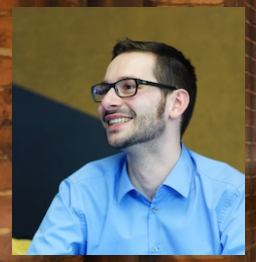
# Hybrid identity design and security considerations in Azure Active Directory



Thomas Naunheim

aOS Germany
1/12/2020

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# About Me

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# Azure Active Directory

## Microsoft Hybrid Identity

(Windows Server)
**AD Domain Services**

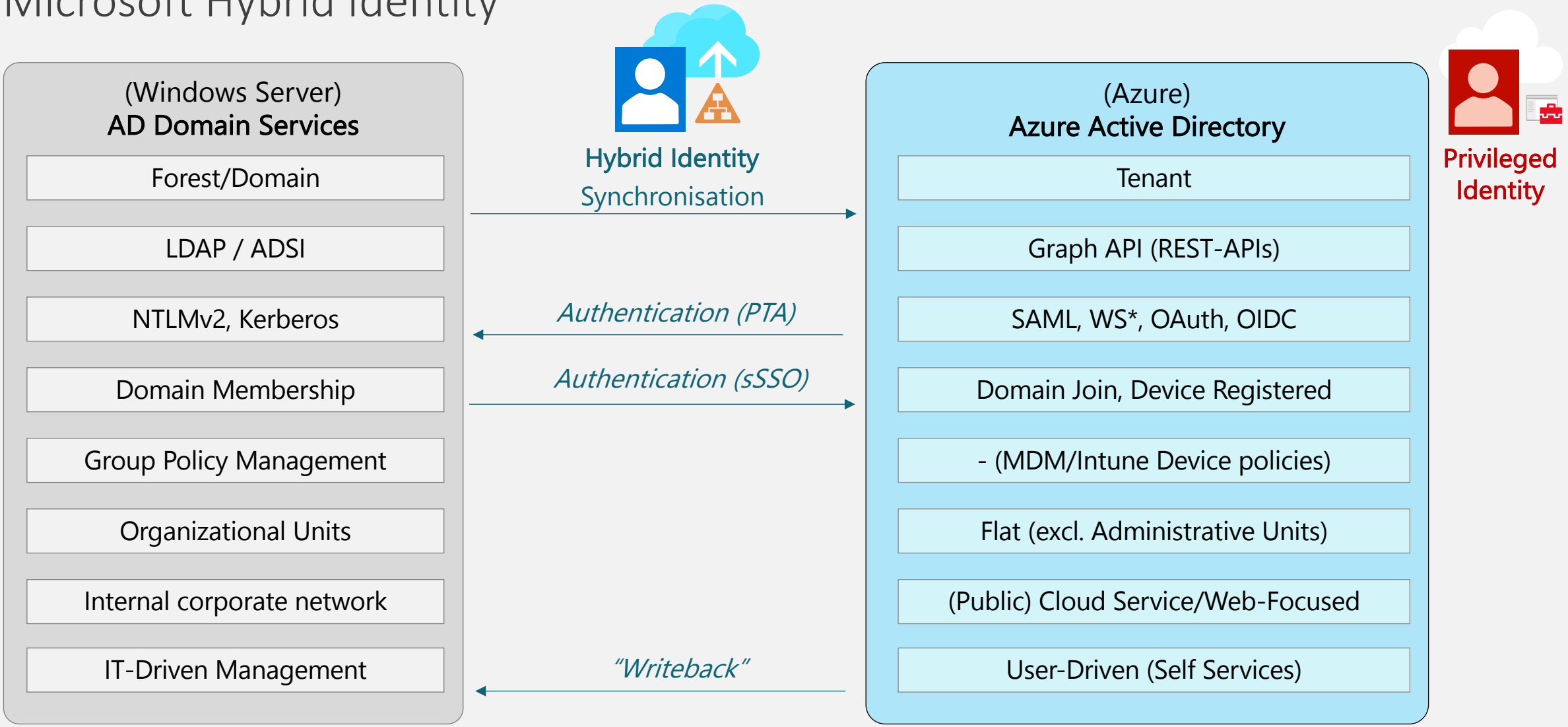
- Forest/Domain
- LDAP / ADSI
- NTLMv2, Kerberos
- Domain Membership
- Group Policy Management
- Organizational Units
- Internal corporate network
- IT-Driven Management

(Azure)
**Azure Active Directory**

- Tenant
- Graph API (REST-APIs)
- SAML, WS*, OAuth, OIDC
- Domain Join, Device Registered
- - (MDM/Intune Device policies)
- Flat (excl. Administrative Units)
- (Public) Cloud Service/Web-Focused
- User-Driven (Self Services)

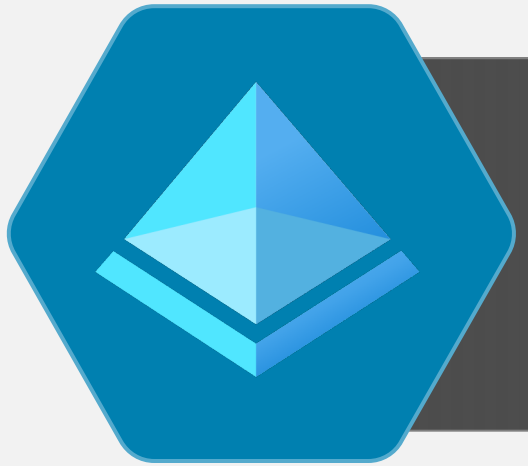
# Azure Active Directory

## Microsoft Hybrid Identity



# Agenda

1. Azure Active Directory Tenant
2. Hybrid Identity Synchronization
3. Hybrid Identity Authentication
4. Hybrid Identity Protection
5. Privileged Identity Management

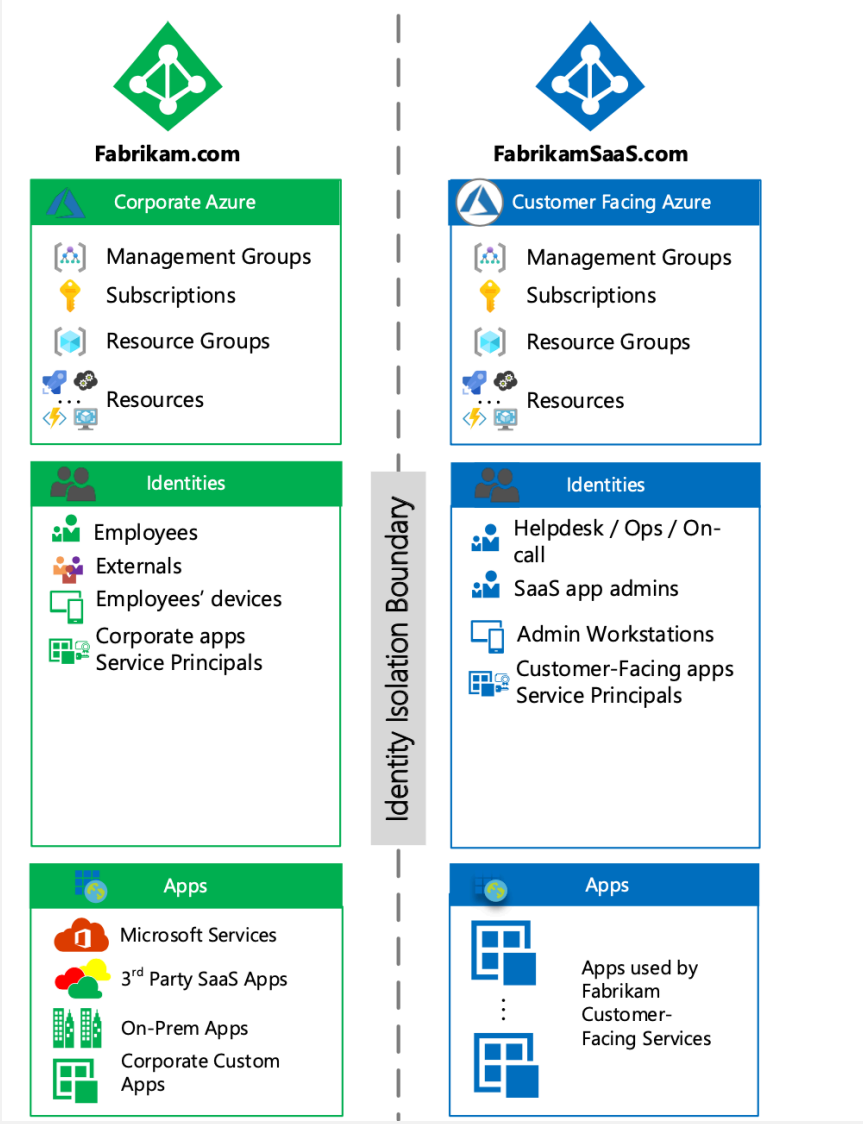


# Azure Active Directory
## Tenant

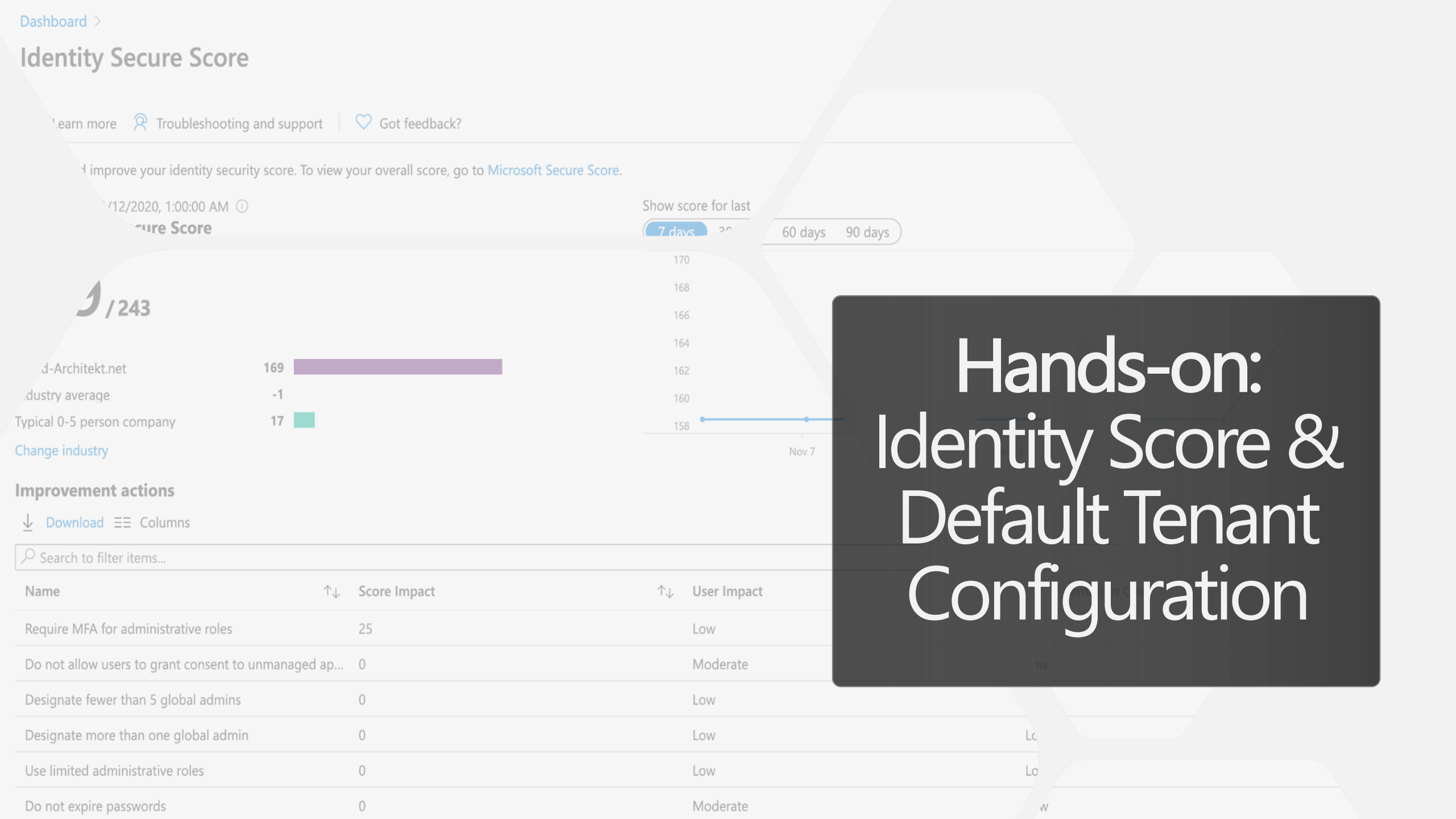
# Azure Active Directory

## One tenant to rule them all…?

- **Tenant isolation (security boundary)**
  - Staging environments, (geopolitical/multi-geo) region or B2C (local) accounts
  - Granulator control over admin permissions
    → Administrative Units, Custom Roles (In Preview)
  - Default user permissions (User Type and Scope)
- **Supported topologies for synchronization**
  - Single Forest to single Azure AD Tenant
  - Multiple Forest to single Azure AD Tenant (via single sync service only)




Source: Securing Azure environments with Azure Active Directory


Dashboard
Identity Secure Score
Learn more
Troubleshooting and support
Got feedback?
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Change industry
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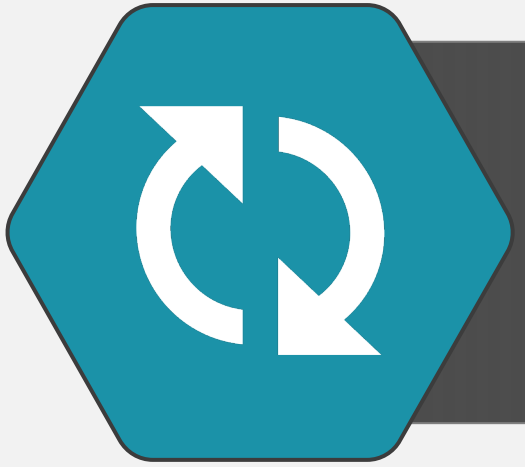
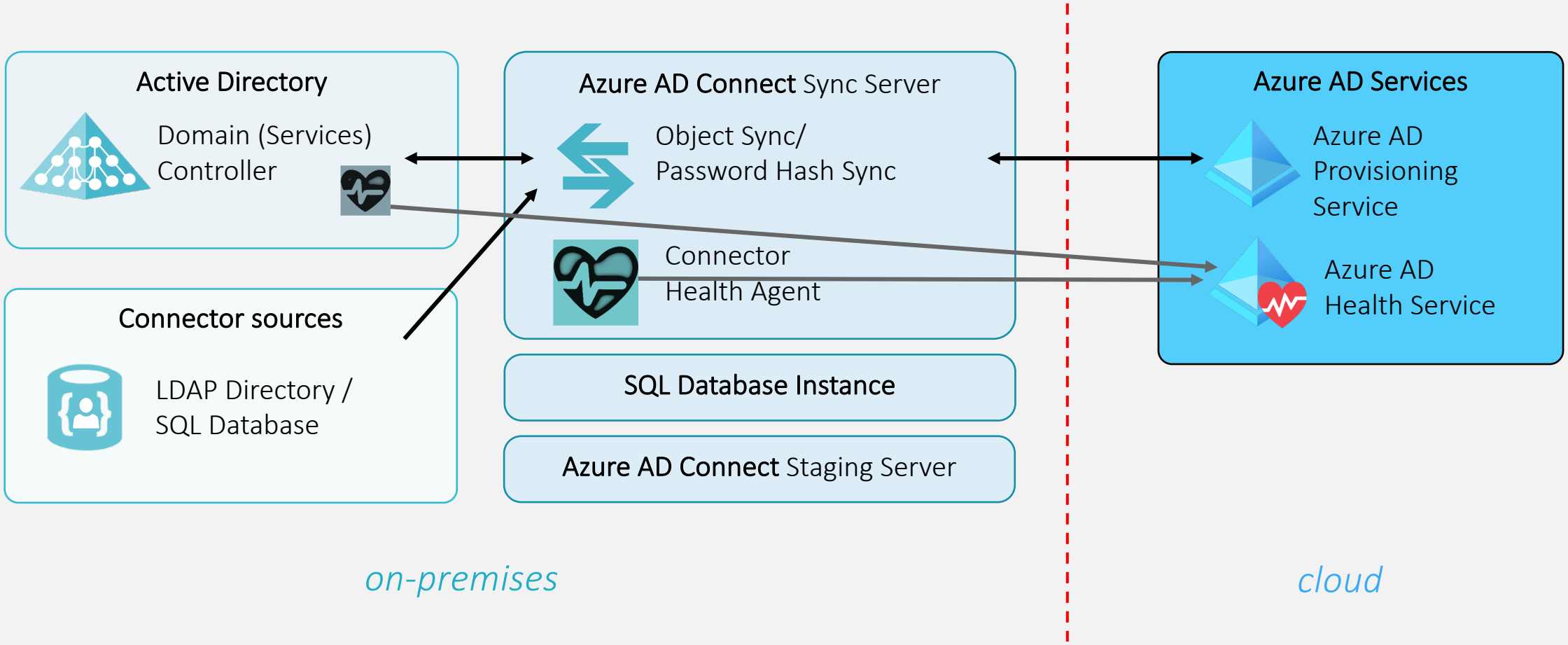
Columns
Search to filter items...
Name
Score Impact
User Impact
Require MFA for administrative roles 25 Low
Do not allow users to grant consent to unmanaged ap... 0 Moderate
Designate fewer than 5 global admins 0 Low
Designate more than one global admin 0 Low
Use limited administrative roles 0 Low
Do not expire passwords 0 Moderate
Hands-on:
Identity Score &
Default Tenant
Configuration



# Hybrid Identity Synchronization

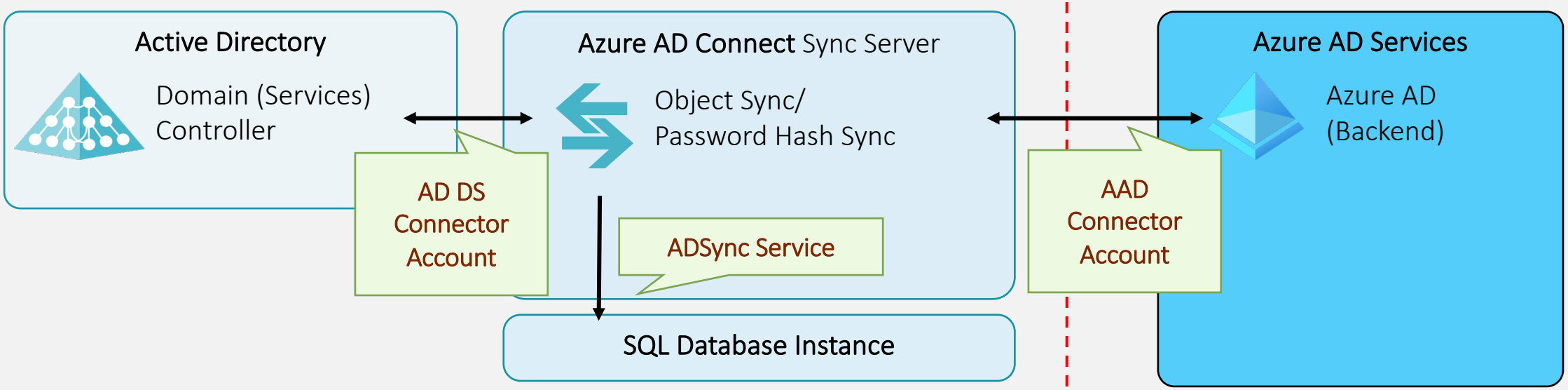
# Azure AD Connect Synchronization

## Architecture and components of „Identity bridge“



# Azure AD Connect Synchronization

## Hardening of Azure AD Connect




- Pre-created AD service accounts and delegated permissions (based on your user scope/filter and write-backs attributes)
  - ADSync service accounts as "(Group) Managed Service Account"
  - Security advisory for AD DS connect service account
- **AAD Connector Accounts** needs to be excluded from Conditional Access = Monitoring!

# Azure AD Connect Synchronization

## Design decisions and prerequisites (before implementing)

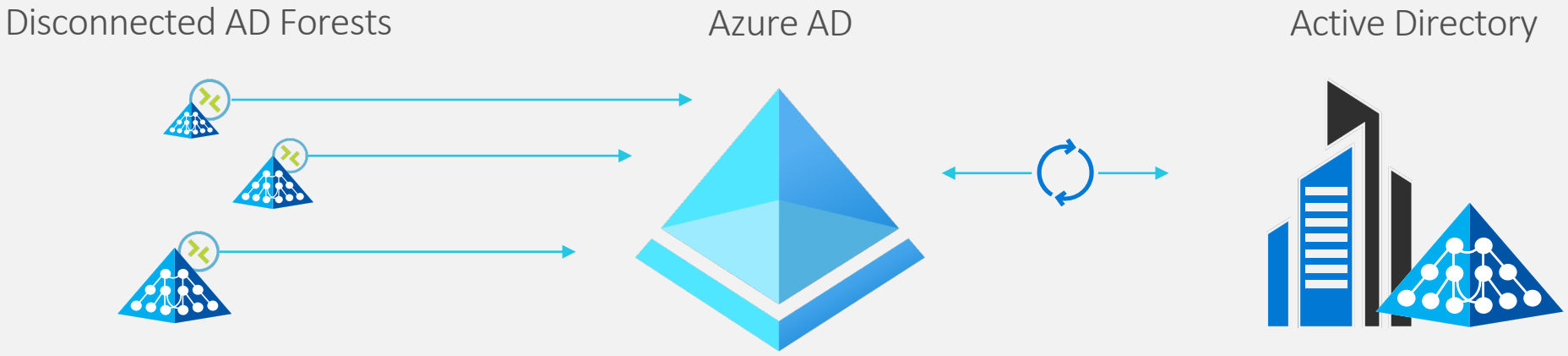
- Review of the synced attributes, filtering and write-back options
  - Scope of objects and filter of attributes that are needed in Azure AD
  - IDFix to prepare and check directory objects and attributes
  - Password Write-back (Self Service Password Reset Service and Auto-Remediation)

- Placement and protection of Azure AD connect, PTAs servers and databases
  - Hybrid identity components must be protected (similarly high as domain controllers)
  - Supported options for “High availability” of PTA and SQL cluster

- **Different interval of synchronization** (object and password hash sync)

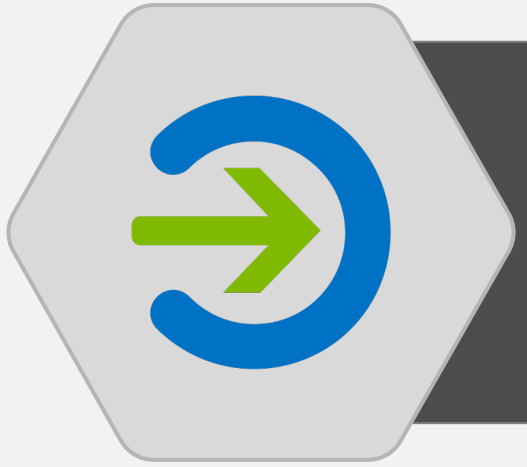
# Azure AD Connect Synchronization

## Synchronization via Cloud provisioning (in preview)




- Easy and lightweight solution
  - Super small on-prem footprint, Configure and manage in the cloud
  - 2-minute sync cycles and active, multiple active agents
  - Support for disconnected forests
- Feature Comparision to Azure AD Connect Sync Service

Source: Microsoft (Ignite BRK2130 „Azure Active Directory: New features and roadmap“)



# Hybrid Identity Authentication

# Hybrid Identity Authentication

## How to choose the right model?

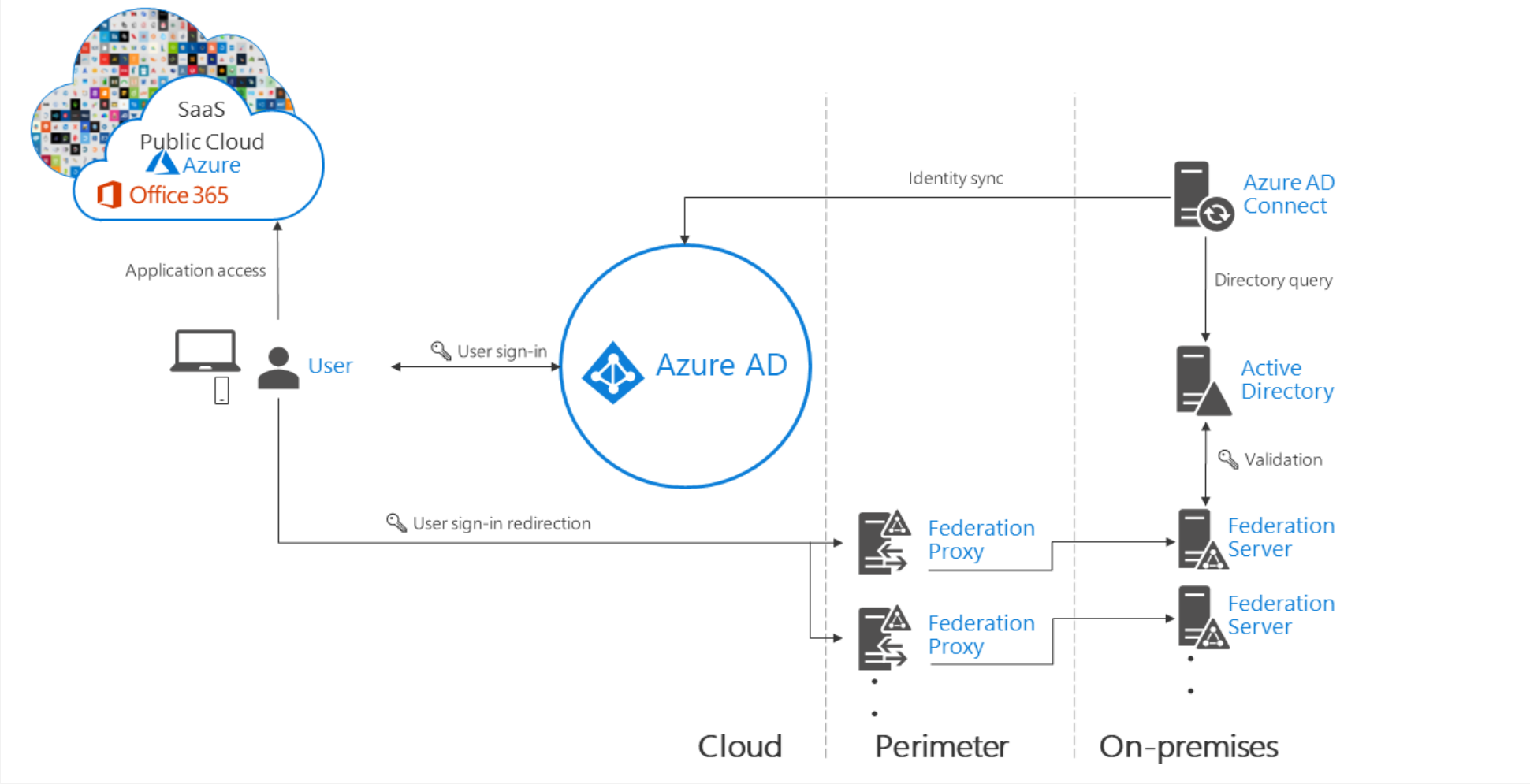
- Decision tree and detailed considerations by Microsoft
- Define **your** (identity) strategy and level of transformation

- **Cloud vs. Federated/On-Prem Authentication?**
  - Defense of initial authentication attacks (brute force and password spray)?
  - Certificate management (Golden SAML)?
  - Hardening of perimeter-network components?
  - Enforcing and validation of local (AD) security policies and identity lifecycle?
    - Example by PHS: "Force Password Change on Next Logon", Account Experation
  - Resilience of IAM Infrastructure (SLA and On-Premises dependency)?

- Identity Protection features (leaked credentials)?

# Hybrid Identity Authentication

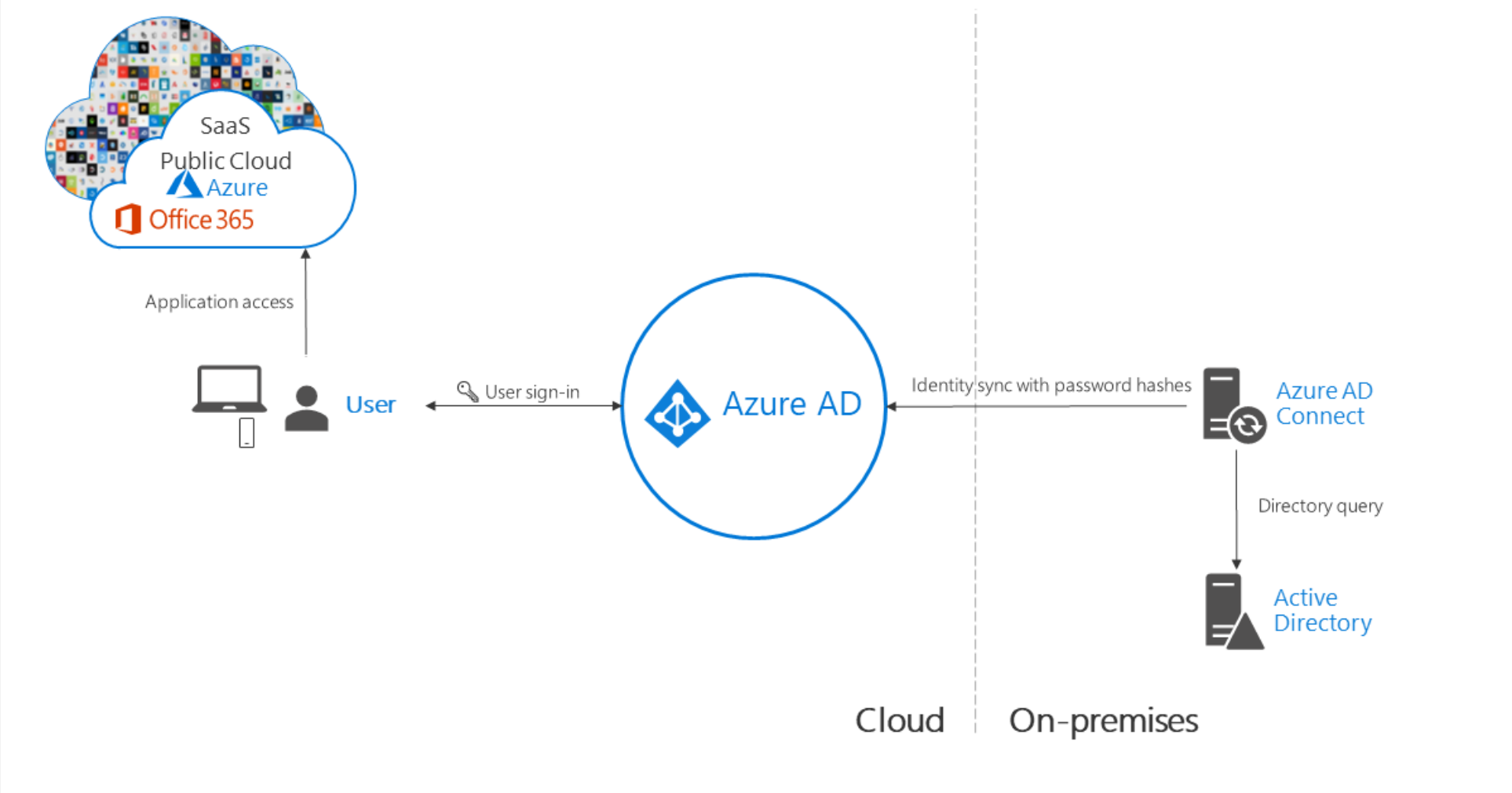
## Hybrid Authentication with Federation Services (AD FS)




Source: https://docs.microsoft.com/en-us/azure/security/azure-ad-choose-authn

# Hybrid Identity Authentication

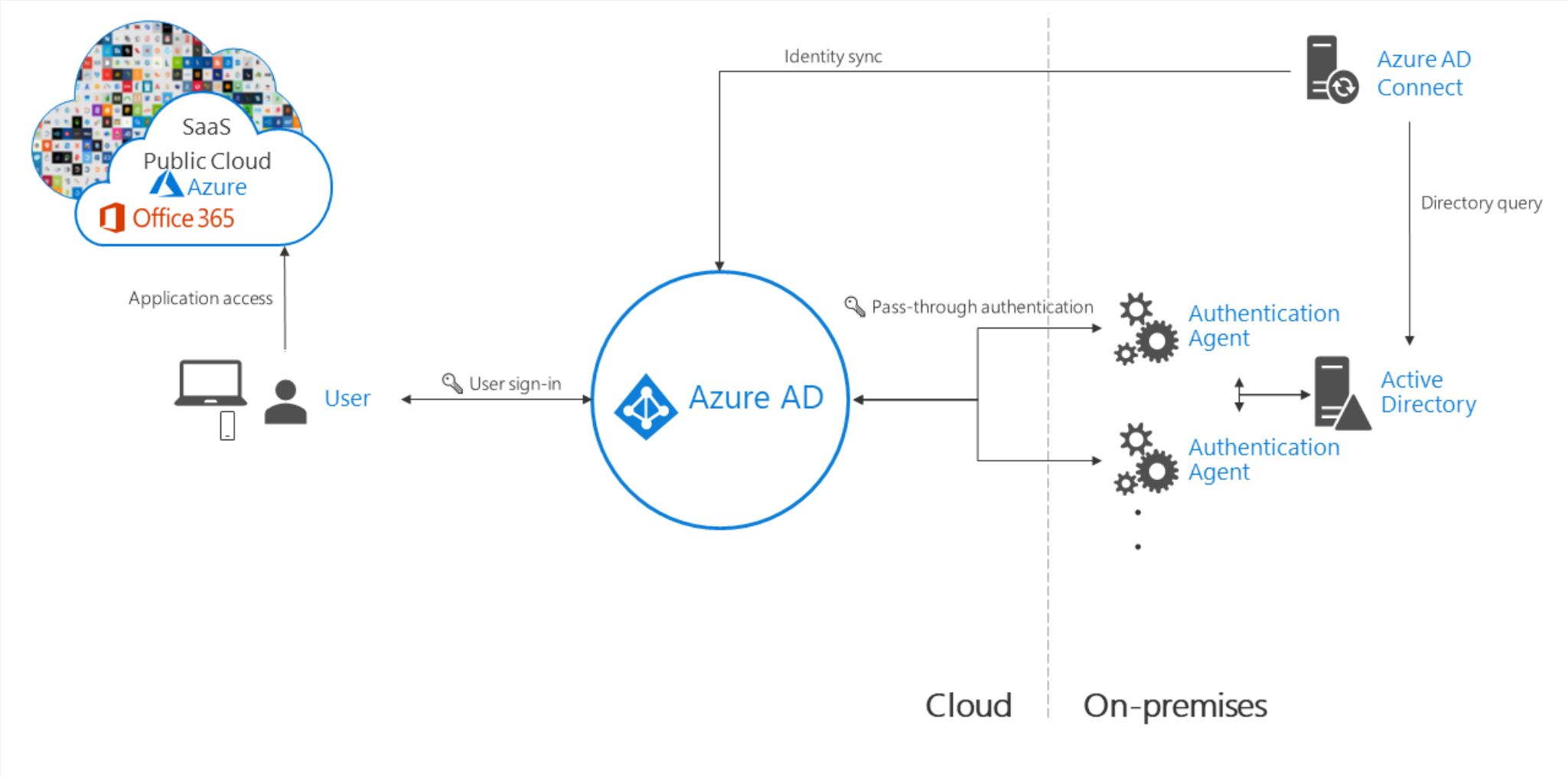
## Hybrid Authentication with Password hash sync (PHS)




Source: https://docs.microsoft.com/en-us/azure/security/azure-ad-choose-authn

# Hybrid Identity Authentication

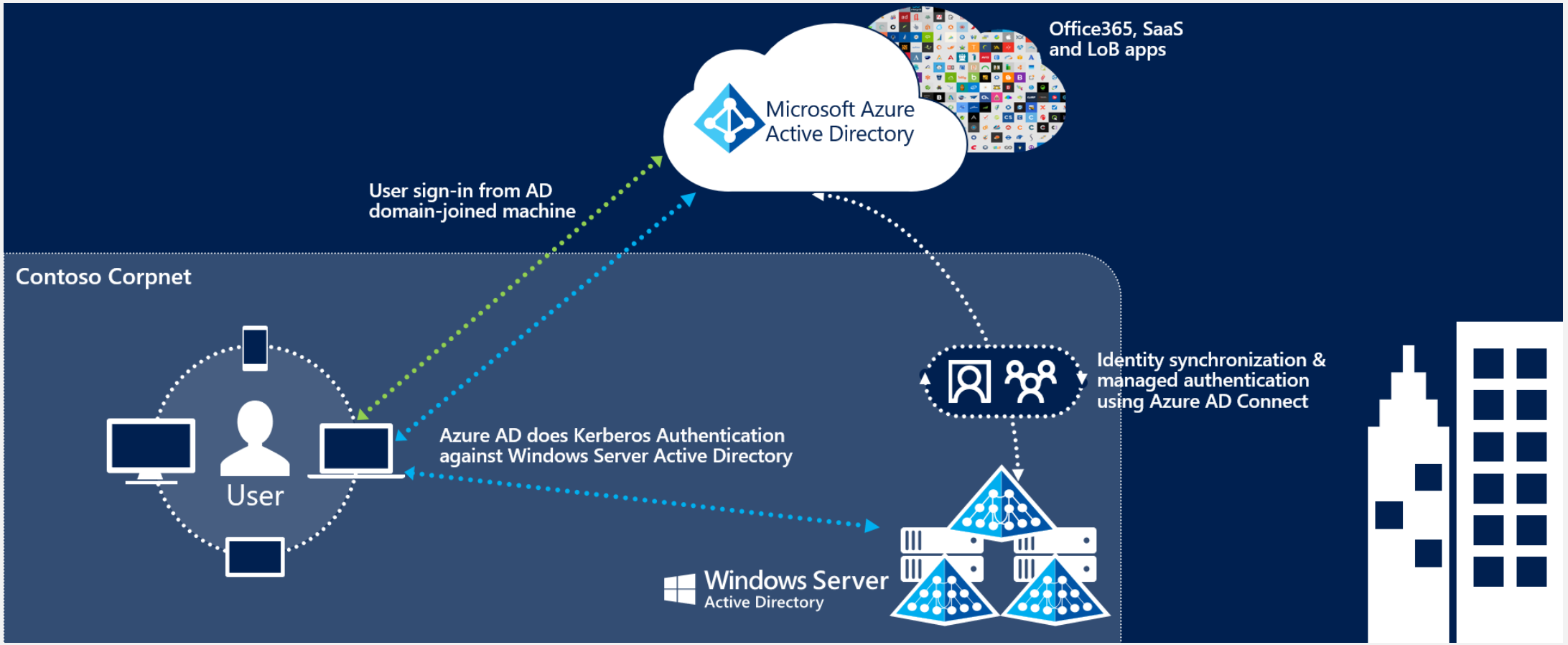
## Hybrid Authentication with Pass-trough Authentication (PTA)




Source: https://docs.microsoft.com/en-us/azure/security/azure-ad-choose-authn

# Hybrid Identity Authentication

## Hybrid Authentication and Seamless Single-Sign On (sSSO)




Source: https://docs.microsoft.com/en-us/azure/active-directory/hybrid/how-to-connect-sso

# Hybrid Identity Authentication

## Weakness of Seamless SSO (sSSO)

- Kerberos (Silver Ticket) Attacks to AZUREADSSOACCT

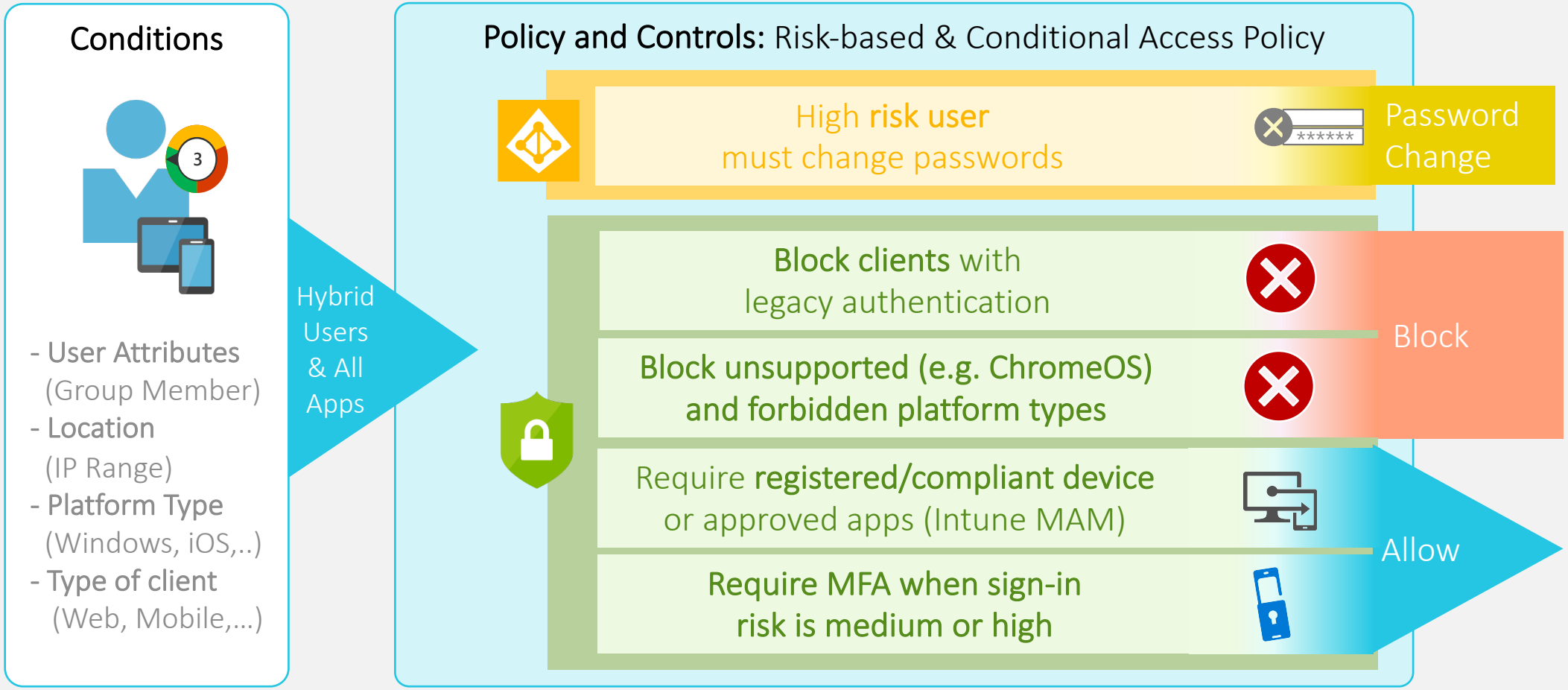
- Limitation of sSSO Kerberos Encryption types in the past:
  - *Support of AES256_HMAC_SHA1 is available (since October 2019), before: RC4_HMAC_MD5 encryption type was only supported*
    Source: https://feedback.azure.com/forums/169401-azure-active-directory/suggestions/36121711-add-support-for-kerberos-aes-and-drop-rc4-hmac-md5

- Known issues and manual roll over Kerberos decyrption key
  - At least every 30 days to mitigate potential compromise of „Computer Account“

# Hybrid Identity Protection

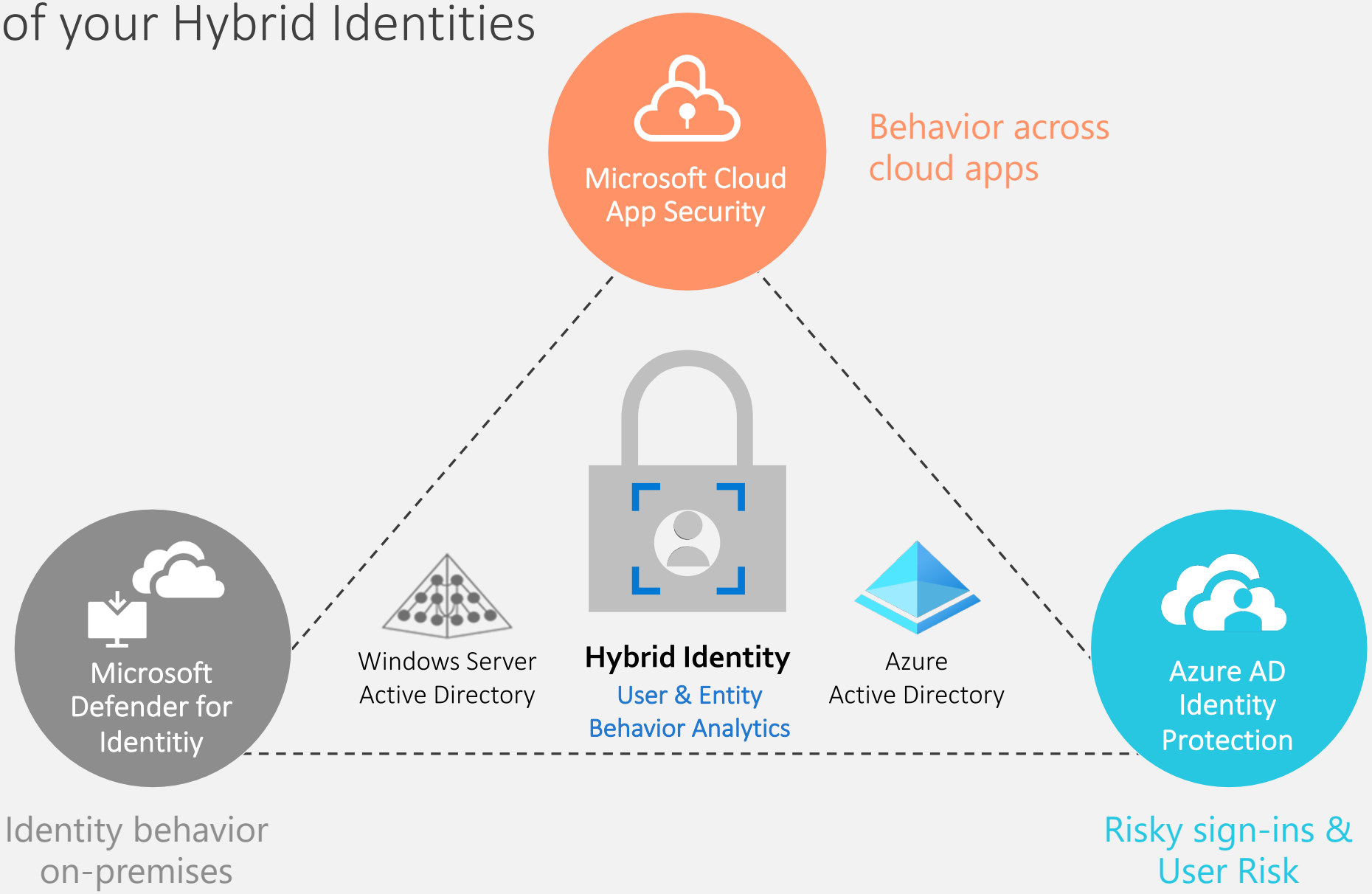
# Hybrid Identity Protection

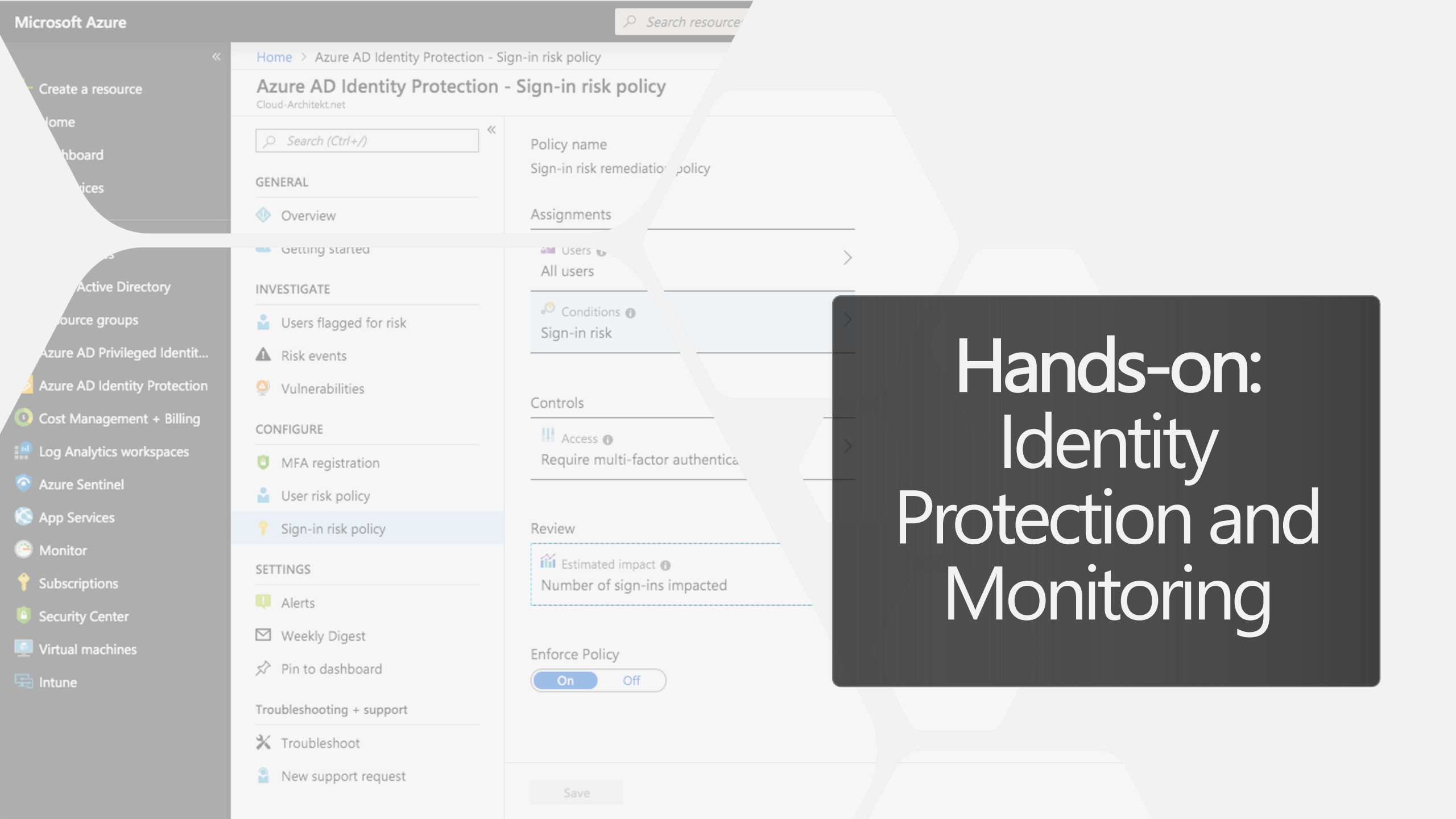
## Design your Identity Protection and Conditional Access Strategy



# Hybrid Identity Protection

## Guards of your Hybrid Identities





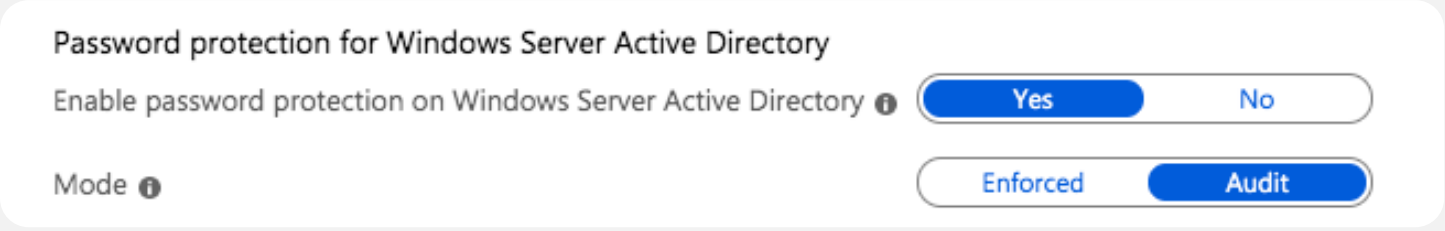

# Hands-on: Identity Protection and Monitoring

# Advanced protection of identities and access

## Password Protection

- **Reset or change password checks** current version of „global **banned password list**“
- Based on **known bad patterns** (passw0rds and k3ywords)
- **Custom** banned password **list** (max. 1000 terms and 16 characters)


- On-premises integration with “**Azure AD Password Protection**“ (including monitoring)

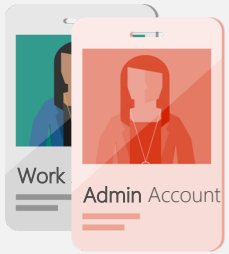



Source: Enforce on-premises Azure AD Password Protection for Active Directory Domain Services

# Privileged Identity Management in Azure AD

# Lower exposure of  privileged accounts

Foundation of securing privileged access




## Separated privileged identities

Issue managed and separated accounts for (least) privileged access
strong or password less authentication

## Non-persistent and audited access

Provide zero rights by default, auditing and regular review of access
Just-in-time (JIT) privileges based on a standardized RBAC model

## Secure devices

Establish a separate device/workstation for administrative tasks
Various kinds of security levels and implementations

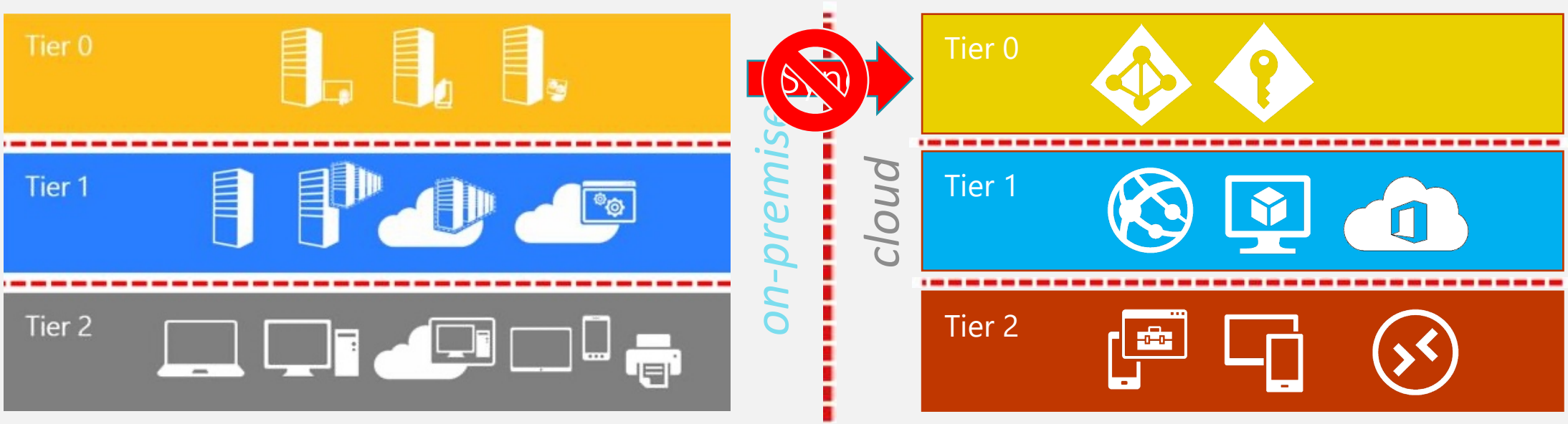
Source: Microsoft Security Blog (“3 investments Microsoft is making to improve identity management”)

# Priviliged Identity Management (PIM)

## Securing privileged access for hybrid and cloud deployments

*„To mitigate risk of identity compromise, or bad actors, implement **tiered administration** and ensure that you **follow principles of least privilege for Azure AD Administrator Roles.**“*

*Source: „Securing Azure Environments with Azure AD (Architecture and Design Guide)“, Page 8*




Source: Active Directory administrative tier model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