Zero trust IAM – the key to successful cloud transformation

→ David Guest

Solution Architect

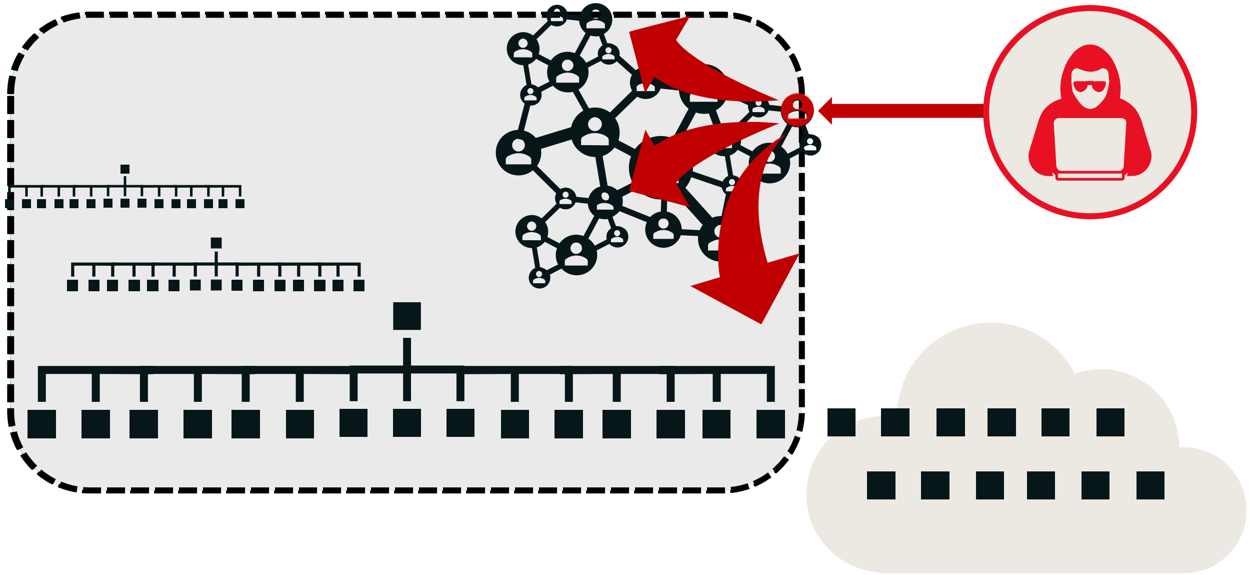
12th October 2022

Kocho

BECOME GREATER

Why are we having a Zero Trust conversation?

Access Control: Keep **Assets** away from **Attackers**

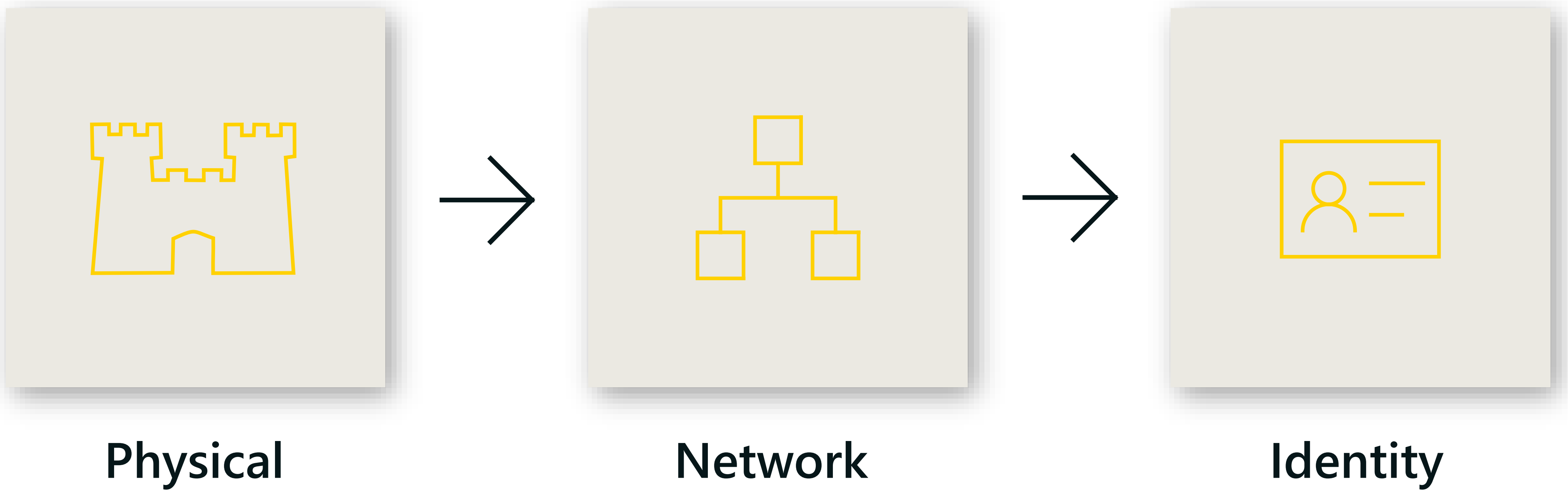


1. **IT Security is Complex**
   - Many Devices, Users, & Connections
2. **"Trusted network" security strategy**
   - Initial attacks were network based
   - *Seemingly* simple and economical
   - Accepted lower security within network
3. **Assets increasingly leave network**
   - BYOD, WFH, Mobile, and SaaS
4. **Attackers shift to identity attacks**
   - Phishing and credential theft
   - Security teams often overwhelmed

Evolution of IT, threats, and Microsoft Identity security

MICROSOFT IDENTITY APPROACH	Windows NT Domains Widespread Password Weakness and Re-use	+ Enterprise Active Directory + Smartcard Authentication Credential Theft Attacks Mass Password Compromises	+ Azure Active Directory + Zero Trust Access Control (Conditional Access) + Password-less Authentication
IDENTITY AND ACCESS TRENDS	Local Identities	Enterprise Single Sign On + 2 factor authentication	Hybrid and Federated Cloud Identity
INFORMATION TECHNOLOGY	Mainframes + PCs	+ Datacenters + Mobile Devices	+ Cloud + Internet of Things (IoT)

Evolution of security perimeters



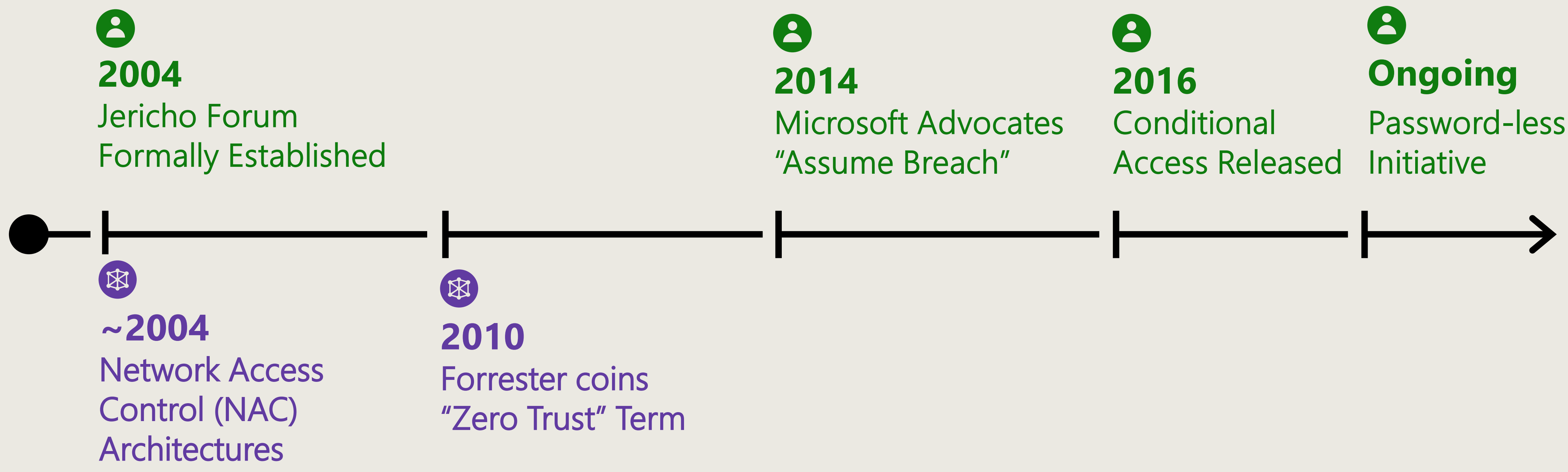
Physical

Network

Identity

A consistent set of controls between assets and threats

This “Zero Trust” is not new



2004
Jericho Forum Formally Established

~2004
Network Access Control (NAC) Architectures

2010
Forrester coins “Zero Trust” Term

2014
Microsoft Advocates “Assume Breach”

2016
Conditional Access Released

Ongoing
Password-less Initiative

Slow mainstream adoption for both network identity models:

Network – Expensive and challenging to implement
Google’s BeyondTrust success is rarely replicated

Identity – Natural resistance to big changes
Security has a deep history/affinity with networking

Trends and challenges

Attackers using identity to bypass network controls

Phishing allow attackers to impersonate valid user Identities

Credential theft allows attackers to expand access by impersonating identities

Passwords aren't enough to protect identities

Single factor authentication (Passwords) without context isn't enough assurance

Attacks on credentials circumvent software assurances (without hardware isolation)

Identities being used outside network

Cloud, Mobile, and IoT assets are frequently beyond reach of enterprise firewalls

Identity and Access controls are inconsistent on different cloud services and devices

Zero Trust Principles

Verify Explicitly

Always authenticate and authorize based on all available data points, including user identity, location, device health, data classification, and anomalies.

Least Privilege

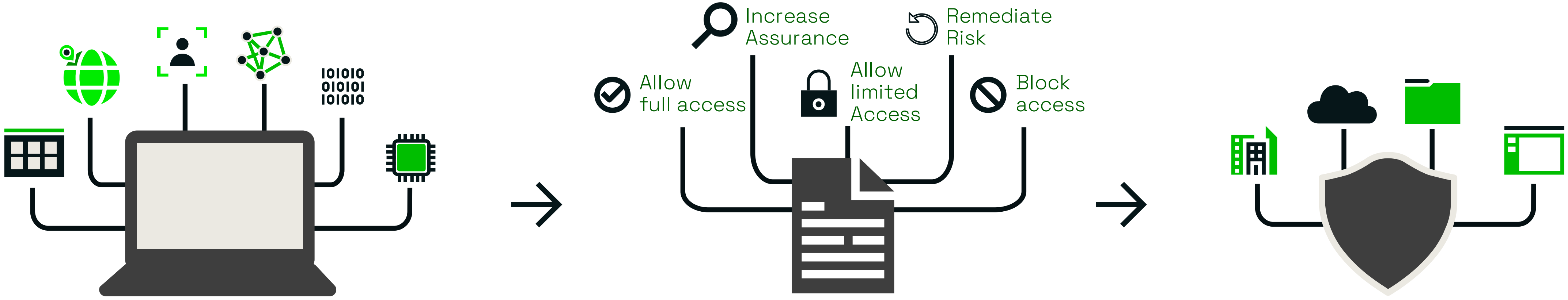
Minimize user access with Just-In-Time and Just-Enough Access (JIT/JEA), risk-based adaptive polices, and data protection which protects data and productivity.

Assume Breach

Minimize scope of breach damage and prevent lateral movement by segmenting access via network, user, devices and application awareness. Verify all sessions are encrypted end to end. Use analytics to get visibility and drive threat detection.

Zero Trust Access Control Strategy

Never Trust. Always verify.



Signal

to make an informed decision

Device Risk

- Device Management
- Threat Detection
- and more…

User Risk

- Multi-factor Authentication
- Behavior Analytics
- and more…

Decision

based on organization’s policy

Apply to inbound requests

Re-evaluate during session

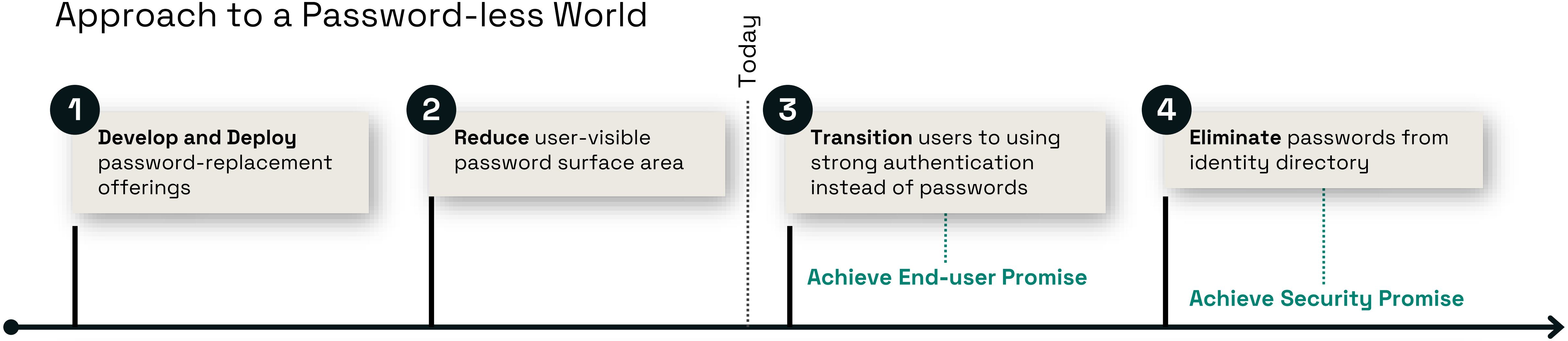
Enforcement

of policy across resources

Modern Applications
SaaS Applications
Legacy Applications
And more…

Eliminate Passwords through strong and multifactor authentication

Approach to a Password-less World



Today

1 **Develop and Deploy** password-replacement offerings

2 **Reduce** user-visible password surface area

3 **Transition** users to using strong authentication instead of passwords

Achieve End-user Promise

4 **Eliminate** passwords from identity directory

Achieve Security Promise

Windows Hello for Business
Available on all Windows 10 Machines today with improvements coming in RS4 and RS5

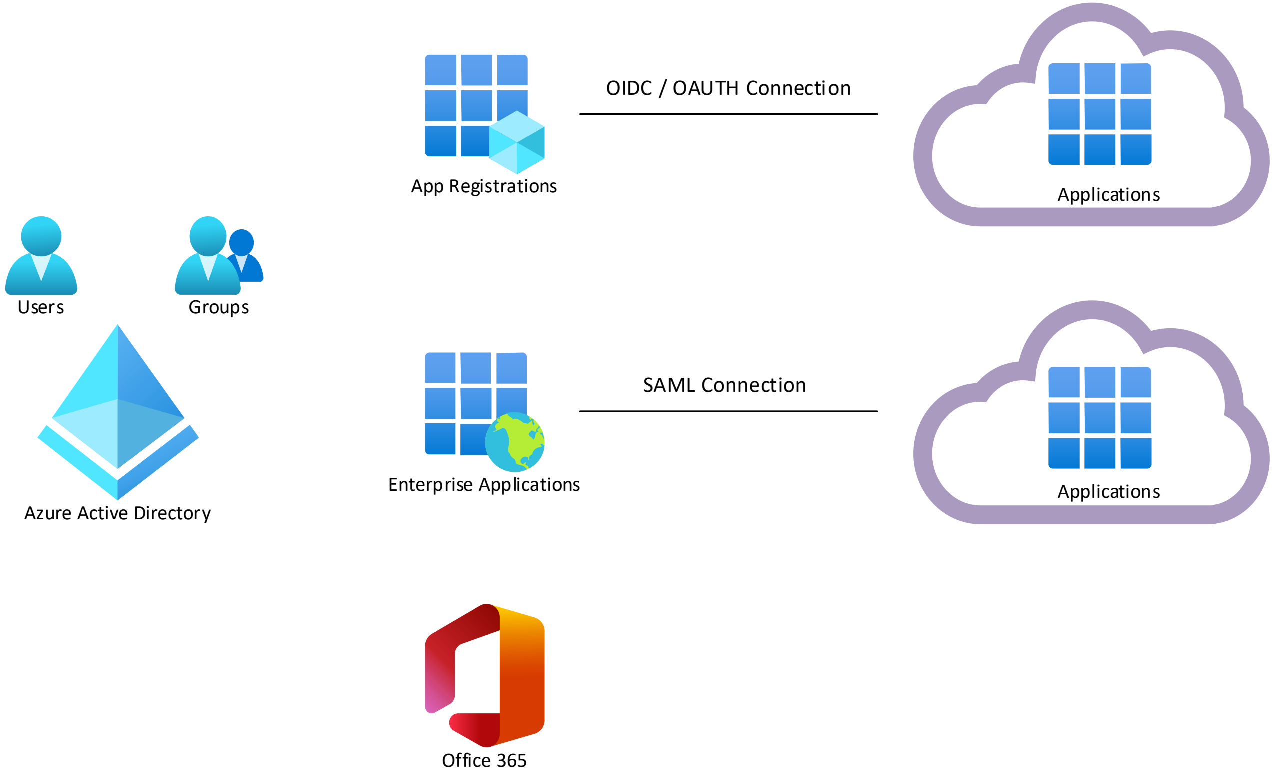
Microsoft Authenticator
Available today across all mobile platforms, integral in corporate bootstrapping of MFA

FIDO

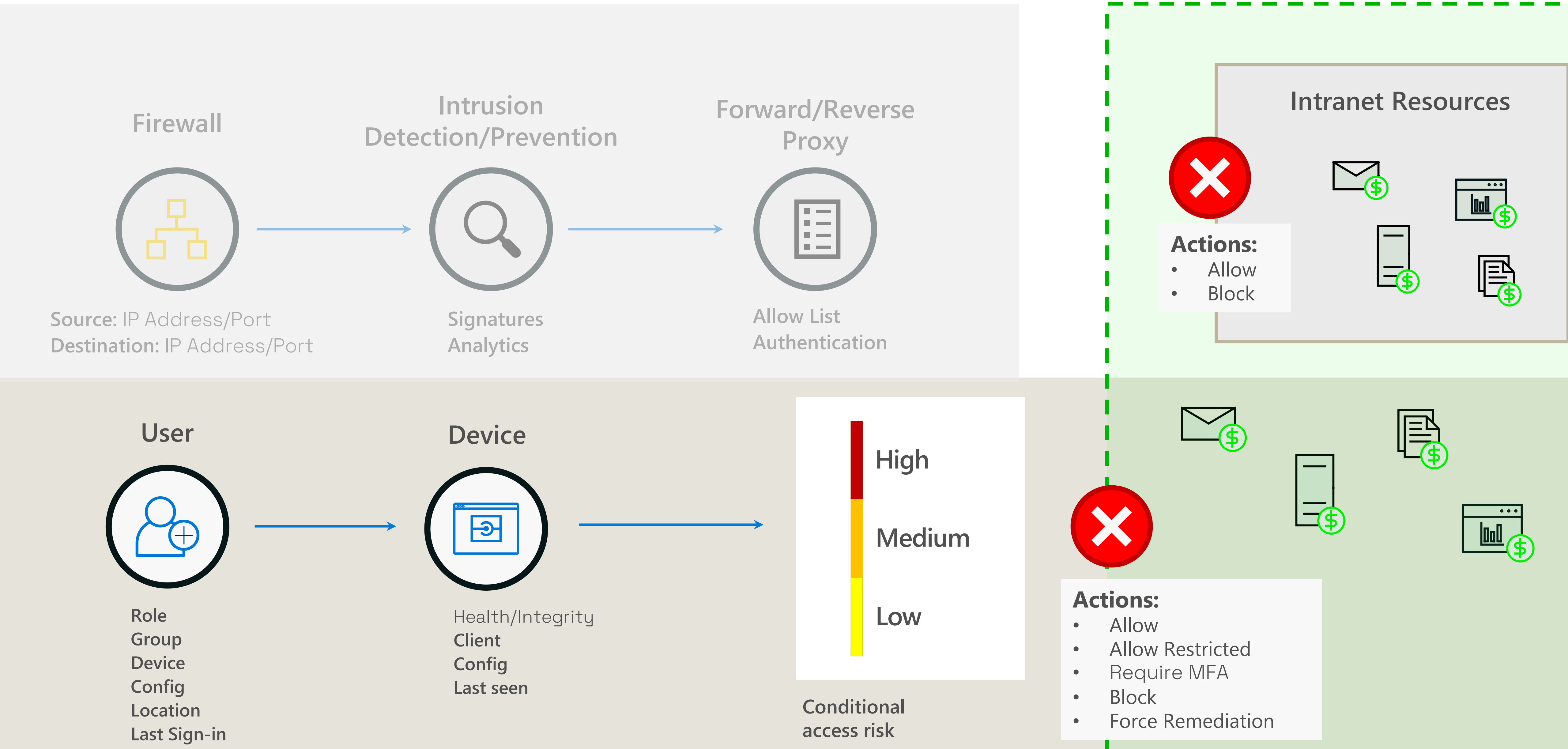
Microsoft
+
Third Party

Connect users and Applications

- →Use Azure AD as the Identity Provider
  - →Provide cloud authentication to services
    - →Office 365
    - →SaaS



VISIBILITY AND CONTROL AT THE PERIMETER



Firewall

Source: IP Address/Port
Destination: IP Address/Port

Intrusion Detection/Prevention

Signatures
Analytics

Forward/Reverse Proxy

Allow List
Authentication

Intranet Resources

Actions:
- Allow
- Block

User

Role
Group
Device
Config
Location
Last Sign-in

Device

Health/Integrity
Client
Config
Last seen

High

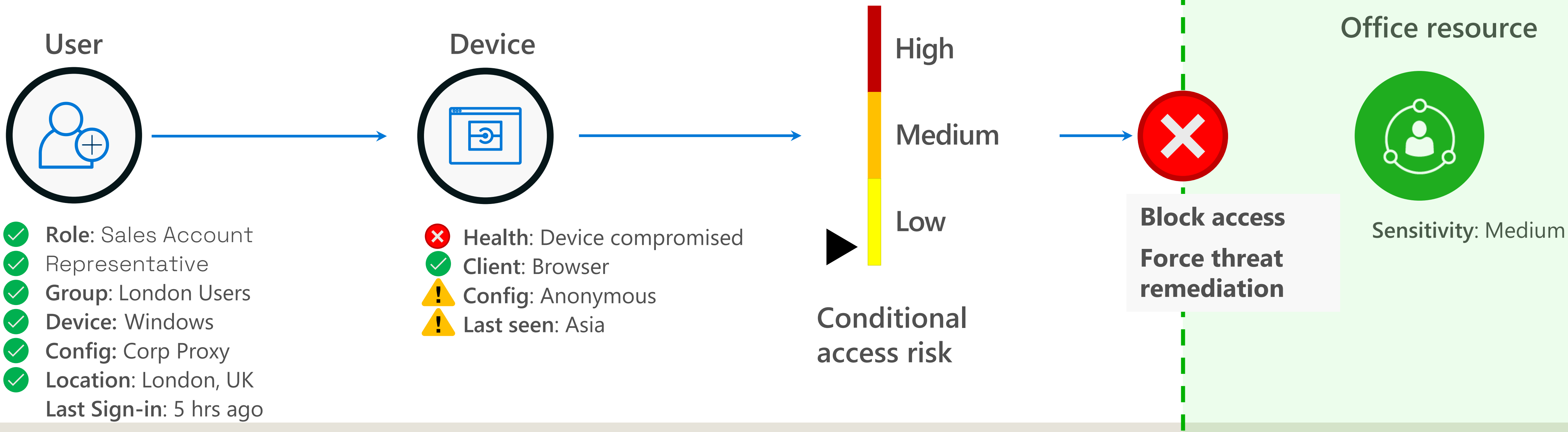
Medium

Low

Conditional access risk

Actions:
- Allow
- Allow Restricted
- Require MFA
- Block
- Force Remediation

Conditional Access Example



- ✓ **Role**: Sales Account
- ✓ Representative
- ✓ **Group**: London Users
- ✓ **Device:** Windows
- ✓ **Config**: Corp Proxy
- ✓ **Location**: London, UK
- **Last Sign-in**: 5 hrs ago

- ✗ **Health**: Device compromised
- ✓ **Client**: Browser
- ⚠ **Config**: Anonymous
- ⚠ **Last seen**: Asia

Block access

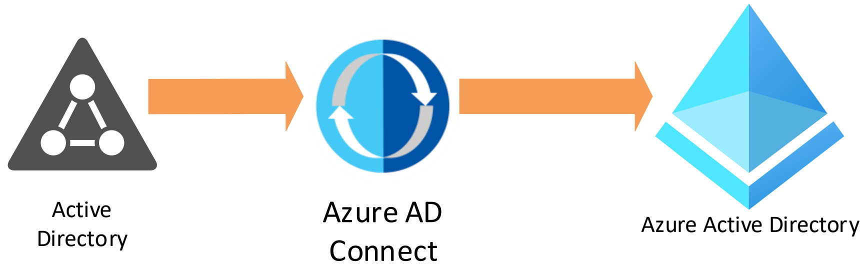
Force threat remediation

Sensitivity: Medium

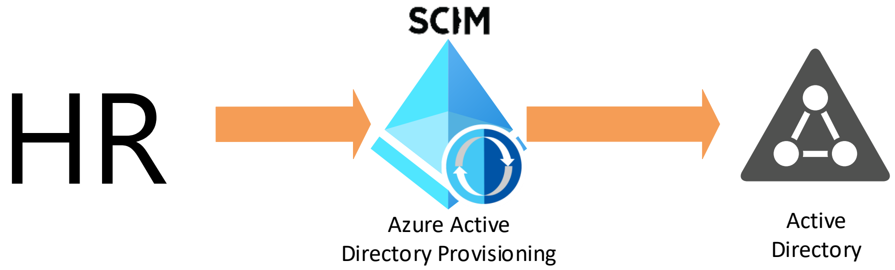
- ✗ Malicious activity detected on device
- ⚠ Anonymous IP
- ⚠ Unfamiliar sign-in location for this user

Provisioning into AAD

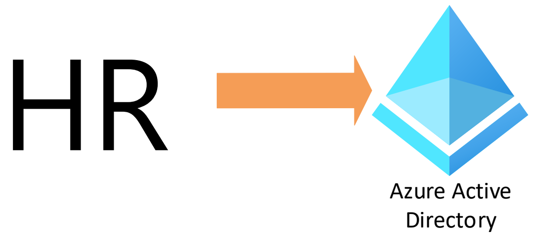
- → Provisioning from AD



- → Provisioning from HR to AD
  - → Then onward to AAD as above



- → Provisioning from HR directly to AAD



What about Privilege

- Privileged accounts should be used sparingly
- Elevate privilege as required
  - JIT – Just in time
- Use the “least privilege”
  - Just enough Privilege to perform
- Using Azure Roles
  - And linking to SaaS

Implement PIM

- Top down
- Start with Highly privileged roles
  - Global Admin
- Work down to lesser roles
- Assign through an access matrix

Access Matrix

AZURE AD ROLES	SERVICE DESK	INFRASTRUCTURE	WINTEL	SECURITY
Application administrator	🟥	🟨	🟨	🟩
Application developer				
Authentication administrator				🟩

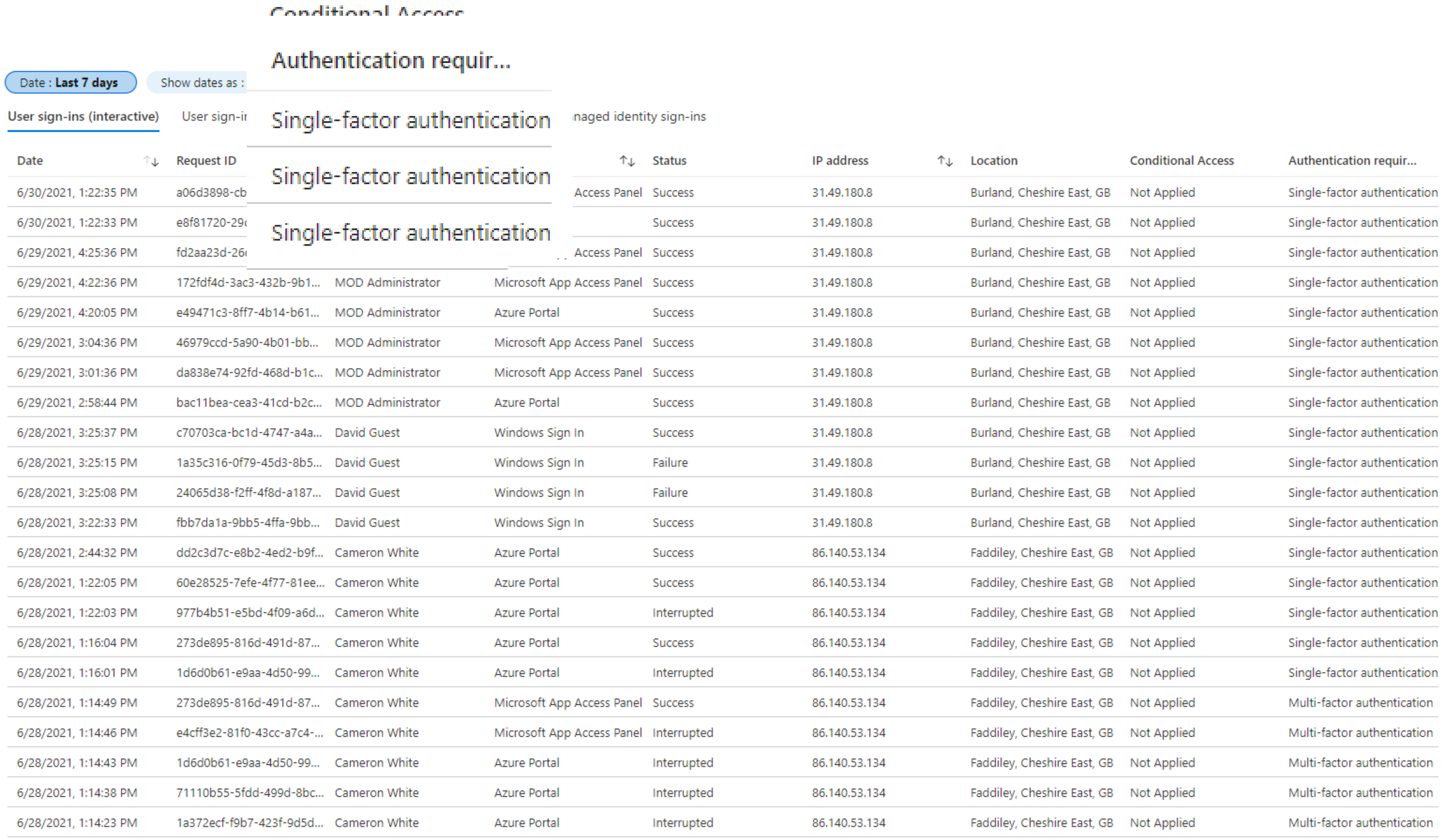
🟩 Always Active   🟨 Auto Approved   🟥 Requires Approval

What do I need to do what

- Which role can perform which activity
- Delegate roles by admin task - Azure Active Directory | Microsoft Docs
    - https://docs.microsoft.com/en-us/azure/active-directory/roles/delegate-by-task

Who signed in – how – where - when

- Azure Sign-In Logs
- Watch out for -



Conditional Access

Authentication requir...

Single-factor authentication

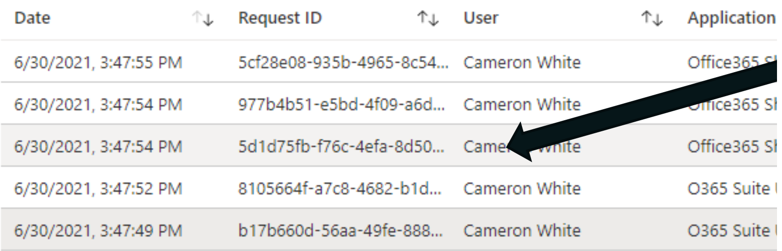
Single-factor authentication

Single-factor authentication

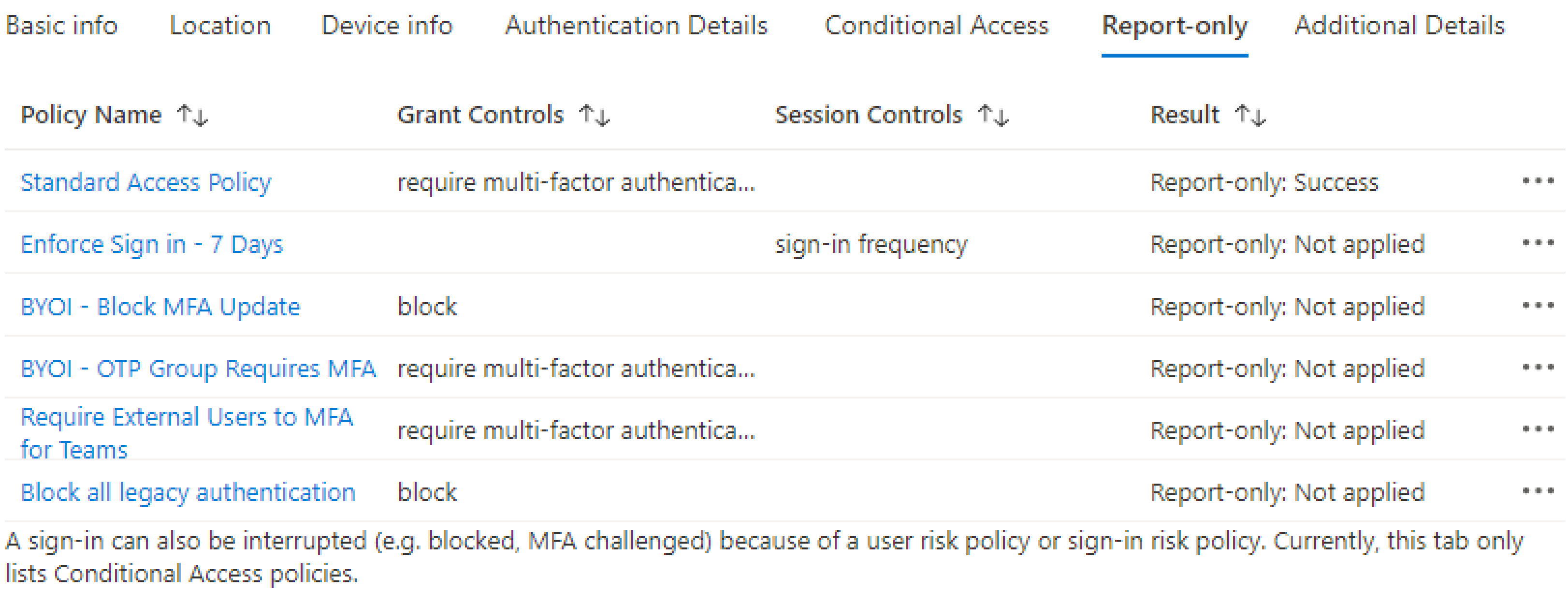
Date	Request ID			Status	IP address	Location	Conditional Access	Authentication requir...
6/30/2021, 1:22:35 PM	a06d3898-cb		Access Panel	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/30/2021, 1:22:33 PM	e8f81720-29			Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/29/2021, 4:25:36 PM	fd2aa23d-26		. . Access Panel	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/29/2021, 4:22:36 PM	172fdf4d-3ac3-432b-9b1...	MOD Administrator	Microsoft App Access Panel	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/29/2021, 4:20:05 PM	e49471c3-8ff7-4b14-b61...	MOD Administrator	Azure Portal	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/29/2021, 3:04:36 PM	46979ccd-5a90-4b01-bb...	MOD Administrator	Microsoft App Access Panel	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/29/2021, 3:01:36 PM	da838e74-92fd-468d-b1c...	MOD Administrator	Microsoft App Access Panel	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/29/2021, 2:58:44 PM	bac11bea-cea3-41cd-b2c...	MOD Administrator	Azure Portal	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 3:25:37 PM	c70703ca-bc1d-4747-a4a...	David Guest	Windows Sign In	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 3:25:15 PM	1a35c316-0f79-45d3-8b5...	David Guest	Windows Sign In	Failure	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 3:25:08 PM	24065d38-f2ff-4f8d-a187...	David Guest	Windows Sign In	Failure	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 3:22:33 PM	fbb7da1a-9bb5-4ffa-9bb...	David Guest	Windows Sign In	Success	31.49.180.8	Burland, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 2:44:32 PM	dd2c3d7c-e8b2-4ed2-b9f...	Cameron White	Azure Portal	Success	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 1:22:05 PM	60e28525-7efe-4f77-81ee...	Cameron White	Azure Portal	Success	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 1:22:03 PM	977b4b51-e5bd-4f09-a6d...	Cameron White	Azure Portal	Interrupted	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 1:16:04 PM	273de895-816d-491d-87...	Cameron White	Azure Portal	Success	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 1:16:01 PM	1d6d0b61-e9aa-4d50-99...	Cameron White	Azure Portal	Interrupted	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Single-factor authentication
6/28/2021, 1:14:49 PM	273de895-816d-491d-87...	Cameron White	Microsoft App Access Panel	Success	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Multi-factor authentication
6/28/2021, 1:14:46 PM	e4cff3e2-81f0-43cc-a7c4-...	Cameron White	Microsoft App Access Panel	Interrupted	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Multi-factor authentication
6/28/2021, 1:14:43 PM	1d6d0b61-e9aa-4d50-99...	Cameron White	Azure Portal	Interrupted	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Multi-factor authentication
6/28/2021, 1:14:38 PM	71110b55-5fdd-499d-8bc...	Cameron White	Azure Portal	Interrupted	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Multi-factor authentication
6/28/2021, 1:14:23 PM	1a372ecf-f9b7-423f-9d5d...	Cameron White	Azure Portal	Interrupted	86.140.53.134	Faddiley, Cheshire East, GB	Not Applied	Multi-factor authentication

Details

- Specific Sign-In deta

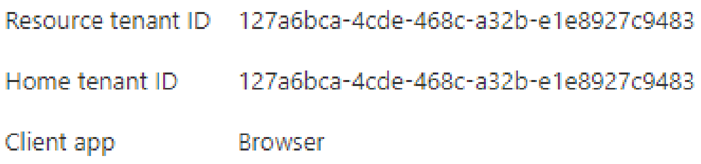


Date	Request ID	User	Application
6/30/2021, 3:47:55 PM	5cf28e08-935b-4965-8c54...	Cameron White	Office365 Sl
6/30/2021, 3:47:54 PM	977b4b51-e5bd-4f09-a6d...	Cameron White	Office365 Sl
6/30/2021, 3:47:54 PM	5d1d75fb-f76c-4efa-8d50...	Cameron White	Office365 Sl
6/30/2021, 3:47:52 PM	8105664f-a7c8-4682-b1d...	Cameron White	O365 Suite
6/30/2021, 3:47:49 PM	b17b660d-56aa-49fe-888...	Cameron White	O365 Suite

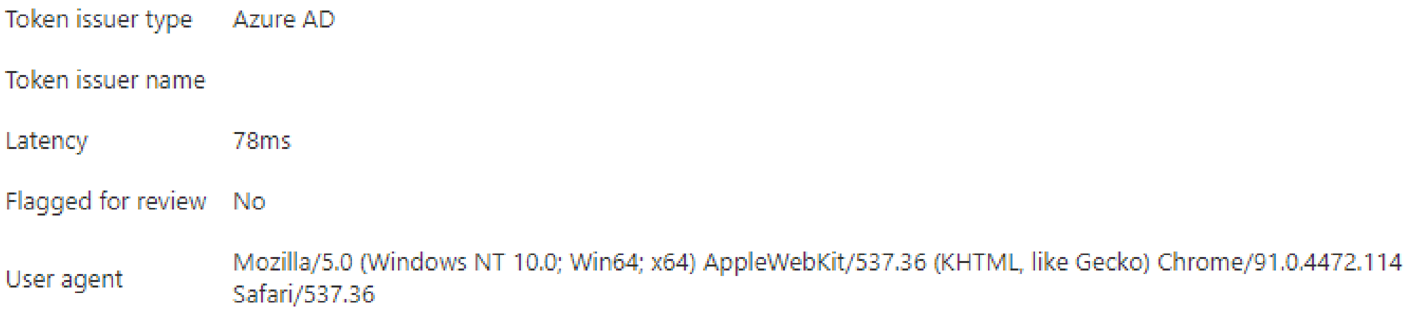


Policy Name ↑↓	Grant Controls ↑↓	Session Controls ↑↓	Result ↑↓
Standard Access Policy	require multi-factor authentica...		Report-only: Success
Enforce Sign in - 7 Days		sign-in frequency	Report-only: Not applied
BYOI - Block MFA Update	block		Report-only: Not applied
BYOI - OTP Group Requires MFA	require multi-factor authentica...		Report-only: Not applied
Require External Users to MFA for Teams	require multi-factor authentica...		Report-only: Not applied
Block all legacy authentication	block		Report-only: Not applied

A sign-in can also be interrupted (e.g. blocked, MFA challenged) because of a user risk policy or sign-in risk policy. Currently, this tab only lists Conditional Access policies.

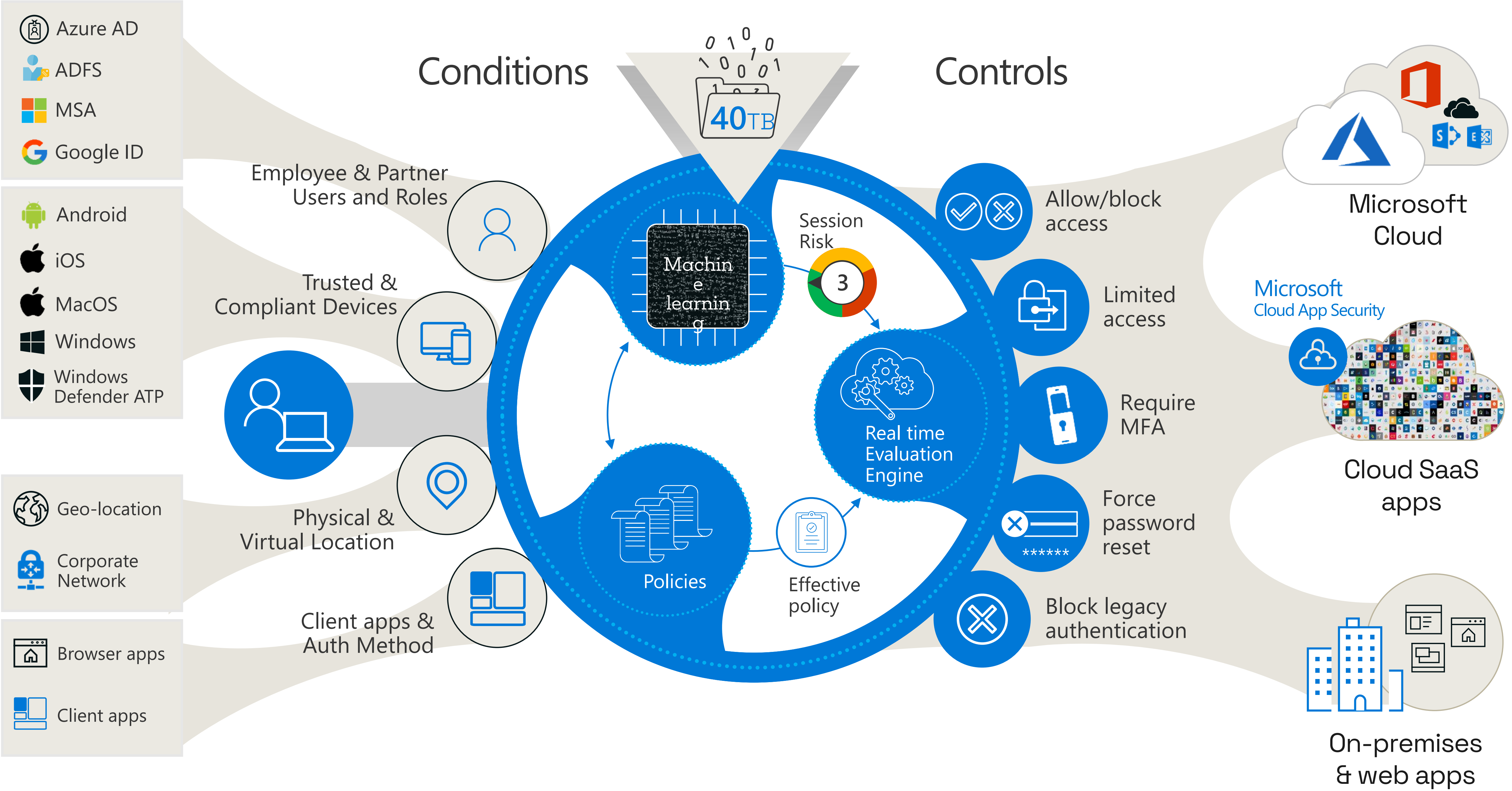


Resource tenant ID	127a6bca-4cde-468c-a32b-e1e8927c9483
Home tenant ID	127a6bca-4cde-468c-a32b-e1e8927c9483
Client app	Browser



Token issuer type	Azure AD
Token issuer name	
Latency	78ms
Flagged for review	No
User agent	Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/91.0.4472.114 Safari/537.36

Azure AD conditional access (Zero Trust)



Azure AD

ADFS

MSA

Google ID

Android

iOS

MacOS

Windows

Windows Defender ATP

Geo-location

Corporate Network

Browser apps

Client apps

Conditions

40TB

Controls

Employee & Partner Users and Roles

Trusted & Compliant Devices

Physical & Virtual Location

Client apps & Auth Method

Machin
e
learnin
g

Session Risk

3

Real time Evaluation Engine

Policies

Effective policy

Allow/block access

Limited access

Require MFA

Force password reset

******

Block legacy authentication

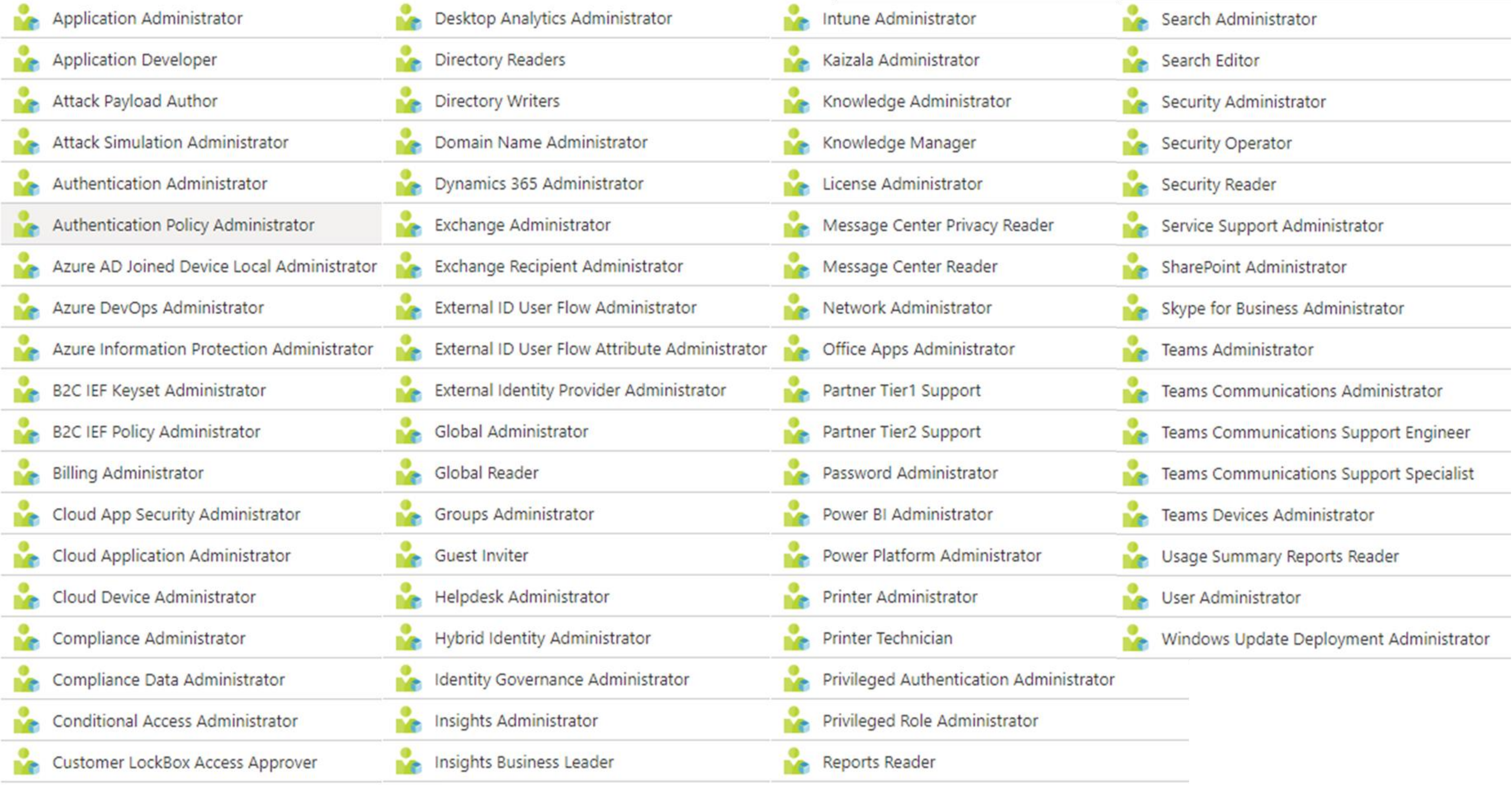
Microsoft Cloud

Microsoft Cloud App Security

Cloud SaaS apps

On-premises & web apps

Azure Roles



- Application Administrator
- Application Developer
- Attack Payload Author
- Attack Simulation Administrator
- Authentication Administrator
- Authentication Policy Administrator
- Azure AD Joined Device Local Administrator
- Azure DevOps Administrator
- Azure Information Protection Administrator
- B2C IEF Keyset Administrator
- B2C IEF Policy Administrator
- Billing Administrator
- Cloud App Security Administrator
- Cloud Application Administrator
- Cloud Device Administrator
- Compliance Administrator
- Compliance Data Administrator
- Conditional Access Administrator
- Customer LockBox Access Approver
- Desktop Analytics Administrator
- Directory Readers
- Directory Writers
- Domain Name Administrator
- Dynamics 365 Administrator
- Exchange Administrator
- Exchange Recipient Administrator
- External ID User Flow Administrator
- External ID User Flow Attribute Administrator
- External Identity Provider Administrator
- Global Administrator
- Global Reader
- Groups Administrator
- Guest Inviter
- Helpdesk Administrator
- Hybrid Identity Administrator
- Identity Governance Administrator
- Insights Administrator
- Insights Business Leader
- Intune Administrator
- Kaizala Administrator
- Knowledge Administrator
- Knowledge Manager
- License Administrator
- Message Center Privacy Reader
- Message Center Reader
- Network Administrator
- Office Apps Administrator
- Partner Tier1 Support
- Partner Tier2 Support
- Password Administrator
- Power BI Administrator
- Power Platform Administrator
- Printer Administrator
- Printer Technician
- Privileged Authentication Administrator
- Privileged Role Administrator
- Reports Reader
- Search Administrator
- Search Editor
- Security Administrator
- Security Operator
- Security Reader
- Service Support Administrator
- SharePoint Administrator
- Skype for Business Administrator
- Teams Administrator
- Teams Communications Administrator
- Teams Communications Support Engineer
- Teams Communications Support Specialist
- Teams Devices Administrator
- Usage Summary Reports Reader
- User Administrator
- Windows Update Deployment Administrator

Zero Trust Model

Modern Approach to Access

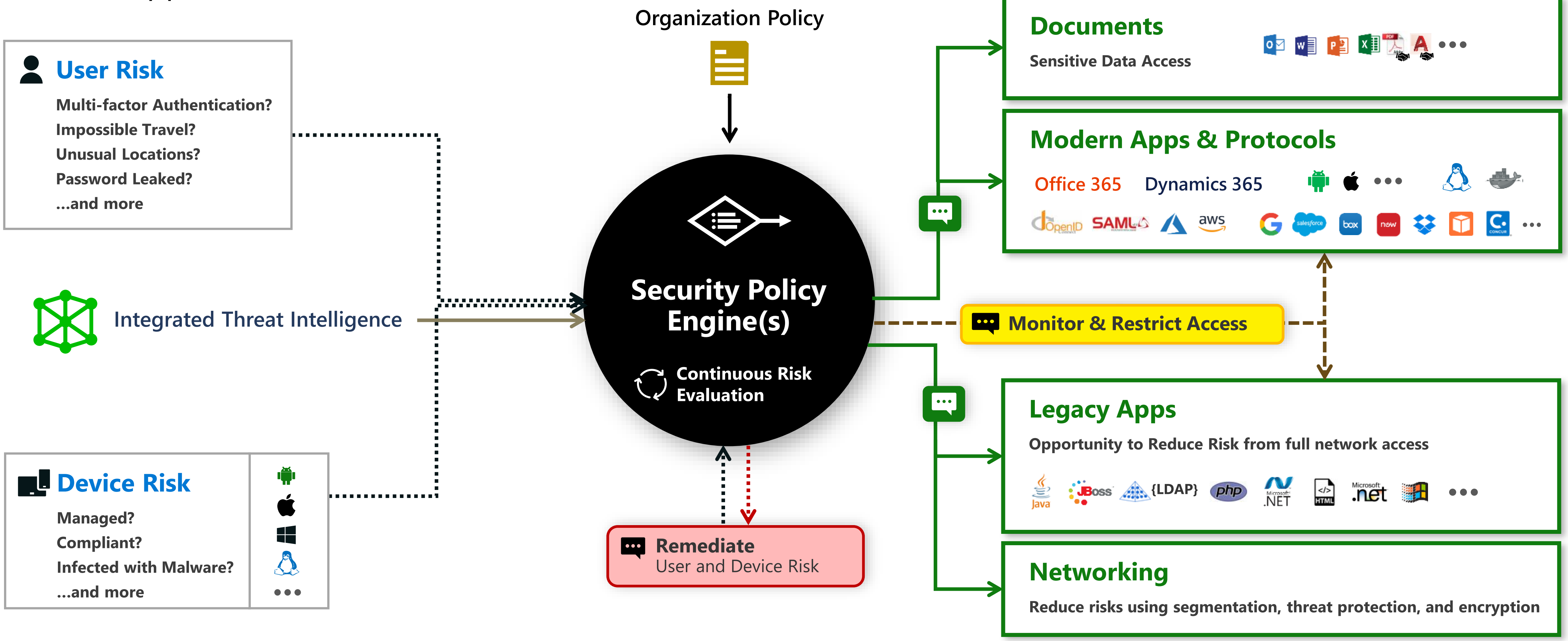
Legend

······ Trust Signal

—— Threat Intelligence

—— Full Access

- - - Limited Access



Organization Policy

User Risk

Multi-factor Authentication?
Impossible Travel?
Unusual Locations?
Password Leaked?
...and more

Integrated Threat Intelligence

Device Risk

Managed?
Compliant?
Infected with Malware?
...and more

Security Policy Engine(s)

Continuous Risk Evaluation

Remediate
User and Device Risk

Monitor & Restrict Access

Documents

Sensitive Data Access

Modern Apps & Protocols

Office 365 Dynamics 365

OpenID SAML aws

Legacy Apps

Opportunity to Reduce Risk from full network access

Java JBoss {LDAP} php .NET HTML .net

Networking

Reduce risks using segmentation, threat protection, and encryption

Signal
to make an informed decision

Decision
based on organizational policy

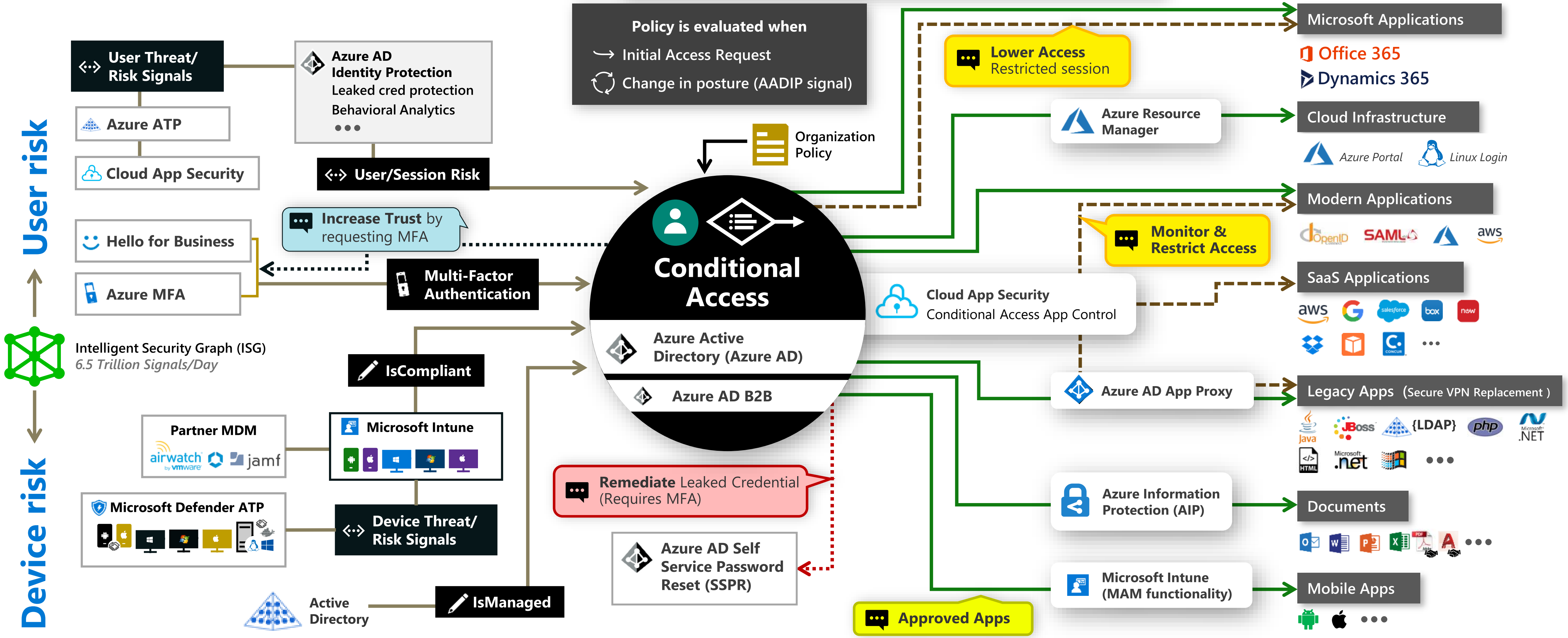
Enforcement
of policy across resources

Zero Trust User Access

Conditional Access to Resources

Legend

- Full access
- Limited access
- Risk Mitigation
- Remediation Path



Policy is evaluated when

Initial Access Request

Change in posture (AADIP signal)

User risk

User Threat/ Risk Signals

Azure ATP

Cloud App Security

Azure AD Identity Protection

Leaked cred protection

Behavioral Analytics

•••

User/Session Risk

Increase Trust by requesting MFA

Hello for Business

Azure MFA

Multi-Factor Authentication

Intelligent Security Graph (ISG)

6.5 Trillion Signals/Day

Device risk

IsCompliant

Partner MDM

airwatch by vmware

jamf

Microsoft Intune

Microsoft Defender ATP

Device Threat/ Risk Signals

Active Directory

IsManaged

Organization Policy

Conditional Access

Azure Active Directory (Azure AD)

Azure AD B2B

Remediate Leaked Credential (Requires MFA)

Azure AD Self Service Password Reset (SSPR)

Lower Access Restricted session

Azure Resource Manager

Monitor & Restrict Access

Cloud App Security Conditional Access App Control

Azure AD App Proxy

Azure Information Protection (AIP)

Microsoft Intune (MAM functionality)

Approved Apps

Microsoft Applications

Office 365

Dynamics 365

Cloud Infrastructure

Azure Portal

Linux Login

Modern Applications

OpenID

SAML

aws

SaaS Applications

aws

salesforce

box

now

•••

Legacy Apps (Secure VPN Replacement)

Java

JBoss

{LDAP}

php

Microsoft .NET

HTML

Microsoft .net

•••

Documents

•••

Mobile Apps

•••

Signal

to make an informed decision

Decision

based on organizational policy

Enforcement

of policy across resources

Kocho

BECOME GREATER

Thank you

→ Any questions?