.8	192.168.100.8	50 minutes ago	Unknown	DNS, MDNS, Net...	54:14:f9:74:d8:21	INTEL CORPORA...					
192.168.100.1	192.168.100.1	50 minutes ago	Server	DNS							
192.168.1.11	192.168.1.11	50 minutes ago	PLC	Siemens S7	00:fb:54:db:ef:9	NETGEAR					
192.168.1.180	192.168.1.180	50 minutes ago	HMI	Siemens S7							
192.168.117.23	192.168.117.23	22 hours ago	PLC	DNP3 (Identifier...)	00:30:a7:08:92:c6	SCHWEITZER EN...					
192.168.117.1	192.168.117.1	22 hours ago	Unknown	DNP3 (Identifier...)	00:23:ea:49:5a:c2	CISCO SYSTEMS ...					
192.168.117.22	192.168.117.22	22 hours ago	PLC	DNP3 (Identifier...)	00:30:a7:08:97:0	SCHWEITZER EN...					
192.168.117.25	192.168.117.25	22 hours ago	PLC	DNP3 (Identifier...)	00:cc:1c:02:09:da	EATON CORPOR...					
192.168.117.7	192.168.117.7	22 hours ago	PLC	Siemens SICAM	00:e0:a8:01:90:be	SAT GMBH & CO.	15.01	CPC65 (6065)			
192.168.117.239	192.168.117.239	22 hours ago	Unknown	Siemens SICAM	00:0c:29:28:28:38	VMWARE INC.					
192.168.117.8	192.168.117.8	22 hours ago	PLC	Siemens SICAM	00:e0:a8:01:90:bb	SAT GMBH & CO.	15.01	CPC65 (6065)			
192.168.107.10	FC50507	22 hours ago	DCS Controller	Yokogawa VNet/IP	00:00:64:9d:5d:10	YOKOGAWA DIG...					
192.168.107.1	192.168.107.1	22 hours ago	Unknown	Yokogawa VNet/IP	00:00:64:9d:73:d4	YOKOGAWA DIG...					
192.168.107.2	192.168.107.2	22 hours ago	Unknown	Yokogawa VNet/IP	00:00:64:9e:84:e5	YOKOGAWA DIG...					
192.168.118.3	192.168.118.3	22 hours ago	PLC	Siemens S7	00:01:e3:11:22:33	SIEMENS AG	3.2.6	6E57 315-6EH14...	0	4	
192.168.118.3	192.168.118.3	22 hours ago	PLC	Siemens S7	00:01:e3:11:22:33	SIEMENS AG	3.2.6	6E57 315-9EH14...	1	2	
192.168.118.3	192.168.118.3	22 hours ago	PLC	Siemens S7	00:01:e3:11:22:33	SIEMENS AG	3.2.6	6E57 315-8EH14...	1	2	

2. You can export the list to a csv file.

Microsoft | MicrosoftDefenderIoTSensor1 - 22.1.2

Home > Device inventory

Defender for IoT | Device inventory

Search | Save Filter | Refresh | Edit Columns | Export

Discover

- Overview
- Device map
- Device inventory**
- Alerts
- Analyze
- Event timeline
- Data mining
- Risk assessment
- Trends & statistics
- Attack vector
- Manage
- System settings
- Custom alert rules
- Users
- Forwarding
- Support
- Support

Showing 100 of 291 items

	IP Address	Name	Last Activity	Type	Protocols	MAC Address	Vendor	Firmware Version	Model	Operating System	Rack	Slot
<input type="checkbox"/>	192.168.100.8	192.168.100.8	An hour ago	Unknown	DNS, MDNS, Net...	5:14:f3:7d:8:21	INTEL CORPORA...					
<input type="checkbox"/>	192.168.100.1	192.168.100.1	An hour ago	Server	DNS							
<input type="checkbox"/>	192.168.1.11	192.168.1.11	An hour ago	PLC	Siemens S7	0:0:fb:5:4:be:f3	NETGEAR					
<input type="checkbox"/>	192.168.1.180	192.168.1.180	An hour ago	HMI	Siemens S7							
<input type="checkbox"/>	192.168.117.23	192.168.117.23	22 hours ago	PLC	DNP3 (Identifier...)	0:30:a7:08:92:c6	SCHWEITZER EN...					
<input type="checkbox"/>	192.168.117.1	192.168.117.1	22 hours ago	Unknown	DNP3 (Identifier...)	0:23:ea:49:5a:c2	CISCO SYSTEMS ...					
<input type="checkbox"/>	192.168.117.22	192.168.117.22	22 hours ago	PLC	DNP3 (Identifier...)	0:30:a7:08:97:c0	SCHWEITZER EN...					
<input type="checkbox"/>	192.168.117.25	192.168.117.25	22 hours ago	PLC	DNP3 (Identifier...)	0:0cc1:02:09:da	EATON CORPOR...					
<input type="checkbox"/>	192.168.117.7	192.168.117.7	22 hours ago	PLC	Siemens SICAM	0:e0:a8:01:90:be	SAT GMBH & CO.	15.01	CPC65 (6065)			
<input type="checkbox"/>	192.168.117.239	192.168.117.239	22 hours ago	Unknown	Siemens SICAM	0:0:c2:92:28:38	VMWWARE INC.					
<input type="checkbox"/>	192.168.117.8	192.168.117.8	22 hours ago	PLC	Siemens SICAM	0:e0:a8:01:90:bb	SAT GMBH & CO.	15.01	CPC65 (6065)			
<input type="checkbox"/>	192.168.107.10	FC50507	22 hours ago	DCS Controller	Yokogawa VNet/IP	0:0:0:64:9d:5:d:10	YOKOGAWA DIG...					
<input type="checkbox"/>	192.168.107.1	192.168.107.1	22 hours ago	Unknown	Yokogawa VNet/IP	0:0:0:64:9d:7:3:d	YOKOGAWA DIG...					
<input type="checkbox"/>	192.168.107.2	192.168.107.2	22 hours ago	Unknown	Yokogawa VNet/IP	0:0:0:64:9e:84:e5	YOKOGAWA DIG...					
<input type="checkbox"/>	192.168.118.3	192.168.118.3	22 hours ago	PLC	Siemens S7	0:0:1:e3:11:22:33	SIEMENS AG	3.2.6	6E57 315-6EH14...	0	4	
<input type="checkbox"/>	192.168.118.3	192.168.118.3	22 hours ago	PLC	Siemens S7	0:0:1:e3:11:22:33	SIEMENS AG	3.2.6	6E57 315-9EH14...	1	2	
<input type="checkbox"/>	192.168.118.3	192.168.118.3	22 hours ago	PLC	Siemens S7	0:0:1:e3:11:22:33	SIEMENS AG	3.2.6	6E57 315-8EH14...	1	2	

Load More...

Task 4: View the Event Timeline

- This view will allow you a Forensic analysis of your alerts. You can choose to Hide or Unhide the User Operations or select more filter types from the "Add filter".

Microsoft | MicrosoftDefenderIoTSensor1 - 22.1.2

Home > Event timeline

Defender for IoT | Event timeline

Search | Create event | Refresh | Export

User Operations == Hide | Add filter | Reset filters

Discover

- Overview
- Device map
- Device inventory
- Alerts
- Analyze
- Event timeline**
- Data mining
- Risk assessment
- Trends & statistics
- Attack vector
- Manage
- System settings
- Custom alert rules
- Users
- Forwarding
- Support
- Support

Event type

Event type	Time	Description
Device Detected	6/24/2022, 2:29:04 PM	Device 192.168.1.180 was detected
Device Connection Detected	6/24/2022, 2:29:04 PM	Connected devices 192.168.1.11 and 192.168.1.180
Device Detected	6/24/2022, 2:29:04 PM	Device 192.168.1.11 was detected
Firmware Update	6/23/2022, 5:30:28 PM	Client device 192.168.122.20 copied firmware on PLC 192.168.122.1:Client device 192.168.122.20 copied fir...
PLC Password Change	6/23/2022, 5:30:28 PM	Client device 192.168.122.20 requested PLC 192.168.122.1 to change password
PLC Reset	6/23/2022, 5:30:28 PM	Client device 192.168.122.20 requested PLC 192.168.122.1 to reset itself
PLC Start	6/23/2022, 5:30:28 PM	Client device 192.168.122.20 changed the PLC 192.168.122.1 mode to start
Firmware Update	6/23/2022, 5:30:28 PM	Client device 192.168.122.21 copied firmware on PLC 192.168.122.1
PLC Programming Mode Set	6/23/2022, 5:30:28 PM	Client device 192.168.122.20 tried to change PLC 192.168.122.1 mode to programming mode
Firmware Update	6/23/2022, 5:30:28 PM	Client device 192.168.122.21 copied firmware on PLC 192.168.122.2
PLC Password Change	6/23/2022, 5:30:28 PM	Client device 192.168.122.21 requested PLC 192.168.122.1 to change password
PLC Reset	6/23/2022, 5:30:28 PM	Client device 192.168.122.21 requested PLC 192.168.122.1 to reset itself

Load More...

Task 5: Data Mining

- In this section you can create multiple custom reports. As an example, we will create a Report based on firmware updates versions. Click on + Create report to open the wizard.

Create new report

Name * Report name

Description

Send to CM

Choose Category * Category

Order by Activity

Filter by Results within the last 3 minutes

IP address

MAC address

Port

Device group

Save Cancel

2. Assign a name and a description to your report. Pick “**Modules and Firmware Versions**” for Category, select “**Firmware Version (GENERIC)**” from “add filter”.

Create new report

Name * PLC Firmware Version

Description Report showing the firmware version of the different PLCs.

Choose Category * Modules and Firmware Versions

Order by Activity

Filter by Results within the last 3 minutes

IP address

MAC address

Port

Device group Firmware Version (GENERIC)

+ Add filter type

Save Cancel

3. Your report will show up on the list under “My reports”.

The screenshot shows the Microsoft Defender for IoT interface. On the left, there's a navigation sidebar with sections like Discover, Analyze, Manage, and Support. Under Analyze, the 'Data mining' option is selected. In the main content area, there's a 'Recommended' section with cards for Programming Commands, Internet Activity, Excluded CVEs, Active Devices (Last 24 Hours), Remote Access, CVEs, and Non Active Devices (Last 7 Days). Below this is a 'My reports' section with a table:

Name	Description	Last modified
PLC Firmware Version	Report showing the firmware version of the different PLCs.	2 minutes ago
ALL		4 days ago
test		3 months ago

4. You can export the report as pdf or csv.

This screenshot shows a detailed view of a report titled 'PLC Firmware Version'. At the top, there are buttons for Refresh, Expand all, Collapse all, Export to CSV, Export to PDF, Snapshots, Manage report, and Edit mode. The 'Export to CSV' and 'Export to PDF' buttons are highlighted with a pink box. The report content below is a simple table:

PLC Firmware Version	
Report showing the firmware version of the different PLCs.	

Task 6: Generate a Risk Assessment report

1. On the Risk assessment page, run the assessment by clicking the "Generate report" button. You can download and view the report as pdf.

This screenshot shows the 'Risk assessment' page. On the left, the 'Risk assessment' option in the sidebar is selected. In the center, there's a 'Generate report' button highlighted with a pink box. Below it is a 'Reports list' table:

#	Name	Date Created	Size
1	risk-assessment-report-4.pdf	just now	2 MB
2	risk-assessment-report-3.pdf	4 days ago	2 MB
3	risk-assessment-report-2.pdf	A month ago	1 MB
4	risk-assessment-report-1.pdf	3 months ago	1 MB

Exercise 6: Cloud Connect your sensor.

Task 1: Create the cloud connected sensor on the Cloud Management portal

1. On the cloud management (Azure) portal, navigate to "Sites and sensors" and click on "Onboard OT sensor".

The screenshot shows the Microsoft Azure Cloud Management portal with the 'Defender for IoT | Sites and sensors' page selected. At the top, there's a search bar and several navigation icons. Below the header, there are sections for 'General' (Getting started, Device inventory (Preview), Alerts (Preview), Workbooks (Preview)) and 'Management' (Pricing, Sensor name, Sensor type, Zone, Subscription ..., Sensor version, Sensor status, Last connect..., Threat Intelli..., Threat Intelli...). A message at the top says 'Trial subscription "BuildEnv" expired. Please contact Microsoft sales.' Below these, there are four categories: All sensors (4), IoT (1), OT cloud connected (2), and OT (1). Under 'Management', the 'Sites and sensors' tab is selected and highlighted with a pink box. It shows 'Showing 4 of 4 sensors' with a table. The first row in the table has a pink box around it, indicating the 'Locally managed' status. The table columns include Sensor name, Sensor type, Zone, Subscription ..., Sensor version, Sensor status, Last connect..., Threat Intelli..., Threat Intelli..., and Threat Intelli... .

2. Give the sensor a meaningful name, pick the subscription from the dropdown menu, and ensure that "cloud connected" is checked. Click on "Register".

The screenshot shows the 'Step 3: Register this sensor with Microsoft Defender for IoT' form. It includes fields for Sensor name (with a pink box around the input field), Subscription (a dropdown menu with 'Please select a subscription' and 'Onboard subscription' options, both highlighted with a pink box), Cloud connected (a checked checkbox highlighted with a pink box), Automatic Threat Intelligence updates (an unchecked checkbox), Sensor version (set to '22.X and above'), Site (with Resource name and Display name fields, both with pink boxes around them), Tags (a table with a pink box around it), and Zone (with a pink box around the input field). At the bottom, there's a 'Register' button highlighted with a pink box.

3. The download for the activation starts immediately. Please check your downloads.

Task 2: Upload the activation file to cloud connect your sensor.

1. Navigate back to your sensor and click on "System settings" -> "Sensor management" -> "Subscription and Activation Mode".

The screenshot shows the Microsoft Defender for IoT Sensor management interface. On the left, there's a sidebar with 'Discover', 'Analyze', and 'Manage' sections. Under 'Manage', 'System settings' is selected and highlighted with a pink box. In the main area, under 'Sensor management', there are several cards: 'Software Update', 'Threat Intelligence', 'Subscription & Activation Mode' (which is also highlighted with a pink box), 'Backup & Restore', 'System Health Check', and 'SNMP MIB Monitoring'. Each card has a brief description below it.

2. Upload the activation file you downloaded in the previous step. Click on "Activate".

This screenshot shows the 'Subscription & Activation Mode' dialog box overlaid on the main interface. The dialog box contains fields for 'Activation Mode' (set to 'Cloud Connected'), 'Activation Status' (set to 'Active'), 'Tenant ID' (a long GUID), 'Subscription ID' (another long GUID), and a file upload field labeled 'Upload activation file:' with a 'Select file' button. The main interface background is visible, showing the same layout as the first screenshot.

Task 3: Verify Cloud connection

1. On the sensor console.

2. On the Cloud management console.

Sensor name	Sensor type	Zone	Subscription ...	Sensor version	Sensor status	Last connect...	Threat Intelli...	Threat Intelli...	Threa...
D4IOTsensor-TT	EloT	default	BuildEnv		Unavailable	--	-	--	...
sensor-Cyber	OT cloud co...	default	BuildEnv	22.1.3.4162	Disconnected	A month ago	5/25/2022	Automatic	...
test1	OT cloud co...	default	BuildEnv	22.1.3.4162	OK	19 minutes a...	7/11/2022	Automatic	...

Exercise 7: Manage your sensor via the Cloud Management Portal

The cloud management portal serves as a central management tool when you deploy multiple sensors, and gives you a consolidated view of all the devices, alerts and incidents across different sites and zones.

Task 1: Manage your devices

1. Click on "Device Inventory", and see your total number of devices, new devices, and classification of devices.

Device inventory

447 Total devices

78 New devices

Last active time == 03/02/2023 - 03/16/2023 Network location (Preview) == All Add filter

Showing 447 of 447 devices

Group by (Preview) No grouping

Site	IPv4 address	Name	Type	Subtype	Vendor	Model	MAC address	VLAN
cs-playground	192.168.111.1	192.168.111.1	Industrial	DCS controller	FISHER CONTROLS	DeltaV MD/MD Plus	00:80:74:02:0F:42	--
cs-playground	192.168.111.20	192.168.111.20	Industrial	Engineering station	DELL INC.	--	18:66:DA:FA:4B:0C	--
cs-playground	192.168.111.2	192.168.111.2	Industrial	DCS controller	FISHER CONTROLS	DeltaV MD/MD Plus	00:80:74:02:0F:44	--
cs-playground	192.168.109.1	PLC_B	Industrial	PLC	INTEL CORPORATE	BME P58 1020	00:1C:C0:5F:49:0C	--
cs-playground	192.168.118.4	PLC_A	Industrial	PLC	SIEMENS AG	6ES7 315-2EH14-0A	00:01:E3:11:22:34	--
cs-playground	192.168.114.2	192.168.114.2	Industrial	Engineering station	MITSUBISHI ELECTR	QJ71GF11-T2	58:52:8A:B4:B1:4D	--
cs-playground	192.168.122.21	192.168.122.21	Industrial	Engineering station	--	--	--	--
b25eiotlab	192.168.0.17	192.168.0.17	Industrial	PLC	Acuity Brands Lighti	255F T2550 PAC	00:11:00:4E:51:62	--
b25eiotlab	192.168.0.3	192.168.0.3	Industrial	PLC	KNX LTD.	BACnet Server	00:C0:72:3F:FF:A3	--

2.Click on any device to open details about that device.

10.140.32.30

Unclassified

Status: Authorized | Last Seen: 7 days ago | Alerts: 0

PROCURVE NETWORKING BY HP | cs-playground | EMEA | Supervisory

Network interfaces:

- IP: 10.140.32.30 | MAC: 00:16:B9:8C:AB:00

Protocols: SNMP

Tags: 10.140.32.0/24, 10.9.14.0/24, 10.140.32.0/24

3.Click on “View Full Details” to open the full device page.

10.140.32.30

Attributes

Name	Value
Authorization	Authorized
Class	Unclassified
Data source	OT sensor
First seen	3/8/2023, 11:54:19 a.m.
Importance	Normal
Last activity	3/9/2023, 4:56:05 a.m.
Network location	Local
Parent slot	0
Programming device	No
Protocols	SNMP
Purdue level	Supervisory
Rack	0
Scanner device	No
Sensor	css-eee-1722024942
Site	cs-playground
Subtype	Unclassified

General information:

- Type: Unclassified | Subtype: Unclassified
- Vendor: PROCURVE NETWORKING BY HP | Location: cs-playground | EMEA | Supervisory

Network interfaces:

- IP: 10.140.32.30 | MAC: 00:16:B9:8C:AB:00

Protocols: SNMP

Tags: 10.140.32.0/24, 10.9.14.0/24, 10.140.32.0/24

4.Click on the “Group by” dropdown, and pick any of the other options, for example: Zone or Vendor, to see the different views.

The screenshot shows the Microsoft Defender for IoT Device inventory page. At the top, there are links for Device inventory, Alerts, Incidents (Preview), Recommendations (Preview), Workbooks, and Firmware inventory (Preview). Below these are sections for Management, Troubleshooting + Support, and Diagnose and solve problems.

Key statistics at the top include:

- Total devices: 447
- New devices: 76
- Devices by class: OT (105), Endpoint (86), Network (20), IoT (6)

Search and filter options are available, along with a "Group by (Preview)" dropdown set to "Vendor".

The main table lists 52 groups by vendor, including:

- AAEON TECHNOLOGY INC. (24)
- ACT'L (1)
- Acuity Brands Lighting, Inc. (1)
- AMERICAN POWER CONVERSION CORP (1)
- AUTOMATEDLOGIC CORPORATION (1)
- B&R INDUSTRIAL AUTOMATION GMBH (1)
- BROCADE COMMUNICATIONS SYSTEMS LLC (1)

Task 2: View your Alerts

1. Click on the "Alerts" tab and view your Open Alerts, New Alerts and Alert count by severity.

The screenshot shows the Microsoft Defender for IoT Alerts page. The left sidebar includes links for Getting started, Device inventory, **Alerts**, Incidents (Preview), Recommendations (Preview), Workbooks, and Firmware inventory (Preview). Management, Troubleshooting + Support, and Diagnose and solve problems sections are also present.

Key statistics at the top include:

- Open alerts: 584
- New alerts: 584
- Active alerts: 0

Alerts are grouped by severity: High (228), Medium (196), and Low (160).

Search and filter options are available, along with a "Group by" dropdown set to "No grouping".

The main table lists 278 of 278 alerts, showing columns for Severity, Name, Site, Engine, First detection, Status, Source device, and Tactics. Most alerts are categorized as POLICY_VIOLATION.

Severity	Name	Site	Engine	First detection	Status	Source device	Tactics
High	Unauthorized Internet Connectivity D	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	Internet	Initial access
High	Port Scan Detected	b25eiotlab	ANOMALY	21 hours ago	New	10.0.100.20	Discovery
Low	An S7 Stop PLC Command was Sent	b25eiotlab	OPERATIONAL	21 hours ago	New	192.168.119.22	Initial access
High	Unauthorized PLC Programming	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	ahi2225	Initial access
Medium	Unauthorized PLC Configuration Writ	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	192.168.118.22	Initial access
Medium	Unauthorized PLC Configuration Writ	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	192.168.119.22	Initial access
High	Unauthorized PLC Programming	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	192.168.119.22	Initial access
High	Unauthorized PLC Programming	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	ahi2225	Initial access
High	Unauthorized PLC Programming	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	192.168.118.22	Initial access
Medium	Unauthorized PLC Program Upload	b25eiotlab	POLICY_VIOLATION	21 hours ago	New	10.0.101.15	Initial access

2. Click on any alert to see the details.

Showing 278 of 278 alerts

Severity	Name	Site	Engine	First detection	Status
High	Unauthorized Internet Connectivity D	b25eioltab	POLICY_VIOLATION	21 hours ago	
High	Port Scan Detected	b25eioltab	ANOMALY	21 hours ago	
Low	An S7 Stop PLC Command was Sent	b25eioltab	OPERATIONAL	21 hours ago	
High	Unauthorized PLC Programming	b25eioltab	POLICY_VIOLATION	21 hours ago	
Medium	Unauthorized PLC Configuration Writ	b25eioltab	POLICY_VIOLATION	21 hours ago	
Medium	Unauthorized PLC Configuration Writ	b25eioltab	POLICY_VIOLATION	21 hours ago	
High	Unauthorized PLC Programming	b25eioltab	POLICY_VIOLATION	21 hours ago	
High	Unauthorized PLC Programming	b25eioltab	POLICY_VIOLATION	21 hours ago	
High	Unauthorized PLC Programming	b25eioltab	POLICY_VIOLATION	21 hours ago	
Medium	Unauthorized PLC Program Upload	b25eioltab	POLICY_VIOLATION	21 hours ago	
Low	Unauthorized PLC Configuration Rec	b25eioltab	POLICY_VIOLATION	21 hours ago	
Low	Unauthorized PLC Configuration Rec	b25eioltab	POLICY_VIOLATION	21 hours ago	
Low	PLC Operating Mode Changed	b25eioltab	OPERATIONAL	21 hours ago	
Low	PLC Operating Mode Changed	b25eioltab	OPERATIONAL	21 hours ago	

Unauthorized Internet Connectivity Detected Alert ID: 95a746d9-021a-4223-819c-a8a73e9346de

Severity: High | Status: New | Last detection: 21 hours ago

Description: A device defined as part of your network is communicating with Internet addresses. The device is not authorized to communicate with Internet addresses.

Source device: Internet (137.220.100.146) Unknown → Destination device: 192.168.0.110 Unclassified

MITRE ATT&CK®

[View full details](#)

3.Click on "View full details" to view the alert page.

Alerts | Unauthorized Internet Connectivity Detected ...

Refresh | Download PCAP

Unauthorized Internet Connectivity Detected Alert ID: 95a746d9-021a-4223-819c-a8a73e9346de

Severity: High | Status: New | Last detection: 21 hours ago

Description: A device defined as part of your network is communicating with Internet addresses. The device is not authorized to communicate with Internet addresses.

Source device: Internet (137.220.100.146) Unknown → Destination device: 192.168.0.110 Unclassified

MITRE ATT&CK®

Tactics: Initial access: The adversary is trying to get into your network. [read more on attack.mitre.org](#)

Techniques: Internet accessible device: T0883

Alert details

Source device	Site	Device IP type
Internet	b25eioltab	Internal
Source device address	Zone	First detection (in the network)
137.220.100.146	default	3/15/2023, 6:08:42 p.m.
Destination device	Sensor	Last detection (in the network)
192.168.0.110	ah1225	3/15/2023, 6:08:42 p.m.
Destination device address	Category	Last activity (manual or automated changes)
192.168.0.110	Internet Access	3/15/2023, 10:18:00 p.m.
	Protocol	
	GENERIC	

Entities

- Devices (1)**

ID	Name	Subtype	Protocols	Vendor
4d09a3fc-8818-42c7-a339-a5	192.168.0.110	Unclassified	FTP, MDNS, Netbios Name Se	INTEL CORPORATE
- IP (1)**

Address
137.220.100.146

4.Click on the "Group by" dropdown to view the alerts by severity, site, engine, etc.

Device inventory Alerts 584 Open alerts New alerts 0 Active alerts

Open alerts by severity:

High (228) | Medium (196) | Low (160)

Search: Last detection == Last month | Status == 2 selected | Add filter

Showing 278 of 278 alerts

Group by: Severity

Severity	Name	Site	Engine	First detection	Status	Source device	Tactics
> High (88)							
> Low (96)							
> Medium (94)							

Troubleshooting + Support

Diagnose and solve problems New support request (Preview)

Task 3: View your recommendations

- Click on the "Recommendations" tab, to view the list of recommended fixes/remediation steps for alerts or misconfigurations on the sensors.

The screenshot shows the Microsoft Defender for IoT portal interface. On the left, there's a sidebar with various tabs like 'General', 'Device inventory', 'Alerts', and 'Recommendations (Preview)', which is highlighted with a pink box. The main area is titled 'Active recommendations' and shows 'Showing 2 of 2 recommendations'. There are two rows in a table:

Severity	Name	Unhealthy devices	Healthy devices	Last update time
Medium	Review PLC operating mode	16 devices	0 devices	3/20/2023
Low	Review unauthorized devices	31 devices	616 devices	3/20/2023

- Click on any recommendation to view full details.

The screenshot shows the details of the 'Review PLC operating mode' recommendation. It includes a description: 'To reduce the threat of malicious PLC programming, we recommend setting the PLC operating mode to the secure Run state if access is no longer required to this PLC.' A box highlights the 'Remediation steps' section, which lists three items:

- Check whether each PLC must be in unsecure state, such as Program or Remote.
- If the PLC can be configured to the secure Run mode, check that the PLC has a physical key switch.
- Do one of the following: If the PLC has a physical key switch, change the switch position to Run. If the PLC does not have a physical key switch, change the PLC operating mode to Run using the Engineering Station software.

Below this is a table showing 16 unhealthy devices:

Name	IP	Site	Last update time
EIP-Line1	192.168.110.1	bettertogethersite	3/20/2023
10.0.100.105	10.0.100.105	b25eiotlab	3/16/2023
192.168.0.17	192.168.0.17	b25eiotlab	3/15/2023
10.0.101.105	10.0.101.105	b25eiotlab	3/15/2023
10.0.101.110	10.0.101.110	b25eiotlab	3/15/2023
10.0.100.104	10.0.100.104	b25eiotlab	3/15/2023
10.0.100.110	10.0.100.110	b25eiotlab	3/15/2023
EIP-Line4	192.168.110.4	bettertogethersite	3/14/2023
192.168.90.122	192.168.90.122	cs-playground	3/12/2023
EIP-Line1	192.168.110.1	muli	3/1/2023
EIP-Line3	192.168.110.3	muli	3/1/2023
EIP-Line2	192.168.110.2	muli	3/1/2023
EIP-Line4	192.168.110.4	muli	3/1/2023

Task 4: Visualize Data by utilizing Workbooks

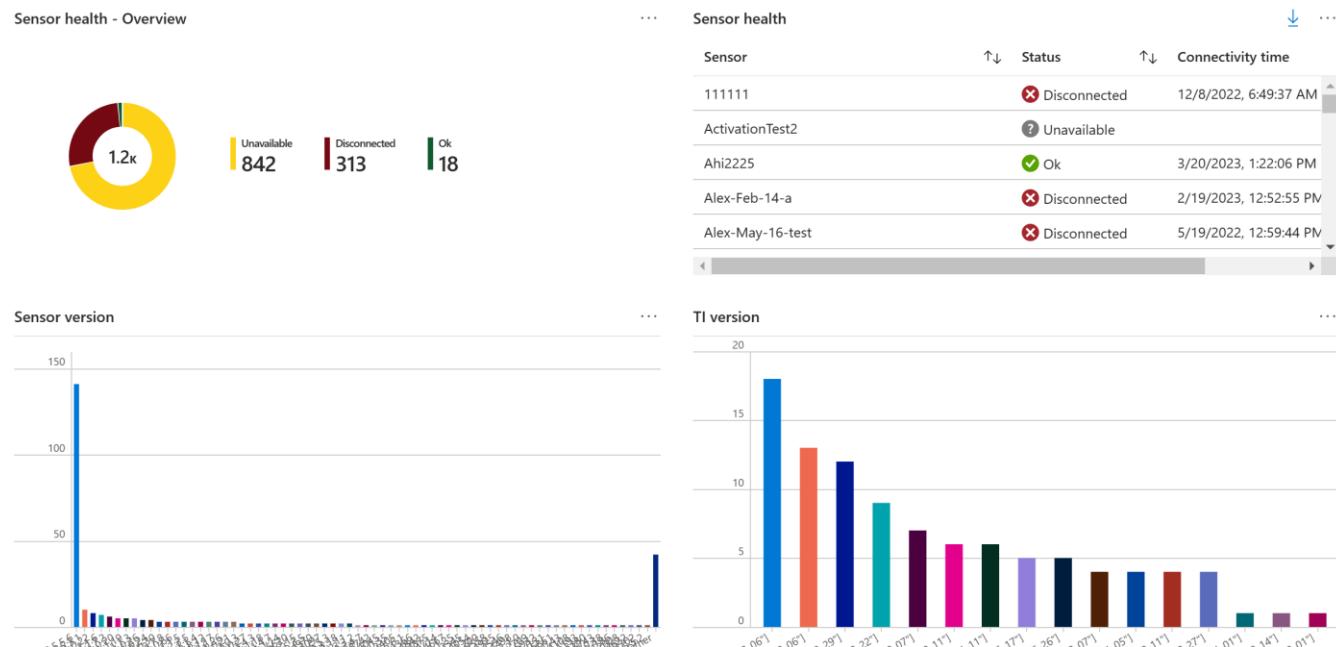
- Click on the "Workbooks" tab, to view the list of Defender for IoT workbooks.

The screenshot shows the Microsoft Defender for IoT Workbooks Gallery. On the left, there's a sidebar with categories: General (Getting started, Device inventory, Alerts, Recommendations (Preview), Workbooks - highlighted with a pink box), Management (Sites and sensors, Plans and pricing, Settings (Preview)), Troubleshooting + Support (Diagnose and solve problems), and Sensors. The main area displays a grid of workbooks. Some are blue (e.g., Empty, Sensors Data, Detected MAC) and some are purple (e.g., ByOS type, Workbook 3, DeviceInvestigation). Each card has a preview image, a title, and a brief description.

2. Click on any workbook, for example: "Sensor Health" , to view the preconfigured widgets on the workbook

Sensors

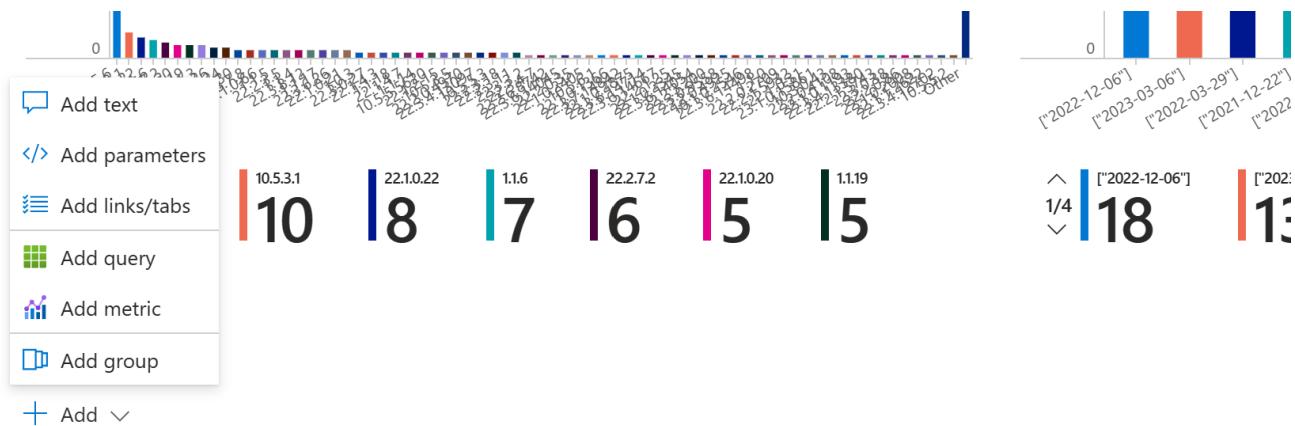
This report consolidates data regarding your sensors' health.



3. Click on the "Edit" option on the top ribbon to edit the existing widgets.



4. Click on "+Add" at the bottom of the workbook to add a widget to the workbook.



- Click on "Save" to view your added widget.

Exercise 8: Integrate with Microsoft Sentinel

Task 1: Create a Log Analytics Workspace

- On the Azure portal, search for **Microsoft Sentinel**.

- Click on "+Create" -> "+Create a new workspace".

- Pick your subscription, Resource Group, Name and Region

Create Log Analytics workspace

Basics Tags Review + Create

i A Log Analytics workspace is the basic management unit of Azure Monitor Logs. There are specific considerations you should take when creating a new Log Analytics workspace. [Learn more](#)

With Azure Monitor Logs you can easily store, retain, and query data collected from your monitored resources in Azure and other environments for valuable insights. A Log Analytics workspace is the logical storage unit where your log data is collected and stored.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *	CS-playground
Resource group *	CS-playground
	Create new

Instance details

Name *	VishakhaSentinel
Region *	Canada East

4. Click on "Review +Create" -> "Create".
5. Go to Sentinel -> find the workspace you just created -> Click "Add" to add the workspace to Sentinel.

Add Microsoft Sentinel to a workspace

+ Create a new workspace ⏪ Refresh

Microsoft Sentinel offers a 31-day free trial. See [Microsoft Sentinel pricing](#) for more details.

Filter by name...				
Workspace ↑↓	Location ↑↓	ResourceGroup ↑↓	Subscription ↑↓	Directory ↑↓
DemoTogether	centralus	demotogether	CS-playground	Microsoft
HandsOnLab	canadacentral	cs-playground	CS-playground	Microsoft
Hank-HOL	eastus	hank_hol	CS-playground	Microsoft
test	westeurope	cs-playground	CS-playground	Microsoft

[Add](#) [Cancel](#)

Task 2: Install the Defender for IoT package

1.Go to Sentinel, make sure your workspace is selected.

The screenshot shows the Microsoft Sentinel News & guides interface. At the top, it says "Selected workspace: 'handsonlab'". Below that is a search bar and a documentation link. The navigation menu includes "General", "Overview", "Logs", and "News & guides", with "News & guides" being the active tab. The main content area features a heading "A cloud-native SIEM to h".

2.Go to “Content Hub” -> Type “Defender for IoT” and click on “Install”. The package includes Analytic Rukles, Data Connector, Playbooks and Workbooks.

The screenshot shows the Microsoft Sentinel Content Hub. On the left, there's a sidebar with sections like General, Threat management, Content management, and Configuration. The main area shows a search bar with "Defender for IoT" typed in. Below the search bar, there are four counts: 282 Solutions, 269 Standalone contents, 0 Installed, and 0 Updates. A grid of solutions is displayed, with one item highlighted: "Microsoft Defender for IoT" by Microsoft Sentinel, Microsoft Corporation. To the right, a detailed view of the "Microsoft Defender for IoT" solution is shown, including its provider (Microsoft), support (Microsoft Support), version (2.0.2), and a description: "Defender for IoT on assessing your Internet of Things (IoT)/Operational Technology (OT) infrastructure". It also lists "Underlying Microsoft Technologies used": a. Codeless Connector Platform/Native Sentinel Polling, Data Connectors: 1, Workbooks: 1, Analytic Rules: 15, Playbooks: 8. There are links to learn more about Microsoft Sentinel and Solutions. At the bottom right of this panel is a large "Install" button.

3.Click on “Create”.

The screenshot shows the Microsoft Defender for IoT solution page. It has a header with the solution name and a "Add to Favorites" button. Below the header, it says "Microsoft Sentinel, Microsoft Corporation | Azure Application". A dropdown menu is open, showing "Plan" and "Microsoft Defender for IoT" with a "Create" button next to it. The "Create" button is highlighted with a pink rectangle.

Underlying Microsoft Technologies used:
This solution takes a dependency on the following technologies, and some of these dependencies either may be in [Preview](#) state or might result in additional ingestion or operational costs:
[Codeless Connector Platform/Native Sentinel Polling](#)

4.Select the workspace and click on “Review and Create”.

Data Connectors: 1, Workbooks: 1, Analytic Rules: 15, Playbooks: 7

[Learn more about Microsoft Sentinel](#) | [Learn more about Solutions](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ

C3-playground

Resource group * ⓘ

C3-playground

Create new

Instance details

Workspace * ⓘ

HandsOnLab

Review + create

< Previous

Next : Data Connectors >

5. Go to "Data Connectors" and verify that the Defender for IoT Connector is connected.

The screenshot shows the Microsoft Sentinel interface. On the left, there's a sidebar with sections like Threat management, Content management, and Configuration. Under Configuration, the 'Data connectors' item is highlighted with a pink box. The main area displays connector statistics: 126 Connectors, 1 Connected, and a link to the Content hub. Below this, a table lists connected connectors, showing one entry for 'Microsoft Defender for IoT' from 'Microsoft' with a status of 'Connected'. There are also filters for 'Providers : All', 'Data Types : All', and 'Status : Connected'.

6. Go to the package and click on "Manage" to see a list of resources installed as a part of the package.

Solutions (1) Content sources . All

Microsoft Defender for IoT
Microsoft Sentinel, Microsoft Corporation
Internet of Things (IoT), Security - Threat Protection
Analytics rule (15) Data connector +2
Installed

Standalone (2)

Workbook (2)

Content name	Created content	Content type	Version
Microsoft Defender for IoT	1 item	Data connector	1.0.0
PLC unsecure key state (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Unauthorized PLC changes (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Unauthorized remote access to the network (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Unauthorized DHCP configuration in the network (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Multiple scans in the network (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Internet Access (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Excessive Login Attempts (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Firmware Updates (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
No traffic on Sensor Detected (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Illegal Function Codes for ICS traffic (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Suspicious malware found in the network (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
PLC Stop Command (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
Denial of Service (Microsoft Defender for IoT)	--	Analytics rule	1.0.1
High bandwidth in the network (Microsoft Defender for IoT)	--	Analytics rule	1.0.1

Content type i 15 Data connector 7 Playbook 1 Workbook

Category i Internet of Things (IoT), Security - Threat Protection

Manage Actions View details

24 Installed content items

Microsoft Defender for IoT

Provider Microsoft Provider **Support** Microsoft Support **Version** 2.0.2

Description

The Microsoft Defender for IoT solution for Microsoft Sentinel allows you to ingest Security alerts reported in Microsoft Defender for IoT on assessing your Internet of Things (IoT)/Operational Technology (OT) infrastructure.

Underlying Microsoft Technologies used:

This solution takes a dependency on the following technologies, and some of these dependencies either may be in [Preview](#) state or might result in additional ingestion or operational costs:

a. [Codeless Connector Platform/Native Sentinel Polling](#)

Data Connectors: 1, **Workbooks:** 1, **Analytic Rules:** 15, **Playbooks:** 8

[Learn more about Microsoft Sentinel](#) | [Learn more about Solutions](#)

Content type i 15 Data connector 7 Playbook 1 Workbook

Category i Internet of Things (IoT), Security - Threat Protection

Manage Actions View details

Content type i 15 Analytics rule 1 Data connector 7 Playbook 1 Workbook

Category i Internet of Things (IoT), Security - Threat Protection

Pricing i

Manage Actions View details

Task 3: Create Incidents

1. Go to the Defender for IoT connector and click on "Open Connector Page".

Status	Connector name ↑	Disconnect... Status	Microsoft Provider	Last Log Rec...
	Microsoft Defender for Cloud Microsoft			
	Microsoft Defender for Cloud Apps Microsoft			
	Microsoft Defender for Endpoint Microsoft			
	Microsoft Defender for Identity Microsoft			
	Microsoft Defender for IoT Microsoft	Last data received		
	Microsoft Defender for Office 365 (Preview) Microsoft	--		
		Description		
		Gain insights into your IoT security by connecting Microsoft Defender for IoT alerts to Microsoft Sentinel. You can get out-of-the-box alert metrics and data, including alert trends, top alerts, and alert breakdown by severity. You can also get information about the recommendations provided for your IoT hubs including top recommendations and recommendations by severity.		
		Last data received		
		--		
		Content source ⓘ		
		IoTOTThreatMonitoringwithDefenderforIoT		
		Version	Author	
		1.0.0	Microsoft	
		Supported by		
		Microsoft Corporation Email		
		Open connector page		

2.Click on “Create Incidents” to automatically create alerts from the connector.



Create incidents - Recommended!

Create incidents automatically from all alerts generated in this connected service.

[Enable](#)

Task 4: Validate Defender for IoT logs are streamed correctly to Sentinel (KQLS on the data)

1.In Microsoft Sentinel, select Logs > AzureSecurityOfThings > SecurityAlert, or search for SecurityAlert.

2.Use the following sample queries to filter the logs and view alerts generated by Defender for IoT:

To see all alerts generated by Defender for IoT:

```
SecurityAlert | where ProductName == "Azure Security Center for IoT"
```

To see specific sensor alerts generated by Defender for IoT:

```
SecurityAlert
```

```
| where ProductName == "Azure Security Center for IoT"
| where tostring(parse_json(ExtendedProperties).SensorId) == "<sensor_name>"
```

To see specific OT engine alerts generated by Defender for IoT:

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where ProductComponentName == "MALWARE"
```

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where ProductComponentName == "ANOMALY"
```

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where ProductComponentName == "PROTOCOL_VIOLATION"
```

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where ProductComponentName == "POLICY_VIOLATION"
```

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where ProductComponentName == "OPERATIONAL"
```

To see high severity alerts generated by Defender for IoT:

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where AlertSeverity == "High"
```

To see specific protocol alerts generated by Defender for IoT:

SecurityAlert

```
| where ProductName == "Azure Security Center for IoT"  
| where tostring(parse_json(ExtendedProperties).Protocol) == "<protocol_name>"
```

Task 5: Investigate Defender for IoT incidents

1. In Microsoft Sentinel, go to the **Incidents** page.
2. Above the incident grid, select the **Product name** filter and clear the **Select all** option. Then, select **Microsoft Defender for IoT** to view only incidents triggered by Defender for IoT alerts. For example:

The screenshot shows the Microsoft Sentinel Incidents page. On the left, there's a navigation sidebar with sections like General, Threat management, Content management, and Configuration. The Threat management section has 'Incidents' selected. The main area displays three counts: 917 Open incidents, 917 New incidents, and 0 Active incidents. Below these are filters for Severity (All), Status (2 selected), and a Product name dropdown. The Product name dropdown is open, showing options like Azure Information Protection, Microsoft Defender for Endpoint, Microsoft Defender for IoT (which is checked), Microsoft Defender for Office 365, Microsoft 365 Insider Risk Management, Microsoft 365 Defender, and Microsoft Sentinel. At the bottom of the dropdown is an 'OK' button. To the right of the dropdown, there's a large circular icon with three boxes and a plus sign, with the text 'No incidents selected' and 'Select an incident to view more details'. A red box highlights the 'Product name' dropdown.

3. Select a specific incident to begin your investigation.

In the incident details pane on the right, view details such as incident severity, a summary of the entities involved, any mapped MITRE ATT&CK tactics or techniques, and more.

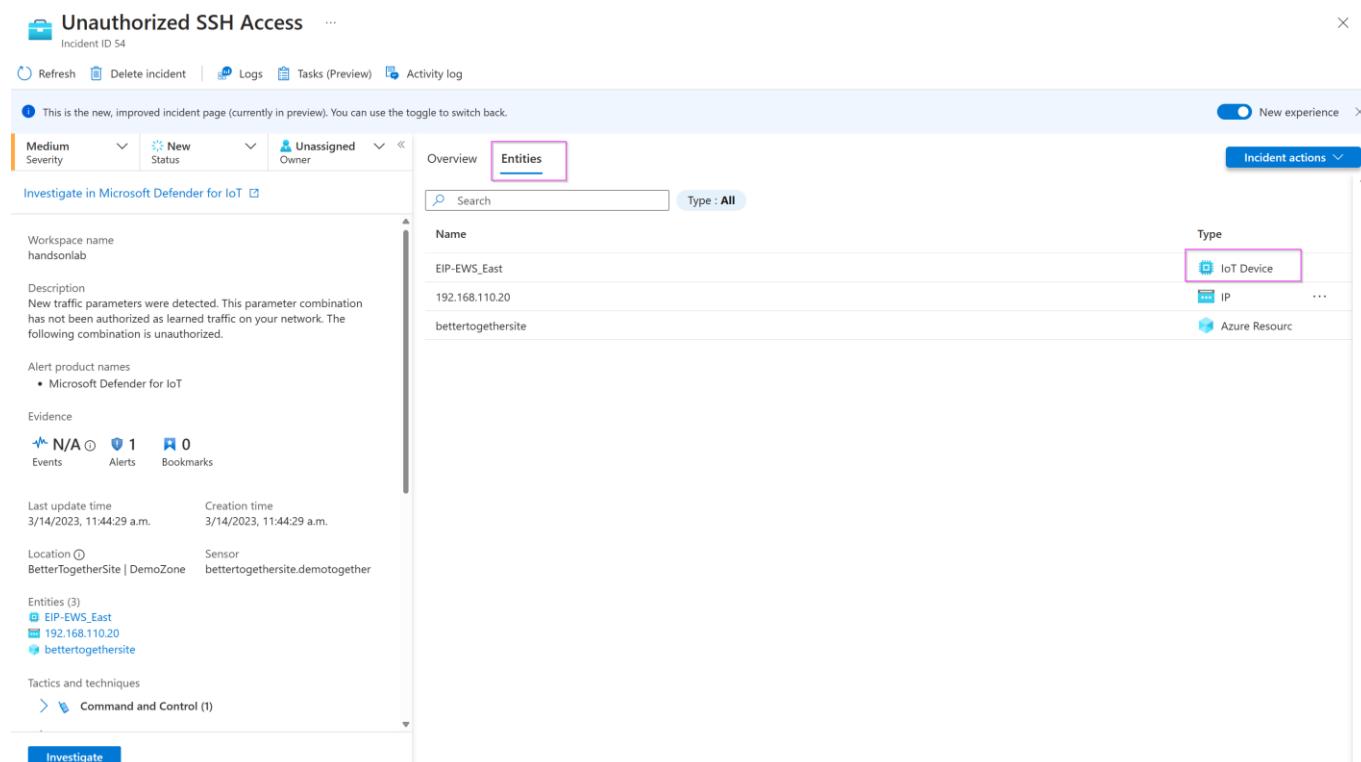
The screenshot shows the Microsoft Sentinel Incidents page with the 'Incidents' section selected in the sidebar. The main area displays 676 Open incidents, 676 New incidents, and 0 Active incidents. The Product name filter is set to 'Microsoft Defender for IoT'. The incident grid shows various entries with columns for Severity, Incident ID, Title, Alerts, Product names, Created time, and Last update time. One specific incident is highlighted in the grid. To the right, an incident details pane is open for 'Malicious Domain Name Request' (Incident ID: 107793). The pane includes sections for Description (Suspicious network activity was detected. This activity may be associated with an attack exploiting a method used by known malware.), Alert product names (Microsoft Defender for IoT), Evidence (Events: 1, Alerts: 0, Bookmarks: 0), Last update time (09/22/22, 10:36 AM), Creation time (09/22/22, 03:05 AM), Entities (1) (192.168.42.23, View full details >), Tactics and techniques (Command and Control (1), Initial Access (0)), and Incident workbook (Incident Overview). At the bottom are 'View full details' and 'Actions' buttons. A red box highlights the incident entry in the grid and the 'Microsoft Defender for IoT' selection in the Product name dropdown.

Task 6: Investigate further with IoT device entities

The IoT device entity page provides contextual device information, with basic device details and device owner contact information. The device entity page can help prioritize remediation based on device importance and business impact, as per each alert's site, zone, and sensor.

1. When you are at the incident details page, click on "Entities".

2. Find the IoT identity categorized by this device icon: 



The screenshot shows the Microsoft Defender for IoT incident details page for an incident titled "Unauthorized SSH Access" (Incident ID 54). The page has tabs for Overview and Entities, with Entities selected. A search bar and a Type filter set to All are visible. The main content area displays a table of entities with columns for Name, Type, and additional details. One entity, "EIP-EWS_East", is highlighted with a pink box. The Type column for this entity shows "IoT Device" with an icon, while other entries like "192.168.110.20" and "bettertogethersite" show icons for IP and Azure Resource respectively. The page also includes sections for Evidence (Events: N/A, Alerts: 1, Bookmarks: 0), Location (BetterTogetherSite | DemoZone), and Tactics and techniques (Command and Control: 1).

3. To drill down even further, select the IoT device entity link and open the device entity details page.

4. Alternatively, you can hunt for vulnerable devices on the Microsoft Sentinel Entity behavior page. For example, view the top five IoT devices with the highest number of alerts, or search for a device by IP address or device name:

The screenshot shows the Microsoft Sentinel Entity behavior page. On the left, a sidebar navigation includes General, Threat management (Incidents, Workbooks, Hunting, Notebooks, Entity behavior - highlighted with a red box), Content management (Content hub, Repositories, Community), and Configuration (Data connectors, Analytics). The main area displays several cards: 'Accounts by # of alerts' (No data to display), 'Hosts by # of alerts' (1 host, 1 alert), 'IPs by # of alerts (Preview)' (list of IP addresses and alert counts), 'IoT devices by # of alerts (Preview)' (list of IoT devices and alert counts, highlighted with a red box), and 'Azure resources by # of alerts (Preview)' (list of Azure resources and alert counts).

Task 7: Investigate the alert in Defender for IoT

1. Go to your incident details page and view the alerts listed under "Timeline".

The screenshot shows the Microsoft Sentinel Incident details page for Incident ID 319410. The left sidebar shows the incident summary: 'Unauthorized PLC Programming' (Incident ID: 319410, Investigate in Microsoft Defender for IoT). The main area has tabs for Timeline, Similar incidents (Preview), Alerts, Bookmarks, Entities, and Comments. The Timeline tab is selected, showing a single entry: 'Nov 29 1:03 PM Unauthorized PLC Programming High | Detected by Microsoft Defender for IoT | Tactics: [redacted]'. The right side of the screen shows detailed information for this incident, including Description, Severity (High), Status (New), Product name (Microsoft Defender for IoT), and a list of Entities (4) with their respective IP addresses.

Task 8: Acknowledge Alerts and Re-run PCAPs

1. Go back to your sensor console, select all the alerts, and click on “Learn”. The reason we are doing this is that we can re-run the alerts to show how they are sent and analyzed by Sentinel.

Microsoft | MicrosoftDefenderIoTSensor1 - 22.1.2

Home > Alerts

Defender for IoT | Alerts

Search Refresh Edit Columns Export to CSV Change Status Learn

Discover Overview Device map Device inventory Alerts Analyze Event timeline Data mining Risk assessment Trends & statistics Attack vector Manage System settings Custom alert rules Users Forwarding Support Support

Showing 22 of 22 alerts Group by No grouping

Severity	Name	Engine	Detection time	Status	Source Device
Critical	Unauthorized Internet Connectivity Detected	Policy Violation	2 weeks ago	Closed	192.168.110.21
Critical	Unauthorized Internet Connectivity Detected	Policy Violation	2 weeks ago	New	192.168.112.30
Critical	Port Scan Detected	Anomaly	2 weeks ago	Closed	192.168.110.21
Major	EtherNet/IP Encapsulation Protocol Command Failed	Operational	2 months ago	New	192.168.110.2
Critical	Unauthorized PLC Programming	Policy Violation	2 months ago	Closed	192.168.122.1
Critical	No Traffic Detected on Sensor interface	Operational	2 months ago	New	192.168.100.8
Critical	Unauthorized Internet Connectivity Detected	Policy Violation	2 months ago	New	192.168.100.1
Warning	Traffic Detected on Sensor interface	Operational	2 months ago	New	192.168.101.10
Major	EtherNet/IP Encapsulation Protocol Command Failed	Operational	3 months ago	Closed	192.168.117.23
Critical	Excessive SMB login attempts	Anomaly	3 months ago	New	192.168.117.239
Major	Event Buffer Overflow in Outstation	Operational	3 months ago	New	192.168.117.239
Warning	Controller Reset	Operational	3 months ago	New	192.168.118.22
Warning	Controller Reset	Operational	3 months ago	New	192.168.118.11
Warning	An S7 Stop PLC Command was Sent	Operational	3 months ago	New	192.168.12.1
Warning	An S7 Stop PLC Command was Sent	Operational	3 months ago	New	192.168.109.1
Major	GE SRTP Command Failure	Operational	3 months ago	New	192.168.109.2
Major	Modbus Exception	Protocol Violation	3 months ago	New	192.168.108.2
Major	Modbus Exception	Protocol Violation	3 months ago	New	192.168.108.2
Major	Honeywell Firmware Version Chanoed	Policy Violation	3 months ago	New	192.168.108.2

2. From the System Settings tab, Click the “Play All” on the PCAP Files to replay simulating the alerts.

Microsoft | MicrosoftDefenderIoTSensor1 - 22.1.2

Home > System settings

Defender for IoT | System settings

Search Basic Sensor Setup

Discover Overview Device map Device inventory Alerts Analyze Event timeline Data mining Risk assessment Trends & statistics Attack vector Manage System settings Custom alert rules Users Forwarding Support Support

PCAP PLAYER Upload and replay PCAP files.

Upload Play All Clear All

1-S7comm-VaService-Read-D61DBD0.pcap
pcap_wednesdaypcapng

Sensor Network Settings Define sensor network settings

Connection to Management Console Connect this sensor to the on-premises management console

Time & Region Define time zone settings for this sensor

SSL/TLS Certificate Manage SSL/TLS certificates installed on this sensor

Play PCAP Upload and play PCAP files

Network monitoring Sensor management Integrations Import settings

Close

Exercise 9: Automate response to Defender for IoT alerts.

[Playbooks](#) are collections of automated remediation actions that can be run from Microsoft Sentinel as a routine. A playbook can help automate and orchestrate your threat response; it can be run manually or set to run automatically in response to specific alerts or incidents, when triggered by an analytics rule or an automation rule, respectively.

Before using the out-of-the-box playbooks, make sure you perform the following prerequisites, as needed for each playbook:

- [Ensure valid playbook connections](#)
- [Add a required role to your subscription](#)
- [Connect your incidents, relevant analytics rules, and the playbook](#)

For a full list of DIoT Playbooks, refer to [this](#) document.

Exercise 10: Clean Up

Task 1: Delete resources

It is best practice to delete all your resources after the training.

Search for the Resource Group created for this training.

Select Delete resource group on the top right side.

Enter your-resource-group-name for **TYPE THE RESOURCE GROUP NAME** and select Delete. This operation will take a few minutes.

After that is done go to Microsoft Defender for IoT and deactivate the subscription.

Exercise 11: Submit Feedback

It is through your feedback and suggestions that we can continue to improve the experience. Please share how your experience was via [this form](#).