#### Security, Identity and Cybersecurity Services

Microsoft Defender for Identity (MDI)

Introduction and Technical Overview

Liju Varghese Sr. CSA-Engineering







#### **Conditions and Terms of Use**

#### Microsoft Confidential

This training package is proprietary and confidential, and is intended only for uses described in the training materials. Content and software is provided to you under a Non-Disclosure Agreement and cannot be distributed. Copying or disclosing all or any portion of the content and/or software included in such packages is strictly prohibited.

The contents of this package are for informational and training purposes only and are provided "as is" without warranty of any kind, whether express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, and non-infringement.

Training package content, including URLs and other Internet Web site references, is subject to change without notice. Because Microsoft must respond to changing market conditions, the content should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information presented after the date of publication. Unless otherwise noted, the companies, organizations, products, domain names, e-mail addresses, logos, people, places, and events depicted herein are fictitious, and no association with any real company, organization, product, domain name, e-mail address, logo, person, place, or event is intended or should be inferred.

#### **Copyright and Trademarks**

© 2016 Microsoft Corporation. All rights reserved.

Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in written license agreement from Microsoft, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

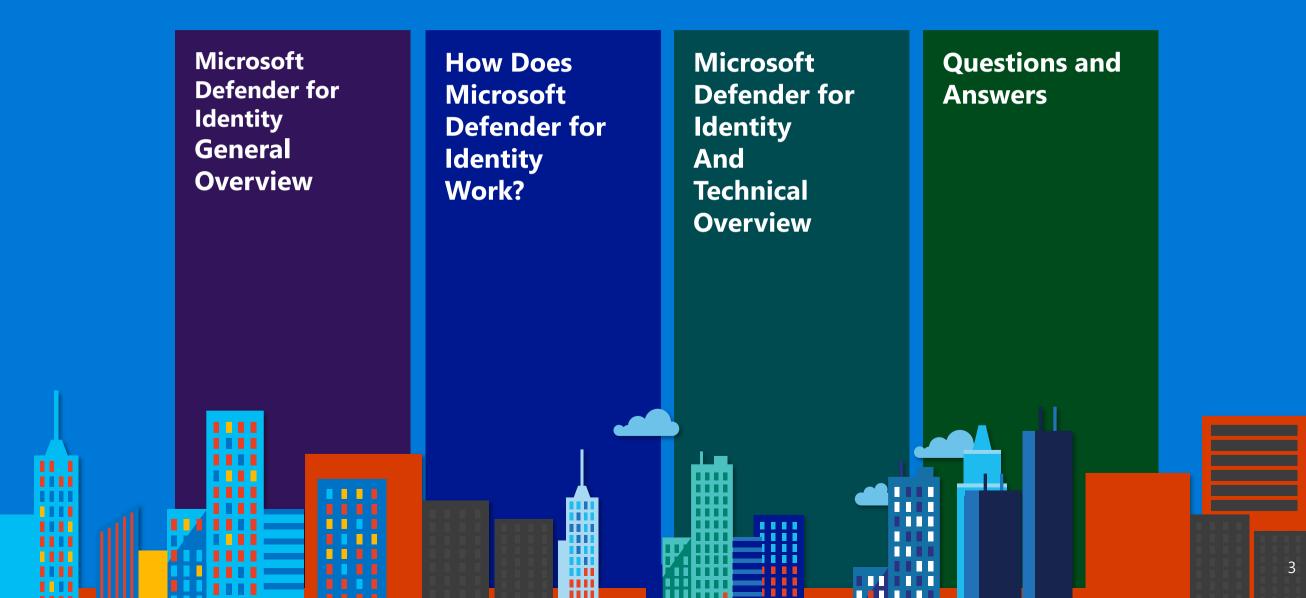
Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the express written permission of Microsoft Corporation.

For more information, see Use of Microsoft Copyrighted Content at

http://www.microsoft.com/en-us/legal/intellectualproperty/Permissions/default.aspx

DirectX, Hyper-V, Internet Explorer, Microsoft, Outlook, OneDrive, SQL Server, Windows, Microsoft Azure, Windows PowerShell, Windows Server, Windows Vista, and Zune are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other Microsoft products mentioned herein may be either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. All other trademarks are property of their respective owners.

#### Agenda



#### The Problem

#### Traditional IT security tools are typically:



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



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



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 TARGET You CANNOT DEFEND against EVERYTHING

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

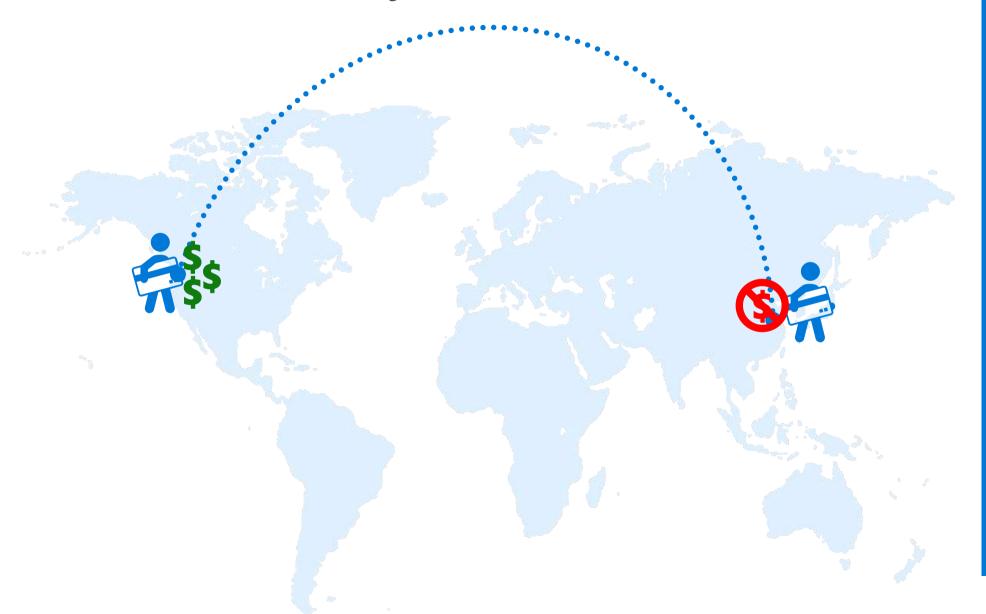


Enterprises successfully use **UEBA** to detect malicious and abusive behavior that otherwise went unnoticed by existing security monitoring systems, such as SIEM and (DLP).



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







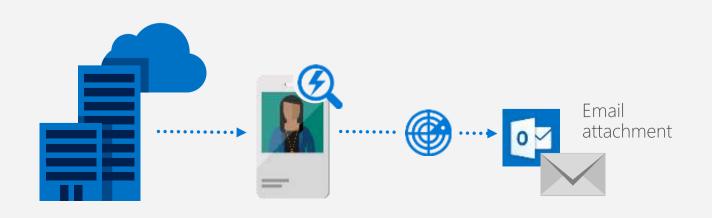




Behavioral Analytics Detection for known attacks and issues

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 nonhuman service accounts
- Network name resolution

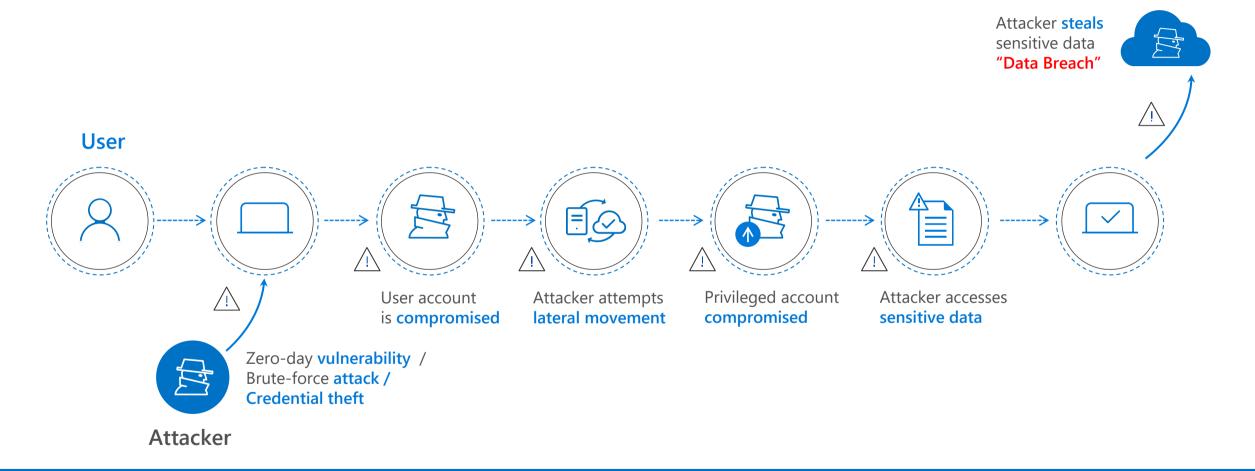
#### It provides clear information

- 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

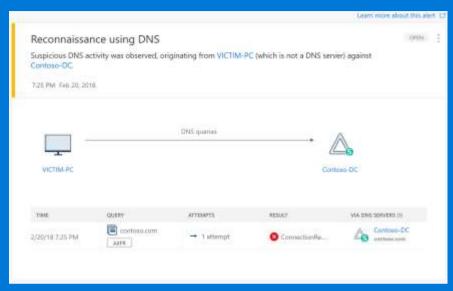
#### The anatomy of an attack

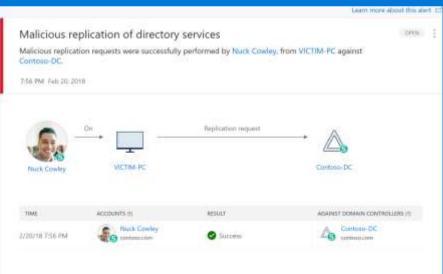






#### Detected Threats





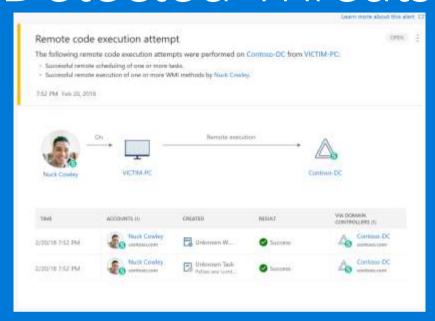
#### **Reconnaissance and brute force suspicious activities:**

- 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





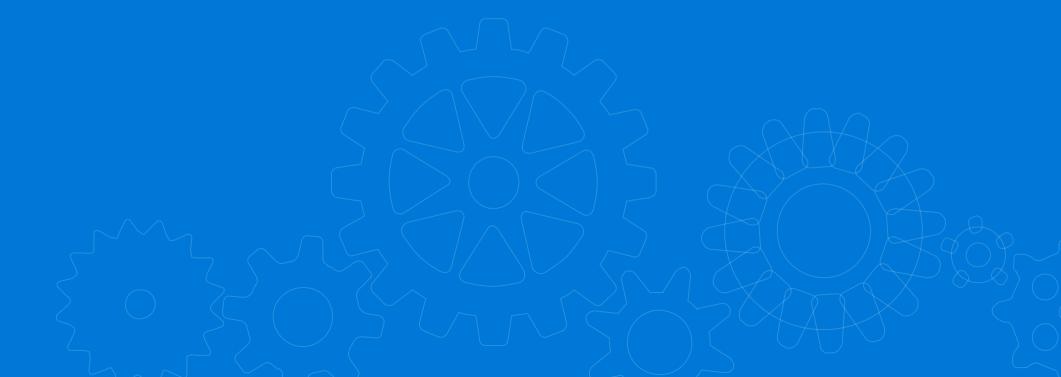
#### **Abnormal behavior suspicious activities:**

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

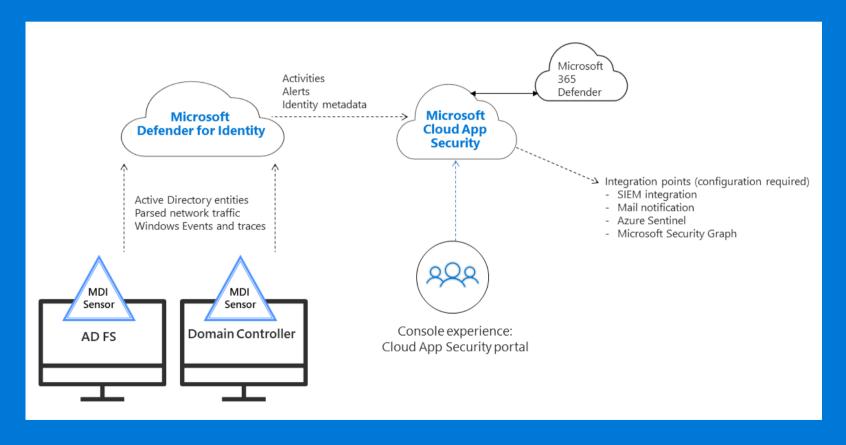
#### **Security issues:**

- 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?



#### 1. Analyze

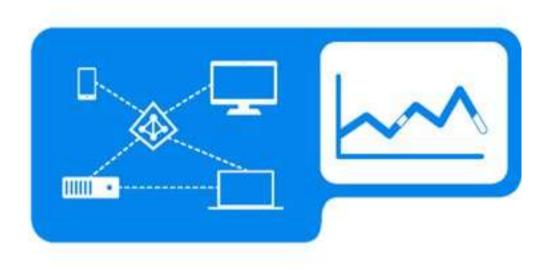


#### **After installation:**

- 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

#### 2 Learn



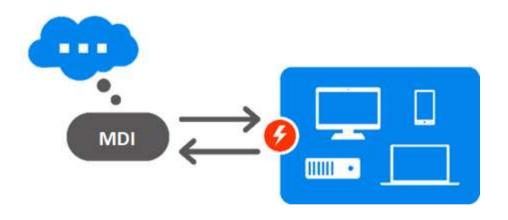
#### MDI:

- 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

#### 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**.

#### 4 Alert

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



MDI identifies

Who?

What?

When?

How?



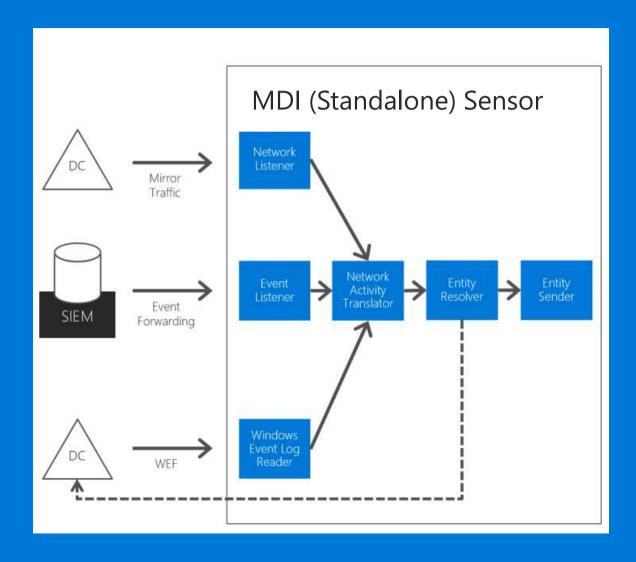
For each suspicious activity, MDI provides recommendations for the investigation and remediation

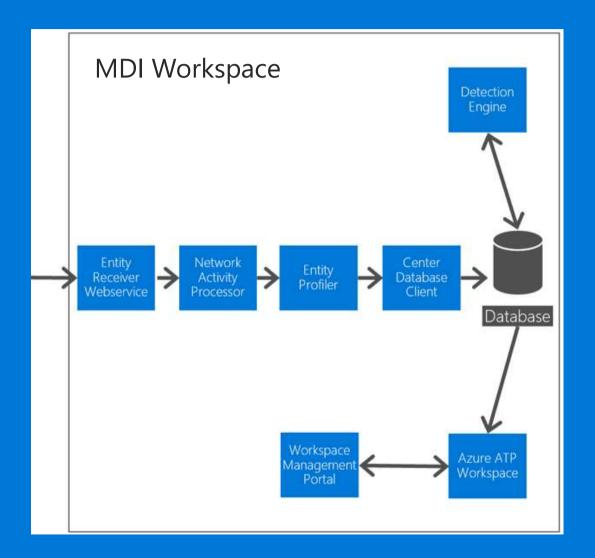




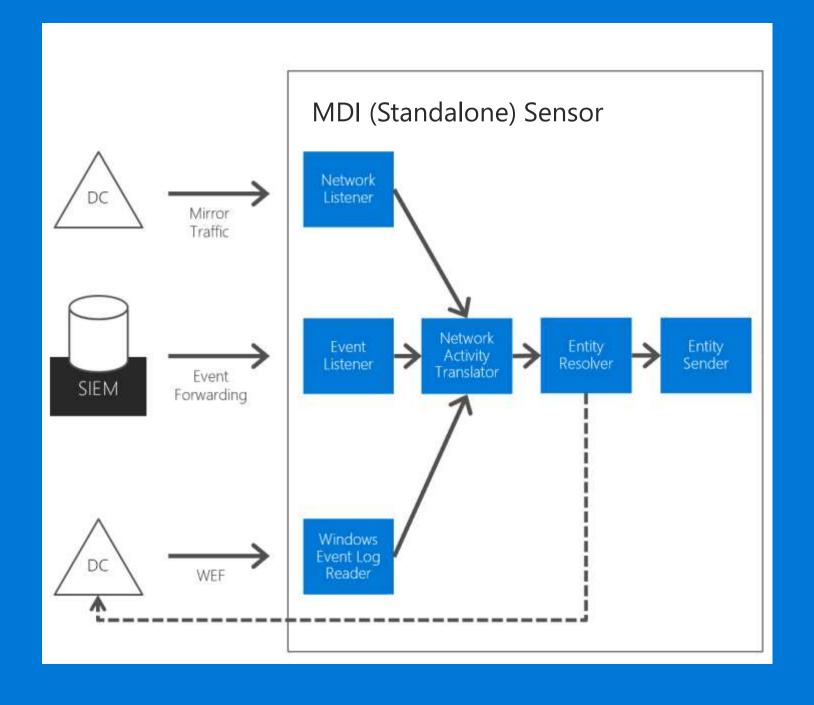
### MDI Technical Overview and Architecture

#### Overview: Entire MDI Architecture

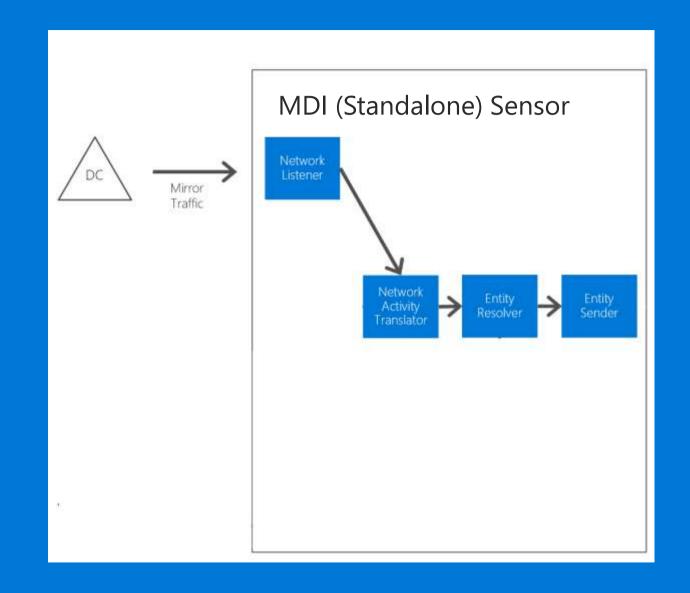




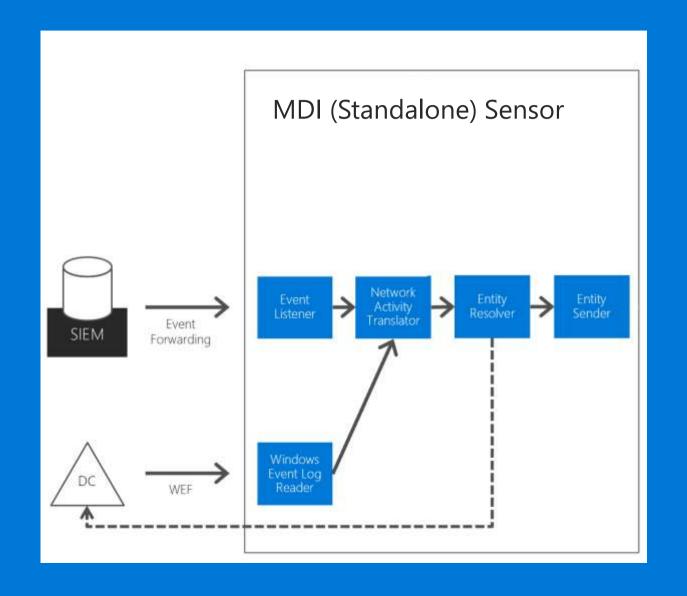
#### MDI Sensor Architecture



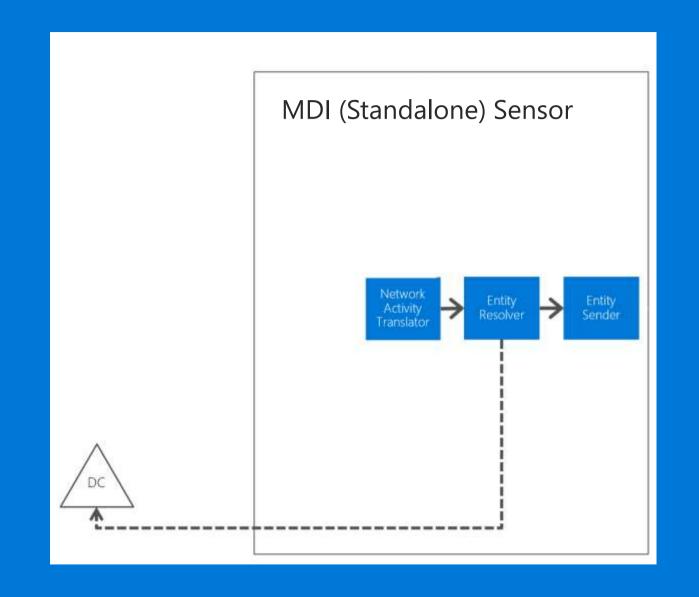
### MDI Sensor: Network Activity Collection



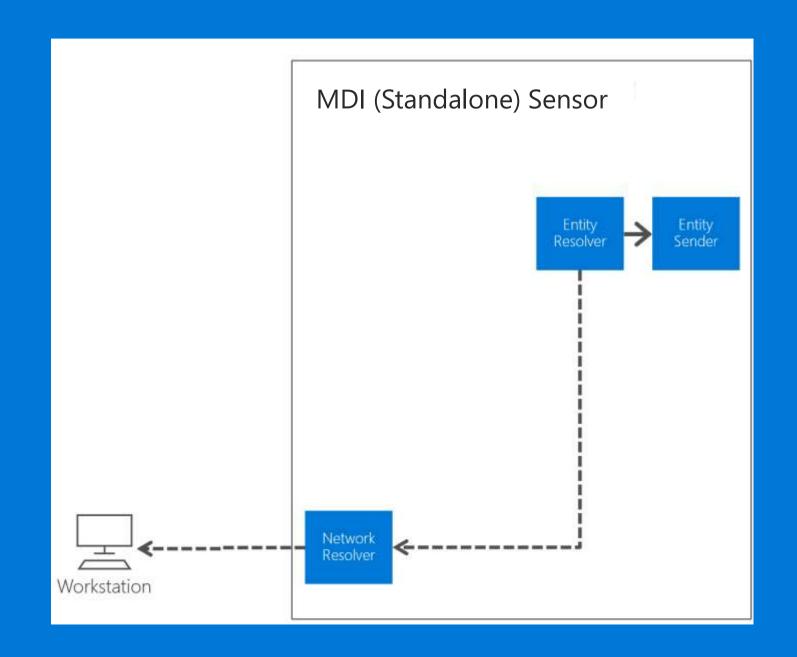
#### MDI Sensor: SIEM and Event Collection



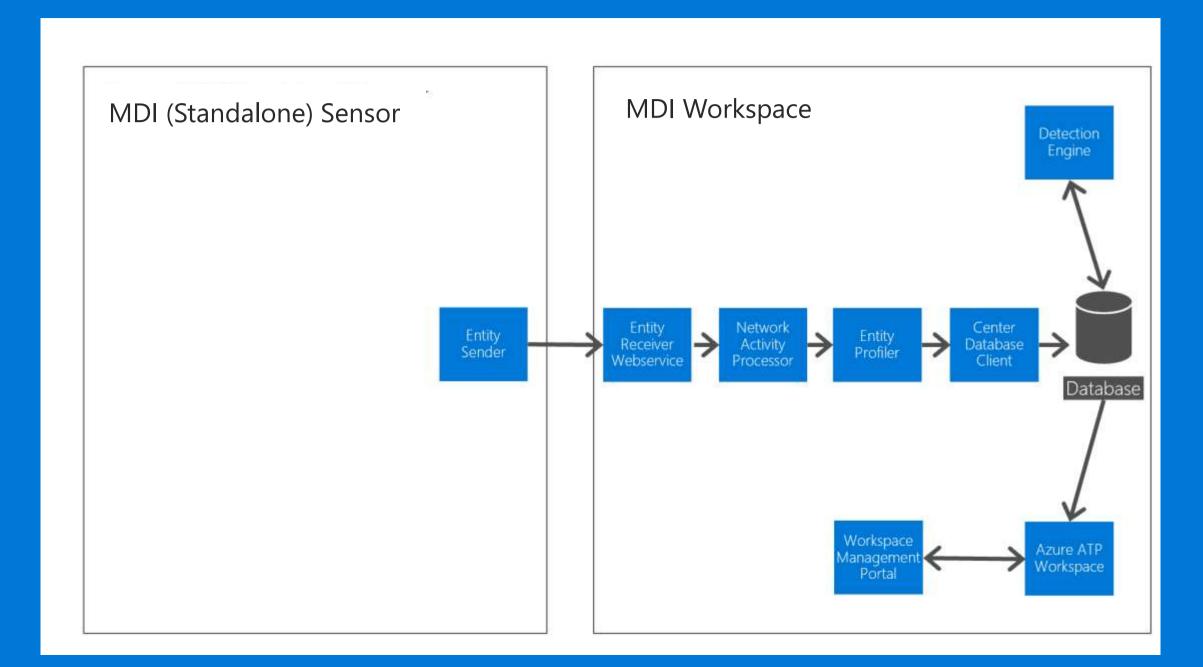
## MDI Sensor: Directory Services Collection



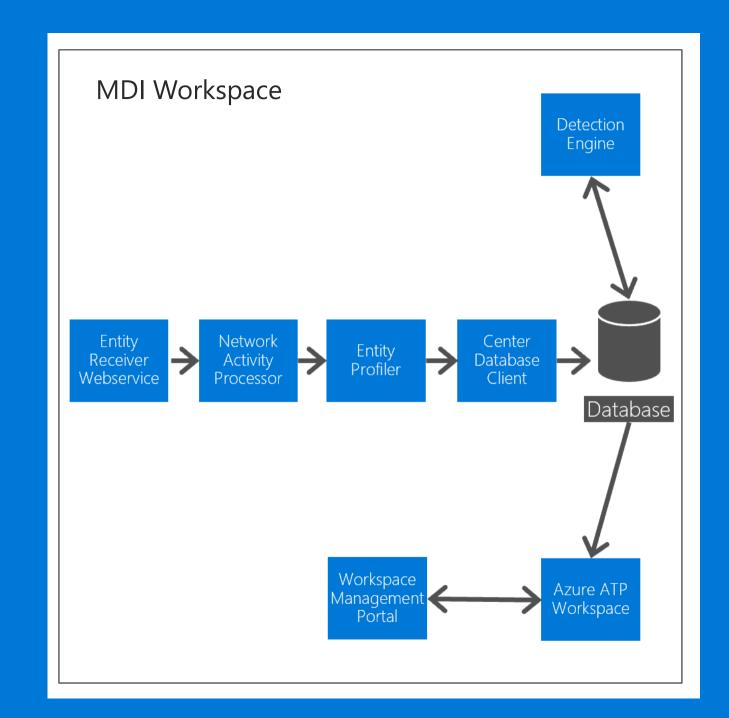
#### MDI Name Resolution Collection



#### 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)
- 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

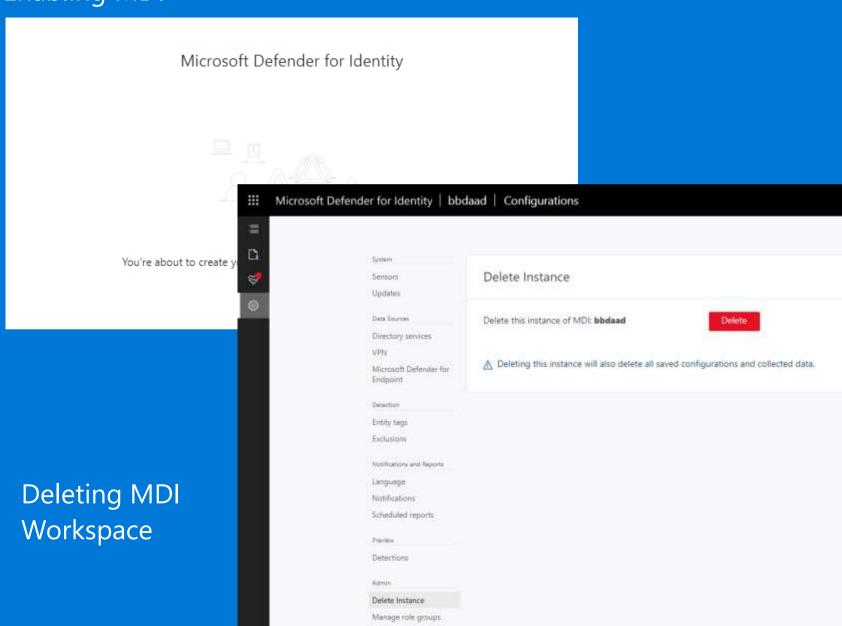
- Operating system: Windows Server 2012 or above (includes server core).
- Roles: AD Domain Controller only. ADFS and DC roles should not co-exist on target server.
- Domain Controller: Branch or RODCs are supported.
- .NET: During installation, if .NET Framework 4.7 or later isn't installed, the .NET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

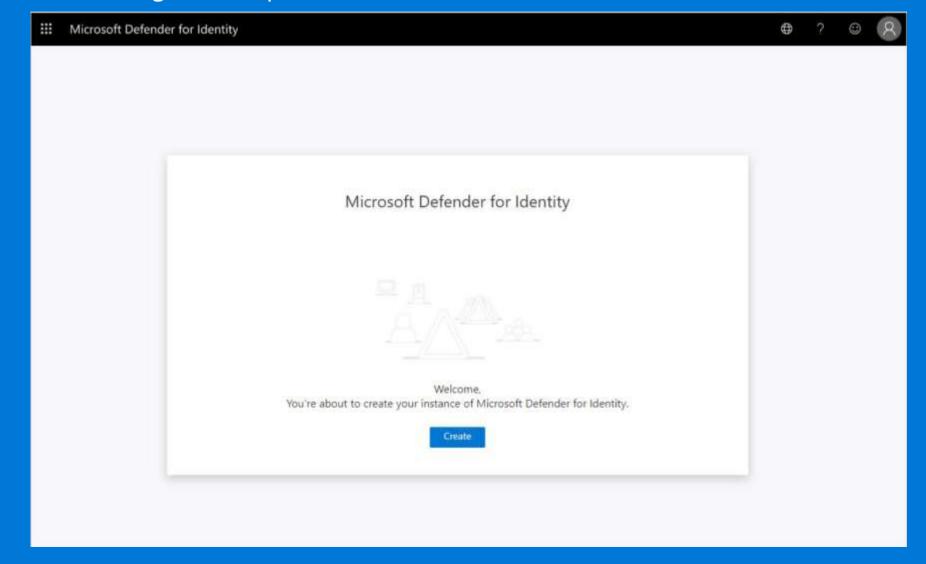
# Microsoft Defender for Identity Configuration

#### **Enabling MDI**



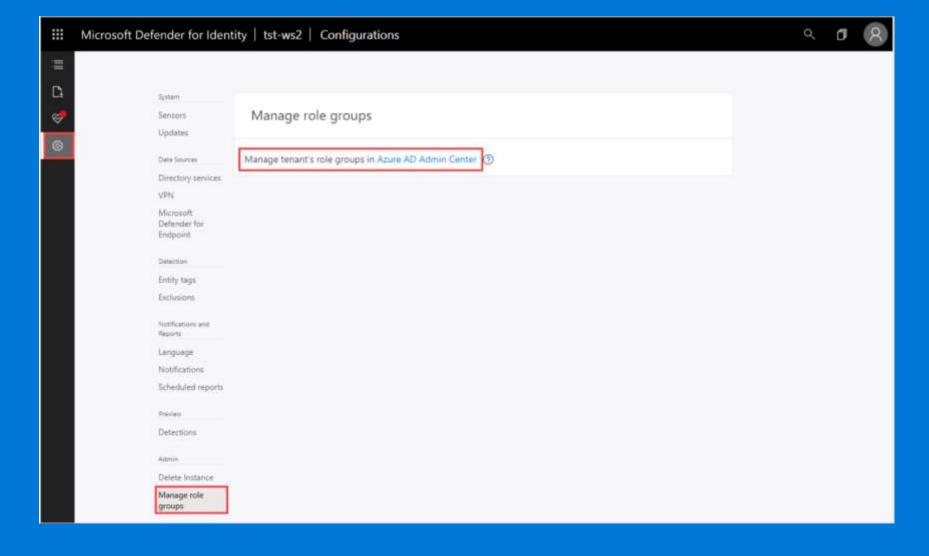
# Microsoft Defender for Identity Configuration

Creating a workspace



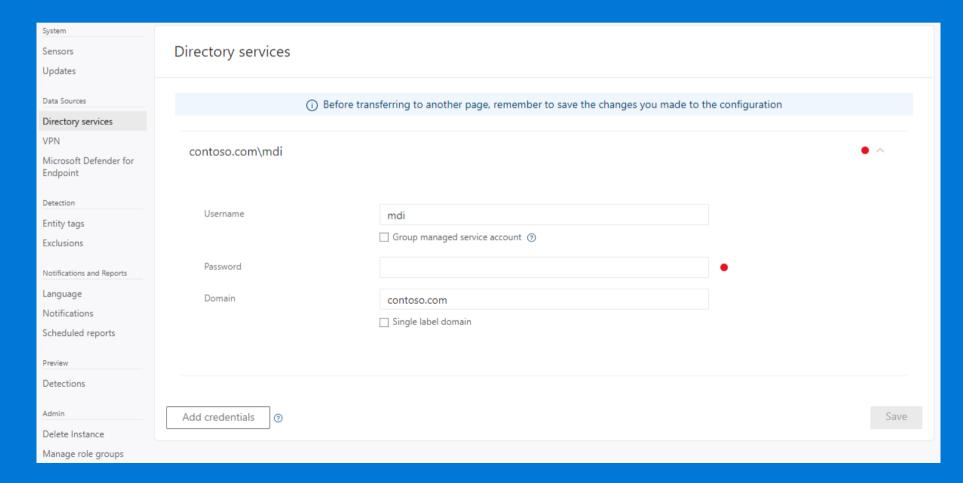
### Microsoft Defender for Identity Configuration

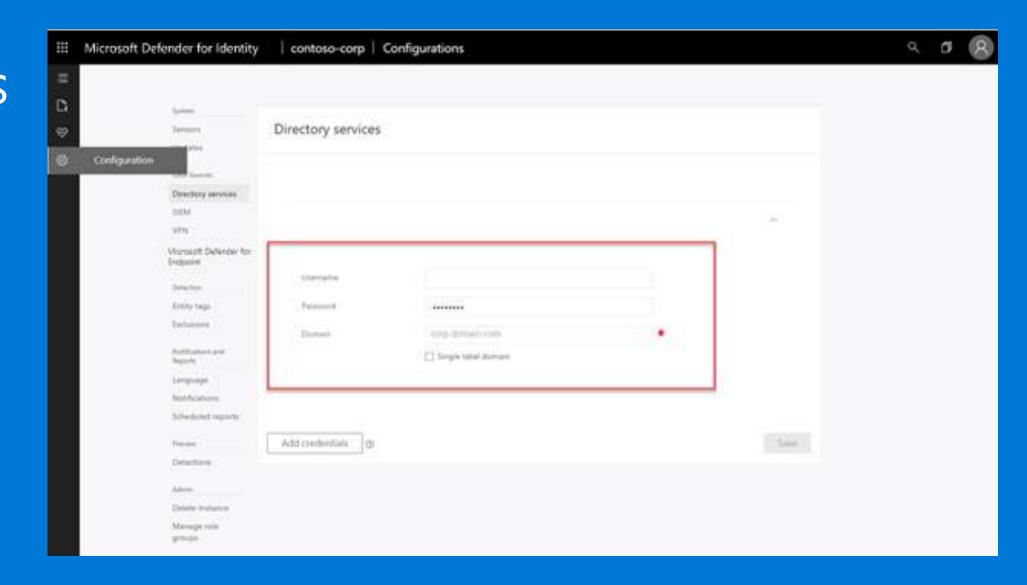
Assign necessary delegations



### 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

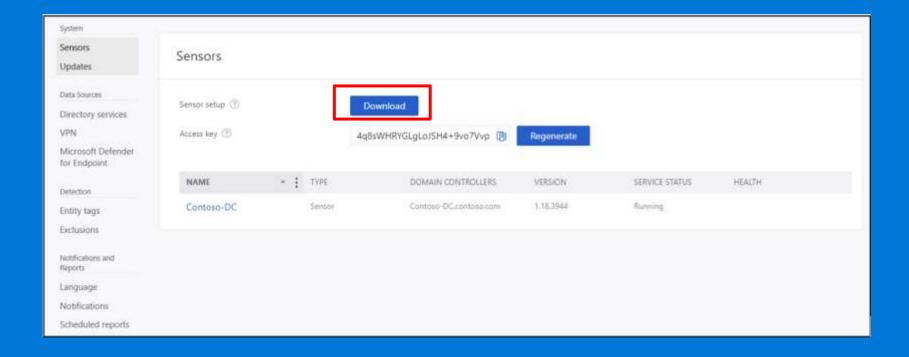






- The MDI sensor can be installed in different ways
- -MDI Standalone Sensor
- -MDI Sensor (installed on Domain Controller or ADFS servers)

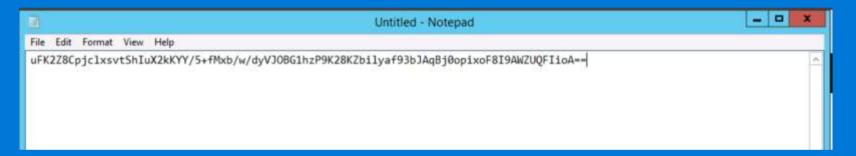
The MDI sensor installation packet



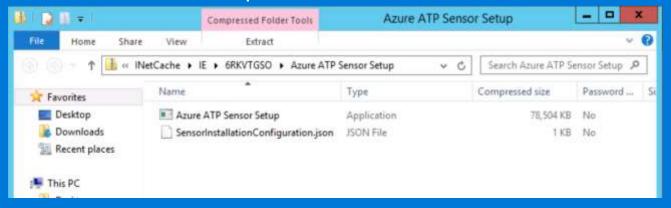
Download the MDI sensor installation packet to the machine from a browser



Copy the access key

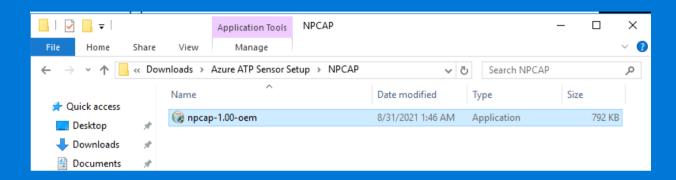


• Extract the setup files



Install the NPCAP application

Install the NPCAP application



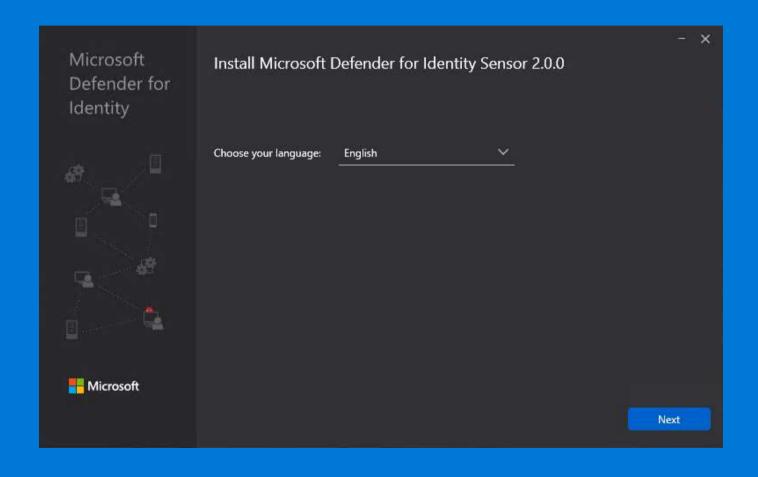
Start the MDI sensor installation



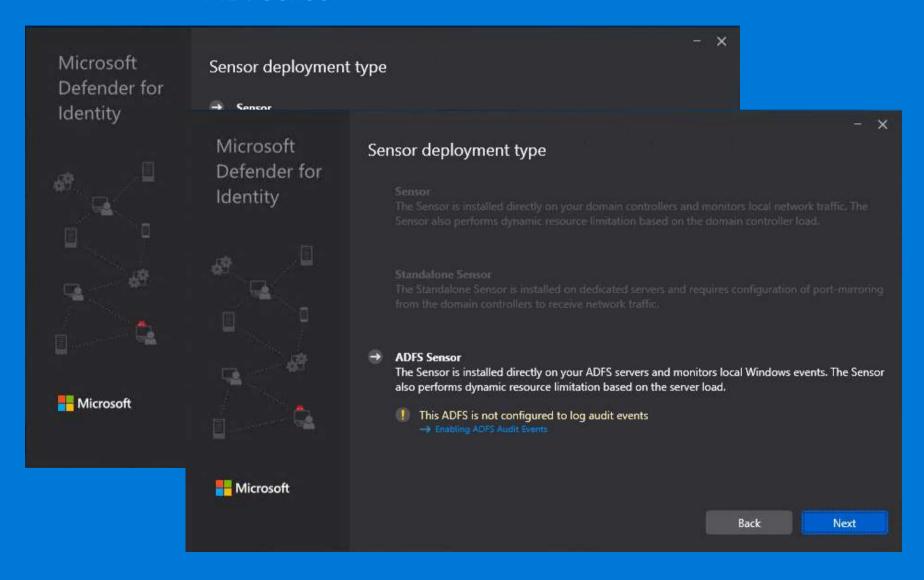
 MDI will install the right version of .NET framework if it is not installed

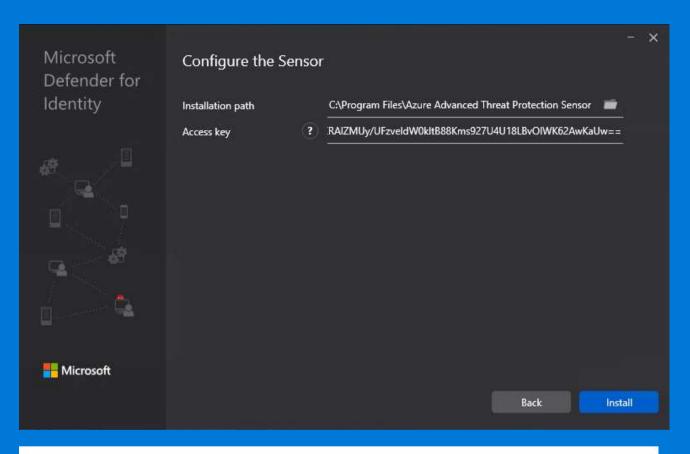


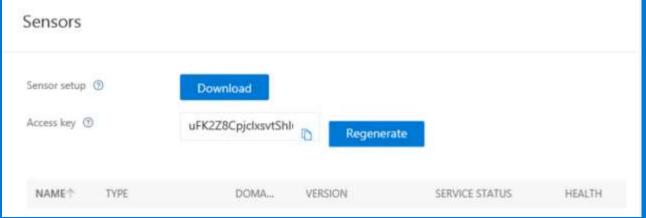
Choose language to install

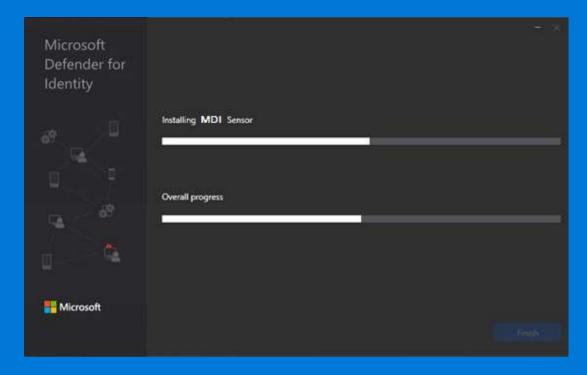


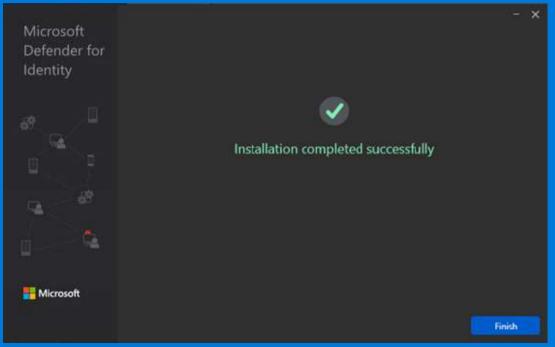
#### MDI Sensor









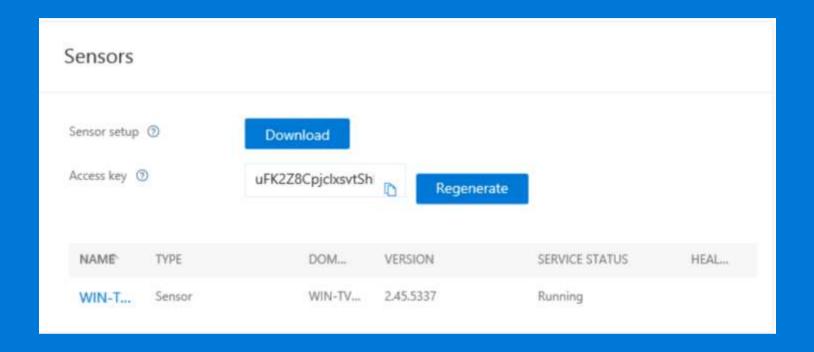


### Installing the MDI Sensor

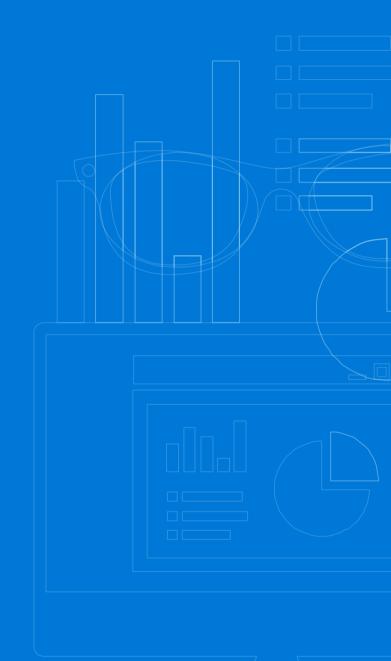
- Scripted installation can be done via Sensor Setup
- Install

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

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



### Configuration Options



### Configuring MDI

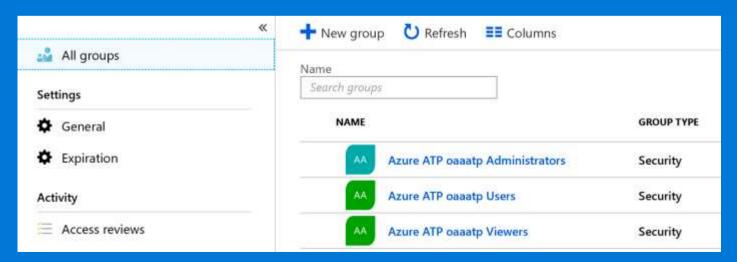
- 1. Set up the MDI Service
- 2. Configure detection options (honey token account)
- 3. Configure alerting options (mail integration, syslog integration)
- 4. Configure the MDI Sensor settings within the MDI configuration
- 5. Download the MDI Sensor Setup package, transfer to the MDI Sensor, and run 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.

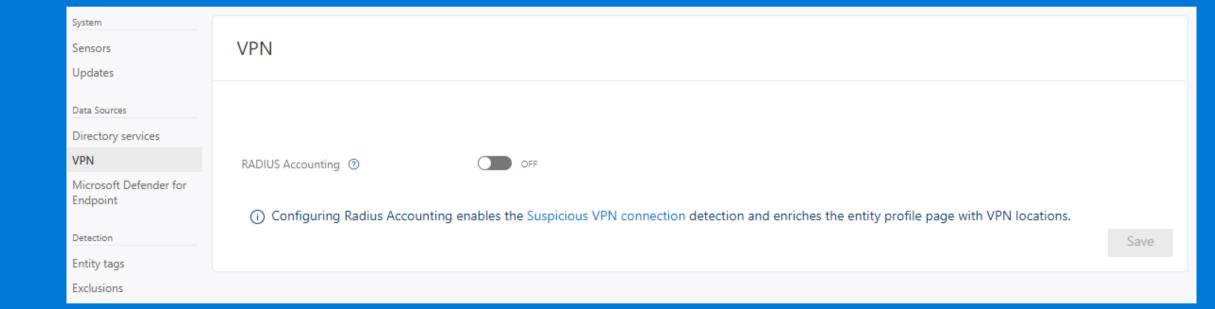


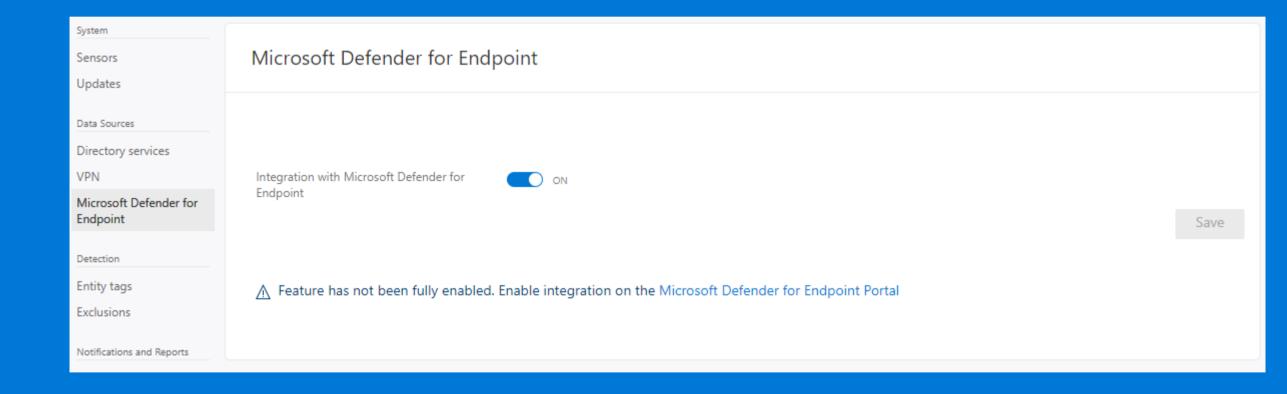
 MDI security groups can be used to delegate the administration to other users after the initial setup



#### SIEM/Syslog Listener

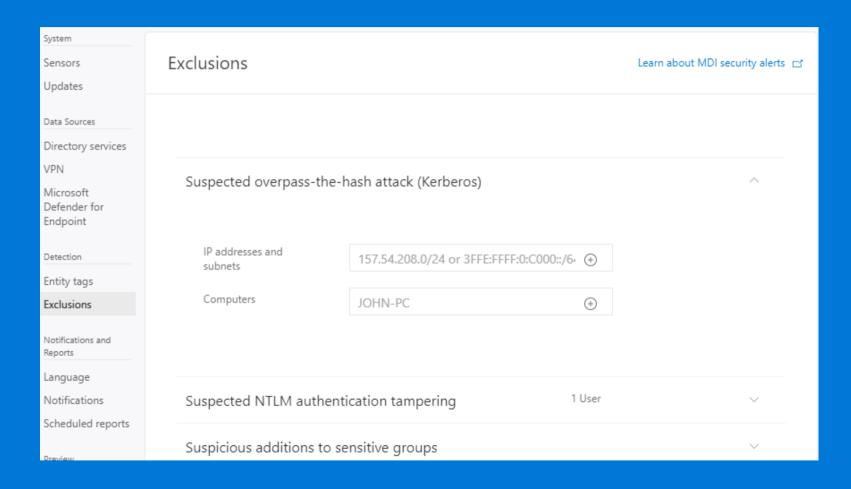
- ✓ Already enabled on Standalone Sensors
- ✓ Supports below solutions
  - HP Arcsight
  - Splunk
  - RSA Security Analytics
  - Snare
  - Qradar





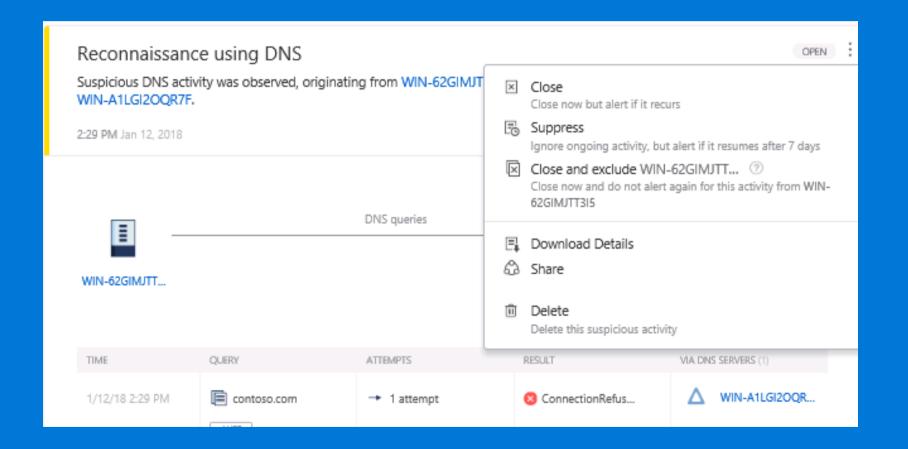
### Configure Exclusions

#### From the Exclusions tab on the Configuration page:



### Configure Exclusions

#### Or from suspicious activity itself:



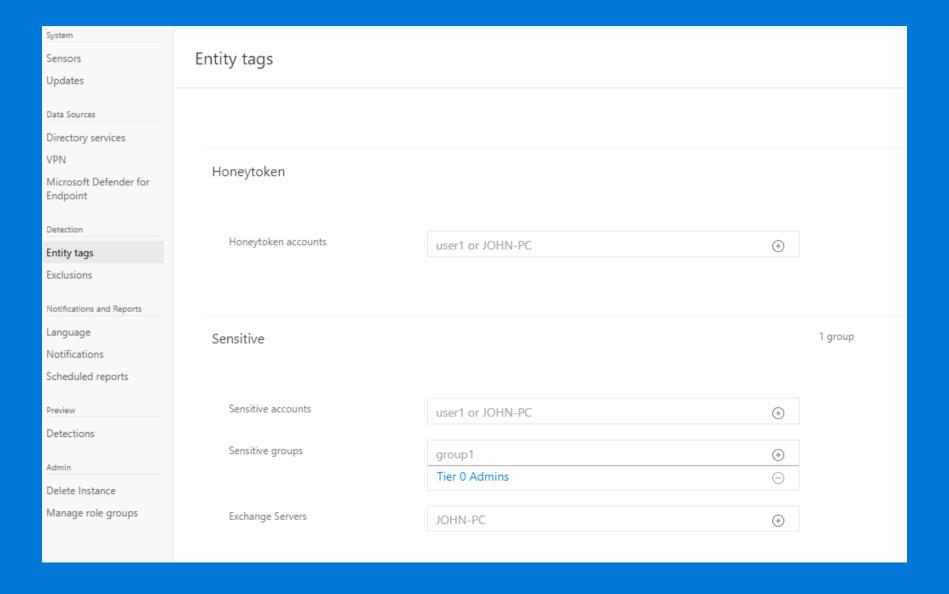
### Detection Settings

- 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



#### Notifications: Alerts

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

## Questions & Answers



### Microsoft