Security, Identity and Cybersecurity Services

Microsoft Defender for Identity (MDI)

Introduction and Technical Overview

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Microsoft

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Agenda

Microsoft Defender for Identity General Overview

How Does Microsoft Defender for Identity Work?

Microsoft Defender for Identity And Technical Overview

Questions and Answers

The Problem

Traditional IT security tools are typically:

▶ Complex

Initial setup, fine-tuning, and the creation of rules, thresholds, and baselines can take a long time

▶ Prone to false positives

You receive too many reports in a day with false positives that require valuable time that you do not have.

▶ Designed to help protect the perimeter

When user credentials are stolen and attackers are inside the network, your current defenses provide limited protection.

Start with the right assumptions!

Your **ARE** a <u>**TARGET**</u>

You <u>**CANNOT**</u> <u>**DEFEND**</u> against <u>**EVERYTHING**</u>

Your infrastructure <u>**IS**</u>, or <u>**WILL BE**</u>, <u>**COMPROMISED**</u>

Assume Compromise!

Based on all of this information, what should you assume?

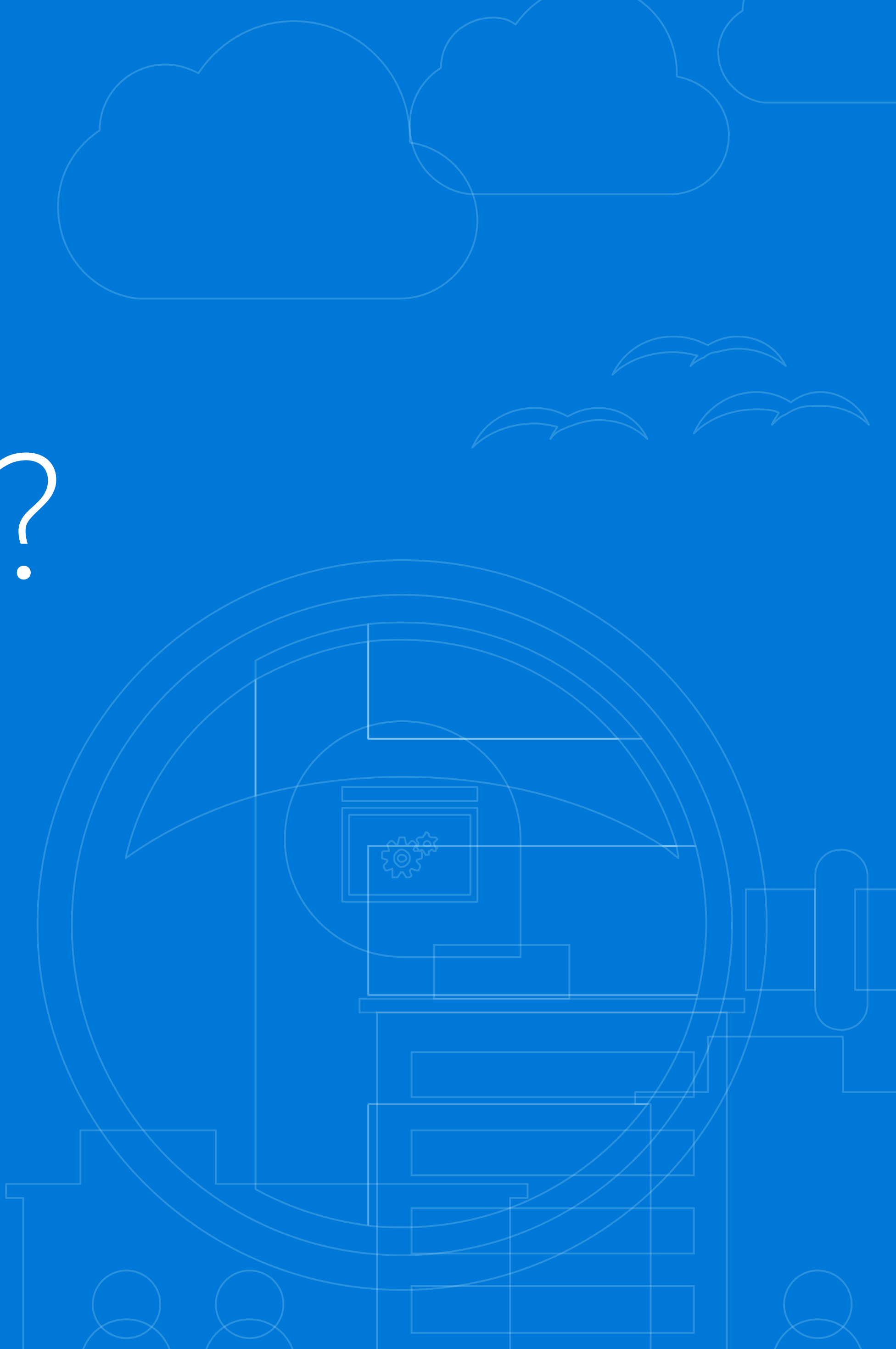
How do I detect **compromised credentials?**

How do I **detect attackers** moving laterally in my environment?

How do I **detect Pass-the-Hash? Pass-the-Ticket?**

Aren’t **rule-based security solutions** enough?

What is the solution?



Microsoft Defender for Identity

User and Entity Behavior Analytics (UEBA)

Monitors behaviors of users and other entities by using multiple data-sources

Profiles behavior and detects anomalies by using machine learning algorithms

Evaluates the activity of users and other entities to detect advanced attacks

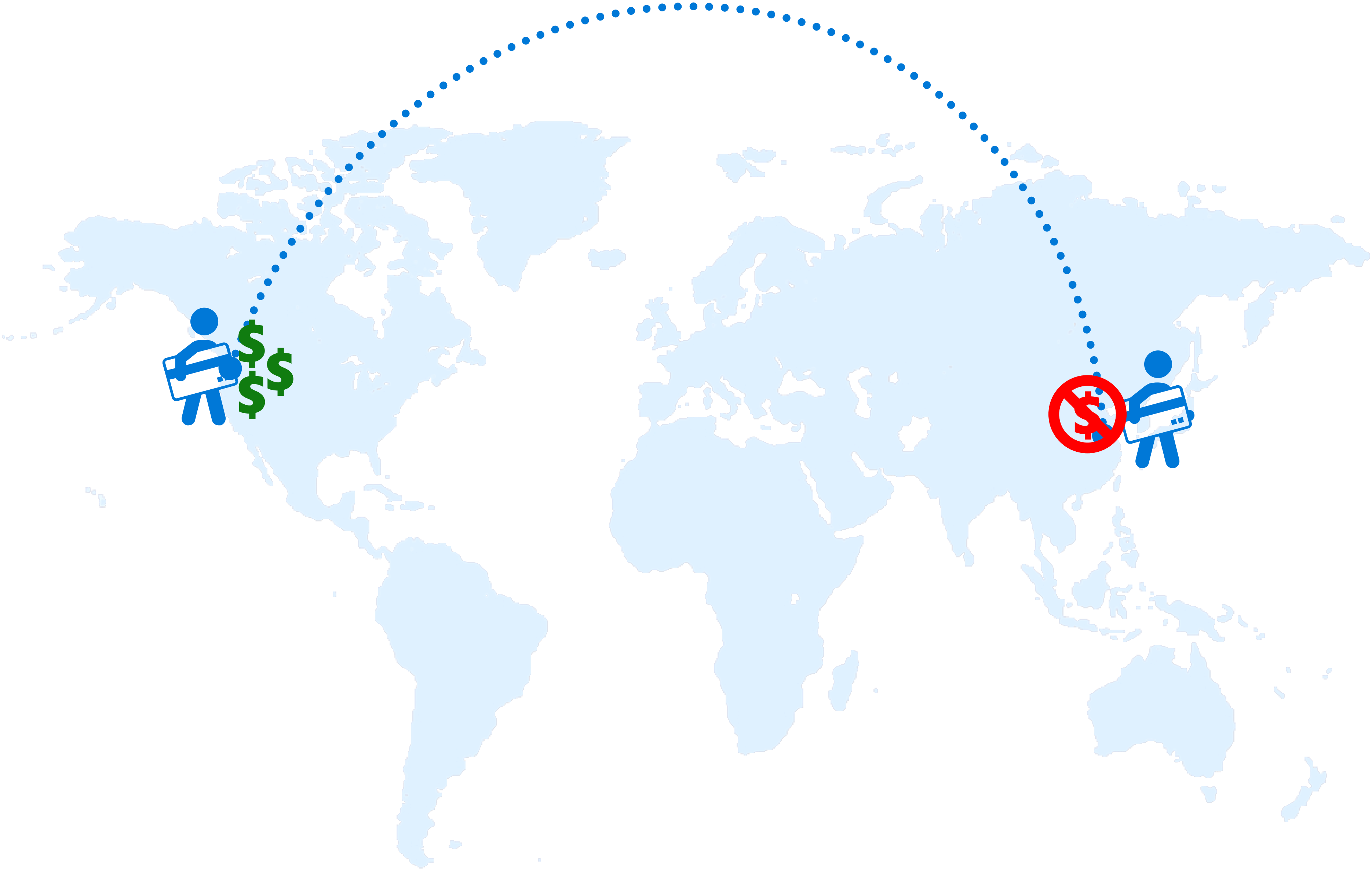
> “Enterprises successfully use **UEBA** to detect malicious and abusive behavior that otherwise went unnoticed by existing security monitoring systems, such as SIEM and (DLP) .”

Gartner®

SIEM: Security Information and Event Management

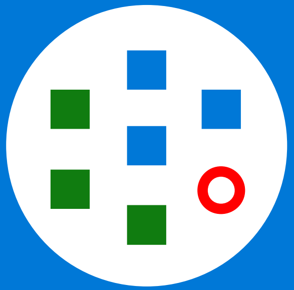
DLP: MDI loss prevention

Behavior Analytics In Practice



Credit card companies monitor cardholders' behavior.

By observing purchases, they learn what is typical behavior for each buyer.



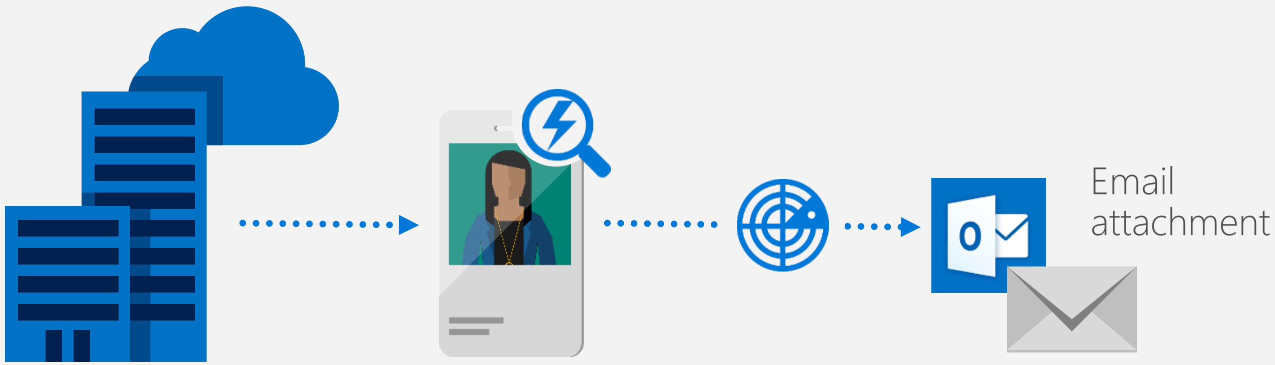
If there is any abnormal activity, they will notify the cardholder to verify charge.

Microsoft Defender for Identity

A platform to identify advanced security attacks ***before*** they cause damage

Behavioral Analytics + Detection for known attacks and issues = Microsoft Defender for Identity

Microsoft Defender for Identity brings the behavioral analytics concept to IT and the organization's users.



Benefits of Microsoft Defender for Identity

Detect threats fast with Behavioral Analytics

Adapt as fast as your enemies

Focus on what is important by using the simple attack timeline

Reduce the fatigue of false positives

Prioritize and plan for next steps

Microsoft Defender for Identity: Differentiating Factors

It is fast

- No need to create rules, thresholds, or baselines
- Straightforward and fast deployment

It is reliable

- Takes advantage of unique data sources, combines entity contextual deep packet inspection (DIP) and logs
- Consistent learning and abnormal behavior identification
- Detection of human and non-human service accounts
- Network name resolution

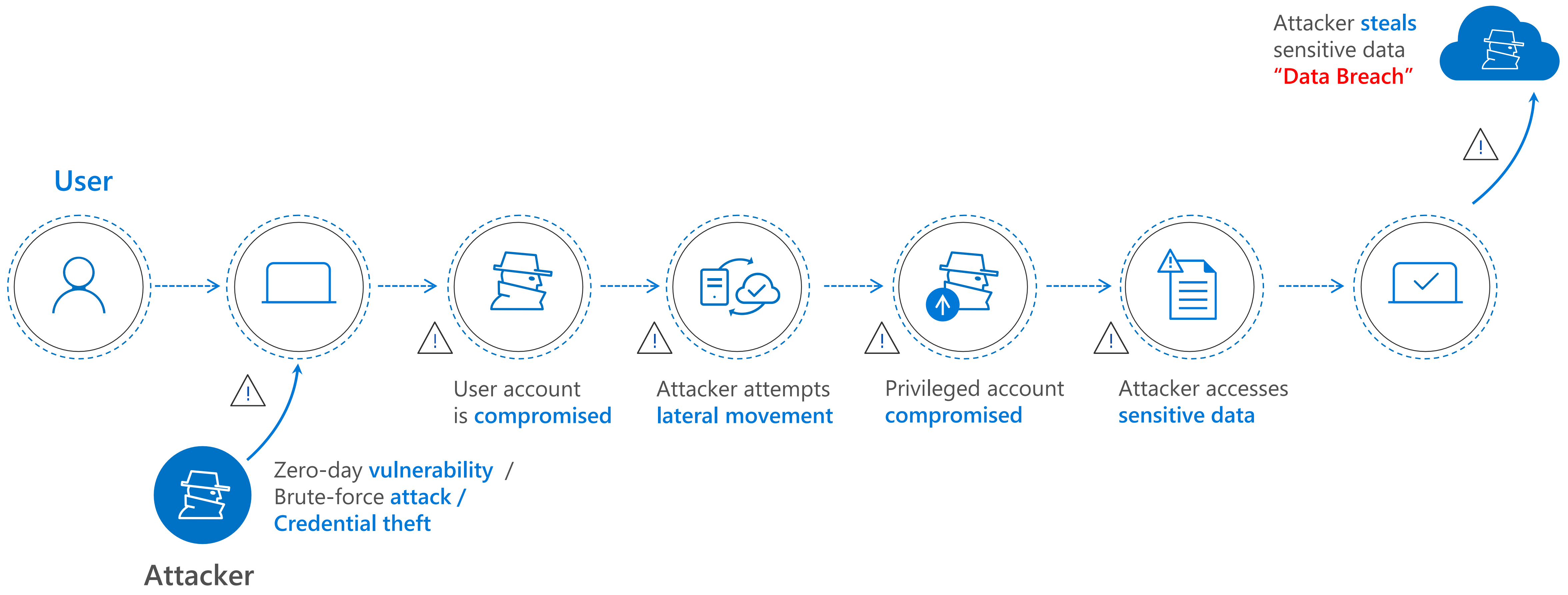
It provides clear information

- Functional, clear, and actionable attack timeline, that shows the who, what, when, and how in near real time
- Continuously updated reports

It is innovative

- Patented technology
- Combines deterministic and machine learning based algorithms
- The UEBA product that allows user input

The anatomy of an attack



Attacker **steals** sensitive data
"Data Breach"

User

User account is **compromised**

Attacker attempts **lateral movement**

Privileged account **compromised**

Attacker accesses **sensitive data**

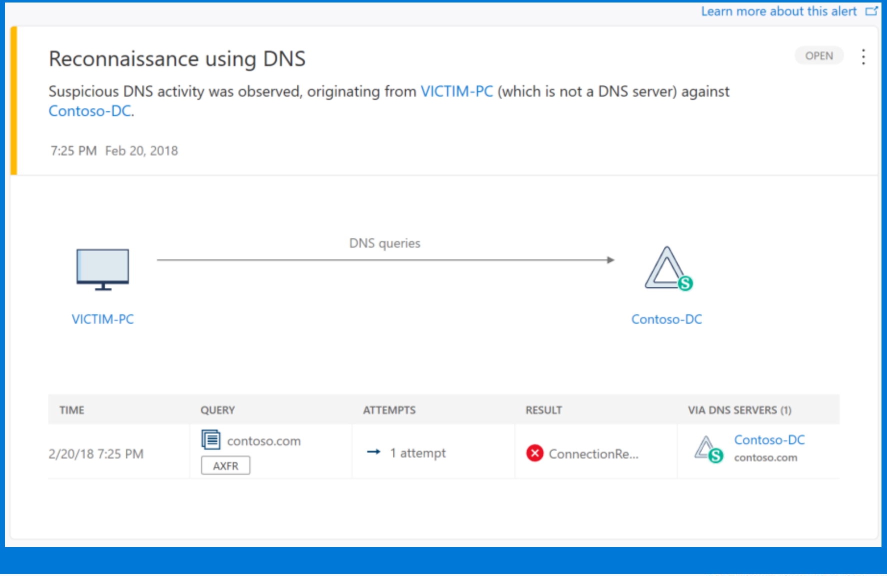
Zero-day **vulnerability** /
Brute-force **attack /**
Credential theft

Attacker

⚠ Anomalous user behavior
Unfamiliar sign-in location

⚠ Lateral movement attacks
Escalation of privileges
Account impersonation

Detected Threats

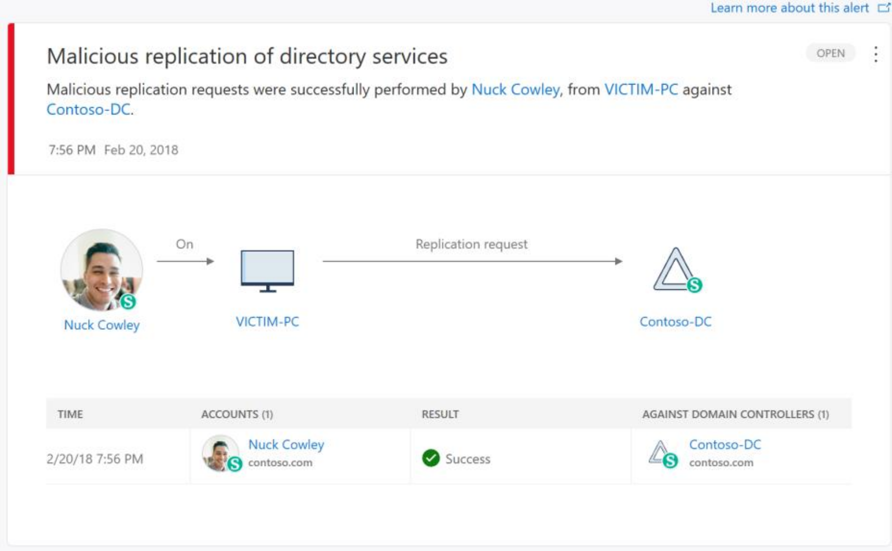


Reconnaissance using DNS

Suspicious DNS activity was observed, originating from VICTIM-PC (which is not a DNS server) against Contoso-DC.

7:25 PM Feb 20, 2018

TIME	QUERY	ATTEMPTS	RESULT	VIA DNS SERVERS (1)
2/20/18 7:25 PM	contoso.com AXFR	→ 1 attempt	ConnectionRe...	Contoso-DC contoso.com



Malicious replication of directory services

Malicious replication requests were successfully performed by Nuck Cowley, from VICTIM-PC against Contoso-DC.

7:56 PM Feb 20, 2018

TIME	ACCOUNTS (1)	RESULT	AGAINST DOMAIN CONTROLLERS (1)
2/20/18 7:56 PM	Nuck Cowley contoso.com	✓ Success	Contoso-DC contoso.com

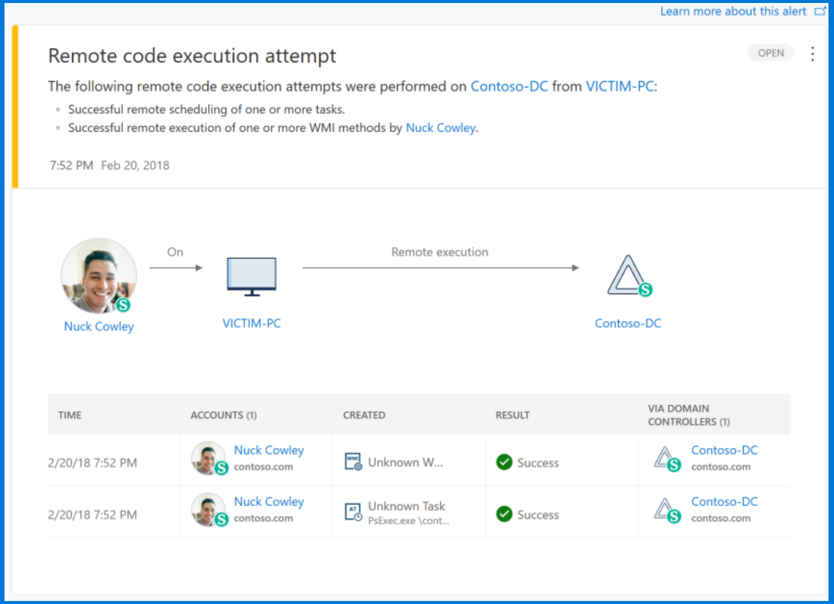
Reconnaissance and brute force suspicious activities:

- Account enumeration reconnaissance
- Active Directory attributes reconnaissance (LDAP)
- Network mapping reconnaissance (DNS)
- Security principal reconnaissance (LDAP)
- User and Group membership reconnaissance (SAMR)
- User and IP address reconnaissance (SMB)
- Suspected Brute force attacks (LDAP, Kerberos, SMB)

Identity theft suspicious activities:

- Pass-the-ticket
- Pass-the-hash
- Over-Pass-the-hash
- Skeleton key
- MS11-013 Elevation of Privilege
- Forged PAC (MS14-068)
- Golden ticket
- Remote execution
- Malicious DPAPI Request
- Suspicious communications

Detected Threats



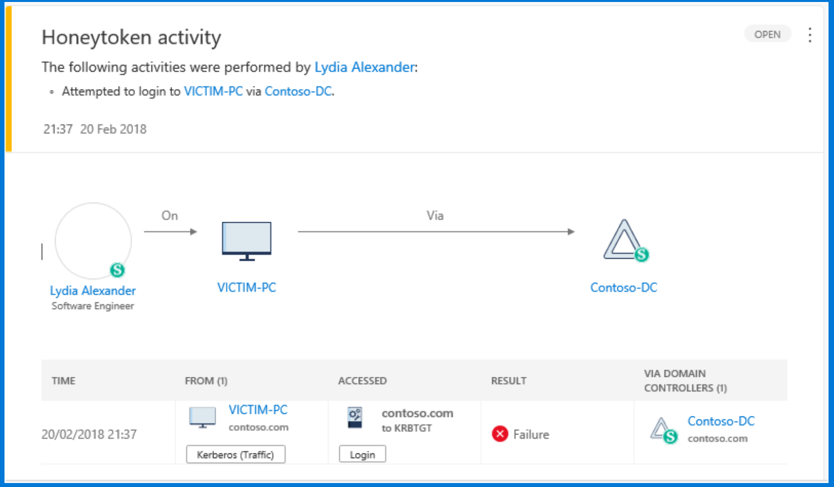
Remote code execution attempt

The following remote code execution attempts were performed on Contoso-DC from VICTIM-PC:

- Successful remote scheduling of one or more tasks.
- Successful remote execution of one or more WMI methods by Nuck Cowley.

7:52 PM Feb 20, 2018

TIME	ACCOUNTS (1)	CREATED	RESULT	VIA DOMAIN CONTROLLERS (1)
2/20/18 7:52 PM	Nuck Cowley contoso.com	Unknown W...	✓ Success	Contoso-DC contoso.com
2/20/18 7:52 PM	Nuck Cowley contoso.com	Unknown Task PsExec.exe \cont...	✓ Success	Contoso-DC contoso.com



Honeytoken activity

The following activities were performed by Lydia Alexander:

- Attempted to login to VICTIM-PC via Contoso-DC.

21:37 20 Feb 2018

TIME	FROM (1)	ACCESSED	RESULT	VIA DOMAIN CONTROLLERS (1)
20/02/2018 21:37	VICTIM-PC contoso.com Kerberos (Traffic)	contoso.com to KRBTGT Login	✕ Failure	Contoso-DC contoso.com

Abnormal behavior suspicious activities:

- Abnormal behavior based on authentication, authorization, and working hours (machine learning algorithm)
- Abnormal modification of sensitive groups
- Massive object deletion

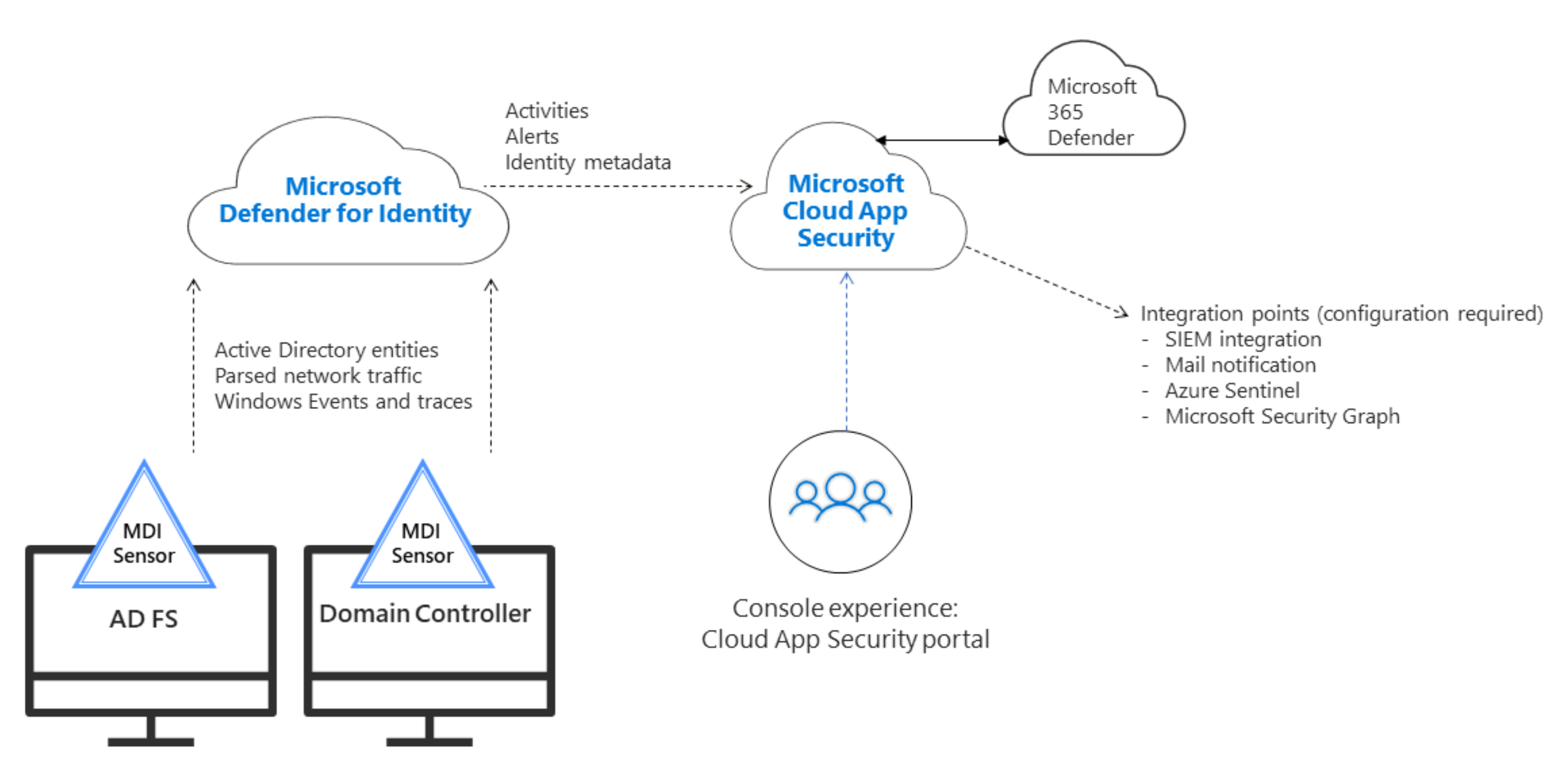
Security issues:

- Sensitive account exposed in plain text authentication
- Service exposing accounts in plain text authentication
- Remote Execution attempts
- Honey token accounts suspicious activity
- Malicious replication requests
- Computer account broken trust
- Data exfiltration over SMB

How Does MDI Work?

How MDI Works

1. Analyze



Microsoft Defender for Identity
Activities
Alerts
Identity metadata
Microsoft Cloud App Security
Microsoft 365 Defender
Integration points (configuration required)
- SIEM integration
- Mail notification
- Azure Sentinel
- Microsoft Security Graph
Active Directory entities
Parsed network traffic
Windows Events and traces
MDI Sensor
AD FS
MDI Sensor
Domain Controller
Console experience:
Cloud App Security portal

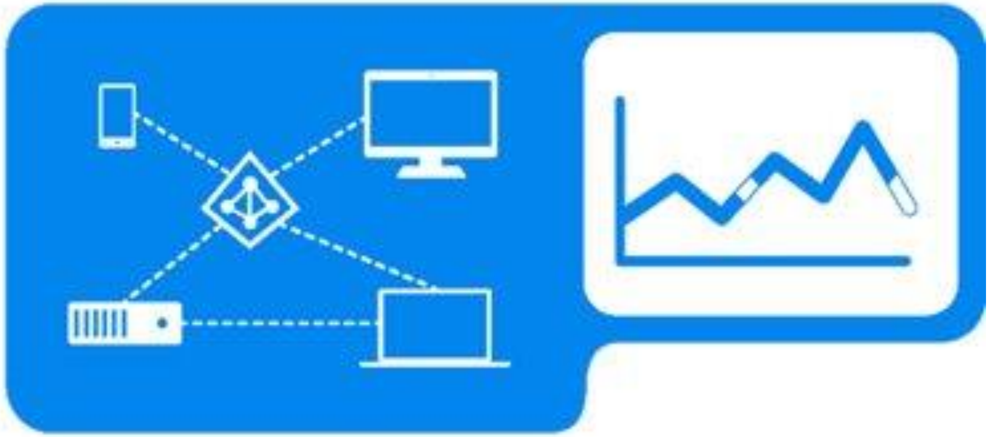
After installation:

- Install MDI sensor on DCs or ADFS servers to monitor their traffic directly, without the need for a dedicated server or configuration of port mirroring.
- Or configure a dedicated server that monitors the traffic from your domain controllers using either port mirroring or a network TAP.

Note: MDI Sensor uses an agent, rather than port-mirroring

How MDI Works

2 Learn



MDI :

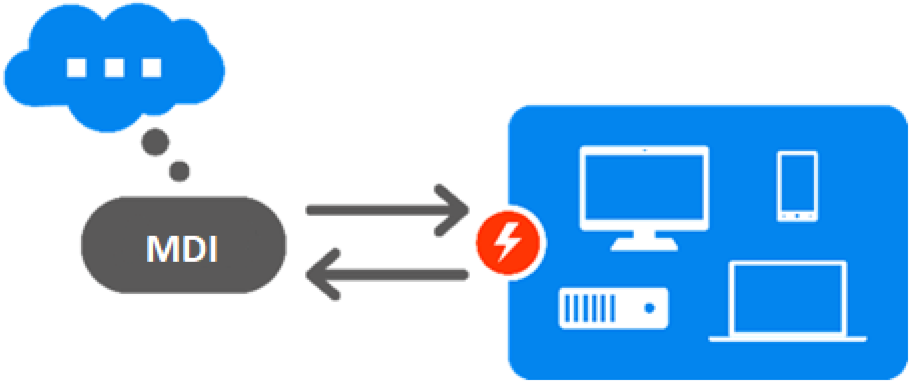
- Automatically starts learning and profiling entity behavior
- Identifies normal behavior for entities
- Learns continuously to update the activities of the users, devices, and resources

What is an entity?

An entity represents users, devices, or resources

How MDI Works

3 Detect



Microsoft Defender for Identity:

- Looks for abnormal behavior and identifies suspicious activities
- Only raises red flags if abnormal activities are contextually aggregated
- Uses world-class security research to detect security risks and attacks in near real time, based on attackers’ Tactics, Techniques, and Procedures (TTPs)

MDI not only compares the entity’s behavior to its own, but also to the behavior of other entities in the interaction path.

How MDI Works

4 Alert

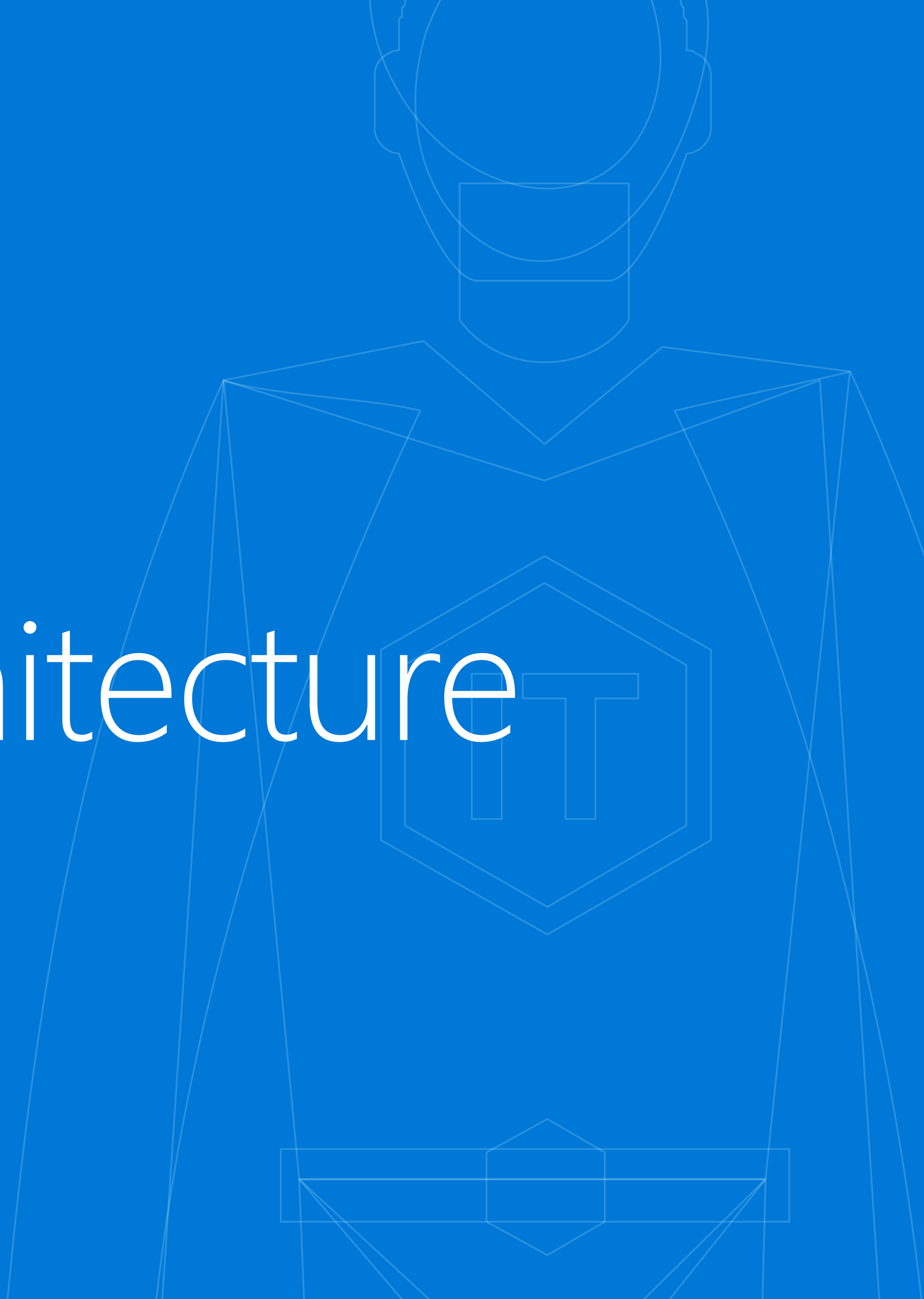
MDI reports all suspicious activities on a simple, functional, usable attack timeline

MDI identifies
- Who?
- What?
- When?
- How?

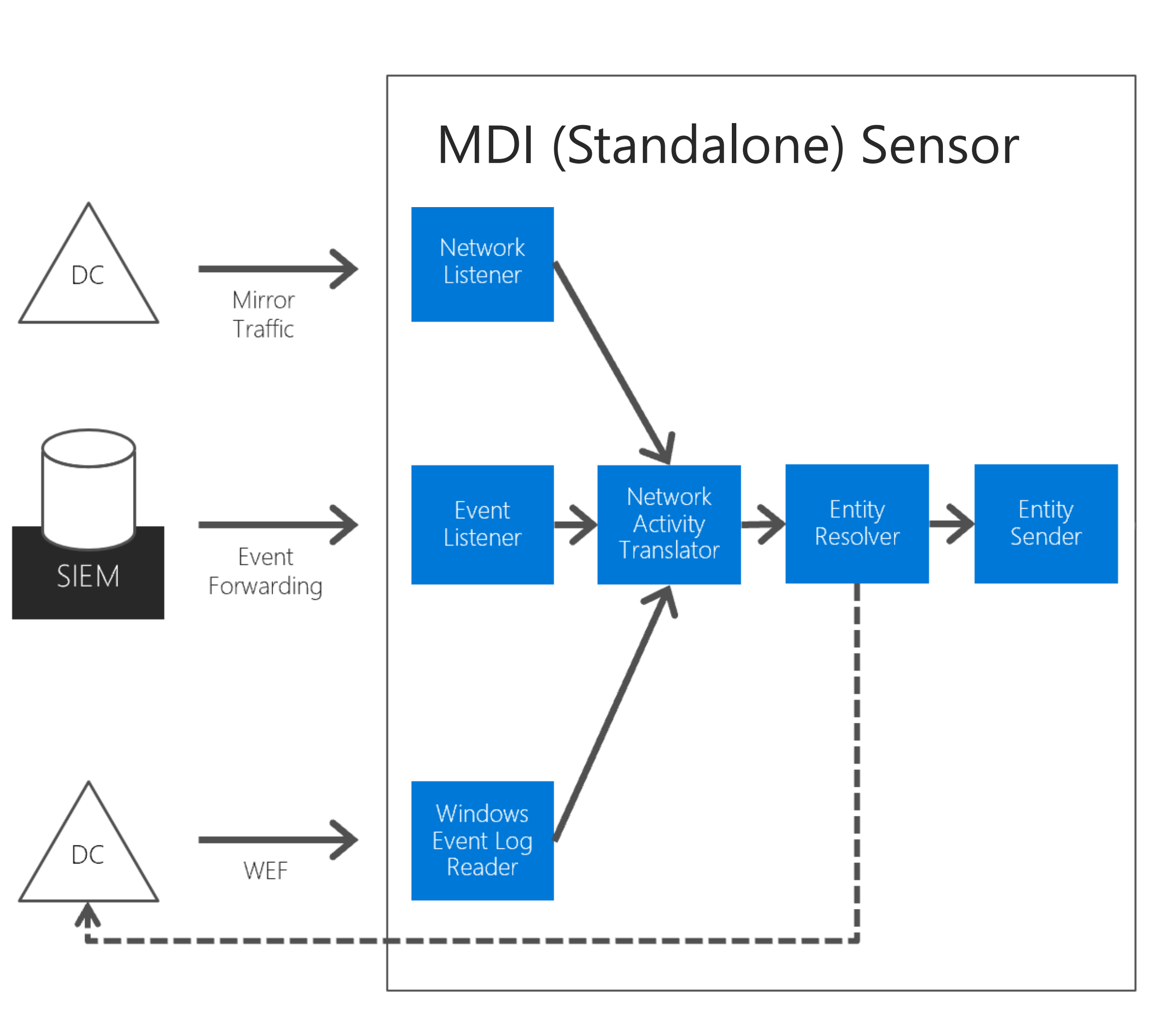
For each suspicious activity, MDI provides recommendations for the investigation and remediation

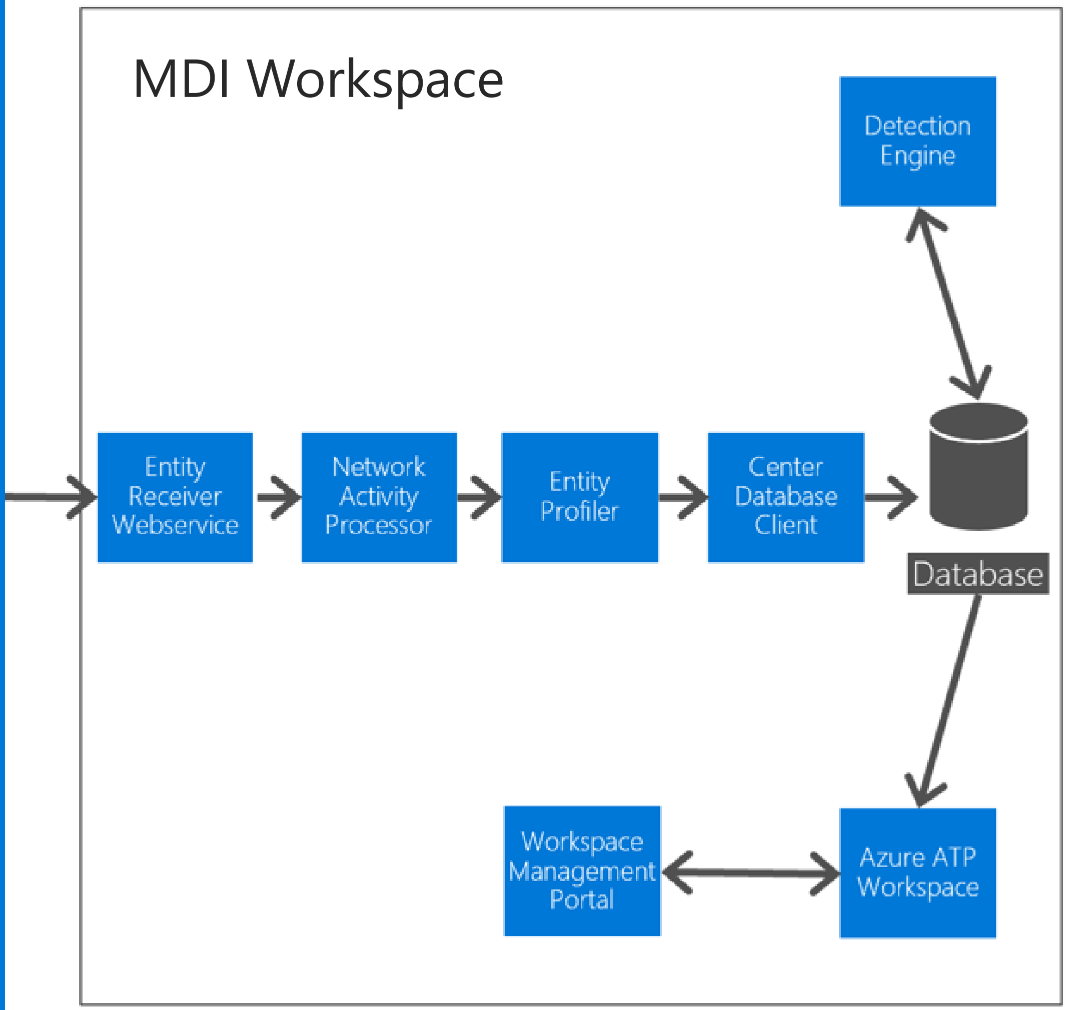
Microsoft

MDI Technical Overview and Architecture

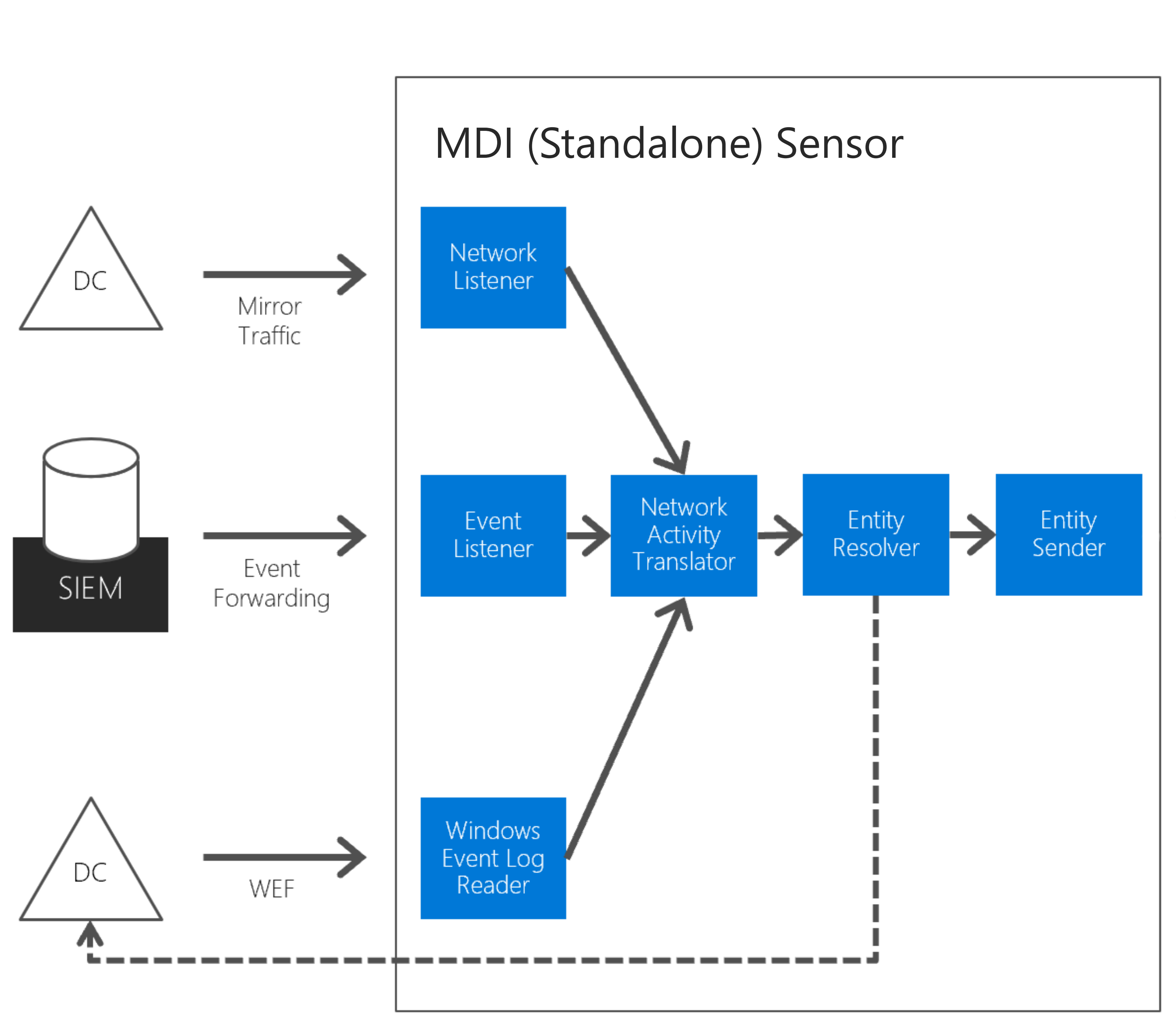


Overview: Entire MDI Architecture

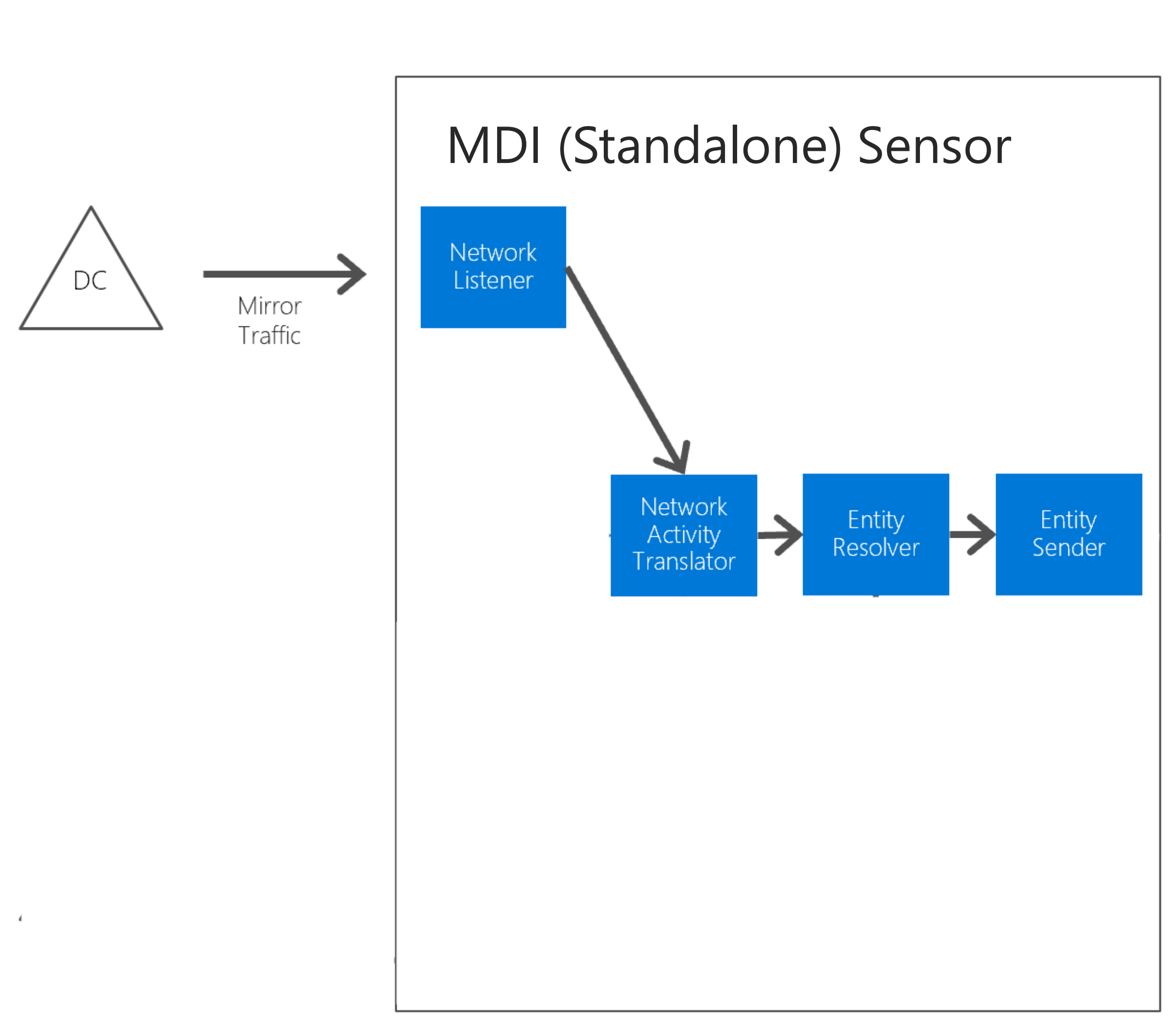




MDI Sensor Architecture

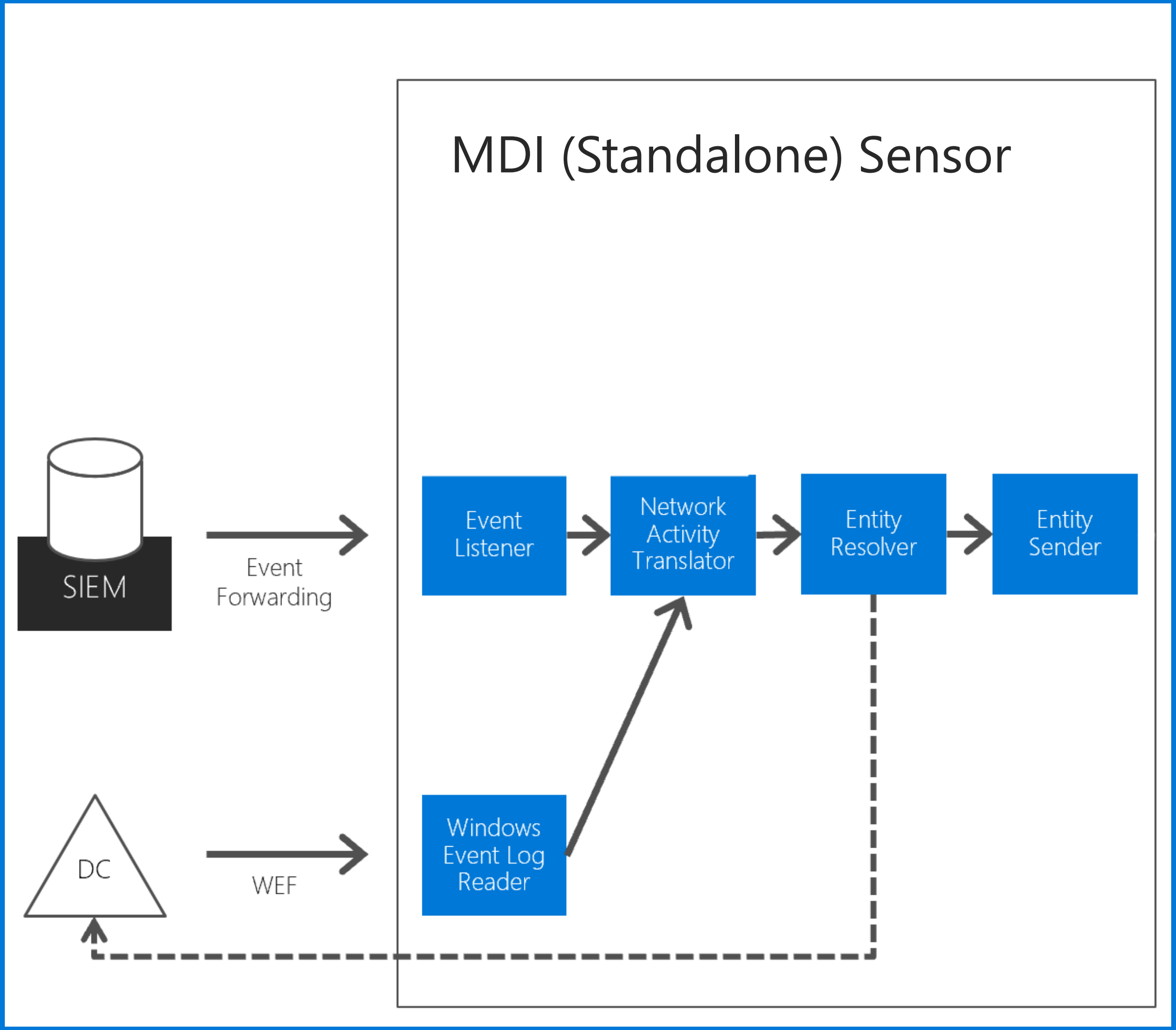


MDI Sensor: Network Activity Collection

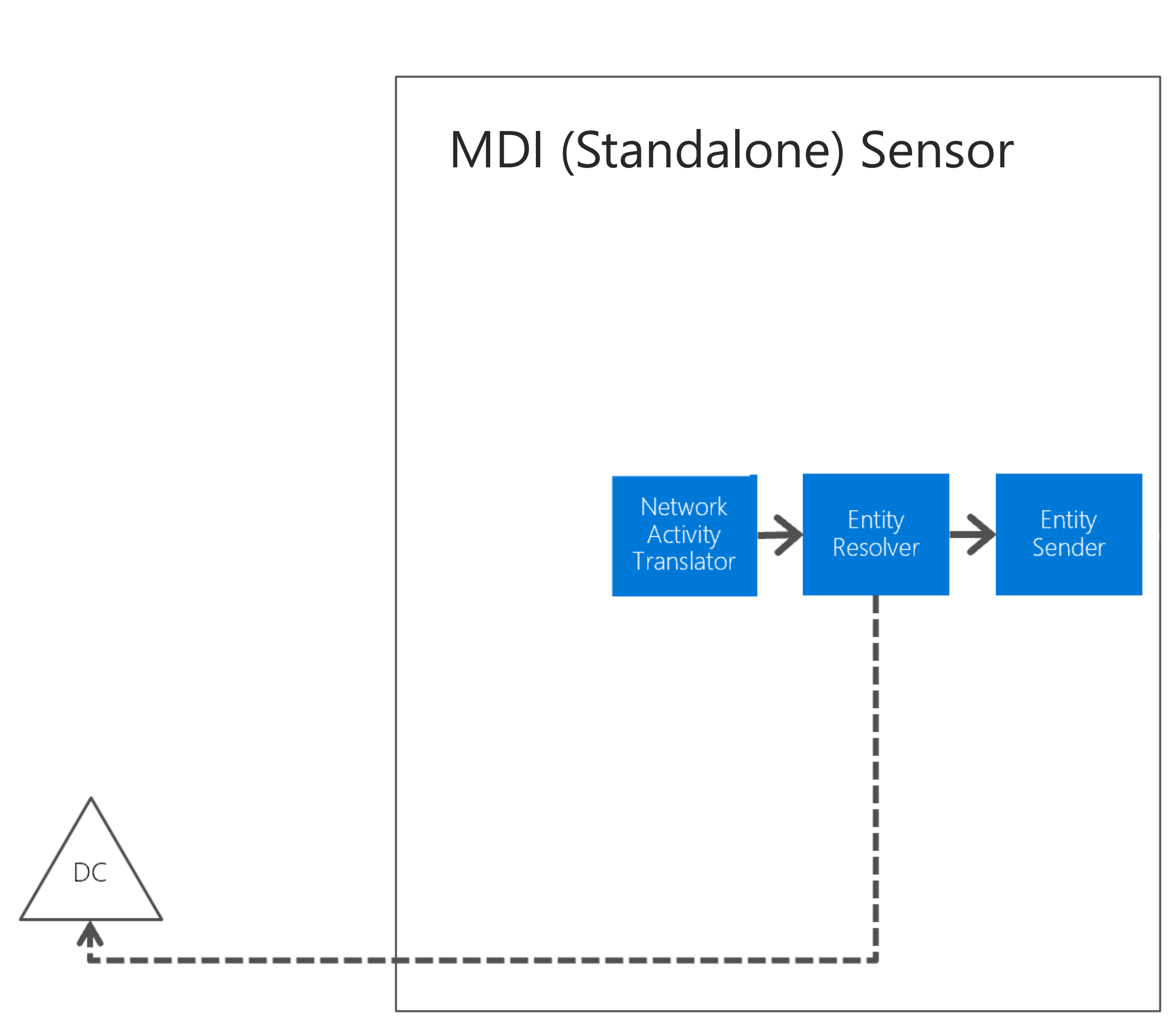


MDI (Standalone) Sensor

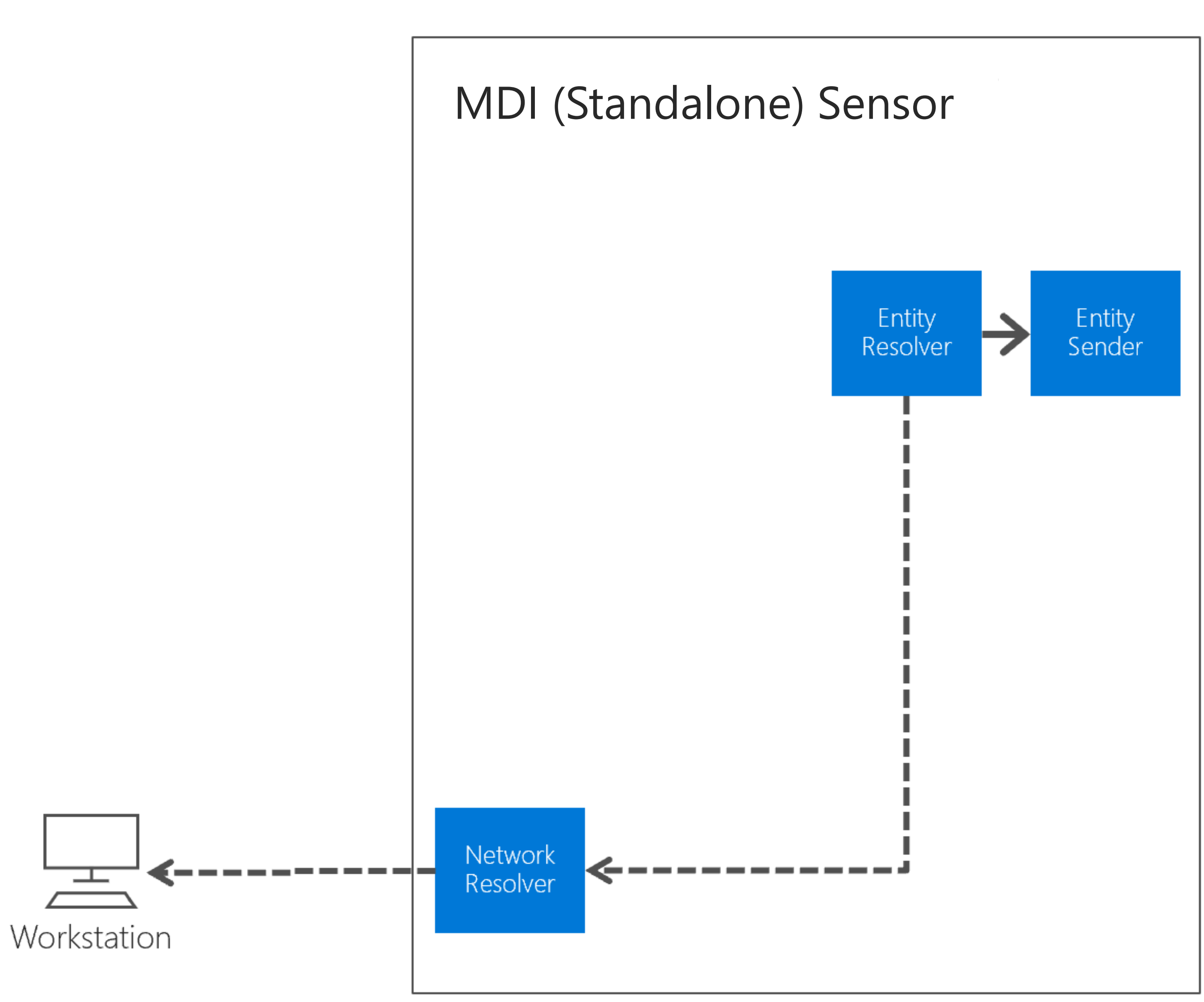
MDI Sensor: SIEM and Event Collection



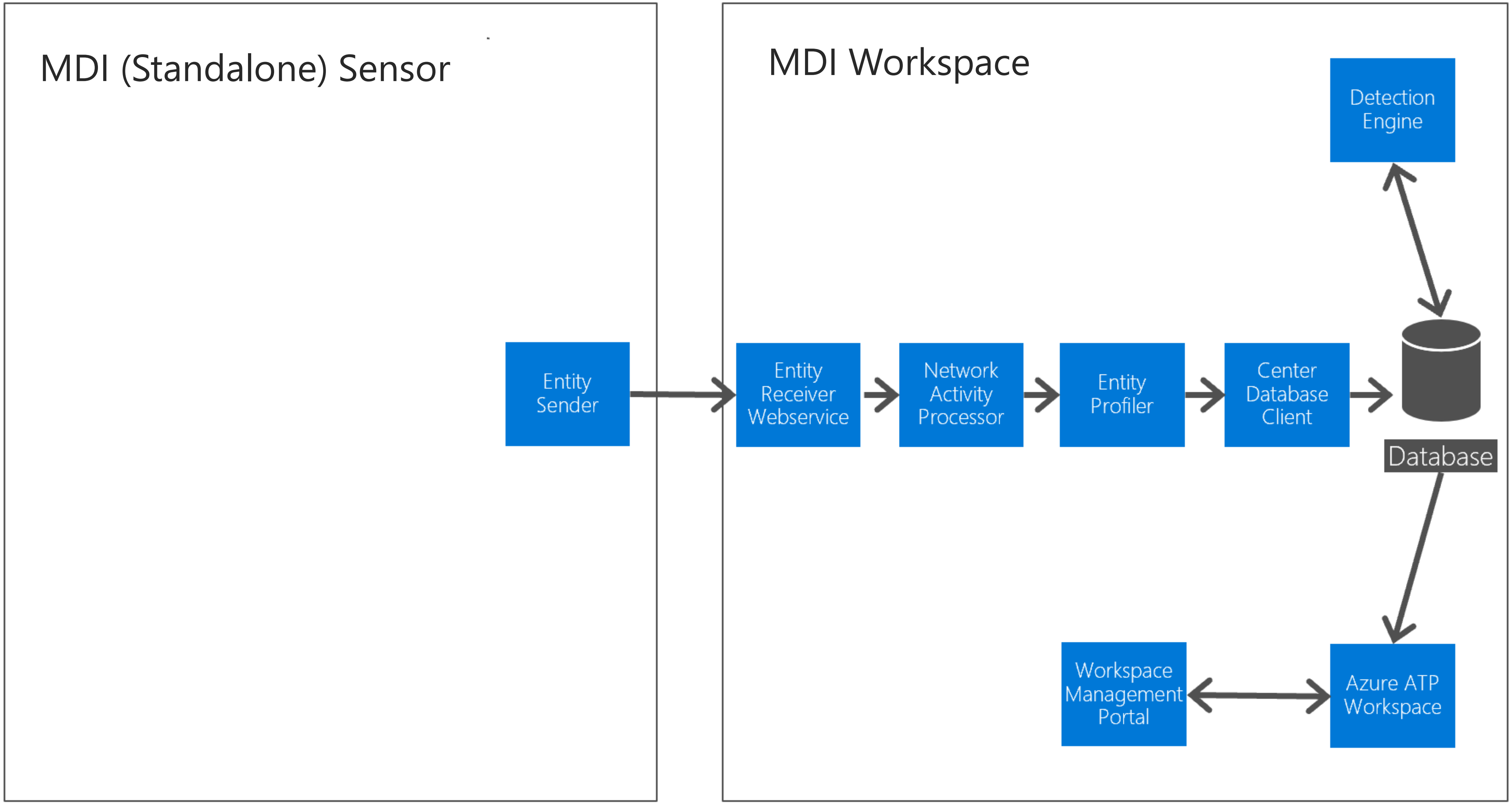
MDI Sensor: Directory Services Collection



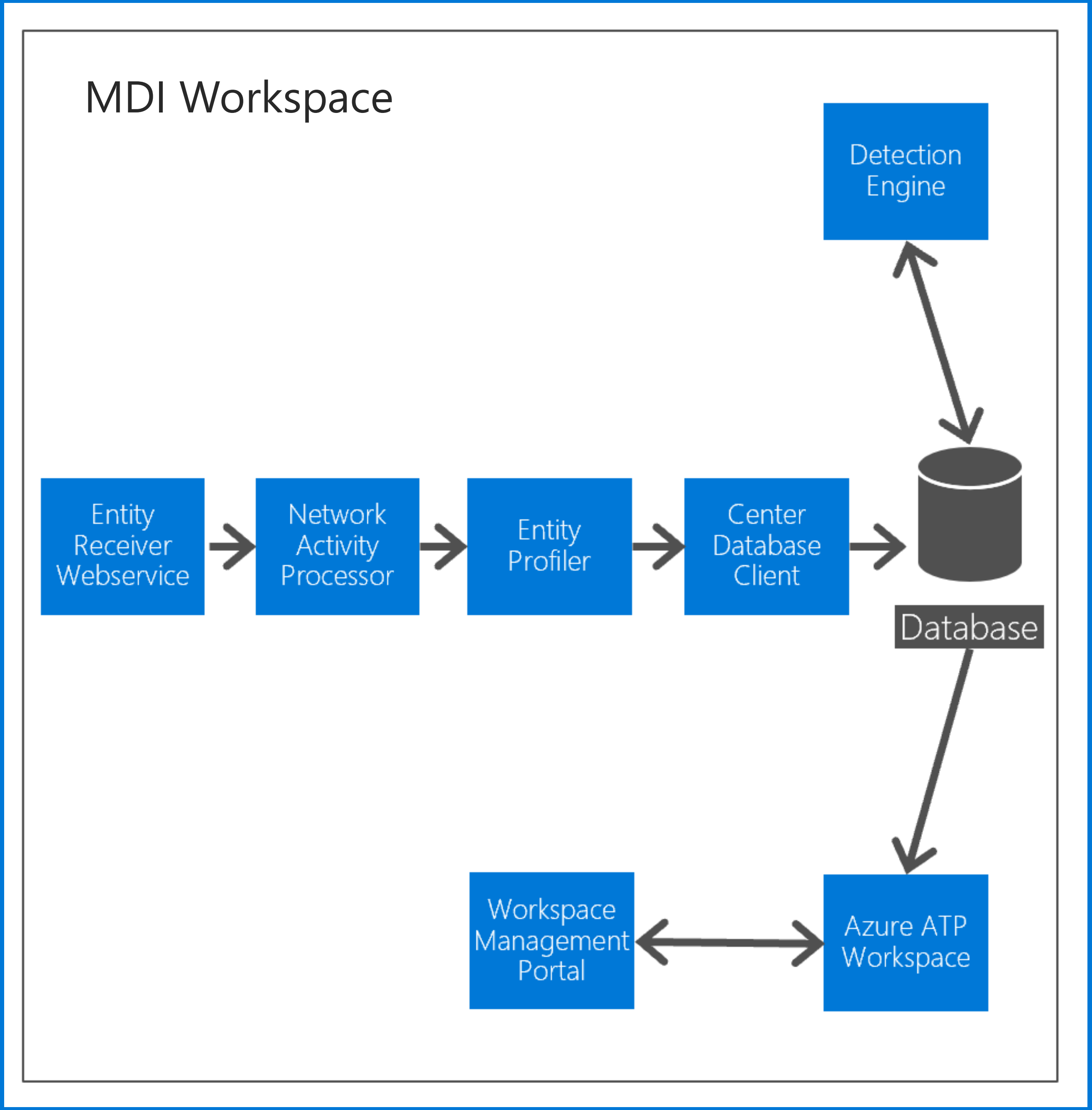
MDI Name Resolution Collection



MDI sensor: MDI Sensor to MDI Webservice Communication



MDI Cloud Architecture



MDI Deployment Planning

Preparing for MDI

- MDI Workspace
- MDI Sensor Types
- Port mirroring configuration
- Off domain / On domain (Standalone Sensor only)
- Active Directory Domain Services (AD DS) user accounts
- Proper auditing on DCs and ADFS servers
- Honey token account

Preparation for MDI

1. Create an Active Directory Domain Services (AD DS) account for the MDI Sensor to use
2. Create the MDI Detection mailbox (Optional)
3. Create a honey token account in AD (Optional)
4. Configure and validate port mirroring (domain controller = source, MDI Standalone Sensor = destination)
5. Enable relevant Audit policy
6. Procure Enterprise Mobility + Security E5 and enable for the correct tenant

MDI Cloud service Network Port Requirements

- Communication between the MDI Cloud service and the MDI Sensor is encrypted by using SSL on port 443 and the configuration endpoints over port 80
- The MDI Portal is secured by using SSL on port 443

MDI Network Port Requirements

Protocol	Transport	Port	To/From	Direction
SSL (MDI Communications)	TCP	443	MDI Sensor	Outbound
SMTP (optional)	TCP	25	MDI Sensor/SMTP server	Outbound
SMTPS (optional)	TCP	465	MDI Sensor/SMTP server	Outbound
Syslog (optional)	TCP	514	MDI Sensor/SIEM server	Outbound
Syslog (optional)	TCP/UDP	514	MDI Sensor/SIEM server	Inbound
LDAP	TCP and UDP	389	Domain controllers	Outbound
LDAPS (optional)	TCP	636	Domain controllers	Outbound
DNS	TCP and UDP	53	DNS servers	Outbound
Kerberos (optional if domain joined)	TCP and UDP	88	Domain controllers	Outbound
Netlogon (optional if domain joined)	TCP and UDP	445	Domain controllers	Outbound
Windows Time (optional if domain joined)	UDP	123	Domain controllers	Outbound

MDI Pre-requisite Script

- By running the MDI Audit Script, you can verify that the domain controller are having the correct Audit settings

MDI Sensor Administrative Requirements

- Configured by using the MDI Cloud Service and install package downloaded to MDI Sensor server
- Requires an Active Directory account with read-only access (does not need interactive sign in) used to enumerate users and devices for event correlation and behavioral analysis in the MDI Cloud service
- Nothing special added, not even an administrative local group
- Requires read-only access on Deleted Objects container and ADFS database

MDI Standalone Sensor Requirements

- Operating system: Windows Server 2012 R2 or Windows Server 2016 or 2019 (includes server core). OS can be a domain or workgroup member.

- Hardware: An MDI Standalone Sensor can support monitoring multiple domain controllers, depending on the amount network traffic to and from the domain controllers.

- Networking: Two or more NICs
  - Management Adapter
  - Capture Adapter

Configure a static non-routable IP address on the capture adapter with no default gateway and no DNS server addresses. For example, 1.1.1.1/8

MDI Sensor Requirements for DCs

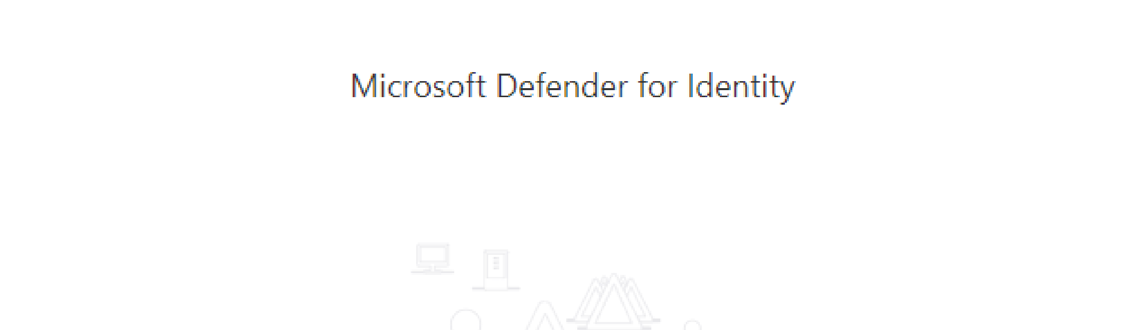
- Operating system: Windows Server 2012 or above (includes server core).
- Roles: AD Domain Controller only. ADFS and DC roles should not co-exist on target server.
- Domain Controller: Branch or RODCs are supported.
- .NET: During installation, if .NET Framework 4.7 or later isn't installed, the .NET Framework 4.7 is installed and might require a reboot of the server.

MDI Sensor Requirements for ADFS Servers

- **Operating system:** Windows Server 2016 or 2019
- **Roles:** AD Federation Services only. ADFS and DC roles should not co-exist on target server.
- **ADFS Database:** Connect, log in, read, and select permissions to the AdfsConfiguration database.
- **.NET:** During installation, if .NET Framework 4.7 or later isn't installed, the .NET Framework 4.7 is installed and might require a reboot of the server.

Microsoft Defender for Identity Configuration

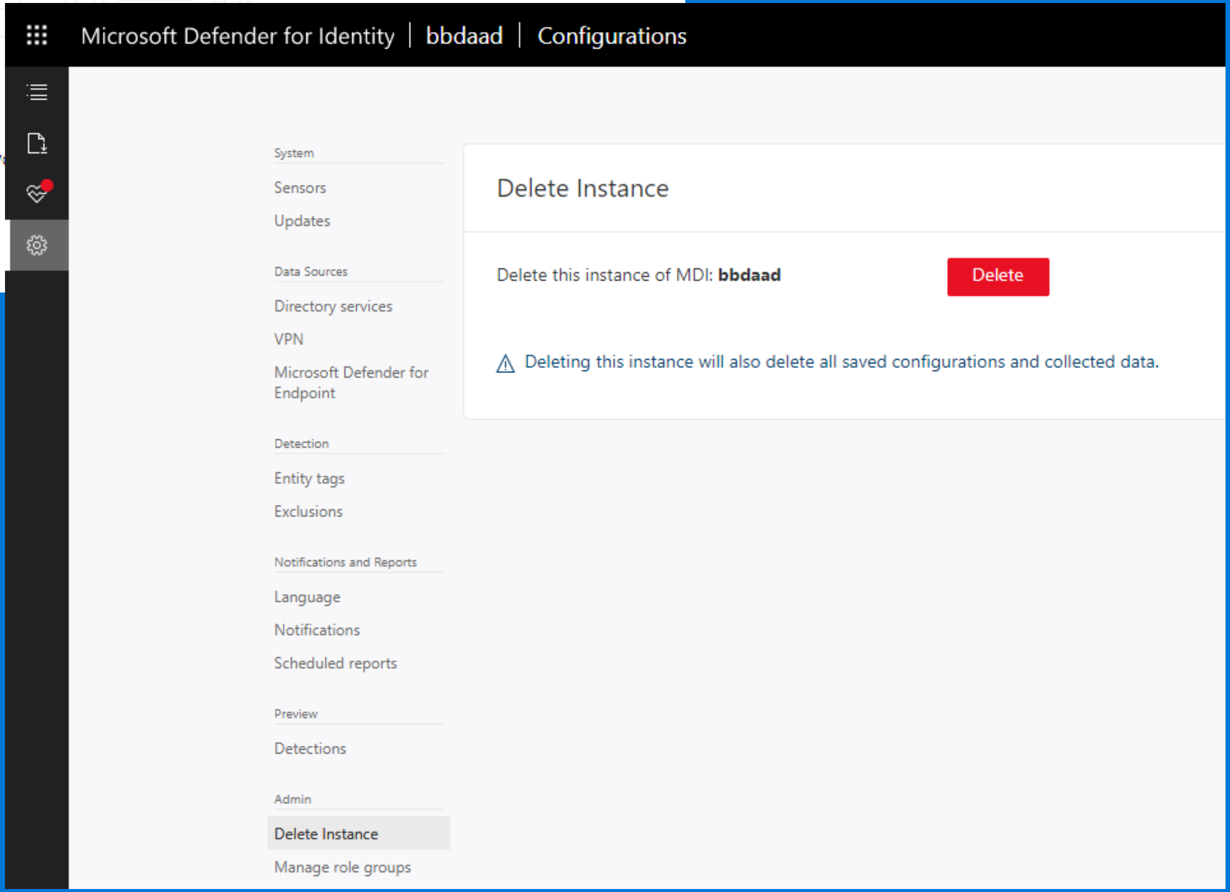
Enabling MDI



Microsoft Defender for Identity

You're about to create y

Deleting MDI Workspace



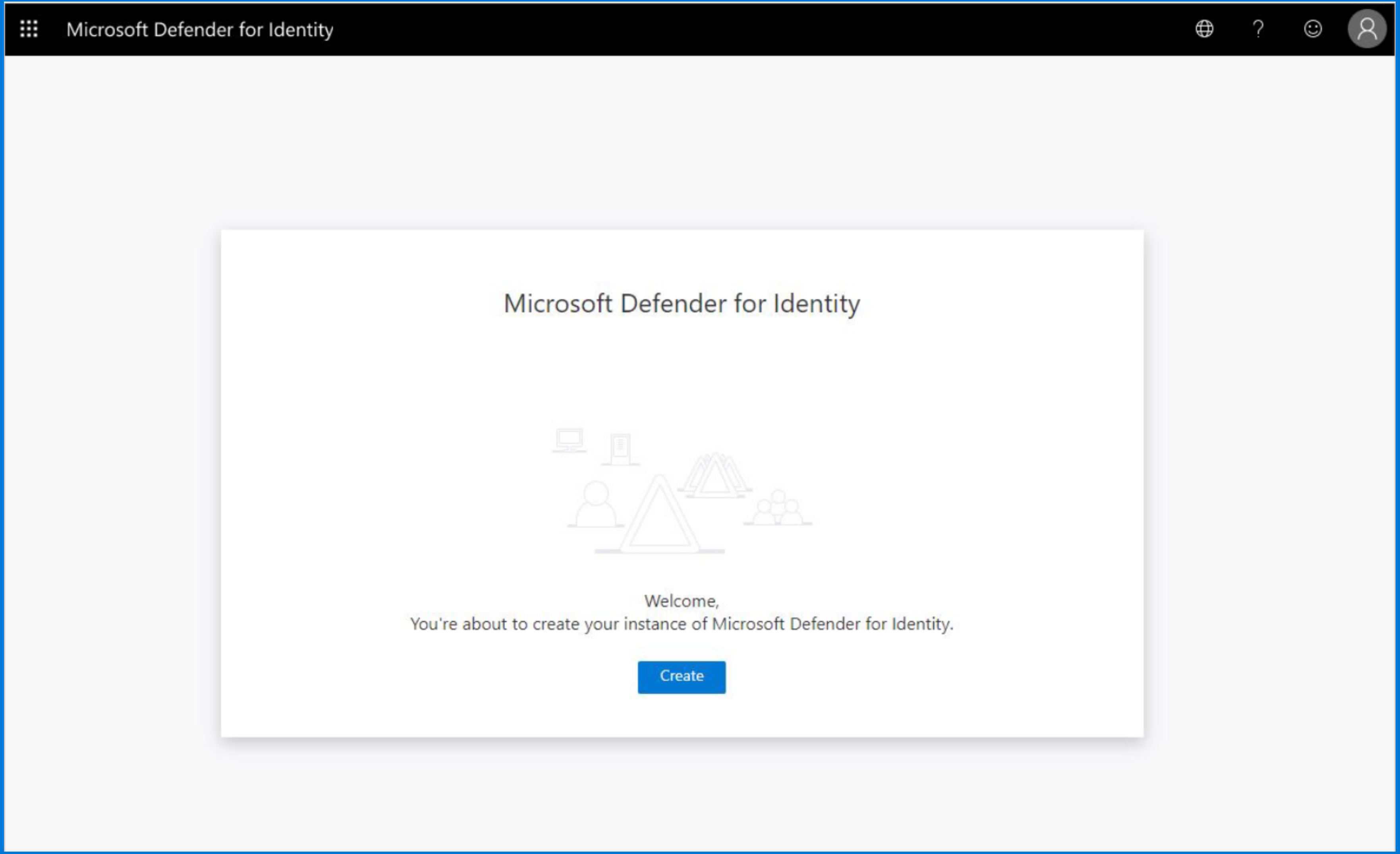
Delete Instance

Delete this instance of MDI: **bbdaad**

⚠ Deleting this instance will also delete all saved configurations and collected data.

Microsoft Defender for Identity Configuration

- Creating a workspace

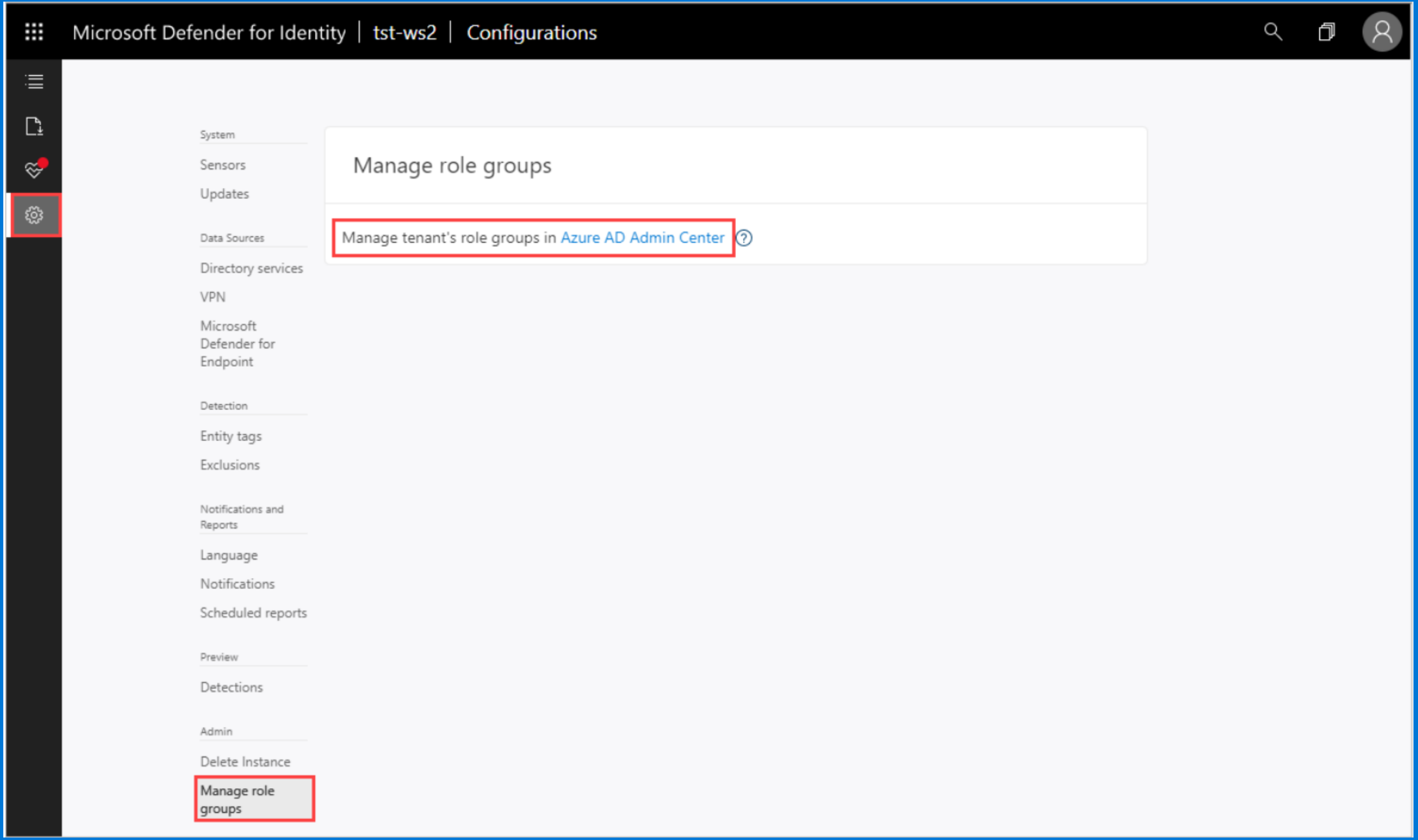


Microsoft Defender for Identity

Welcome,
You're about to create your instance of Microsoft Defender for Identity.

Microsoft Defender for Identity Configuration

- Assign necessary delegations



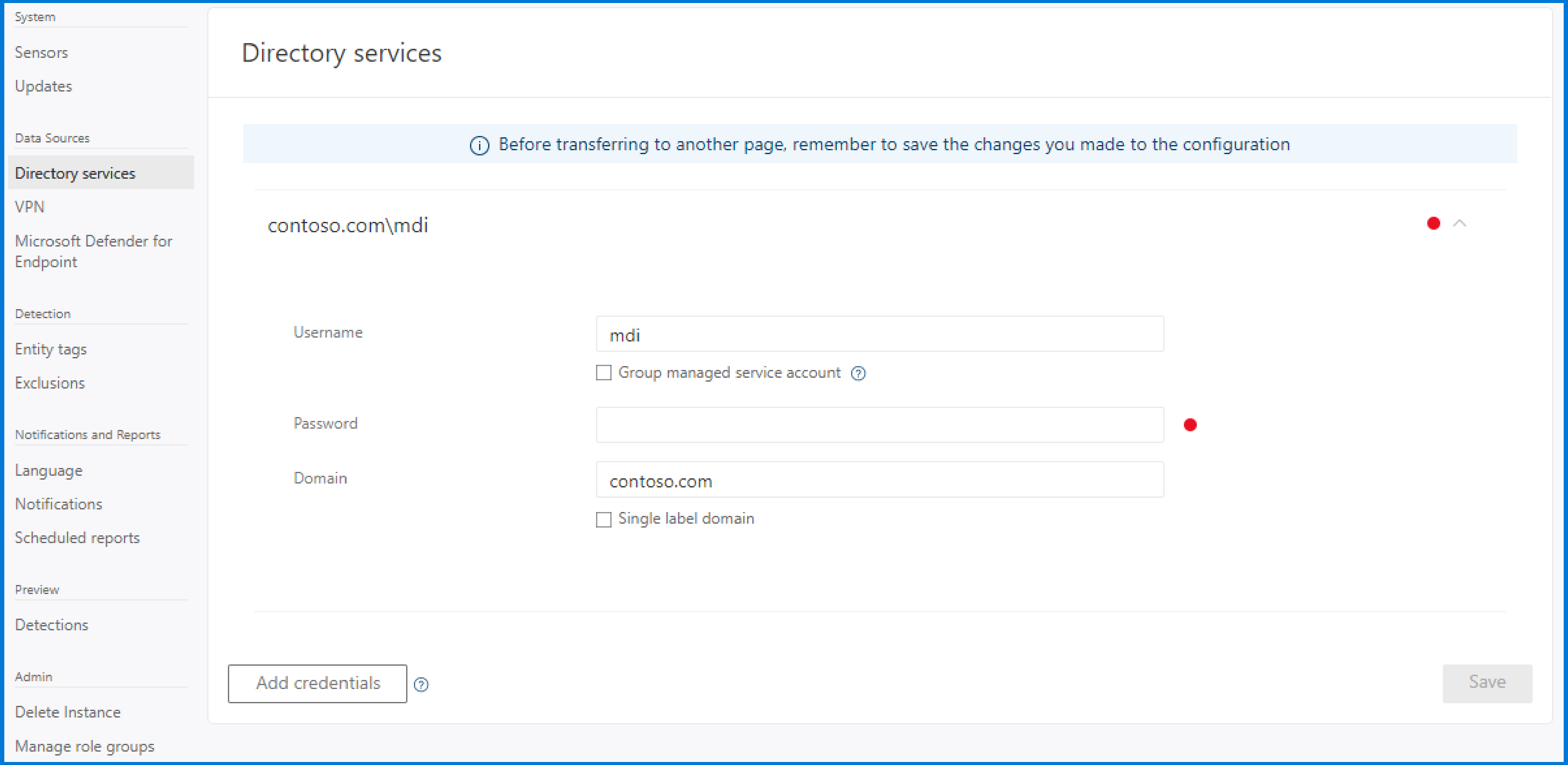
Microsoft Defender for Identity | tst-ws2 | Configurations

Manage role groups

Manage tenant's role groups in Azure AD Admin Center

Read-Only AD User Account

- MDI uses this to read from Active Directory Domain Services and correlate network activity to the Active Directory object. gMSA is recommended



Directory services

ⓘ Before transferring to another page, remember to save the changes you made to the configuration

contoso.com\mdi ●

Username: mdi

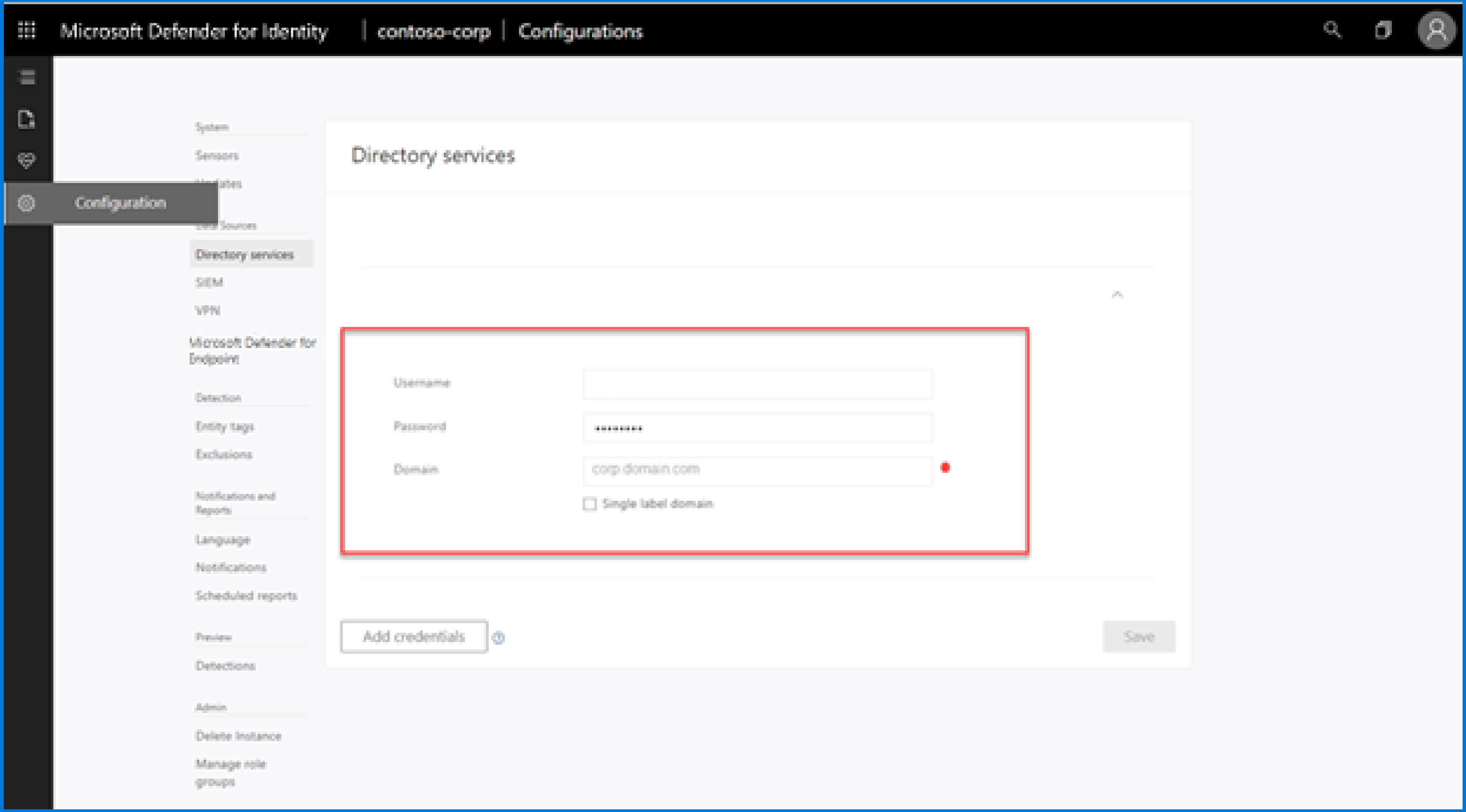
□ Group managed service account ?

Password: ●

Domain: contoso.com

□ Single label domain

Data sources



Directory services

Username

Password ••••••••

Domain corp.domain.com

□ Single label domain

MDI Sensor Installation

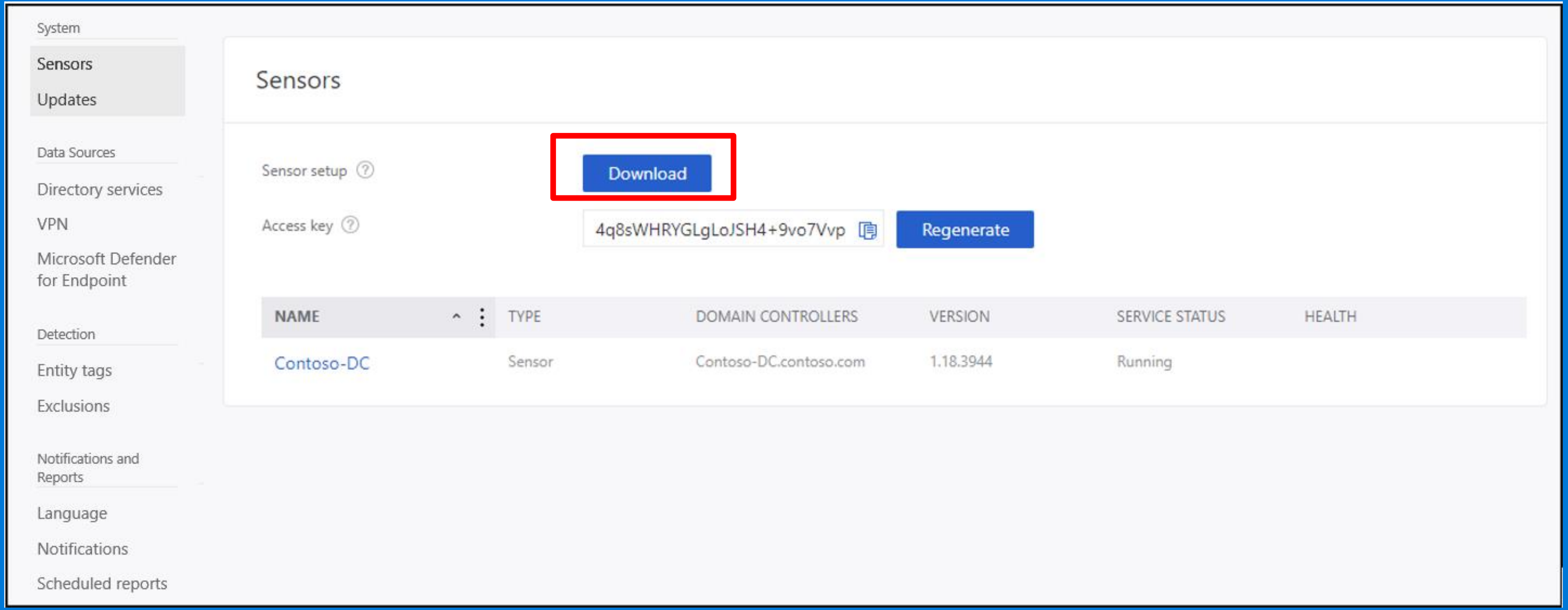
MDI Sensor Installation

- The MDI sensor can be installed in different ways

- -MDI Standalone Sensor
- -MDI Sensor (installed on Domain Controller or ADFS servers)

MDI Sensor Installation

- The MDI sensor installation packet



Sensors

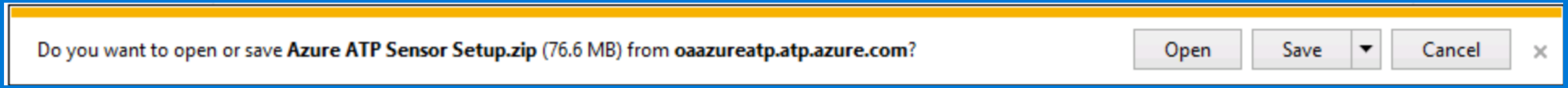
Sensor setup

Access key 4q8sWHRYGLgLoJSH4+9vo7Vvp

NAME	TYPE	DOMAIN CONTROLLERS	VERSION	SERVICE STATUS	HEALTH
Contoso-DC	Sensor	Contoso-DC.contoso.com	1.18.3944	Running	

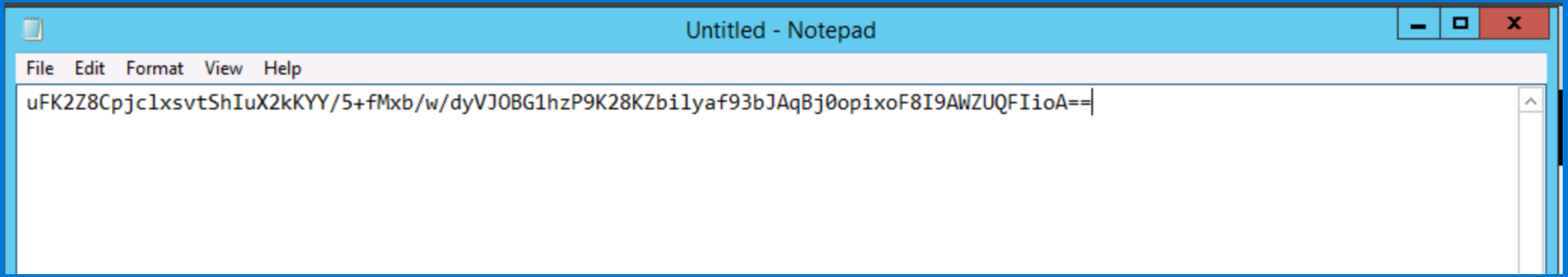
MDI Sensor Installation

- Download the MDI sensor installation packet to the machine from a browser



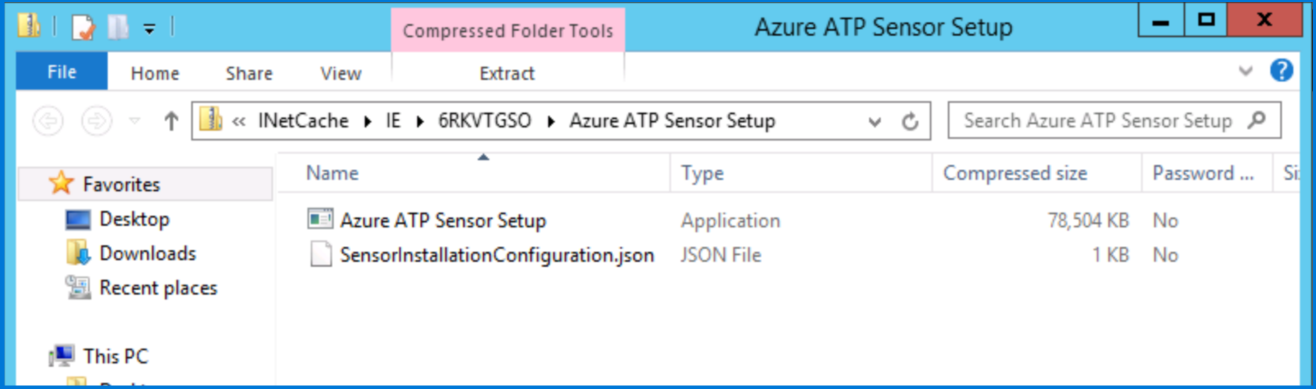
Do you want to open or save **Azure ATP Sensor Setup.zip** (76.6 MB) from **oaazureatp.atp.azure.com**?

- Copy the access key



```
uFK2Z8CpjclxsvtShIuX2kKYY/5+fMxb/w/dyVJOBG1hzP9K28KZbilyaf93bJAqBj0opixoF8I9AWZUQFIioA==
```

- Extract the setup files

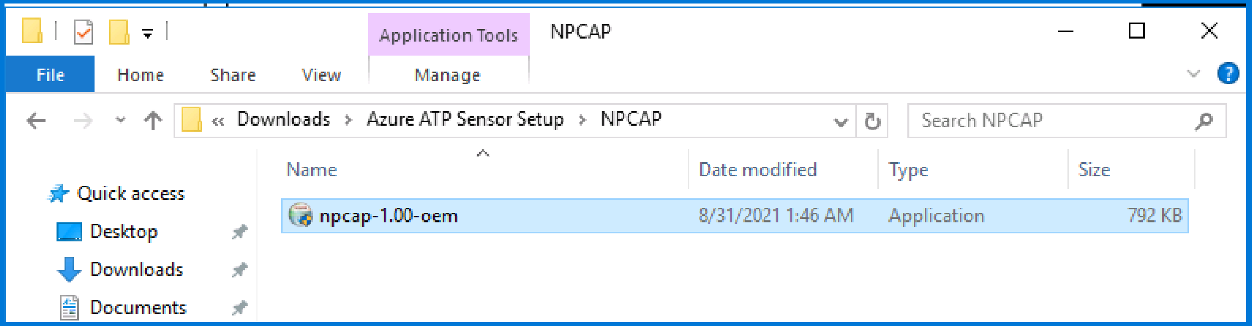


Name	Type	Compressed size	Password ...	Si
Azure ATP Sensor Setup	Application	78,504 KB	No	
SensorInstallationConfiguration.json	JSON File	1 KB	No	

MDI Sensor Installation

Install the NPCAP application

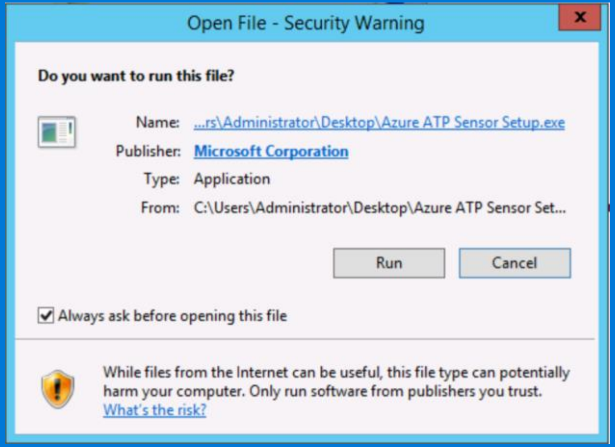
- Install the NPCAP application



Name	Date modified	Type	Size
npcap-1.00-oem	8/31/2021 1:46 AM	Application	792 KB

MDI Sensor Installation

- Start the MDI sensor installation



Open File - Security Warning

Do you want to run this file?

Name: ...rs\Administrator\Desktop\Azure ATP Sensor Setup.exe

Publisher: Microsoft Corporation

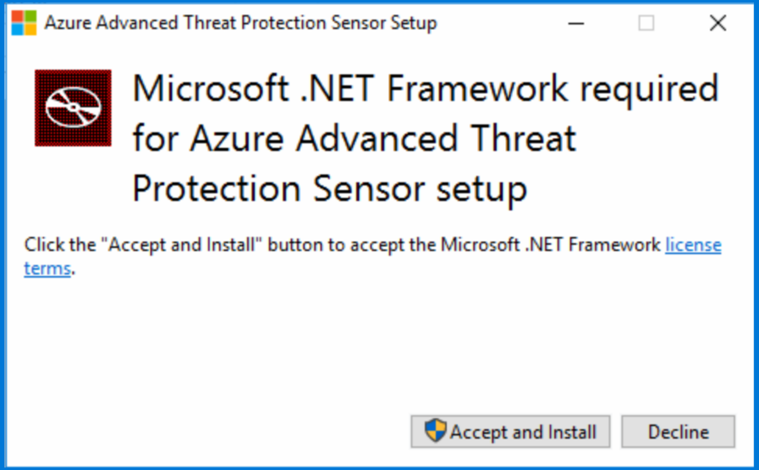
Type: Application

From: C:\Users\Administrator\Desktop\Azure ATP Sensor Set...

☑ Always ask before opening this file

While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?

- MDI will install the right version of .NET framework if it is not installed



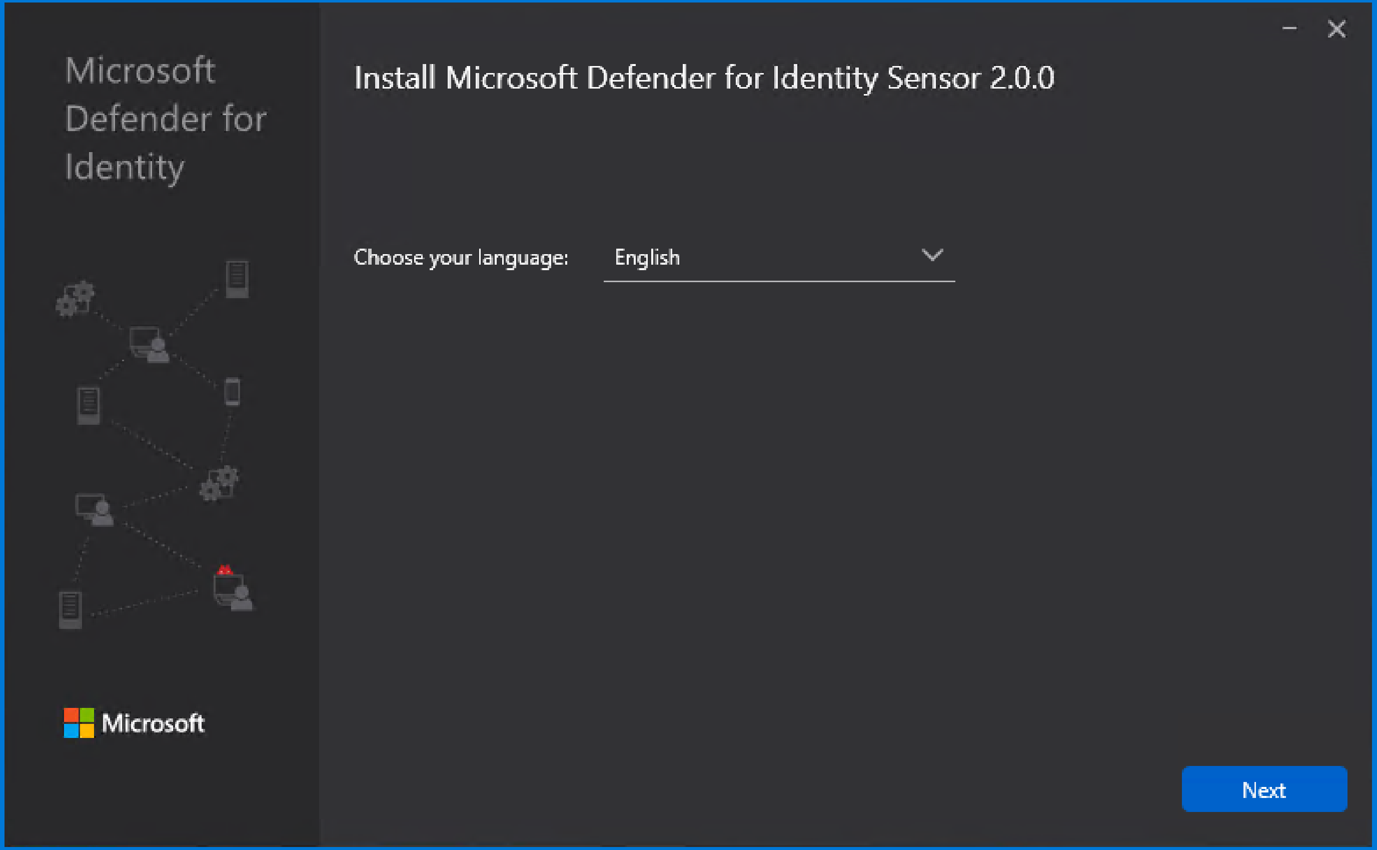
Azure Advanced Threat Protection Sensor Setup

Microsoft .NET Framework required for Azure Advanced Threat Protection Sensor setup

Click the "Accept and Install" button to accept the Microsoft .NET Framework license terms.

MDI Sensor Installation

- Choose language to install

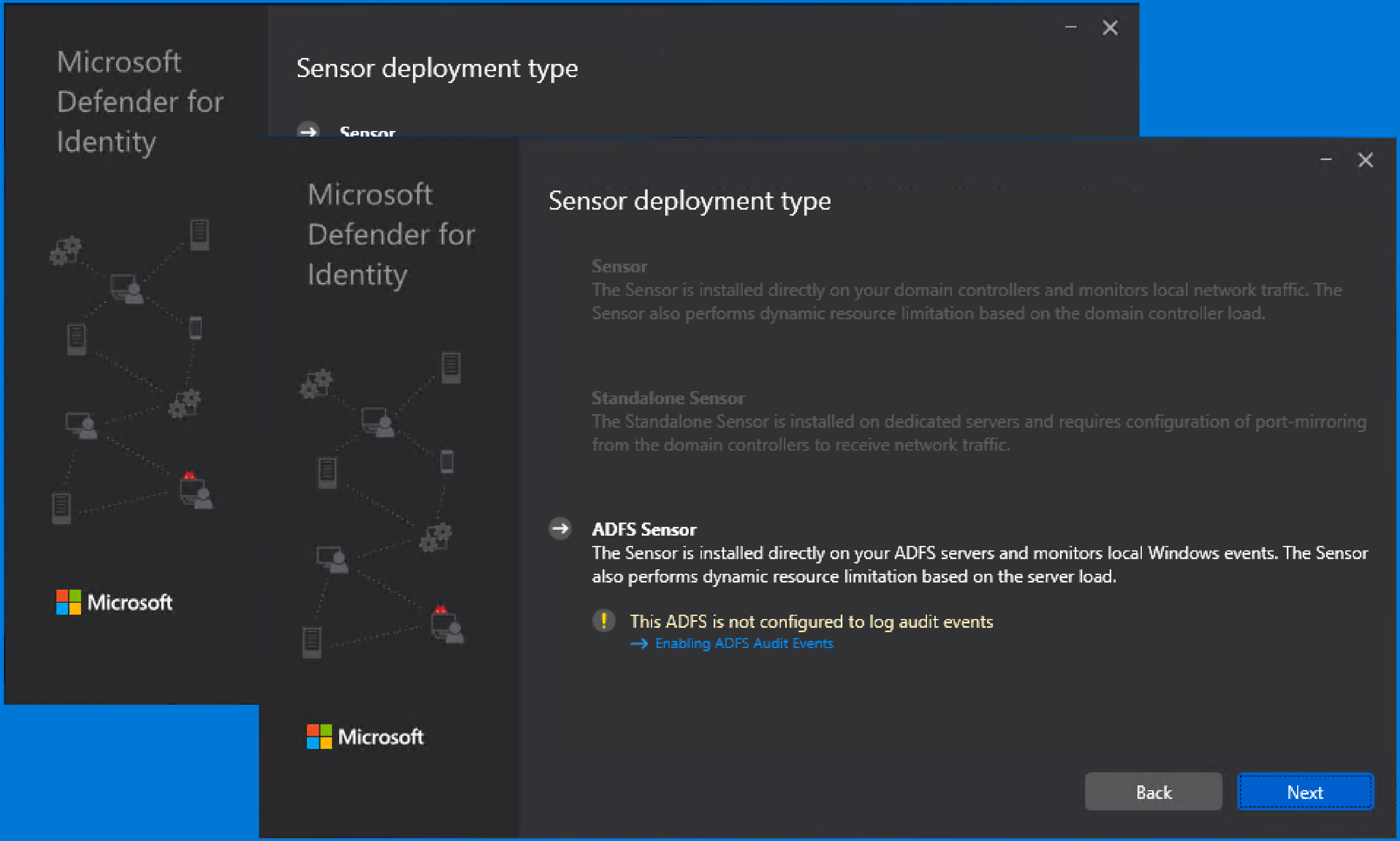


Install Microsoft Defender for Identity Sensor 2.0.0

Choose your language: English

MDI Sensor Installation

- MDI Sensor



Microsoft Defender for Identity

Sensor deployment type

Sensor

Microsoft Defender for Identity

Sensor deployment type

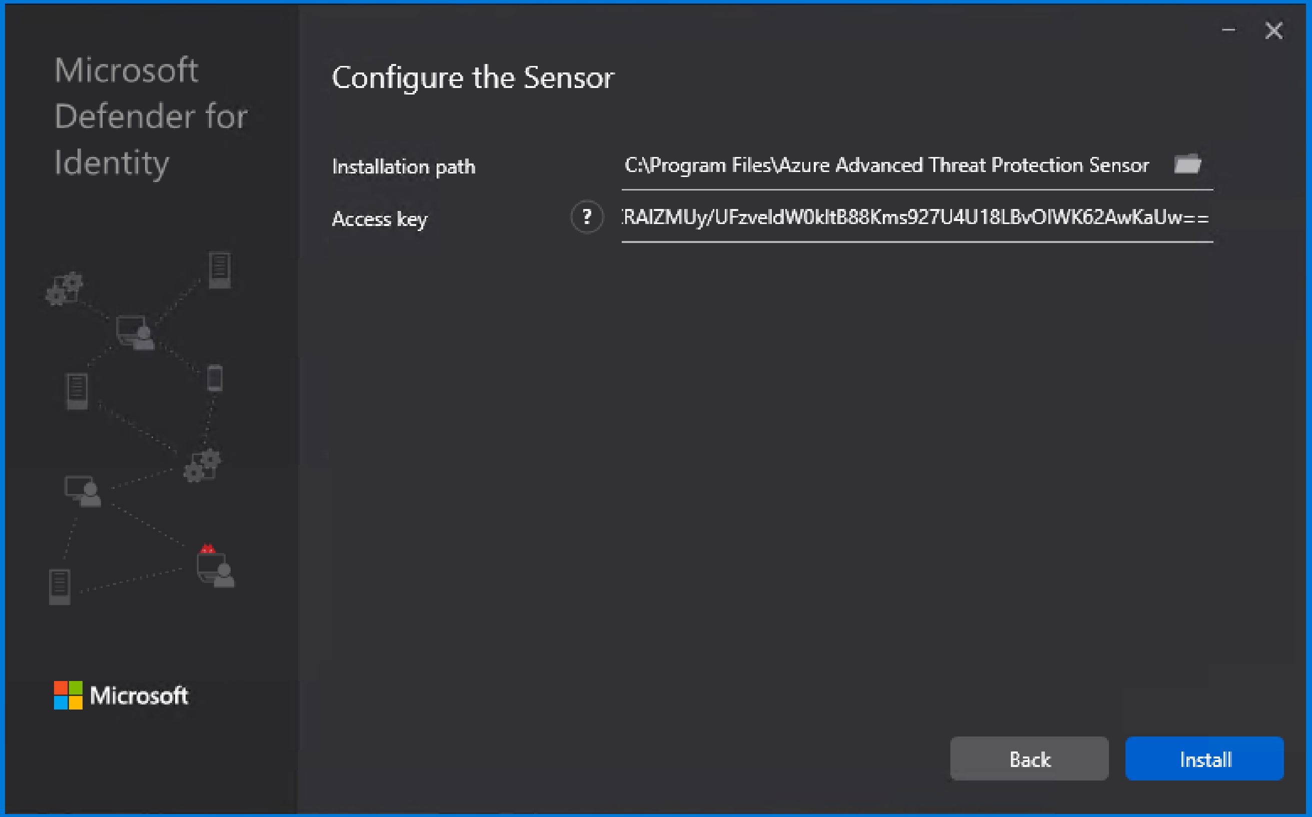
Sensor
The Sensor is installed directly on your domain controllers and monitors local network traffic. The Sensor also performs dynamic resource limitation based on the domain controller load.

Standalone Sensor
The Standalone Sensor is installed on dedicated servers and requires configuration of port-mirroring from the domain controllers to receive network traffic.

→ **ADFS Sensor**
The Sensor is installed directly on your ADFS servers and monitors local Windows events. The Sensor also performs dynamic resource limitation based on the server load.

! This ADFS is not configured to log audit events
→ Enabling ADFS Audit Events

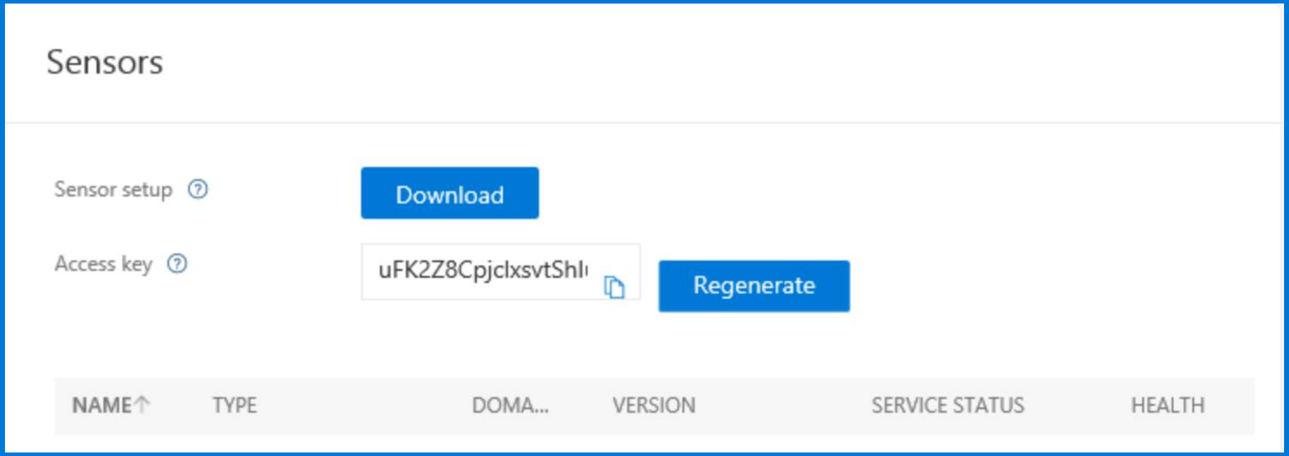
MDI Sensor Installation



Configure the Sensor

Installation path: C:\Program Files\Azure Advanced Threat Protection Sensor

Access key: RAIZMUy/UFzveldW0kltB88Kms927U4U18LBvOIWK62AwKaUw==



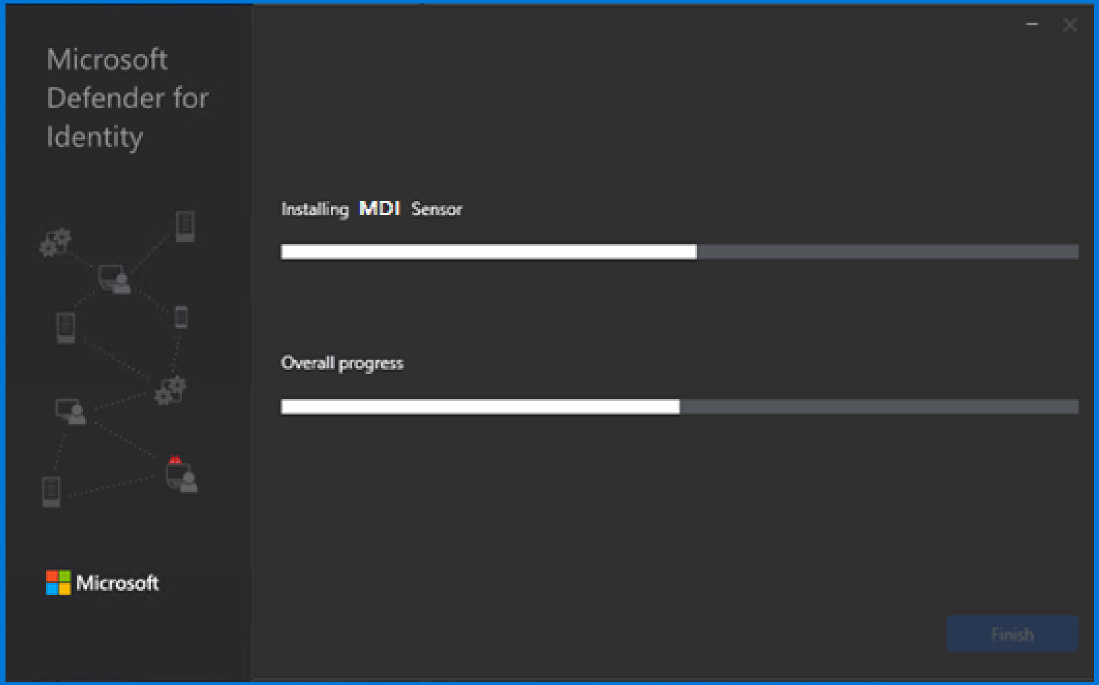
Sensors

Sensor setup

Access key: uFK2Z8CpjclxsvtShl

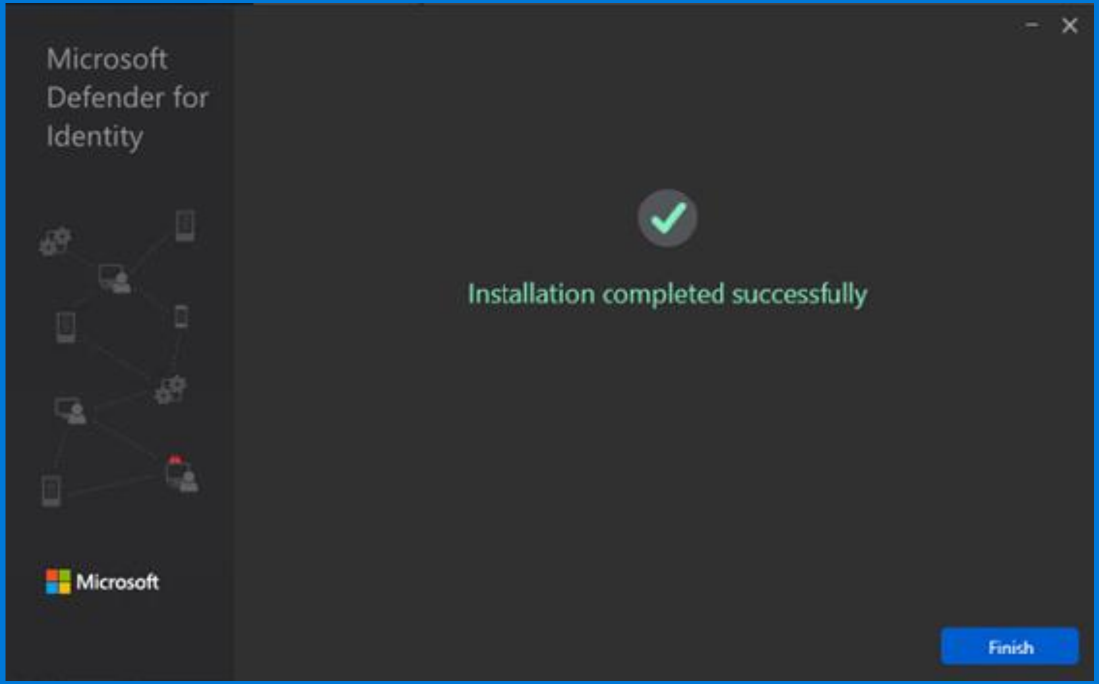
NAME↑	TYPE	DOMA...	VERSION	SERVICE STATUS	HEALTH

MDI Sensor Installation



Installing MDI Sensor

Overall progress



Installation completed successfully

Installing the MDI Sensor

- Scripted installation can be done via Sensor Setup

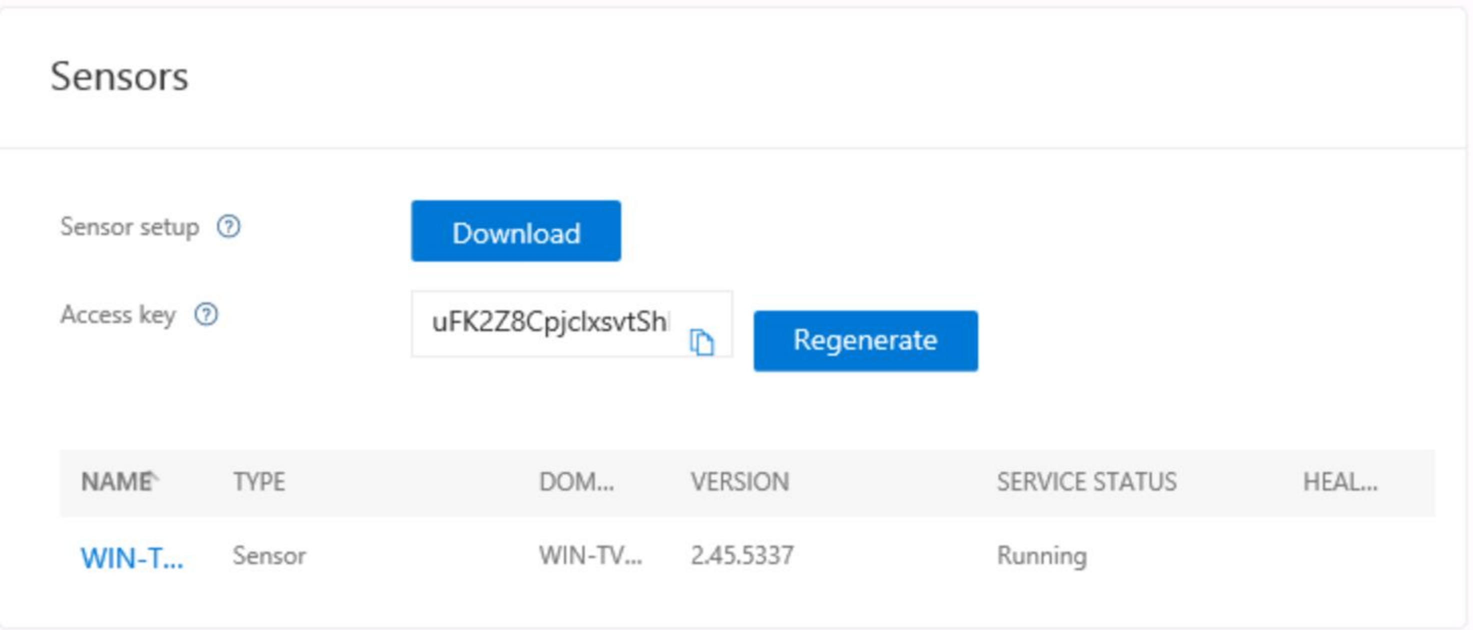
- Install

```
'D:\Azure ATP Sensor Setup.exe' /quiet
NetFrameworkCommandLineArguments="/q"
AccessKey=<YourMDIWorkspaceAccessKey>
```

- Uninstall

```
Azure ATP Sensor Setup.exe [/quiet] [/Uninstall] [/Help]
```

MDI Sensor Installation



Sensors

Sensor setup ⓘ Download

Access key ⓘ uFK2Z8CpjclxsvtSh Regenerate

NAME	TYPE	DOM...	VERSION	SERVICE STATUS	HEAL...
WIN-T...	Sensor	WIN-TV...	2.45.5337	Running	

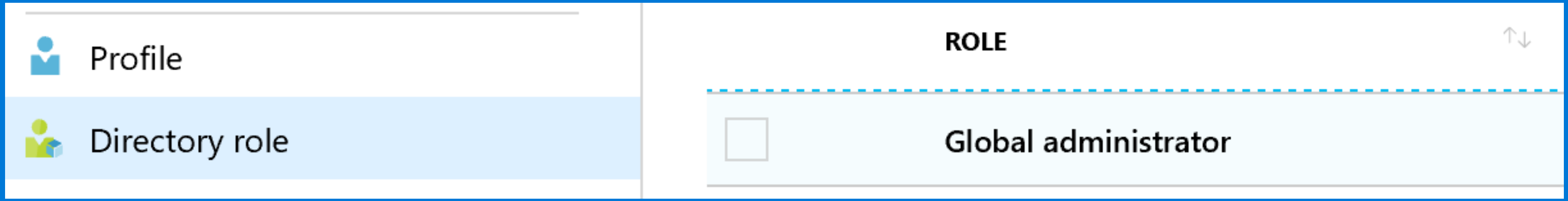
Configuration Options

Configuring MDI

1. Set up the MDI Service
2. Configure detection options (honey token account)
3. Configure alerting options (mail integration, syslog integration)
4. Configure the MDI Sensor settings within the MDI configuration
5. Download the MDI Sensor Setup package, transfer to the MDI Sensor, and run setup
6. Configure each MDI Sensor accordingly
7. When the MDI Sensor configuration completes, wait for MDI to learn about the Active Directory environment

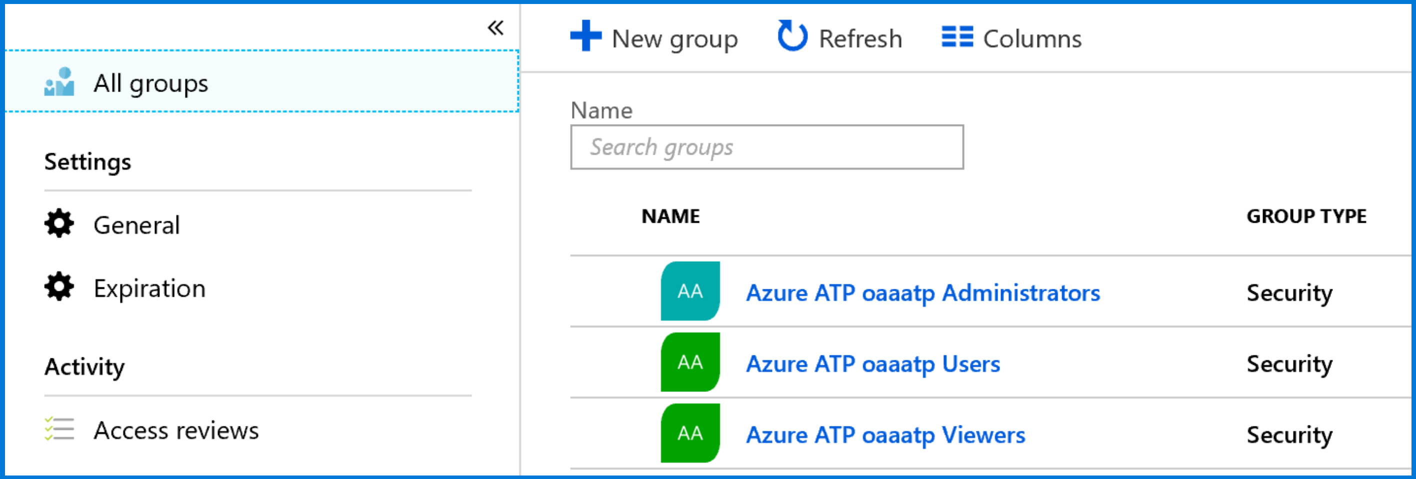
Group for Administering Microsoft Defender for Identity (MDI)

- To configure the MDI portal, you must be a member of either the Global Administrator role or the Security Administrator role on the tenant where the service is going to be installed.



	ROLE
□	Global administrator

- MDI security groups can be used to delegate the administration to other users after the initial setup



Name
Search groups

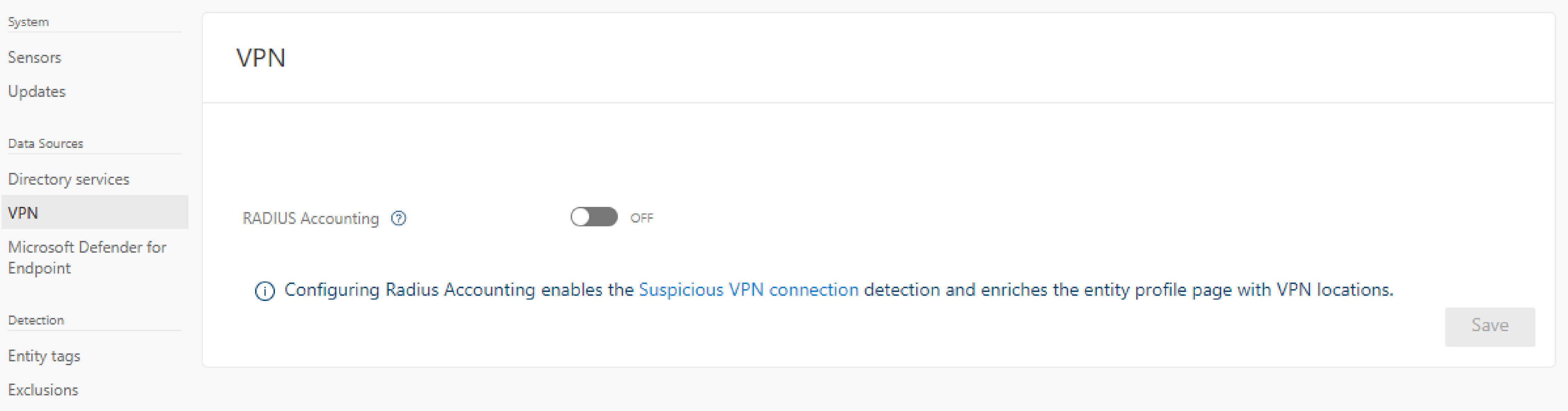
	NAME	GROUP TYPE
AA	Azure ATP oaaatp Administrators	Security
AA	Azure ATP oaaatp Users	Security
AA	Azure ATP oaaatp Viewers	Security

Data sources

SIEM/Syslog Listener

- ✓ Already enabled on Standalone Sensors
- ✓ Supports below solutions
  - ▪ HP Arcsight
  - ▪ Splunk
  - ▪ RSA Security Analytics
  - ▪ Snare
  - ▪ Qradar

Data sources

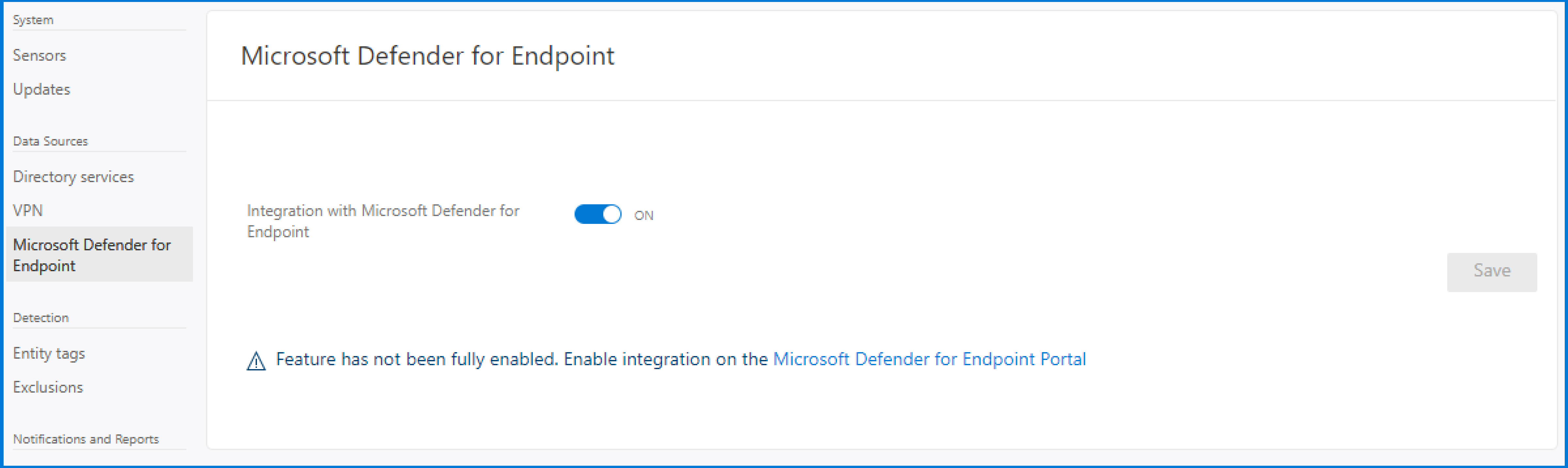


VPN

RADIUS Accounting ⓘ OFF

ⓘ Configuring Radius Accounting enables the Suspicious VPN connection detection and enriches the entity profile page with VPN locations.

Data sources



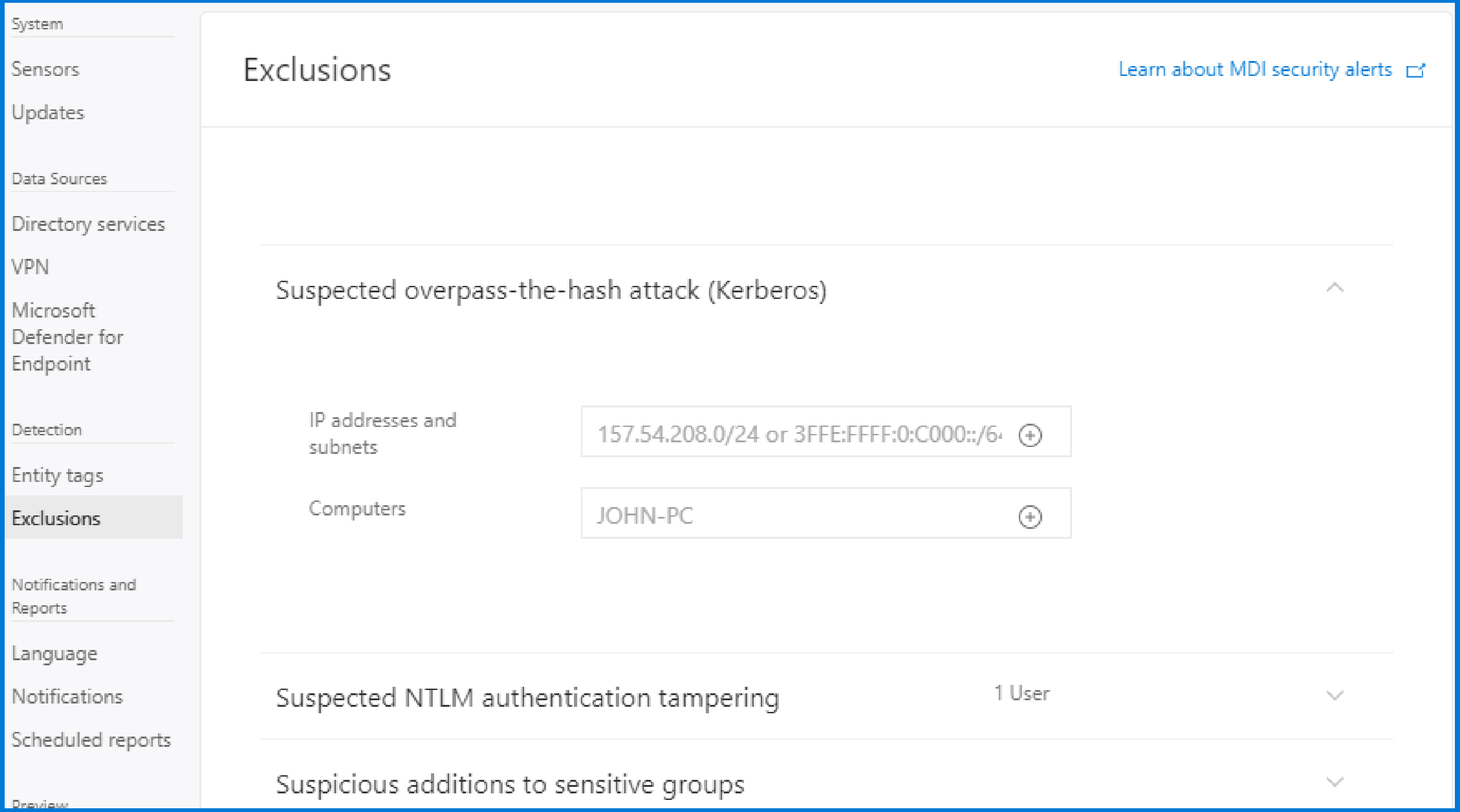
Microsoft Defender for Endpoint

Integration with Microsoft Defender for Endpoint ON

⚠ Feature has not been fully enabled. Enable integration on the Microsoft Defender for Endpoint Portal

Configure Exclusions

From the Exclusions tab on the Configuration page:



Exclusions

Learn about MDI security alerts

Suspected overpass-the-hash attack (Kerberos)

IP addresses and subnets: 157.54.208.0/24 or 3FFE:FFFF:0:C000::/6

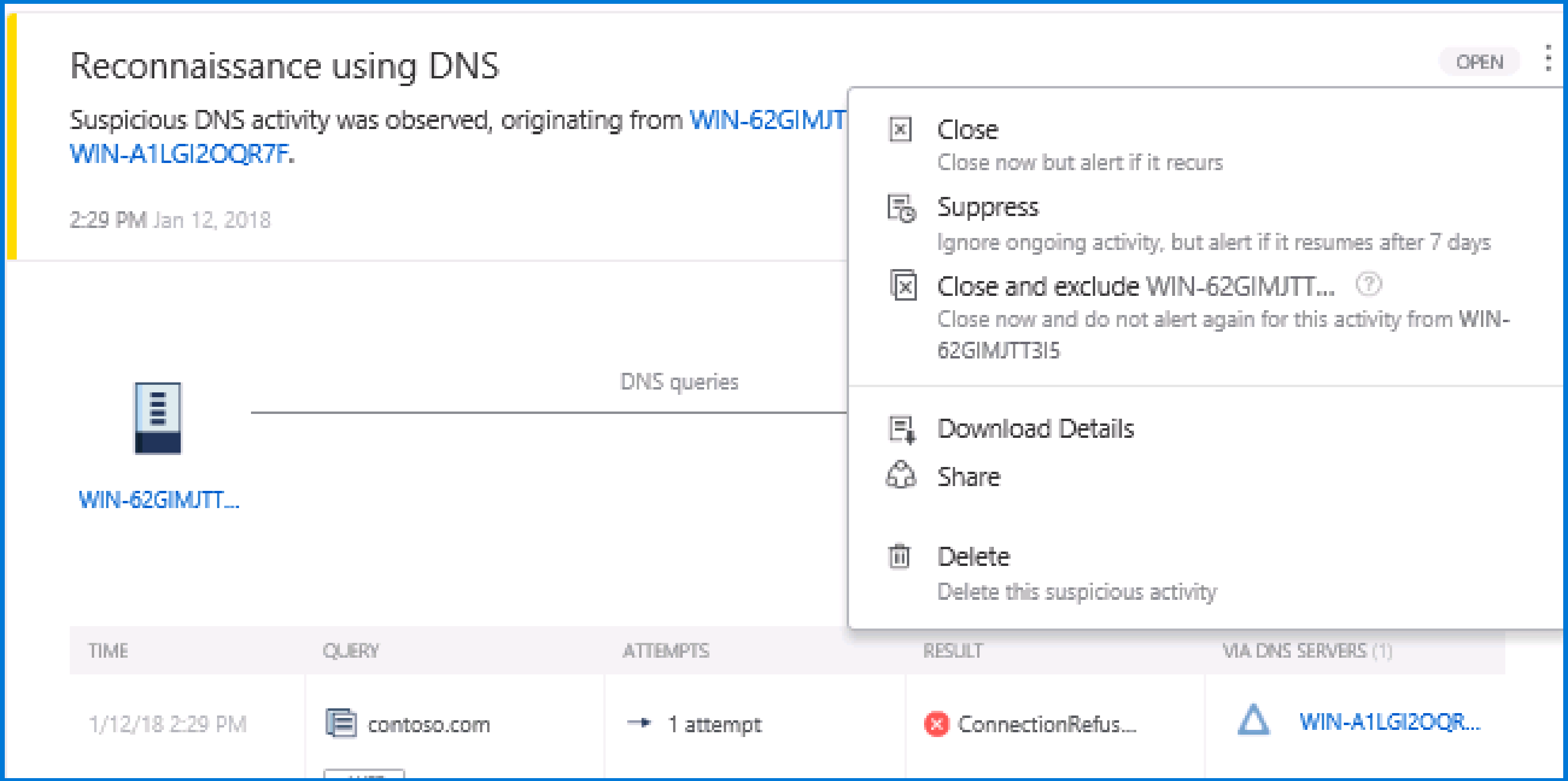
Computers: JOHN-PC

Suspected NTLM authentication tampering 1 User

Suspicious additions to sensitive groups

Configure Exclusions

Or from suspicious activity itself:



Reconnaissance using DNS

OPEN

Suspicious DNS activity was observed, originating from WIN-62GIMJT
WIN-A1LGI2OQR7F.

2:29 PM Jan 12, 2018

Close
Close now but alert if it recurs

Suppress
Ignore ongoing activity, but alert if it resumes after 7 days

Close and exclude WIN-62GIMJTT... ⓘ
Close now and do not alert again for this activity from WIN-62GIMJTT3I5

Download Details

Share

Delete
Delete this suspicious activity

TIME	QUERY	ATTEMPTS	RESULT	VIA DNS SERVERS (1)
1/12/18 2:29 PM	contoso.com	→ 1 attempt	⊗ ConnectionRefus...	WIN-A1LGI2OQR...

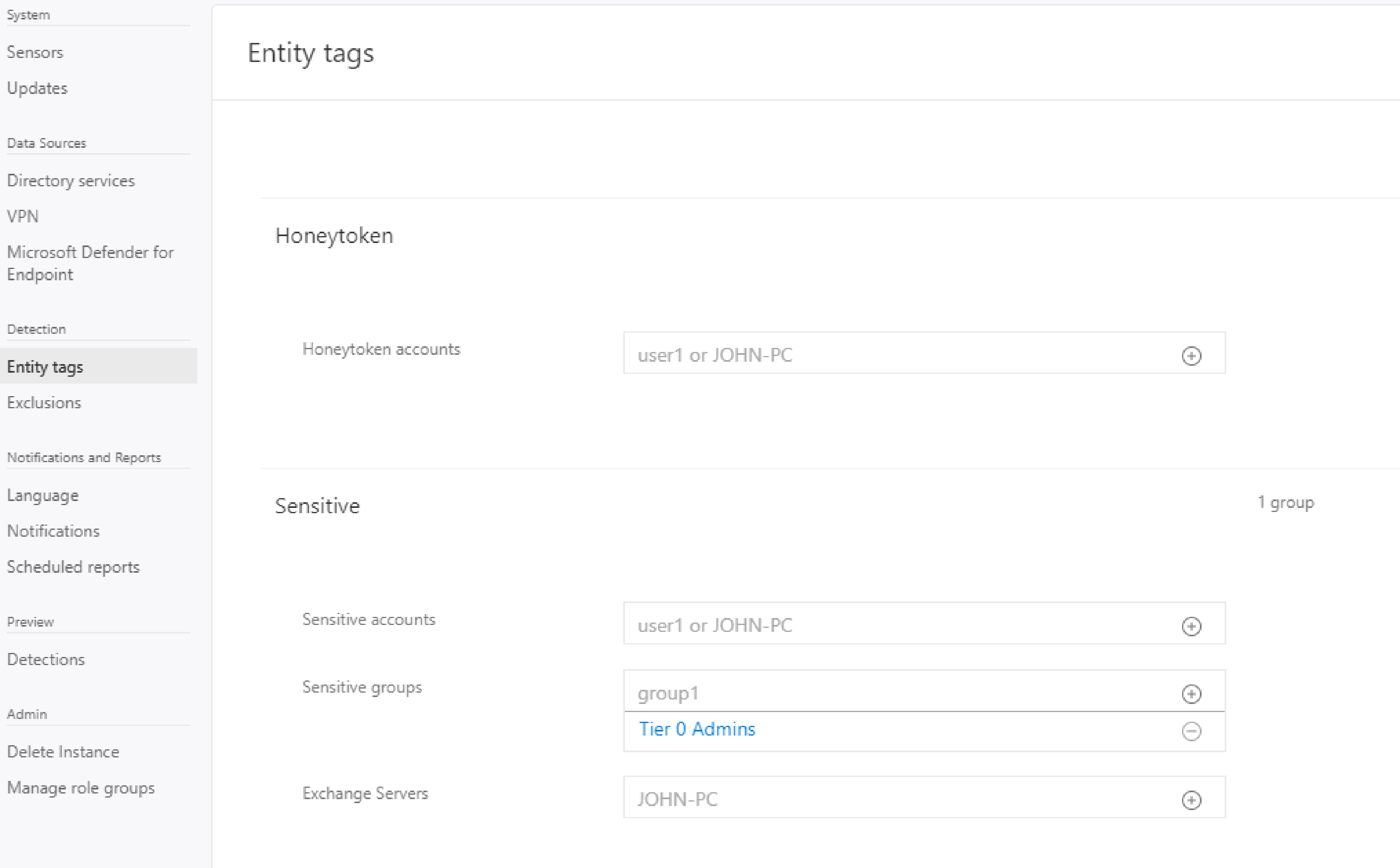
Detection Settings

- Configure exclusions from suspicious activity itself, or from the Exclusions tab on the Configuration page.
- Account enumeration reconnaissance
- Network mapping reconnaissance (DNS)
- gMSA Password retrieval
- User and IP address reconnaissance (SMB)
- User and group membership reconnaissance (SAMR)
- Suspected brute force attack (Kerberos, NTLM)
- Suspected brute force attack (LDAP)
- Honeytoken activity
- Suspected WannaCry ransomware attack
- Suspected brute force attack (SMB)
- Suspected use of Metasploit hacking framework
- Suspected overpass-the-hash attack (Kerberos)
- Malicious request of Data Protection API master key
- Suspicious VPN connection
- Suspected over-pass-the-hash attack (encryption downgrade)
- Suspected golden ticket usage (encryption downgrade)

Detection Settings

- Configure exclusions from suspicious activity itself, or from the Exclusions tab on the Configuration page.
- Suspected skeleton key attack (encryption downgrade)
- Suspected identity theft (pass-the-hash)
- Suspected identity theft (pass-the-ticket)
- Suspected golden ticket usage (forged authorization data)
- Suspicious modification of sensitive groups
- Suspicious service creation
- Suspected golden ticket usage (time anomaly)
- Suspected golden ticket usage (nonexistent account)
- Suspected DCSync attack (replication of directory services)
- Remote code execution attempt
- Suspected DCShadow attack (domain controller promotion)
- Suspected DCShadow attack (DC replication request)
- Suspicious communication over DNS

Configuring Entity Tags



Entity tags

Honeytoken

Honeytoken accounts: user1 or JOHN-PC ⊕

Sensitive — 1 group

Sensitive accounts: user1 or JOHN-PC ⊕

Sensitive groups: group1 ⊕
Tier 0 Admins ⊖

Exchange Servers: JOHN-PC ⊕

Notifications: Alerts

- MDI will send email alerts for events:
- Required Items
- Additional Options
- Data Options

Questions & Answers

Microsoft