Top 5 Ways to Improve your Apple End User Experience in AAD/M365

Intro

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Agenda

What is Azure AD and Conditional Access?

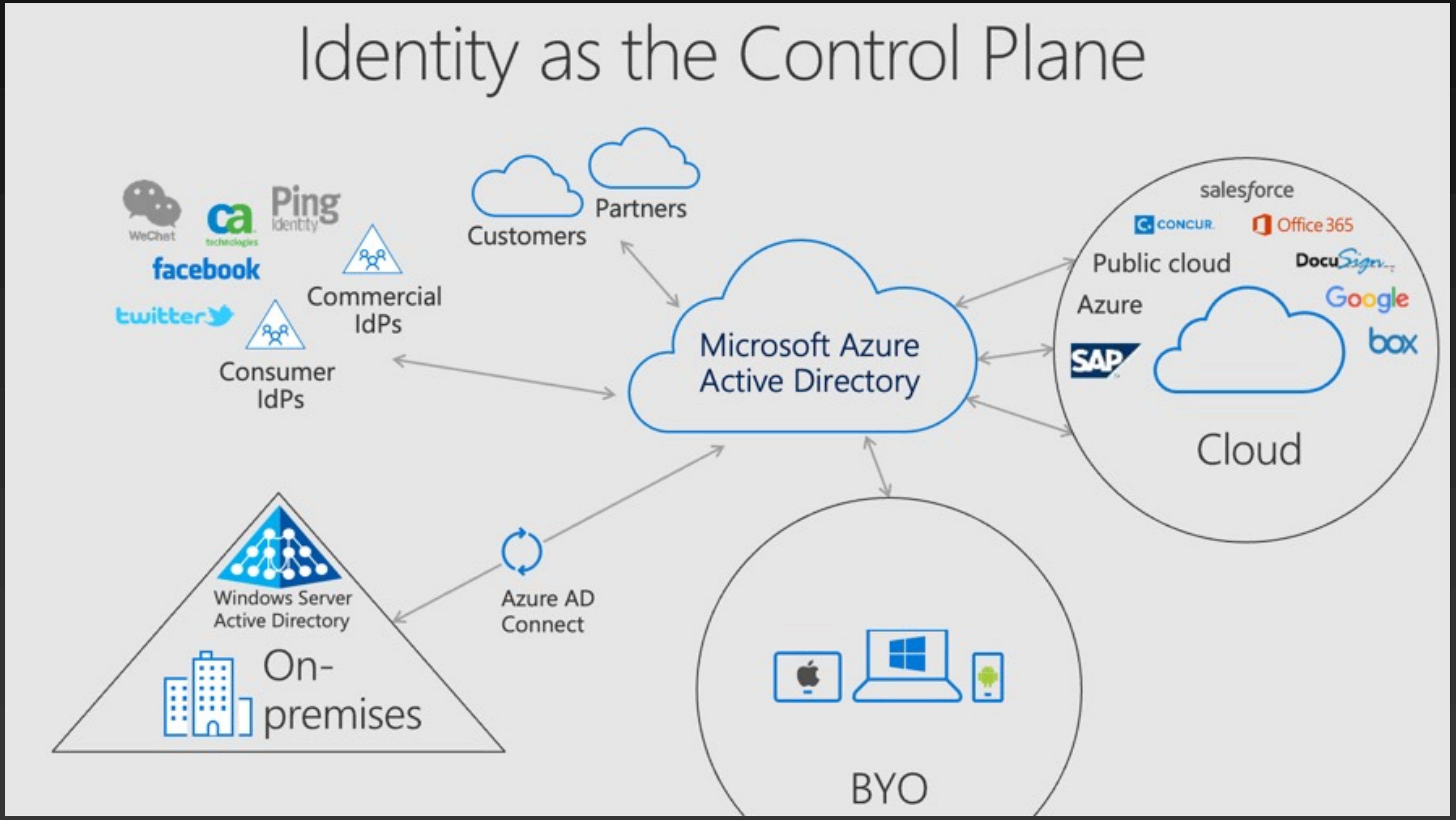
Prompting…why is it bad?

Top 5 Recommendations

Go-Dos

Azure AD

- Azure AD is a full blown IDaaS solution, not an IDP for just Office 365/Azure
- Resources are moving to the cloud, devices are proliferating, users are outside the office
- Identity needs to be the new control plane, rather than the network perimeter



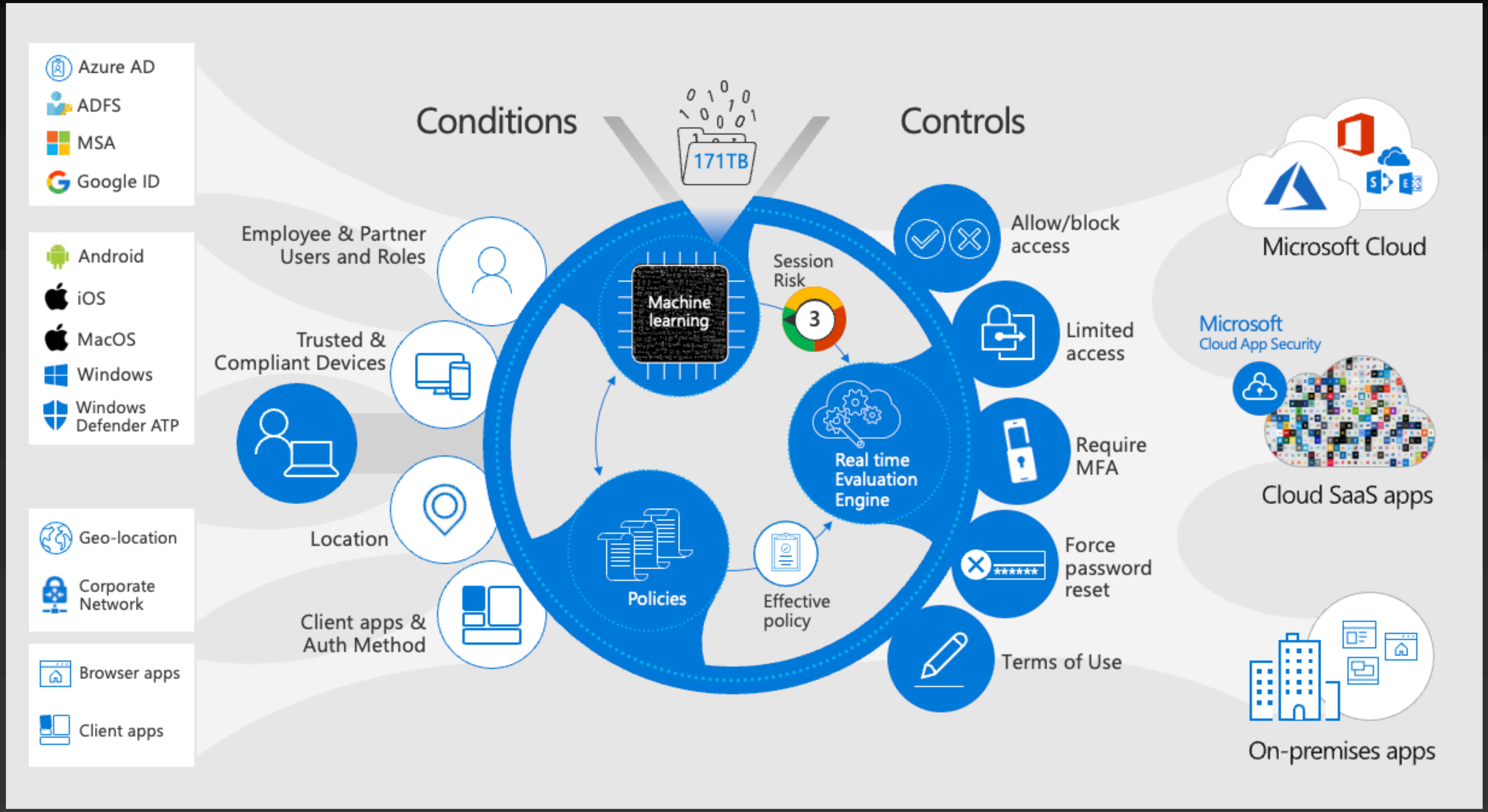
Identity as the Control Plane

Azure AD Protocols

- Committed to open standards, especially OpenID Connect and other modern protocols
- Microsoft cloud services are built on OpenID Connect
- Investing in new standards, like FIDO and DIF
  - See joint Passkeys announcement from FIDO foundation, Microsoft, Apple, and Google: https://aka.ms/PasskeyAnnouncement

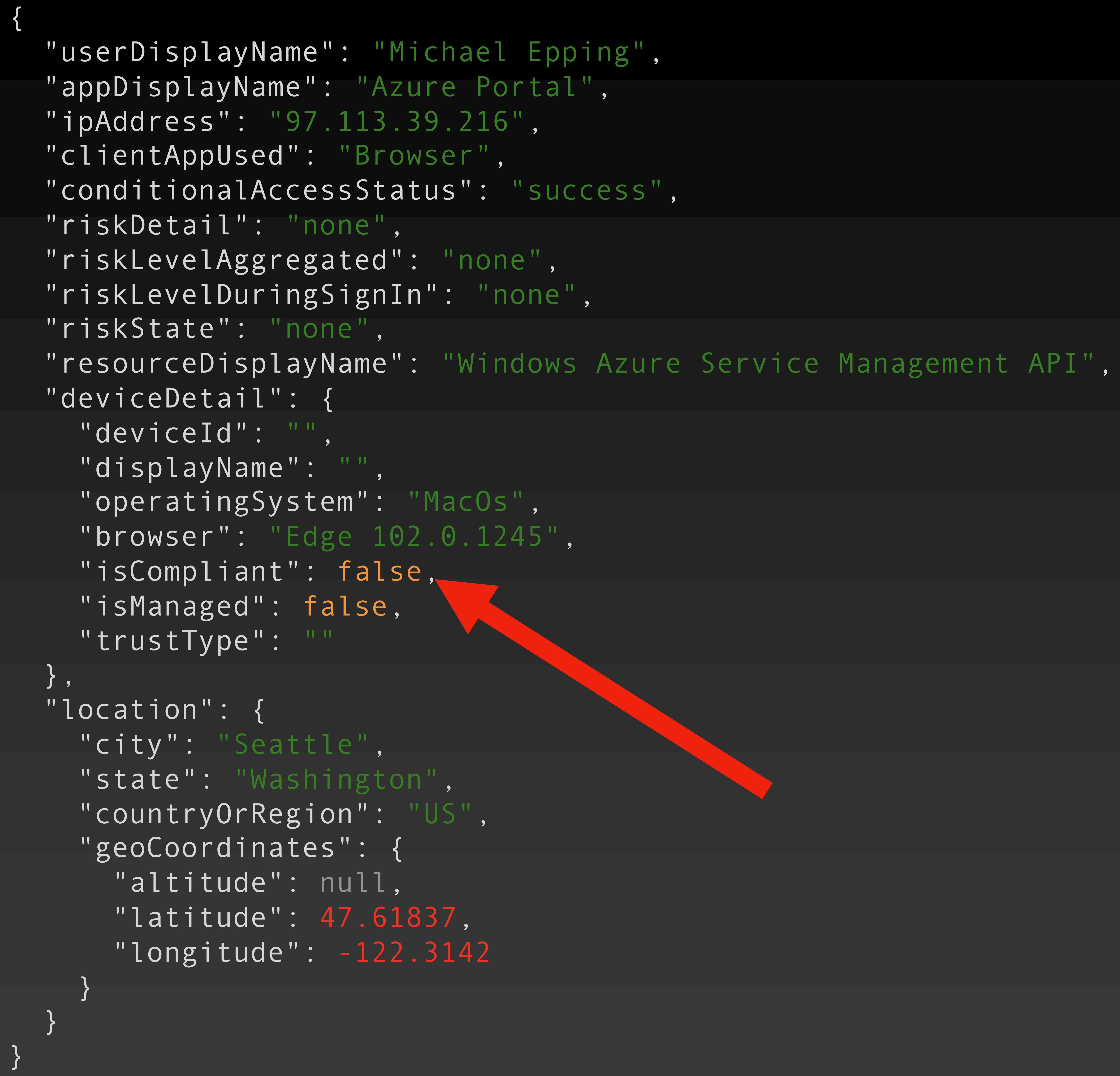
Conditional Access

- Zero-trust AuthN and AuthZ engine
  - Evaluate trust every time a user or device requests access to a resource
- Conditional access understands the user's activity
  - User location
  - User Risk
  - State of device
  - App requirements



Conditional Access Evaluation Phase

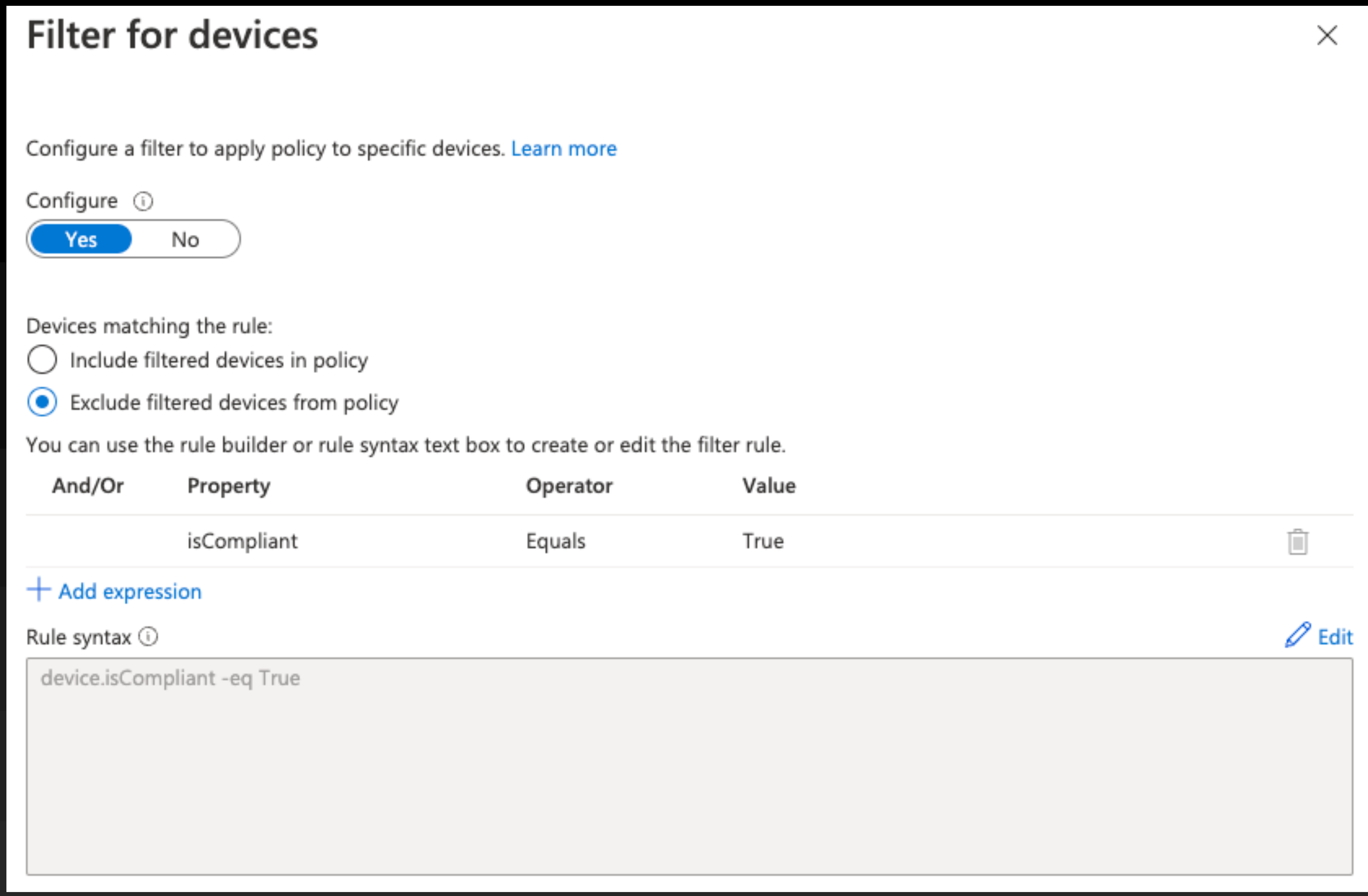
- All Conditional Access polices are ANDed together. (Not like GPO LSDO precedence)
  - Is Policy in scope of the request
  - BLOCK controls satisfied first
  - GRANT controls applied in order
    - Risk
    - MFA
    - Device
    - Approved client app/app protection
  - Tries to satisfy policy without user interaction
    - Example: Control MFA or Device compliant. If device is NOT compliant, will THEN prompt for MFA.



```
{
  "userDisplayName": "Michael Epping",
  "appDisplayName": "Azure Portal",
  "ipAddress": "97.113.39.216",
  "clientAppUsed": "Browser",
  "conditionalAccessStatus": "success",
  "riskDetail": "none",
  "riskLevelAggregated": "none",
  "riskLevelDuringSignIn": "none",
  "riskState": "none",
  "resourceDisplayName": "Windows Azure Service Management API",
  "deviceDetail": {
    "deviceId": "",
    "displayName": "",
    "operatingSystem": "MacOs",
    "browser": "Edge 102.0.1245",
    "isCompliant": false,
    "isManaged": false,
    "trustType": ""
  },
  "location": {
    "city": "Seattle",
    "state": "Washington",
    "countryOrRegion": "US",
    "geoCoordinates": {
      "altitude": null,
      "latitude": 47.61837,
      "longitude": -122.3142
    }
  }
}
```

Common Policies

- Talk to your IAM team to understand your Conditional Access policies
- Requiring MFA for all users
- Blocking legacy auth
- Blocking access by country location
- Require compliant or hybrid join device
- Stricter Controls for non-corp managed devices (is this macOS in your environment?)
  - Sign-In Frequency to 2 hours for everything not filtered out
  - "Good" for security, but…



Filter for devices

Configure a filter to apply policy to specific devices. Learn more

Configure ⓘ

[✓ Yes] No

Devices matching the rule:

○ Include filtered devices in policy

● Exclude filtered devices from policy

You can use the rule builder or rule syntax text box to create or edit the filter rule.

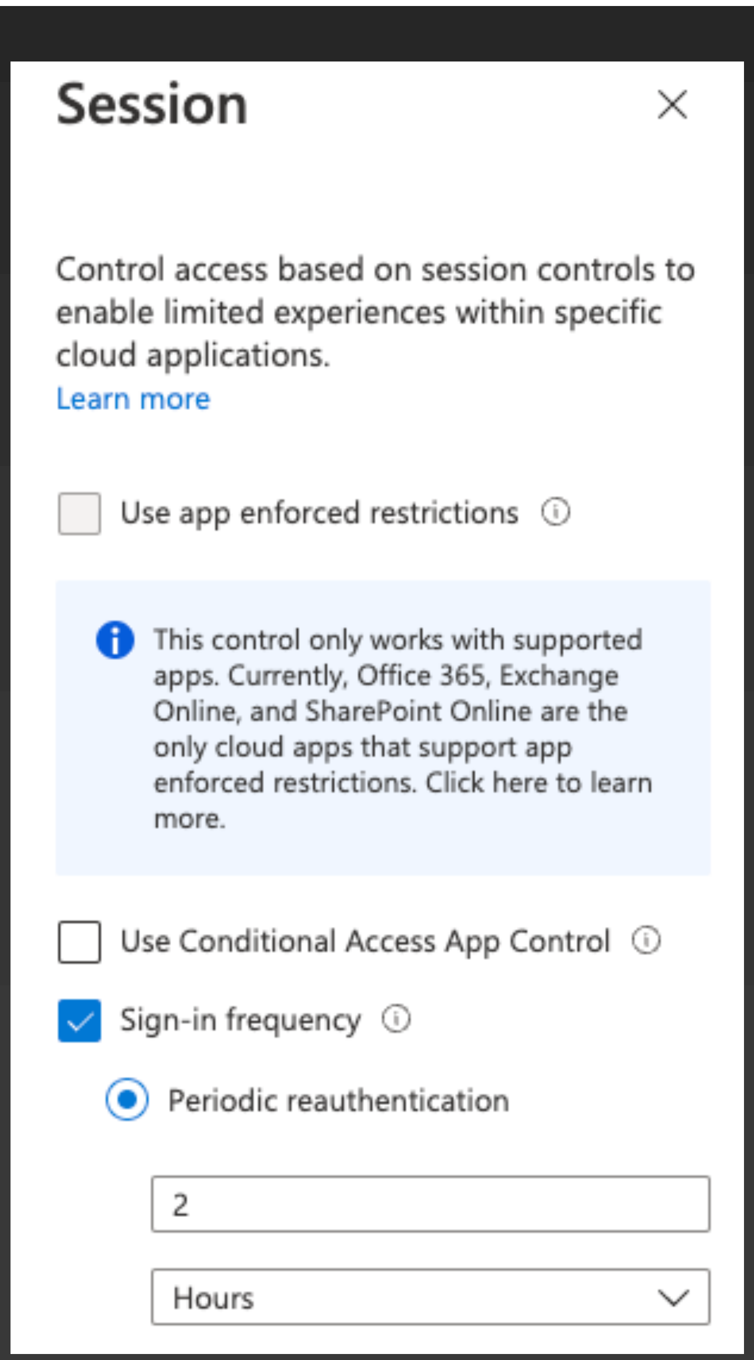
And/Or	Property	Operator	Value
	isCompliant	Equals	True

+ Add expression

Rule syntax ⓘ

Edit

```
device.isCompliant -eq True
```



Session

Control access based on session controls to enable limited experiences within specific cloud applications.
Learn more

☐ Use app enforced restrictions ⓘ

This control only works with supported apps. Currently, Office 365, Exchange Online, and SharePoint Online are the only cloud apps that support app enforced restrictions. Click here to learn more.

☐ Use Conditional Access App Control ⓘ

☑ Sign-in frequency ⓘ

● Periodic reauthentication

2

Hours

Agenda

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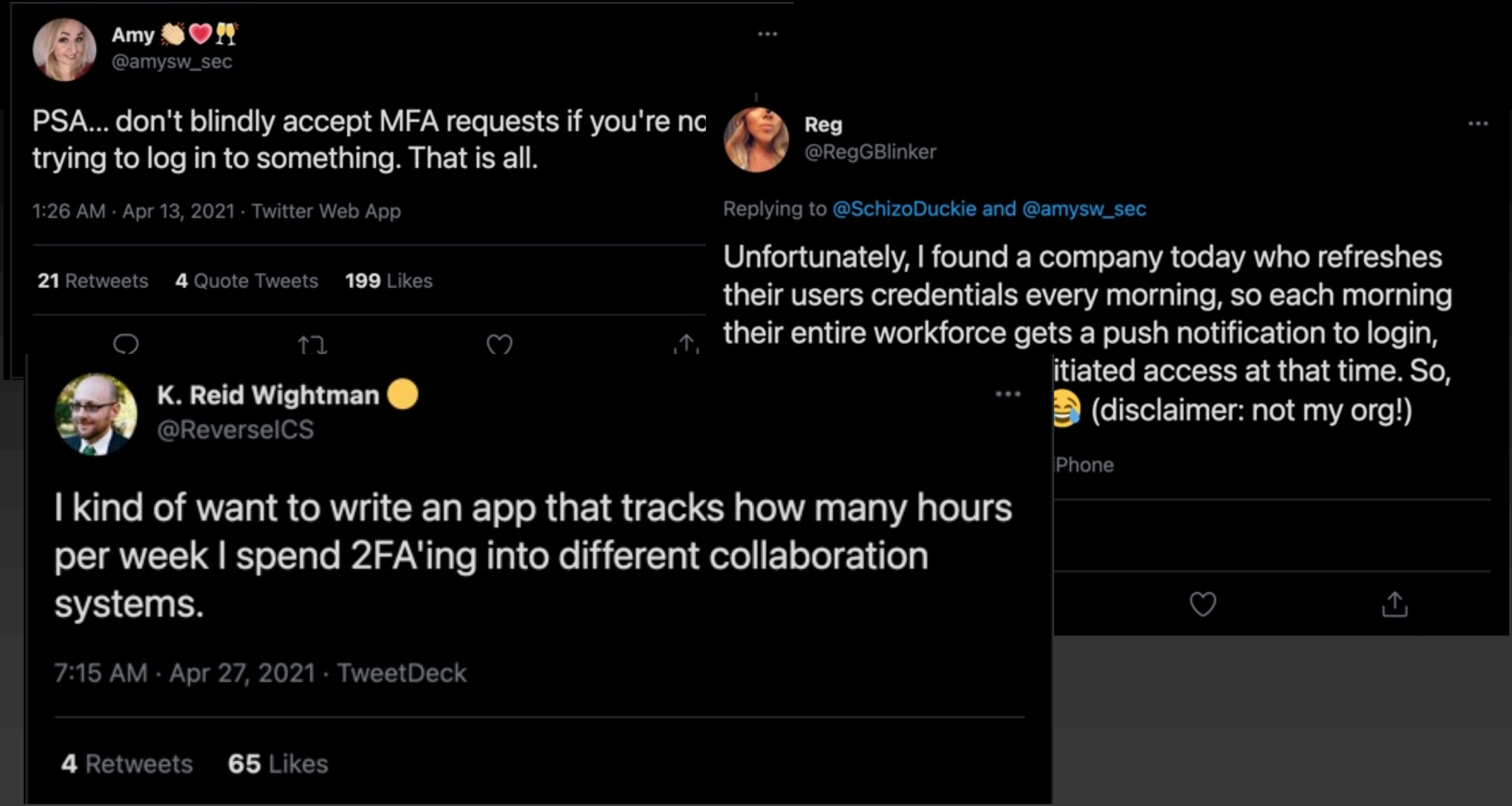
Prompting…why is it bad?

Top 5 Recommendations

Go-Dos



Amy 👏❤️🥂
@amysw_sec

PSA... don't blindly accept MFA requests if you're nc
trying to log in to something. That is all.

1:26 AM · Apr 13, 2021 · Twitter Web App

21 Retweets **4** Quote Tweets **199** Likes

Reg
@RegGBlinker

Replying to @SchizoDuckie and @amysw_sec

Unfortunately, I found a company today who refreshes their users credentials every morning, so each morning their entire workforce gets a push notification to login,
itiated access at that time. So,
😂 (disclaimer: not my org!)

iPhone

K. Reid Wightman 🟡
@ReverseICS

I kind of want to write an app that tracks how many hours per week I spend 2FA'ing into different collaboration systems.

7:15 AM · Apr 27, 2021 · TweetDeck

4 Retweets **65** Likes

Customer Case Study

European financial company simulated cyber attack.

- Attackers used password spray to find users with weak passwords.
- Users with compromised passwords were “hammered” with MFA prompts.

Findings:

- No reports of unexpected prompts to the help desk.
- Many users blindly approved MFA requests.
- One user had uninstalled the Authenticator app.

Why Prompting is Bad

- Over-prompting leads to compromise
  - Users learn bad behaviors, like blindly approving MFA requests
- Prompts impact productivity, especially on platforms without SSO
- Prompting is especially common on macOS, which does not do SSO with Azure AD out of the box
- Should strive to improve user experience AND security
  - Prompt when *needed*, such as new device, new location, change in risk, etc.
  - Passwordless makes prompting less impactful when it IS needed

Agenda

What is Azure AD and Conditional Access?

Prompting…why is it bad?

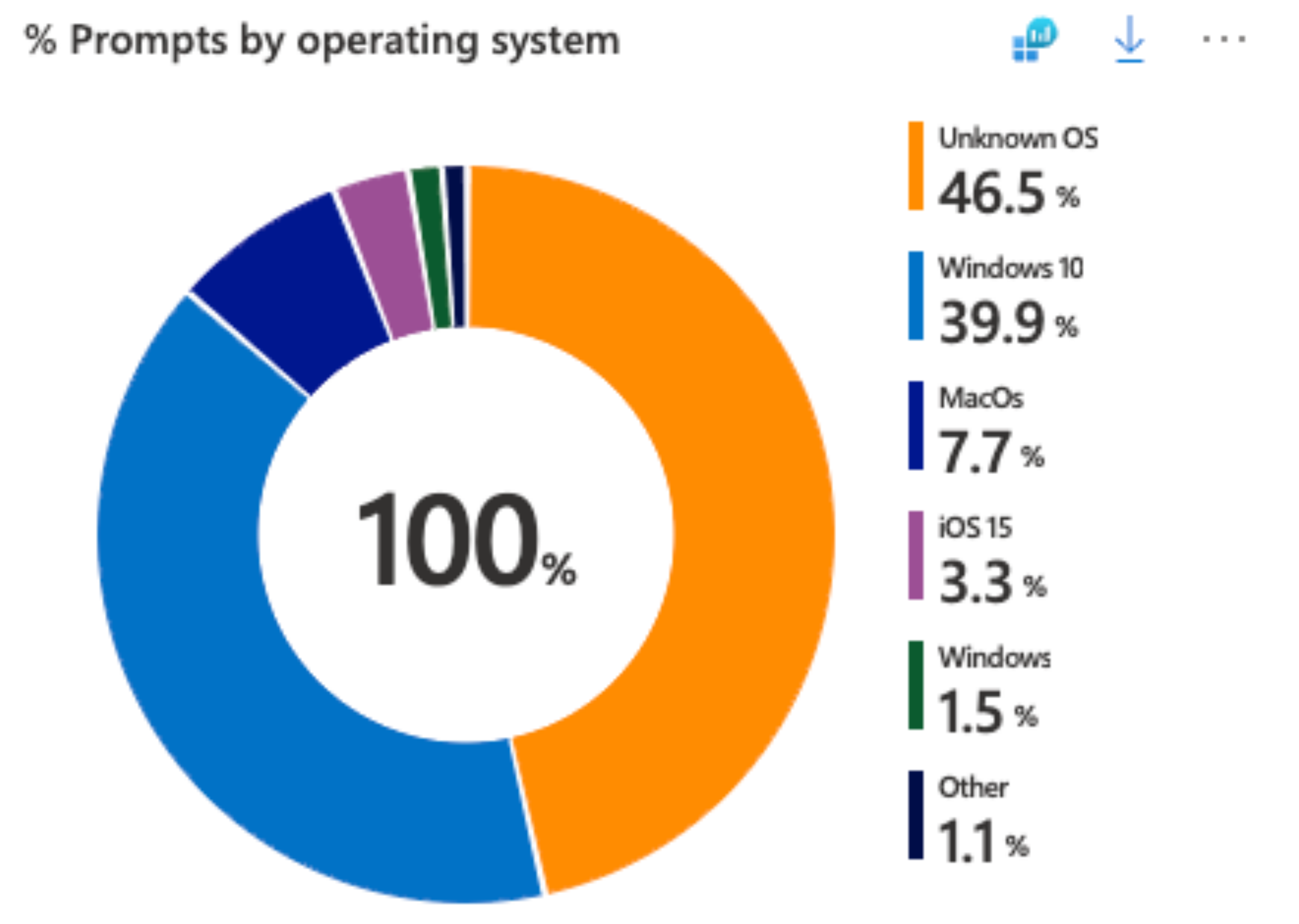
Top 5 Recommendations

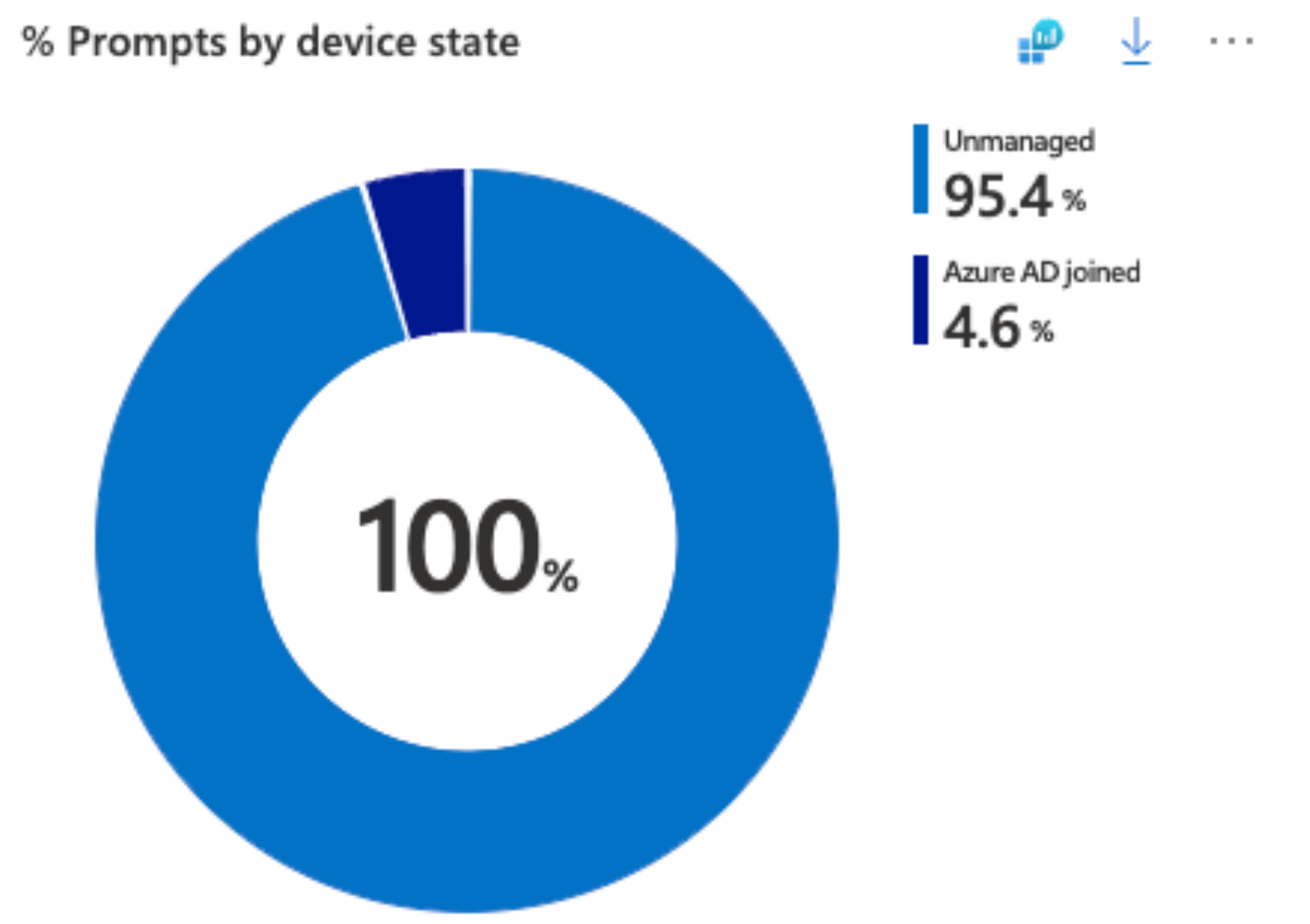
Go-Dos

Recommendation 1: Determine if you have a prompting problem

Show it with data!

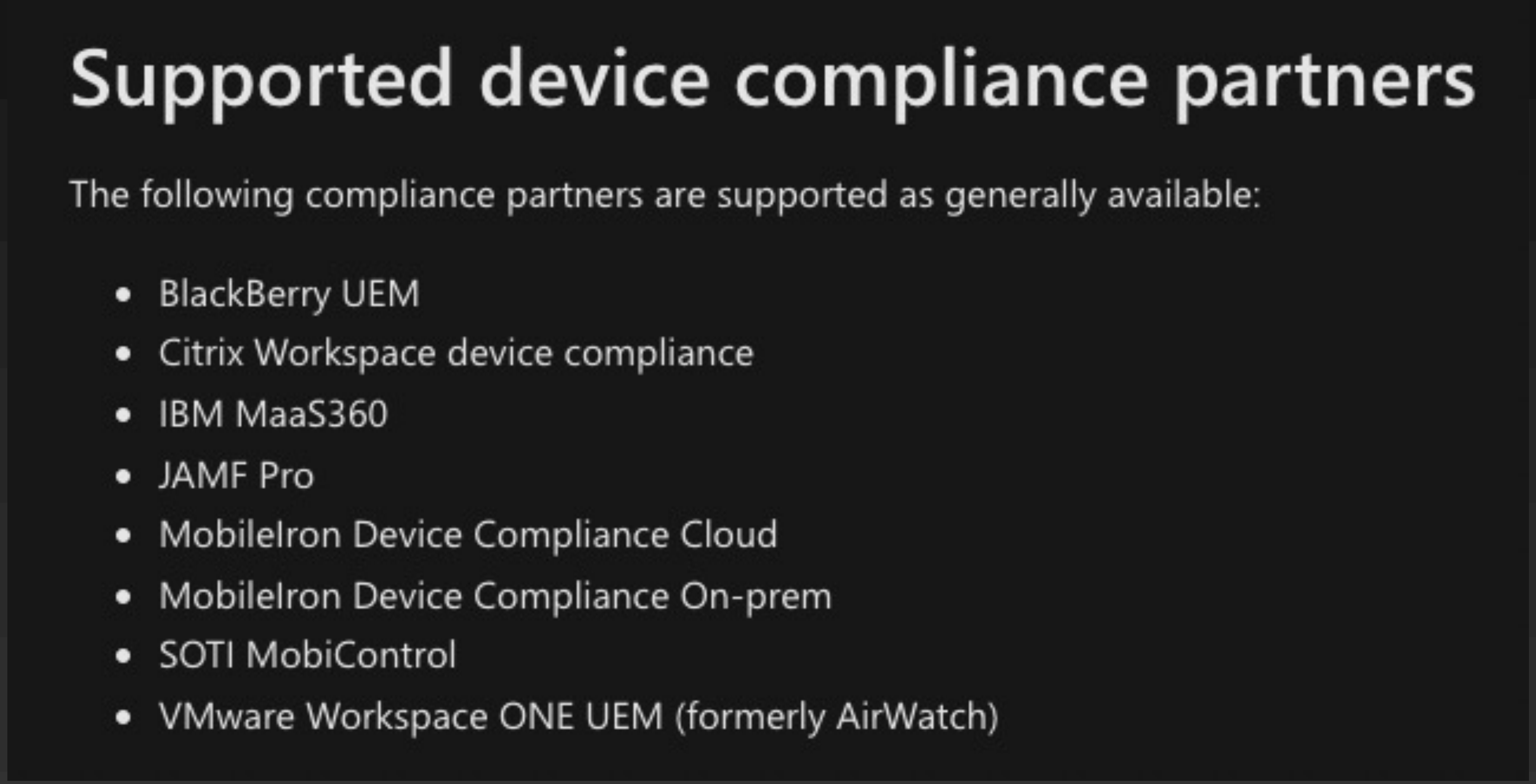
- All the data you need is in your Azure AD sign-in logs
- Use the pre-built Azure AD Workbook http://aka.ms/MFAPromptsWorkbook
- Comes with data visualizations as well as recommendations:
  - Which users are being prompted the most?
  - Which applications have a high prompt count?
  - What is the device state?


% Prompts by operating system


% Prompts by device state

Recommendation 2: Enroll in MDM, Use Device Compliance

- MDM is the only *modern* way to deploy SSO features to macOS
  - MDM helps us improve device and identity security (Conditional Access)
  - SSO helps us improve end-user experience (fewer prompts) and security (over-prompting trains users to make poor decisions)
  - These are *related*, but *different* features
- Intune or Intune-integrated MDMs can send compliance information to Azure AD
  - This information is critical for those device-based Conditional Access policies
- Without Intune or an Intune-integrated MDM, Azure AD sees all Macs as unmanaged



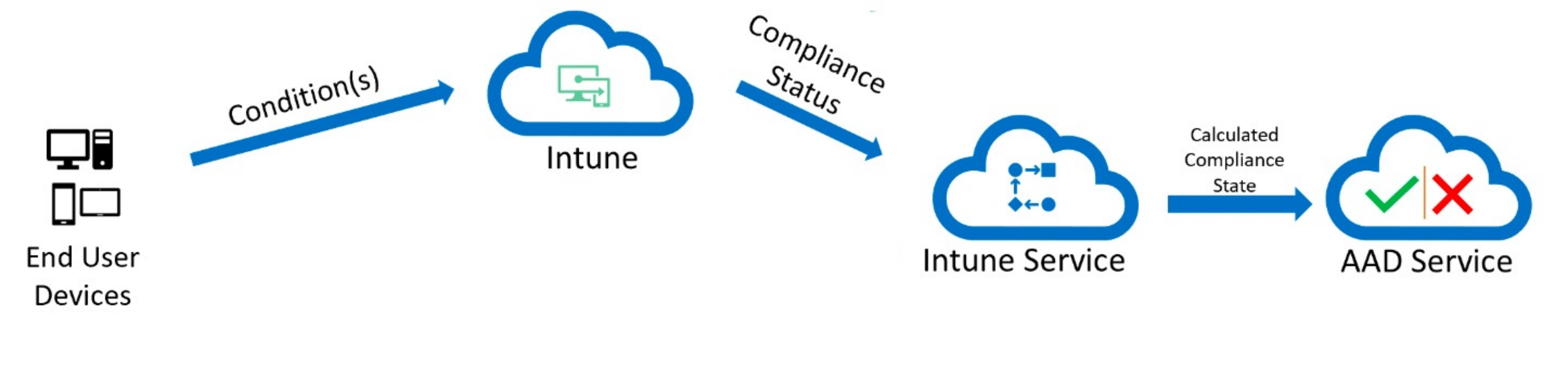
Supported device compliance partners

The following compliance partners are supported as generally available:

- BlackBerry UEM
- Citrix Workspace device compliance
- IBM MaaS360
- JAMF Pro
- MobileIron Device Compliance Cloud
- MobileIron Device Compliance On-prem
- SOTI MobiControl
- VMware Workspace ONE UEM (formerly AirWatch)

Recommendation 2: Enroll in MDM, Use Device Compliance

- Good macOS security with Azure AD requires two MDM-delivered capabilities:
  - Device health attestation
  - SSO deployed through the MDM channel…reduce prompts as much as possible
- Device health and compliance integration with Azure AD is easy to deploy if Intune is the MDM
- Jamf Pro and other 3rd Party MDMs can integrate with Intune to support device compliance
  - Extra work, but *worth it*



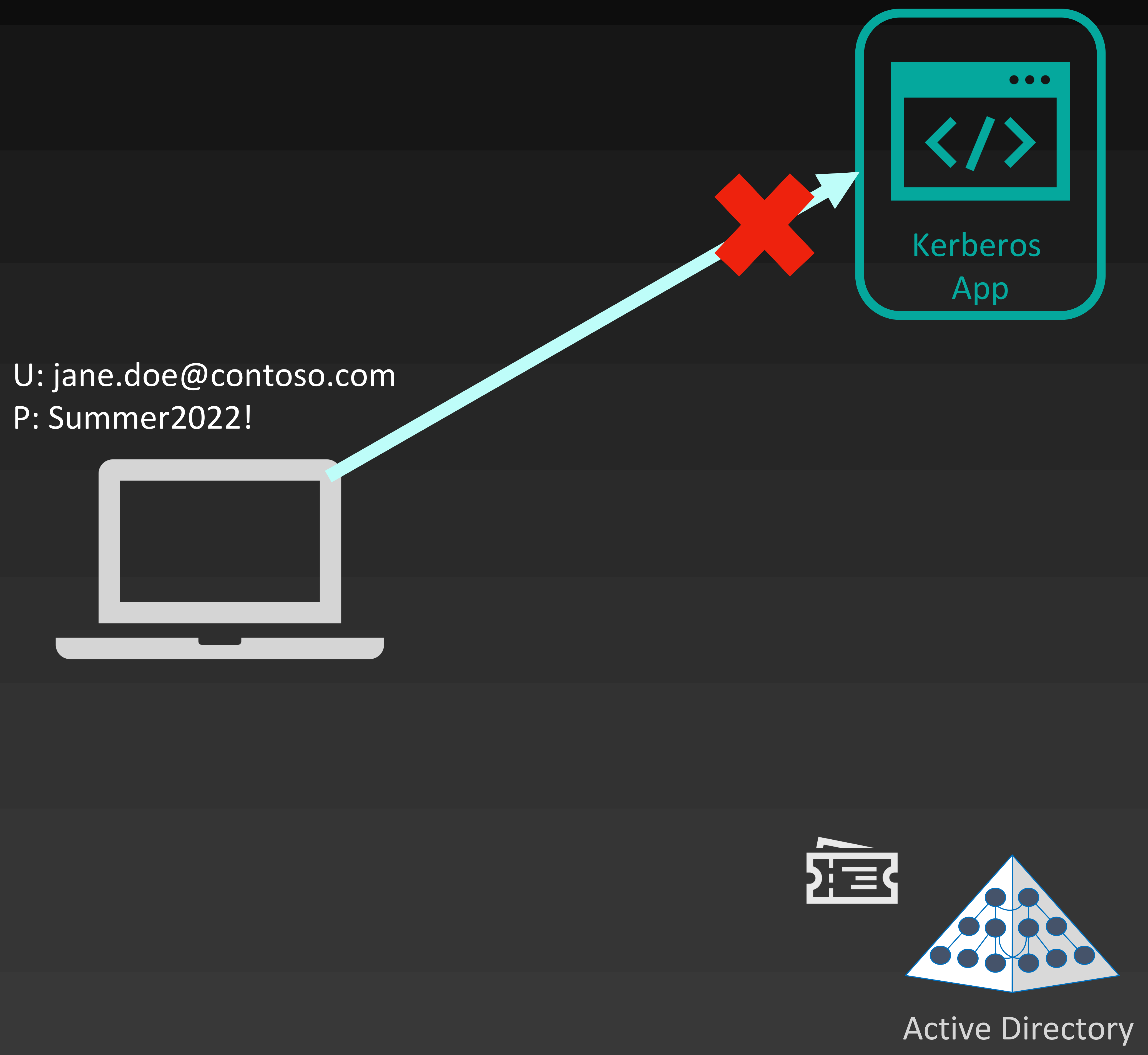
Recommendation 3: Set up SSO Infrastructure

- macOS can provide SSO in a few different ways:
  - Kerberos, via BIND to an LDAP directory, commonly on-premises Active Directory
    - Apple is actively telling customers to move away from this
  - Kerberos, via Apple's Kerberos SSO Extension
    - Must be deployed through MDM
    - Still designed for on-premises directory services, not really designed for the cloud
  - Modern Auth (tokens), via IDP vendor-provided plug-ins for Apple's Extensible Enterprise SSO Framework
    - IDP vendor…that's us!
    - Must be deployed through MDM
    - Two types:
      - Credential
      - Redirect – Azure AD's option is this type

Recommendation 3: SSO Infrastructure - Let’s Start with Kerberos

If you need Kerberos, use the modern, MDM-provisioned Kerberos SSO Extension from Apple:

1) User provides device with their enterprise username and password
2) The device sends the creds to AD and asks for a Kerberos Ticket-Granting Ticket (TGT)
3) AD validates the creds and returns the TGT
4) The user tries to access an app, probably in their browser, but needs a Kerberos ticket



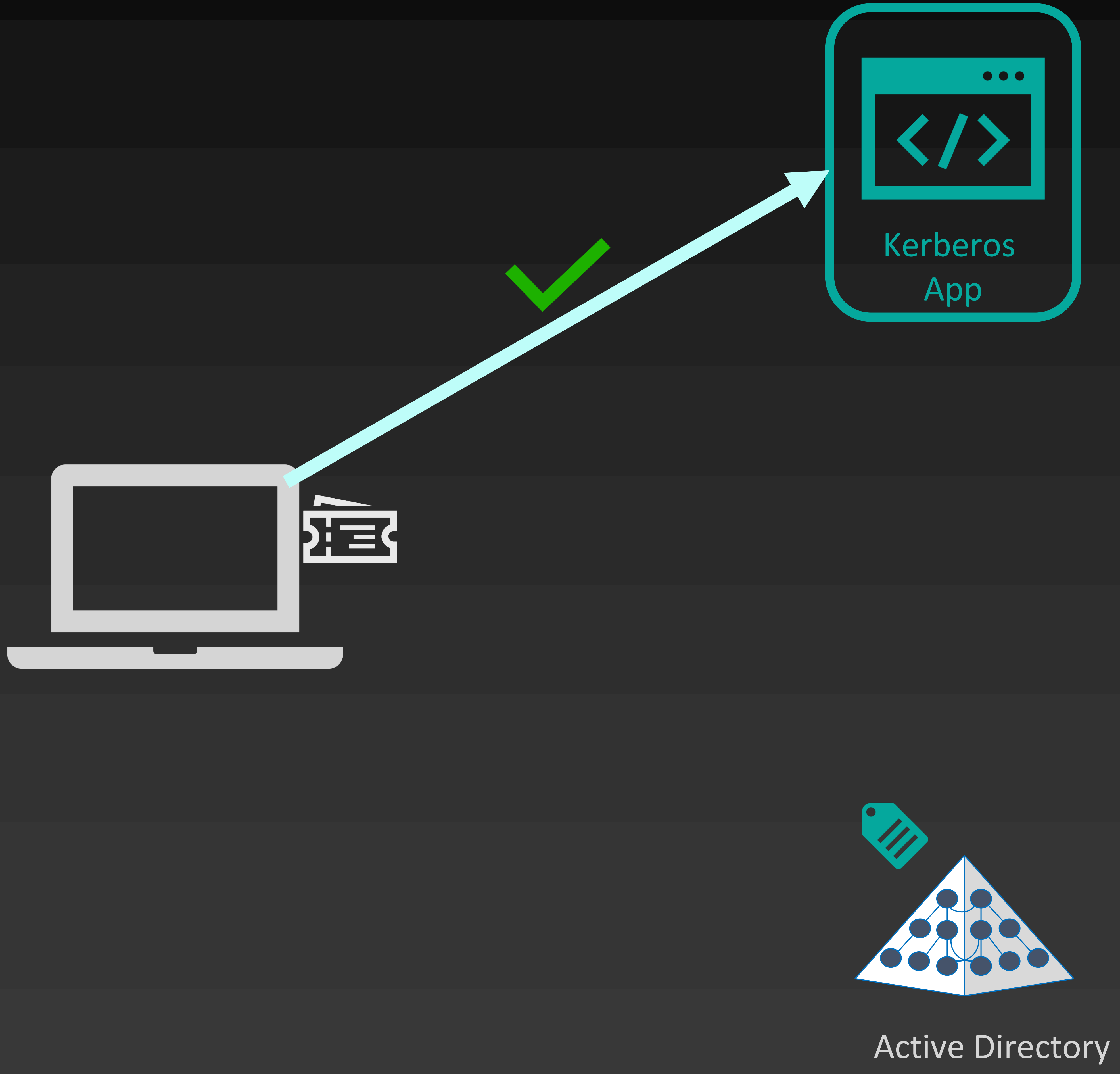
Recommendation 3: SSO Infrastructure - Let's Start with Kerberos

5) macOS sends the TGT to AD, asking for a ticket specific to the app (TGS)

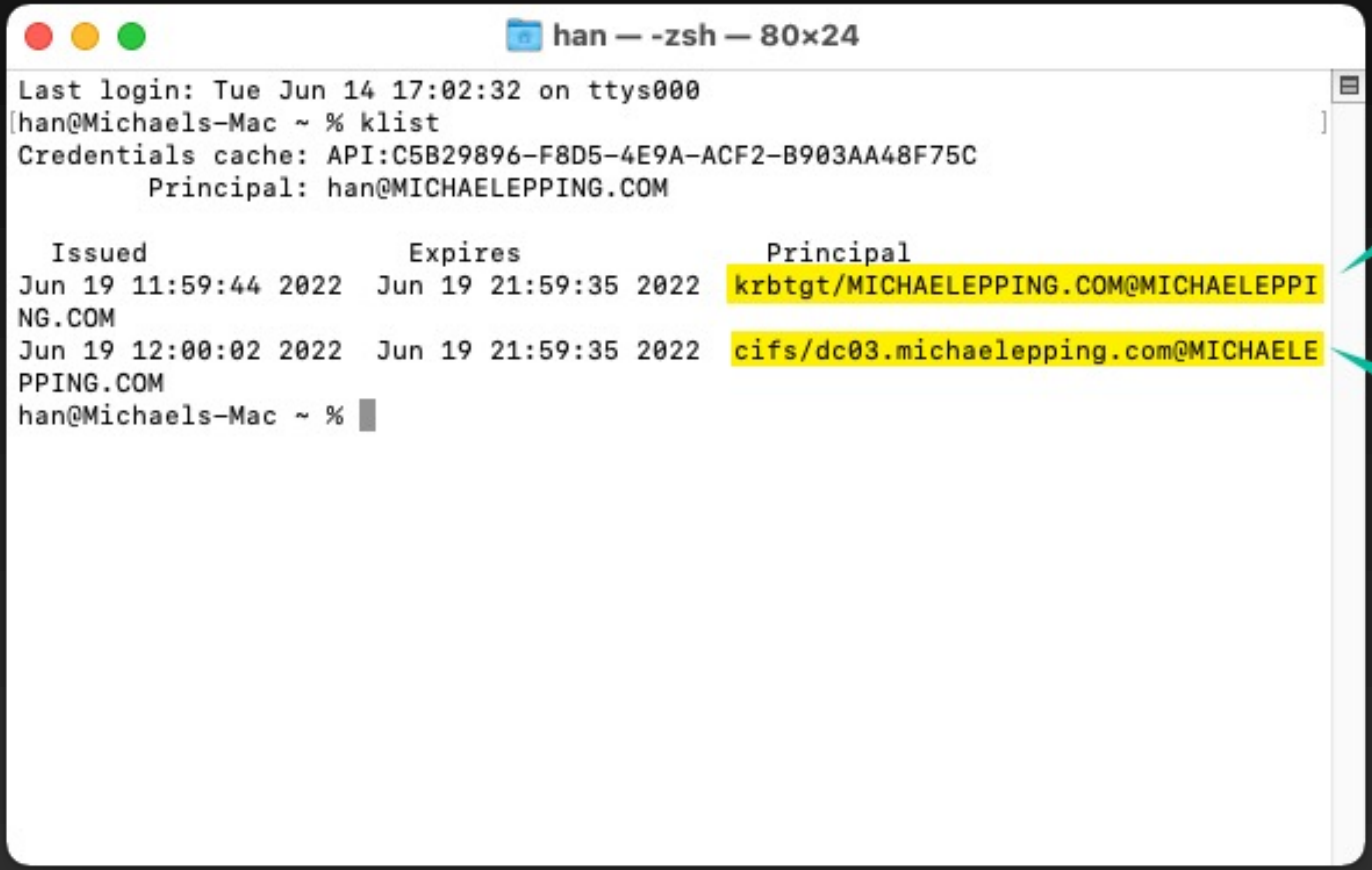
6) AD validates the TGT and returns the TGS

7) The user's browser or other client sends the TGS to the app

8) The user successfully accesses the app



Recommendation 3: SSO Infrastructure - Let’s Start with Kerberos



```
Last login: Tue Jun 14 17:02:32 on ttys000
[han@Michaels-Mac ~ % klist
Credentials cache: API:C5B29896-F8D5-4E9A-ACF2-B903AA48F75C
        Principal: han@MICHAELEPPING.COM

  Issued                Expires               Principal
Jun 19 11:59:44 2022  Jun 19 21:59:35 2022  krbtgt/MICHAELEPPING.COM@MICHAELEPPI
NG.COM
Jun 19 12:00:02 2022  Jun 19 21:59:35 2022  cifs/dc03.michaelepping.com@MICHAELE
PPING.COM
han@Michaels-Mac ~ %
```

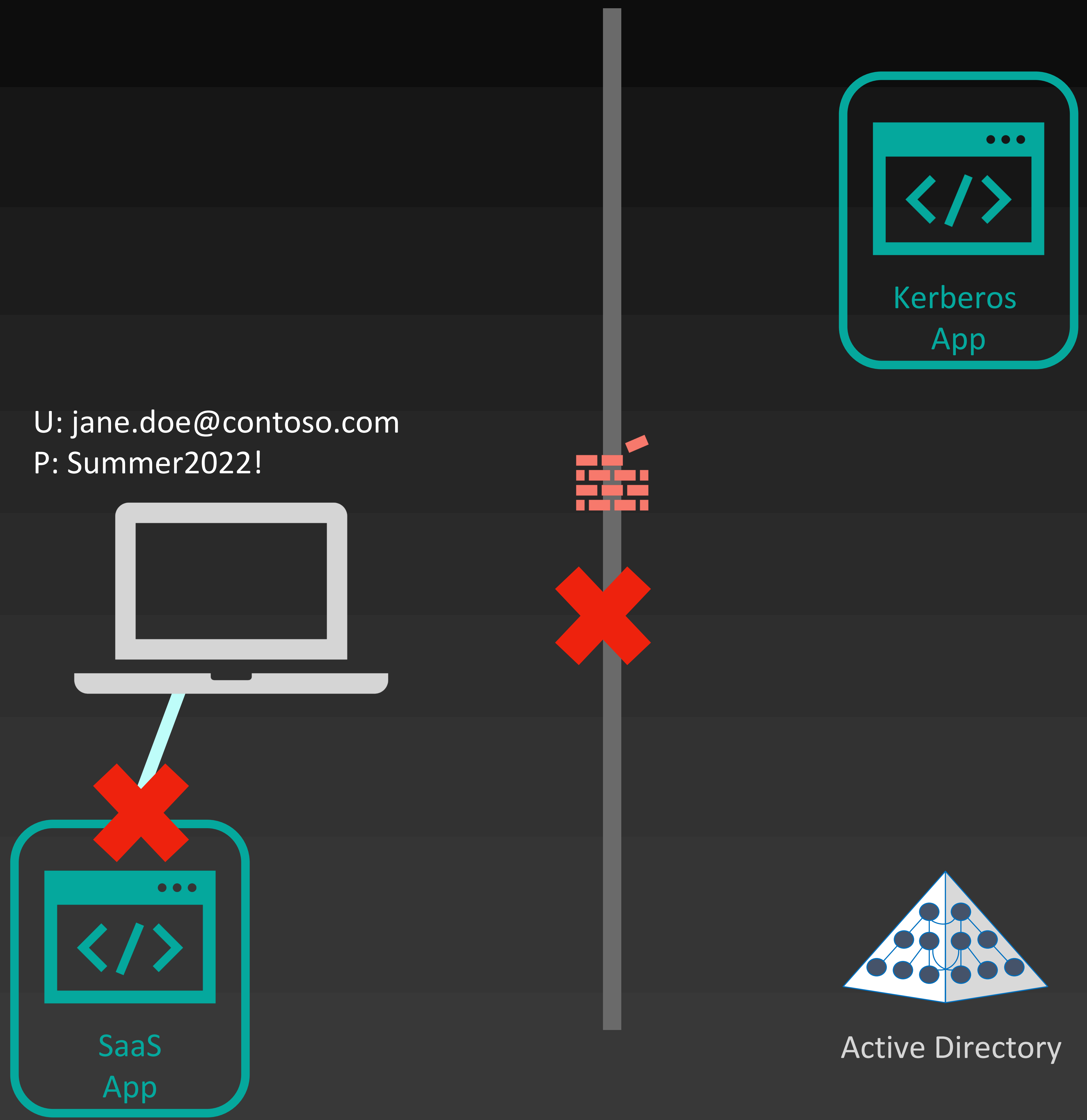
TGT

TGS for a file share

Recommendation 3: SSO - Let's Start with Kerberos

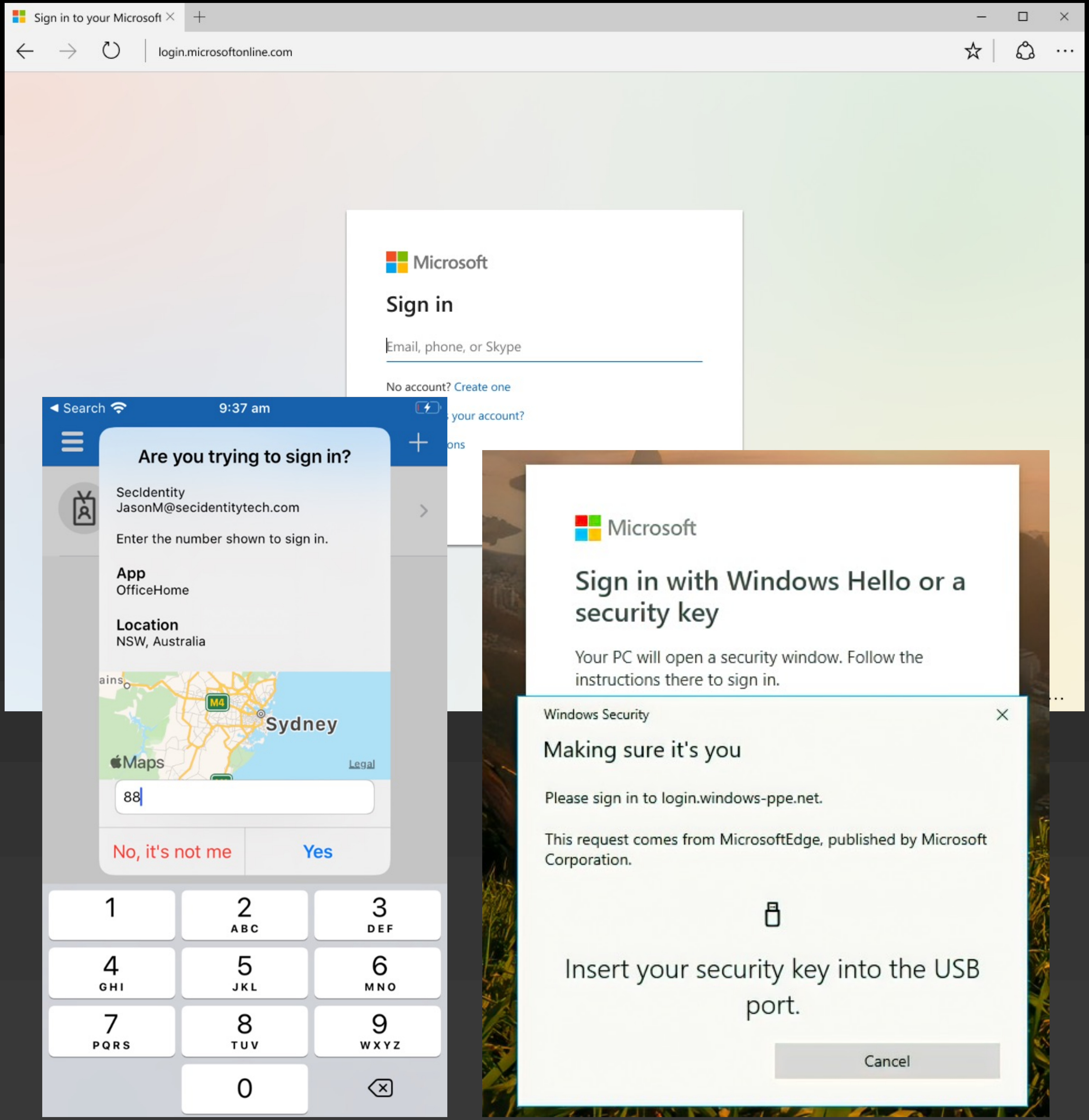
- What's the issues with this story?
- It doesn't work over the internet, so it isn't very modern
- Imagine we have a SaaS app instead of an internal Kerberos app
- Kerberos doesn't make sense for the SaaS app, because devices on the internet shouldn't be able to find a DC

1) User provides device with their enterprise username and password
2) Should the device still want to send the creds to AD and ask for a Kerberos Ticket-Granting Ticket (TGT)?
3) No, this won't work without a VPN



Recommendation 3: SSO – Modernize w/ Modern Auth

- The solution is Modern Auth!
  - SAML – good
  - OpenID Connect and OAuth 2 - better!
- The key advantage of Modern Auth is that it is web-based
  - The flexibility of web technology gives us many security options:
    - Challenge for certificates
    - Many forms of MFA (FIDO, Auth apps, Smartcards, SMS codes, etc.)
    - Direct traffic through proxied sessions to block downloads
    - And much more!



Sign in to your Microsoft

login.microsoftonline.com

Microsoft

Sign in

Email, phone, or Skype

No account? Create one

your account?

ons

Search 9:37 am

Are you trying to sign in?

SecIdentity
JasonM@secidentitytech.com

Enter the number shown to sign in.

App
OfficeHome

Location
NSW, Australia

88

No, it's not me | Yes

Microsoft

Sign in with Windows Hello or a security key

Your PC will open a security window. Follow the instructions there to sign in.

Windows Security

Making sure it's you

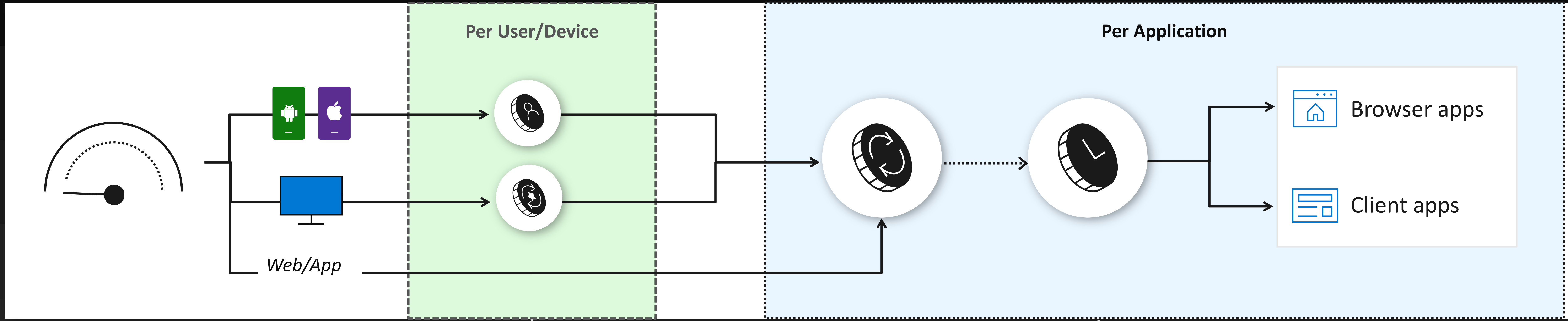
Please sign in to login.windows-ppe.net.

This request comes from MicrosoftEdge, published by Microsoft Corporation.

Insert your security key into the USB port.

Cancel

Recommendation 3: SSO – Modernize w/ Modern Auth



Our Goal: Prompt *Once*

- *per user*
- *per device*
- *per password change*

Don't bother user unless these change

AUTHENTICATION

Until Revoked or Password Change (If actively used within 14 days)

Primary Refresh Token

Long term authentication w/ SSO broker on Windows, macOS, or iOS

ID Token

Long term authentication on Mobile Device

(used by authenticator app and/or company portal)

Note: Authenticator App has two functions: brokering authentication locally + MFA validation

(COARSE) AUTHORIZATION

Refresh Token – (Per App)

Until revoked or Password Changed

Long term access to an application

Note: Includes whether MFA was used for authentication

Access Token – (Per App)

1 hours

Provides user access to use application (short term)

Note: Policy is re-evaluated every time you get a new access token (using the refresh token)

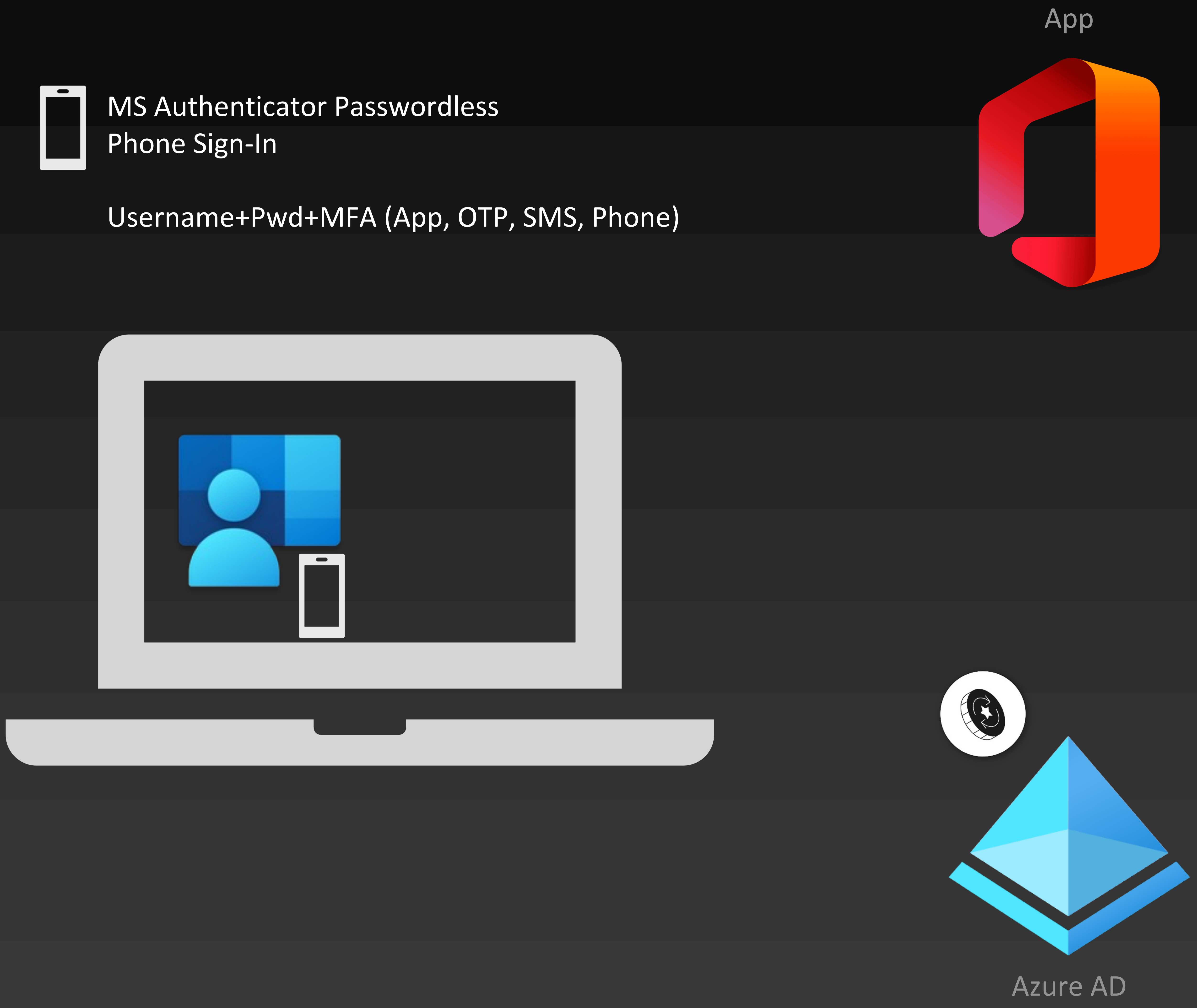
Recommendation 3: SSO – Modernize w/ Modern Auth

- Here’s what you need for Modern Auth and SSO on Apple Platforms:
  - IDP that supports SAML and/or OpenID Connect
    - Azure AD is Microsoft’s cloud IDP, but there are plenty of others on the market
  - Apps integrated with the IDP
  - IDP Vendor must create an SSO Extension plugin
  - Macs under MDM management

Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

- The *modern* approach is to use an IDP, modern auth, and tokens
- SSO Extension is bundled in the Microsoft Company Portal

1) User authenticates to Azure AD in the SSO Extension window – this can be in Company Portal or another app, such as Safari
    - Azure AD supports many more credential types than AD does
2) Azure AD SSO Extension acquires a Primary Refresh Token (PRT) from Azure AD after the user signs in, stores it in the keychain
    - PRTs are good for a rolling 14 day window, constantly refreshed when the user uses the Mac

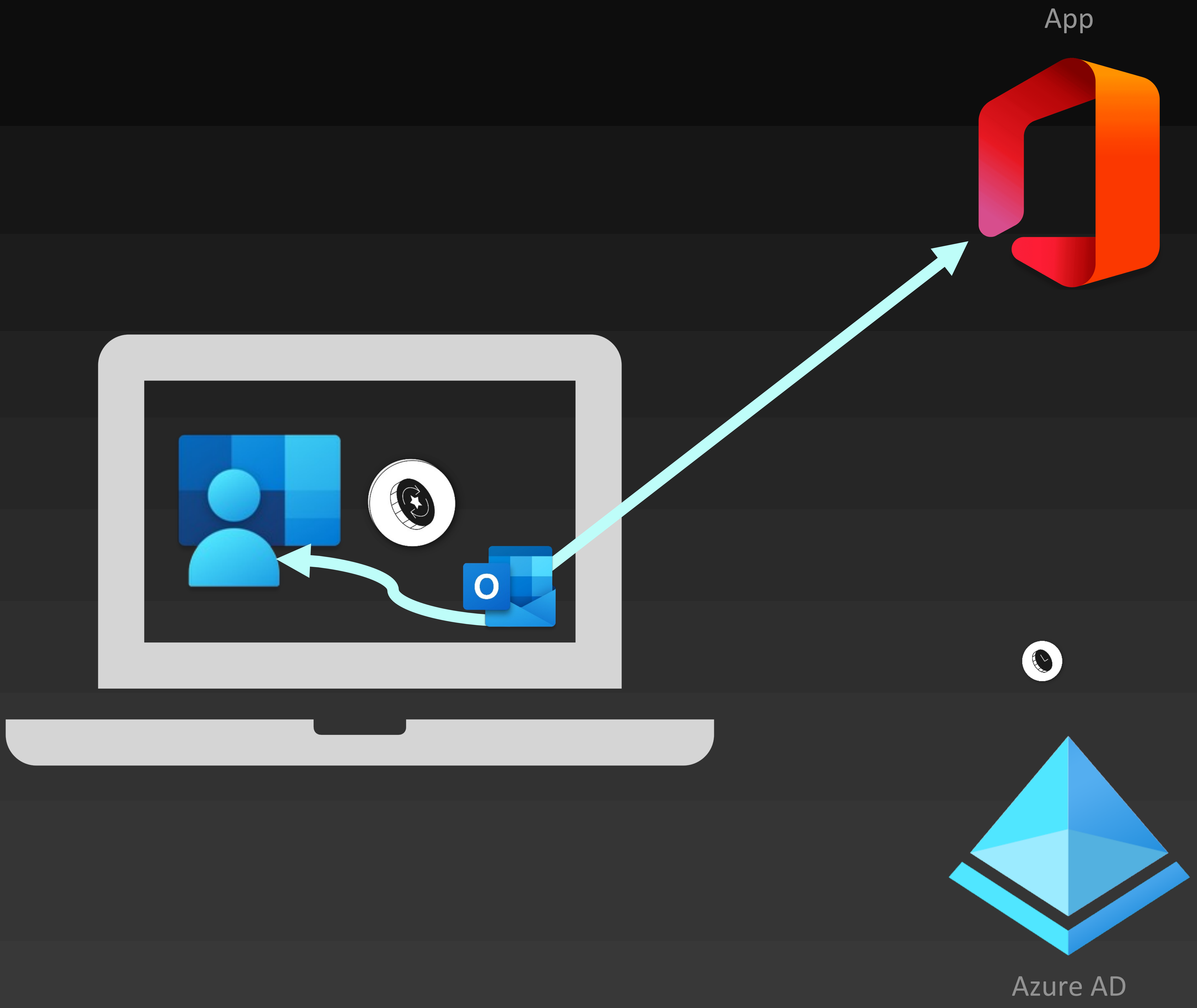

App
MS Authenticator Passwordless Phone Sign-In
Username+Pwd+MFA (App, OTP, SMS, Phone)
Azure AD

Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

One more wrinkle…there’s two different flows for apps to get tokens

We’ll start with the MSAL flow (MSAL is Microsoft Authentication Library, our auth library provided to make app integration with Azure AD easy):

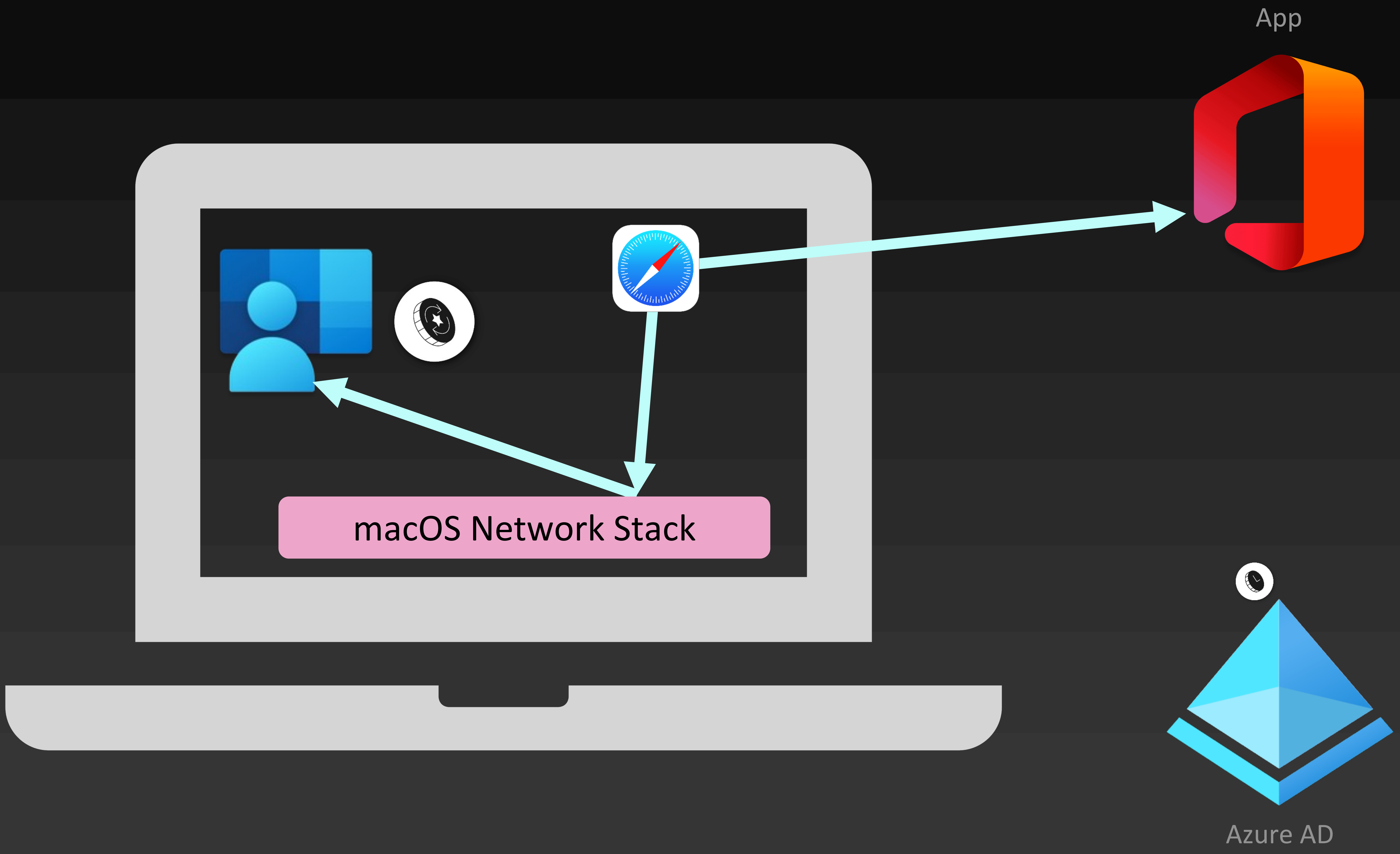
3. App that uses MSAL talks to the SSO Extension directly, asks it to get a token
4. AAD validates the PRT and returns the app-specific token
5. The token is given to the client and the client sends the token to the app
6. The user successfully accesses the app



Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

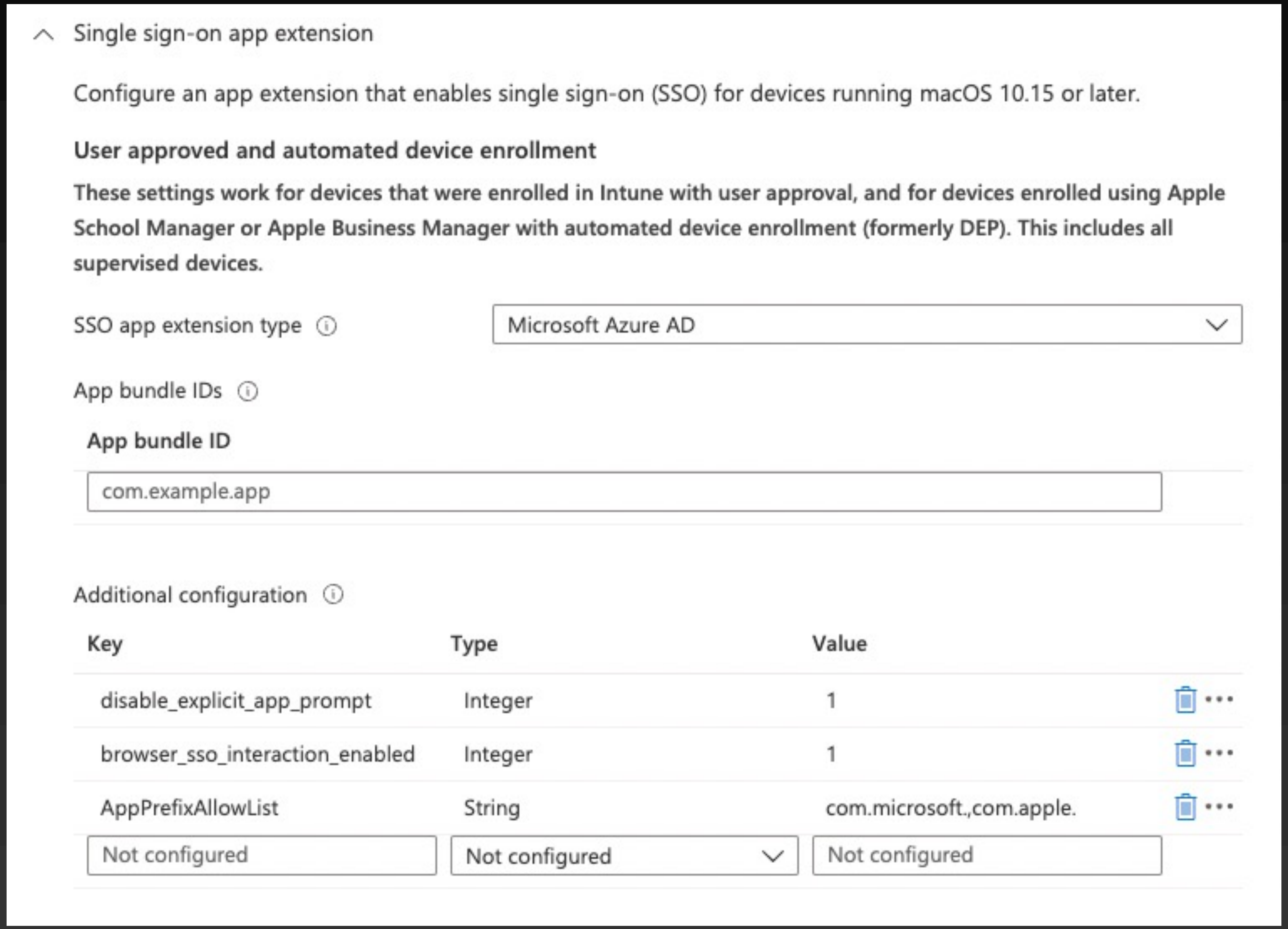
Now let's look at the redirect flow:

3. User tries to log into app, is told to get a token from Azure AD
4. App that doesn't use MSAL tries to go to an Azure AD URL…the macOS Network Stack intercepts the traffic and redirects it to the SSO Extension
5. SSO Extension uses its PRT to request a token
6. AAD validates the PRT and returns the app-specific token
7. The token is given to the client and the client sends the token to the app
8. The user successfully accesses the app



Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

- Redirect SSO Extension Profiles *must* be deployed via MDM:
  - Very easy deployment with Intune as your MDM



Single sign-on app extension

Configure an app extension that enables single sign-on (SSO) for devices running macOS 10.15 or later.

User approved and automated device enrollment

These settings work for devices that were enrolled in Intune with user approval, and for devices enrolled using Apple School Manager or Apple Business Manager with automated device enrollment (formerly DEP). This includes all supervised devices.

SSO app extension type: Microsoft Azure AD

App bundle IDs

App bundle ID

com.example.app

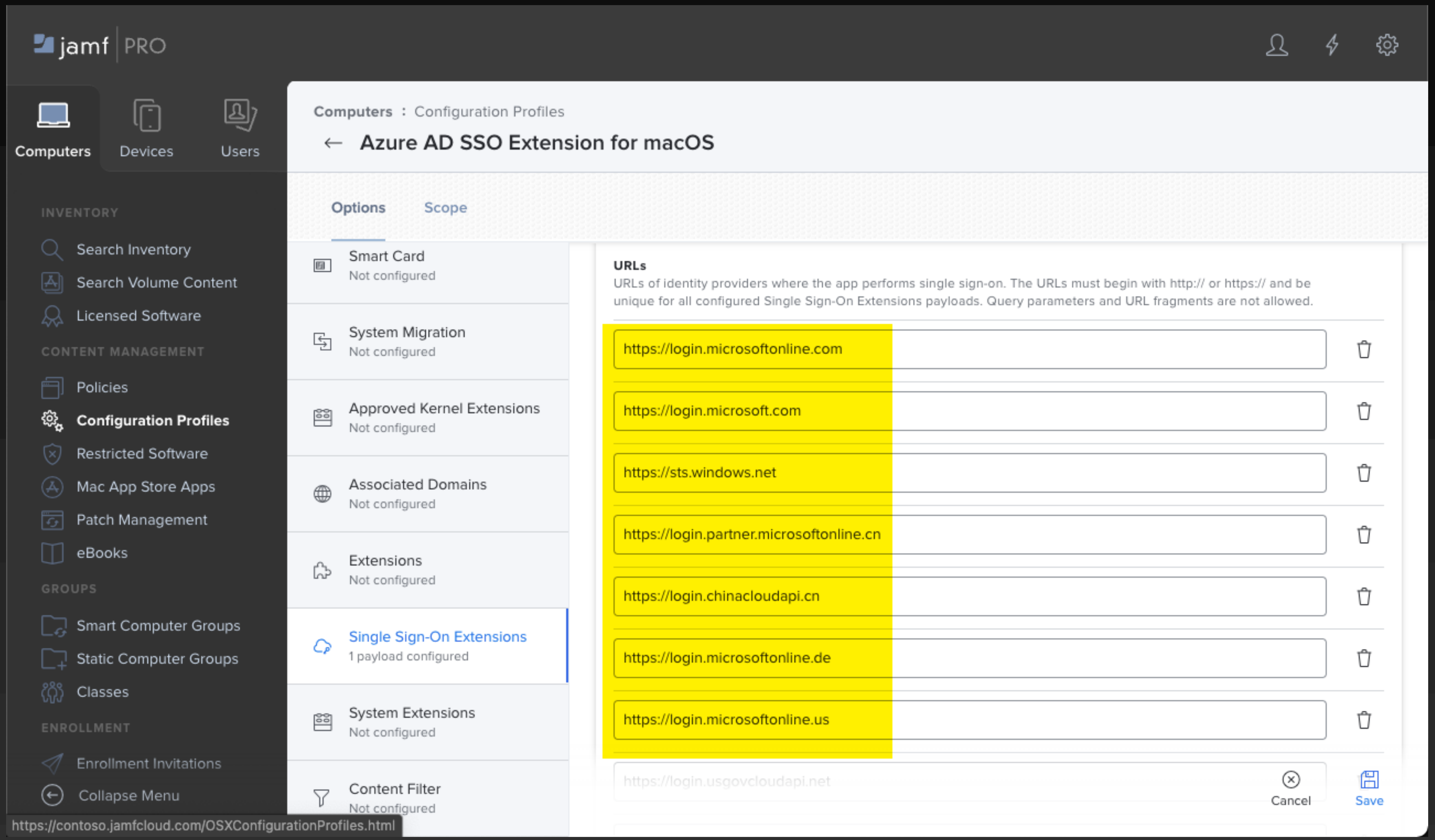
Additional configuration

Key	Type	Value
disable_explicit_app_prompt	Integer	1
browser_sso_interaction_enabled	Integer	1
AppPrefixAllowList	String	com.microsoft.,com.apple.
Not configured	Not configured	Not configured

https://aka.ms/AppleSSO-Intune

Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

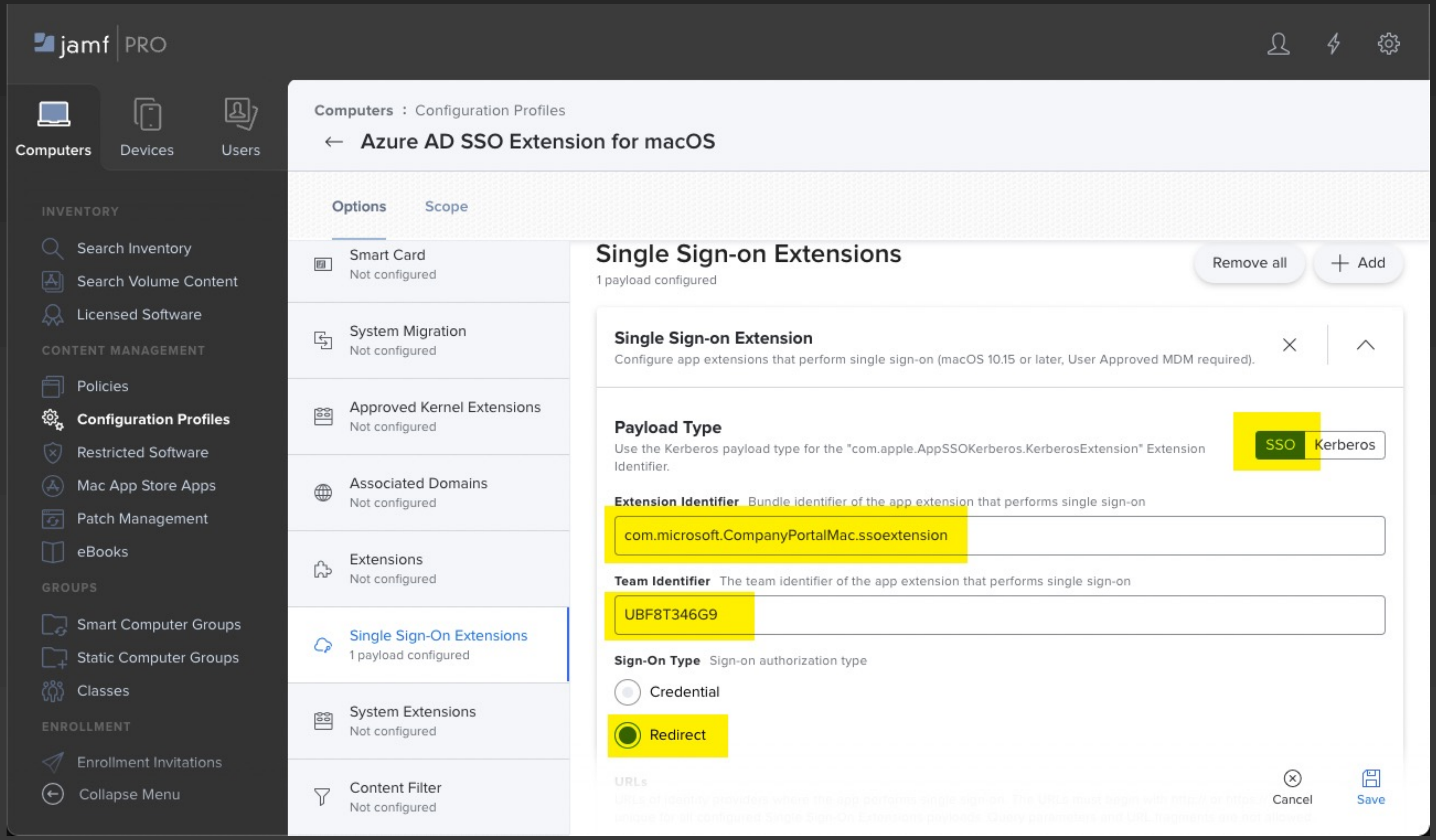
- Redirect SSO Extension Profiles *must* be deployed via MDM:
  - Very easy deployment with Intune as your MDM
  - Jamf Pro requires a little more work and a PLIST file



← Azure AD SSO Extension for macOS

URLs
URLs of identity providers where the app performs single sign-on. The URLs must begin with http:// or https:// and be unique for all configured Single Sign-On Extensions payloads. Query parameters and URL fragments are not allowed.

- https://login.microsoftonline.com
- https://login.microsoft.com
- https://sts.windows.net
- https://login.partner.microsoftonline.cn
- https://login.chinacloudapi.cn
- https://login.microsoftonline.de
- https://login.microsoftonline.us
- https://login.usgovcloudapi.net



← Azure AD SSO Extension for macOS

Single Sign-on Extensions
1 payload configured

Single Sign-on Extension
Configure app extensions that perform single sign-on (macOS 10.15 or later, User Approved MDM required).

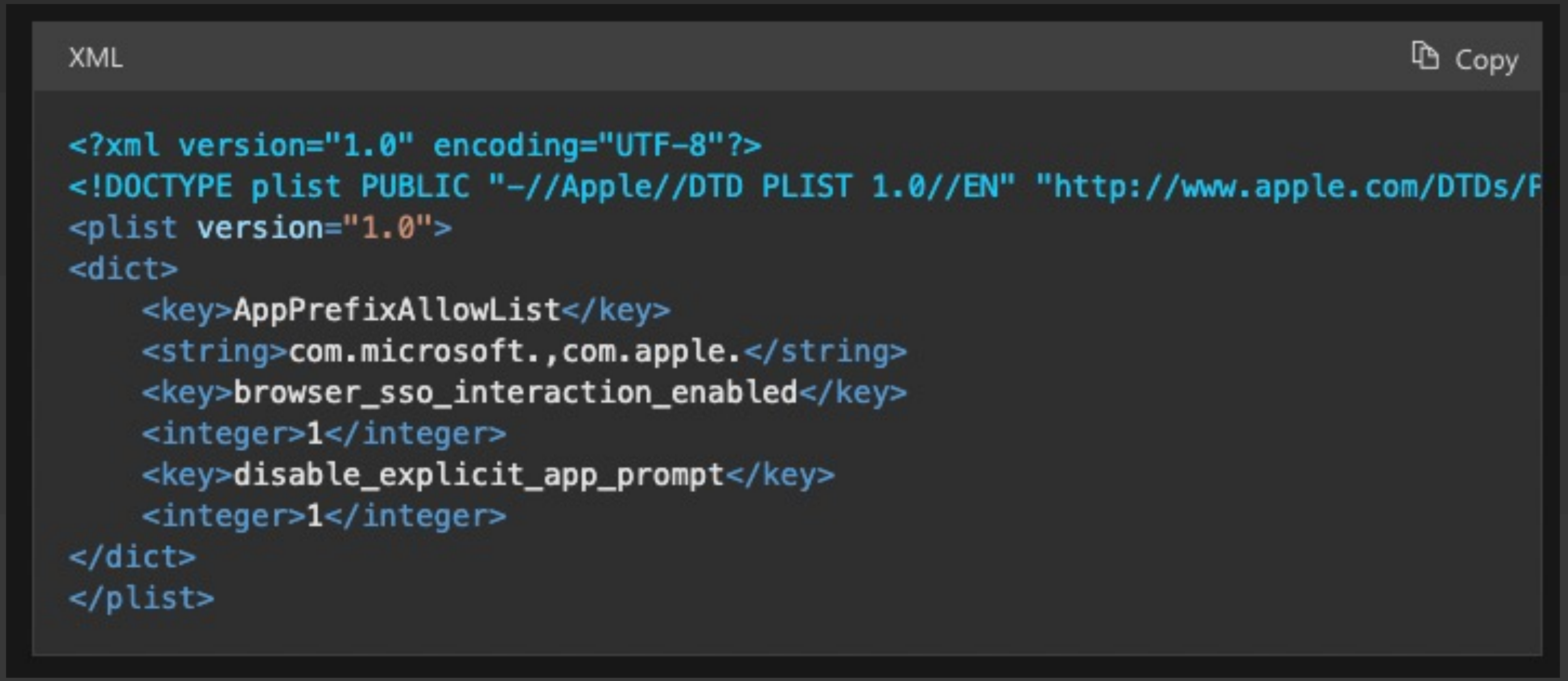
Payload Type Use the Kerberos payload type for the "com.apple.AppSSOKerberos.KerberosExtension" Extension Identifier. [✓ SSO] Kerberos

Extension Identifier Bundle identifier of the app extension that performs single sign-on
com.microsoft.CompanyPortalMac.ssoextension

Team Identifier The team identifier of the app extension that performs single sign-on
UBF8T346G9

Sign-On Type Sign-on authorization type
○ Credential
● Redirect

URLs

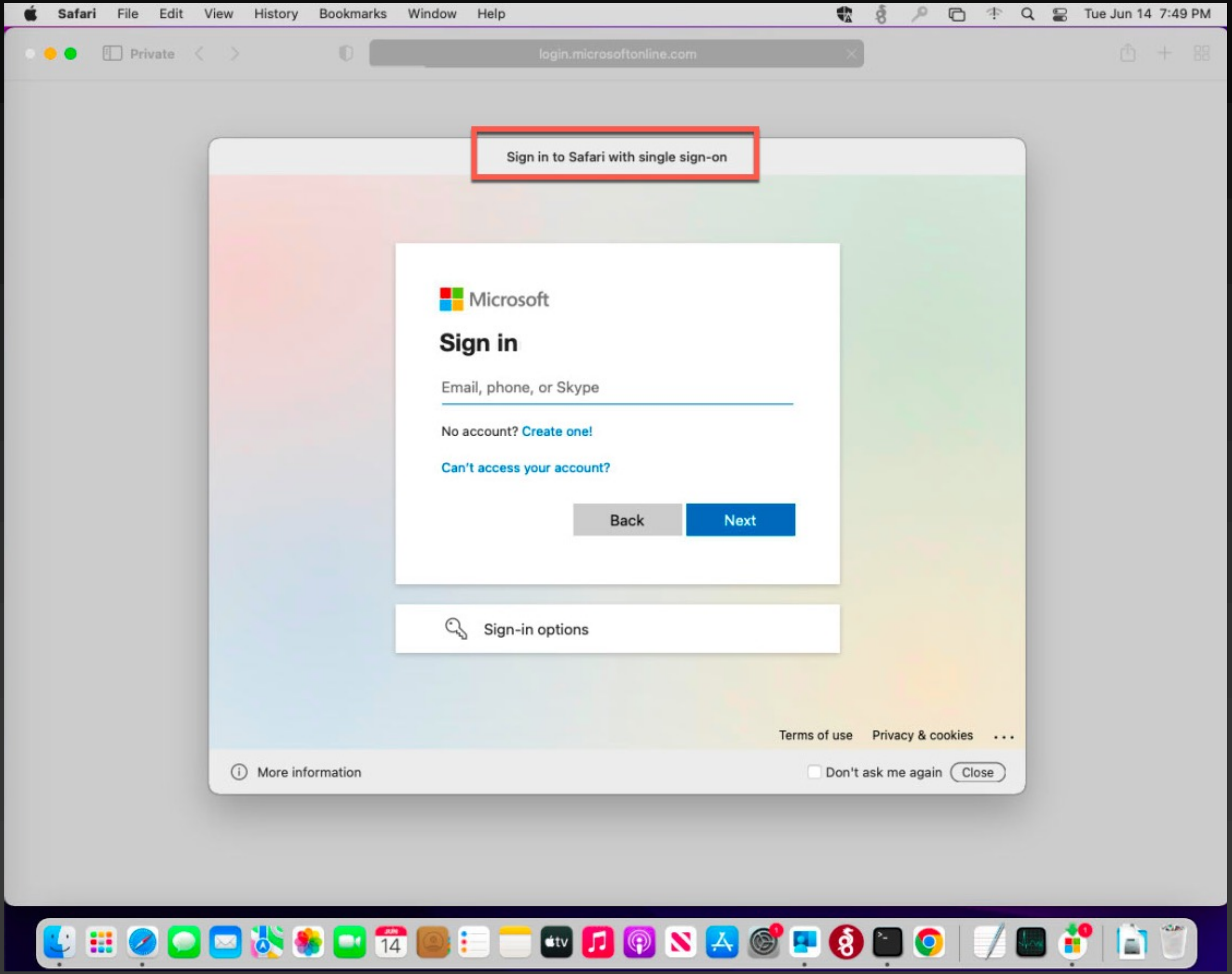


```xml
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/P
<plist version="1.0">
<dict>
    <key>AppPrefixAllowList</key>
    <string>com.microsoft.,com.apple.</string>
    <key>browser_sso_interaction_enabled</key>
    <integer>1</integer>
    <key>disable_explicit_app_prompt</key>
    <integer>1</integer>
</dict>
</plist>
```

https://aka.ms/AppleSSO-JamfPro

Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

- Redirect SSO Extension Profiles *must* be deployed via MDM:
  - Very easy deployment with Intune as your MDM
  - Jamf Pro requires a little more work and a PLIST file
- *Can configure settings so users never need to open Company Portal*
  - Company Portal must always be installed, but users don't need to open it if you follow recommended config
- Don't need to integrate with Intune for CA in order to get SSO, its just recommended
- Easiest tool to test if things are working is Safari in Private mode



Safari File Edit View History Bookmarks Window Help
Tue Jun 14 7:49 PM
Private
login.microsoftonline.com

Sign in to Safari with single sign-on

Microsoft

Sign in

Email, phone, or Skype

No account? Create one!

Can't access your account?

□ Don't ask me again

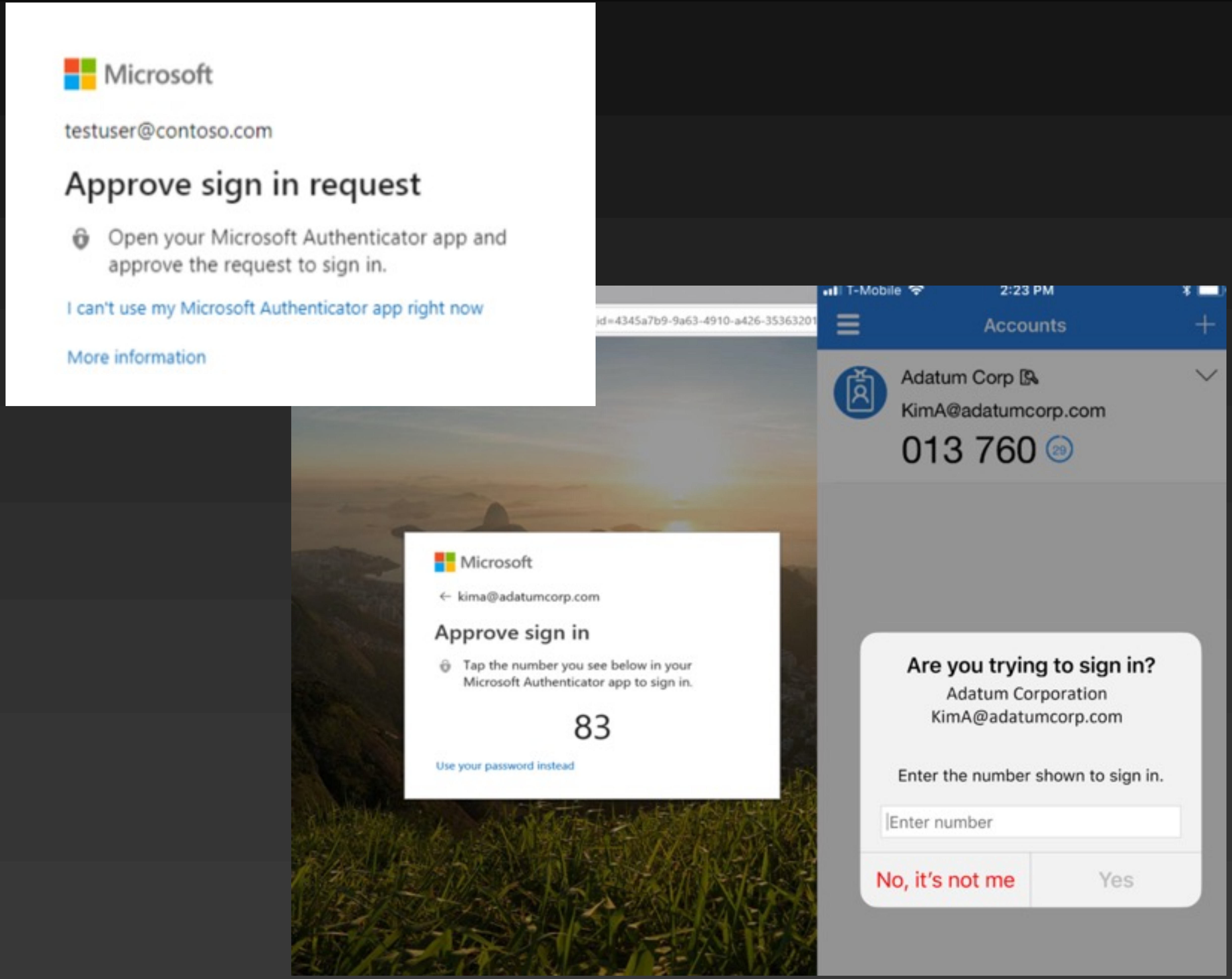
Recommendation 3: SSO – Modernize w/ IDP Vendor SSO Extensions

There's a few limitations/caveats/warnings:

- SSO Extension component from Microsoft is still Public Preview (supported)
- Apps must use MSAL or Apple's system frameworks for network requests
  - This means that some apps don't work…the SSO Extension is unaware of them and they don't use Apple's network stack
  - Chrome and Firefox are the primary examples
  - Talk to your app vendors about the need to support SSO extensions! They should want their apps to work, Apple is only making SSO extensions more important as time goes on
- PLIST files for non-Intune MDMs are hard to manage – we may change the extension default settings to be more mistake-friendly around GA timeframe
- No support for FIDO keys as a passwordless auth method in the SSO Extension window, as of macOS Monterey
  - Authenticator App Phone Sign-In passwordless mode works well
  - More on Passwordless next…

Recommendation 4: Authenticator App and Passwordless

- Authenticator App used as a token broker for iOS devices (similar to Company Portal on MacOS)
  - Provides that PRT experience
- https://aka.ms/nudge will interrupt on sign-in to register for Authenticator App
- Move from push notification to number match if possible (MFA hammering)
- Also used as a passwordless method



Microsoft

testuser@contoso.com

Approve sign in request

Open your Microsoft Authenticator app and approve the request to sign in.

I can't use my Microsoft Authenticator app right now

More information

id=4345a7b9-9a63-4910-a426-35363201

Microsoft

← kima@adatumcorp.com

Approve sign in

Tap the number you see below in your Microsoft Authenticator app to sign in.

83

Use your password instead

T-Mobile 2:23 PM

Accounts

Adatum Corp

KimA@adatumcorp.com

013 760

Are you trying to sign in?

Adatum Corporation

KimA@adatumcorp.com

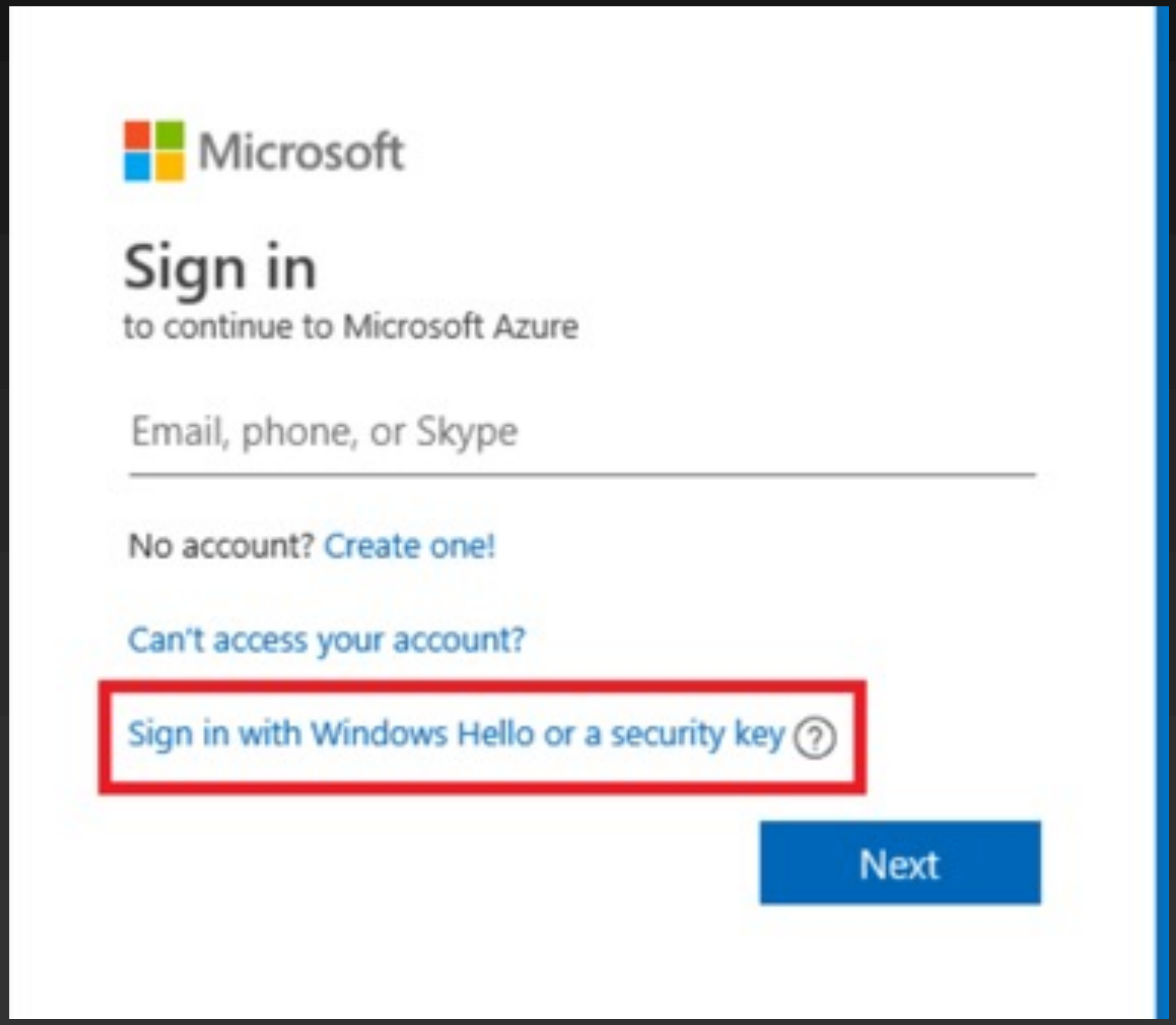
Enter the number shown to sign in.

Enter number

No, it's not me | Yes

Recommendation 4: Authenticator App and Passwordless

- Best user experience + Best security
  - We’ve been passwordless since Nov 2020 on macOS!
  - Can be used with any app integrated in your Azure AD
- Passwordless methods
  - Authenticator app number match
  - FIDO2 Key
    - Private key never leaves the physical key
    - Edge and Chrome today
    - Safari in the future
- Passkeys
  - Emerging standard supported by Apple, Microsoft and Google!
  - Passkey synced across devices on same device platform



Microsoft

Sign in

to continue to Microsoft Azure

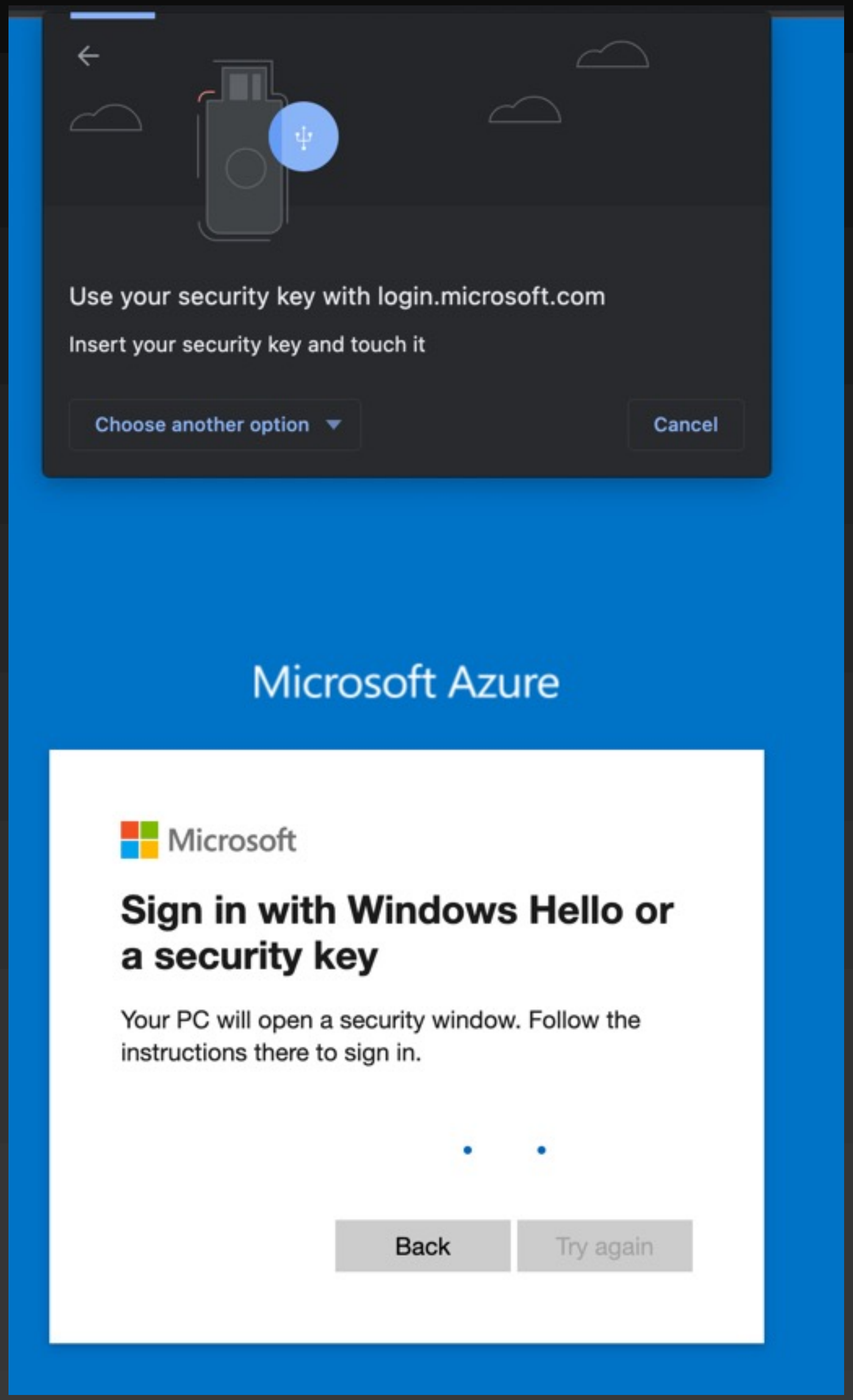
Email, phone, or Skype

No account? Create one!

Can’t access your account?

Sign in with Windows Hello or a security key

Next



Use your security key with login.microsoft.com

Insert your security key and touch it

Choose another option

Cancel

Microsoft Azure

Microsoft

Sign in with Windows Hello or a security key

Your PC will open a security window. Follow the instructions there to sign in.

Back

Try again

Recommendation 5: SSO All the things!

- All the work you do for steps 1-4 won’t matter much if your apps aren’t integrated with your IDP
- Azure AD can publish many kinds of apps
  - Modern Auth (SAML, OAuth 2.0, OIDC)
  - On-premises legacy Kerberos
  - Password-based
  - Almost anything else via 3rd party integrations (F5, Akamai, etc.)
- We try to make it easy for you…

Recommendation 5: SSO All the things!

3000+ pre-integrated apps in the gallery

Federated Connectors

Sauce Labs – Mobile and Web testing	SkyHigh Networks	Jamf Pro
Skillport	Palo Alto Networks	Fidelity NetBenefits
OneTrust Privacy Management Software	Adobe Creative Cloud	Adobe Experience Manager
Apptio	Carlson Wagonlit Travel	DigiCert
SAP Cloud Platform Identity Authentication	Form.com	OrgChart Now

Provisioning Connectors

Cisco WebEx	Samanage
GitHub	LucidChart
BlueJeans	Zendesk
Tableau Online	ThousandEyes
Pingboard	Slack

3rd party native Azure AD apps

Myday	Canvas	Calendly	Templafy
Doodle AG	Smartsheet	Nine for Office365	K2 for Office365
Exclaimer Cloud	Firefly	Insights	Cronofy
Flipgrid	Edmodo	Boomerang	Bluemail

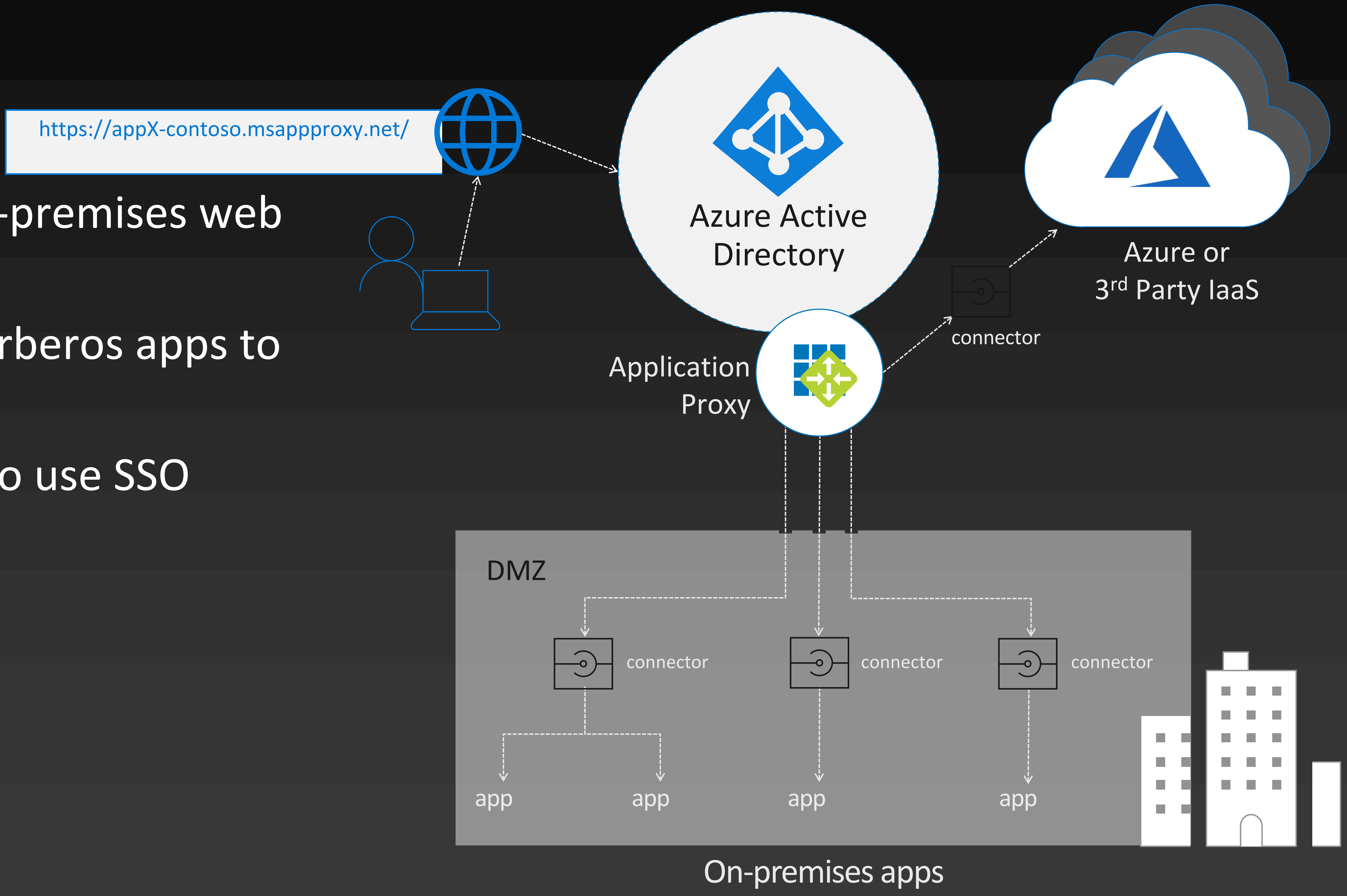
…and more added each month

Request a gallery app: https://aka.ms/AADAppGalleryRequest

Recommendation 5: SSO All the things!

Application Proxy

- Connect any claims-aware on-premises web app to Azure AD
- Also, connect on-premises Kerberos apps to Azure AD
- The goal is to get *everything* to use SSO



Recommendation 5: SSO All the things!

- There's a lot in Azure AD beyond SSO and Office 365
- New features are released all the time, the cloud continues to evolve
- Migrating apps to Azure AD means that they benefit from these features, and more
    - Provision/Deprovision to app based on dynamic group membership
    - Access Reviews/Entitlement Management/Governance tools
    - Same strong auth usage as other corporate apps

Azure AD Connect	B2B collaboration	Provisioning-Deprovisioning	Conditional Access
SSO to SaaS	Self-Service capabilities	Connect Health	Multi-Factor Authentication
Addition of custom cloud apps	Access Panel/MyApps	Dynamic Groups	Identity Protection
Remote Access to on-premises apps	Azure AD B2C	Group-Based Licensing	Privileged Identity Management
Microsoft Authenticator - Password-less Access	Azure AD Join	MDM-auto enrollment / Enterprise State Roaming	Security Reporting
Azure AD DS	Office 365 App Launcher	HR App Integration	Access Reviews

Agenda

What is Azure AD and Conditional Access?

Prompting…why is it bad?

Top 5 Recommendations

Go-Dos

Recap & Go Dos!

1. Work with your IAM/Security team on the end user experience
   - Use data in the Azure AD Authentication Prompt analysis (http://aka.ms/MFAPromptsWorkbook)
2. Set device compliance via Intune or an MDM
3. Deploy the Azure AD Enterprise SSO plugin to macOS *and iOS*
4. Nudge users to use the Microsoft Authenticator app on iOS/Android and start moving to passwordless
5. More SSO! Bring your modern auth apps to your IAM team. Move away from apps that require line of sight to a DC

Thank You

Slides: aka.ms/AADMacAdmins2022