



Supercharge your user's
Microsoft 365 experience
with Enterprise Single Sign On

About me

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Your turn

How many of you use Microsoft 365 (Outlook or Teams or OneDrive)?

How many of you use Azure Active Directory?

How many of you have heard of Enterprise SSO?

How many of you have deployed Enterprise SSO?

Agenda

What is Azure Active Directory?

Prompting...why is it bad?

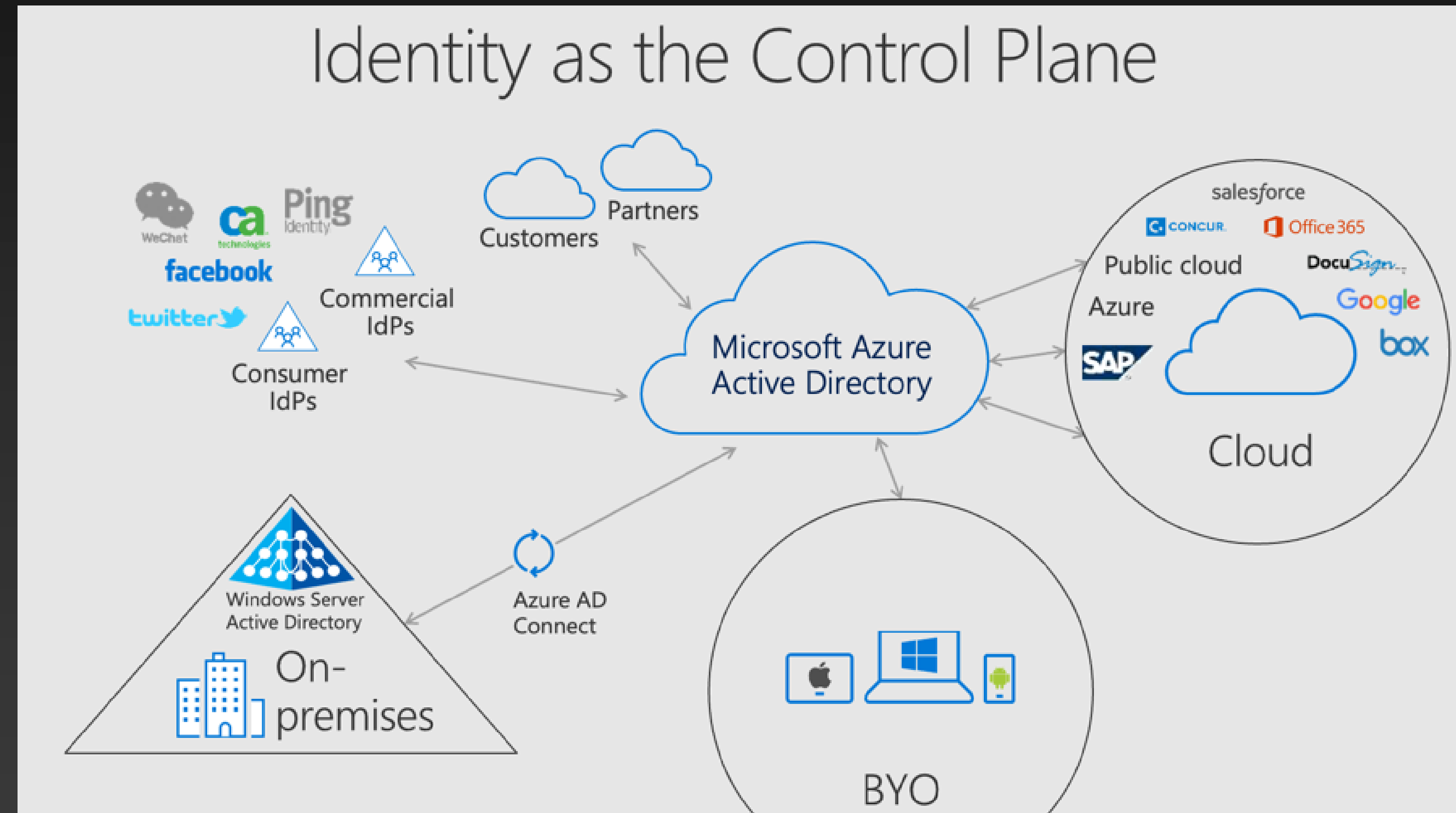
Enterprise Single Sign On (SSO) - How does it work?

Deploying Enterprise SSO

Troubleshooting Enterprise SSO

Azure Active Directory

- Azure Active Directory 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



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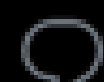


Amy 🍷❤️🍷
@amysw_sec

PSA... don't blindly accept MFA requests if you're not 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



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



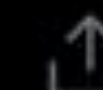
Reg
@RegGBlinker

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,

initiated access at that time. So, 🤔 (disclaimer: not my org!)

Phone



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.

Recent phishing attacks that made the news




services.

It is believed that the entry point that caused the cyber attack on the private health insurer was when a person with high-level access within Medibank's systems had their credentials stolen by a hacker. The information was then sold on a Russian-language cyber crime forum, according to a report from *The Guardian* that attributed the information to a source who was not authorised to speak publicly.



8. Australian Parliament House Data Breach



AUSTRALIAN
PARLIAMENT HOUSE

Date: February 2019

Impact: Multiple political party networks - Liberal, Labor, and the Nationals.

The cybercriminals used phishing methods to steal employee credentials and gain entry into the government's network. This precursor attack took place on an infected external website that a small number of parliament staff visited.

6. Service NSW Data Breach



Date: April 2020

Impact: 104,000 people

47 [Service NSW](#) staff email accounts were hacked through a series of phishing attacks. This led to 5 million documents being accessed, 10 percent of which contains sensitive data impacting 104,000 people.

High volume AiTM phishing kits

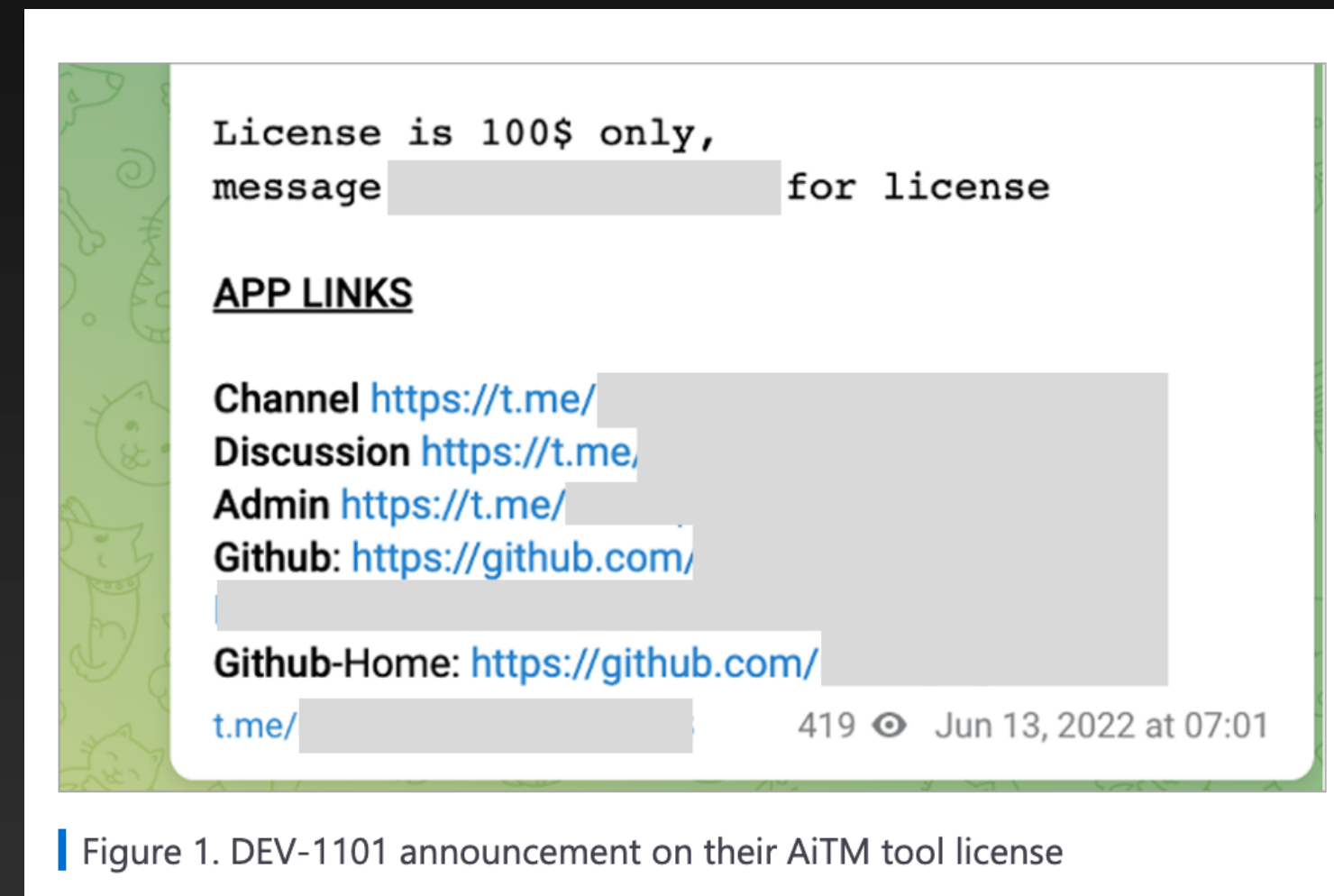
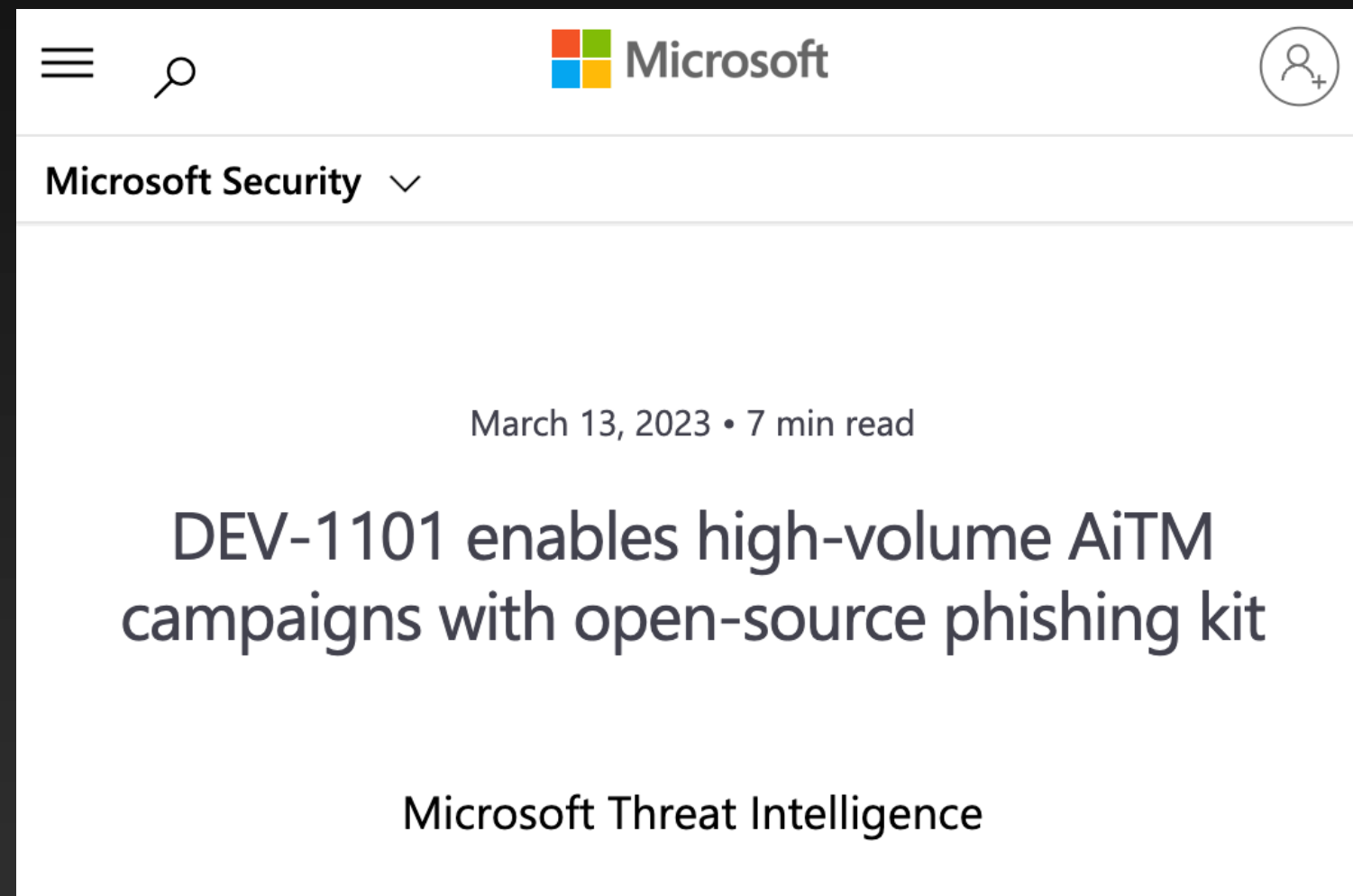


Figure 1. DEV-1101 announcement on their AiTM tool license

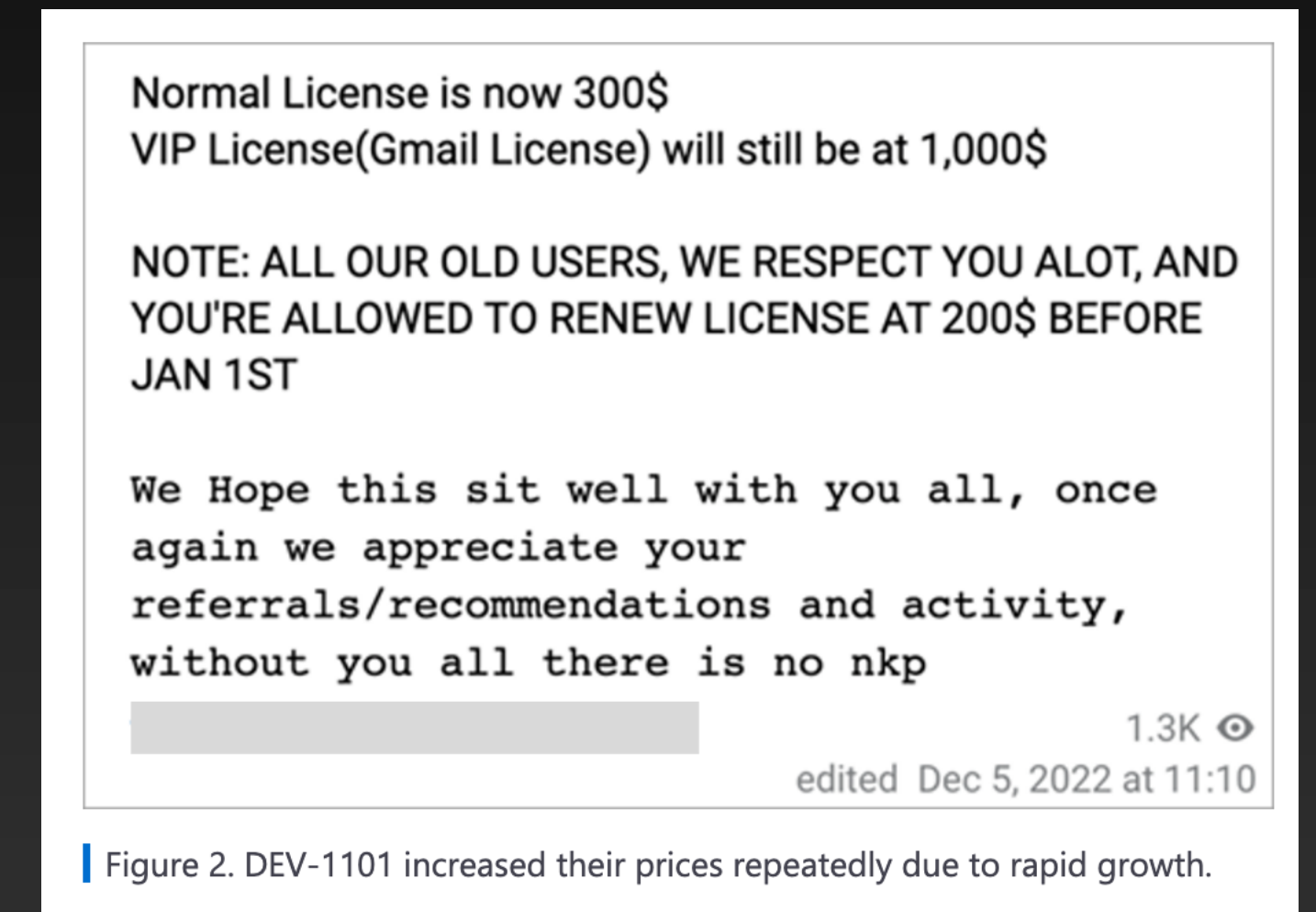


Figure 2. DEV-1101 increased their prices repeatedly due to rapid growth.

DEV-1101 enables high-volume AiTM campaigns with open-source phishing kit

How AiTM phishing works

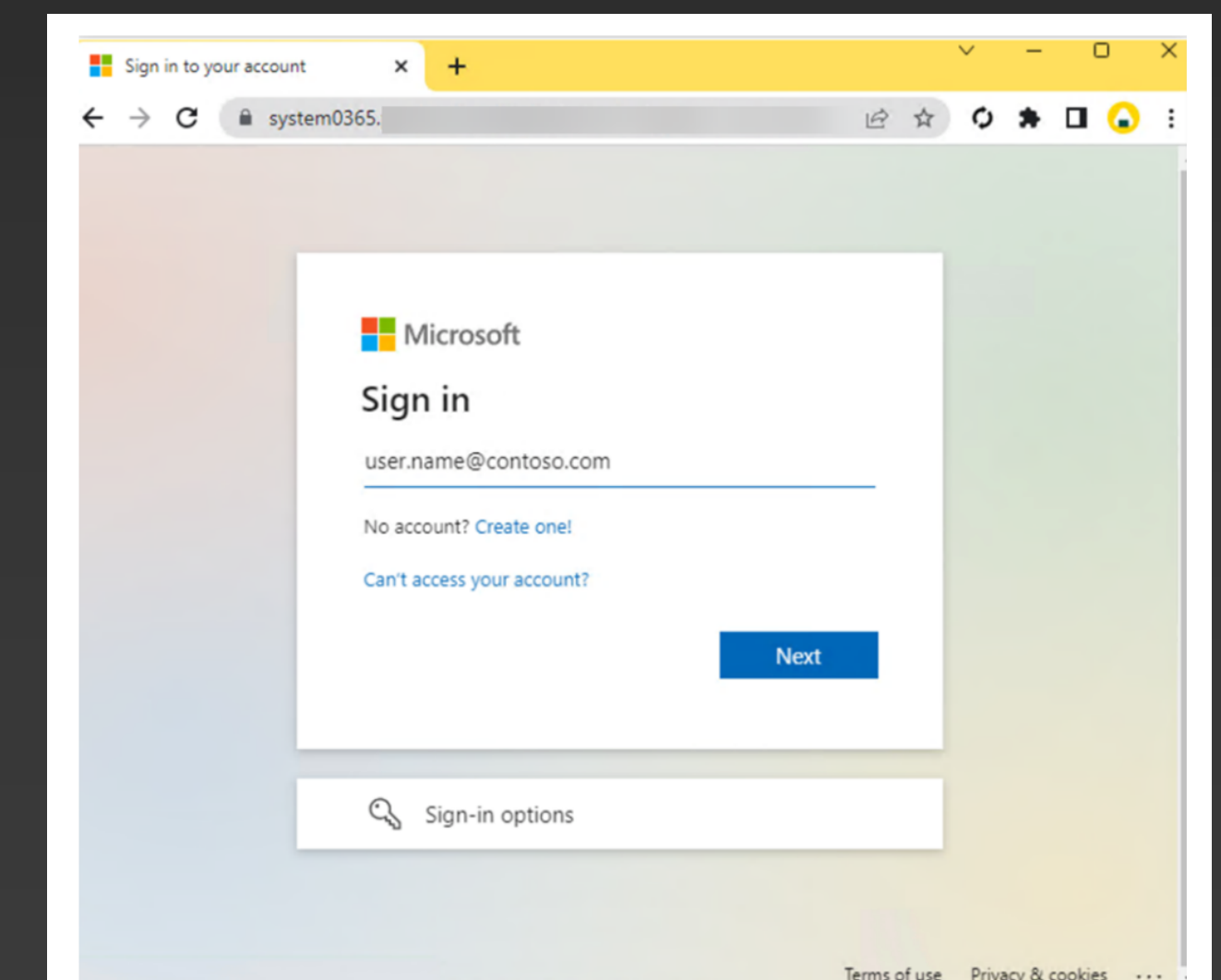
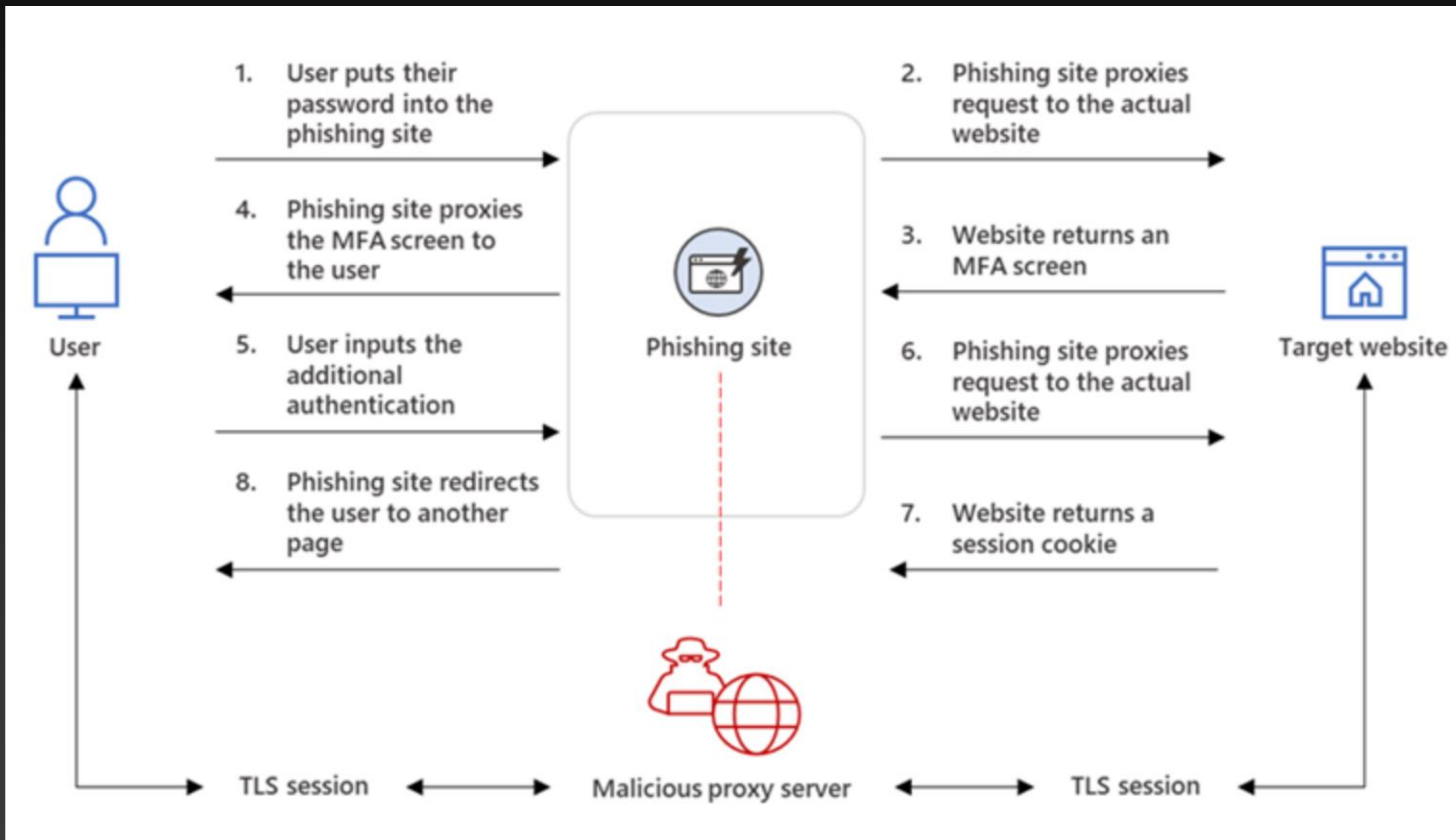


Figure 7. Credential harvester mimicking a Microsoft sign-in portal.

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

Prompts are bad

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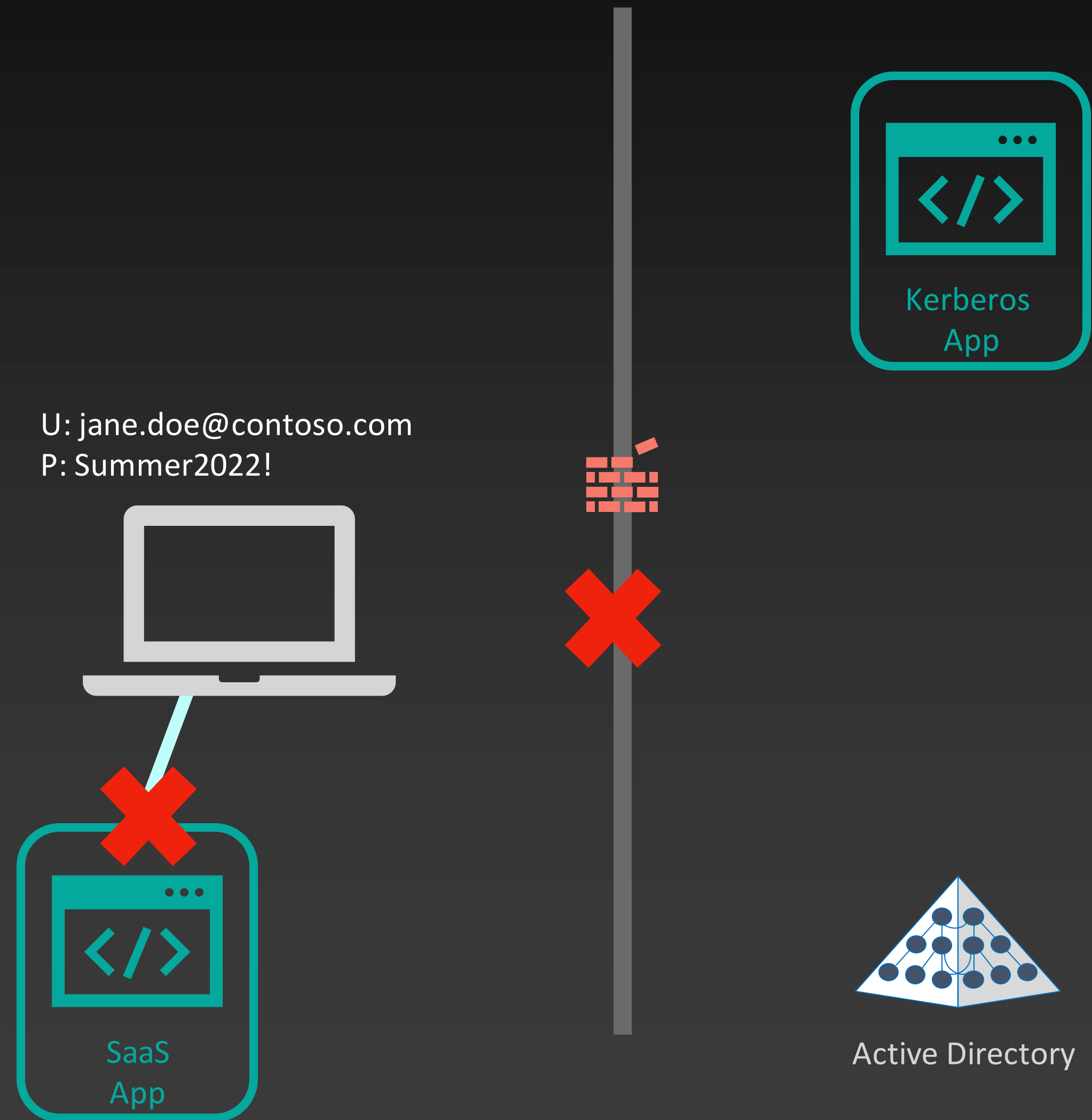
Troubleshooting Enterprise SSO

Single Sign On options

- 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 me!
 - Must be deployed through MDM
 - Two types:
 - Credential
 - Redirect – Azure AD's option is this type

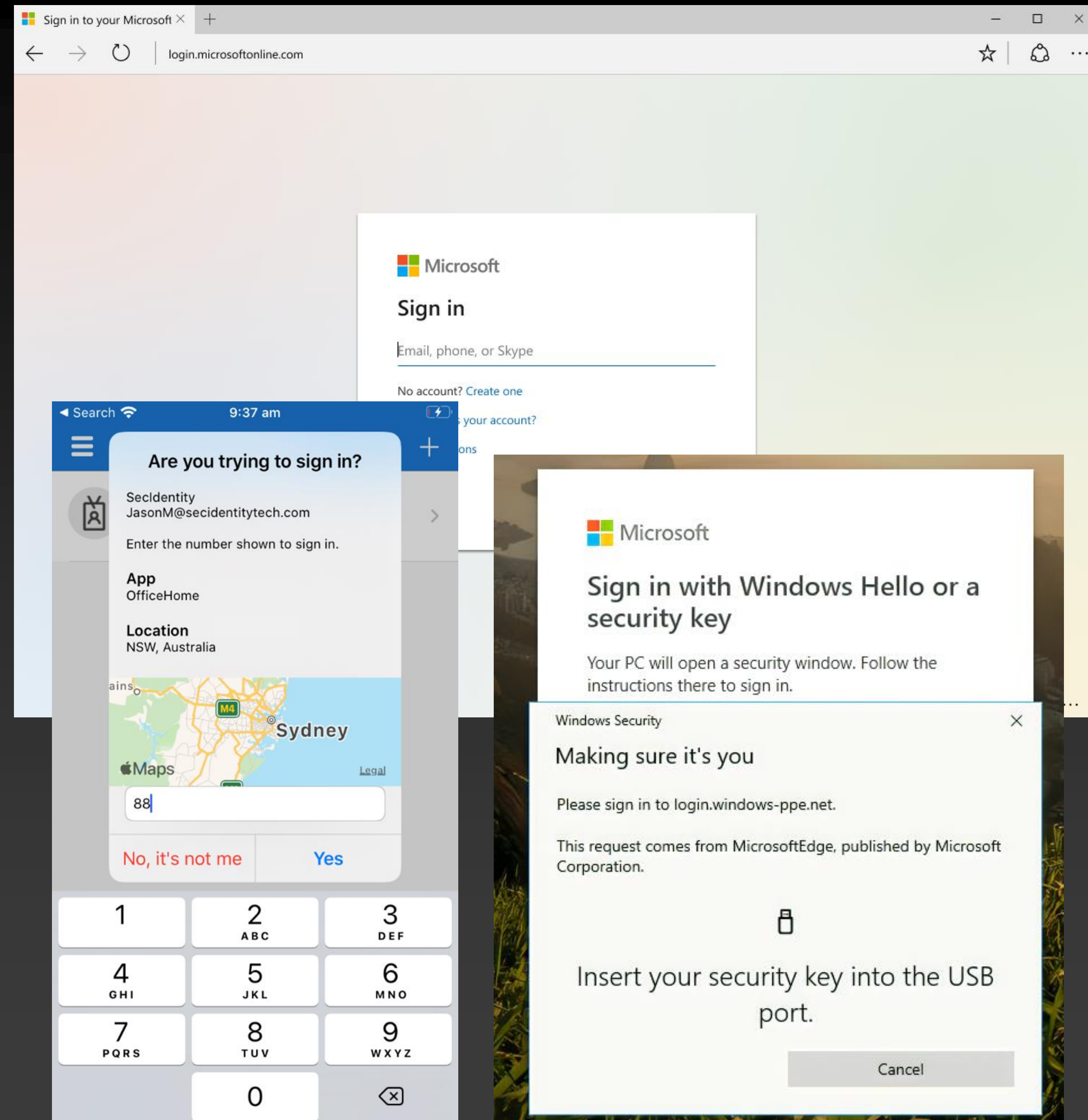
SSO with Kerberos just doesn't cut it anymore

- What's the issue with Kerberos SSO?
 - 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

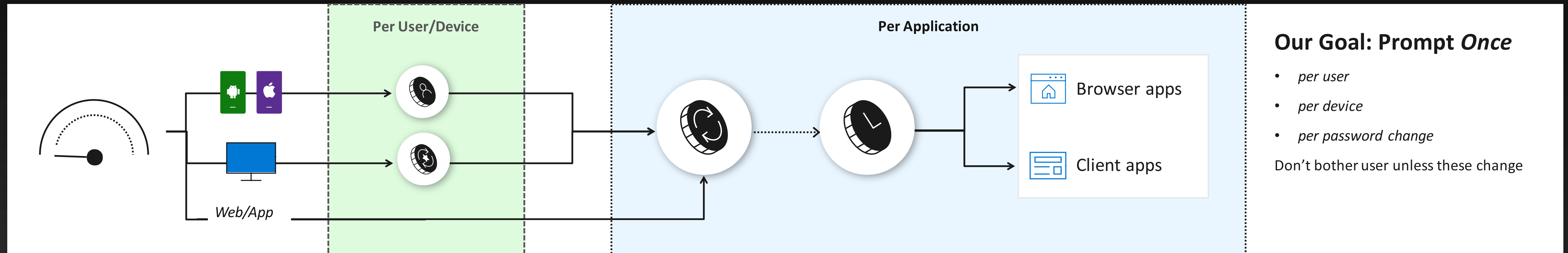


SSO – Modernize w/ Modern Auth

- The future 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!



Microsoft's 'prompt' goal



AUTHENTICATION



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



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

(COARSE) AUTHORIZATION



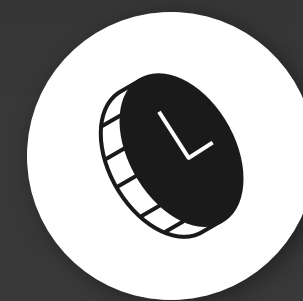
Refresh Token – (Per App)

Long term access to an application

Note: Includes whether MFA was used for authentication



Until revoked or Password Changed



Access Token – (Per App)

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)



1 hours

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

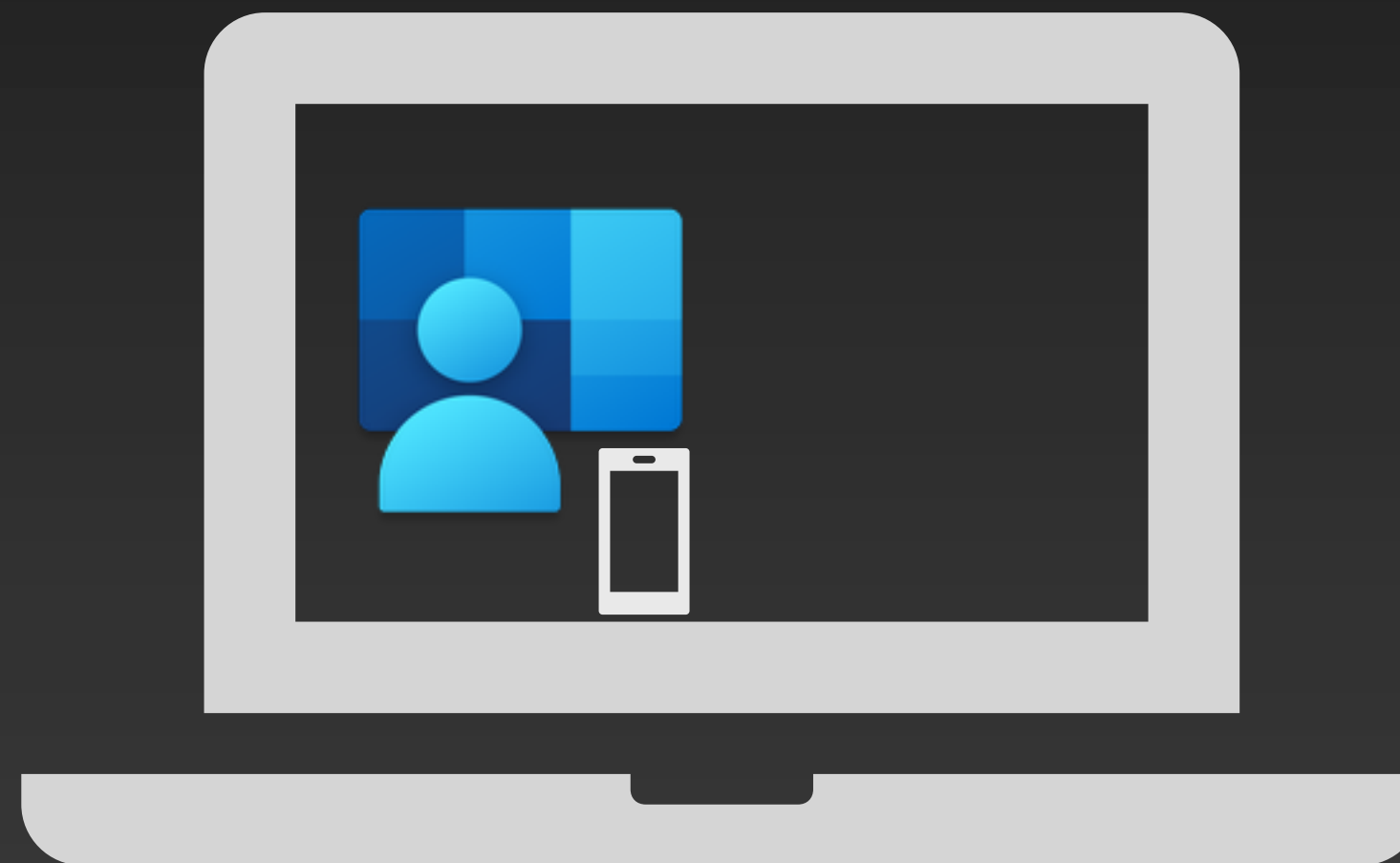
SSO – Modernize w/ IDP Vendor SSO Extensions

- 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



MS Authenticator Passwordless
Phone Sign-In

Username+Pwd+MFA (App, OTP, SMS, Phone)



App



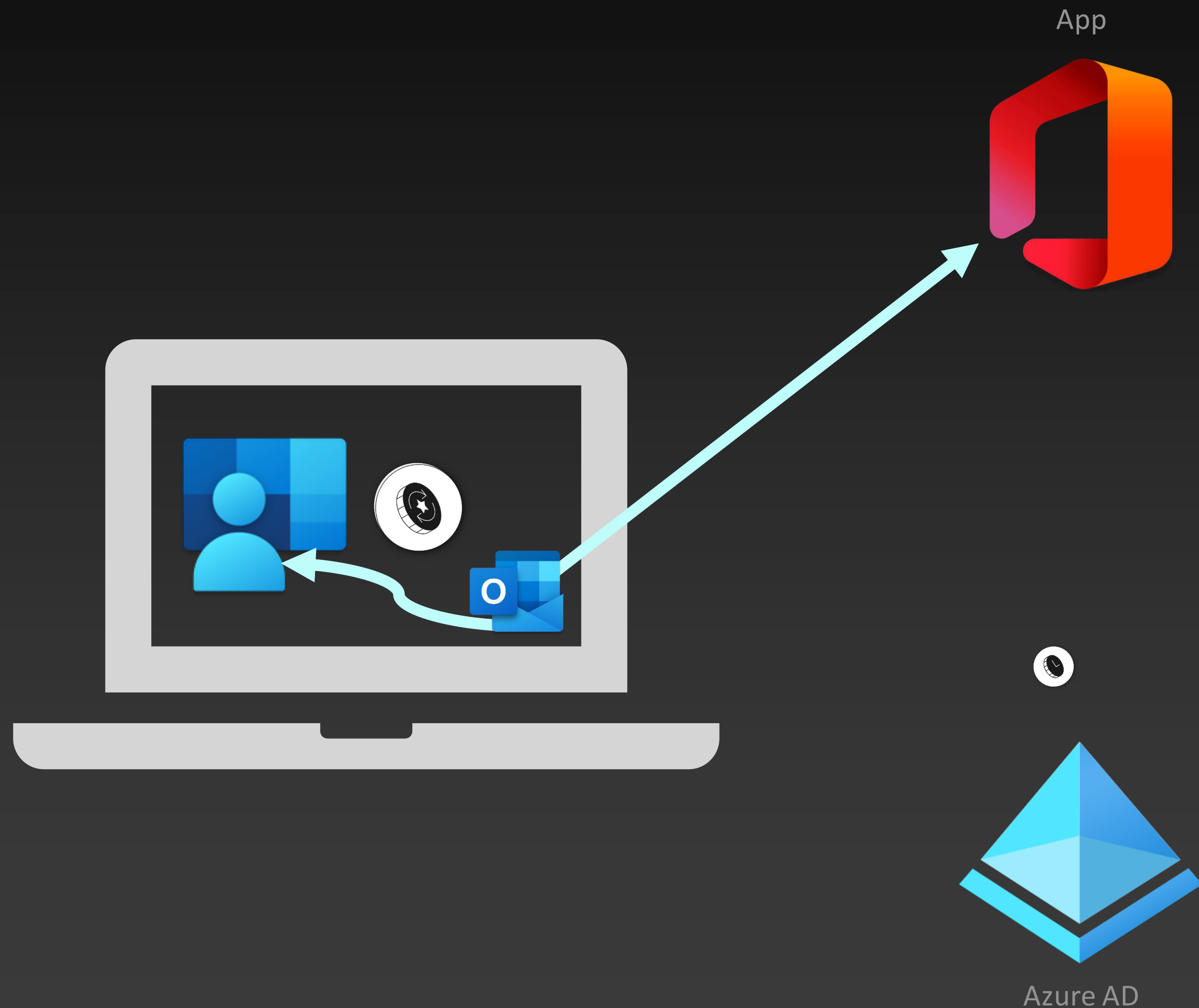
Azure AD

SSO Extension with MSAL

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):

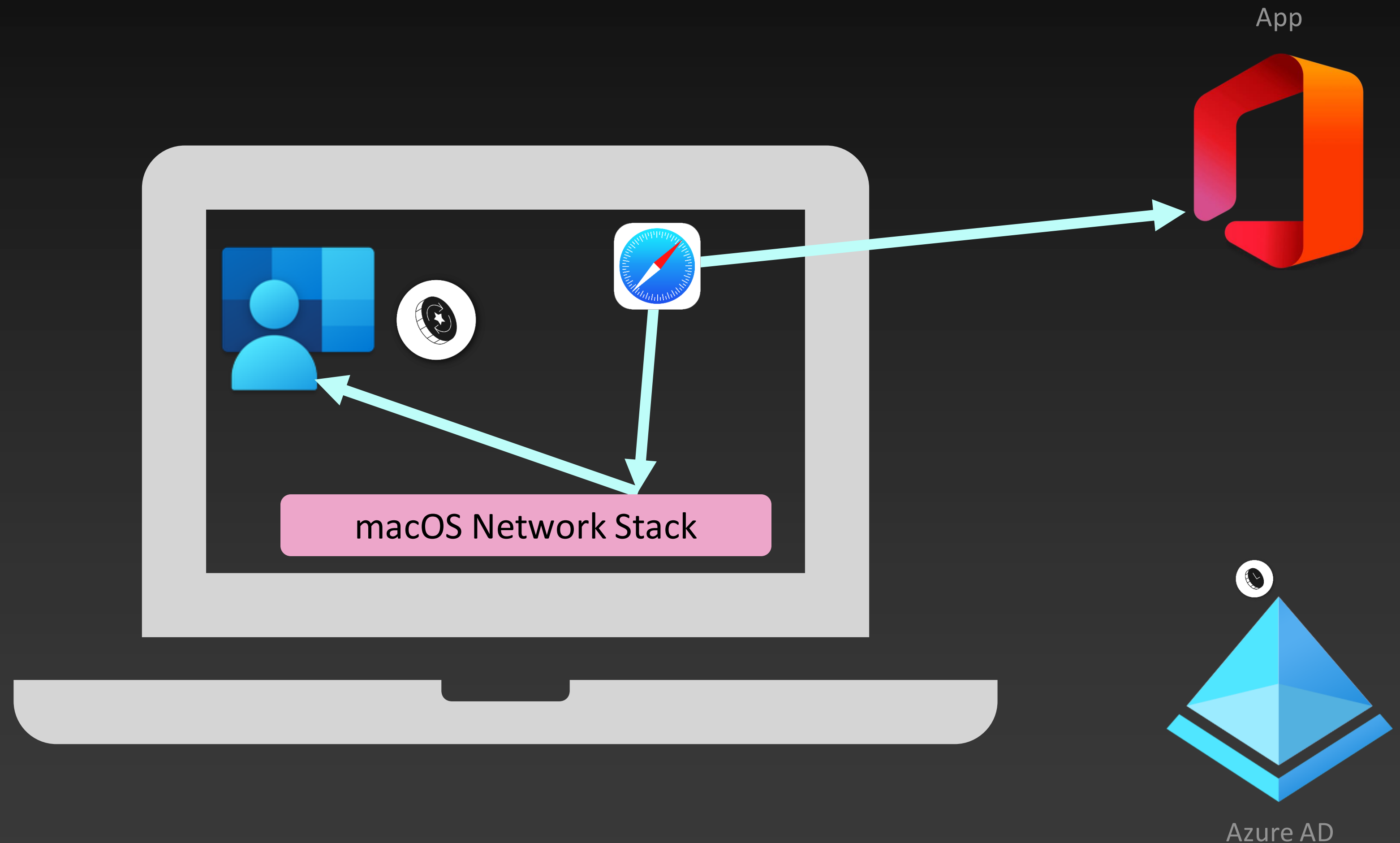
3. App that uses MSAL talks to the SSO Extension directly, asks it to get a token
4. AAD validates the PRT and returns the app-specific token
5. The token is given to the client and the client sends the token to the app
6. The user successfully accesses the app



Enterprise SSO Redirect flow

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



Demo

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Deploying Enterprise SSO with Intune

- Redirect SSO Extension Profiles must be deployed via MDM:
- Very easy deployment if Intune is 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

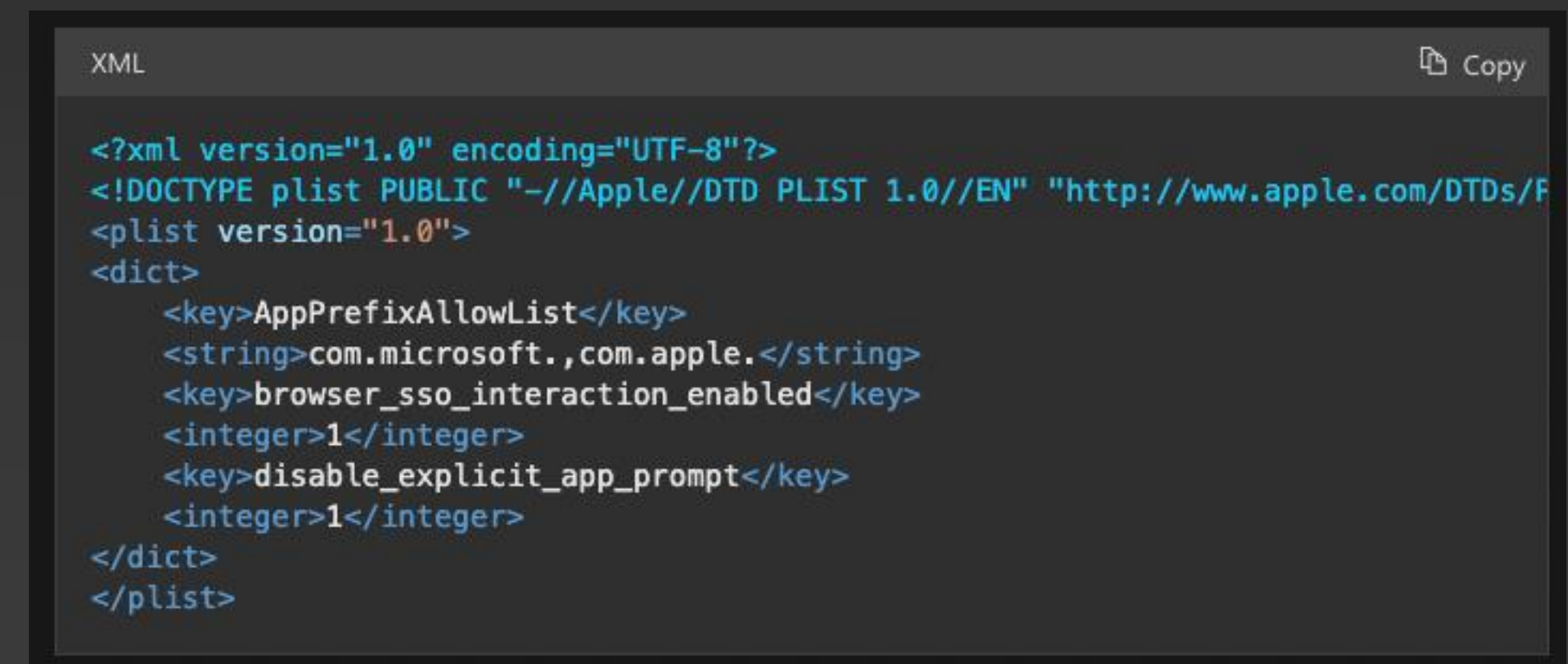
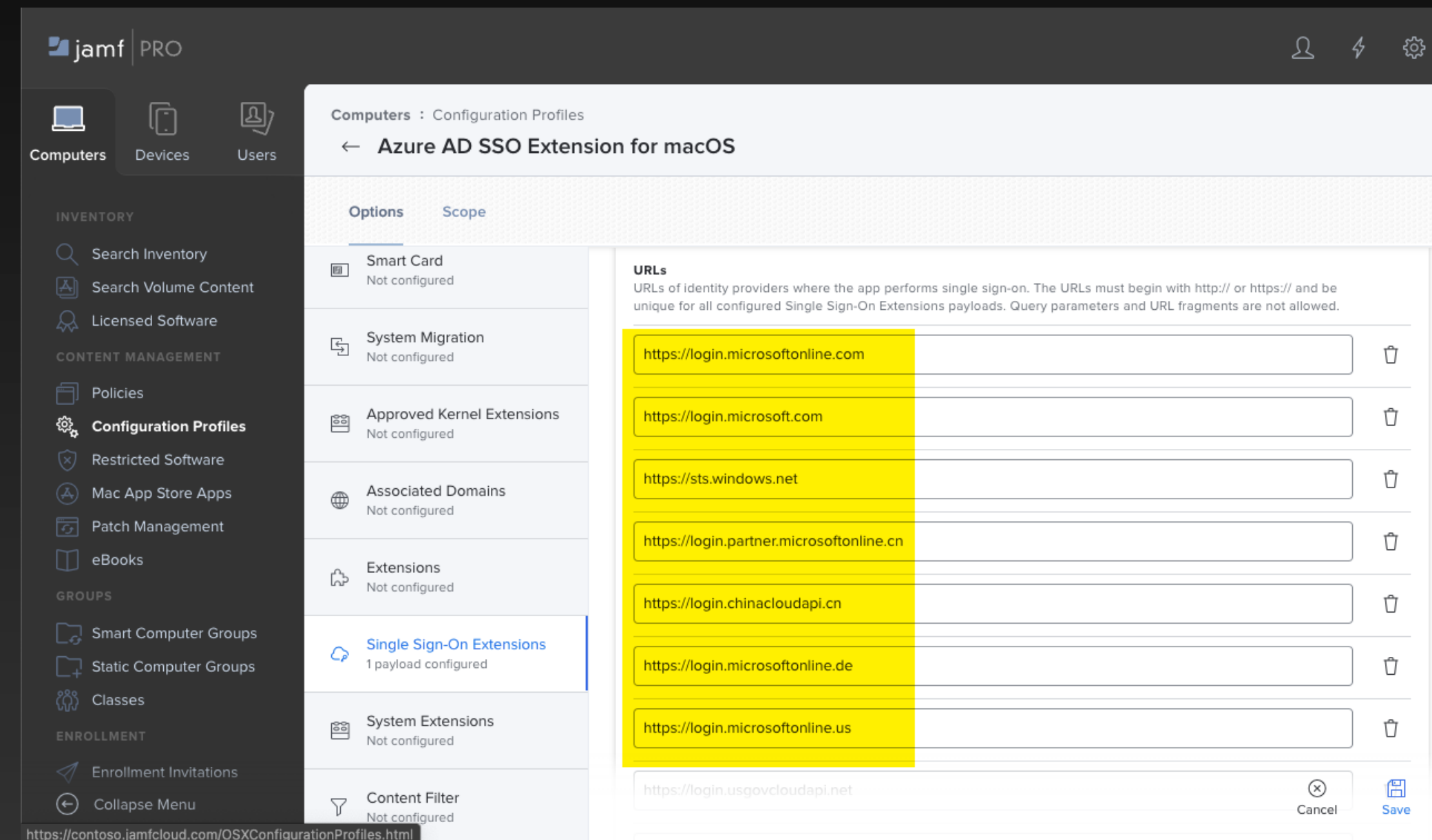
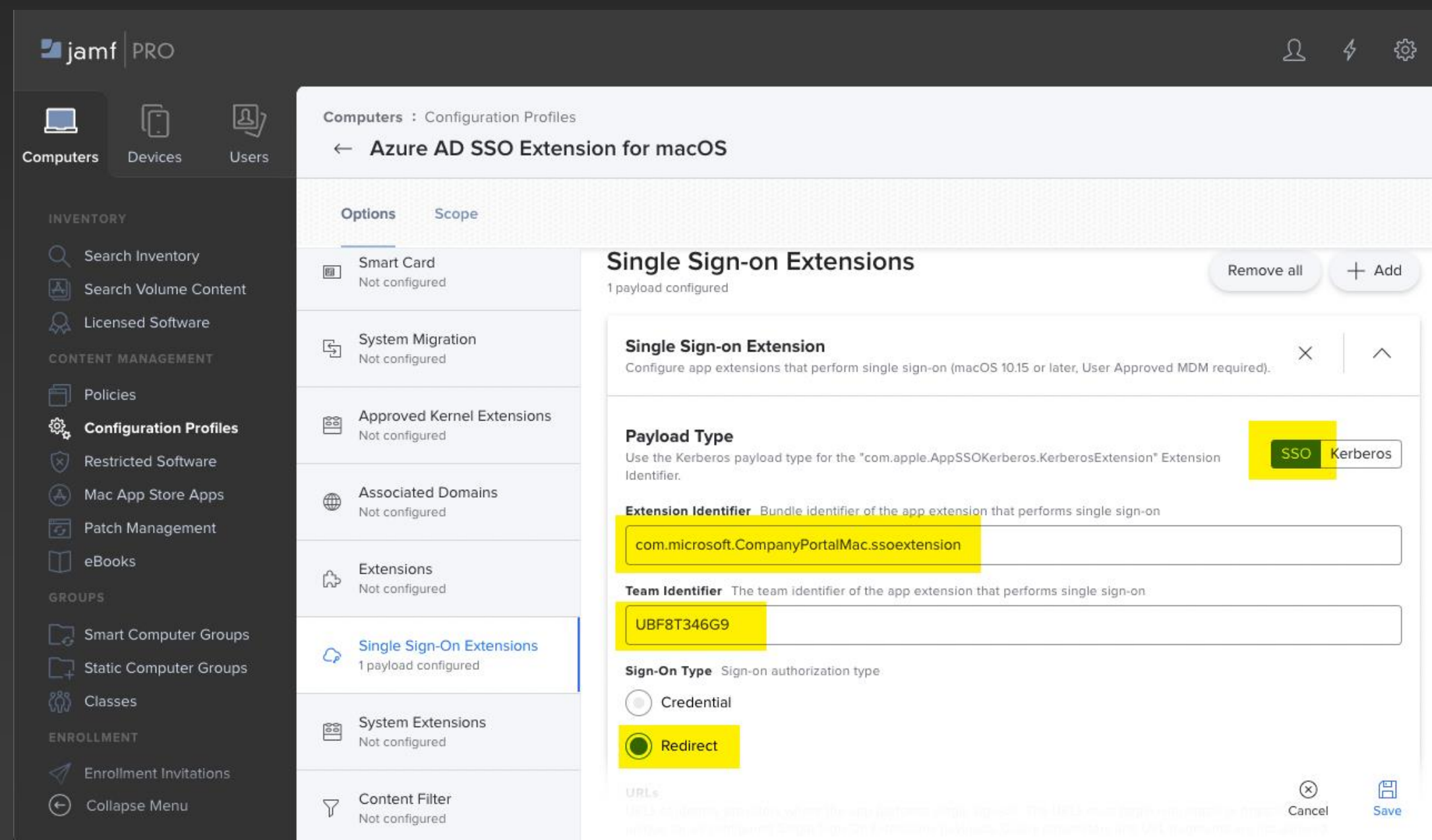
Additional configuration ⓘ

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>

Deploying Enterprise SSO with Jamf Pro

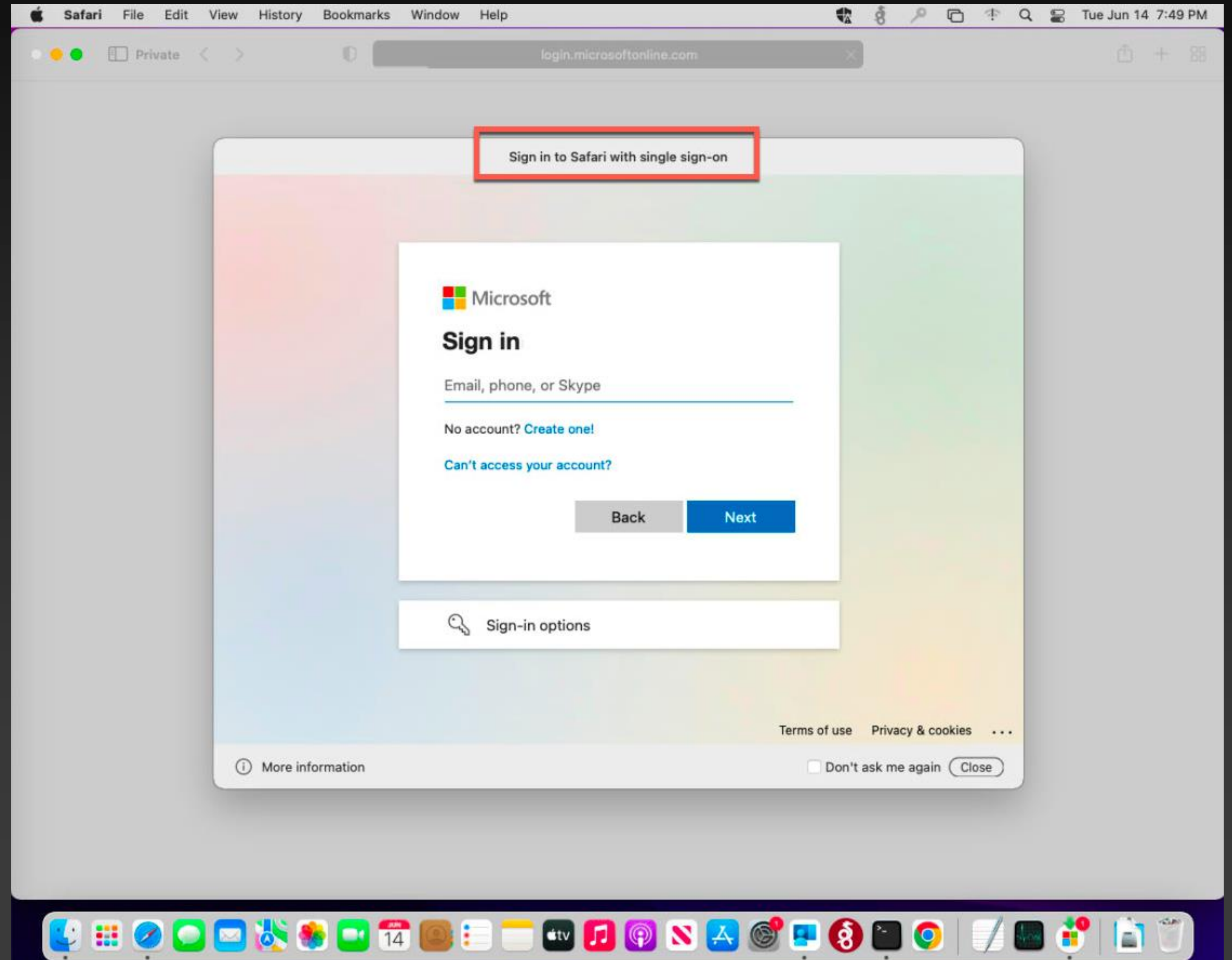
- Redirect SSO Extension Profiles must be deployed via MDM:
- Jamf Pro config is quite straightforward with a PLIST file



<https://aka.ms/AppleSSO-JamfPro>

Modernize w/ IDP Vendor SSO Extensions

- Redirect SSO Extension Profiles must be deployed via MDM:
 - Out of the box support with Intune if it is your MDM
 - Jamf Pro config is quite straightforward with a PLIST file
 - Guidance provided for other MDM vendors
- 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



Some things to keep in mind

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
- No support for FIDO keys as a passwordless auth method in the SSO Extension window
 - Authenticator App Phone Sign-In passwordless mode works well

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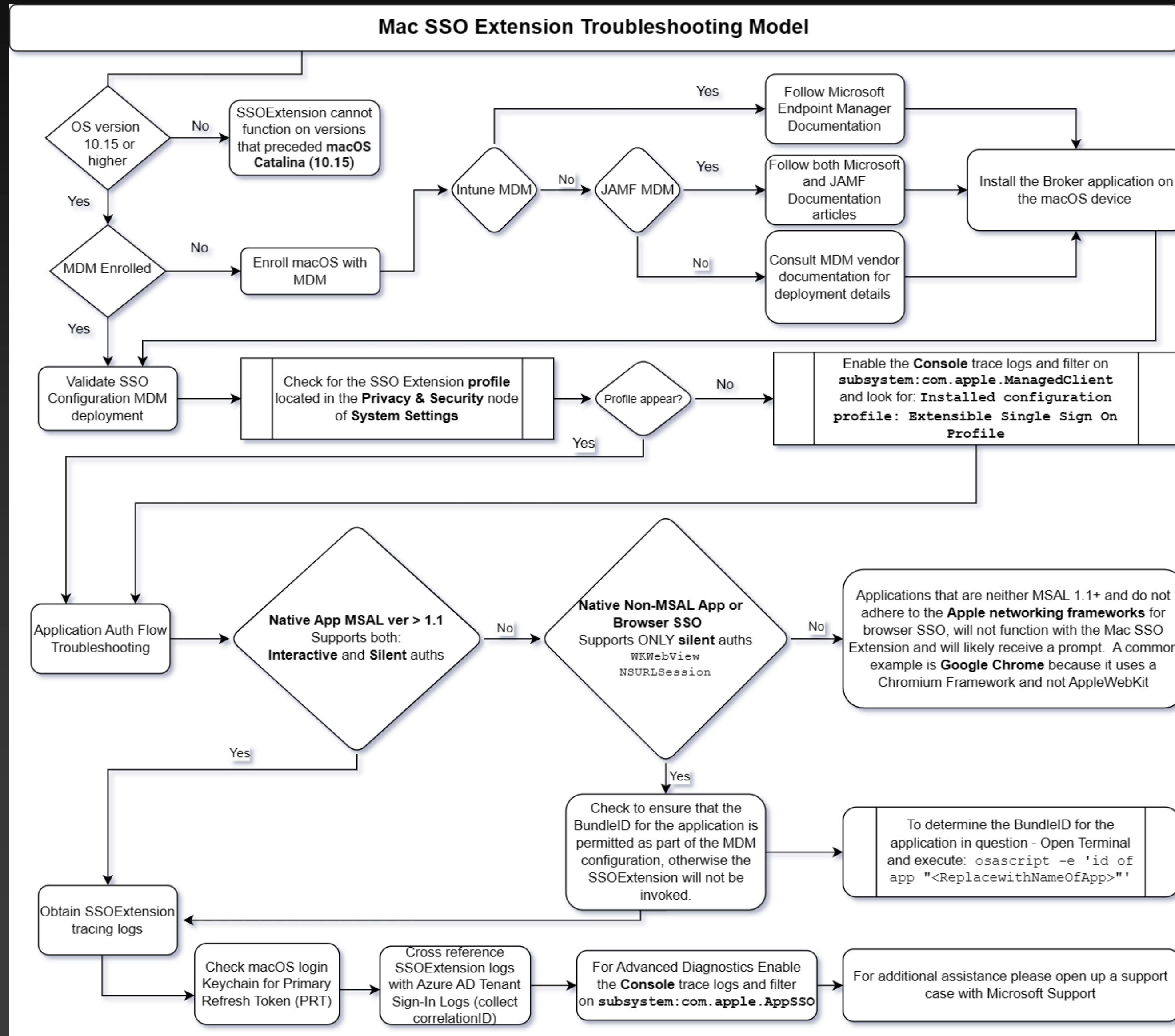
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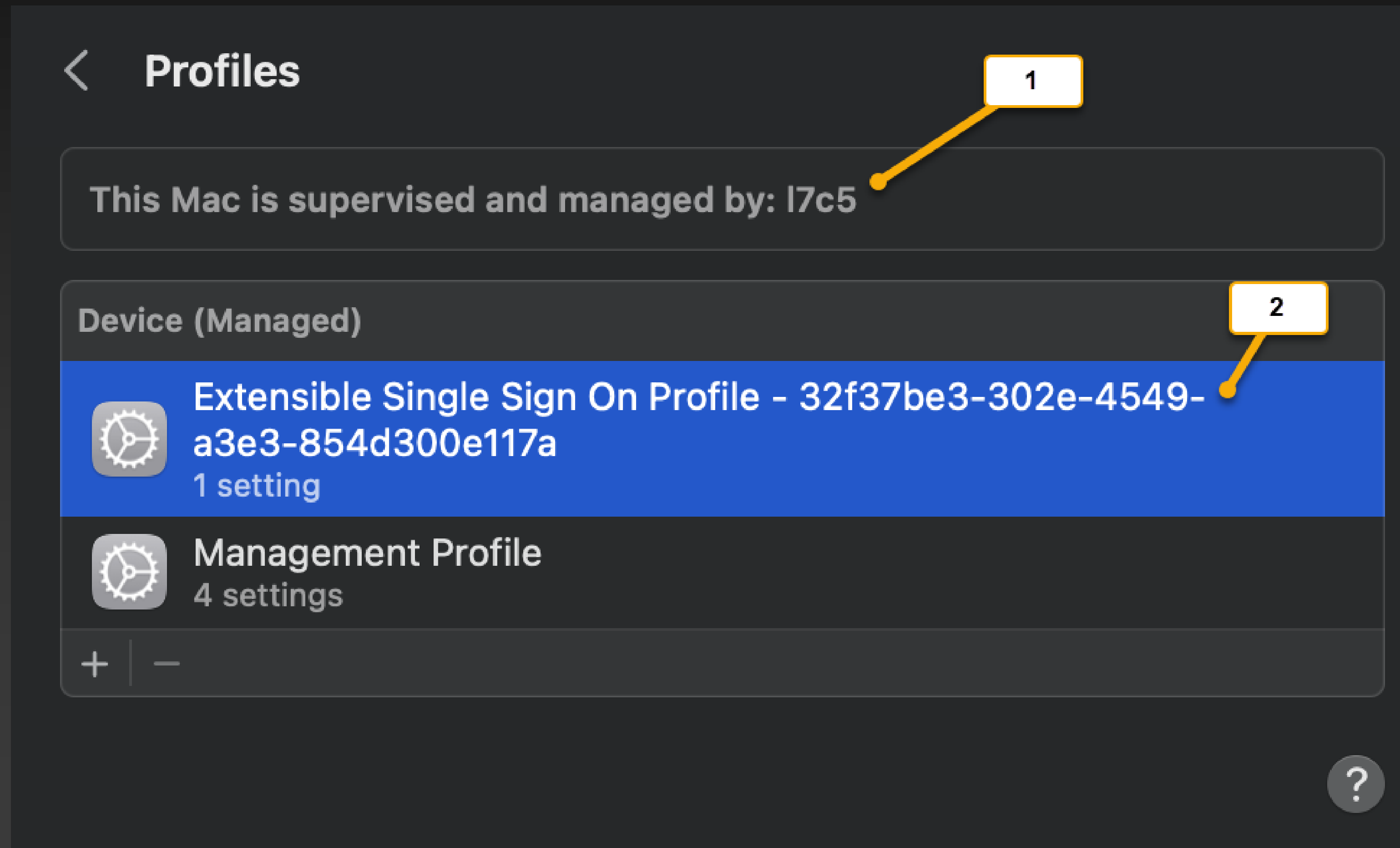
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Troubleshooting Enterprise SSO



Locate SSO extension MDM profile



Verify the extension configuration

 **Extensible Single Sign On Profile - 32f37be3-302e-4549-a3e3-854d300e117a**
17c5 Verified

Description

The configuration profile enables your company's technical support to enforce security policies on your mobile device

Signed

AppleConfigProfileSigning.manage.microsoft.com

Installed

Dec 26, 2022 at 3:53 PM

Settings

Single Sign On Extension

Details

Single Sign On Extension

Description

Extensible Single Sign On Profile - 32f37be3-302e-4549-a3e3-854d300e117a

Extension

com.microsoft.CompanyPortalMac.ssoextension (UBF8T346G9)

Type

Redirect

URLs

<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>

OK

1

2

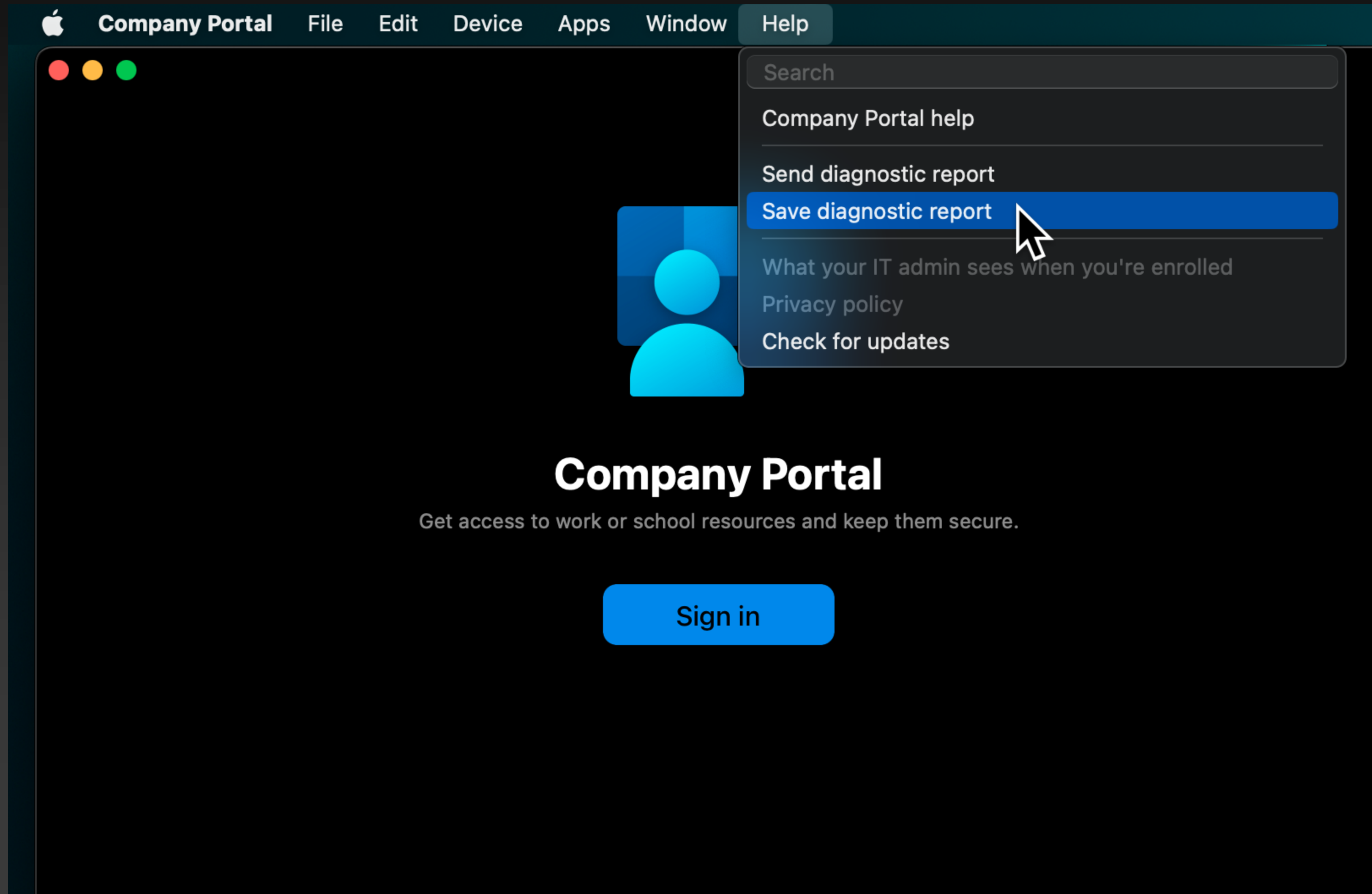
3

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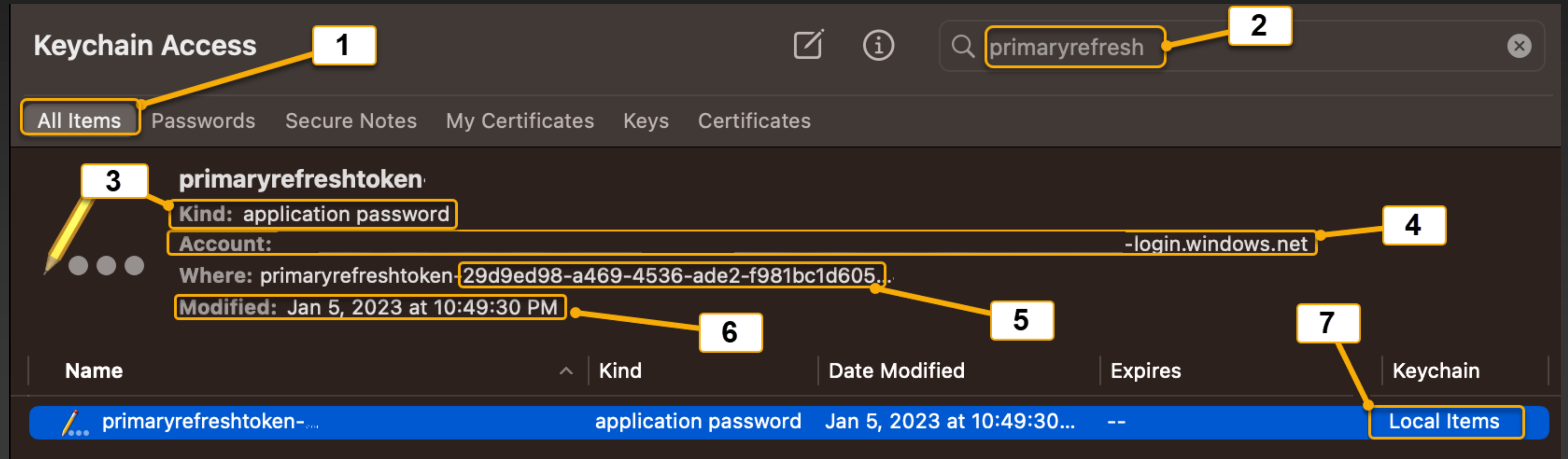
5

6

Collect Enterprise SSO logs



Check keychain access for PRT



Questions?

Thank You



Slides: aka.ms/xworld

 [@merill](https://twitter.com/merill)

 [@merill@infosec.exchange](mailto:merill@infosec.exchange)

MacAdmins | @merill | #microsoft-aad