Microsoft

Microsoft CISO Workshop
4a - Threat Protection Strategy (IDENTIFY-PROTECT)

Microsoft Cybersecurity Solutions Group

Session Outline

1. LIFE WITH THE CLOUD (AS SECURITY)

What is security like when fully on the Cloud?

What's gone?

What's new or changed?

2. THE JOURNEY

How do I rapidly protect my cloud assets effectively?

How do I use the cloud to increase my security?

(A) Threat protection – Identify and Protect

EVOLUTION AND CHANGES

LEARNINGS

SECURITY EVOLUTION

COMPLIANCE EVOLUTION

LINGERING 'DEBT' OF SECURITY HYGIENE

CLICK TO **ZOOM** INTO A SECTION

STRATEGIES & SUCCESS CRITERIA

CIS BENCHMARKS (AZURE, M365)

PENETRATION TESTING

SECURITY RECOMMENDATIONS AND ROADMAPS

APP/DEV SECURITY (PAAS)

3RD PARTY SAAS RISK & COMPLIANCE

OFFICE 365

INFRASTRUCTURE SECURITY (IAAS)

CRITICAL HYGIENE

WINDOWS 10 SECURITY

SECURING PRIVILEGED ACCESS

TRACKING PROGRESS

Prevent as many threats as possible

Prevention raises attacker costs without 24x7 monitoring

…but it can't block all attacks

Prevention

Detection and Response

Key Learnings

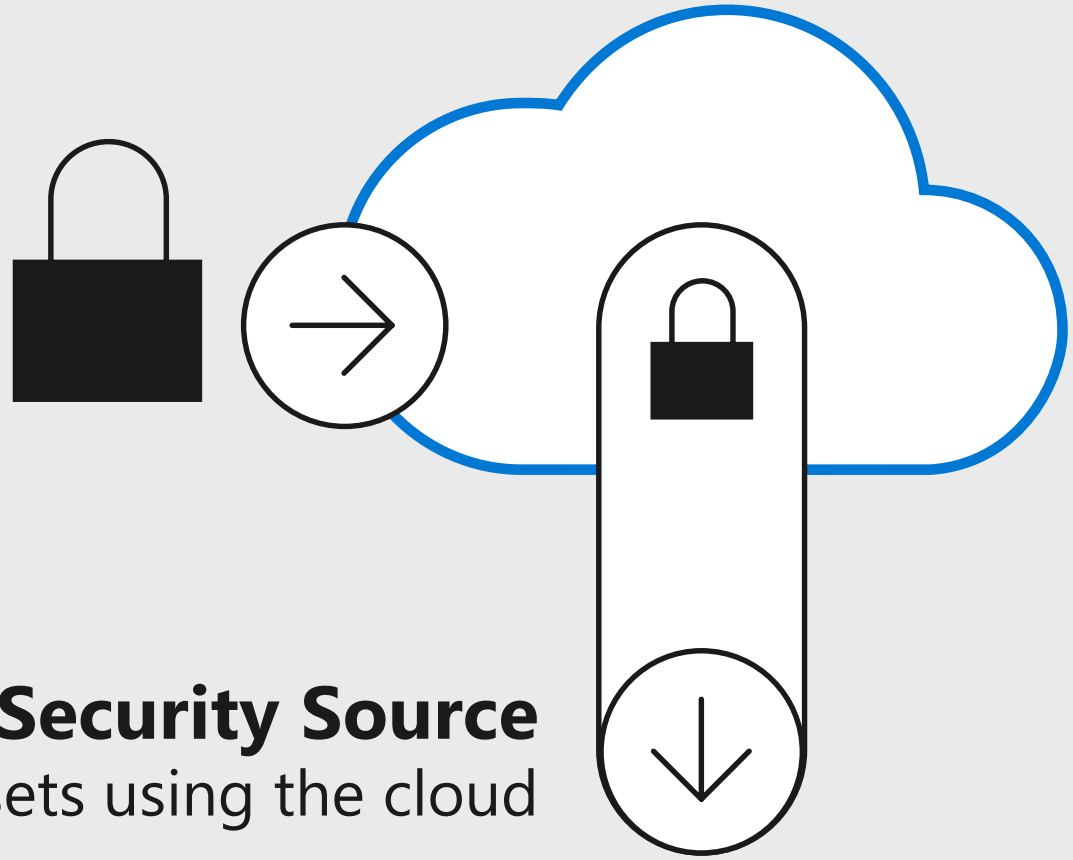
1. Invest in preventive controls for **each attack phase**
2. Enable **hardware-based assurances** when available
3. Adopt **containment** strategies extensively (network, host, identity, etc.)
4. Integrate **Intelligence** and **Machine Learning**

Security Hygiene is Critical

Vulnerable software and configurations can undermine advanced security capabilities

Integrate Cloud into a security strategy

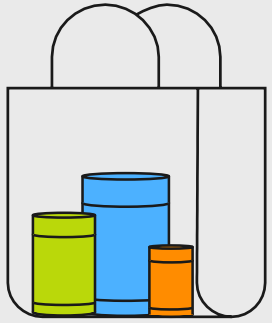
Secure Platform
Protects assets in the cloud



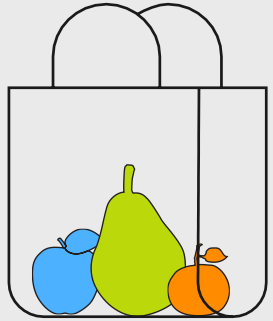
Security Source
Protect assets using the cloud

Keep everything fresh

As the pace of business, IT, and security changes



From
Major changes planned for *months or years*



To
Frequent adjustments in *weeks, days, or hours*

Digital transformation requires agility from IT and Security

- Rapidly changing business needs
- Rapidly transforming technology (devices, IoT, threat intel, etc.)
- Rapidly changing threats

Microsoft is investing to help security keep up

Journey ***starts*** with cloud (and integrated intelligence/guidance)

Continues with simplifying security tasks:

- MAINTAIN IP ADDRESSES (in filtering rules, etc.)
  - **Application Security Groups** abstraction
- RAPIDLY SPIN UP/DOWN RESOURCES (Virtual Machines, networks, etc.)
  - **Azure Security Center** – Identify and Correct Security Hygiene Issues
  - **Azure Policy** – Audit and enforce configuration policy
- UPDATE OPERATING SYSTEM VERSIONS
  - **Windows as a Service** (WaaS) for Windows 10 and Server 2016
- DEPLOY AND SECURE OPERATING SYSTEMS (patch, configuration, etc.)
  - Refactor applications to **Platform as a Service (PaaS)** technology

Cloud Security Changes

MAIN MENU

WHAT'S NEW

SHARED RESPONSIBILITY

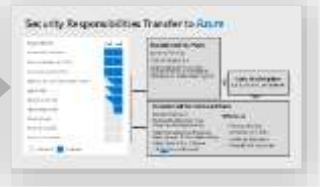
EVOLUTION OF VISIBILITY AND CONTROL

...AND USER CHOICE

OFFICE 365 RESPONSIBILITIES

THREATS TO OFFICE 365

"NO FIREWALL" IN OFFICE 365

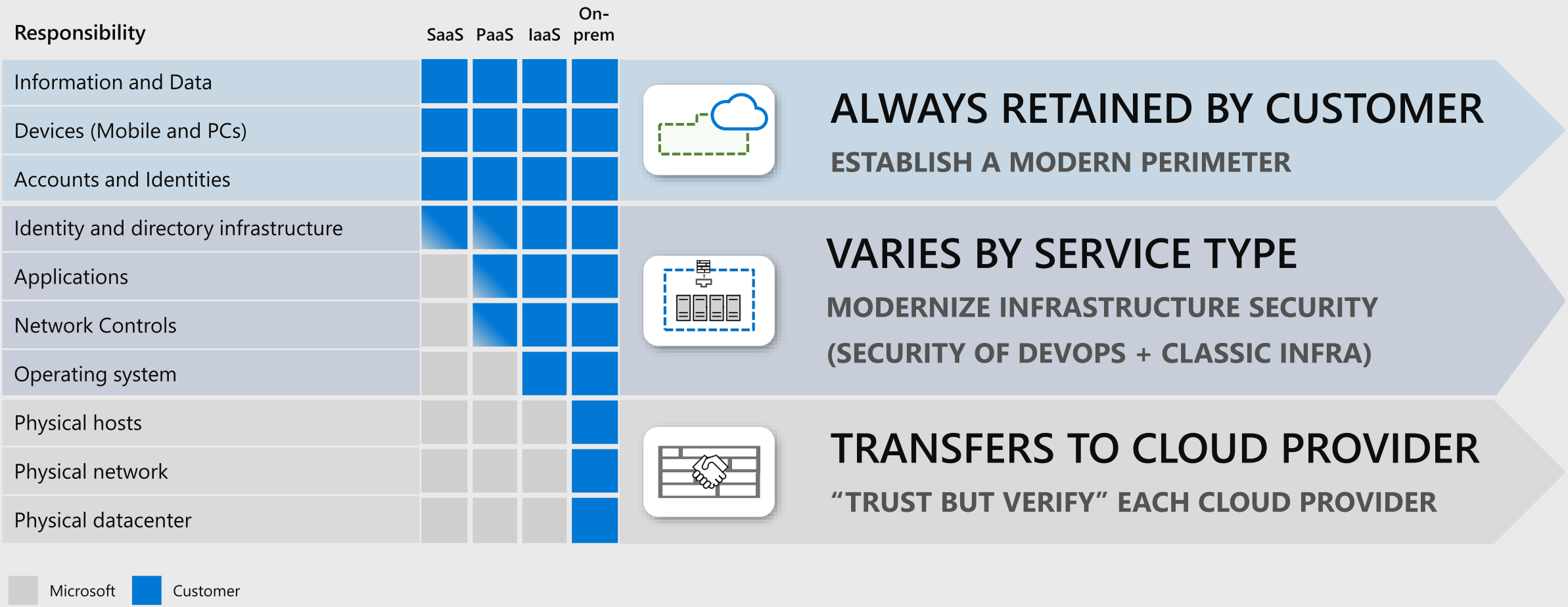


INFRASTRUCTURE RESPONSIBILITIES

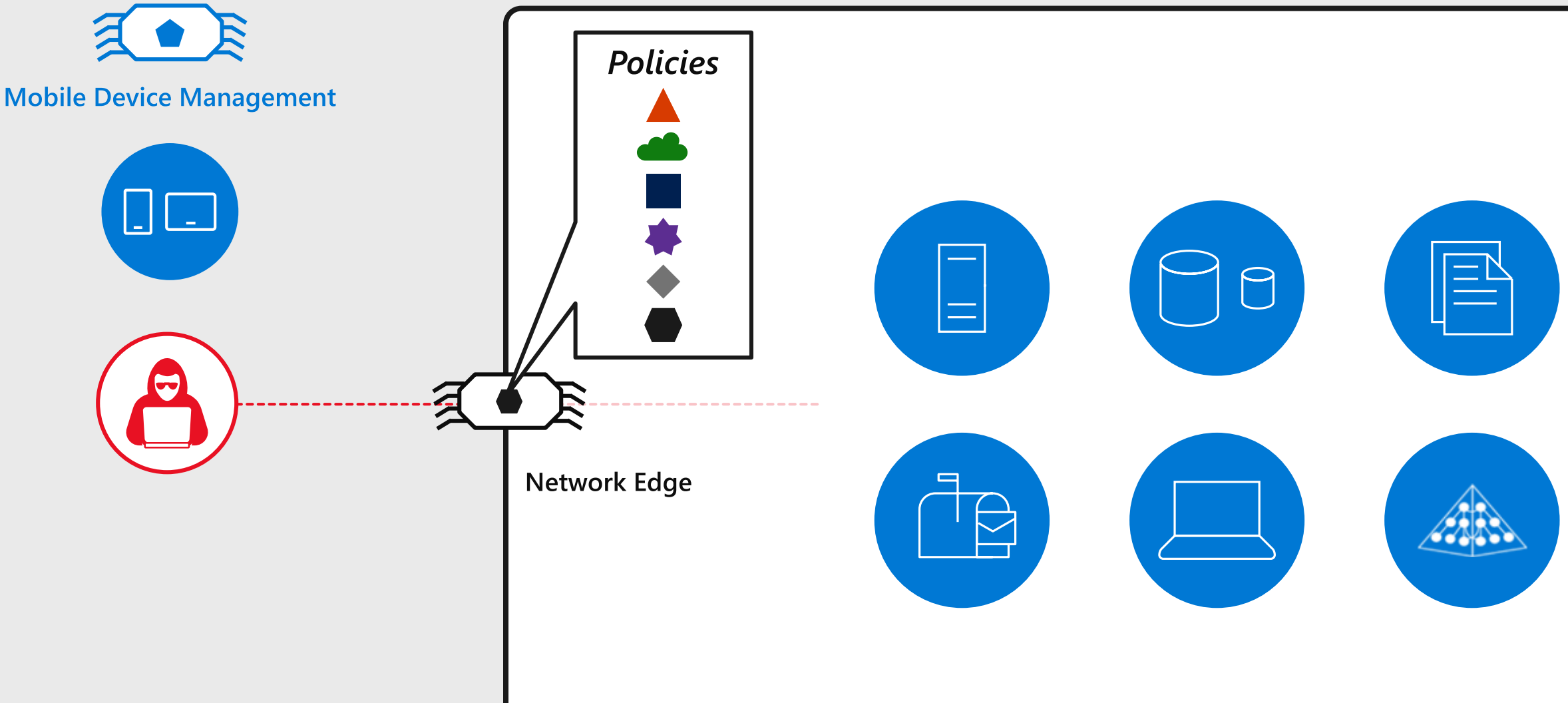
INFRASTRUCTURE THREATS

NETWORK SECURITY

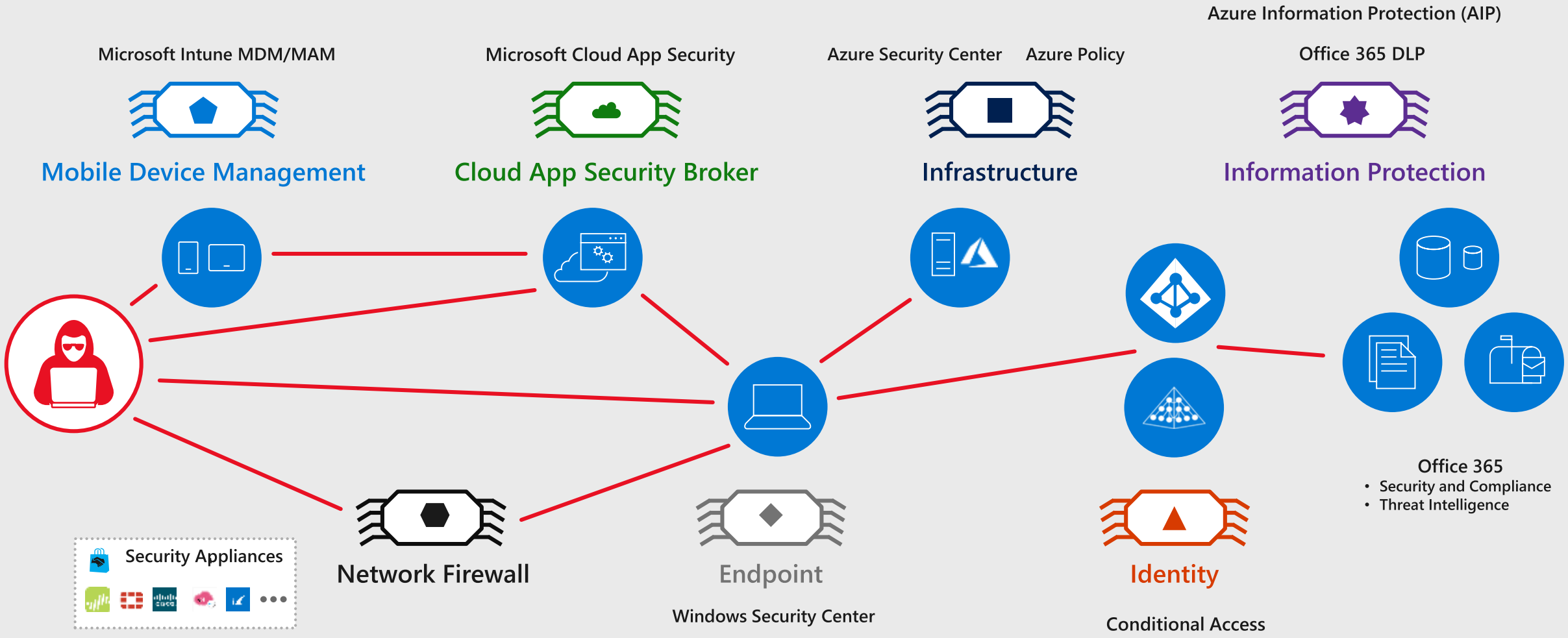
Building a resilient cybersecurity program



Evolution of Visibility and Policy Enforcement



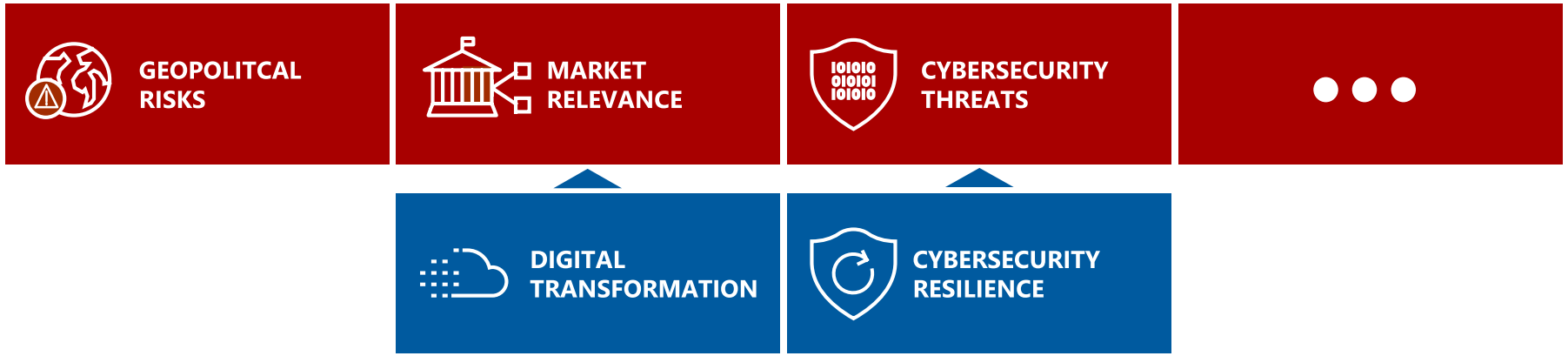
Evolution of Visibility and Policy Enforcement



Must shift to policy and controls tailored for each asset type

Security and IT changing

SECURITY RISK – ELEVATED TO BUSINESS RISK (ONE OF MANY)



IT – GOVERNANCE OUTPACED BY CLOUD RELEASE CYCLES

Users bypassing governance to get job done, forcing focus on security and productivity

Outcomes

Integration with business to put security risk in context

Shadow IT and BYOD programs (discovery, evaluation, integration/transition)

Identity management and security across clouds and devices

Cloud Changes Security

DIFFERENT SECURITY MODEL

SECURITY BENEFITS

- *Secure/consistent platform*
- *Better visibility, control, and threat detection*
- *Less direct responsibility*
- *Automated routine hygiene functions*
- *Easier compliance management/reporting*

REQUIRES

- *Learn New Platform and Controls*
- *Learn shared responsibility model*
- *Increase Identity & Access hygiene*

BIG CHANGES

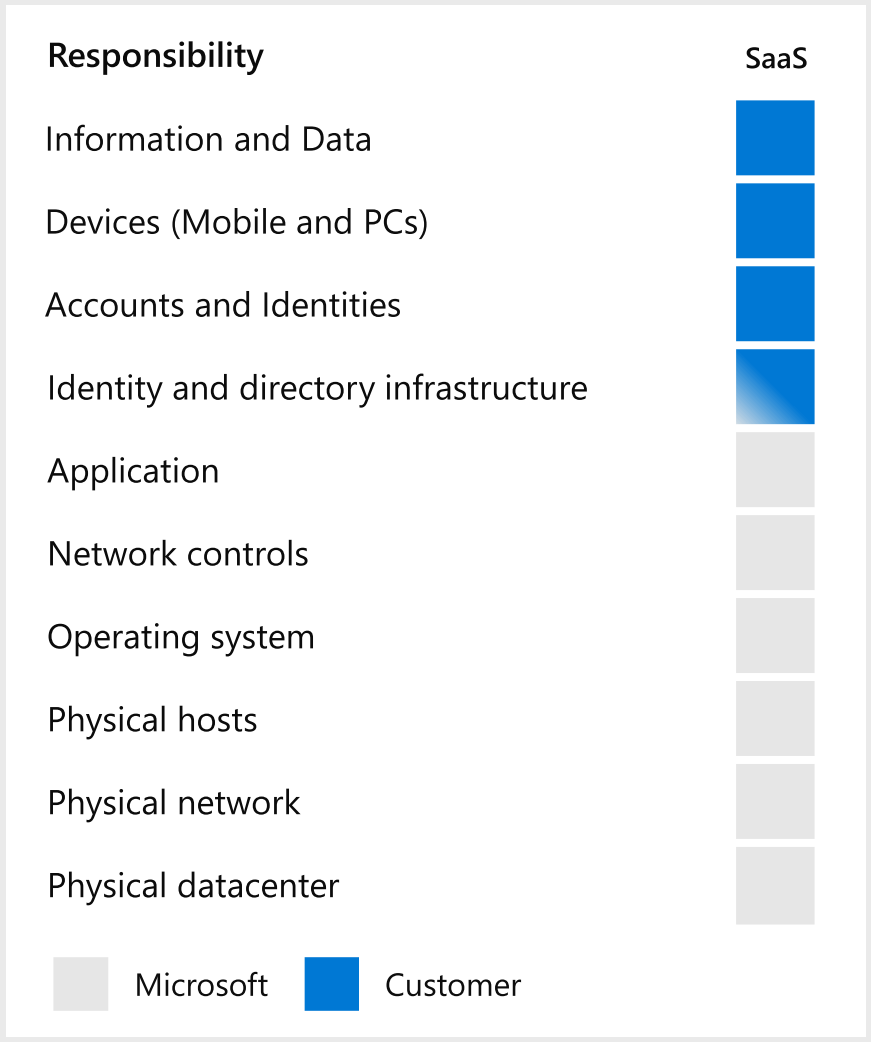
IDENTITY & ACCESS IS THE FRONT LINE

- Primary security perimeter for all workloads
- Firewalls/network still required for legacy workloads

NO PERMANENT PRIVILEGES

- Just in Time access for all resources
- Used to secure cloud platform and your tenant

Security Responsibilities Transfer to Office 365



Security Patches (Server)

Feature Upgrades*

Service Uptime
→ SLA from Microsoft

Server Maintenance and Troubleshooting

Backup and Archive

Attacks on

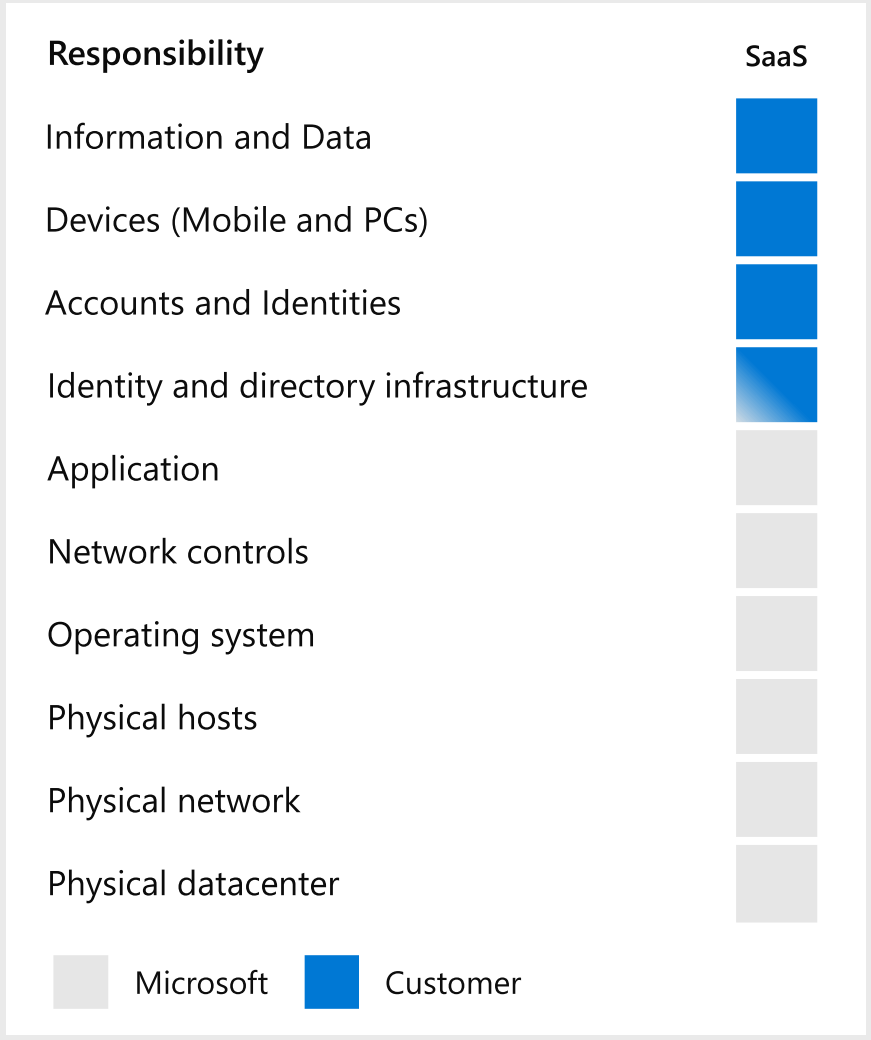
- Operating System (OS) and Admins
- Application attacks
- Hardware/Firmware

Denial of Service

Physical Attacks

**You still need to manage feature configuration*

Office 365 Threats are different



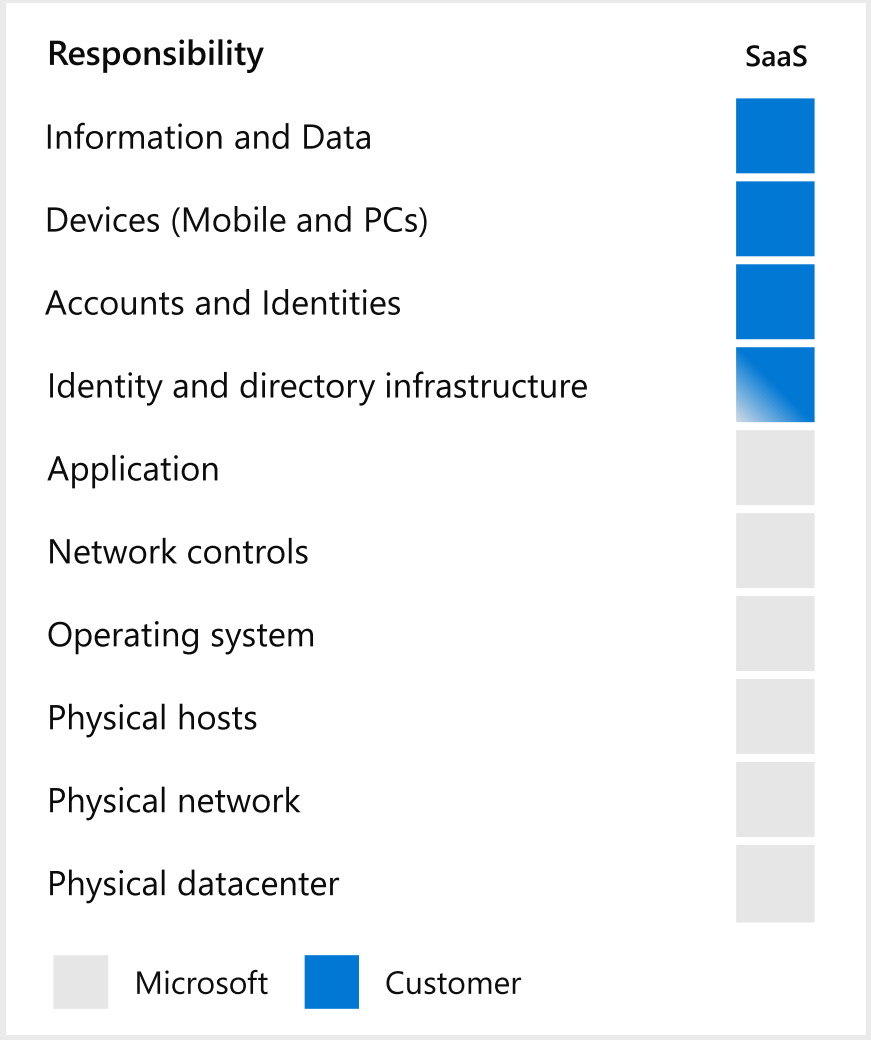
Notable trends:

1. **Identity Attacks**
   - Password spray
   - Brute force
   - Password re-use

2. **App/Data Layer Attacks**
   - Social engineering
   - Delegation and forwarding rule attacks
   - PowerShell scripts in attacks
3. **Pivot from On-Premises**

For more information, see https://aka.ms/O365attacks

Key Change



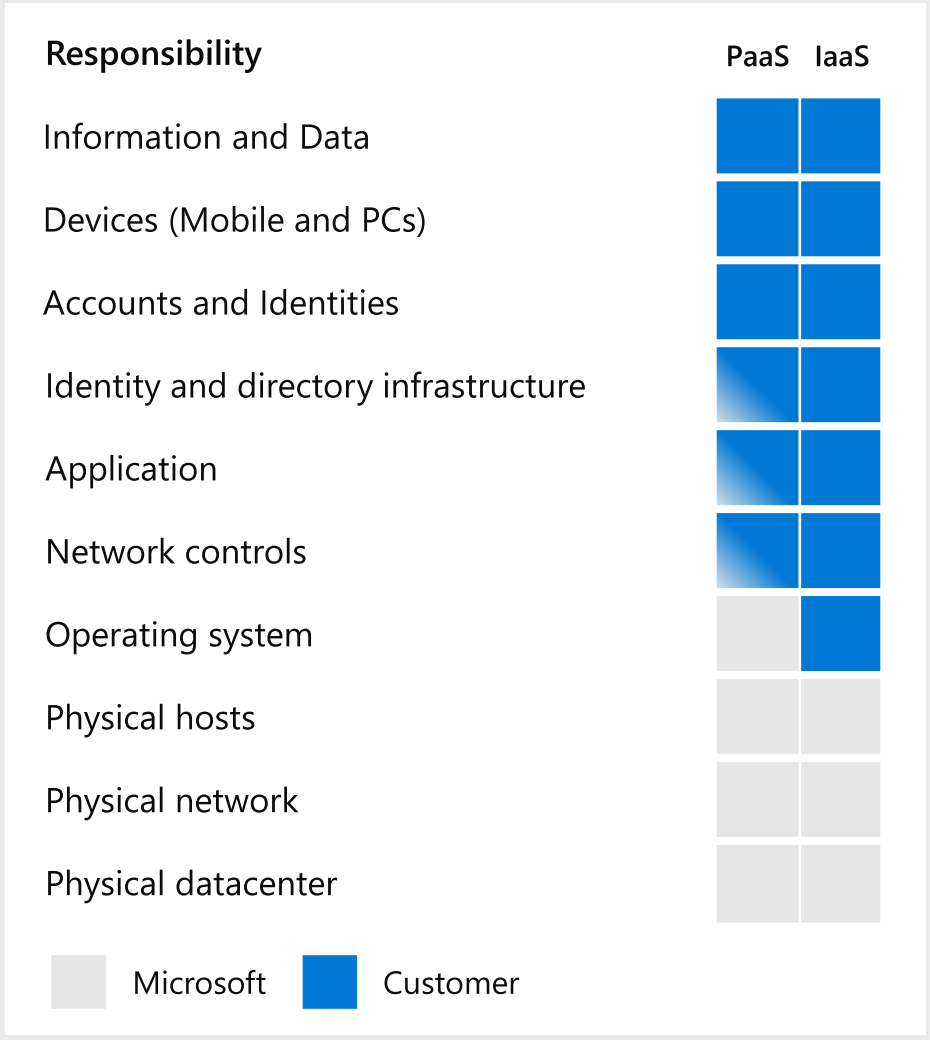
"No Firewall"

Service connected directly to Internet
(users and **admin interfaces**)

Implications

1. **Authentication Security is Extremely Critical**
   - Multi-factor authentication
   - Anomaly detection using
     - User and Entity **Behavior** Analytics (UEBA)
     - **Context** awareness (time, date, geolocation)
   - Integrated security **intelligence**
2. **Tenant Security Configuration is Critical**

Security Responsibilities Transfer to Azure



Transferred for PaaS

Security Patches

Feature Upgrades

VMs/Containers security –
OS and Middleware Installation, Maintenance, troubleshooting, etc.

Azure Marketplace
fits PaaS or IaaS model

Transferred for IaaS and PaaS

Denial of Service*

Racking/Stacking Servers, Delays in Adding Capacity

Fabric/Virtualization Patching, Maintenance & Troubleshooting

Fabric Availability / Uptime
→ SLA from Microsoft

Attacks on

- Physical Attacks
- Virtualization Fabric
- Hardware/Firmware
- Network Infrastructure

Azure Threats – Mix of Old & New…

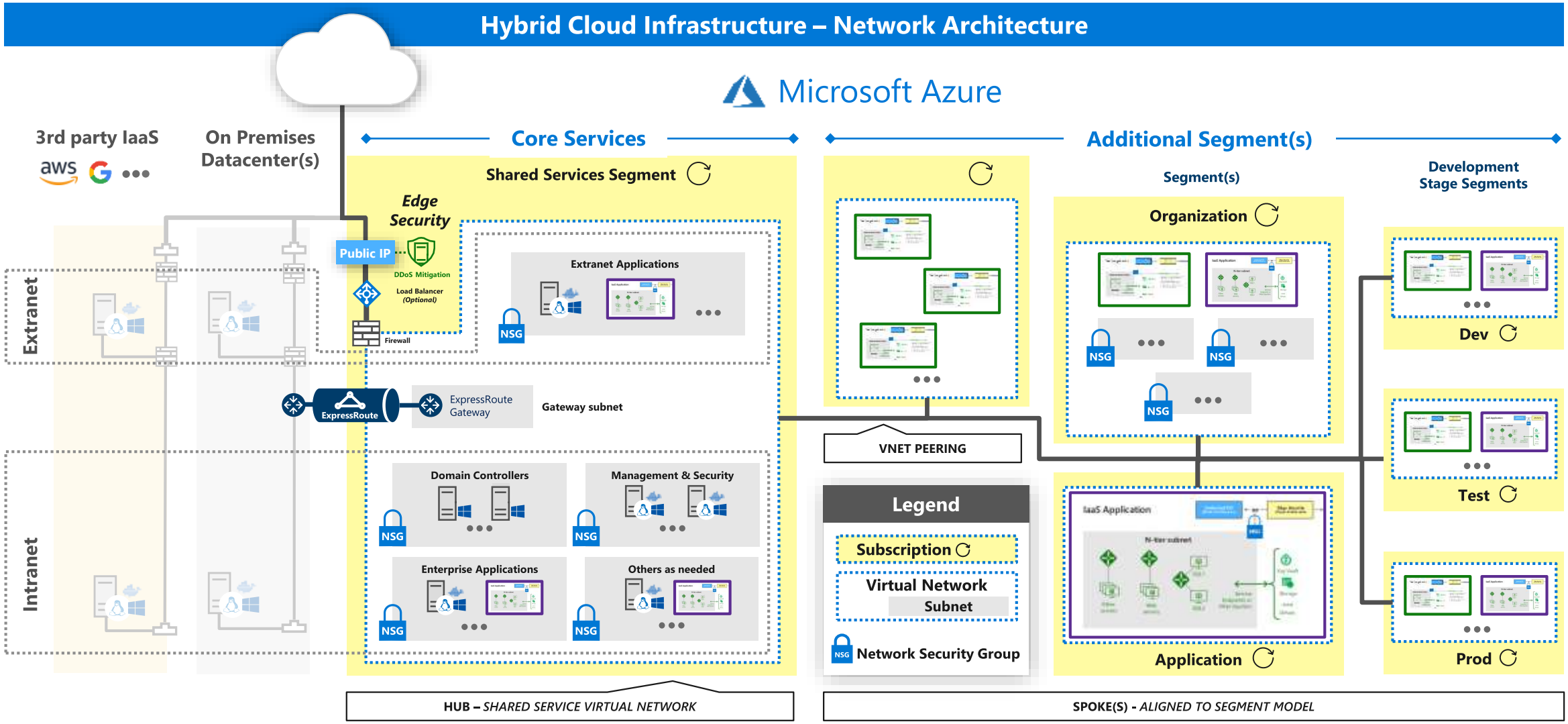
EXISTING TECHNIQUES (AT COMPARABLE LEVELS)

EXPLOIT/ENTER	TRAVERSAL	MONETIZATION
SOCIAL ENGINEERING	CREDENTIAL THEFT & ABUSE (HASHES, SSH…)	RANSOMWARE
PHISHING	SCAN & EXPLOIT	TARGETED DATA THEFT
GEO-FILTERING EVASION WITH PROXY		COMMODITY BOTNET/DDOS/ETC
● ● ●	● ● ●	● ● ●

New Techniques (☆) or Very High Usage (⌂)

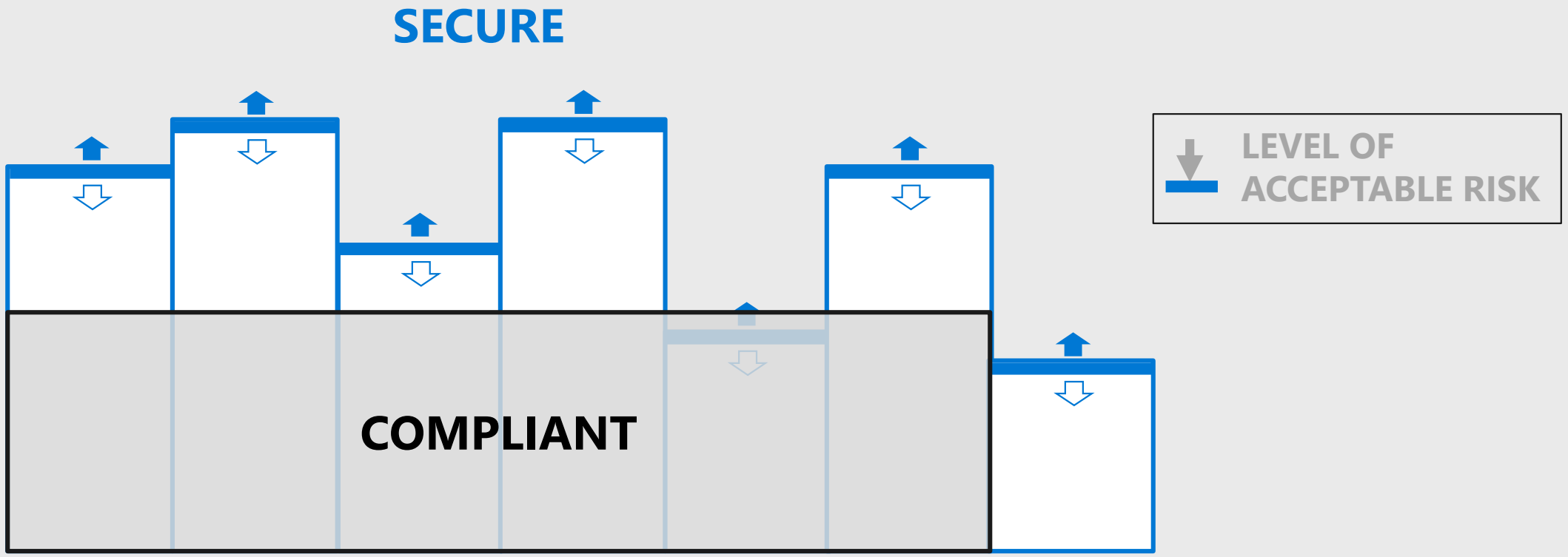
☆ ACQUIRE TENANT KEYS FROM GITHUB/ETC	☆ PIVOT TO ON PREMISES FROM CLOUD	⌂ CRYPTOMINERS – (WEBSERVERS, VISITORS)
⌂ RDP/SSH PASSWORD SPRAY & BRUTE FORCE		

Reference Enterprise Design - Azure Network Security

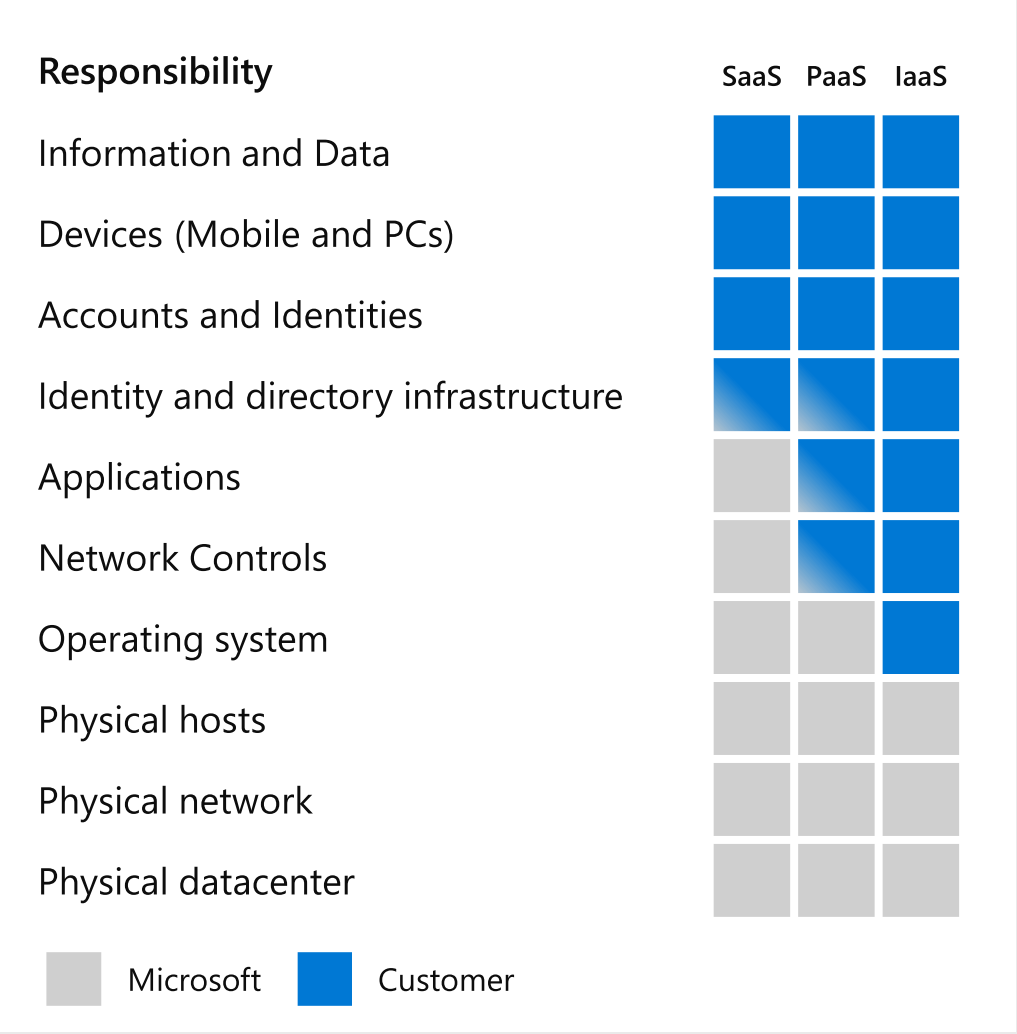


COMPLIANT ≠ SECURE

COMPLIANT = Meets minimum requirement (e.g. not negligent) at point in time
SECURE = Raises attacker cost to acceptable level for expected attacks



Security compliance is better in the cloud



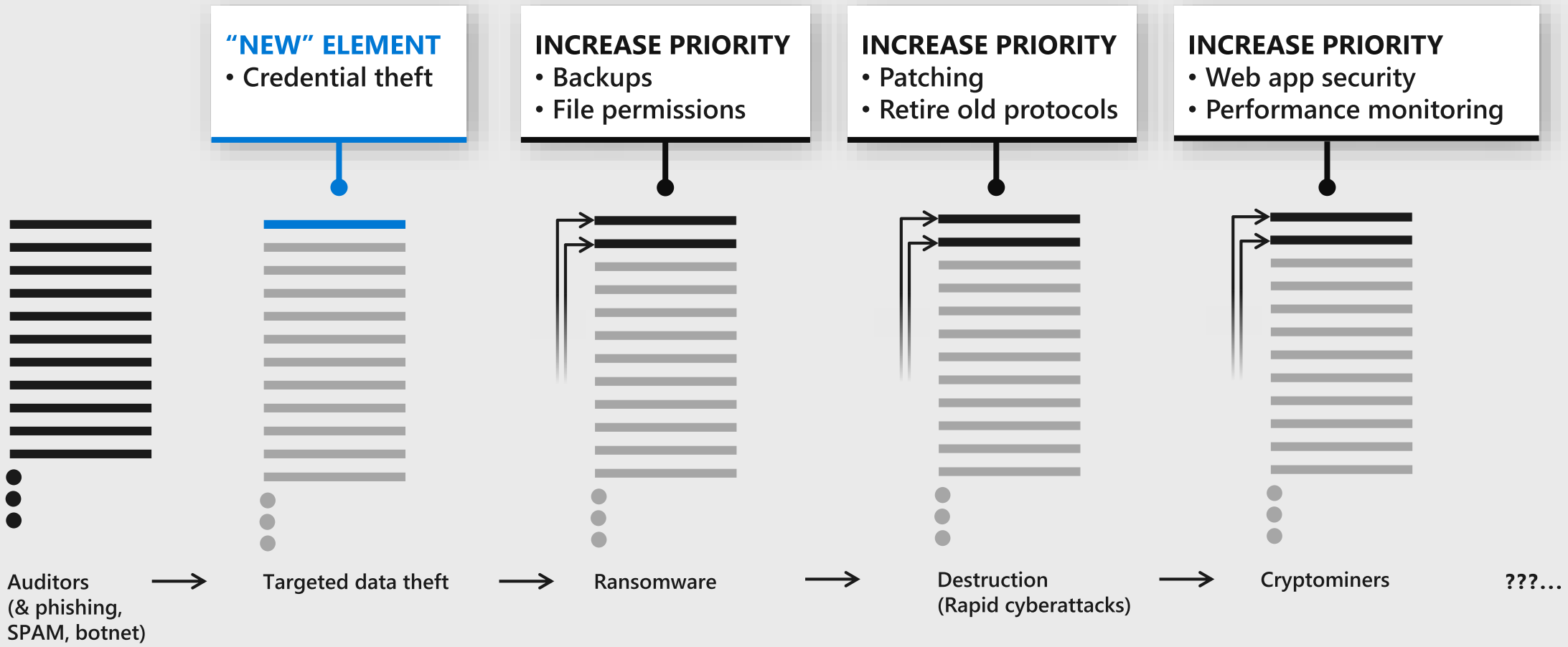
Automated tooling for continuous monitoring and reporting
(e.g. Microsoft Compliance Manager)

Less responsibility
(varies by workload)

Utilize Tooling and documentation from cloud provider
(e.g Microsoft Trust Center)

Critical Hygiene = Technical Debt to Pay Off

Cloud can speed this up, but some hard work must be done

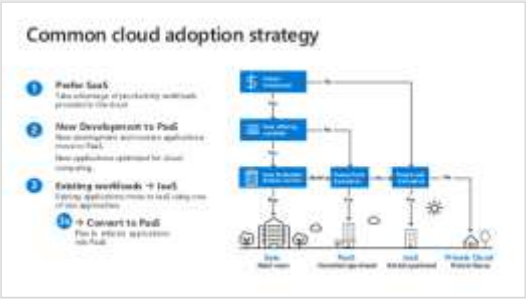


New monetization models just reshuffle priorities of same old hygiene debt

Recommended Approach

MAIN MENU

STRATEGIES



CLOUD ADOPTION STRATEGIES

SUCCESS CRITERIA

COVERAGE AND BALANCE ACROSS KILL CHAIN + ASSETS

RESOURCES

MICROSOFT LEARNINGS & TOOLING

RECOMMENDATION ROADMAPS

Common cloud adoption strategy

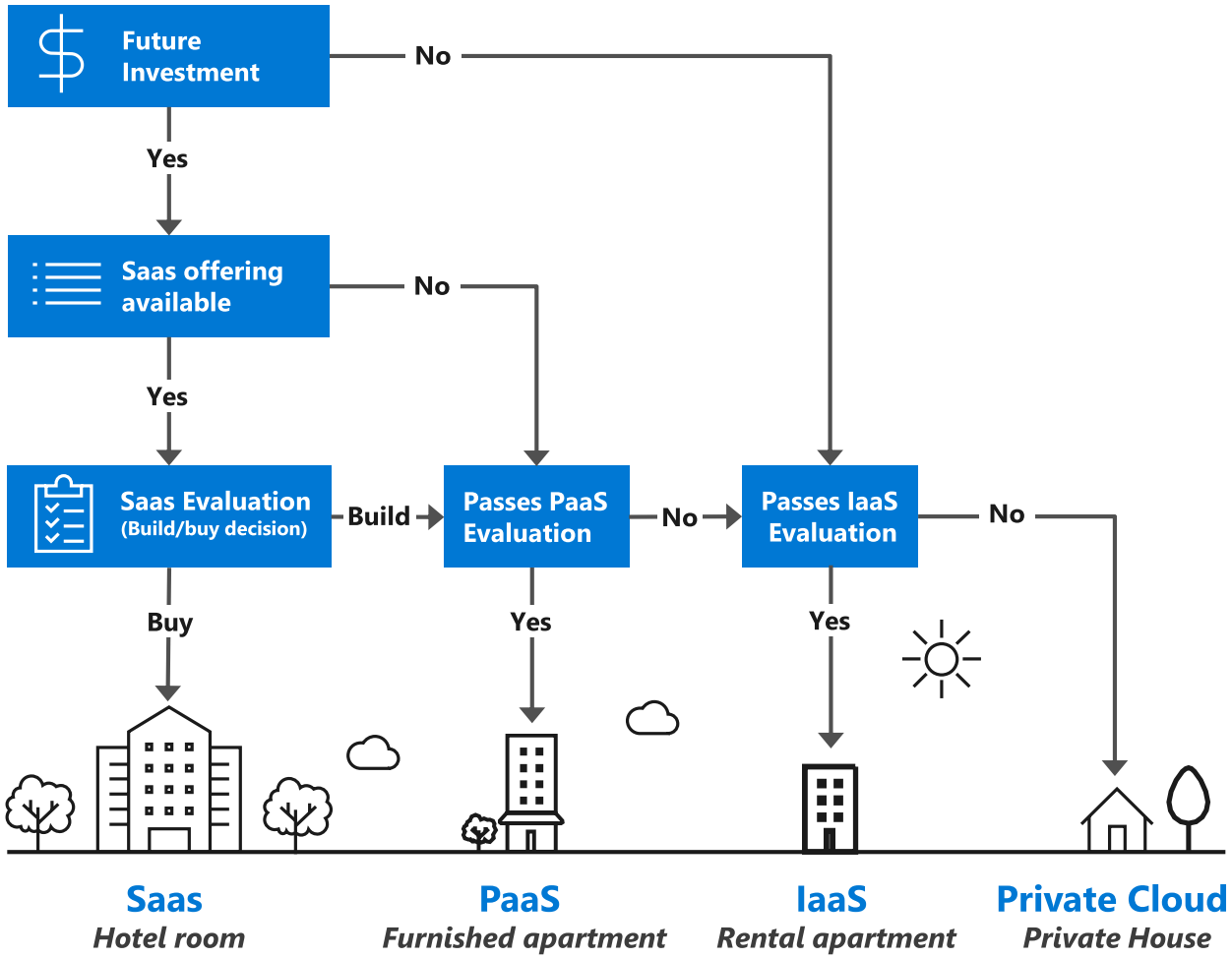
1 **Prefer SaaS**
Take advantage of productivity workloads provided in the cloud

2 **New Development to PaaS**
New development and modern applications move to PaaS.

New applications optimized for cloud computing.

3 **Existing workloads → IaaS**
Existing applications move to IaaS using one of two approaches:

3a **→ Convert to PaaS**
Plan to refactor applications into PaaS



Balanced/Complete coverage

Assess and prioritize using multiple perspectives

Across Kill Chains

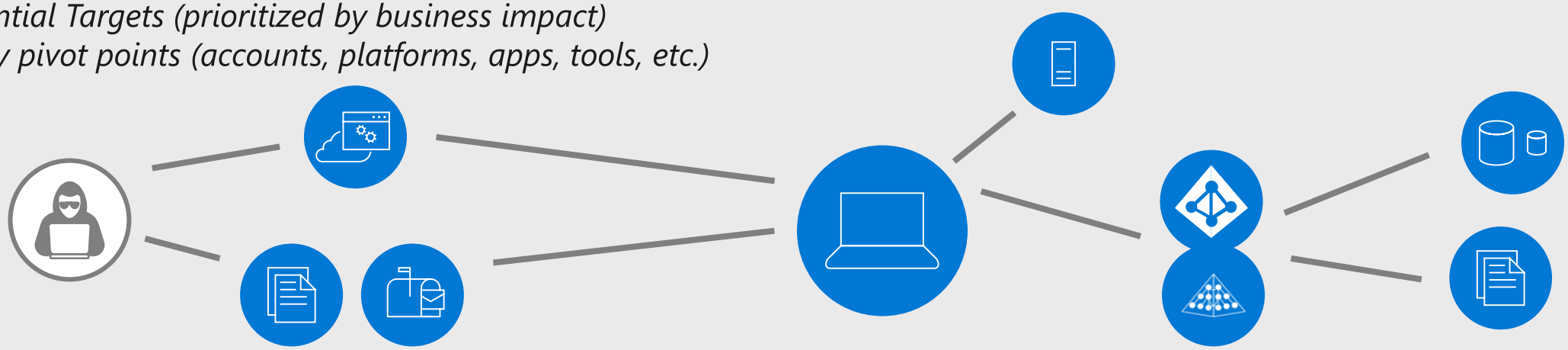
of Common Attack Profiles: **COMMODITY | TARGETED | RANSOMWARE | RAPID DESTRUCTION | COIN MINERS | MALWARE-LESS**

RECONNAISSANCE **DELIVERY** **EXPLOITATION** **ACTIONS ON OBJECTIVE**

ENTRY & LATERAL TRAVERSAL

Across Resources

- *Potential Targets (prioritized by business impact)*
- *Likely pivot points (accounts, platforms, apps, tools, etc.)*

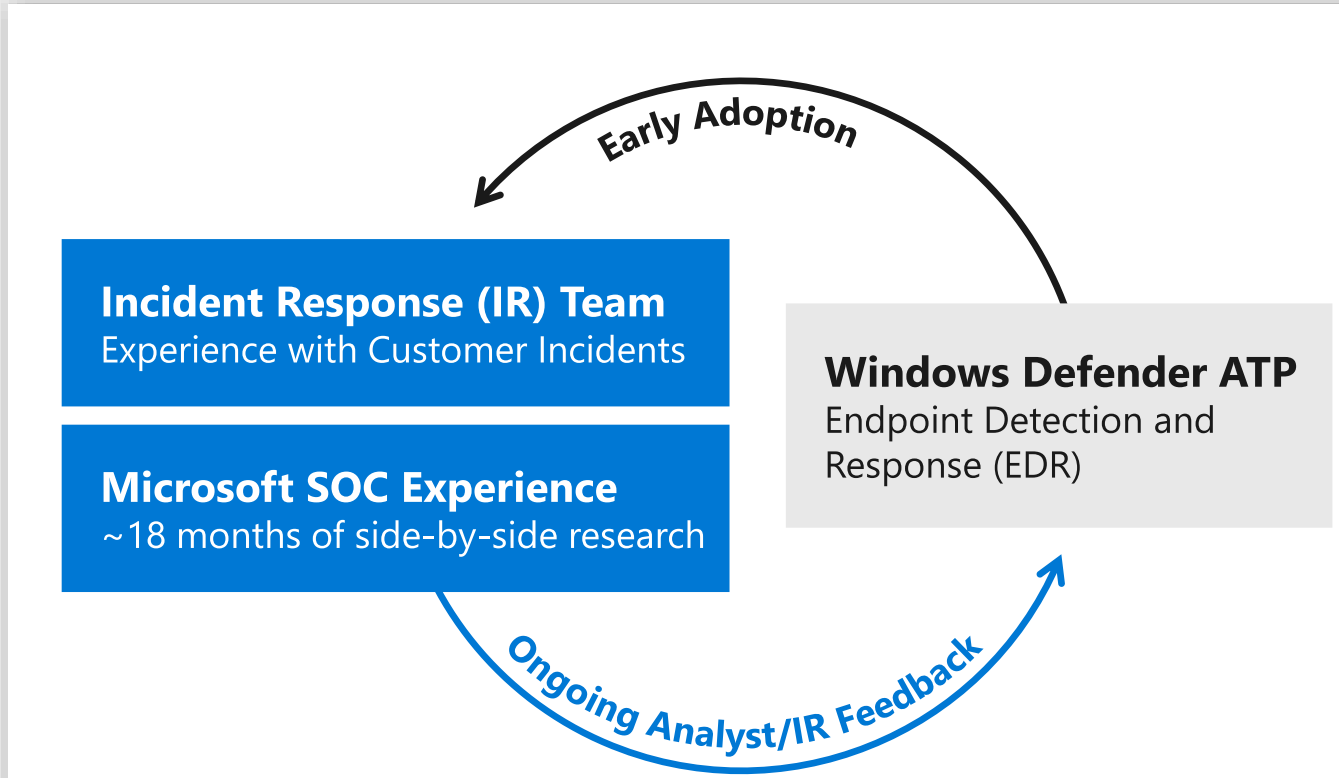


Inside-Out - Applying Microsoft Learnings (Examples)

Platform as a Service (PaaS)
Process + Automation for Security and Compliance

Secure DevOps Toolkit
https://github.com/azsk/DevOpsKit
https://github.com/azsk/DevOpsKit-docs

Azure Security Center
Compliance Detection
(on Roadmap)



Roadmap Methodology

MAIN MENU

30 DAYS

MEANINGFUL POSITIVE IMPACT
with zero or minimal:

- Risk of operational downtime
- Learning of new skillsets
- Tooling changes / deployment

90 DAYS

SIGNIFICANT POSITIVE IMPACT
with limited investment into

- Operational impact testing
- Learning a new skillset (e.g. threat modeling)
- Detailed tasks such as reviewing code
- Deployment/configuration of tooling

BEYOND

SUSTAIN & IMPROVE POSTURE

Long term investments that provide ongoing meaningful risk mitigation

RECOMMENDATION ROADMAPS FOR PRIORITY AREAS

(IN THIS MODULE)

OFFICE 365
SECURITY PRIORITIES

HYBRID INFRASTRUCTURE
INFRA AS A SERVICE (IAAS) + ON-PREMISES

APPLICATION DEVELOPMENT
FOR PLATFORM AS A SERVICE (PAAS)

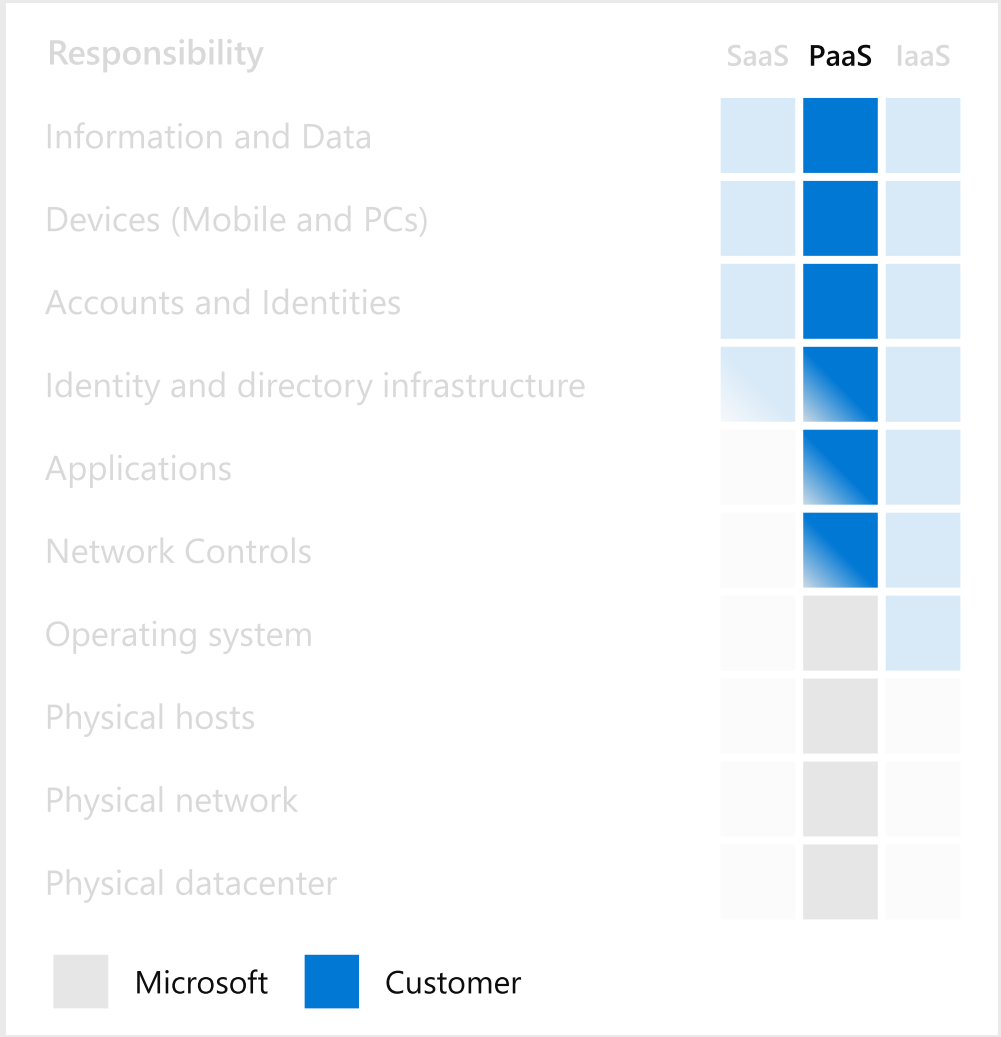
3RD PARTY SAAS
RISK & COMPLIANCE

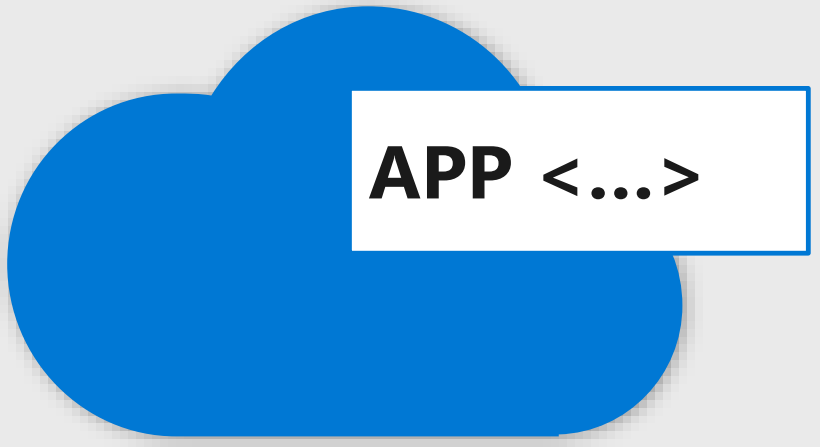
CRITICAL HYGIENE
RANSOMWARE + WANNACRYPT/PETYA

PRIVILEGED ACCESS
LATERAL TRAVERSAL / PTH / ETC.

DEVICE SECURITY
WINDOWS 10 + MOBILE

Scope and Assumptions

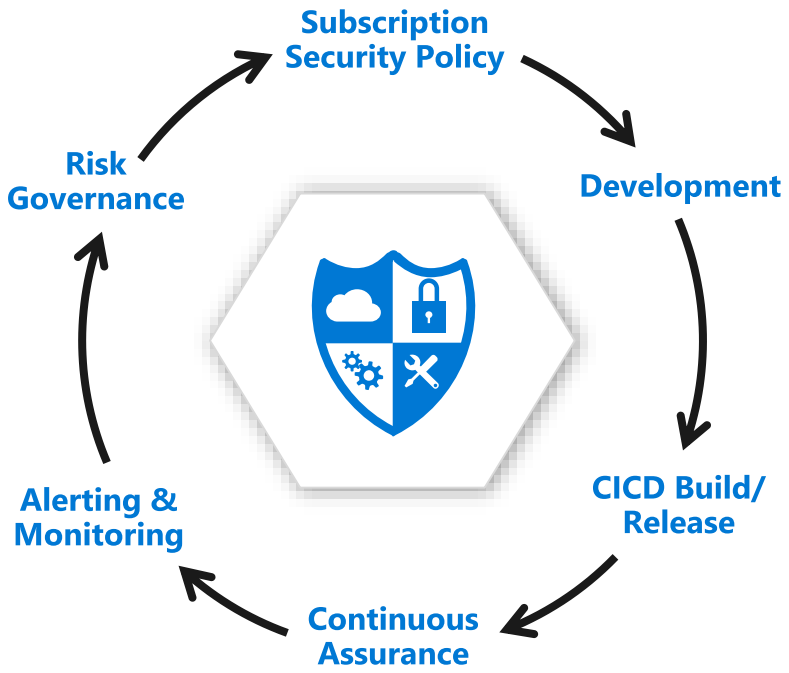




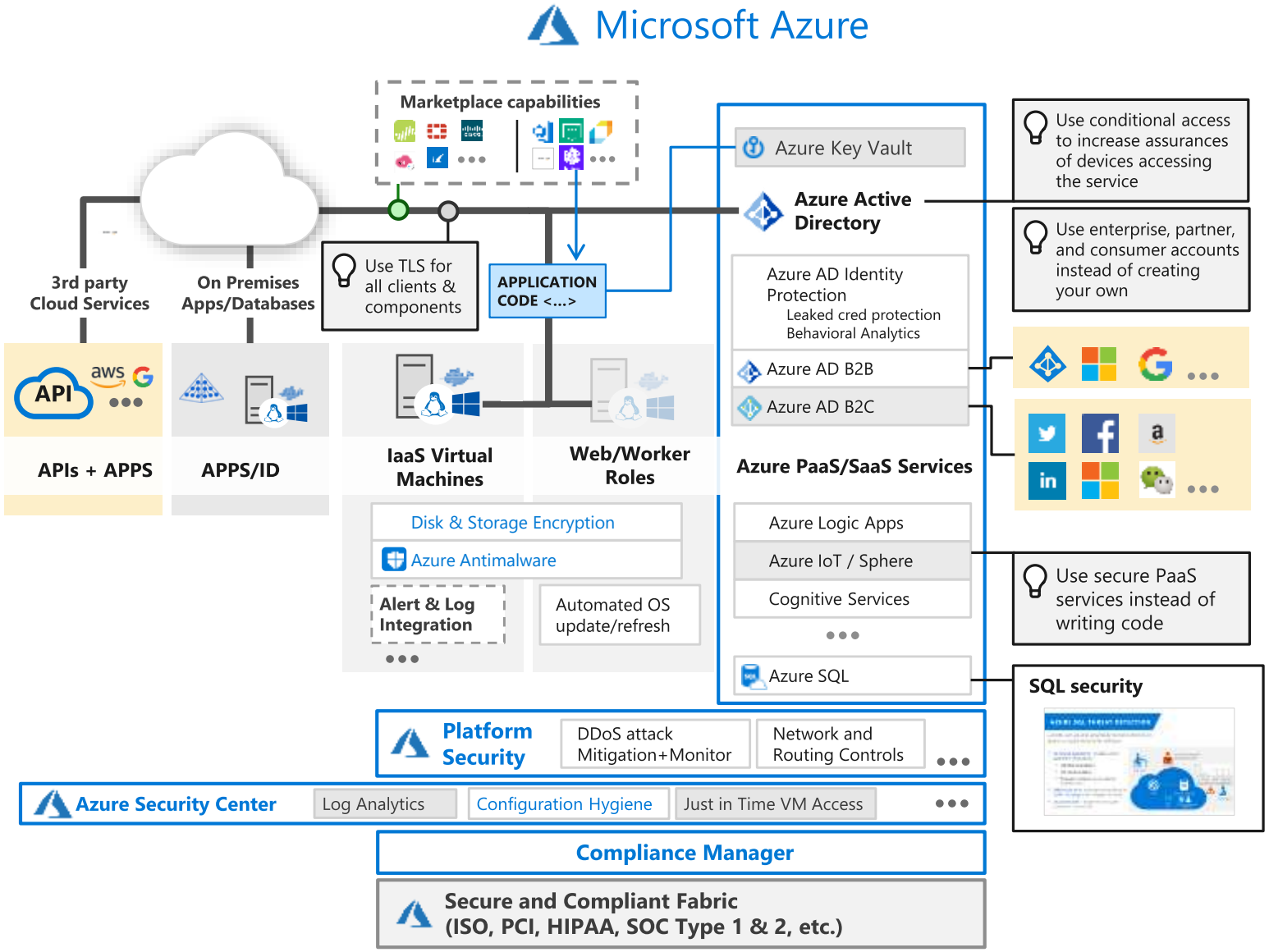
Development Security Challenges

- Persistent poor security coding practices (which caused SDL and OWASP to exist)
- Many apps assembled from vulnerable open-source components and frameworks
- Security, Dev, and Ops still on journey to common language/principles
- **Cloud is New to Many -** PaaS (and IaaS) environments unfamiliar to many in security (and continuously changing)

DevSecOps / PaaS Security Architecture



https://azsk.azurewebsites.net/



Practical Roadmap for PaaS Security

MAIN MENU

30 DAYS

1. **Enable** [Azure Security Center & SQL Threat Detection]
2. **Mitigate basic coding errors** with Web App Firewalls (WAFs) and Web vulnerability scanning
3. Discover and remediate exposed keys with **CredScan** https://secdevtools.azurewebsites.net/helpcredscan.html
4. Download and review documentation in **Secure DevOps Toolkit** https://azsk.azurewebsites.net/

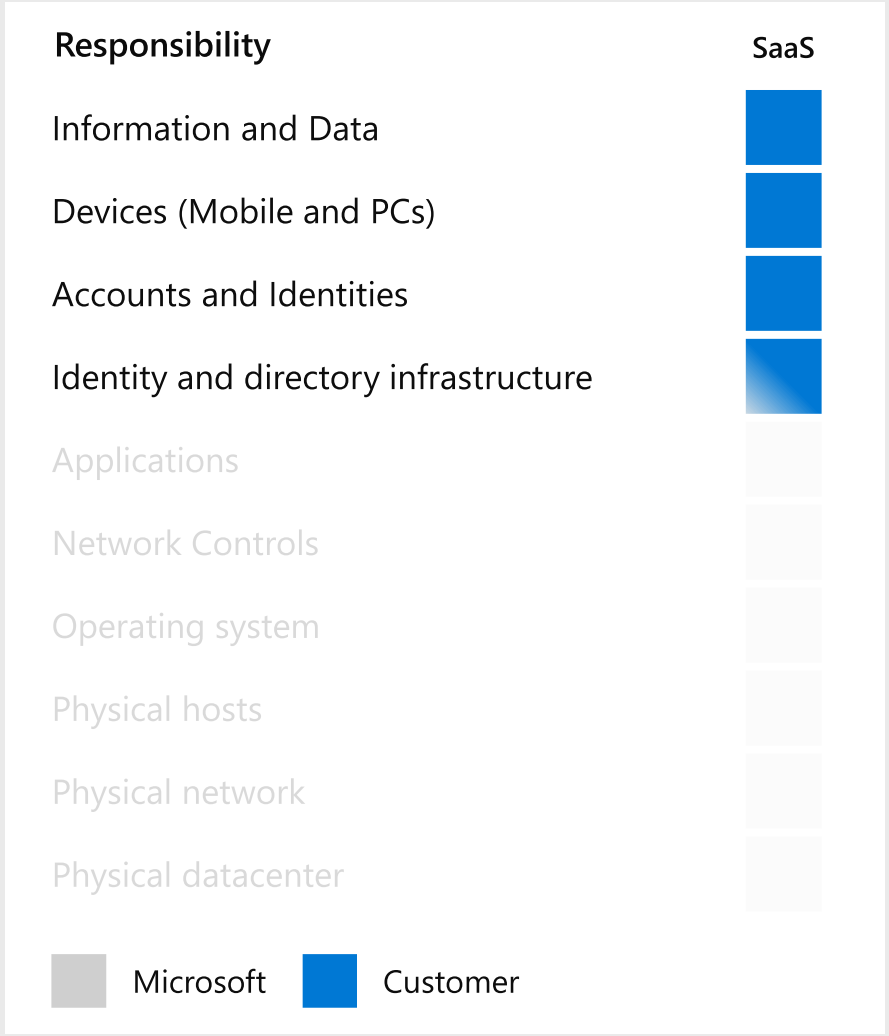
90 DAYS

5. **Deploy Secure DevOps Toolkit** automation https://azsk.azurewebsites.net/
6. **Encrypt all network traffic** with TLS
7. **Validate key & secret management**
8. **Build Threat Model** for all critical apps
9. **Define AuthN best practices** for developers (use AAD/established ID providers, Tenant Admin Protections)
10. **Validate all inputs and outputs** to mitigate attacks like XSS, XSRF, SQL Injection
11. **Validate data storage** protections
12. **Run static and dynamic analysis tools** and fix critical bugs

BEYOND

13. **Build Threat Model process into new apps and major changes**
14. **Cryptographic best practices –** Review code and ensure you are following best practices cryptography
15. **Push Left into CI/CD** with security education programs, enhanced tooling, and support processes for developers
16. **Evaluate security of dependencies** prior to inclusion (copy/paste 3rd party libraries, external module called by app, etc.)

Scope and Assumptions – 3rd party SaaS Risk



Observations

- 80% of employees admit to using non-approved SaaS apps in their jobs
- Security responsible for understanding & managing risk
- Must meet business requirements ***and*** mitigate risk

Roadmap Outcomes

Rapidly discover and manage risk from SaaS applications with Cloud App Security

MAIN MENU

30 DAY S

Learn about SaaS Usage & Risk

- **Identify App Usage** with snapshot reports and/or continuous upload
- **Tag apps** as already sanctioned or unsanctioned
- **Review risk scores** of unsanctioned apps to understand the risks
- **Report to stakeholders** on the risks of unsanctioned/risky app usage

90 DAYS

Mitigate risk and Automate

- **User Communications** – Contact users of highly used unsanctioned apps to understand requirements
- **Sanction/Migrate/Acquire–** For highly used unsanctioned apps, choose whether to **sanction**, **migrate** to approved solution, or **acquire** alternate solution.
- **Automate app tagging** where possible using app discovery policies with risk factors/levels

BEYOND

Monitor and Refine

- **Monitor usage trends** of unsanctioned apps and the sanctioned alternatives
- **Block access** to unsanctioned apps at firewall/proxy with MCAS block scripts or another control (GPO or MDM policy)
- **Monitor effectiveness** of security policy – Work with users and business leaders on evolving requirements, impact on business

Report risk reduction to stakeholders

Communicate Changes to Affected users

Office 365 Security Roadmap

http://aka.ms/o365secroadmap

MAIN MENU

30 DAYS

- **Rapid Configuration**
  - Basic admin protections
  - Logging and Analytics
  - Basic Identity Protections
- **Tenant Configuration**
- **Prepare** stakeholders

90 DAYS

- **Advanced Protections** for
  - Admin Accounts
  - User Accounts and Data
- **Customize roadmap** for your compliance, threat, and user needs
- **Adapt and implement** default policies and protections

BEYOND

- **Adjust and refine** key policies and controls
- **Extend protections** to on premises dependencies
- **Integrate** with business and security processes (legal, insider threat, etc.)

Monitor Logs via SIEM (if applicable)

Regularly Review Alerts and Upcoming Updates

30 DAY Plan

THREAT PROTECTION

Admins

- Separate Admin Account
- Enforce MFA for admins
- Highly Secure Productivity Device

Windows 10 guidance http://aka.ms/HighSecWin10

Tenant / All Users

- Enable logging + anomaly detection

  Logs → Cloud App Security → SIEM

INFORMATION PROTECTION

- Evaluate example Information Protection policies https://aka.ms/O365DataPolicy

- = Start preparation for action in 90 day plan

IDENTITY AND ACCESS MANAGEMENT

- Enable Azure AD Identity protection

  Ensure passwords hashes are synchronized to Azure AD

- If Federated, enforce account security (Password length / age / complexity, etc.)
- Evaluate example conditional access policies https://aka.ms/O365IdentityPolicy

SECURITY MANAGEMENT

Configure Advanced Threat Protection for Email/Collaboration, Roles, Policies, tenant security settings, and Microsoft Cloud App Security (MCAS) – https://aka.ms/O365TenantSecurity

Regularly Review Alerts (MCAS, Threat Dashboard) and Upcoming Changes (Roadmap | Blog | YouTube)

90 DAY Plan

THREAT PROTECTION

Admins

- Privileged Access Workstation http://aka.ms/cyberpaw
- Configure Azure AD PIM

Tenant / All Users

- Configure SIEM to collect *logs* from Identity Federation and Office 365

INFORMATION PROTECTION

- **Adapt and Implement** Information Protection policies https://aka.ms/O365DataPolicy

IDENTITY AND ACCESS MANAGEMENT

- Enable and Enforce **Multi-factor Authentication** for all users
- **Adapt and Implement** Conditional Access policies https://aka.ms/O365IdentityPolicy

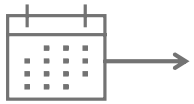
SECURITY MANAGEMENT

Plan actions for your unique security needs using:

- **Secure Score** – Identify important actions and low hanging fruit https://securescore.microsoft.com
- **Sharing Risks** – Use MCAS to identify oversharing of sensitive/internal documents
- **Threat Intelligence –** Conduct Attack Simulation + Industry Trends
- **Compliance Status –** Compliance manager (GDPR, NIST 800-171) https://servicetrust.microsoft.com/ComplianceManager

Regularly Review Alerts (MCAS, Threat Dashboard, SIEM) and Upcoming Updates

...And BEYOND



THREAT PROTECTION

Admins

- SPA roadmap for on premises AD http://aka.ms/SPAroadmap

Tenant / All Users

- Integrate Microsoft Cloud App Security (MCAS) into
  - Insider threat program
  - Shadow IT GRC risks/program

INFORMATION PROTECTION

- Integrate AIP into insider threat risk strategy
- Refine Information Protection policies
  - Office 365 DLP
  - CASB policies and alerts
  - Data Encryption Solution

IDENTITY AND ACCESS MANAGEMENT

- Refine policies and operational process
- Integrate alerts on user behavior in with insider threat program (from Azure AD Identity Protection or other capability)

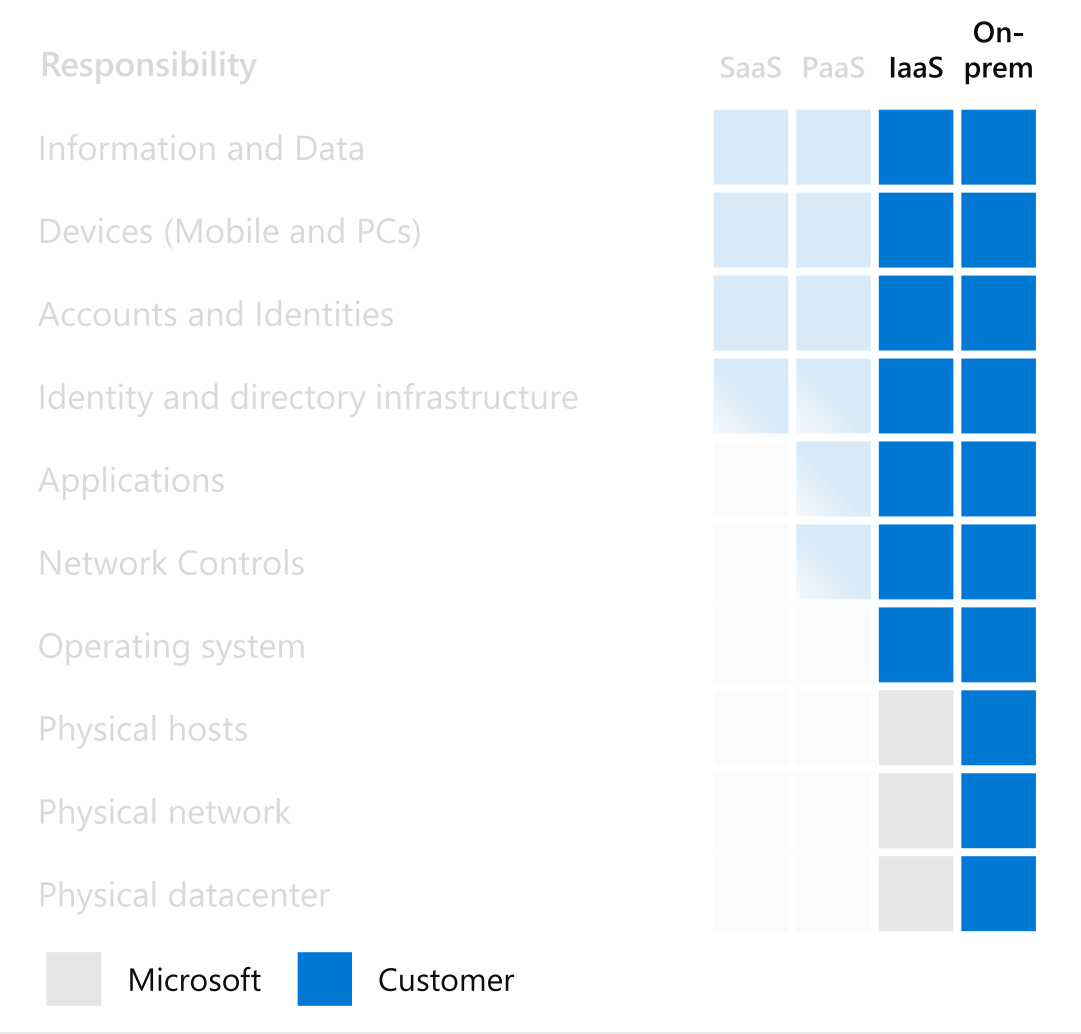
SECURITY MANAGEMENT

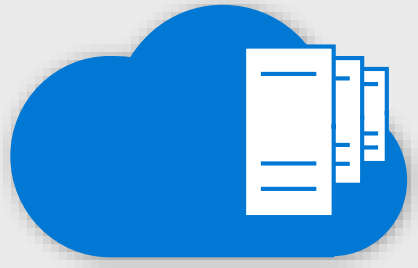
- **Secure Score –** Continue Planning Next Actions
- **eDiscovery –** Integrate into legal and threat response processes

Regularly Review Alerts and Upcoming Updates

Scope and Assumptions – Hybrid Infrastructure

Securing Workloads on Legacy Architecture





Key Observations

Enterprise infrastructure is (or will be) hybrid

- Difficult to resist value & security of cloud
- Difficult to retire all on-premises hardware

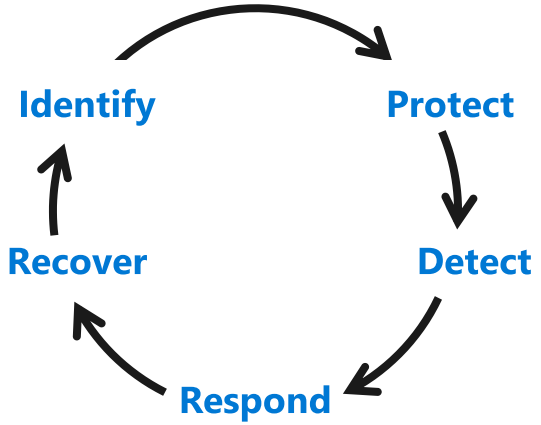
IaaS security similar to on-premises, but better

- Legacy workloads require network controls
- Cloud platform makes security hygiene easier
- Cloud vastly improves threat detection & response

Roadmap to a secure modern infrastructure

First 30 Days

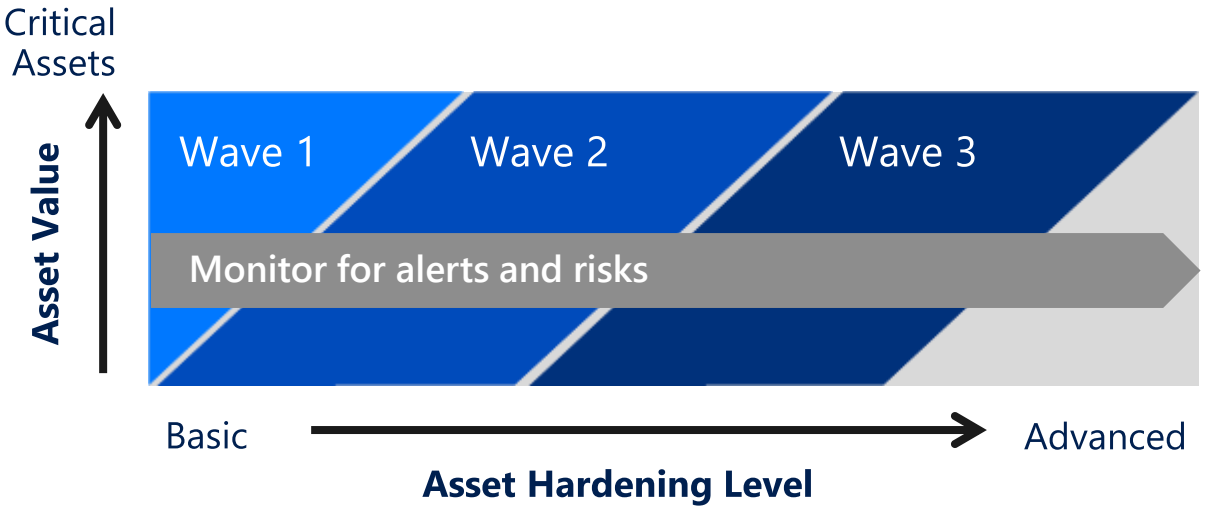
Quick wins



- Identification of Assets
- Establish critical protections, monitoring
- Establish response processes

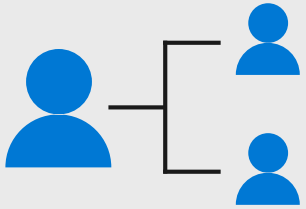
Day 31 and Beyond

Prioritized infrastructure handling



- Categorize Systems
- Harden assets in waves
- Monitor datacenter resources for attacks and vulnerabilities

Measuring and Planning - A-H/N Approach



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/

Admin

Isolate Administrative Interfaces from Risk, enforce Role Based Access Control (RBAC) for all layers of access:

- Tenant
- Identity
- Storage & Network
- OS, Apps, Containers
- PaaS Service Configuration

Host

Harden Hosts against compromise including IaaS VMs, On-Premises VMs, and physical servers

Addresses many aspects of platform security:

- Security Monitoring
- Configuration baselines
- Security updates
- AV & Security Tooling

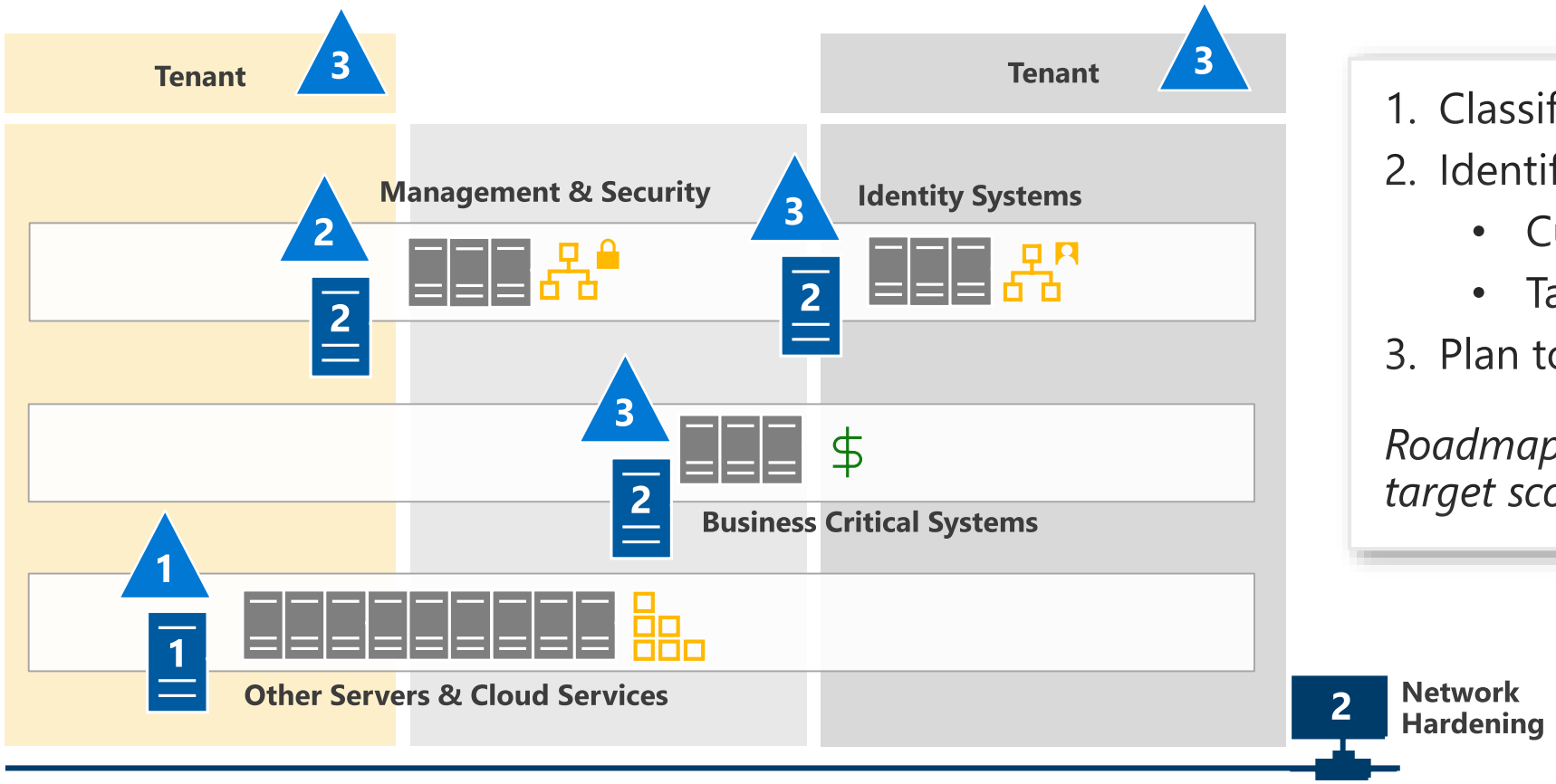
Network

Implement network defenses

Addresses **network protections** including

- Security Monitoring
- Device security updates
- Device configuration & Password Management
- ***Thoughtful*** network segmentation

Use A-H/N scoring to measure and improve security



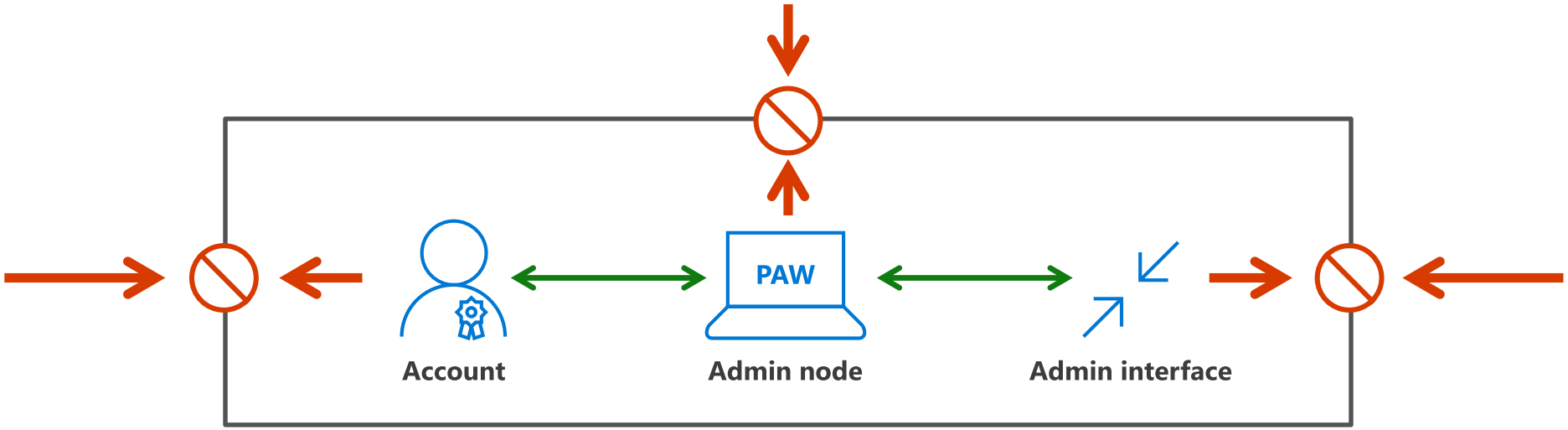
1. Classify your assets
2. Identify **A-H/N** scores
   - Current Score
   - Target Score
3. Plan to fill gaps

Roadmap contains default target scores and schedule

Admin isolation – Host hardening / Network isolation

Isolate Administrative Interfaces

Protect and Monitor all administrative interfaces for servers/services



1 Basic

Service Defense

- Reduce admin quantity & eliminate shared accounts
- Enable logging & analytics
- Strong AuthN + Device Security
- Enable built-in PIM (as available)

2 Intermediate

Per-Role Defense

- Role Based Access Control
- PAW + PAM for all admin roles
- Restrict Tier 0 account exposure
- Randomize local passwords

3 Advanced

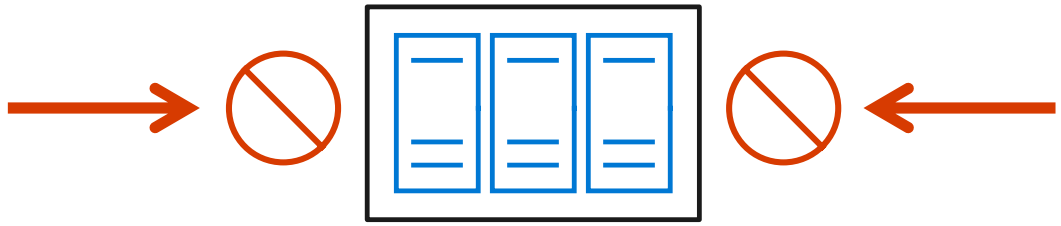
Specialized / Advanced Hardening

- Service account hardening/restrictions
- Reduce and Restrict Administration rights on server hosts

Monitor SIEM/ASC for alerts + Lateral movement paths via Azure ATP

Host Hardening

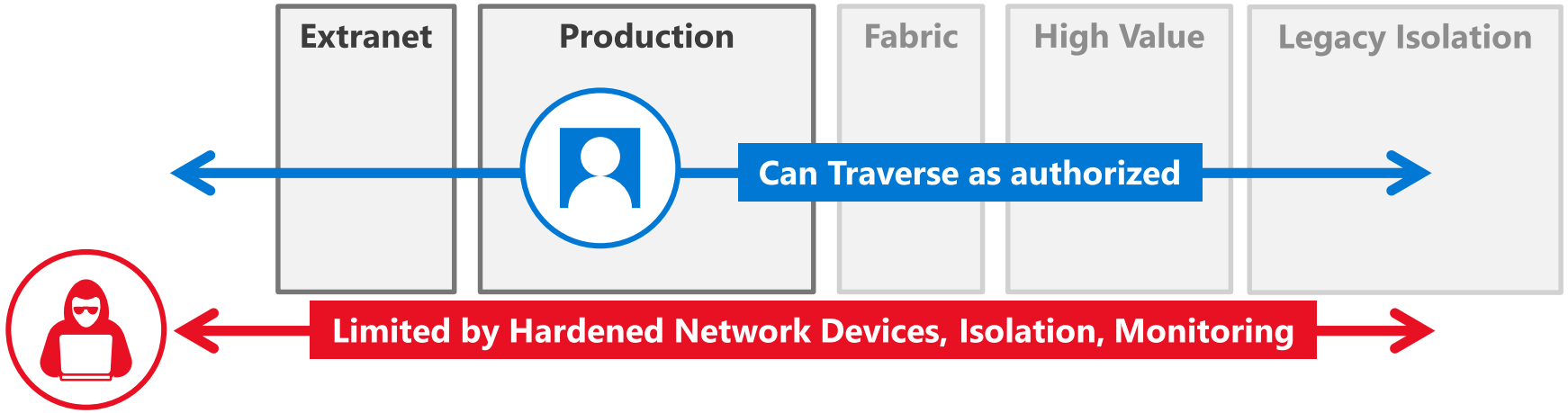
Reduce the attack surface of servers and services



1 Basic	2 Intermediate	3 Advanced
Host Hardening	Platform Hardening	Workload Hardening
• Basic patch management • Disk/Volume encryption • Antivirus + Endpoint Detection & Response (EDR) • Host firewall • Whitelisting applications (*Azure Windows Hosts*)	• OS Configuration Baseline • Enable logging Monitor with SIEM/Analytics • Full patch compliance • Restrict remote credential exposure • Firmware security (updates + remote access) (*physical hosts*)	• Whitelisting Applications (All) • Code signing for Critical Apps • Crashdump + in memory process analysis • Automated Investigation and Response

Network Isolation

Increase the cost and difficulty for an attacker to traverse your environment



1 Basic

Network
Perimeter Segmentation

- Filter inbound traffic from Internet→Extranet→Intranet
- Next Generation Firewall / Web Application Firewalls (WAFs)
- DNS hygiene and monitoring
- Strong password for network devices

2 Intermediate

Network
Access Segmentation

- Just in time management port access
- Filter outbound access for servers
- Unique and segmented passwords for network devices
- Network Device patching and configuration hygiene

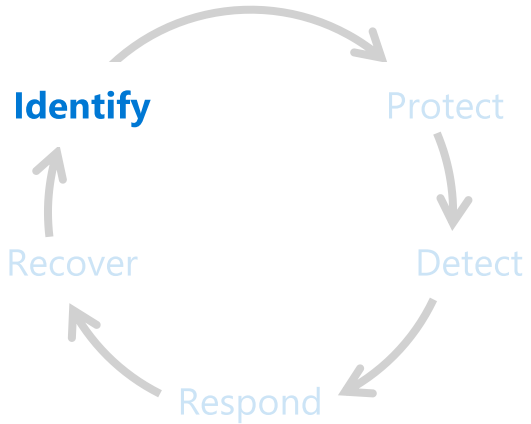
3 Advanced

Network
Flow Segmentation

- Monitor network flow
- Encrypt all workload traffic
- PIM for network device management
- Advanced micro-segmentation and workload isolation
- Retire insecure management protocols

First 30 Days (1-3)

Quick wins



- Identification of Assets
- Establish critical protections & monitoring
- Establish response processes

1. Identify Management & Security Systems (e.g. Tier 0)

(systems, administrative roles, admin count, etc.)

- ✓ Tenant Administration
- ✓ Configuration Management
- ✓ Deployment Systems
- ✓ Monitoring
- ✓ Security scanning
- ✓ Backups
- ✓ Firewall | IDS/IPS
- ✓ Vulnerability scanning

2. Build Inventory of servers

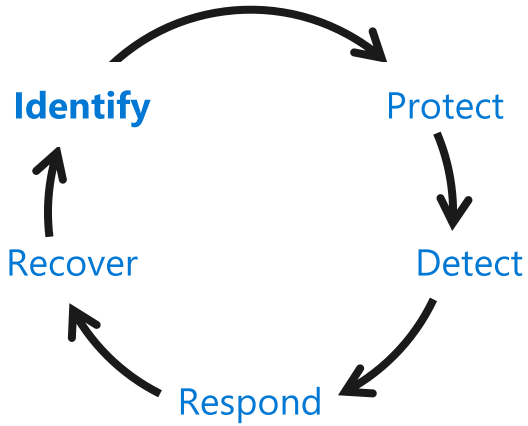
- **Azure -** 100% Using Azure Security Center
- **On-Premises & 3rd Party Cloud -** 80% using tools or manual processes

3. Identify Internet Facing Servers

- **Azure -** 100% identified and remediated) with Azure Security Center Alerts
- **On-Premises & 3rd Party Cloud -** 80% using tools or manual processes

First 30 Days (4-6)

Quick wins



- ~~Identification of Assets~~
- Establish critical protections & monitoring
- Establish response processes

4. Essential Security for Azure Tenant Administration

- **Dedicated Admin account with no email/browsing allowed**
- **Reduce Tenant Administrator Count**
  - **Global Admins –** 2 people max *or* identify specific justification for why each admin can't use a delegated role (for 3+ admins)
- **Enforce MFA and Just in Time Privileges**

5. Establish Critical Security Monitoring

- **Azure -** 100% Coverage using Azure Security Center (Standard)
- **On-Premises & 3rd Party Cloud VMs** – Azure Security Center or SIEM
- **All –** Monitor for identity attacks on admins (Azure ATP or 3rd party)

6. Build/Update Response and Recovery Processes

Establish or validate written guidance on how to investigate, classify, and recover from server/datacenter incidents

- **Response and Recovery Framework**
- **Technical Instructions for Recovering Accounts, Hosts, Devices**

Beyond the quick wins

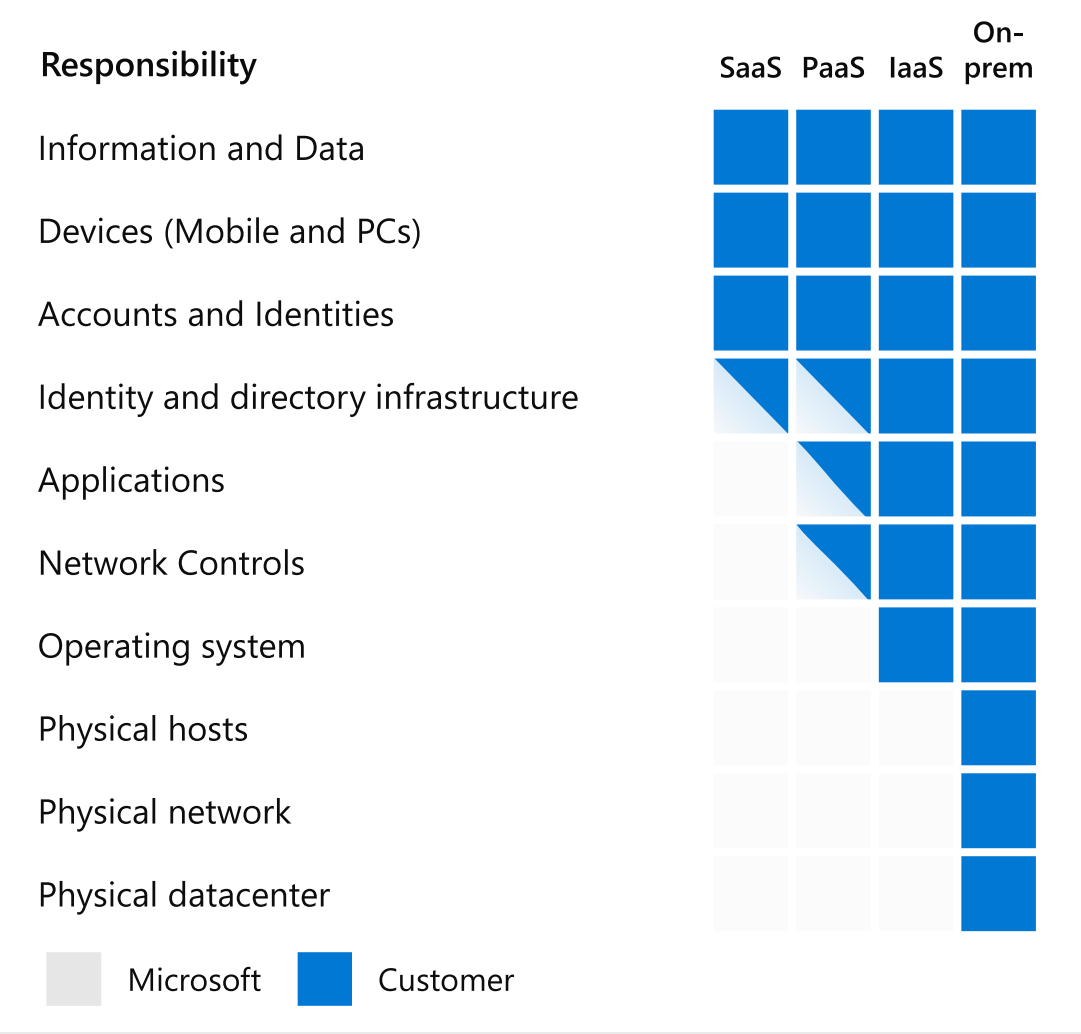
MAIN MENU

		60 days	90 days	120 days	180 days	6 months +
Critical assets	**Management + security** **Identity systems** **Business critical systems**	1	1 1	2 1	2 2	3 3
	Servers and cloud services	**N/A**	**N/A**	1 1	1 1	2 2
	Network hardening	**N/A**	1	1	2	3

Monitor Logs via SIEM/ASC + Lateral movement paths via Azure ATP

Admin isolation - Host hardening / Network isolation

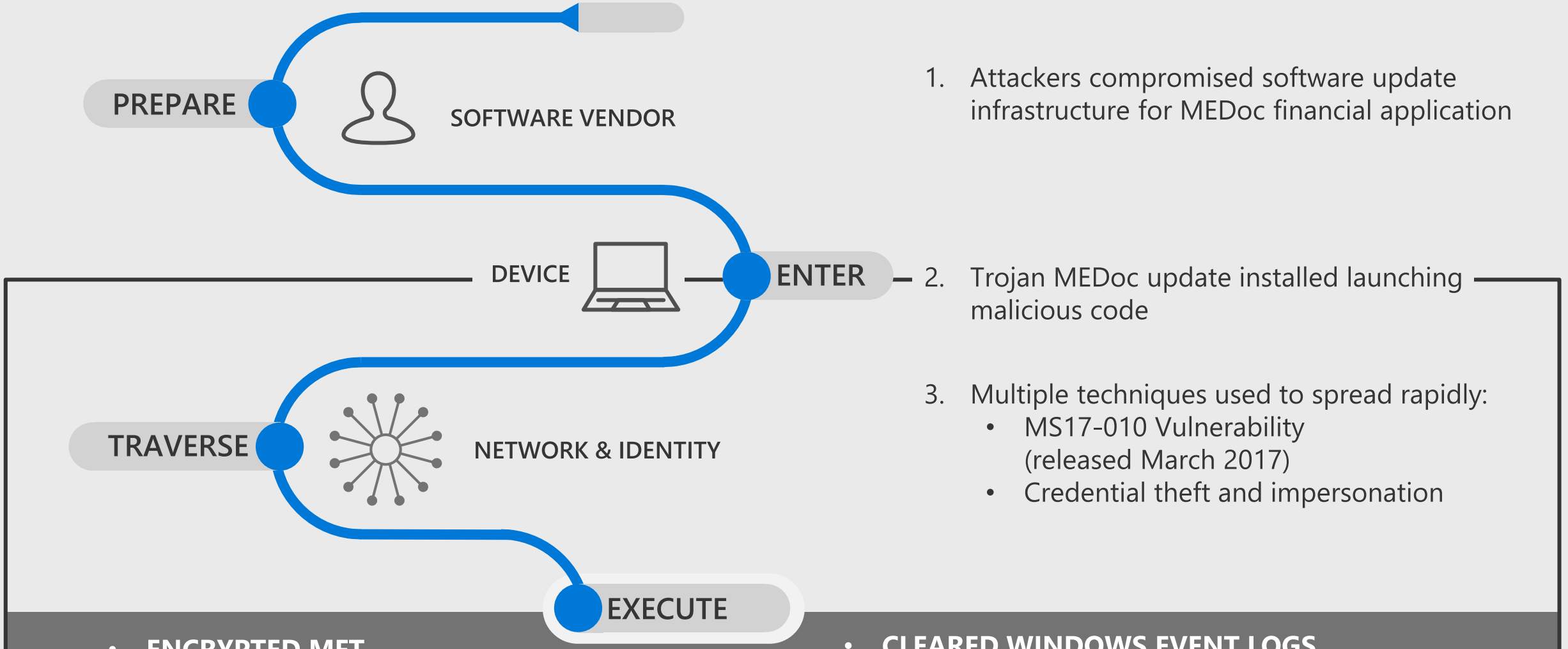
Scope, Assumptions, Observations



Paying down “technical debt” of critical hygiene leads to lower risk and less vulnerability to ‘new’ attack combinations like Petya/Wannacrypt

Cloud Provider Responsible for Hygiene of Cloud Services

Anatomy of a Petya Attack



1. Attackers compromised software update infrastructure for MEDoc financial application

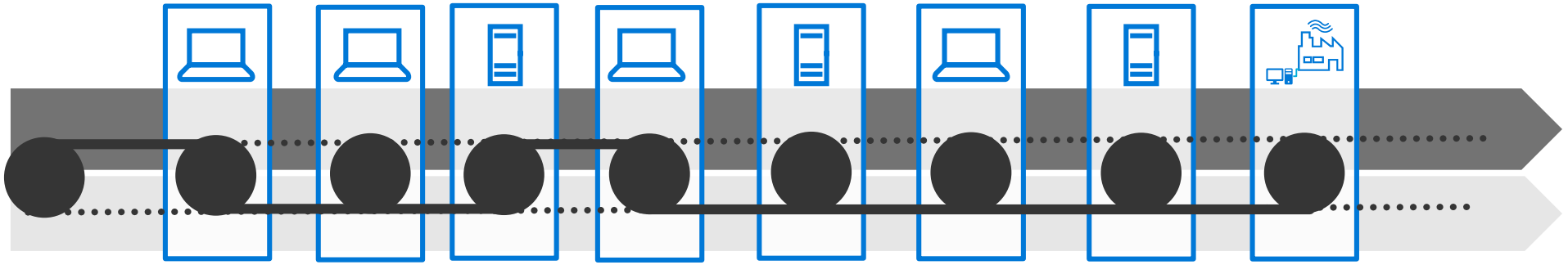
2. Trojan MEDoc update installed launching malicious code

3. Multiple techniques used to spread rapidly:
   - MS17-010 Vulnerability (released March 2017)
   - Credential theft and impersonation

- **ENCRYPTED MFT**
- **MADE SYSTEMS UNBOOTABLE**

- **CLEARED WINDOWS EVENT LOGS**
  - ***JUST STANDARD PRACTICE?***
  - ***HIDING OTHER ACTIONS?***

Critical Element: Multi-Channel Propagation



MITIGATING ONE VECTOR ISN'T ENOUGH

Most of Petya propagations were from impersonation "channel"
97% patched was not enough to stop the spread

DUAL BENEFITS OF INVESTMENTS

Credential theft, patch, and other investments also mitigate targeted attacks

Petya - Massive Technical and Business Impact

Rapid Destruction at Global Organizations

Example of Technical Impact
(Anonymous)

GEOGRAPHIES	All
DURATION	~60 minutes
IMPACTED COMPUTERS	**62,000 computers** **12,000** servers **50,000** workstations

Publicly Reported Losses
(By Different Organizations)

$200 Million

$300 Million

$310 Million

Summary of Key Recommendations

MAIN MENU

Measures that directly impact the known attack playbook

https://aka.ms/rapidattack

Quick wins: 0-30 Days

DIRECT ATTACK MITIGATION
RAPID ENABLEMENT

1. Create **destruction-resistant backups** of your critical systems and data
2. Immediately deploy **critical security updates** for OS, browser, & email
3. **Isolate (or retire) computers** that cannot be updated and patched
4. Implement **advanced e-mail and browser protections**
5. Enable host anti-malware and network defenses to get near-**realtime blocking responses from cloud** (if available in your solution)
6. Implement **unique local administrator passwords** on all systems
7. Separate and protect **privileged accounts**

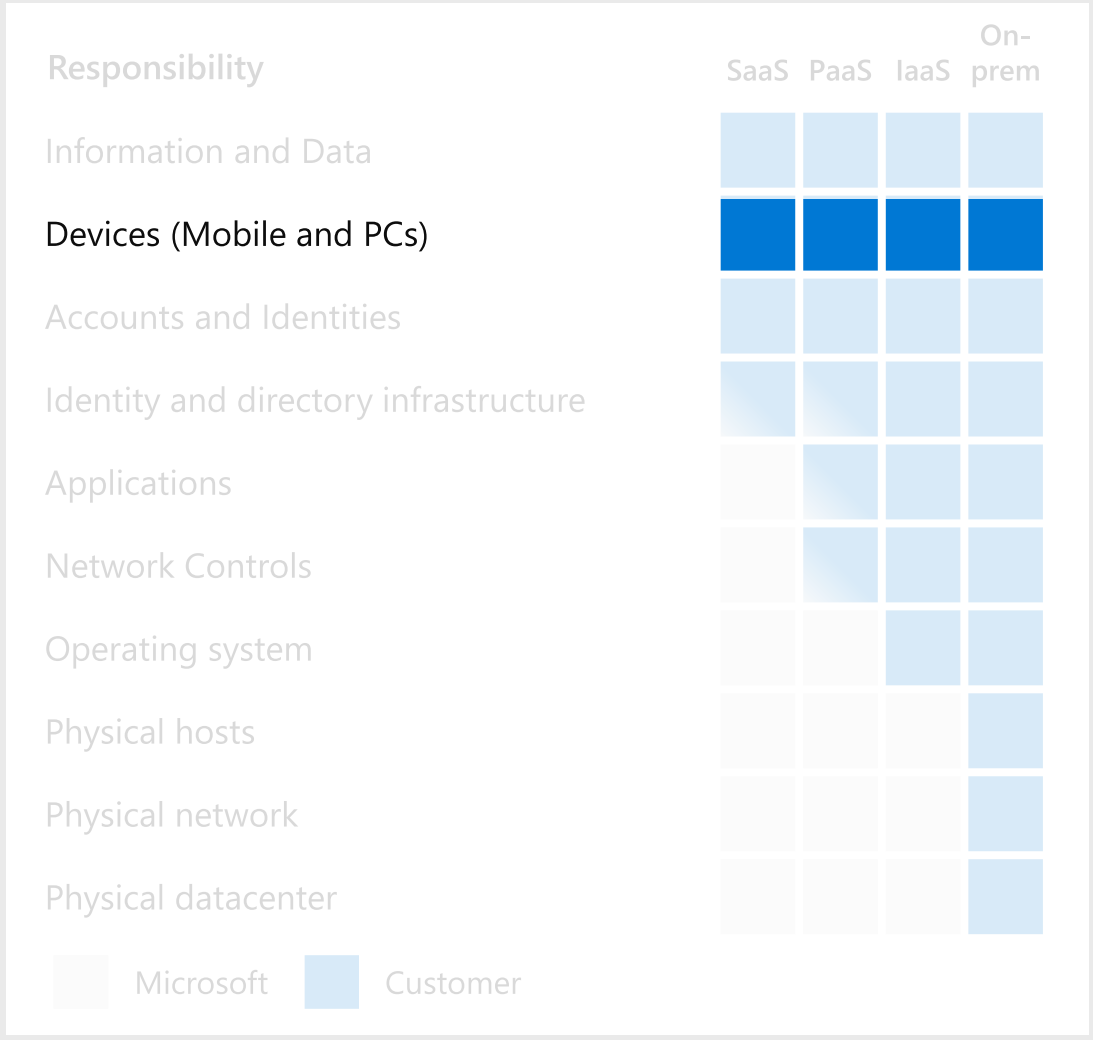
Less than 90 Days

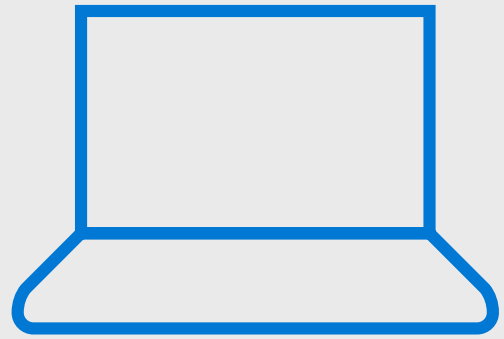
DIRECT ATTACK MITIGATION
LONGER ENABLEMENT

1. **Validate** your backups using standard restore procedures and tools
2. **Discover and reduce** broad permissions on file repositories
3. Rapidly deploy all **critical security updates**
4. **Disable unneeded** legacy protocols
5. **Stay current –** Run only current versions of operating systems and apps

Next Quarter + Beyond

Windows 10 - Scope and Assumptions





Observations

- Client devices are on the front line
  - Target of many single stage attack patterns
  - Entry point for many multi-stage attack patterns
- Fundamental Windows Security Shift
  - **Previous Versions -** advanced security from 3rd party tools
  - **Windows 10** – Native advanced security capabilities built in (EDR, Exploit Mitigations, Whitelisting etc.)
  - **Windows 10** – Windows as a Service (WaaS) for updates
- Application compatibility is top challenge to security feature adoption

Practical Roadmap for Windows 10 Security

Enabling Advanced Threat Protection (ATP) capabilities

MAIN MENU

30 DAYS

Enable Critical Capabilities

Protect

- **Antimalware** (Defender with cloud-delivered protection or 3rd party)
- **Credential Guard**
- **SmartScreen** (+ Chrome plug-in)

Identify/Detect/Respond

- **Patching** – view status in Secure Score
- **Endpoint Detection & Response** (EDR) (Defender ATP or 3rd party)
- **Exploit Guard 1** (Audit Mode)

90 DAYS

Enable Next Critical Capabilities

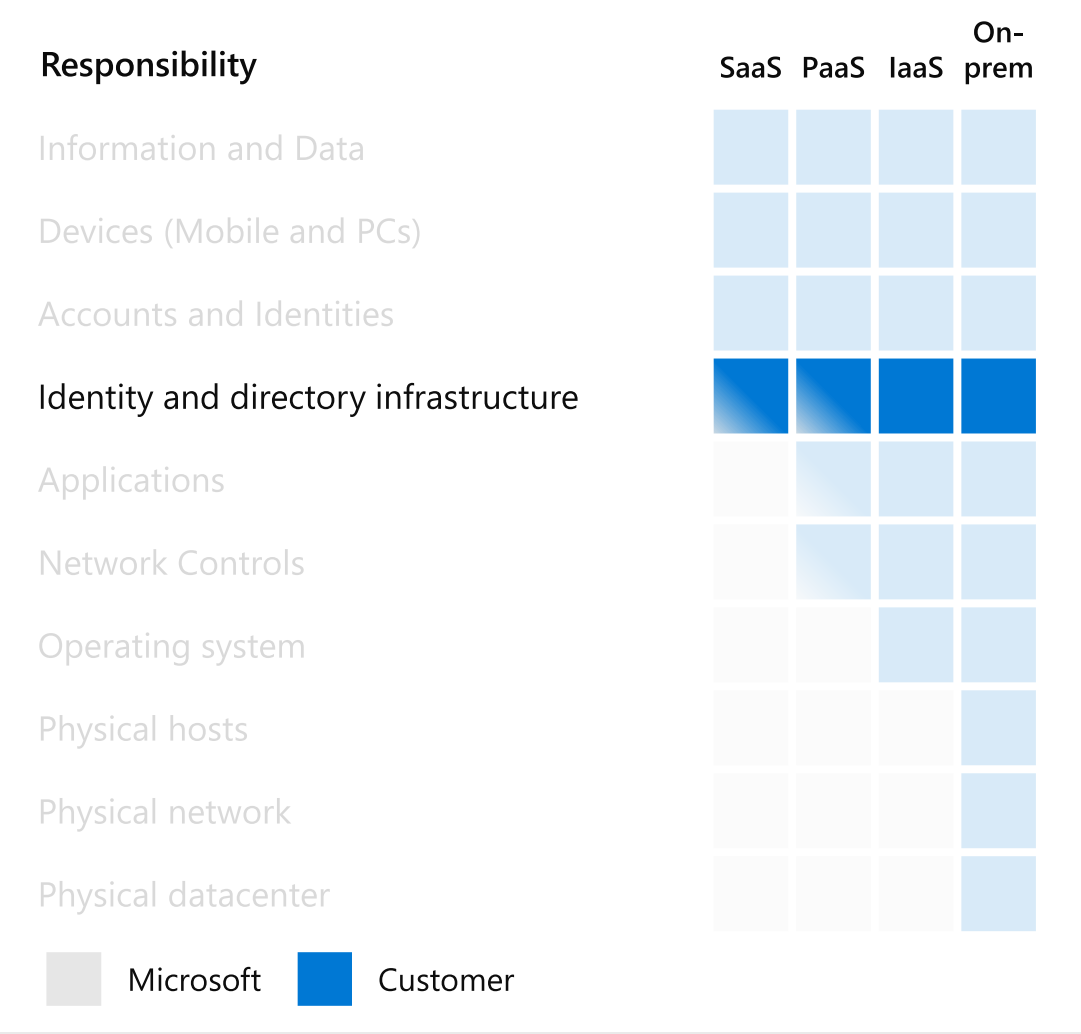
- **Patching -** Apply critical security updates 99%+ of computers within 4 days (Operating System, Email, browser)
- **Random Local Passwords** - Deploy Local Administrator Password Solution (LAPS)
- Enable **Application Guard**
- **Exploit Guard 2 –** Deploy Enforcement in a pilot (using audit mode data)
- **Windows Hello for Business** – Plan and deploy production pilot

BEYOND

- Deploy **Security Baseline** configurations (Pilot → Production)
- Remove **local admin rights** from standard users
- Deploy **Application Whitelisting**
- **Exploit Guard 3 –** Deploy Enforcement to all production workstations
- **Reduce critical attack surface** - Unsupported applications + Apps requiring vulnerable middleware
- **Stay Current -** Ensure processes support deploying new versions (usually every 6 months)

Plan and execute **Secure Score** recommendations - https://aka.ms/WindowsSecureScore

Scope, Assumptions, Observations

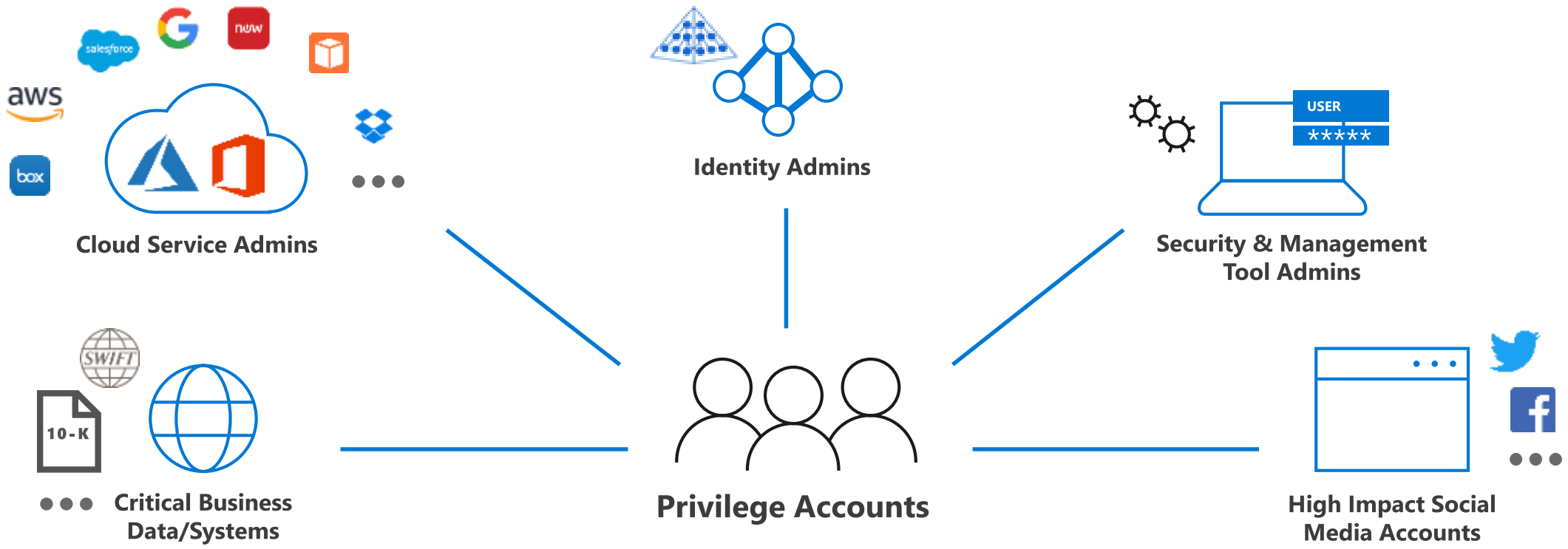


Assumptions and Observations

- **High Business Impact**
  - Privileged access provides attacker control of many critical systems at once
- **Cloud has higher security**
  - Rigorous security practices from day one
  - Stringent regulatory oversight
  - Key investments (no standing access, admin workstations, physical security, etc.)
- **On Premises Active Directory** is a key dependency for many systems

Privileged Access is more than Administrators

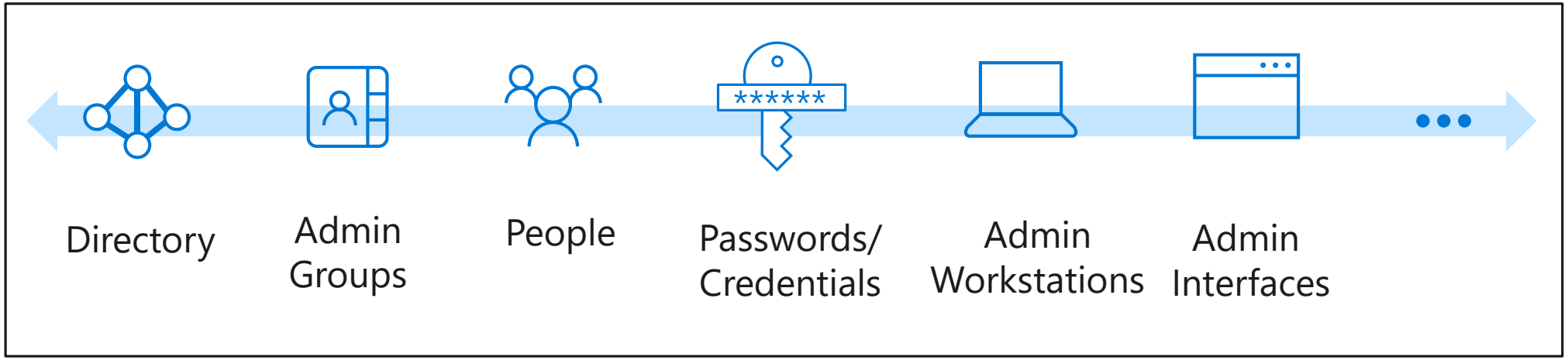
Protect high impact accounts/roles



Securing Privileged Access

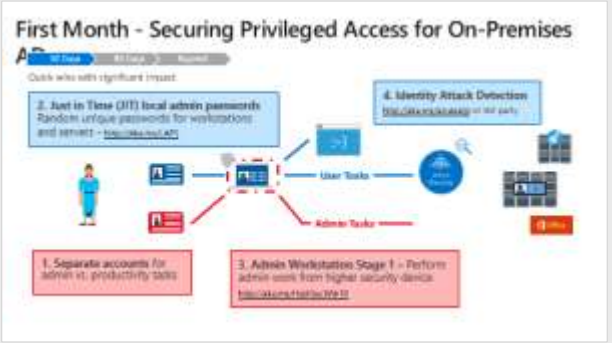
More than just vaulting admin passwords

Protect all parts of the privileged lifecycle



Securing Privileged Access

1. **Strengthen Authentication**
   - Passwordless, MFA, Leaked credential detection, etc.
2. **Reduce Attack surface**
   - Remove legacy/insecure protocols
   - Remove duplicate/weak passwords
   - Reduce dependencies
3. **Increased Monitoring and Detection**
4. **Automate Threat Response**
5. **Ensure Usability for Administrators**



ON-PREMISES AD

AKA.MS/SECURITYSTEPS

AZURE AD

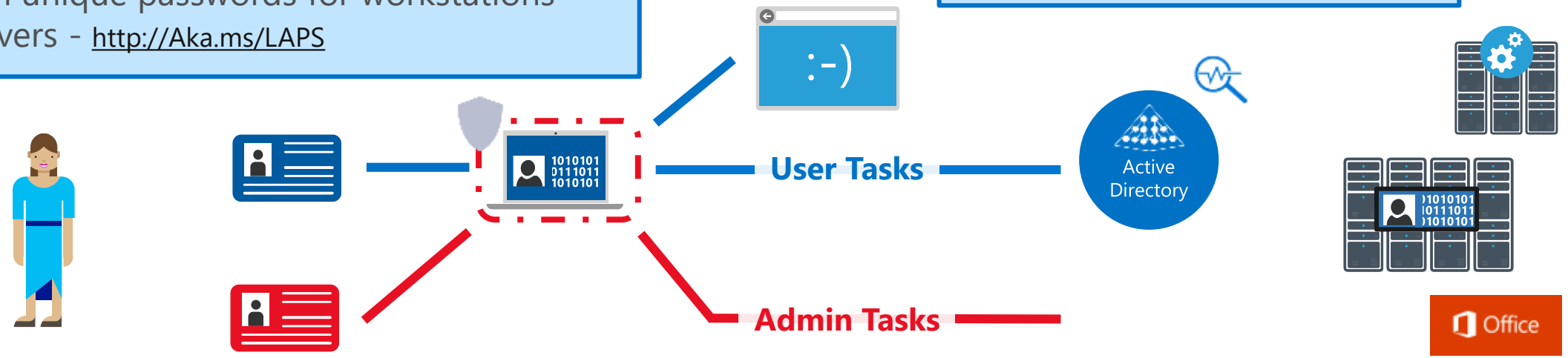
First Month - Securing Privileged Access for On-Premises A

30 Days | 90 Days | Beyond

Quick wins with significant impact

2. Just in Time (JIT) local admin passwords
Random unique passwords for workstations and servers - http://Aka.ms/LAPS

4. Identity Attack Detection
http://aka.ms/azureatp or 3rd party



1. Separate accounts for admin vs. productivity tasks

3. Admin Workstation Stage 1 – Perform admin work from higher security device
http://aka.ms/HighSecWin10

First Quarter - Securing Privileged Access for On-Premises AD

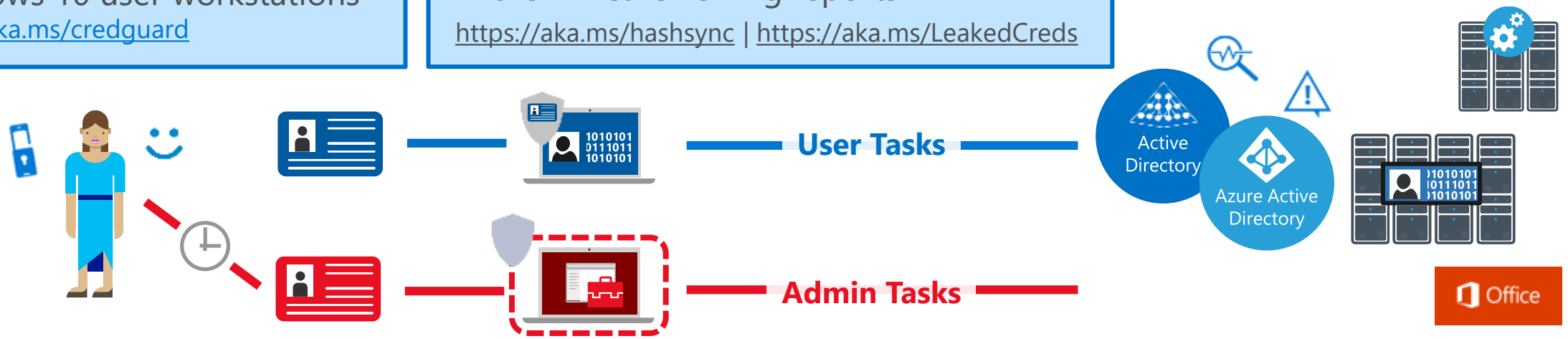
30 Days | 90 Days | Beyond

Key protections that provide significant mitigation

4. Enable Credential Guard on Windows 10 user workstations
http://aka.ms/credguard

5. Leaked Credentials 1 - Detect risk by synchronizing user password hashes to Azure AD & reviewing reports
https://aka.ms/hashsync | https://aka.ms/LeakedCreds

6. Lateral Movement Vulnerability Detection
http://aka.ms/LateralMovementRisk



1. Require Windows Hello for business / MFA for admin accounts
http://aka.ms/HelloForBusiness

2. Admin Workstation Stage 2 – Require Privileged Access Workstations for AD admins
Phase 1 Instructions of http://aka.ms/CyberPAW

3. Just in Time Privileges using privileged access management (PAM) solution
http://aka.ms/PAM or 3rd party

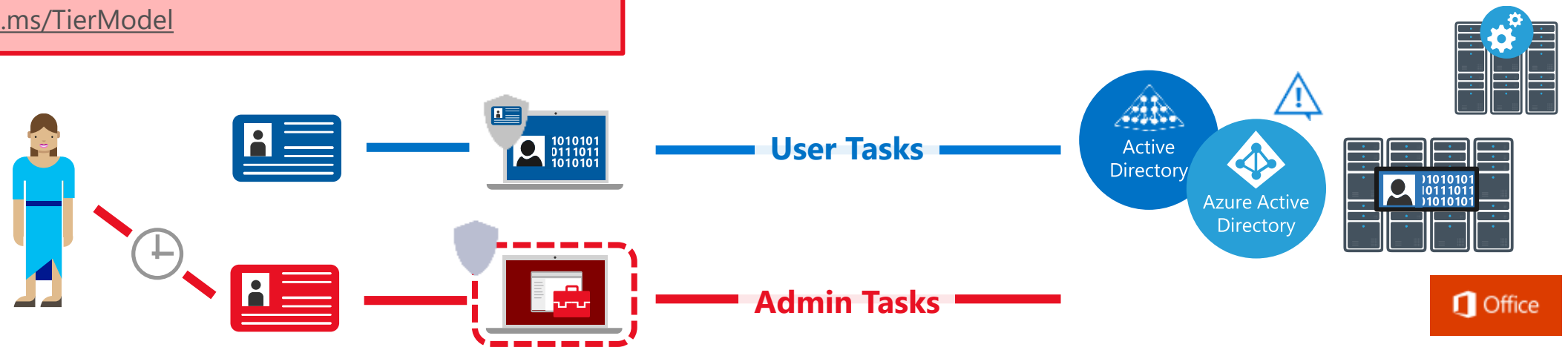
Beyond - Securing Privileged Access for On-Premises AD

30 Days | 90 Days | Beyond

Proactively increase security posture

1. Review Role Based Access Control (RBAC) model to reduce risk from tier combinations
https://aka.ms/TierModel

4. Leaked Credentials 2 - Force Reset of passwords using conditional access and self-service password reset
https://aka.ms/CAPolicy | https://aka.ms/selfservicepasswordreset



2. Lower attack surface of Domain, DCs, ADFS, and Connect
http://aka.ms/HardenAD

3. Integrate Logs with SIEM
https://aka.ms/SIEM-AD

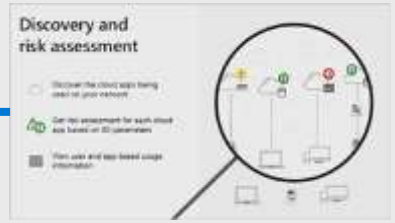
Progress Against Recommendations

Microsoft Secure Score

Office 365, Windows 10, EMS

Azure Security Center

Cloud Hybrid Infrastructure



Microsoft Cloud App Security

3rd party SaaS risk

For More information, See **Vulnerability Management** Section in Module 2

CIS Azure Benchmarks

Non-profit entity that harnesses the power of a global IT community to safeguard private and public organizations against cyber threats.

Microsoft and CIS Partnership

Goal
Simplify and drive consistency in our customers' efforts to securely deploy workloads to Azure

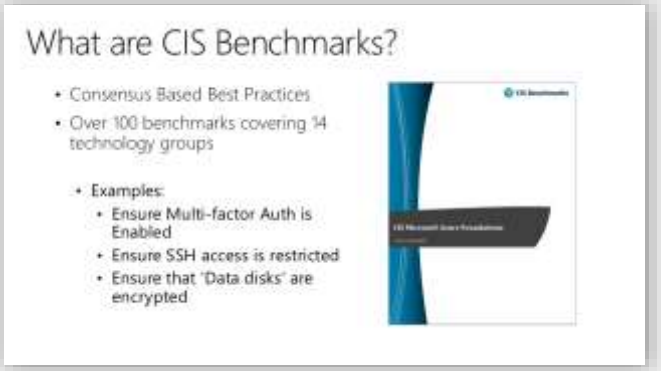
Benefits
CIS brings independence and consensus driven approach

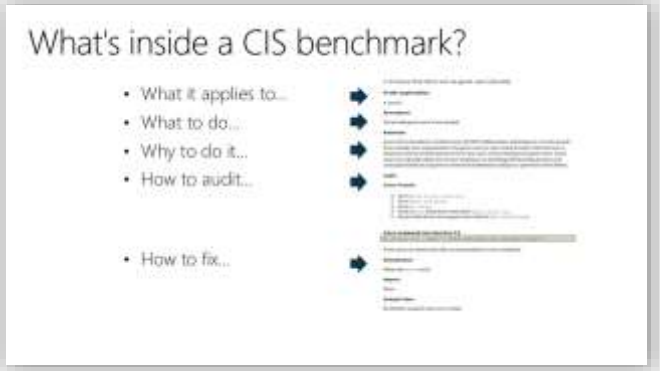
Benchmarks informed by Microsoft's experience & best practices

CIS Benchmarks

MAIN MENU

- Azure
  - https://azure.microsoft.com/en-us/resources/cis-microsoft-azure-foundations-security-benchmark/
- Microsoft 365
  - https://cloudblogs.microsoft.com/microsoftsecure/2019/01/10/best-practices-for-securely-using-microsoft-365-the-cis-microsoft-365-foundations-benchmark-now-available/





Penetration Testing on Microsoft Cloud

MAIN MENU

Microsoft Cloud Unified Penetration Testing Rules of Engagement

https://technet.microsoft.com/en-us/mt784683

SCOPE

- Azure Active Directory
- Microsoft Intune
- Microsoft Azure
- Microsoft Dynamics 365
- Microsoft Account
- Office 365
- Visual Studio Team Services

CONTENTS

- Reporting Security Issues
- Microsoft Azure Penetration Testing Notification
- Rules Of Engagement To Perform Penetration Testing On The Microsoft Cloud
  - Prohibited activities
  - Encouraged Activities