



https://content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2flrs.aws.training%2fTCAP%2f&auth=Basic OjIyJUzNTRmLTE... — X

content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2flrs.aws.training%2fTCAP%2f&auth=Basic%20OjIyJUzNTRmLT...

## IoT Device Security Challenges

aws training and certification

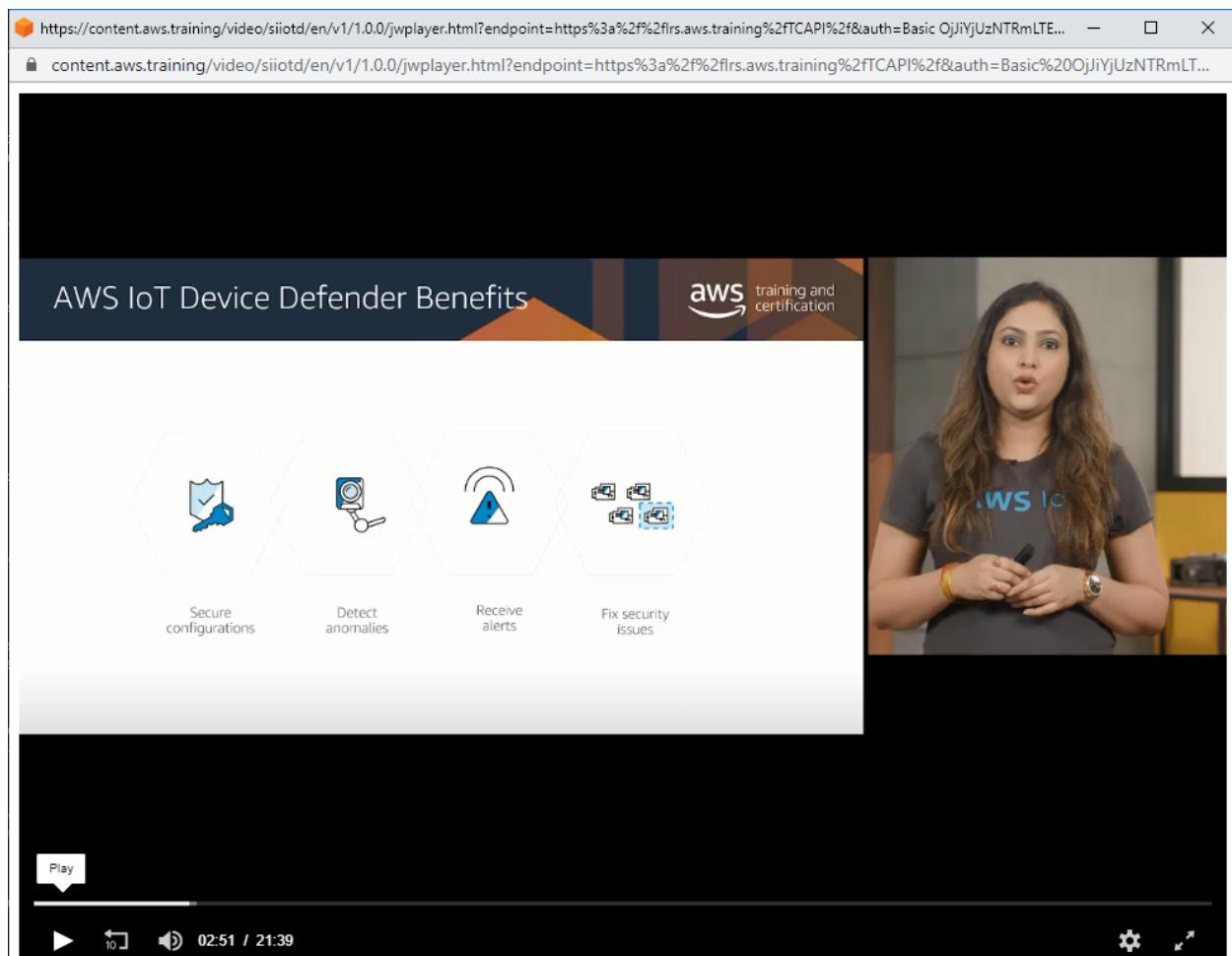
Devices will be compromised; security is not point in time.

- Detecting compromises
- Ensuring notifications are made
- Constantly evolving systems to monitor threat landscape



▶ 02:04 / 21:39

⚙️ ✎



https://content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2firs.aws.training%2fTCAP%2f&auth=Basic OjIyJUzNTRmLTE... — X

content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2firs.aws.training%2fTCAP%2f&auth=Basic%20OjIyJUzNTRmLT...

# AWS IoT Device Defender

AWS training and certification

Device Defender ...

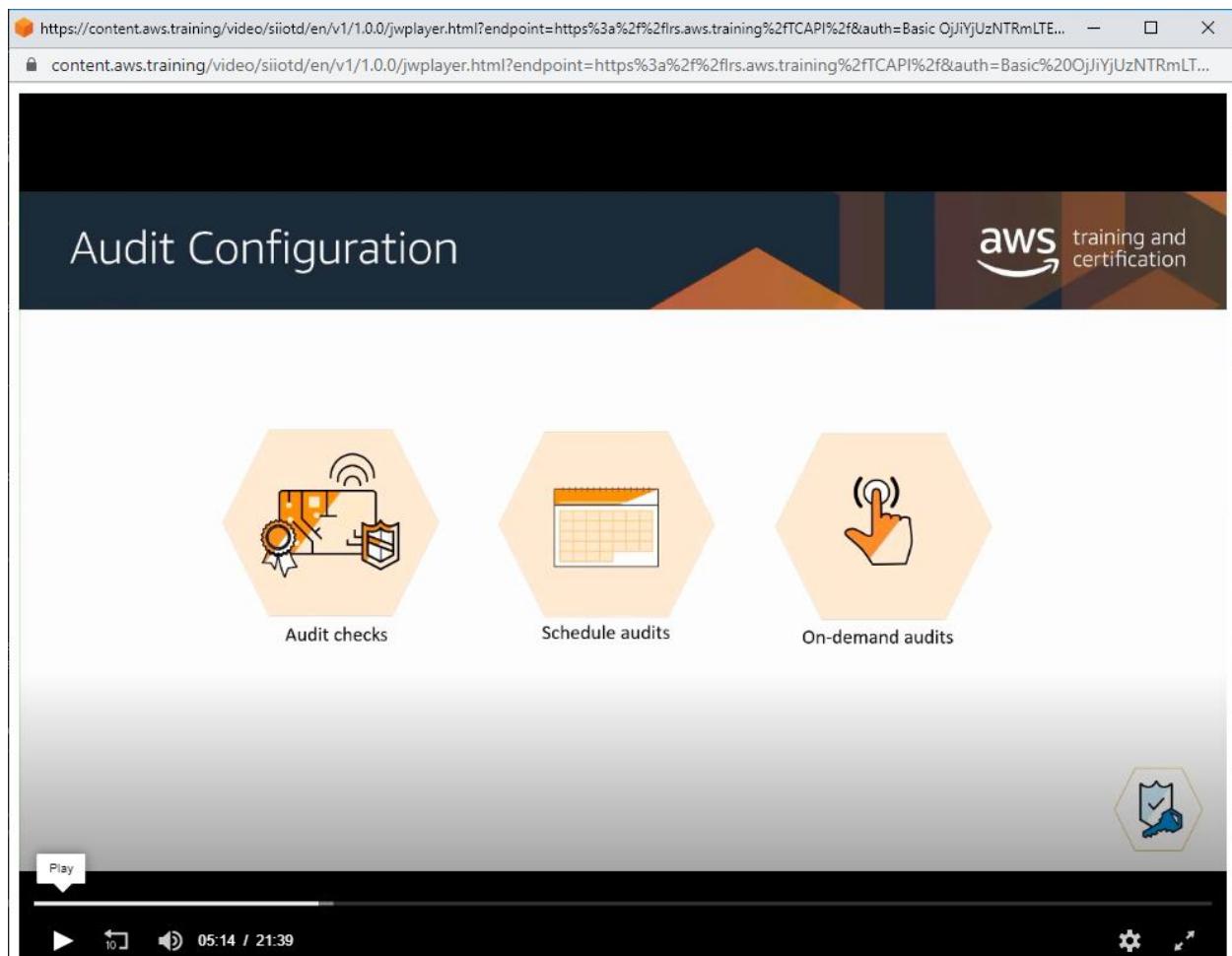
- Audits device fleets
- Detects abnormal device behavior
- Alerts you to security issues
- Helps investigate and mitigate security issues



Play

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https://content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2firs.aws.training%2fTCAP%2f&auth=Basic OjJiYjUzNTRmLTE... — X

content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2firs.aws.training%2fTCAP%2f&auth=Basic%20OjJiYjUzNTRmLT...

## Audit Checks

aws training and certification

Certificates	Policies	Device Connection	Account Setting
Expiring Certificates/CA Certificates	Overly permissive IoT policies	Client ID Collision	Logging not enabled
Revoked Certificates/CA Certificates	Cognito IDs with overly permissive access	Certificate shared by devices	

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content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2flrs.aws.training%2fTCAP%2f&auth=Basic%20OjJiYjUzNTRmLT...

## Detect Abnormal Device Behavior

aws training and certification

- Monitor device metrics
- Define behavior – blacklist/whitelist
- Define behavior – thresholds
- Security profiles

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content.aws.training/video/siiotd/en/v1/1.0.0/jwplayer.html?endpoint=https%3a%2f%2flrs.aws.training%2fTCAP%2f&auth=Basic%20OjJiYjUzNTRmLT...

## Detect Abnormal Device Behavior

aws training and certification

Monitor device metrics

Define behavior – blacklist/whitelist

Define behavior – thresholds

Security profiles

09:31 / 21:39

## Security Profiles

aws training and certification

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▶ 10 10.01 / 21:39

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## Security Profiles

aws training and certification

Play

▶ 10 10.20 / 21:39

⚙️ ✎

## Define Device Behavior

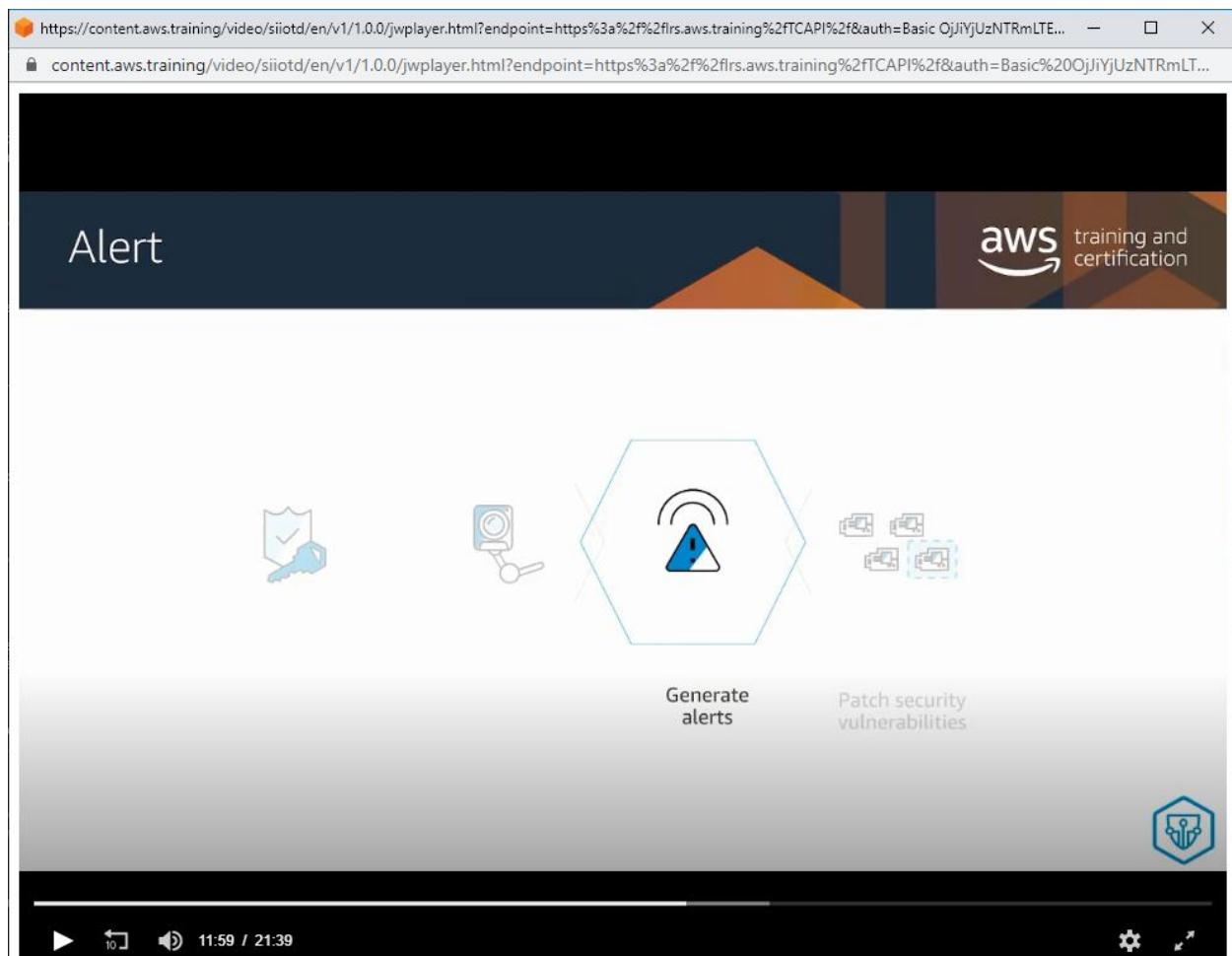
aws training and certification

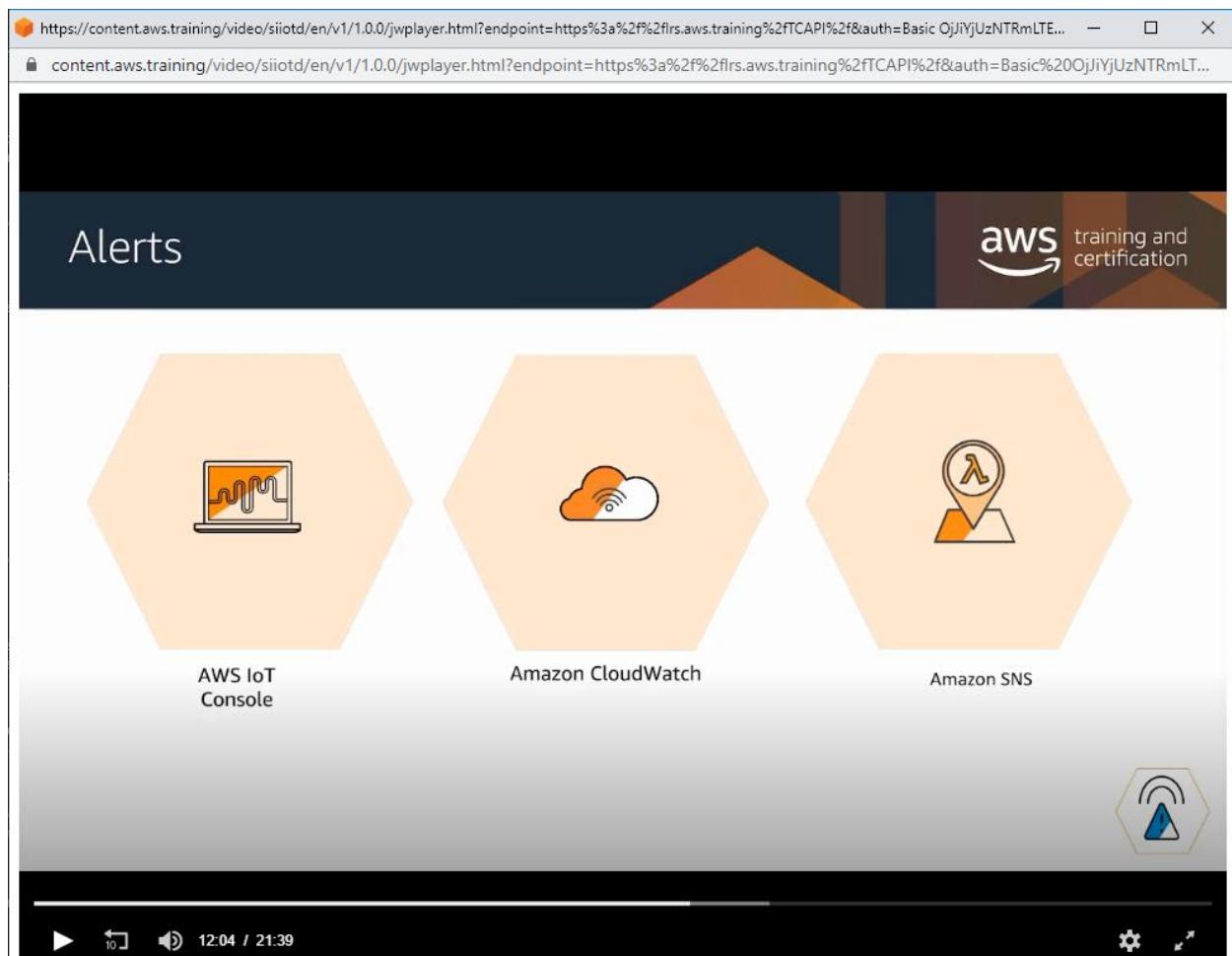
Metrics	Threshold	Blacklist/Whitelist
AWS Metrics	<ul style="list-style-type: none"><li>• Message Rate (Sent and Received)</li><li>• Message Size</li><li>• Authorization Failures</li></ul>	<ul style="list-style-type: none"><li>• Source IPs</li></ul>
Device Metrics	<ul style="list-style-type: none"><li>• TCP Connections</li><li>• Open Ports (TCP/UDP)</li><li>• Outbound Packets</li><li>• Outbound Bytes</li><li>• Destination IPs (TCP)</li></ul>	<ul style="list-style-type: none"><li>• Open Ports (TCP/UDP)</li><li>• Destination IPs (TCP)</li></ul>



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## Investigate and Mitigate



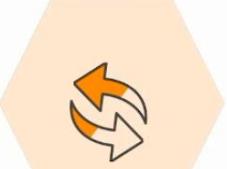
Contextual information



Historical information



Recommendation

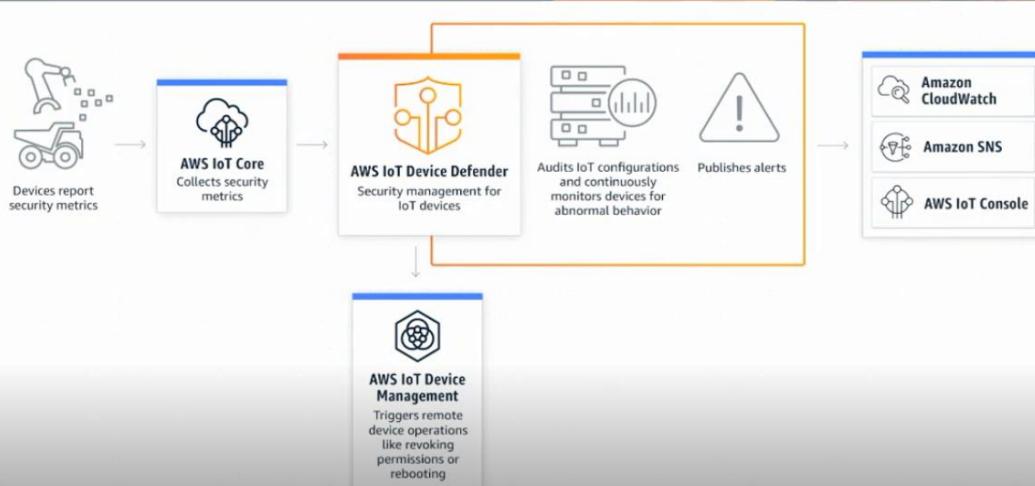


AWS IoT Device Management –  
Device Jobs



## How it Works

Press **Esc** to exit full screen



AWS IoT

Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#dd/intro

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Services Resource Groups

Aditya/Hanuman-Amazon @ 153.159.128.136 N. Virginia Support

**AWS IoT**

Monitor Onboard Manage Greengrass Secure **Defend** Audit Detect Settings Act Test Software Settings

**Conduct on-going audits**

Ensure the security posture of your device fleet is known, good, and trusted. You can run audits on-demand or schedule them to run periodically.

[View documentation](#)

**Monitor device activity**

Device Defender Detect monitors device activity collected from the cloud and, optionally, an agent installed on the device.

[View documentation](#)

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Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#dd/auditIntro

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Device Defender Audit

Secure your IoT fleet with Device Defender Audit

Monitor Onboard Manage Greengrass Secure Defend Audit Results Schedules Detect Settings Act Test Software 16.51 / 21:39

Enable audit for your fleet

Enabling the audit feature will allow you to monitor your fleet against a set of pre-defined security best practices that we have created for you.

View documentation

Conduct on-going audits

Ensure the security posture of your device fleet is known, good, and trusted. You can run audits on-demand or schedule them to run periodically.

More about audit checks View documentation

Investigate non-compliance

Device Defender Audit identifies any non-compliant resources. For each type of compliance issue, Audit provides suggested mitigation actions.

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Device Defender Audit Schedules

Scheduled audits (2)

Create

1-2 of 2

Name	Recurrence	...
WeekendAudit	Weekly on Sunday	***
DailyAudit	Daily	***

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AWS Services Resource Groups Admin/Martti.Iengard@... N. Virginia Support

CREATE AN AUDIT

## Create a new audit

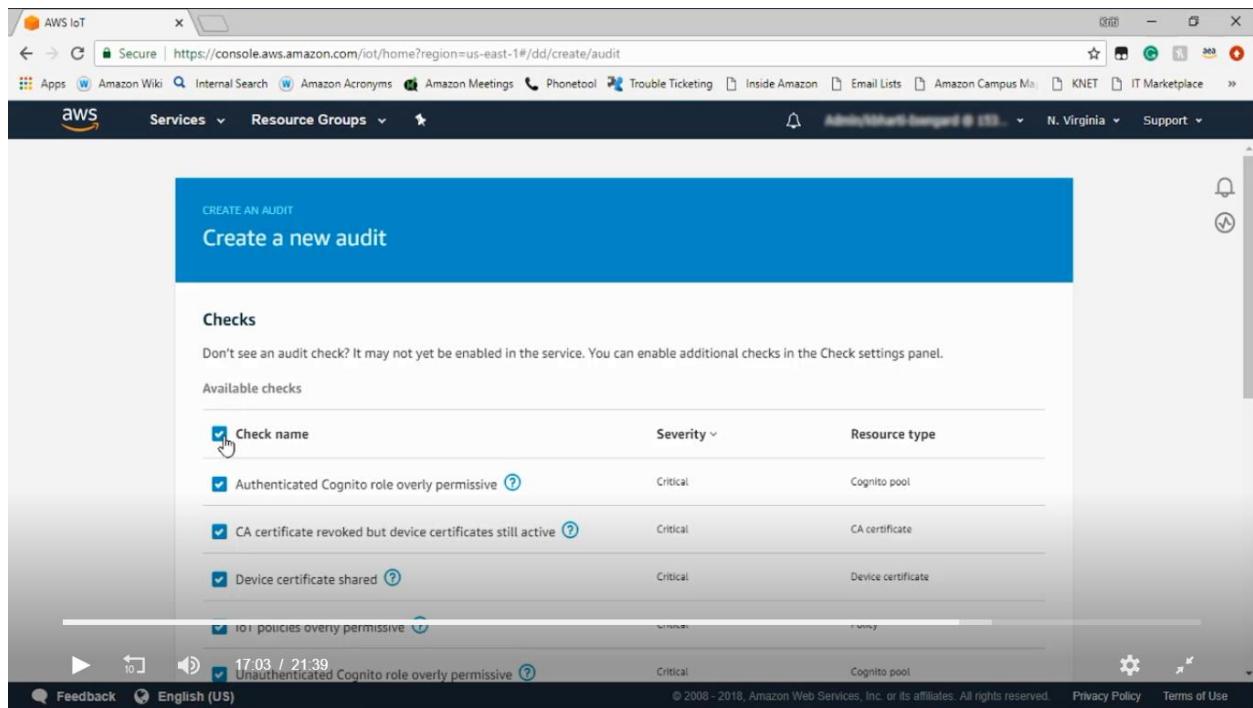
**Checks**

Don't see an audit check? It may not yet be enabled in the service. You can enable additional checks in the Check settings panel.

Available checks

Check name	Severity	Resource type
Authenticated Cognito role overly permissive	Critical	Cognito pool
CA certificate revoked but device certificates still active	Critical	CA certificate
Device certificate shared	Critical	Device certificate
IoT policies overly permissive	Warning	Cognito pool
Unauthenticated Cognito role overly permissive	Critical	Cognito pool

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Device Defender > Audit > Results

Audit results (10+)

Successfully created an audit

Date	Name	Status	Summary
Aug 16, 2018 3:41:34 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 3:39:42 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 3:37:05 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 11:38:27 AM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 11:35:17 AM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 4:46:13 AM -0700	DailyAudit	Canceled	7 of 10 non-compliant
Aug 15, 2018 4:46:13 AM -0700	DailyAudit	Canceled	7 of 10 non-compliant

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Software Test 17.26 / 21.39

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Device Defender > Audit > Results

Audit results (10+)

Create

Date	Name	Status	Summary
Aug 16, 2018 3:45:58 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 3:43:40 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 3:41:34 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 3:39:42 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 3:37:05 PM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 11:38:27 AM -0700	On-demand	Not compliant	1 of 1 non-compliant
Aug 16, 2018 4:46:13 AM -0700	DailyAudit	Canceled	7 of 10 non-compliant
Aug 15, 2018 4:46:13 AM -0700	DailyAudit	Canceled	7 of 10 non-compliant

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Software Test 17.31 / 21.39

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Press Esc to exit full screen

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Device Defender > Audit > Results > On-demand

On-demand - Aug 16, 2018 3:45:58 PM -0700

Audit findings

Audit task ID 3be8c3baab6e595b309a5649922b47c7 Started at Aug 16, 2018 3:45:58 PM -0700

Non-compliant checks (1 of 1)

Check name	Severity	Non-compliant	% Resources	Mitigation
Revoked device certificate still active	Medium	8	3.70%	Reprovision & revoke ⓘ

17:37

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The screenshot shows the AWS IoT Device Defender Audit Results page. The left sidebar has 'Audit' selected under 'Results'. The main content area shows an audit task started on Aug 16, 2018, at 3:45:58 PM -0700. One non-compliant check was found: 'Revoked device certificate still active', which is Medium severity, affects 8 resources (3.70%), and has a mitigation step of 'Reprovision & revoke'. A progress bar at the bottom indicates the audit took 17:37.

AWS IoT

Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#dd/audit/3be8c3baab6e595b309a5649922b47c7/REVOKE\_DEVICE\_CERTIFICATE\_STILL\_ACTIVE... ☆

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AWS IoT

Monitor Onboard Manage Greengrass Secure

Defend Audit Results Schedules Detect Settings

Act Test Software

Feedback English (US)

8 of 216 device certificates non-compliant

**Mitigation** Verify that the device certificate has not been compromised. If it has, follow your security best practices to mitigate the situation. You may want to:

1. Provision a new certificate and attach it to the device.
2. Verify that the new certificate is valid and the device is able to connect.
3. Mark the old certificate as "REVOKED" in the AWS IoT system using [UpdateCertificate](#).
4. Detach the old certificate from the device. (See [DetachThingPrincipal](#)).

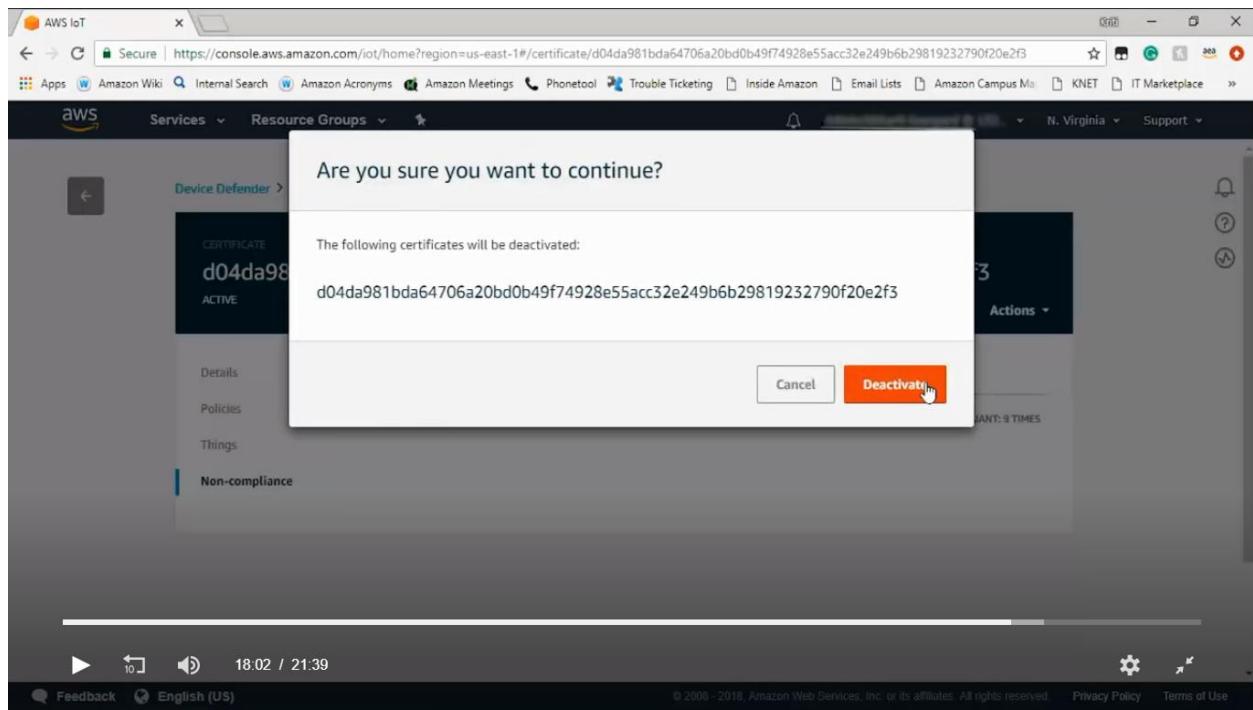
Non-compliant certificate (8)

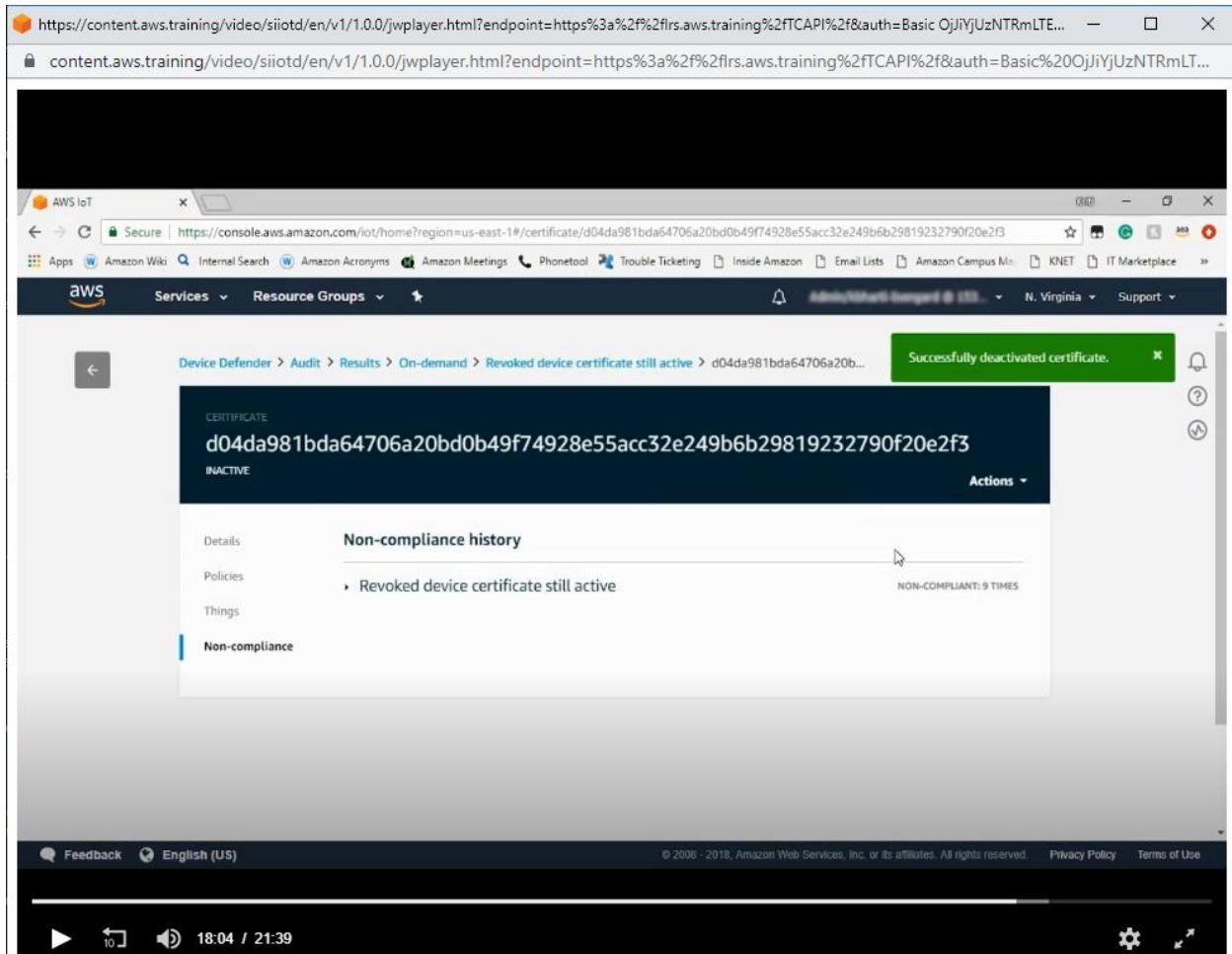
Reason	Certificate ID	Action
Certificate revoked by Issuer.	d04da981bda64706a20bd0b49f74928e55acc32e249b6b29819232790f20e2f3	<button>Copy ID</button>
Certificate revoked by Issuer.	a#24e644dc952ac9b8b7da#f4689ab0c4804e947bbe9ed668635742cd8f5f08ce	<button>Copy ID</button>
Certificate revoked by Issuer.	824c49fb2d0c9e7a0d65496f9003a6777c1847e954f19524f3f60d579f3a1ab	<button>Copy ID</button>
Certificate revoked by Issuer.	4dc0b609276ccb3f374384206dd99b9ec1467f1f63546f5d710eb9634741233	<button>Copy ID</button>

17:43 / 21:39 Certificate revoked by Issuer.

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The screenshot shows the AWS IoT Device Defender Audit Results page. The URL is https://console.aws.amazon.com/iot/home?region=us-east-1#/certificate/d04da981bda64706a20bd0b49f74928e55acc32e249b6b29819232790f20e2f3. The top navigation bar includes links for AWS IoT, Secure, Internal Search, Amazon Acronyms, Amazon Meetings, Phonetool, Trouble Ticketing, Inside Amazon, Email Lists, Amazon Campus Ma, KNET, IT Marketplace, and more. The main content area shows a certificate titled "d04da981bda64706a20bd0b49f74928e55acc32e249b6b29819232790f20e2f3" with an "ACTIVE" status. A dropdown menu labeled "Actions" is open. On the left, there are tabs for Details, Policies, Things, and Non-compliance, with "Non-compliance" selected. The "Non-compliance history" section lists a single item: "Revoked device certificate still active" (NON-COMPLIANT: 9 TIMES). A cursor arrow points to the "Actions" button.





AWS IoT

Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#/dd/create/audit

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CREATE AN AUDIT

## Create a new audit

Checks

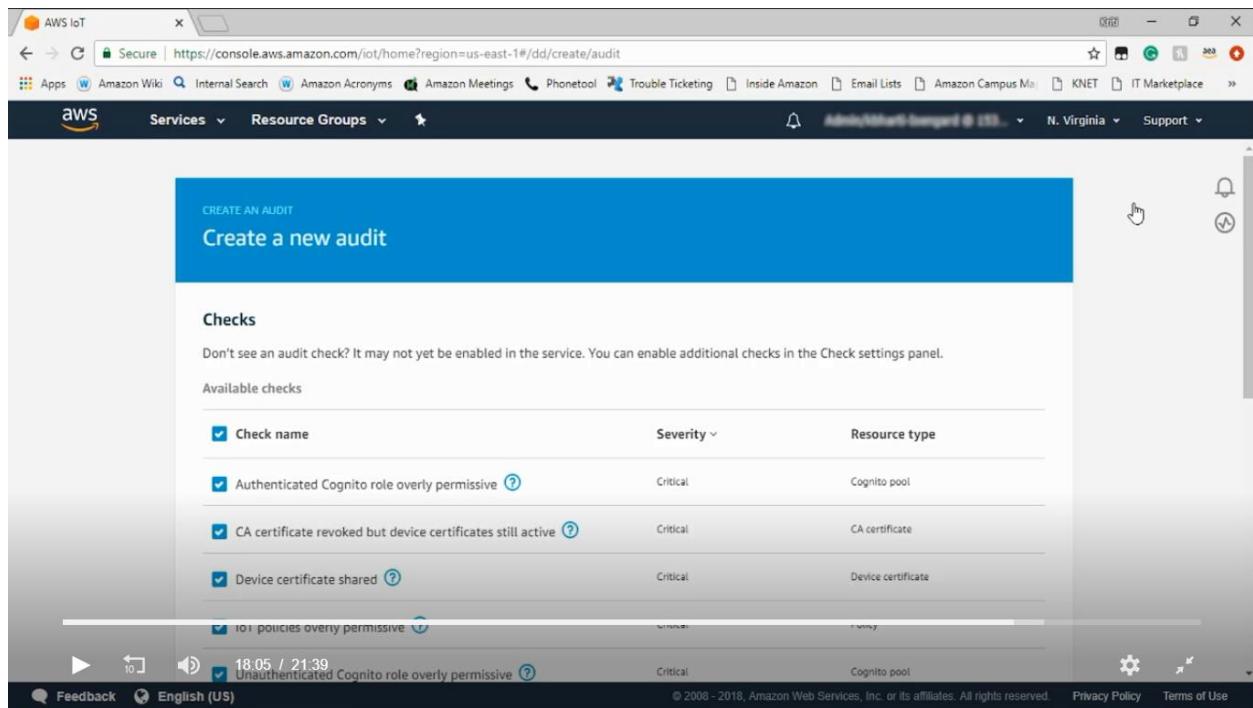
Don't see an audit check? It may not yet be enabled in the service. You can enable additional checks in the Check settings panel.

Available checks

Check name	Severity	Resource type
Authenticated Cognito role overly permissive	Critical	Cognito pool
CA certificate revoked but device certificates still active	Critical	CA certificate
Device certificate shared	Critical	Device certificate
IoT policies overly permissive	Warning	Thing
Unauthenticated Cognito role overly permissive	Critical	Cognito pool

18.05 / 21.39

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Device Defender > Audit > Results > On-demand

On-demand - Aug 16, 2018 3:47:59 PM -0700

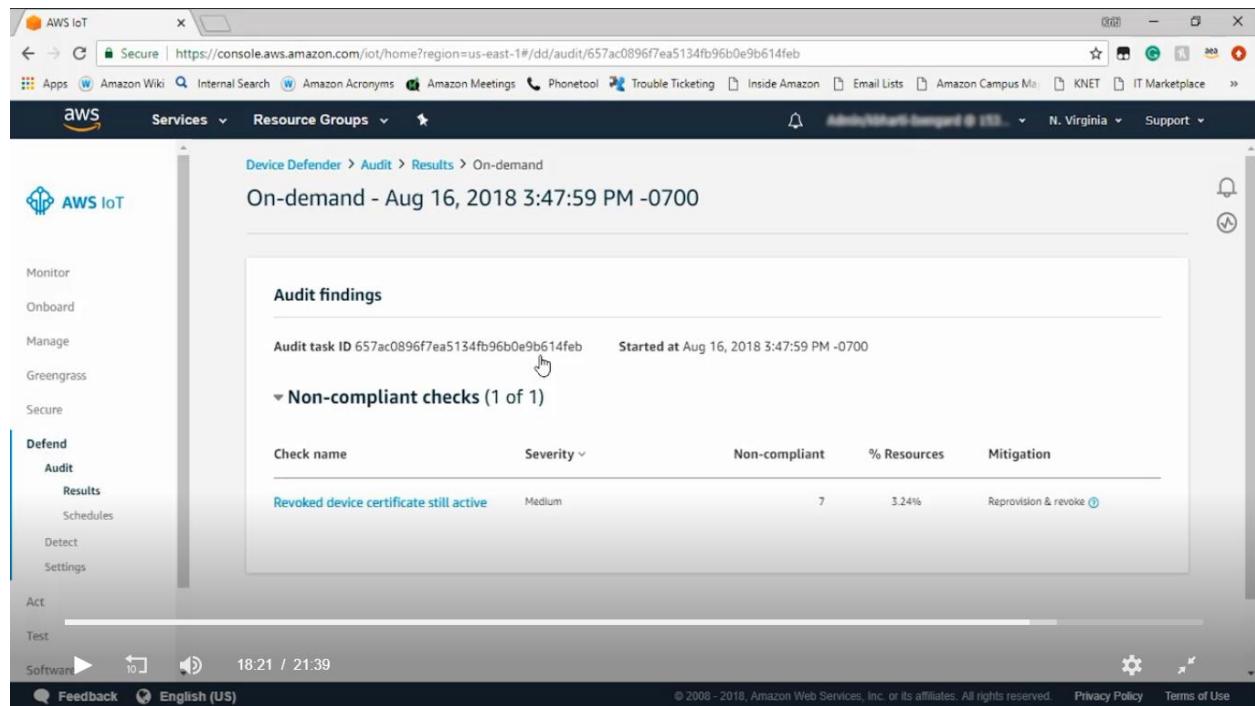
**Audit findings**

Audit task ID 657ac0896f7ea5134fb96b0e9b614feb Started at Aug 16, 2018 3:47:59 PM -0700

▼ Non-compliant checks (1 of 1)

Check name	Severity	Non-compliant	% Resources	Mitigation
Revoked device certificate still active	Medium	7	3.24%	Reprovision & revoke ⓘ

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Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#/dd/audit/657ac0896f7ea5134fb96b0e9b614feb/REVOKED\_DEVICE\_CERTIFICATE\_STILL\_ACTIVE\_...

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Device Defender > Audit > Results > On-demand > Revoked device certificate still active

## Revoked device certificate still active

7 of 216 device certificates non-compliant

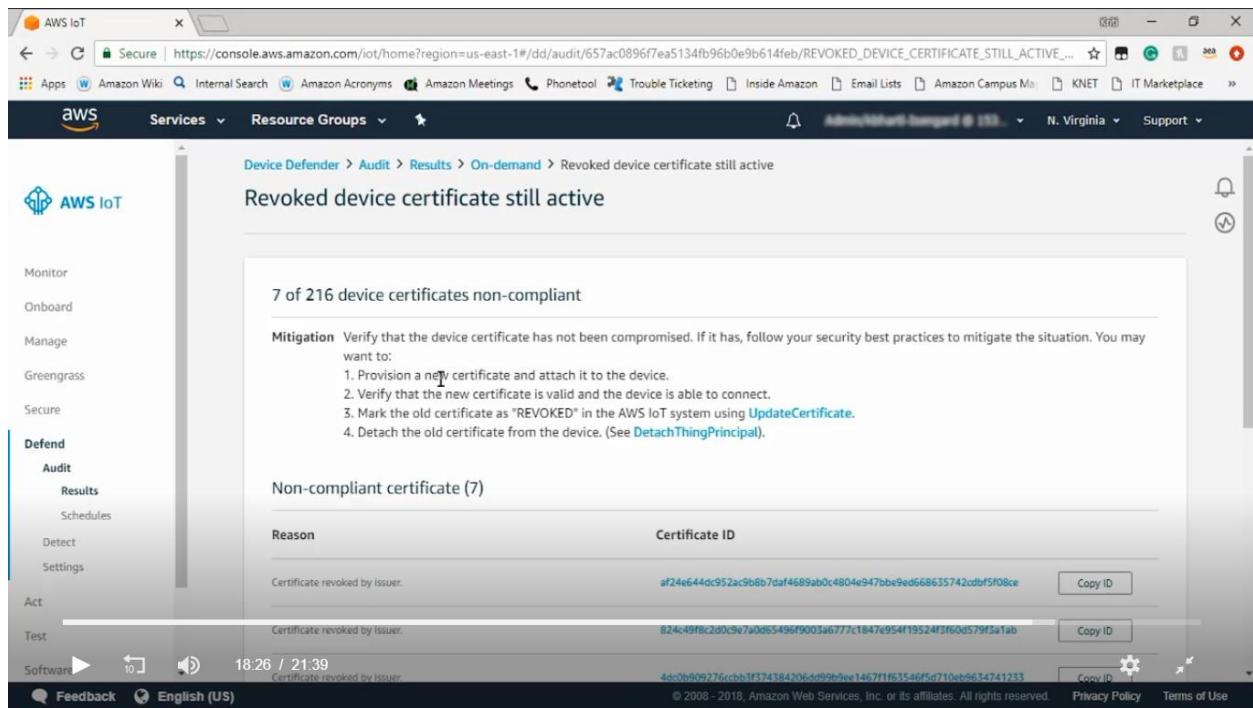
**Mitigation** Verify that the device certificate has not been compromised. If it has, follow your security best practices to mitigate the situation. You may want to:

1. Provision a new certificate and attach it to the device.
2. Verify that the new certificate is valid and the device is able to connect.
3. Mark the old certificate as "REVOKED" in the AWS IoT system using [UpdateCertificate](#).
4. Detach the old certificate from the device. (See [DetachThingPrincipal](#)).

**Non-compliant certificate (7)**

Reason	Certificate ID	Action
Certificate revoked by issuer.	a24e644dc952ac9b8b7daf4689ab0c4804e947bbe9ed668635742cd8f5f08ce	<a href="#">Copy ID</a>
Certificate revoked by issuer.	b24c49fb2d0c97a0d65496f9003a6777c1847e954ff19524f3f60d579f3a1ab	<a href="#">Copy ID</a>
Certificate revoked by issuer.	4dc0b909276ccb3f574784206d99b9e146711f63546fd710eb5634741233	<a href="#">Copy ID</a>

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Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#/dd/audit/657ac0896f7ea5134fb96b0e9b614feb/REVOKED\_DEVICE\_CERTIFICATE\_STILL\_ACTIVE\_...

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Device Defender > Audit > Results > On-demand > Revoked device certificate still active

## Revoked device certificate still active

7 of 216 device certificates non-compliant

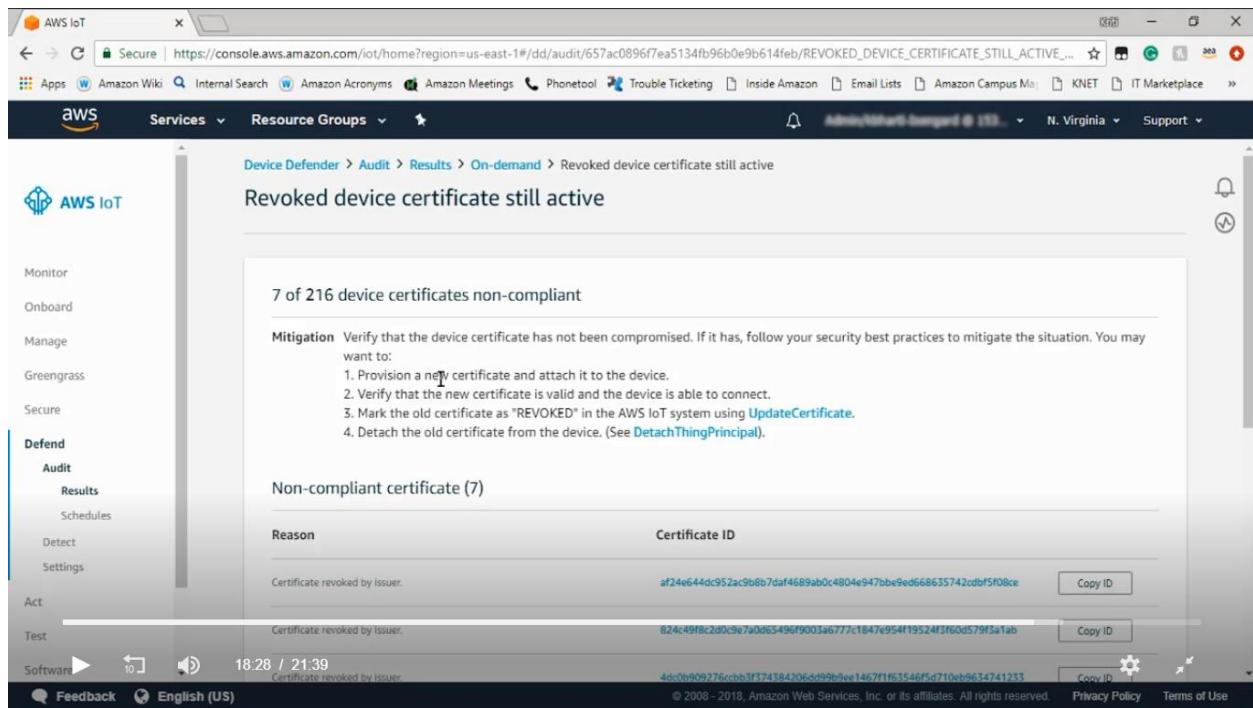
**Mitigation** Verify that the device certificate has not been compromised. If it has, follow your security best practices to mitigate the situation. You may want to:

1. Provision a new certificate and attach it to the device.
2. Verify that the new certificate is valid and the device is able to connect.
3. Mark the old certificate as "REVOKED" in the AWS IoT system using [UpdateCertificate](#).
4. Detach the old certificate from the device. (See [DetachThingPrincipal](#)).

**Non-compliant certificate (7)**

Reason	Certificate ID	Action
Certificate revoked by issuer.	a24e644dc952ac9b8b7daf4689ab0c4804e947bbe9ed668635742cd8f5f08ce	<a href="#">Copy ID</a>
Certificate revoked by issuer.	b24c49fb2d0c9e7a0d65496f9003a6777c1847e954ff19524f3f60d579f3a1ab	<a href="#">Copy ID</a>
Certificate revoked by issuer.	4dc0b909276ccb3f574384206d499b9e1467f1f63546fd710eb9634741233	<a href="#">Copy ID</a>

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**AWS IoT**

Monitor

Onboard

Manage

Greengrass

Secure

**Defend**

Audit

Detect

Settings

Act

Test

Software

Setting\*

Learn

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18:35 / 21:39

Conduct on-going audits

Ensure the security posture of your device fleet is known, good, and trusted. You can run audits on-demand or schedule them to run periodically.

[View documentation](#)

Monitor device activity

Device Defender Detect monitors device activity collected from the cloud and, optionally, an agent installed on the device.

[Create your first security profile](#)

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The screenshot shows the AWS IoT Device Defender Detect landing page. The left sidebar has a 'Defend' section with 'Detect' selected, which has 'Security profiles' highlighted. The main content area has three cards: 'Define device behavior' (with a clipboard icon), 'Monitor device activity' (with a device icon), and 'Investigate anomalies' (with a globe icon). Each card has a 'Learn more about the agent' or 'Explore investigation' button at the bottom.

The screenshot shows the AWS IoT Device Defender Detect Security profiles page. The left sidebar has 'Defend' selected under 'Security profiles'. The main content area shows a message 'Create your first security profile' with a button to do so. Below this, a table lists security profiles, which currently have 0 created. A message at the bottom of the table says 'You have not created any security profiles yet.'

AWS IoT

Secure | https://console.aws.amazon.com/iot/home?region=us-east-1#/dd/securityProfileCreateOrEdit

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CREATE SECURITY PROFILE

Expected behaviors STEP 1/4

Name Security profile name Description (optional) An optional short description

Behaviors Specify how your device **should behave**. You can define behaviors via a visual editor or in JSON. You can use [cloud-side metrics](#) without a device agent deployed. Note: once created, behavior names cannot be edited.

Visual Editor JSON

Name	Metric	Operator	Value	Duration
Behavior name	Authorization failu...	Greater than	Enter value	5 minutes ***

Add behavior

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Alert targets STEP 2/4

DetectDemoProfile

Behaviors (1)

SNS (optional)

Alerts will by default be delivered to the console. You can optionally specify an SNS topic for alerts when a device violates a behavior in this profile.

Topic Select or create the SNS topic for alerts.

No topic selected Create Select

Role Select or create the IAM role that grants permission for Device Defender to publish on the topic.

No role selected Select

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Press Esc to exit full screen

STEP 3/4

CREATE SECURITY PROFILE

Attach

DetectDemoProfile

Behaviors (1)

Alert target

This security profile is not attached to anything. You can attach a security profile to a thing group or to every device in your account.

Attach to

Specific Thing groups  All devices

Cancel Next

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AWS IoT

Secure | https://console.aws.amazon.com/iot/home?region=us-east-1

Press Esc to exit full screen

STEP 3/4

CREATE SECURITY PROFILE

Attach

DetectDemoProfile

Behaviors (1)

Alert target

Type	Details	Action
SNS	Topic DeviceDefender-DetectAlerts    Role AwsIoTDeviceDefenderSNSRole	Add <input type="radio"/>

Attached to (1)

Name	Action
things	Attach <input type="radio"/>

Continue

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AWS Services Resource Groups

Device Defender > Detect > Security profiles

Security profiles (1)

Create

Security Profile "DetectDemoProfile" created

1-1 of 1

Created date	Profile name	Behaviors	Attached to
Aug 16, 2018 4:14:39 PM -0700	DetectDemoProfile	1	All things

Defend

- Audit
- Detect**
- Violations
- Security profiles
- Settings

Act

Test

Software ► 10 20:10 / 21:39

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The screenshot shows the AWS IoT Device Defender Detect Security profiles page. A success message 'Security Profile "DetectDemoProfile" created' is displayed. A table lists one security profile: 'DetectDemoProfile' created on Aug 16, 2018, with 1 behavior and attached to 'All things'. The left sidebar shows the 'Detect' section selected under 'Defend'. The bottom navigation bar includes links for Feedback, English (US), Privacy Policy, and Terms of Use.

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Services Resource Groups

Device Defender > Detect > Security profiles

Security profiles (1)

Create

Monitor

Onboard

Manage

Greengrass

Secure

Defend

Audit

**Detect**

Violations

**Security profiles**

Settings

Act

Test

Play

Software 20.21 / 21.39

Feedback English (US)

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Created date	Profile name	Behaviors	Attached to
Aug 16, 2018 4:14:39 PM -0700	DetectDemoProfile	1	All things

AWS IoT

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Device Defender > Detect > Violations

## Violations

Now History

3 Thing(s) in alarm as of Aug 16, 2018 4:25:38 PM -0700

1-3 of 3

Event	Thing name	Security profile	Behavior	Last emitted
Aug 16, 2018 4:25:00 PM -0700	DetectDemo-Thing2	DetectDemoProfile	MessageRate	6 message(s)
Aug 16, 2018 4:20:00 PM -0700	DetectDemo-Thing1	DetectDemoProfile	MessageRate	6 message(s)
Aug 16, 2018 4:20:00 PM -0700	DetectDemo-Thing0	DetectDemoProfile	MessageRate	11 message(s)

Feedback English (US) 20:32 / 21:39

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Monitor Onboard Manage Greengrass Secure Defend Audit Detect Violations Security profiles Settings Act Test Software 10 20:32 / 21:39

The screenshot shows the AWS IoT Device Defender Detect Violations page. The left sidebar has a 'Violations' section under the 'Detect' heading. The main area displays a table of violations. There are three rows in the table, each representing a violation for a different thing: DetectDemo-Thing2, DetectDemo-Thing1, and DetectDemo-Thing0. Each row includes the event time, thing name, security profile (DetectDemoProfile), behavior (MessageRate), and the number of messages emitted (6, 6, and 11 respectively). The table has columns for Event, Thing name, Security profile, Behavior, and Last emitted.

Event	Thing name	Security profile	Behavior	Last emitted
Aug 16, 2018 4:25:00 PM -0700	DetectDemo-Thing2	DetectDemoProfile	MessageRate	6 message(s)
Aug 16, 2018 4:20:00 PM -0700	DetectDemo-Thing1	DetectDemoProfile	MessageRate	6 message(s)
Aug 16, 2018 4:20:00 PM -0700	DetectDemo-Thing0	DetectDemoProfile	MessageRate	11 message(s)

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Device Defender > Detect > Violations

## Violations

Now History

Violation events (99)

Show events for

Last 14 days All security profiles

1-99 of 99

Event	State	Thing name	Security profile	Behavior	Transition value
Aug 16, 2018 4:25:00 PM -0700	In alarm	DetectDemo-Thing2	DetectDemoProfile	MessageRate	6 message(s)
Aug 16, 2018 4:20:00 PM -0700	In alarm	DetectDemo-Thing1	DetectDemoProfile	MessageRate	6 message(s)
Aug 16, 2018 4:20:00 PM -0700	In alarm	DetectDemo-Thing1	DetectDemoProfile	MessageRate	6 message(s)

Feedback English (US) 20:38 12 21:39 8 4:08:44 PM -0700 Alarm invalidated icgxffgz CloudSideMetricsPr... NumAuthZFailures - Privacy Policy Terms of Use

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# Summary

aws training and certification



Scheduled/on-demand audit

Monitor device behavior and anomalies

Alerts on IoT console, Amazon SNS, Amazon CloudWatch

Investigate and mitigate security issues

01:44



10



20:52 / 21:39



Press Esc to exit full screen

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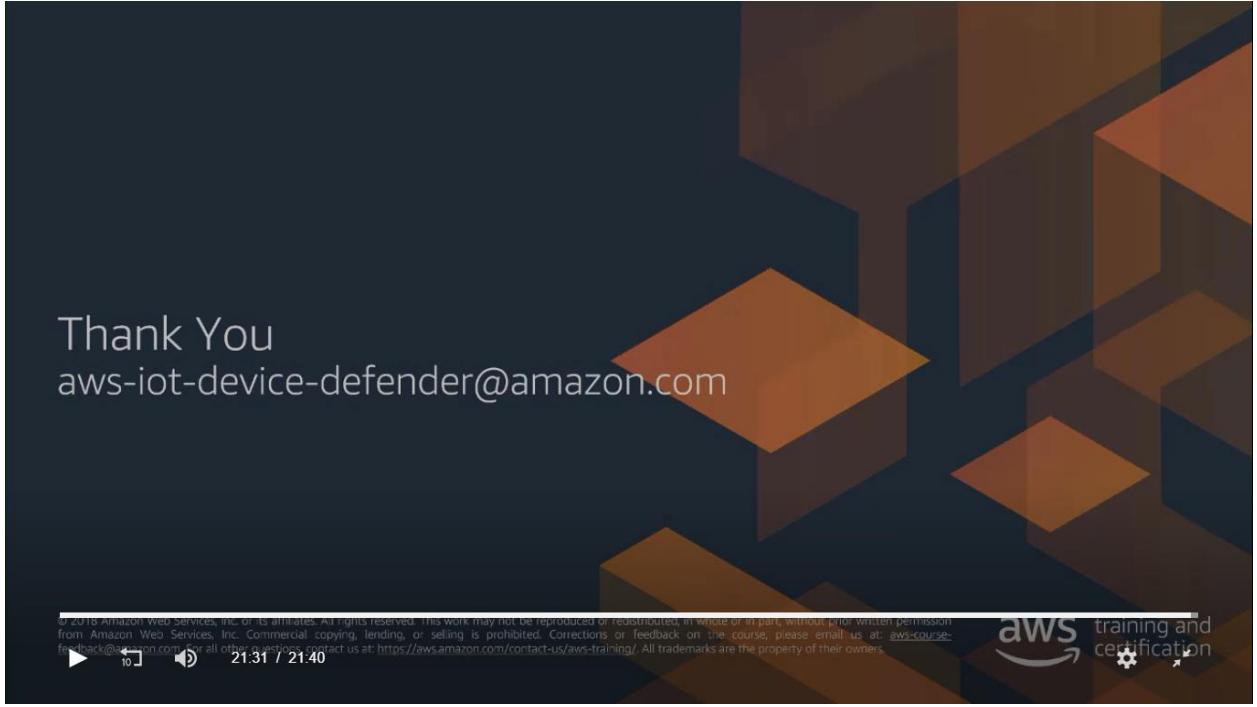


10



21.20 / 21:40





Thank You  
aws-iot-device-defender@amazon.com

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