Microsoft

Bring Your Own Threat Intelligence (BYOTI)

Focus on what matters

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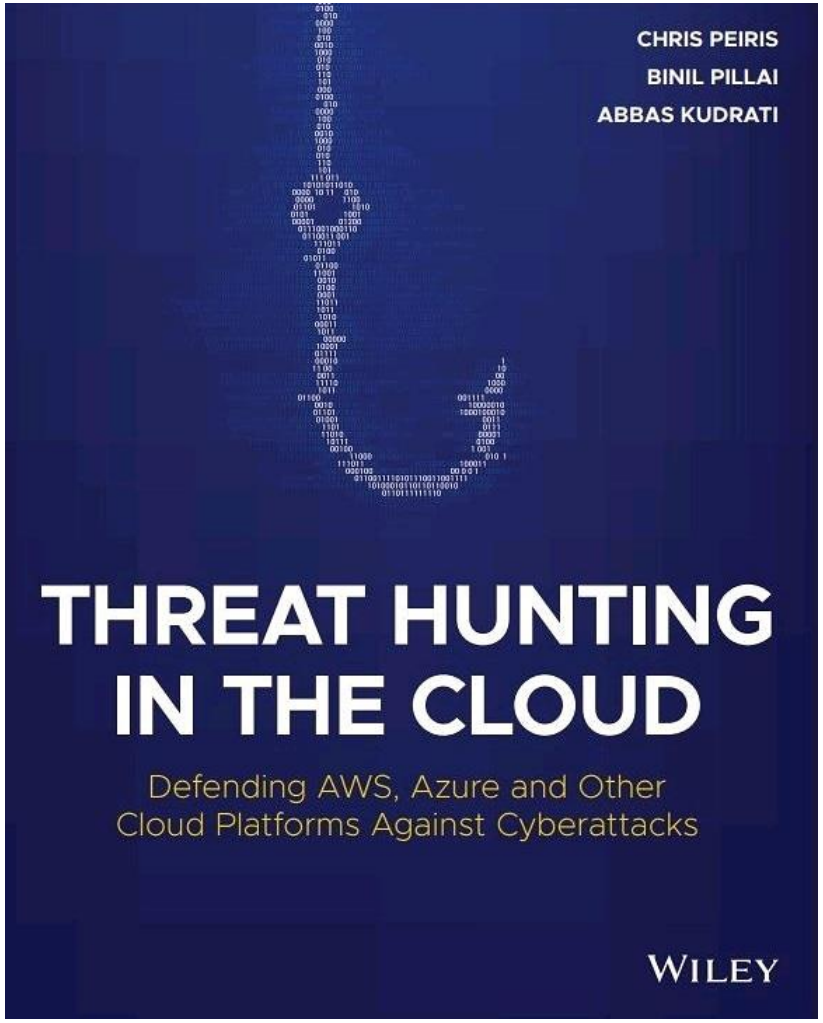
About me

"You join Microsoft, not to be cool
but to make others cool"
Satya Nadella

- **Cybersecurity practitioner and CISO with 25 years of experience in Information / Cybersecurity.**
- **Part time Cybersecurity Professor with Deakin and LaTrobe University in Melbourne, Australia.**
- **Expertise in Zero Trust, Cybersecurity Strategy, Security Operations, Risk, Compliance, Cloud Security and Architecture.**

Upcoming books



Available on Amazon AU

Work in progress

Zero Trust Journey across the Digital Estate

By

Abbas Kudrati & Binil Pillai

CRC Press
Taylor & Francis Group

Target release by May 2022.

Work in progress

Digitization Risks in Post Pandemic World

By

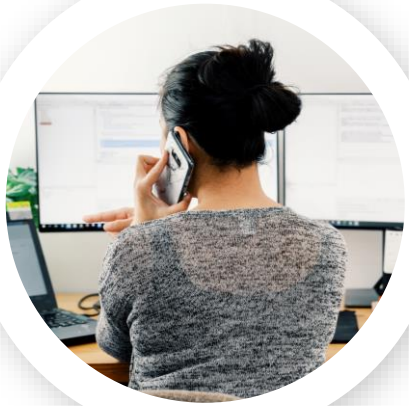
Ashish Kumar, Abbas Kudrati & Shashank Kumar

Packt

Target release by March 2022.

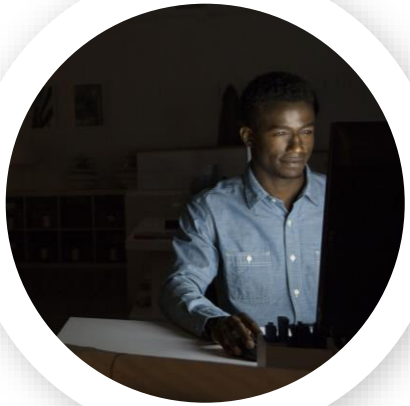
Navigating a shifting world

The nature of business and work have changed

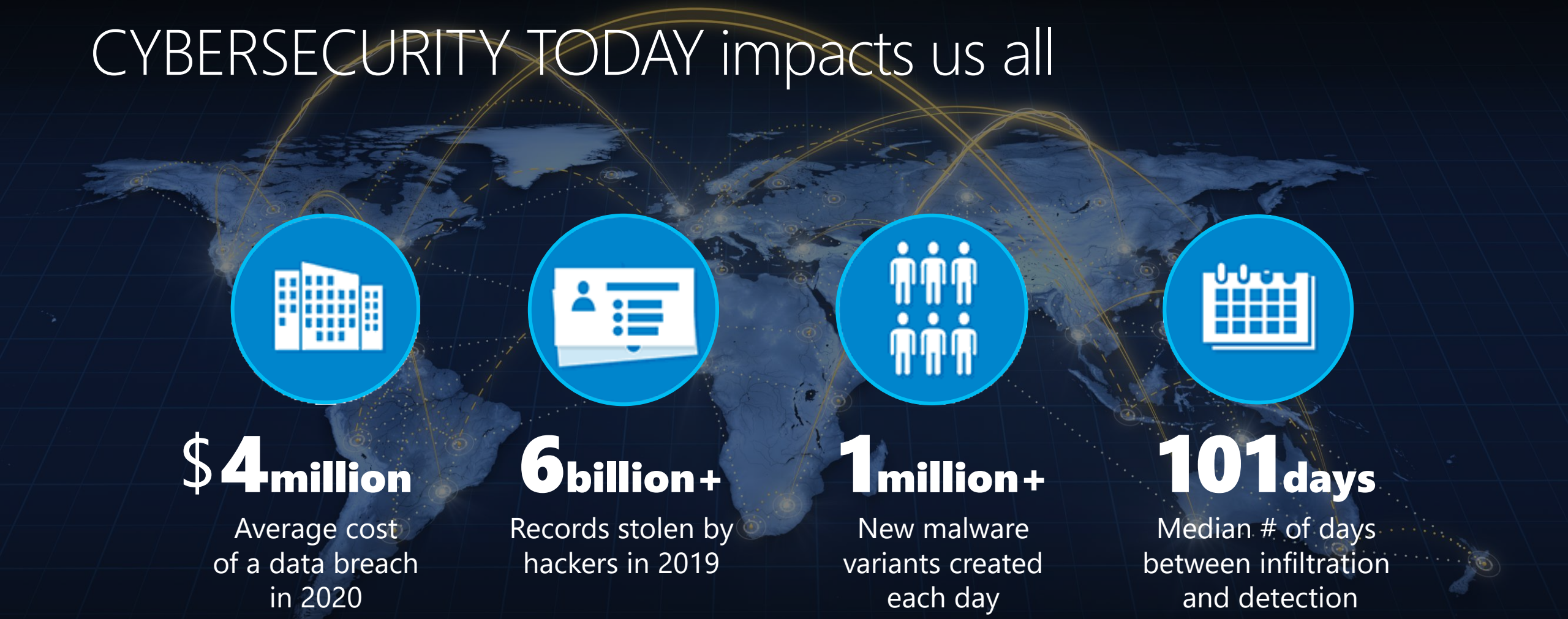


Conventional security tools have not kept pace

Cost of breaches and regulations are increasing



CYBERSECURITY TODAY impacts us all



$4million

Average cost of a data breach in 2020

6billion+

Records stolen by hackers in 2019

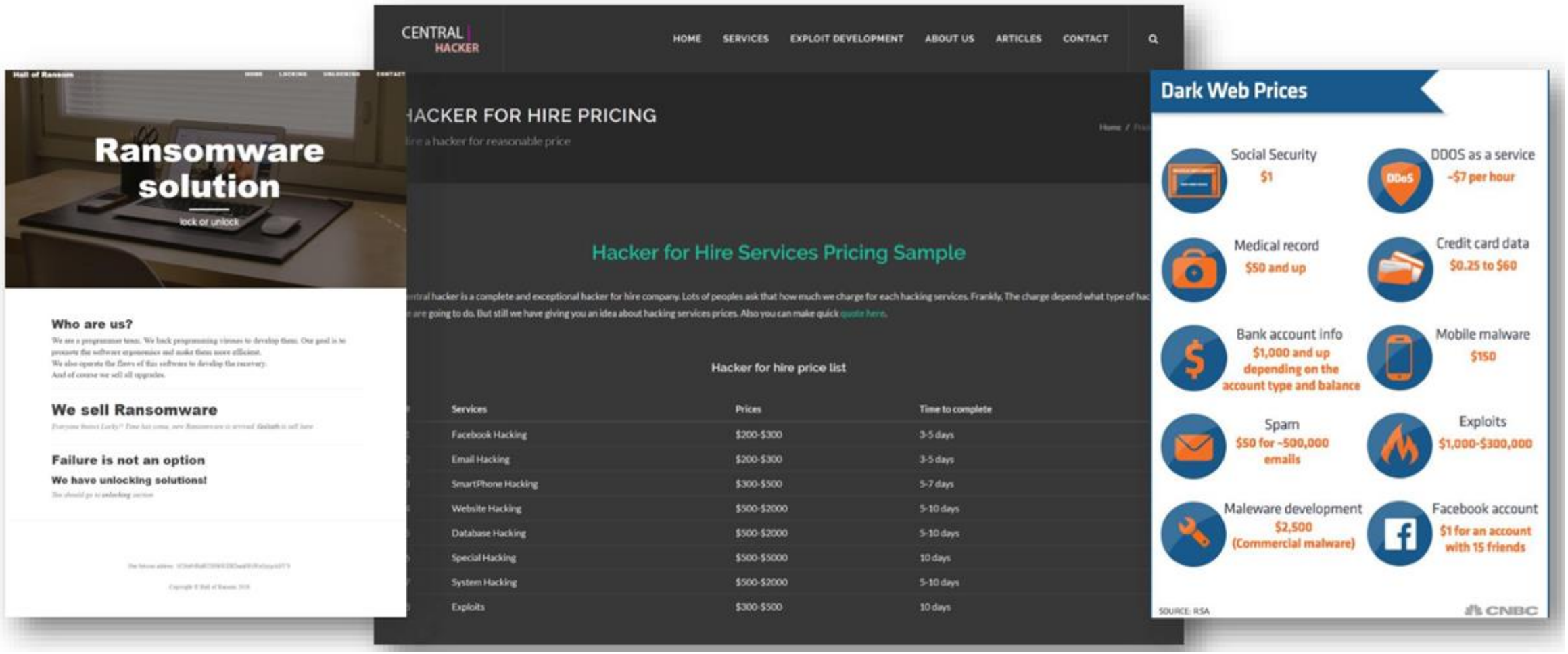
1million+

New malware variants created each day

101days

Median # of days between infiltration and detection

Cybercrime has a supply chain, and a platform



[Russian Hydra DarkNet Market Made Over $1.3 Billion in 2020 (thehackernews.com)]

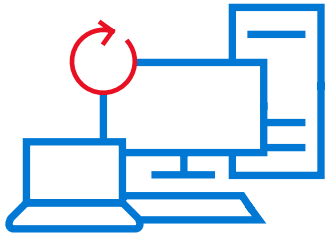
How do we combat this?

- Change of mindset?
- Strategies employed?

Designing for Failure – The Mindshift

THEN

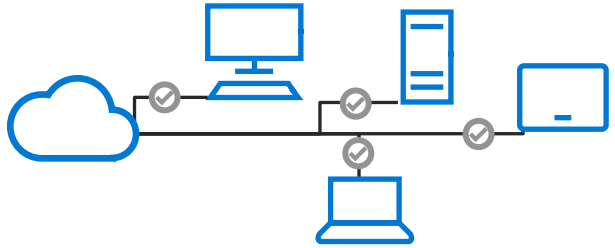
Reliability:
Designed not to fail



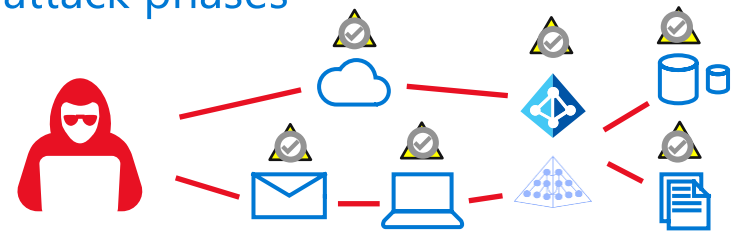
Prevent:
Every possible attack

NOW

Resilience:
Designed to recover quickly



Assume Compromise:
Protect, detect, and respond along attack phases

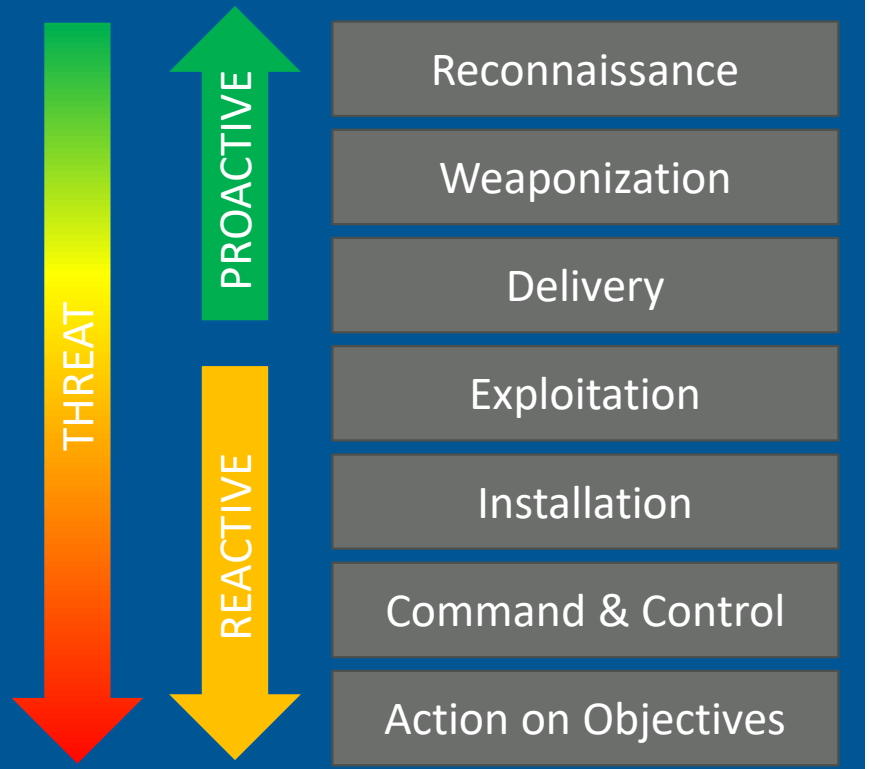


Strategies

Defense-in-depth

Cybersecurity

Cyber Kill Chain



What is Threat Intelligence?

- Indicator of Compromise (IoC) is an artifact linked to a known vulnerability or attack.
- MITRE ATT&CK Framework describes tactics and techniques
- Common Vulnerabilities and Exposures (CVE) are publicly known cybersecurity vulnerabilities.
- The CVE List feeds the U.S. National Vulnerability Database (NVD)
- The NVD documents fix information, severity scores, and impact ratings.

Closer look at Indicator of Compromises (IOC's)

- Indicator types include IP addresses, file hashes, domains, email addresses, & certificates
- IOC records often include an expiration date and confidence score in addition to the indicator value
- IOCs can reside in a local or remote database

Leveraging Threat Intel
Spanning the Killchain

RECONNAISSANCE →	WEAPONIZATION/ INFRASTRUCTURE SETUP →	DELIVERY →	EXPLOITATION →	INSTALLATION →	C2 →	ACTIONS ON INTENT →
Detections submitted from multiple sensors	Threat Intelligence feeds and correlation data	**Mail received by** • M. Smith (Sales) **Detection** • Agenda.doc (Win32/NeroBlaze Dropper)	**IOA Detection** • Browser started suspicious process (Name: inst.dat)	**IOA Detection** • HOST: MSMITH-MAIL • GoogleUpdate.EXE • Rare Startup Program (Prevalence: 2 local /74 WW)	**ATA Detection** • HOST: MSMITH-MAIL • PTH Detection **ATA Detection** • HOST: DC-01 • Mass Computer Enumeration	**Detection** • HOST: AZSQL-01 (Azure SQL instance) • Mass download of database content from an unusual host
Offerings	INTERFLOW & THREAT ATTRIBUTION SERVICE	O365 ATP	WINDOWS DEFENDER ATP	WINDOWS DEFENDER ATP	ATA	AZURE SECURITY CENTER/ OMS

+ Content/Engage	Detection Dictionary Attribution report	Tactics, Techniques, and Processes (TTPs)	Related threats	Downloaded report/mitigation guidance	Engage Microsoft Cybersecurity Group

What is a Threat Intelligence Provider?

- VirusTotal
- AlienVault
- Recorded Future
- EclecticIQ
- ThreatQuotient
- BlueVoyant
- Sixgill
- Palo Alto
- IBM Xforce
- FireEye
- MISP
- Anomali
- ThreatConnect
- Risk IQ

Threat perspectives

Organisation-specific Attack Based Threat Hunting

Hypothetical scenario
- Login to a cloud service from a non-corporate device to steal data

Predict and estimate the footprint
- Unusual IP/Machine name/OS/Geolocation/time/volume/authorisation failures/upload

Enact or hypothesise and gather artefacts
- Inspect logs, ID markers, registry

Block/Alert/Pass?
- CEO new phone? Attacker stealing data? Brute force attack?

Learnings
- Additional logs, if only we had blocked file downloads from new Geolocations

Why do customers need BYOTI?

- Assurance in the face of a major threat
- Compliance reasons
- Microsoft Threat Intelligence is not yet easy to validate (and for good reason!)

Threat Intelligence Challenges

How do we enable customers to gain visibility into rapidly changing threats while reducing the noise generated by insignificant events?

BYOIT Setup Options

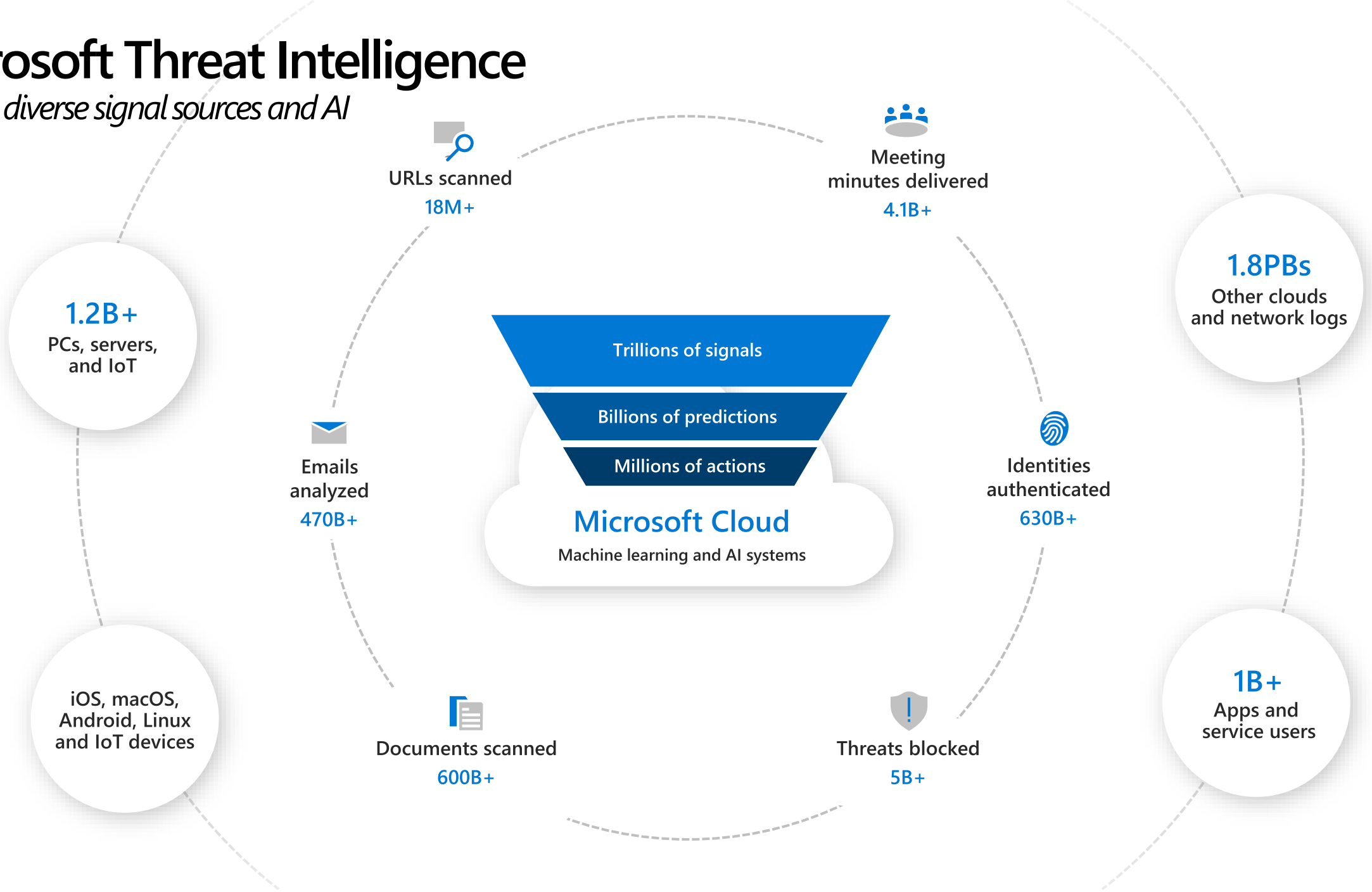
- Manual Hunt / Analytics Rule
- Threat Intelligence Connector
- TAXII
- API (Logic App)

To protect customers and make the internet safer, our global security teams use machine learning to process:

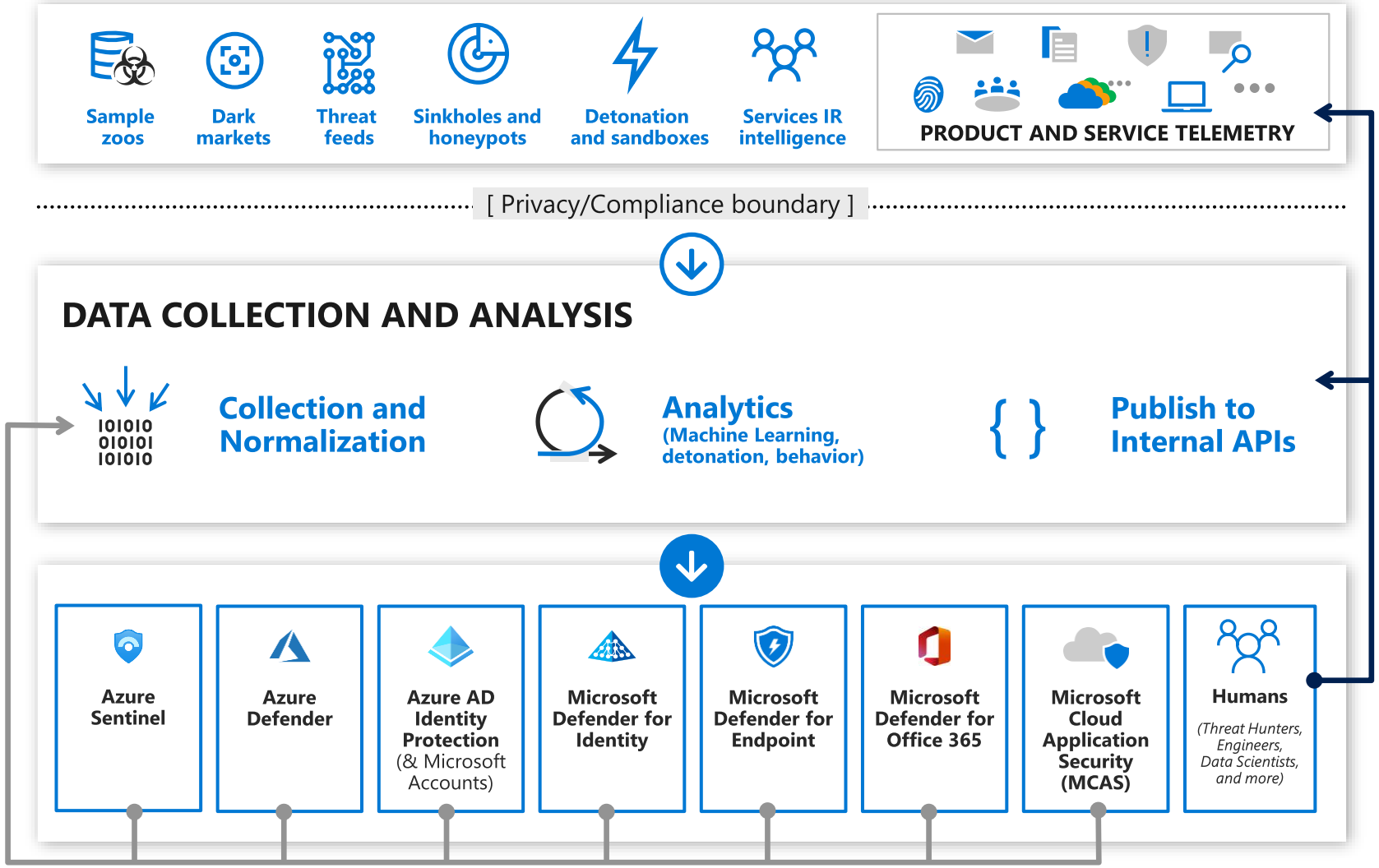
- **Trillions** of raw security signals, which generates
- **Billions** of complex predictions and
- **Millions** of automated actions

Microsoft Threat Intelligence

Built on diverse signal sources and AI



Inside View of Microsoft Threat Intelligence



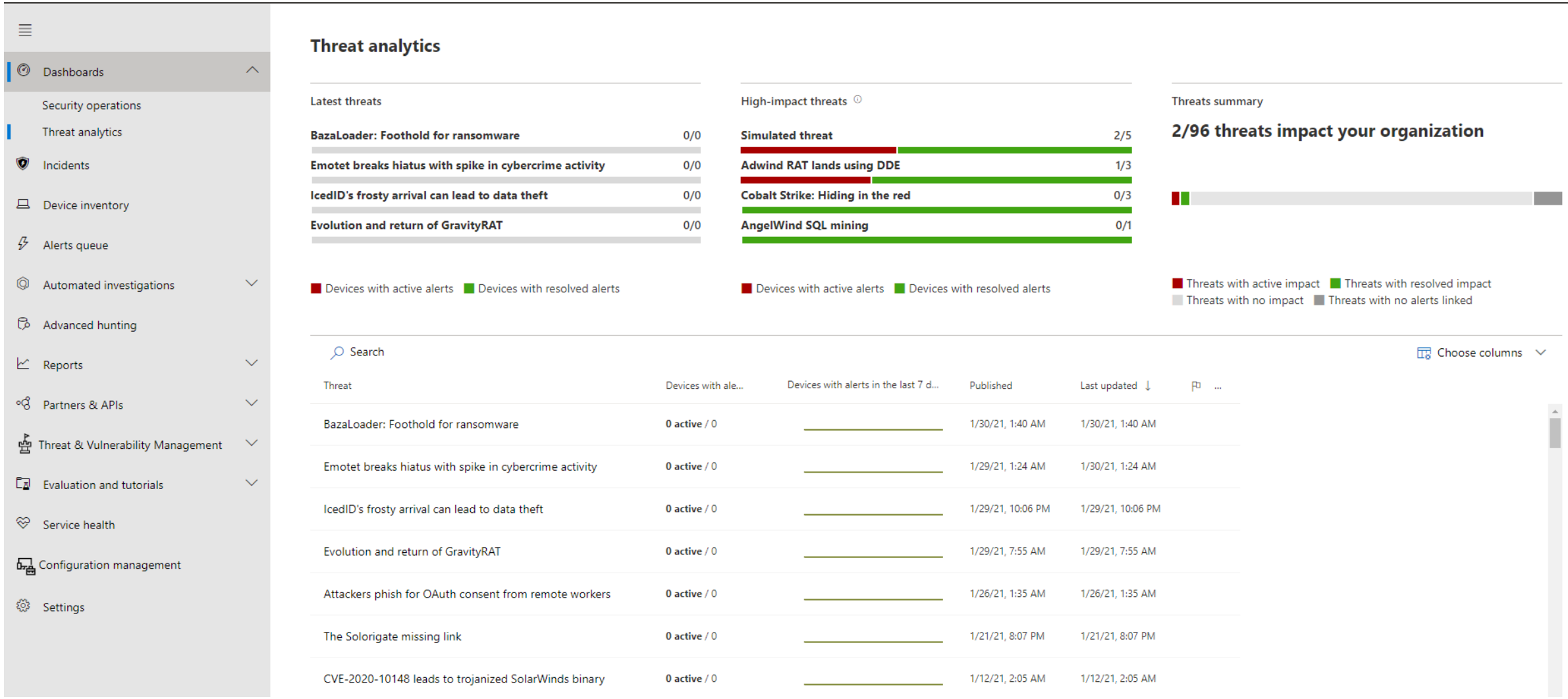
- Products instrumented to strict privacy/compliance standards
  See Microsoft Trust Center
- Analytics help fuel new discoveries
- Products make data available
- Products use Interflow APIs to access results
- Products generate data which feeds back into system
- Humans identify attacks, improve analytics, feed back into databases and product design

Customers want three things from Threat Intelligence:

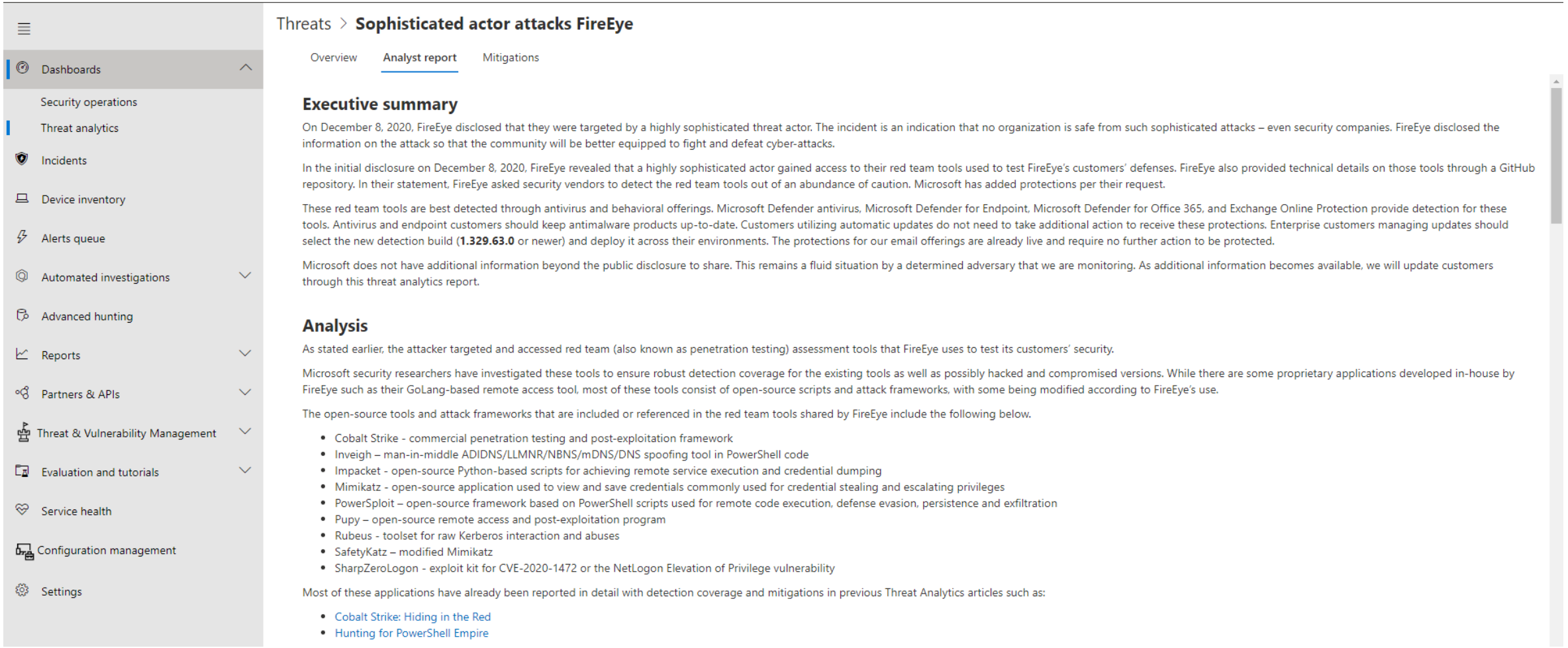
- Protect them from known, relevant threats
- Insights that help them triage and prioritize.
- Understand the full context of threats before they are affected.

More relevant, accurate & actionable data.

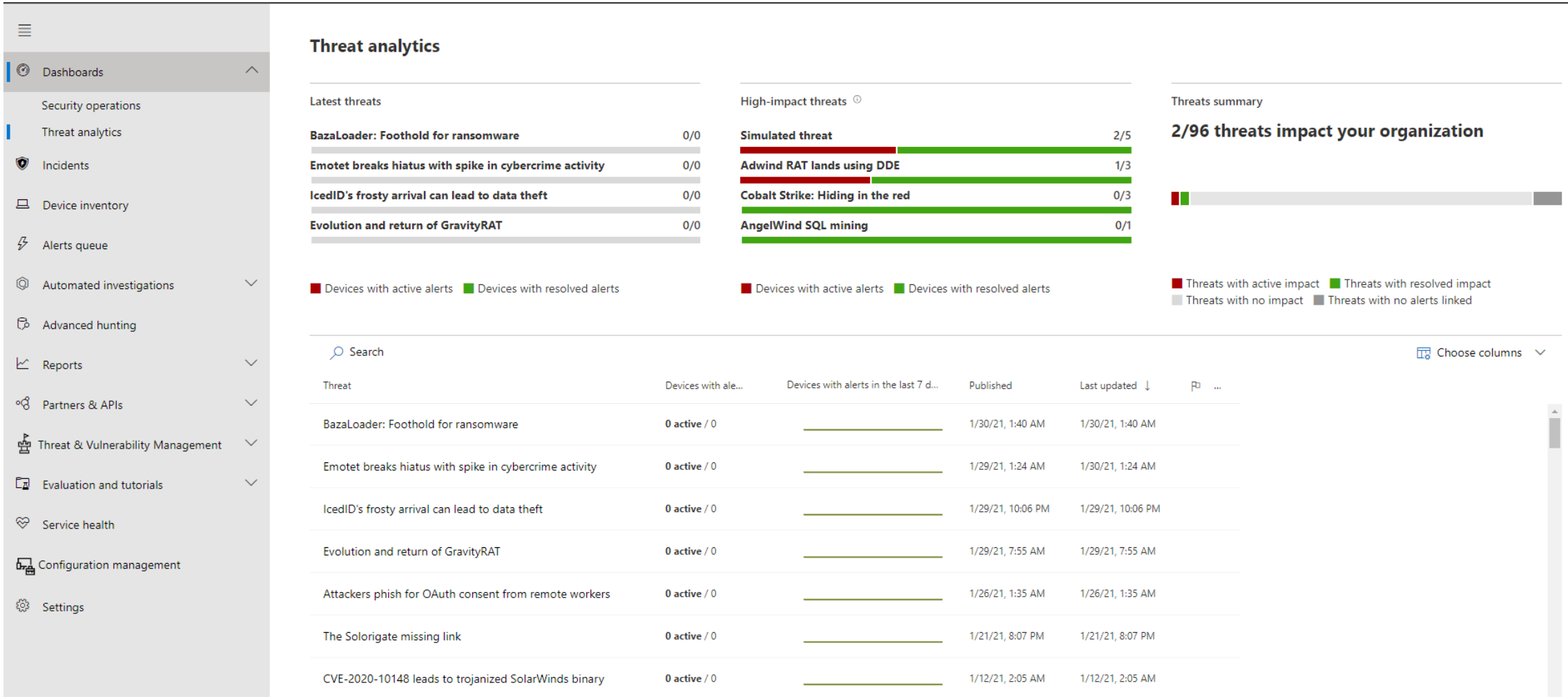
Microsoft Threat Intelligence - Threat Analytics



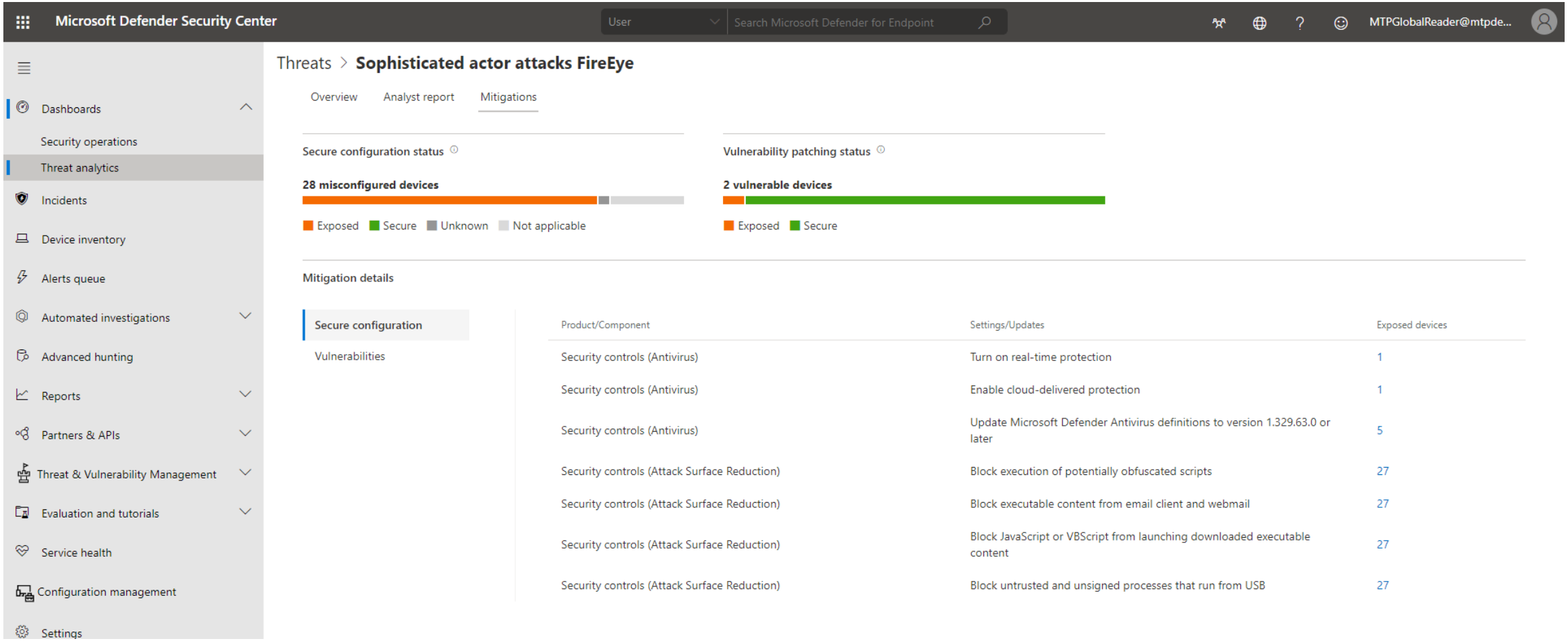
Microsoft Threat Intelligence - Threat Analytics Report



Microsoft Threat Intelligence - Threat Analytics



Microsoft Threat Intelligence - Threat Analytics Mitigations



Microsoft

Where does Microsoft publish threat intelligence !

Where does Microsoft publish threat intelligence

- Global Threat Activity
- Microsoft Digital Defense Report Report
- Microsoft Defender for Endpoint
  - Microsoft Threat Experts
- Microsoft Detection and Response Team

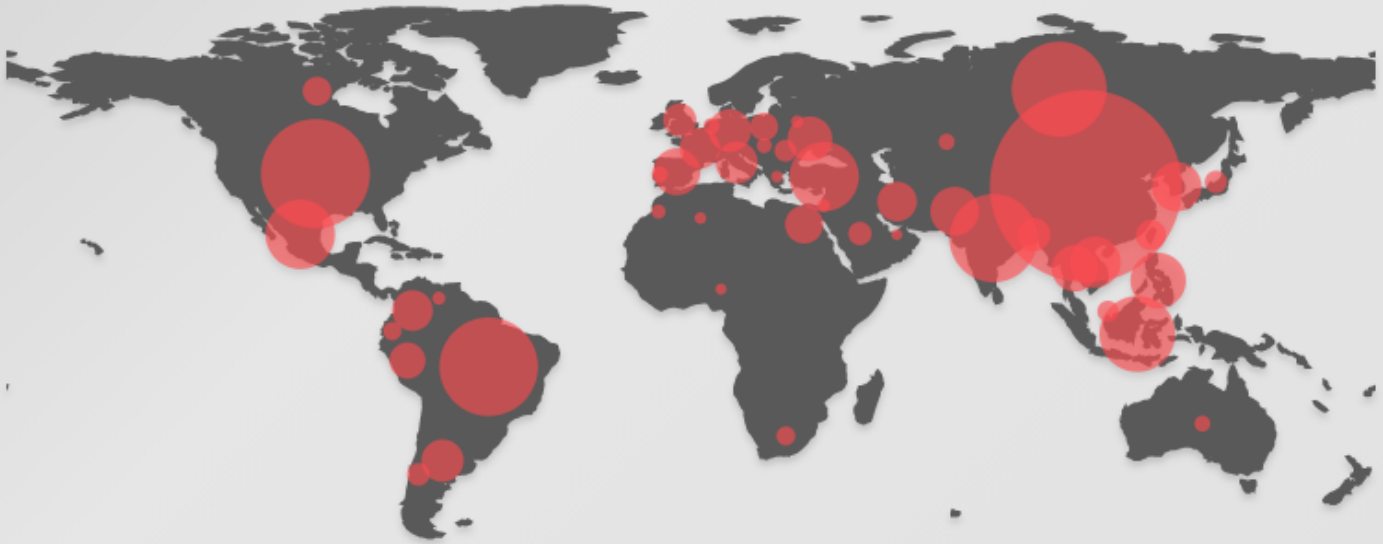
Microsoft Worldwide Security Intelligence provides a macro level view of the top threats to enable monitoring and analysis of high-volume events occurring in real time.

Search the threat encyclopedia

Global threat activity

Countries or regions with the most malware encounters in the last 30 days

Select a region



Worldwide

88,999,509 devices with encounters

Top threats:

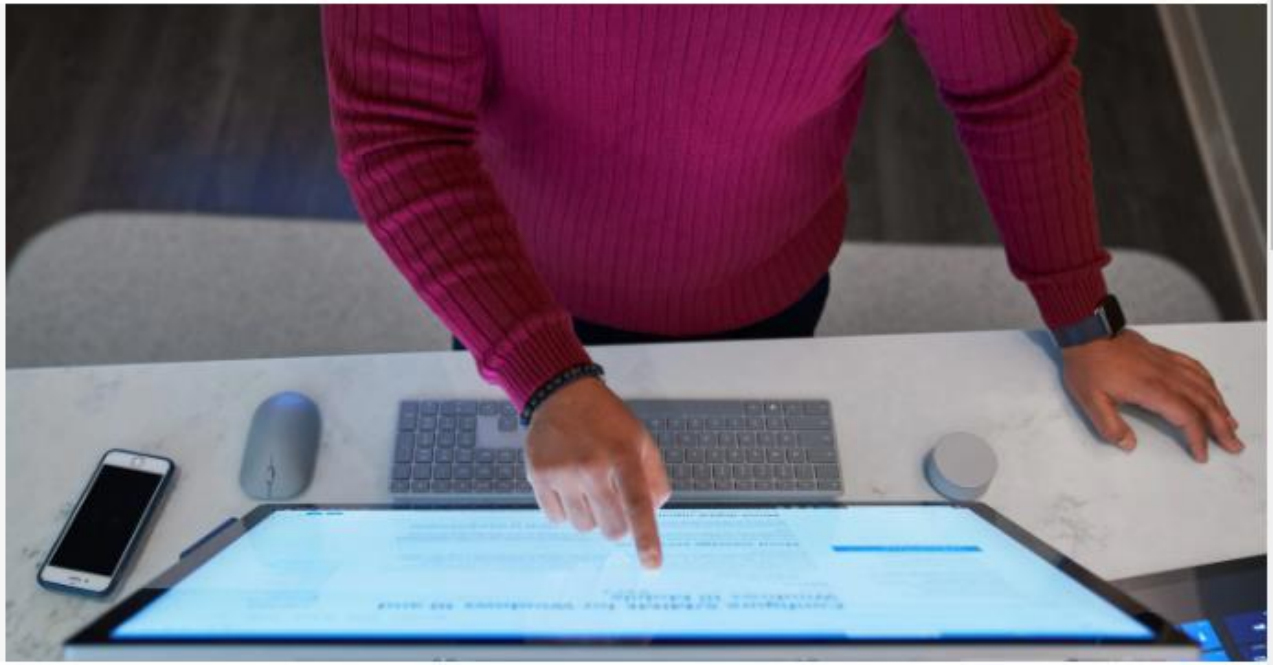
HackTool:Win32/AutoKMS
HackTool:Win64/AutoKMS
HackTool:MSIL/AutoKms
HackTool:Win32/Keygen
Trojan:Win32/CryptInject!ml

Microsoft Digital Defense Report provides global insights about threat intelligence from experts, practitioners and defenders at Microsoft.

Microsoft Digital Defense Report

Get the latest insights about the threat intelligence landscape and guidance from experts, practitioners, and defenders at Microsoft.

Download the report



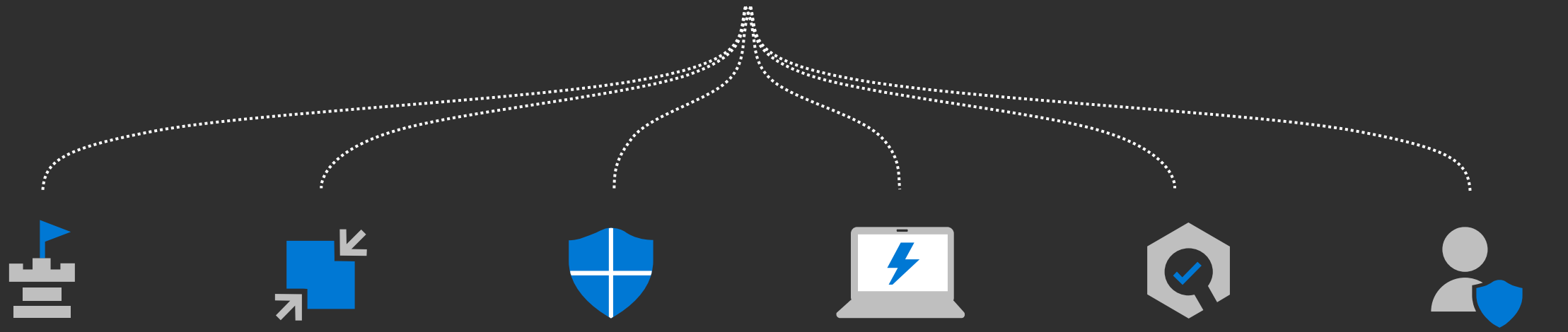
Informed by over 8 trillion daily security signals and observations from our security and threat intelligence experts, our new Digital Defense Report presents telemetry and insights about the current state of cybersecurity.

Download archived security

Microsoft Defender for Endpoint provides your Security Operations Centers with technical capabilities to monitor, investigate and respond to risks and threats across your technical landscape.

Microsoft Defender
For Endpoint

Built-in. Cloud-powered.



Threat Analytics

See how you do against major threats

https://securitycenter.microsoft.com

Threat to posture view

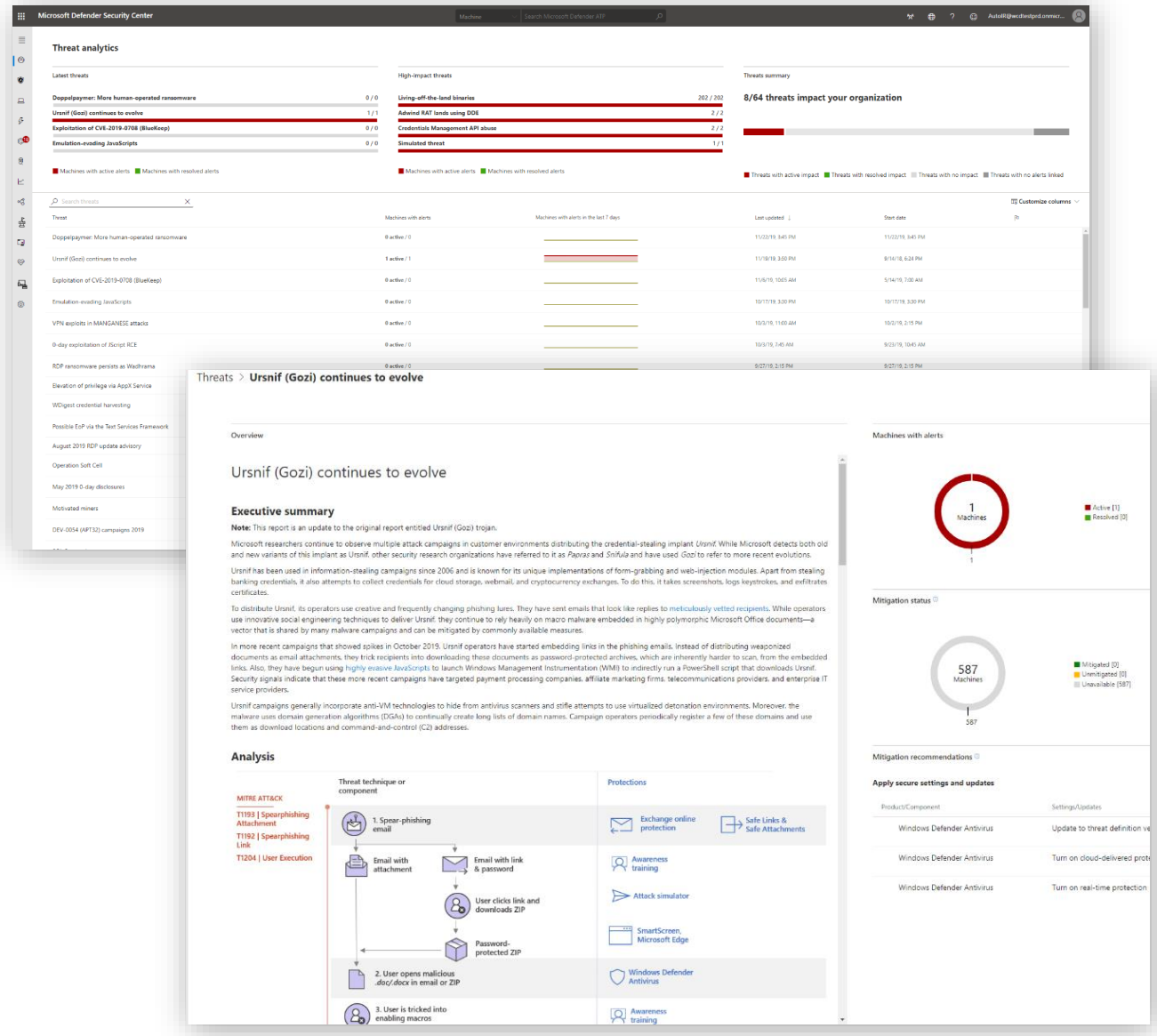
See how you score against significant and emerging campaigns with interactive reports.

Identify unprotected systems

Get real-time insights to assess the impact of the threat on your environment.

Get guidance

Provides recommended actions to increase security resilience, to prevention, or contain the threat.



Threat analytics

Latest threats

ELBRUS (FIN7) activity group	0/0
Signature spoofing exploit with MSI or CAT headers	0/0
CVE-2020-1472 Netlogon EoP vulnerability	0/0
Print Spooler EoP: Persistence pays off	0/0

Devices with active alerts Devices with resolved alerts

High-impact threats

Simulated threat	2/7
Adwind RAT lands using DDE	1/5
Cobalt Strike: Hiding in the red	0/5
Credentials Management API abuse	0/1

Devices with active alerts Devices with resolved alerts

Threats summary

2/80 threats impact your organization

Threats with active impact Threats with resolved impact
Threats with no impact Threats with no alerts linked

Search items

Customize columns

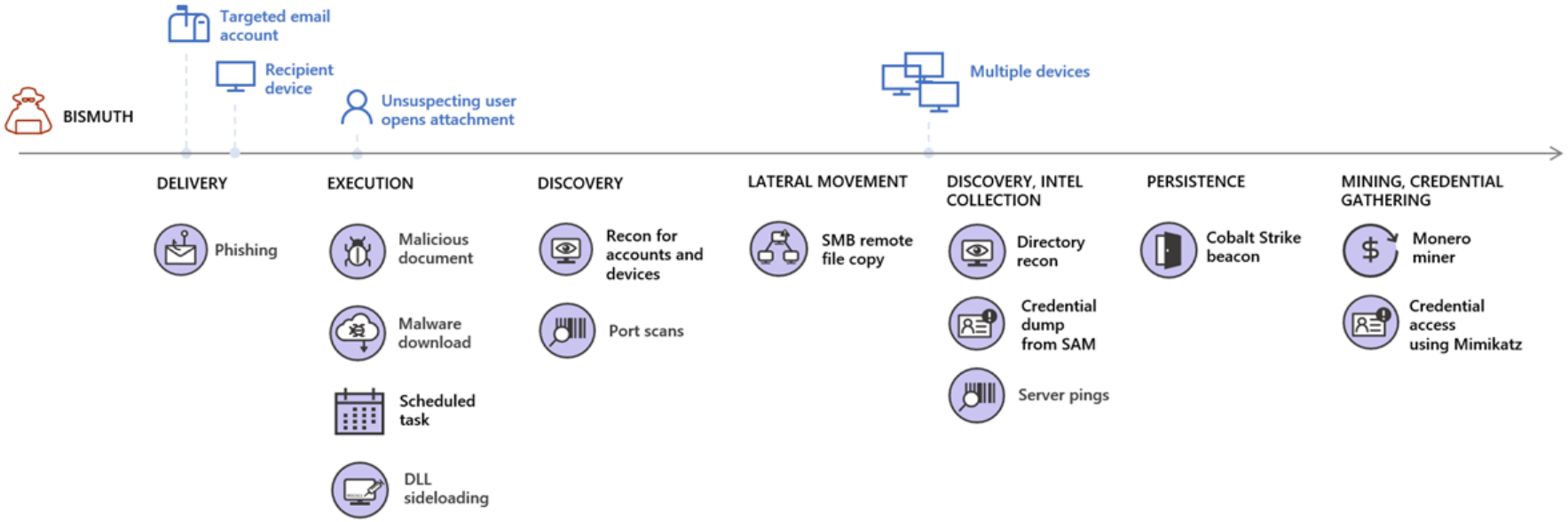
Threat	Devices with alerts	Devices with alerts in the last 7 days	Last updated	Start date
ELBRUS (FIN7) activity group	**0 active** / 0		10/14/20, 7:30 AM	10/14/20, 7:30 AM
Signature spoofing exploit with MSI or CAT headers	**0 active** / 0		10/13/20, 8:15 AM	8/11/20, 8:00 AM
CVE-2020-1472 Netlogon EoP vulnerability	**0 active** / 0		10/5/20, 3:35 PM	8/11/20, 8:00 AM
Print Spooler EoP: Persistence pays off	**0 active** / 0		10/5/20, 11:50 AM	10/5/20, 11:50 AM
Adwind utilizes Java for cross-platform impact	**0 active** / 0		9/8/20, 9:50 AM	9/8/20, 9:50 AM
BISMUTH: Mining for intelligence and coins	**0 active** / 0		9/3/20, 7:40 AM	9/3/20, 7:40 AM
CHIMBORAZO: StrangeU infra marks 2020 attacks	**0 active** / 0		8/25/20, 2:08 PM	8/24/20, 9:35 AM

Threats > **BISMUTH: Mining for intelligence and coins**

Overview | Analyst report | Mitigations

Analysis

BISMUTH stayed true to form using tactics, techniques, and procedures known to be associated with the group, including their use of Cobalt Strike in different stages as well as sideloading of malicious DLLs using Word 2007. During these attacks, however, they also exhibited new, sophisticated behaviors and activities. For example, the attacks co-opted antivirus programs to connect to Cobalt Strike beacons, used a debugger to inject Windows processes with Base64-encoded Mimikatz commands, and even mined for Monero coin—an activity that isn't commonly associated with nation-state actors.



Delivery

BISMUTH gained initial access by sending specially crafted malicious emails from a Gmail account that appears to have been made specifically for this campaign. It is likely the group conducted reconnaissance using publicly available sources and chose individual targets based on their job function. Each email went to only one recipient at each organization and used tailored subject lines and lure themes:

- Dự thảo hợp đồng (translates from Vietnamese to "Draft Contract")
- Ứng tuyển - Trưởng ban nghiên cứu thị trường (translates from Vietnamese to "Application form - Head of Market Research")

While the group sent numerous phishing emails, most recipients did not open the malicious Microsoft Word attachments. Unfortunately, it only took one user at each affected organization opening the malicious attachment to enable BISMUTH to establish a foothold in the organization. Of note, the group sent several replies to one of these emails, which can indicate that they corresponded with some targets before convincing them to open attachments and inadvertently launch the payload.

Execution through a malicious .doc and DLL sideloading

Upon opening of the malicious *.doc* file, *WinWord.exe* dropped several files in the hidden *ProgramData* folder: *MpSvc.dll*—a malicious DLL with the same name as a legitimate Microsoft Defender Antivirus DLL—and a copy of *MsMpEng.exe*, the legitimate Microsoft Defender Antivirus executable. The malicious document then added a scheduled task that launched the *MsMpEng.exe* copy and sideloaded the

Microsoft Threat Experts provide your Security Operations Centers with deep knowledge, expert level monitoring, analysis, and support to identify critical threats in your unique environment.

Managed Hunting by Microsoft Threat Experts

An additional layer of monitoring and analysis to help ensure that critical threats don't get missed

Targeted attack notifications

We have your back.

Threat experts provide special insights and analysis that help ensure that the most critical threats are identified and responded to quickly and accurately.

Experts on demand

World-class expertise at your fingertips.

Threat experts from Microsoft provide technical consultation on relevant detections and adversaries.

Microsoft

Microsoft

Microsoft Threat Experts

Microsoft brings deep knowledge and proactive hunting to your Security Operations Center

THREAT MONITORING AND ANALYSIS

Reduce attacker dwell time and risk to business

HUNTER-TRAINED ARTIFICIAL INTELLIGENCE

Discover and prioritize attacks both known and unknown

PROACTIVE NOTIFICATION SERVICE

Expert hunters look deeper to expose human adversaries and advanced threats

FULL CONTEXT OF BREACH

Improve SOC response with specific info about scope and methods of entry

EXPERTS ON DEMAND

Partner with world-class security experts to better understand threats and alerts

Targeted attack notifications

Intelligent Security Graph

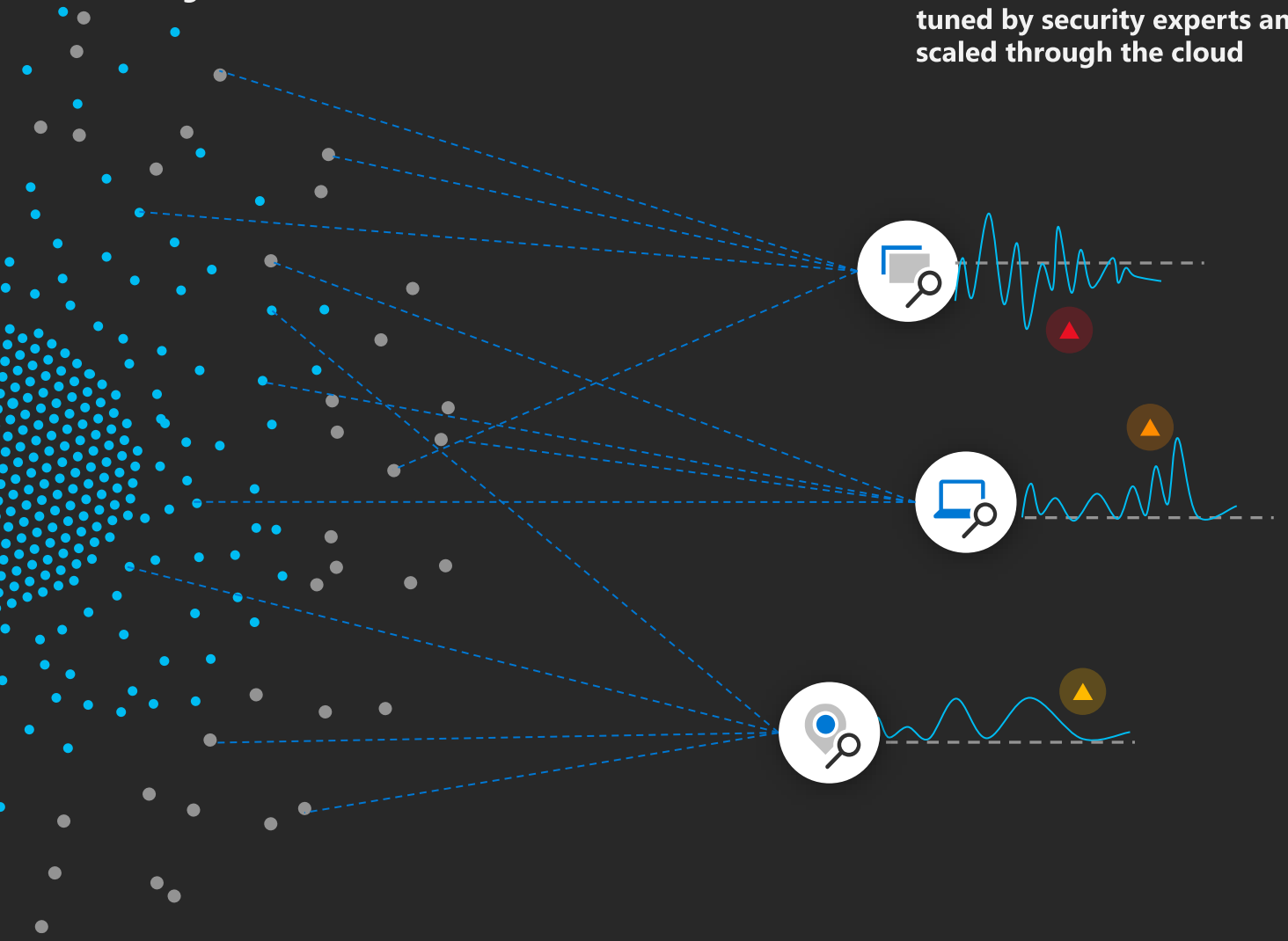
Trillions of signals with unique insights

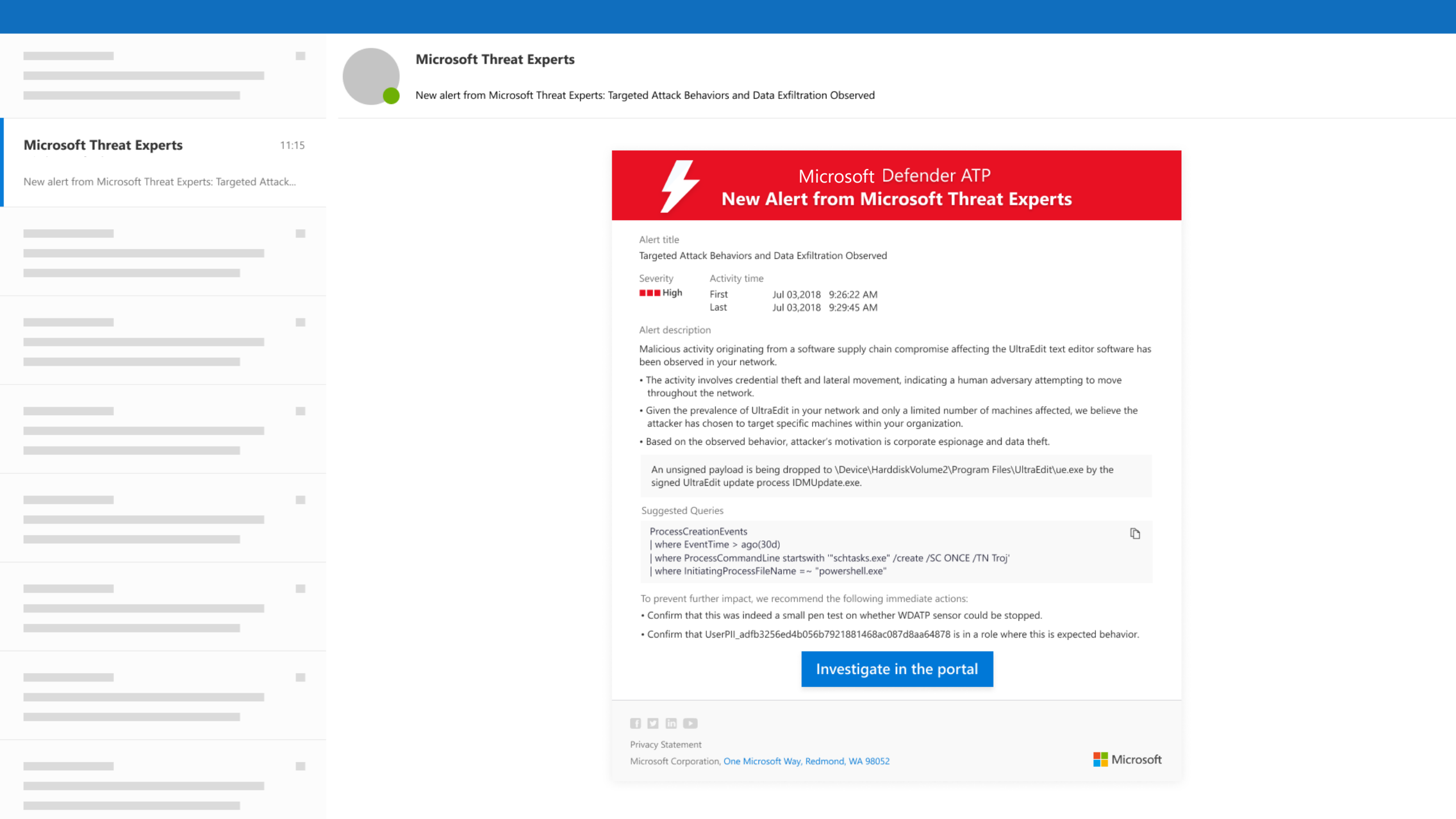
AI modules

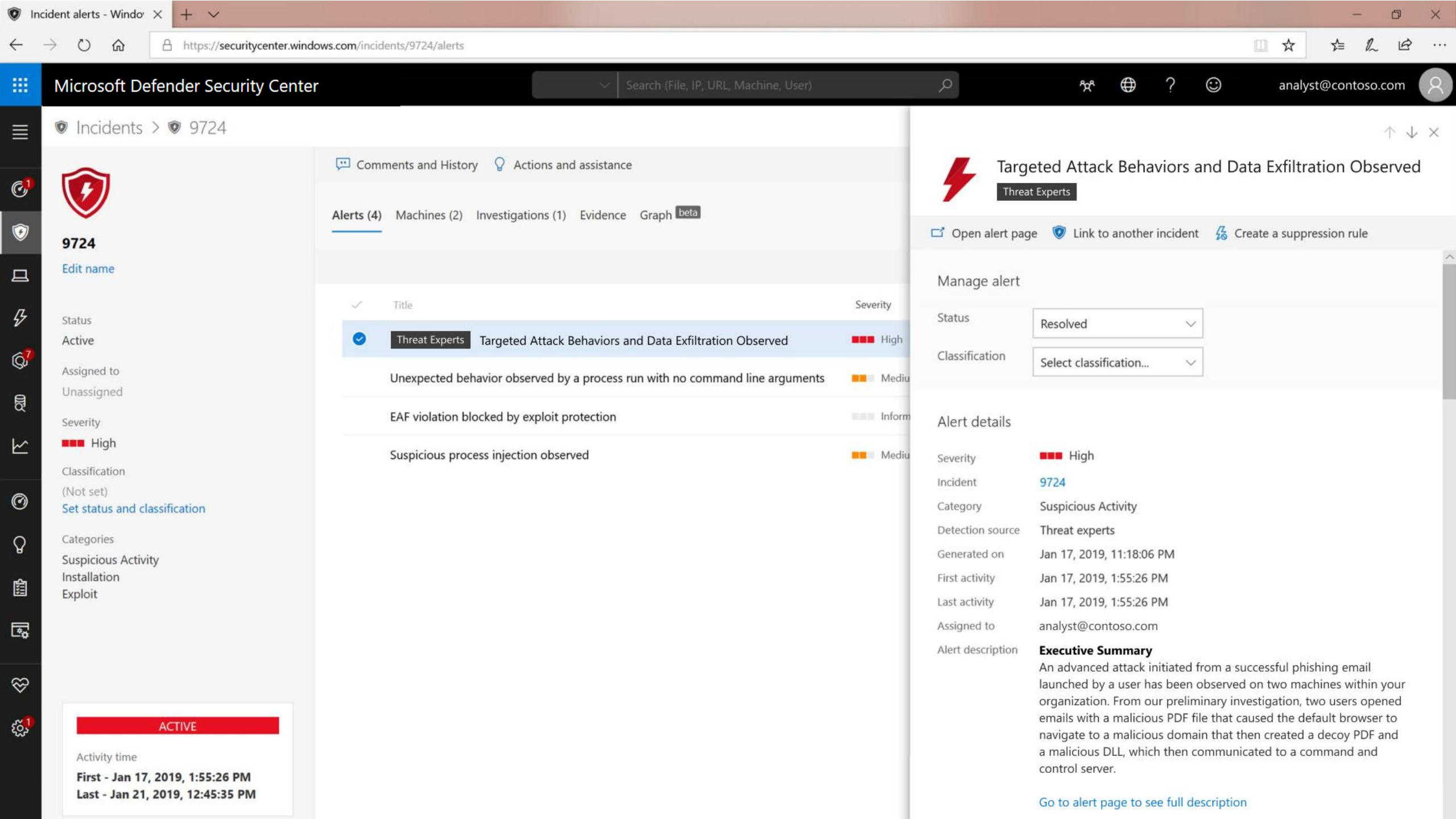
**Fine-grained self-learning modules,
tuned by security experts and scaled through the cloud**

Managed alerts

AI modules prioritize anomalies for hunters to investigate and surface as targeted attack notifications




Microsoft Threat Experts
11:15
New alert from Microsoft Threat Experts: Targeted Attack...
Microsoft Threat Experts
New alert from Microsoft Threat Experts: Targeted Attack Behaviors and Data Exfiltration Observed
Microsoft Defender ATP
New Alert from Microsoft Threat Experts
Alert title
Targeted Attack Behaviors and Data Exfiltration Observed
Severity
High
Activity time
First Jul 03,2018 9:26:22 AM
Last Jul 03,2018 9:29:45 AM
Alert description
Malicious activity originating from a software supply chain compromise affecting the UltraEdit text editor software has been observed in your network.
• The activity involves credential theft and lateral movement, indicating a human adversary attempting to move throughout the network.
• Given the prevalence of UltraEdit in your network and only a limited number of machines affected, we believe the attacker has chosen to target specific machines within your organization.
• Based on the observed behavior, attacker's motivation is corporate espionage and data theft.
An unsigned payload is being dropped to \Device\HarddiskVolume2\Program Files\UltraEdit\ue.exe by the signed UltraEdit update process IDMUpdate.exe.
Suggested Queries
ProcessCreationEvents
| where EventTime > ago(30d)
| where ProcessCommandLine startswith '"schtasks.exe" /create /SC ONCE /TN Troj'
| where InitiatingProcessFileName =~ "powershell.exe"
To prevent further impact, we recommend the following immediate actions:
• Confirm that this was indeed a small pen test on whether WDATP sensor could be stopped.
• Confirm that UserPII_adfb3256ed4b056b7921881468ac087d8aa64878 is in a role where this is expected behavior.
Investigate in the portal
Privacy Statement
Microsoft Corporation, One Microsoft Way, Redmond, WA 98052
Microsoft


Incident alerts - Windo
https://securitycenter.windows.com/incidents/9724/alerts
Microsoft Defender Security Center
Search (File, IP, URL, Machine, User)
analyst@contoso.com
Incidents > 9724
Comments and History
Actions and assistance
9724
Edit name
Status
Active
Assigned to
Unassigned
Severity
High
Classification
(Not set)
Set status and classification
Categories
Suspicious Activity
Installation
Exploit
ACTIVE
Activity time
First - Jan 17, 2019, 1:55:26 PM
Last - Jan 21, 2019, 12:45:35 PM
Alerts (4)
Machines (2)
Investigations (1)
Evidence
Graph beta
Title
Severity
Threat Experts
Targeted Attack Behaviors and Data Exfiltration Observed
High
Unexpected behavior observed by a process run with no command line arguments
EAF violation blocked by exploit protection
Suspicious process injection observed
Targeted Attack Behaviors and Data Exfiltration Observed
Threat Experts
Open alert page
Link to another incident
Create a suppression rule
Manage alert
Status
Resolved
Classification
Select classification...
Alert details
Severity
High
Incident
9724
Category
Suspicious Activity
Detection source
Threat experts
Generated on
Jan 17, 2019, 11:18:06 PM
First activity
Jan 17, 2019, 1:55:26 PM
Last activity
Jan 17, 2019, 1:55:26 PM
Assigned to
analyst@contoso.com
Alert description
Executive Summary
An advanced attack initiated from a successful phishing email launched by a user has been observed on two machines within your organization. From our preliminary investigation, two users opened emails with a malicious PDF file that caused the default browser to navigate to a malicious domain that then created a decoy PDF and a malicious DLL, which then communicated to a command and control server.
Go to alert page to see full description

ATTACKS SPAN EMAIL, IDENTITY, ENDPOINT and CLOUD

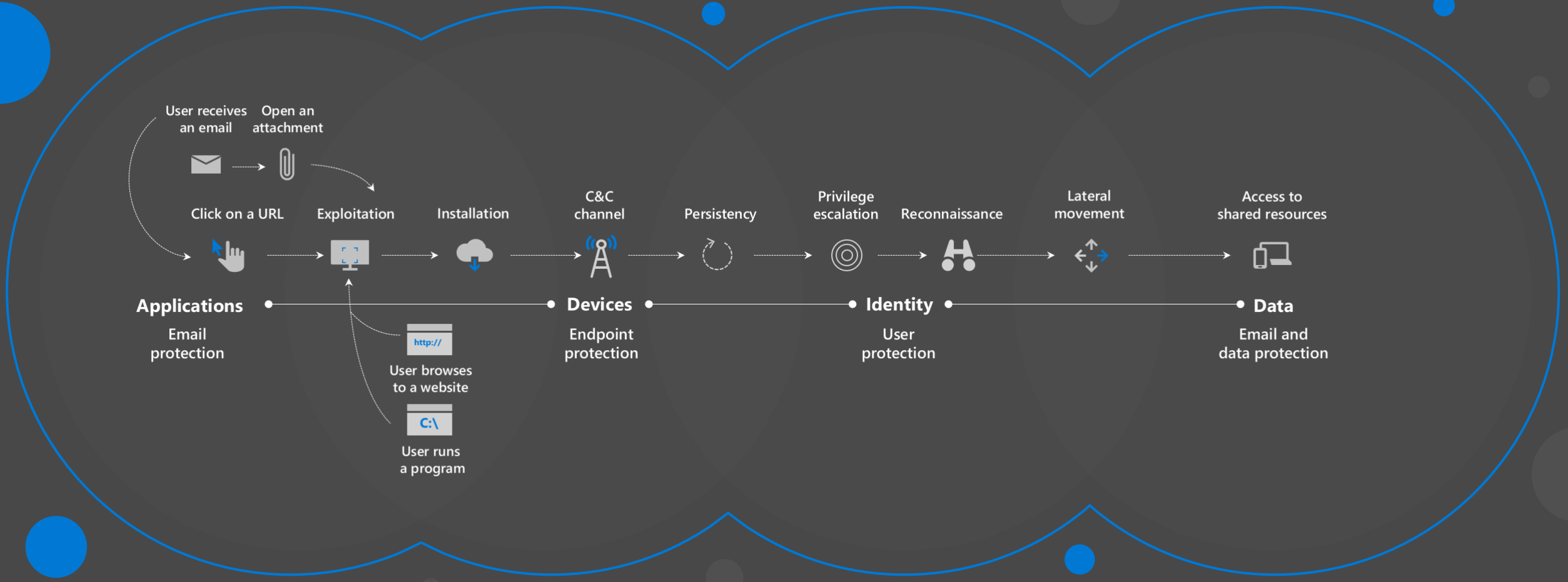


Figure 1 – Protecting the perimeter - An attack traverses the perimeters defended by M365 threat protection - Applications protected by Office 365 ATP and MCAS, Devices protected by Microsoft Defender ATP, Identities protected by Azure ATP and hybrid data centers protected by Azure Security Center

MITRE ATT&CK Simulations w/ MTE

Phase 1 attack steps	Coverage MDATP	Coverage w/ MTE
Initial Access: Red Team emulates a user phish on foothold machine where a user clicks on a self-extracting file which in turn extracts a batch file. This batch file opens a C2 channel to the attacker machine and establishes persistence using the "Startup" folder.	Alerts & Telemetry	Alerts & Telemetry
Initial Discovery: Red Team performs discovery on the local machine	Alerts & Telemetry	Alerts & Telemetry
Privilege Escalation: Red Team uses token duplication to escalate privilege on foothold machines	Alerts & Telemetry	Alerts & Telemetry
Discovery of Lateral Movement: Red Team performs further local and network discovery from foothold machine	Telemetry	MTE Included
Credential Access: Red Team performs credential dumping and steals token	Alerts & Telemetry	Alerts & Telemetry
Lateral Movement: Red Team uses stolen credentials to RDP to a server on the network	Telemetry	MTE Included
Persistence: Persistence is established on the server by adding a new admin user "Jesse"" and by scheduling a malicious executable in Scheduled Tasks	Alerts & Telemetry	Alerts & Telemetry
Collection: Red Team performs file discovery on a server and logs keystrokes and captures screen for logged on user "Debbie"	Alerts & Telemetry	Alerts & Telemetry
Exfiltration: Red Team exfiltrates a Microsoft Office Visio file from the server via the foothold machine	None	MTE Included
Execution of Persistence: Red Team activates persistence (from step 7) by logging out and back in using the new admin account "Jesse"	Telemetry	MTE Included

Phase 2 attack steps	Coverage MDATP	Coverage w/ MTE
Initial Access: This stage is a continuation from Phase 1. Red Team uses credentials for user "Bob" to RDP into "CodeRed" and launch a PowerShell Empire payload "launcher.vbs"	Alerts & Telemetry	Alerts & Telemetry
Initial Discovery: Red Teams performs discovery on the local machine and on the network (Active Directory)	Alerts & Telemetry	Alerts & Telemetry
Privilege Escalation: Red Team escalates privilege using token manipulation	Alerts & Telemetry	Alerts & Telemetry
Discovery of Lateral Movement: Red Team performs LDAP queries to identify possible server targets	Telemetry	MTE Included
Credential Access: Red Team steals credentials using the keylog module and extracts passwords from a file stored remotely on "Conficker"	Alerts & Telemetry	Alerts & Telemetry
Lateral Movement: Red Team attempts to brute force admin shares on several machines and then performs a network log on to $Admin share to "Conficker" using account "KMitnick". Red Team also compromises "Creeper" and runs a vbs payload on it and establishes persistence on "Creeper" using a Windows Service	Alerts & Telemetry	Alerts & Telemetry
Persistence: Red Team establishes persistence on "Creeper" by modifying file permission and by manipulating accessibility feature (magnify.exe)	Alerts & Telemetry	Alerts & Telemetry
Collection: Red Team performs file discovery on "Conficker" and copies a .vsdx from there to "CodeRed"	Telemetry	MTE Included
Exfiltration: Red Team performs exfiltration on "CodeRed" over FTP	Telemetry	MTE Included
Execution of Persistence: Red Team activates persistence by logging through RDP to "Creeper" and activating the "Magnifier" accessibility tool to run as LOCAL SYSTEM	Alerts & Telemetry	Alerts & Telemetry

Experts on demand

Experts on Demand - Overview

What it is:

On-demand support for Microsoft Defender alerts, suspicious activity, and threat intelligence

What it's not:

Product support –> Premier Support (CSS)
Testing guidance –> Account Representative
Incident response –> Microsoft Detection and Response

Targeted Attack Behaviors and Data Exfiltration Observed

This alert is part of incident (9724) Threat Experts

Automated investigation is not applicable to alert type

Actions

Severity: High
Category: Suspicious Activity
Detection source: Threat experts

Alert context

omkantor-7050
contoso\omkantor

First activity: 01.17.2019 | 13:55:26
Last activity: 01.17.2019 | 13:55:26

Resolved
Classification: Not set

Assigned to: analyst@contoso.com

Description

Executive Summary

An advanced attack initiated from a successful phishing email launched by a user has been observed on two machines within your organization. From our preliminary investigation, two users opened emails with a malicious PDF file that caused the default browser to navigate to a malicious domain that then created a decoy PDF and a malicious DLL, which then communicated to a command and control server.

We recommend further investigation and actions be taken immediately in response to this threat.

Timeline of Observed Events

A breakdown of key events from the attack on the compromised machines is as follows:

1. (11/14/2018 9:59 AM UTC) User opened email in Outlook that contained the malicious PDF, which then causes the default browser to connect to a malicious domain and makes the browser create a .LNK and .ZIP file.
2. (11/14/2018 9:59 AM UTC) PowerShell opens the LNK and then creates the malicious payload utilizing Cobalt Strike, cyzfc.dat. PowerShell also creates a decoy PDF with the same name as the one opened in the email and launches it in AcroRd32.exe to make the user believe that the PDF was opened as expected.
3. (11/14/2018 9:59 AM UTC) PowerShell launches rundll32.exe which loads the cyzfc.dat payload, which connected to a malicious command and control server on port 443.

Recommended actions

Queries

This query will surface the compromised user for easier investigation on the entry point machine

```
ProcessCreationEvents | where EventTime between (datetime(11/14/2018 09:59:05)..datetime(11/14/2018 09:59:06)) and MachineId == "0b8b67d65e2912ac569894180dc82d3805880bd7"
| project AccountSid
```

Alert process tree

wininit.exe
services.exe

Threat Intelligence Updates

- Sentinel: New Threat Intelligence Analytic Rule
- Sentinel: New Microsoft Threat Intelligence Connector
- M365 Defender: Network Protection Added Coverage (MacOS, Android etc.)

Takeaways

- Use proactive Threat Hunting for incident management and further assurance
- Create organization specific hypothesis for threat hunting.
- Enroll into Advance security capabilities in Microsoft 365 services.
- Enable features like Network Protection, Cloud Protection, Block at First Sight
- Use Playbooks in Sentinel to automate Threat Hunting into M365 products such as Defender for Endpoint.

“Defenders think in lists. Attackers think in graphs. As long as this is true, attackers win”

~ John Lambert (Microsoft)

Microsoft

Thank You!