Introduction

In this module, you'll be introduced to the Azure identity, access, and security services and tools. You'll learn about directory services in Azure, authentication methods, and access control. You'll also cover things like Zero Trust and defense in depth, and how they keep your cloud safer. You'll wrap up with an introduction to Microsoft Defender for Cloud.

Learning objectives

After completing this module, you'll be able to:

- Describe directory services in Azure, including Azure Active Directory (AD) and Azure AD DS.
- Describe authentication methods in Azure, including single sign-on (SSO), multifactor authentication (MFA), and passwordless.
- Describe external identities and guest access in Azure.
- Describe Azure AD Conditional Access.
- Describe Azure Role Based Access Control (RBAC).
- Describe the concept of Zero Trust.
- Describe the purpose of the defense in depth model.
- Describe the purpose of Microsoft Defender for Cloud.

Next unit: Describe Azure directory services

Describe Azure directory services

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Azure Active Directory (Azure AD) is a directory service that enables you to sign in and access both Microsoft cloud applications and cloud applications that you develop. Azure AD can also help you maintain your on-premises Active Directory deployment.

For on-premises environments, Active Directory running on Windows Server provides an identity and access management service that's managed by your organization. Azure AD is Microsoft's cloud-based identity and access management service. With Azure AD, you

control the identity accounts, but Microsoft ensures that the service is available globally. If you've worked with Active Directory, Azure AD will be familiar to you.

When you secure identities on-premises with Active Directory, Microsoft doesn't monitor sign-in attempts. When you connect Active Directory with Azure AD, Microsoft can help protect you by detecting suspicious sign-in attempts at no extra cost. For example, Azure AD can detect sign-in attempts from unexpected locations or unknown devices.

Who uses Azure AD?

Azure AD is for:

- **IT administrators**. Administrators can use Azure AD to control access to applications and resources based on their business requirements.
- **App developers**. Developers can use Azure AD to provide a standards-based approach for adding functionality to applications that they build, such as adding SSO functionality to an app or enabling an app to work with a user's existing credentials.
- **Users**. Users can manage their identities and take maintenance actions like self-service password reset.
- **Online service subscribers**. Microsoft 365, Microsoft Office 365, Azure, and Microsoft Dynamics CRM Online subscribers are already using Azure AD to authenticate into their account.

What does Azure AD do?

Azure AD provides services such as:

- **Authentication**: This includes verifying identity to access applications and resources. It also includes providing functionality such as self-service password reset, multifactor authentication, a custom list of banned passwords, and smart lockout services.
- **Single sign-on**: Single sign-on (SSO) enables you to remember only one username and one password to access multiple applications. A single identity is tied to a user, which simplifies the security model. As users change roles or leave an organization, access modifications are tied to that identity, which greatly reduces the effort needed to change or disable accounts.
- **Application management**: You can manage your cloud and on-premises apps by using Azure AD. Features like Application Proxy, SaaS apps, the My Apps portal, and single sign-on provide a better user experience.

- **Device management**: Along with accounts for individual people, Azure AD supports the registration of devices. Registration enables devices to be managed through tools like Microsoft Intune. It also allows for device-based Conditional Access policies to restrict access attempts to only those coming from known devices, regardless of the requesting user account.

Can I connect my on-premises AD with Azure AD?

If you had an on-premises environment running Active Directory and a cloud deployment using Azure AD, you would need to maintain two identity sets. However, you can connect Active Directory with Azure AD, enabling a consistent identity experience between cloud and on-premises.

One method of connecting Azure AD with your on-premises AD is using Azure AD Connect. Azure AD Connect synchronizes user identities between on-premises Active Directory and Azure AD. Azure AD Connect synchronizes changes between both identity systems, so you can use features like SSO, multifactor authentication, and self-service password reset under both systems.

What is Azure Active Directory Domain Services?

Azure Active Directory Domain Services (Azure AD DS) is a service that provides managed domain services such as domain join, group policy, lightweight directory access protocol (LDAP), and Kerberos/NTLM authentication. Just like Azure AD lets you use directory services without having to maintain the infrastructure supporting it, with Azure AD DS, you get the benefit of domain services without the need to deploy, manage, and patch domain controllers (DCs) in the cloud.

An Azure AD DS managed domain lets you run legacy applications in the cloud that can't use modern authentication methods, or where you don't want directory lookups to always go back to an on-premises AD DS environment. You can lift and shift those legacy applications from your on-premises environment into a managed domain, without needing to manage the AD DS environment in the cloud.

Azure AD DS integrates with your existing Azure AD tenant. This integration lets users sign into services and applications connected to the managed domain using their existing credentials. You can also use existing groups and user accounts to secure access to resources. These features provide a smoother lift-and-shift of on-premises resources to Azure.

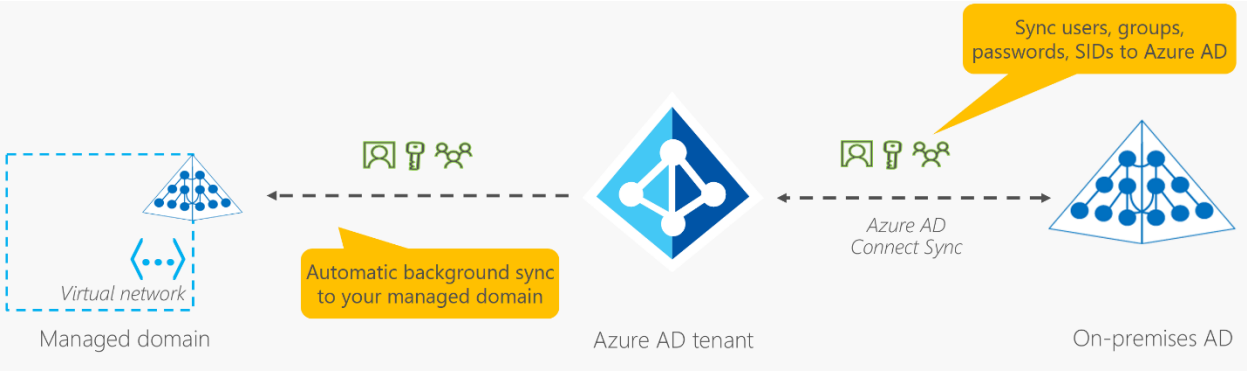
How does Azure AD DS work?

When you create an Azure AD DS managed domain, you define a unique namespace. This namespace is the domain name. Two Windows Server domain controllers are then deployed into your selected Azure region. This deployment of DCs is known as a replica set.

You don't need to manage, configure, or update these DCs. The Azure platform handles the DCs as part of the managed domain, including backups and encryption at rest using Azure Disk Encryption.

Is information synchronized?

A managed domain is configured to perform a one-way synchronization from Azure AD to Azure AD DS. You can create resources directly in the managed domain, but they aren't synchronized back to Azure AD. In a hybrid environment with an on-premises AD DS environment, Azure AD Connect synchronizes identity information with Azure AD, which is then synchronized to the managed domain.



Applications, services, and VMs in Azure that connect to the managed domain can then use common Azure AD DS features such as domain join, group policy, LDAP, and Kerberos/NTLM authentication.

Next unit: Describe Azure authentication methods

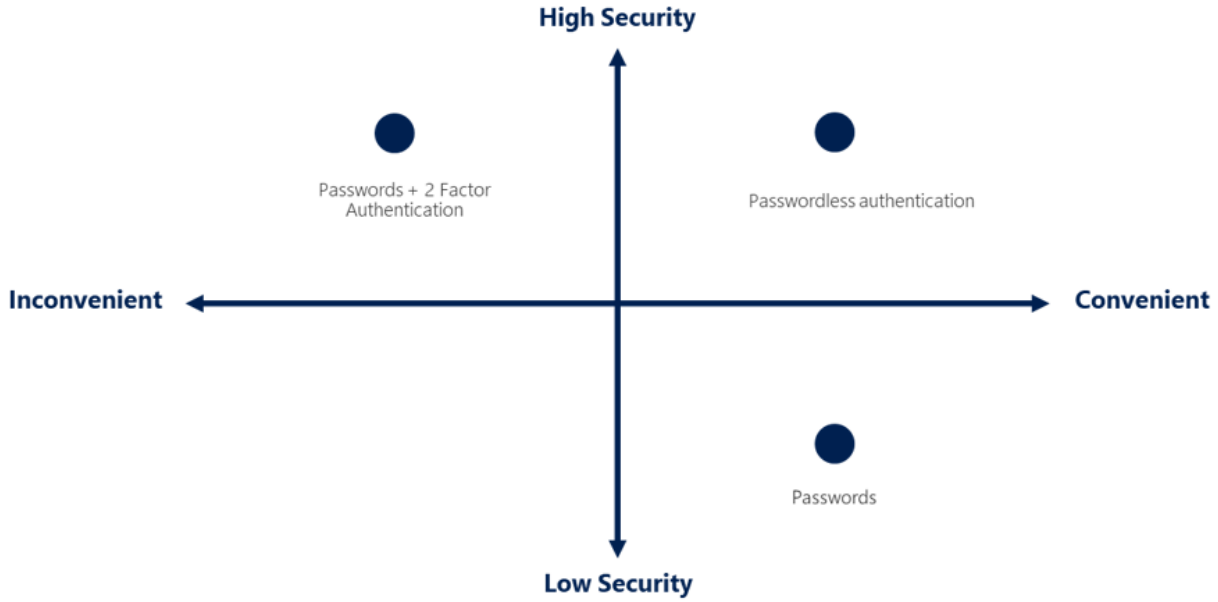
Describe Azure authentication methods

- 6 minutes

Authentication is the process of establishing the identity of a person, service, or device. It requires the person, service, or device to provide some type of credential to prove who they are. Authentication is like presenting ID when you're traveling. It doesn't confirm that you're ticketed, it just proves that you're who you say you are. Azure supports multiple authentication methods, including standard passwords, single sign-on (SSO), multifactor authentication (MFA), and passwordless.

For the longest time, security and convenience seemed to be at odds with each other. Thankfully, new authentication solutions provide both security and convenience.

The following diagram shows the security level compared to the convenience. Notice Passwordless authentication is high security and high convenience while passwords on their own are low security but high convenience.



What's single sign-on?

Single sign-on (SSO) enables a user to sign in one time and use that credential to access multiple resources and applications from different providers. For SSO to work, the different applications and providers must trust the initial authenticator.

More identities mean more passwords to remember and change. Password policies can vary among applications. As complexity requirements increase, it becomes increasingly difficult for users to remember them. The more passwords a user has to manage, the greater the risk of a credential-related security incident.

Consider the process of managing all those identities. More strain is placed on help desks as they deal with account lockouts and password reset requests. If a user leaves an organization, tracking down all those identities and ensuring they're disabled can be challenging. If an identity is overlooked, this might allow access when it should have been eliminated.

With SSO, you need to remember only one ID and one password. Access across applications is granted to a single identity that's tied to the user, which simplifies the security model. As users change roles or leave an organization, access is tied to a single identity. This change greatly reduces the effort needed to change or disable accounts. Using SSO for accounts makes it easier for users to manage their identities and for IT to manage users.

Important

Single sign-on is only as secure as the initial authenticator because the subsequent connections are all based on the security of the initial authenticator.

What’s Multifactor Authentication?

Multifactor authentication is the process of prompting a user for an extra form (or factor) of identification during the sign-in process. MFA helps protect against a password compromise in situations where the password was compromised but the second factor wasn't.

Think about how you sign into websites, email, or online services. After entering your username and password, have you ever needed to enter a code that was sent to your phone? If so, you've used multifactor authentication to sign in.

Multifactor authentication provides additional security for your identities by requiring two or more elements to fully authenticate. These elements fall into three categories:

- Something the user knows – this might be a challenge question.
- Something the user has – this might be a code that's sent to the user's mobile phone.
- Something the user is – this is typically some sort of biometric property, such as a fingerprint or face scan.

Multifactor authentication increases identity security by limiting the impact of credential exposure (for example, stolen usernames and passwords). With multifactor

authentication enabled, an attacker who has a user's password would also need to have possession of their phone or their fingerprint to fully authenticate.

Compare multifactor authentication with single-factor authentication. Under single-factor authentication, an attacker would need only a username and password to authenticate. Multifactor authentication should be enabled wherever possible because it adds enormous benefits to security.

What's Azure AD Multi-Factor Authentication?

Azure AD Multi-Factor Authentication is a Microsoft service that provides multifactor authentication capabilities. Azure AD Multi-Factor Authentication enables users to choose an additional form of authentication during sign-in, such as a phone call or mobile app notification.

What’s passwordless authentication?

Features like MFA are a great way to secure your organization, but users often get frustrated with the additional security layer on top of having to remember their passwords. People are more likely to comply when it's easy and convenient to do so. Passwordless authentication methods are more convenient because the password is removed and replaced with something you have, plus something you are, or something you know.

Passwordless authentication needs to be set up on a device before it can work. For example, your computer is something you have. Once it’s been registered or enrolled, Azure now knows that it’s associated with you. Now that the computer is known, once you provide something you know or are (such as a PIN or fingerprint), you can be authenticated without using a password.

Each organization has different needs when it comes to authentication. Microsoft global Azure and Azure Government offer the following three passwordless authentication options that integrate with Azure Active Directory (Azure AD):

- Windows Hello for Business
- Microsoft Authenticator app
- FIDO2 security keys

Windows Hello for Business

Windows Hello for Business is ideal for information workers that have their own designated Windows PC. The biometric and PIN credentials are directly tied to the user's PC, which prevents access from anyone other than the owner. With public key infrastructure (PKI) integration and built-in support for single sign-on (SSO), Windows Hello for Business provides a convenient method for seamlessly accessing corporate resources on-premises and in the cloud.

Microsoft Authenticator App

You can also allow your employee's phone to become a passwordless authentication method. You may already be using the Microsoft Authenticator App as a convenient multi-factor authentication option in addition to a password. You can also use the Authenticator App as a passwordless option.

The Authenticator App turns any iOS or Android phone into a strong, passwordless credential. Users can sign-in to any platform or browser by getting a notification to their phone, matching a number displayed on the screen to the one on their phone, and then using their biometric (touch or face) or PIN to confirm. Refer to Download and install the Microsoft Authenticator app for installation details.

FIDO2 security keys

The FIDO (Fast IDentity Online) Alliance helps to promote open authentication standards and reduce the use of passwords as a form of authentication. FIDO2 is the latest standard that incorporates the web authentication (WebAuthn) standard.

FIDO2 security keys are an unphishable standards-based passwordless authentication method that can come in any form factor. Fast Identity Online (FIDO) is an open standard for passwordless authentication. FIDO allows users and organizations to leverage the standard to sign-in to their resources without a username or password by using an external security key or a platform key built into a device.

Users can register and then select a FIDO2 security key at the sign-in interface as their main means of authentication. These FIDO2 security keys are typically USB devices, but could also use Bluetooth or NFC. With a hardware device that handles the authentication, the security of an account is increased as there's no password that could be exposed or guessed.

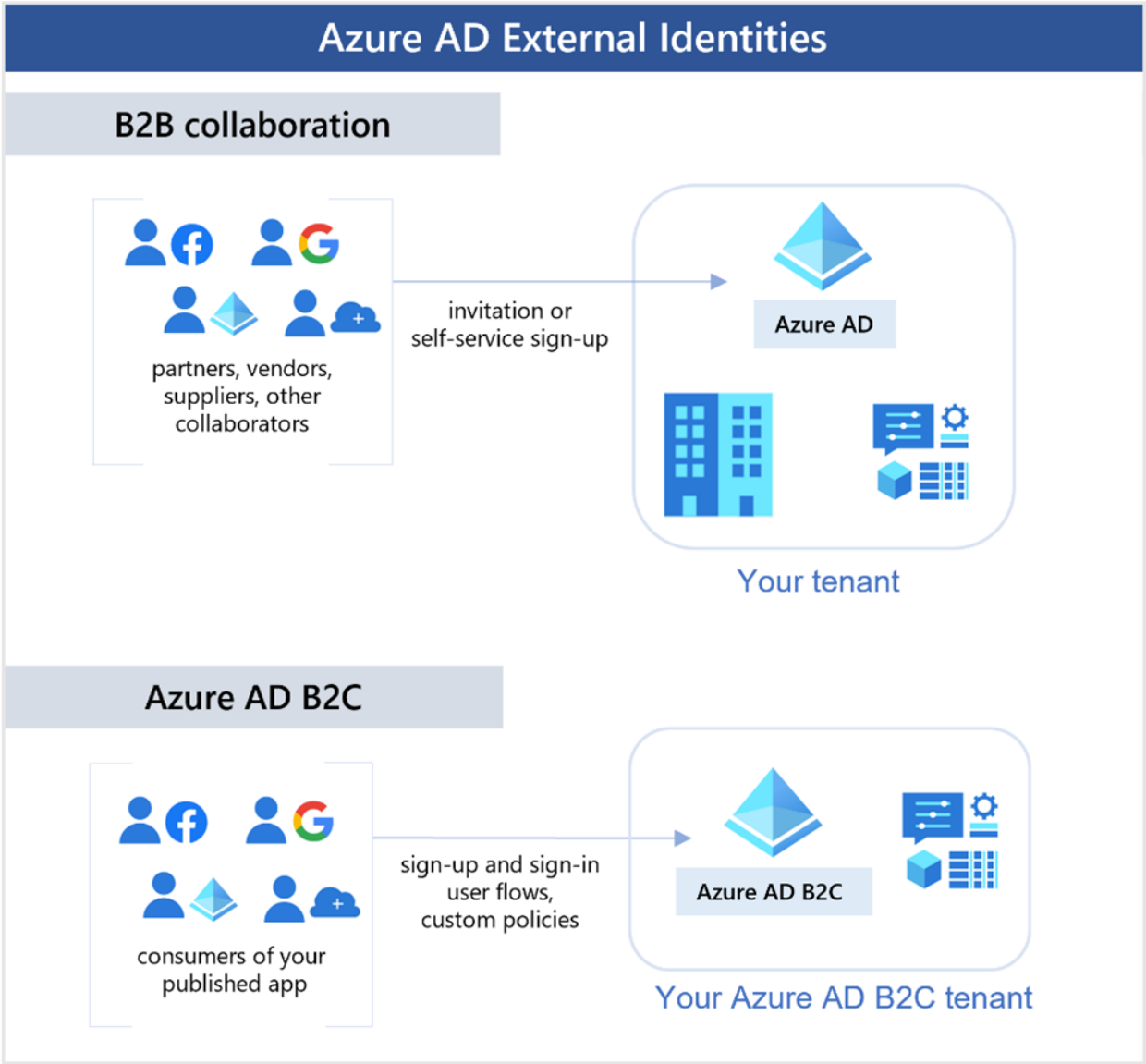
Next unit: Describe Azure external identities

Describe Azure external identities

- 3 minutes

An external identity is a person, device, service, etc. that is outside your organization. Azure AD External Identities refers to all the ways you can securely interact with users outside of your organization. If you want to collaborate with partners, distributors, suppliers, or vendors, you can share your resources and define how your internal users can access external organizations. If you're a developer creating consumer-facing apps, you can manage your customers' identity experiences.

External identities may sound similar to single sign-on. With External Identities, external users can "bring their own identities." Whether they have a corporate or government-issued digital identity, or an unmanaged social identity like Google or Facebook, they can use their own credentials to sign in. The external user’s identity provider manages their identity, and you manage access to your apps with Azure AD or Azure AD B2C to keep your resources protected.



The following capabilities make up External Identities:

- **Business to business (B2B) collaboration** - Collaborate with external users by letting them use their preferred identity to sign-in to your Microsoft applications or other enterprise applications (SaaS apps, custom-developed apps, etc.). B2B collaboration users are represented in your directory, typically as guest users.
- **B2B direct connect** - Establish a mutual, two-way trust with another Azure AD organization for seamless collaboration. B2B direct connect currently supports Teams shared channels, enabling external users to access your resources from within their home instances of Teams. B2B direct connect users aren't represented in your directory, but they're visible from within the

Teams shared channel and can be monitored in Teams admin center reports.
- **Azure AD business to customer (B2C)** - Publish modern SaaS apps or custom-developed apps (excluding Microsoft apps) to consumers and customers, while using Azure AD B2C for identity and access management.

Depending on how you want to interact with external organizations and the types of resources you need to share, you can use a combination of these capabilities.

With Azure Active Directory (Azure AD), you can easily enable collaboration across organizational boundaries by using the Azure AD B2B feature. Guest users from other tenants can be invited by administrators or by other users. This capability also applies to social identities such as Microsoft accounts.

You also can easily ensure that guest users have appropriate access. You can ask the guests themselves or a decision maker to participate in an access review and recertify (or attest) to the guests' access. The reviewers can give their input on each user's need for continued access, based on suggestions from Azure AD. When an access review is finished, you can then make changes and remove access for guests who no longer need it.

Next unit: Describe Azure conditional access

Describe Azure conditional access

- 3 minutes

Conditional Access is a tool that Azure Active Directory uses to allow (or deny) access to resources based on identity signals. These signals include who the user is, where the user is, and what device the user is requesting access from.

Conditional Access helps IT administrators:

- Empower users to be productive wherever and whenever.
- Protect the organization's assets.

Conditional Access also provides a more granular multifactor authentication experience for users. For example, a user might not be challenged for second authentication factor if they're at a known location. However, they might be challenged for a second

authentication factor if their sign-in signals are unusual or they're at an unexpected location.

During sign-in, Conditional Access collects signals from the user, makes decisions based on those signals, and then enforces that decision by allowing or denying the access request or challenging for a multifactor authentication response.

The following diagram illustrates this flow:

Here, the signal might be the user's location, the user's device, or the application that the user is trying to access.

Based on these signals, the decision might be to allow full access if the user is signing in from their usual location. If the user is signing in from an unusual location or a location that's marked as high risk, then access might be blocked entirely or possibly granted after the user provides a second form of authentication.

Enforcement is the action that carries out the decision. For example, the action is to allow access or require the user to provide a second form of authentication.

When can I use Conditional Access?

Conditional Access is useful when you need to:

- Require multifactor authentication (MFA) to access an application depending on the requester’s role, location, or network. For example, you could require MFA for administrators but not regular users or for people connecting from outside your corporate network.
- Require access to services only through approved client applications. For example, you could limit which email applications are able to connect to your email service.

- Require users to access your application only from managed devices. A managed device is a device that meets your standards for security and compliance.
- Block access from untrusted sources, such as access from unknown or unexpected locations.

Next unit: Describe Azure role-based access control