Surprising ways to escalate privileges in Entra ID

Marius Solbakken Mellum
Co-founder and Principal Cloud Engineer @ Fortytwo

Fortytwo
BY AMESTO

Marius Solbakken Mellum

- Co-founder and Principal Cloud Engineer @ Fortytwo
- Microsoft MVP Security
- Working within Microsoft identity for 15 years
- https://goodworkaround.com

What we will talk about

Misconfigurations and patterns leading to unintentional possibilities for privilege escalation

What to avoid and what to do as a developer

What we will NOT talk about

Phishing

Brute force attacks

Abusing SSO features (PRT, Seamless SSO, etc.)

Social engineering

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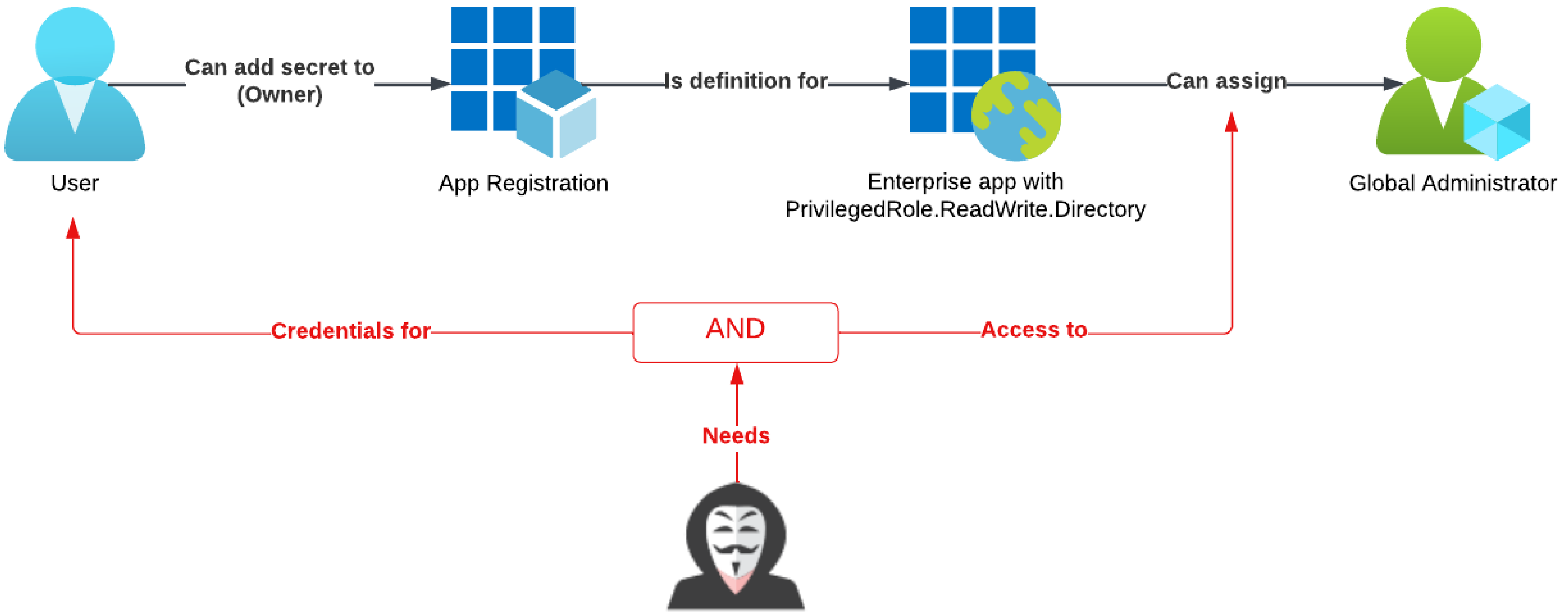
What is an attack path?



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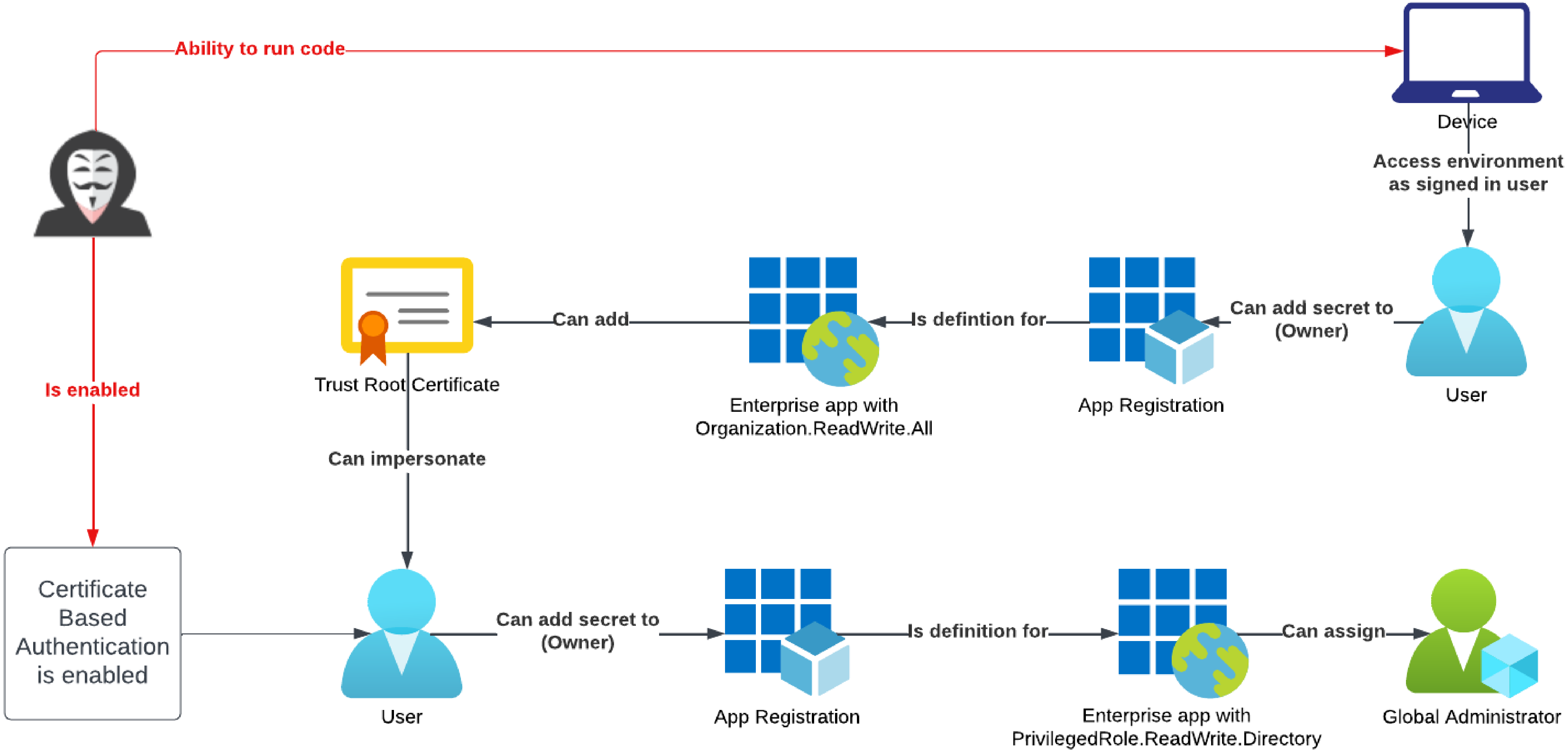
Ability to run code
Device
Access environment as signed in user
User
Can add secret to (Owner)
App Registration
Is defintion for
Enterprise app with Organization.ReadWrite.All
Can add
Trust Root Certificate
Is enabled
Can impersonate
Certificate Based Authentication is enabled
User
Can add secret to (Owner)
App Registration
Is definition for
Enterprise app with PrivilegedRole.ReadWrite.Directory
Can assign
Global Administrator

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Entra ID Roles

- 105 different roles
  - **Global Administrator** - a.k.a. God
  - **Privileged Role Administrator** - can assign global admin
  - **Privileged Authentication Administrator** - can reset credentials for global admins
  - **User Administrator** - Can CRUD users, except high privileged roles + reset passwords + manage groups
  - **Authentication Administrator** – Can reset MFA, create TAP
  - **Group Administrator** - Can manage all aspects of groups
  - **(Cloud) Application Administrator** - Can modify all app registrations and enterprise apps
- Privileged Identity Management – Active vs Eligible

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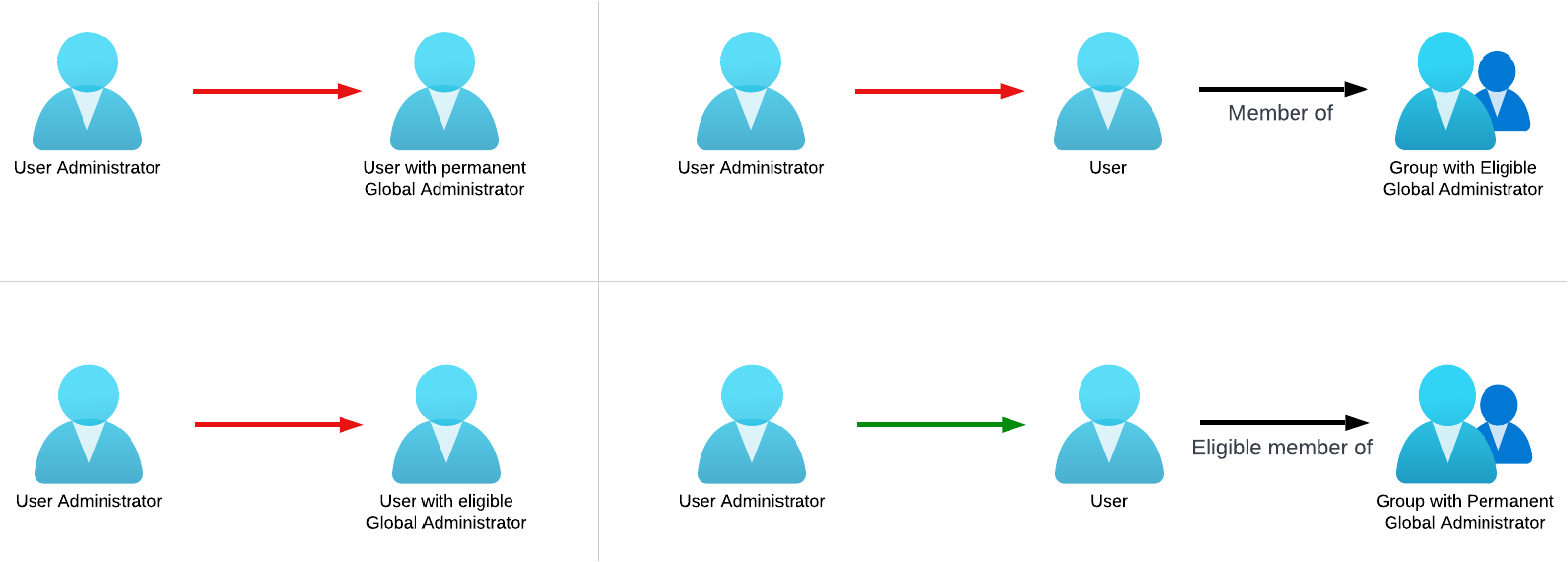
- PROTECTED ROLES -

In summary – Password resets



User Administrator

User with permanent Global Administrator

User Administrator

User

Member of

Group with Eligible Global Administrator

User Administrator

User with eligible Global Administrator

User Administrator

User

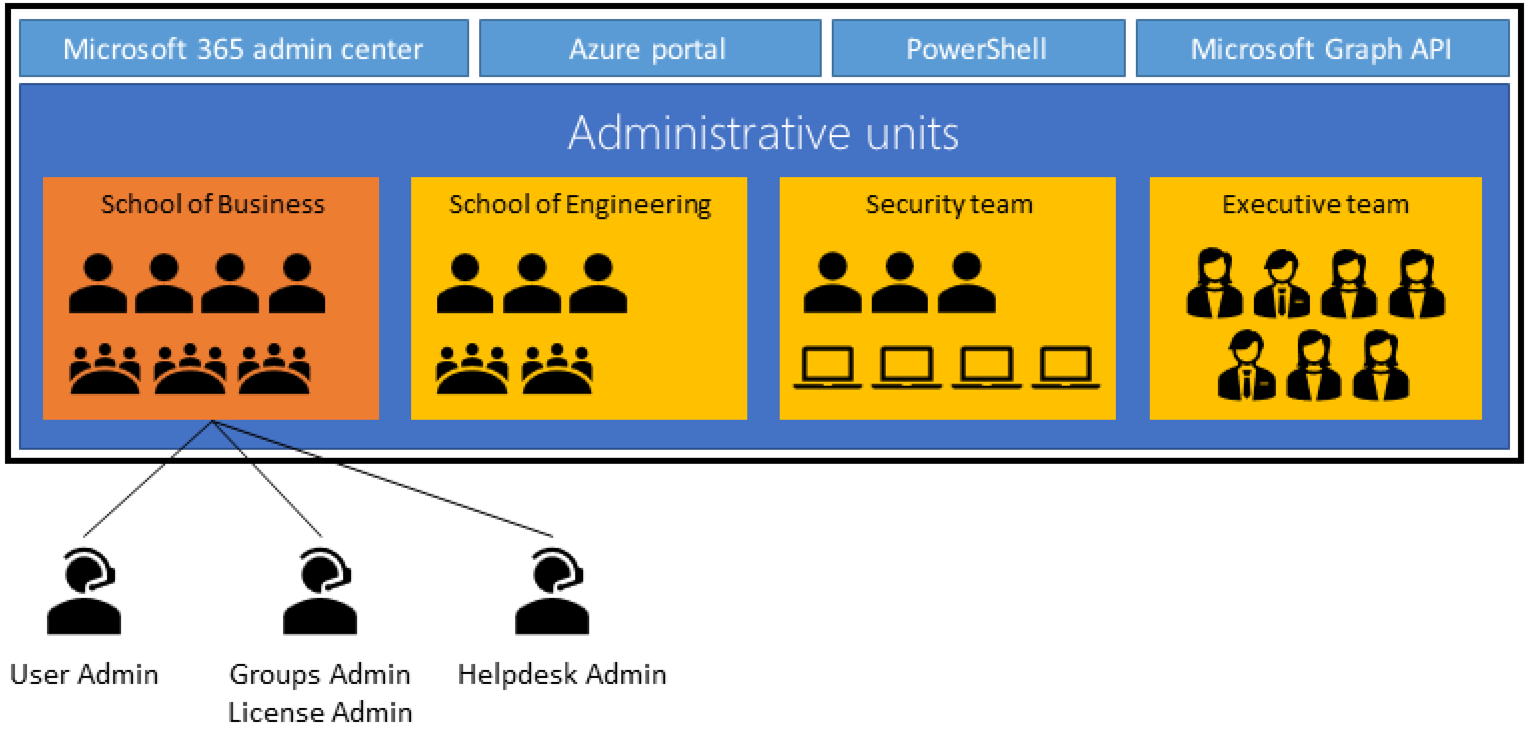
Eligible member of

Group with Permanent Global Administrator

DO NOT USE GROUPS TO PIM ONCE FOR ACTIVATING MULTIPLE ROLES AT THE SAME TIME

Scoped role assignments

- Administrative units
  - Restricted Management



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- ADMINISTRATIVE UNITS -

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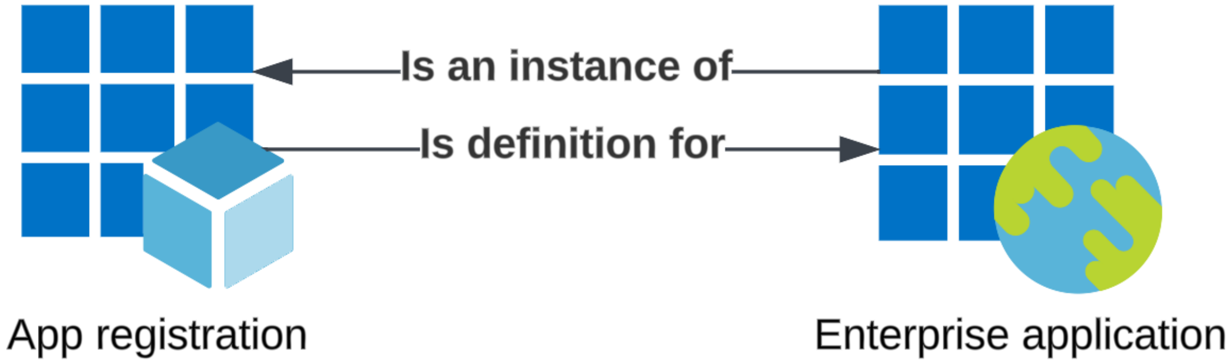
How about applications?

- App registrations and enterprise apps
  - Credentials
    - Secrets
    - Certificates
    - Federated
  - Managed service identities
- Application owner
- App scoped directory roles
- <u>Currently no protection mechanism</u>



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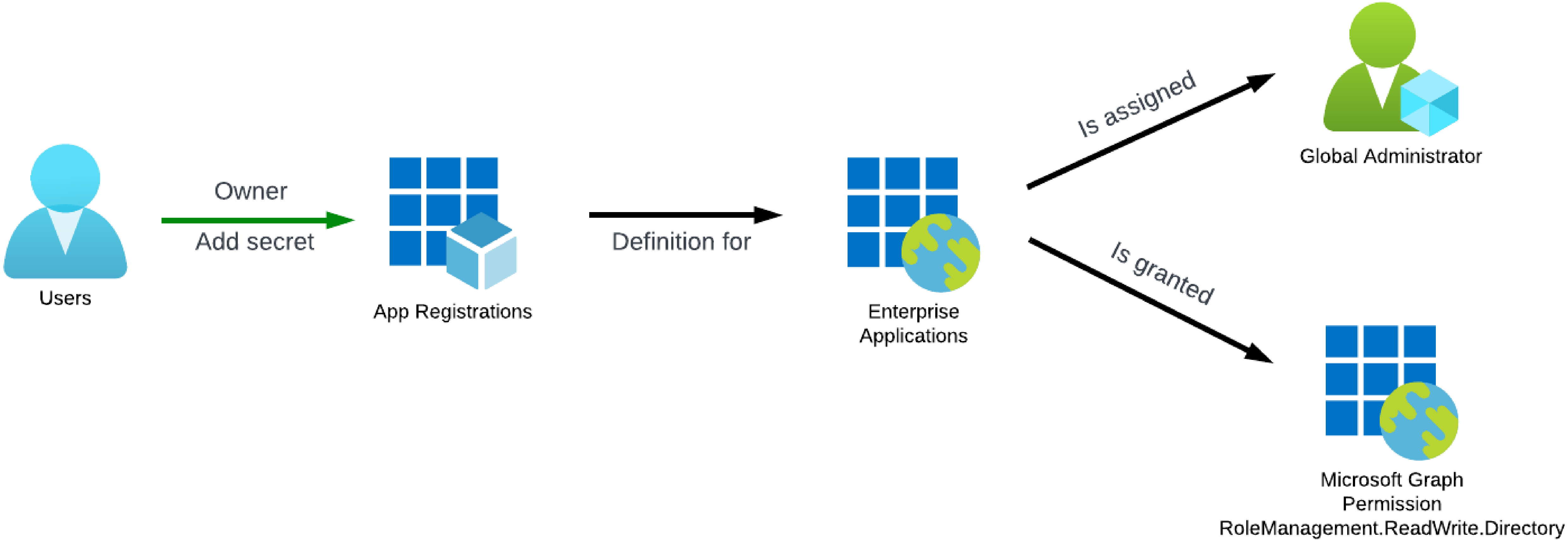
- NO PROTECTION FOR APPS -

In summary – No protection for apps



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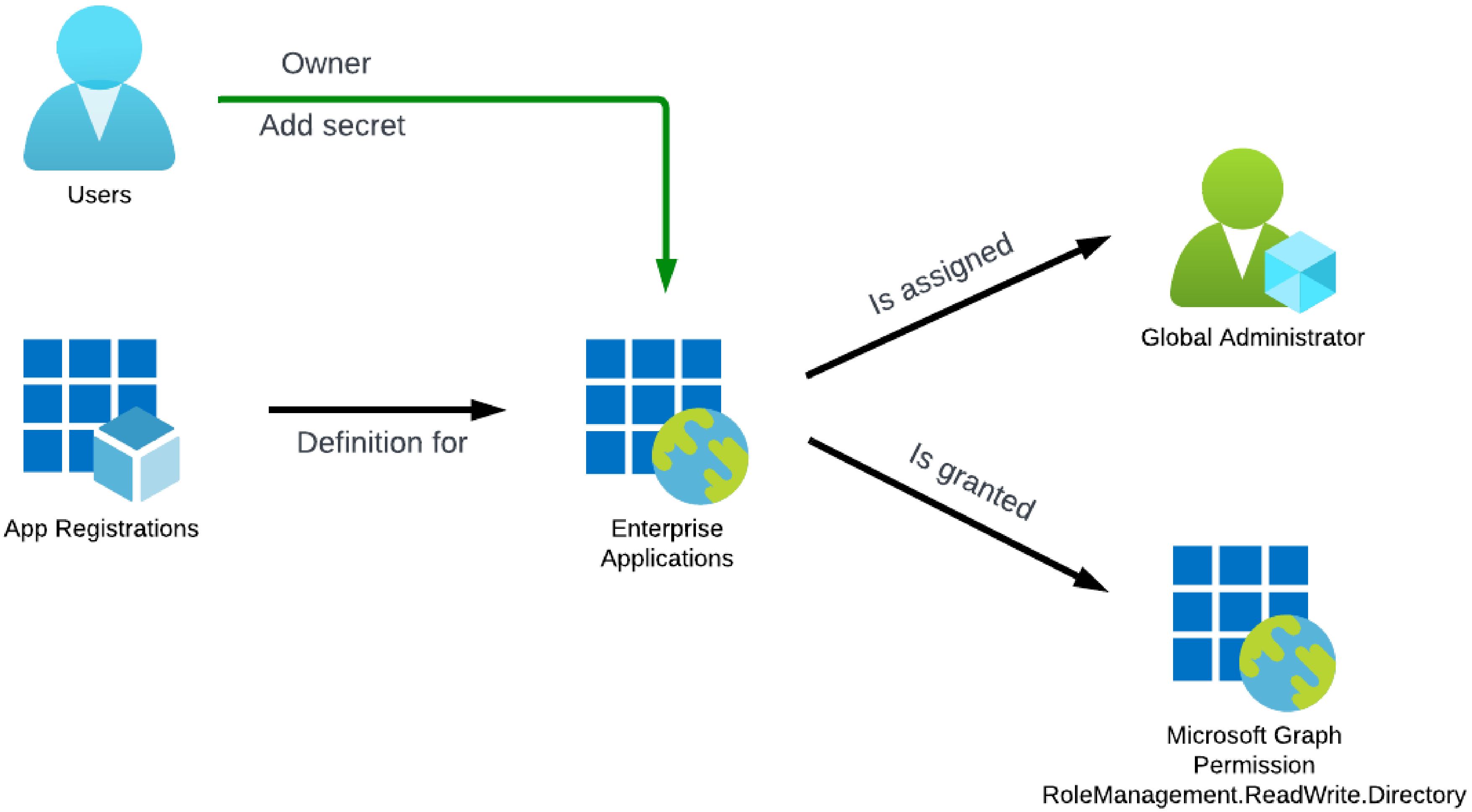
One more thing



Owner

Add secret

Users

App Registrations

Definition for

Enterprise Applications

Is assigned

Is granted

Global Administrator

Microsoft Graph Permission RoleManagement.ReadWrite.Directory

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- SECRET ON ENTERPRISE APPS -

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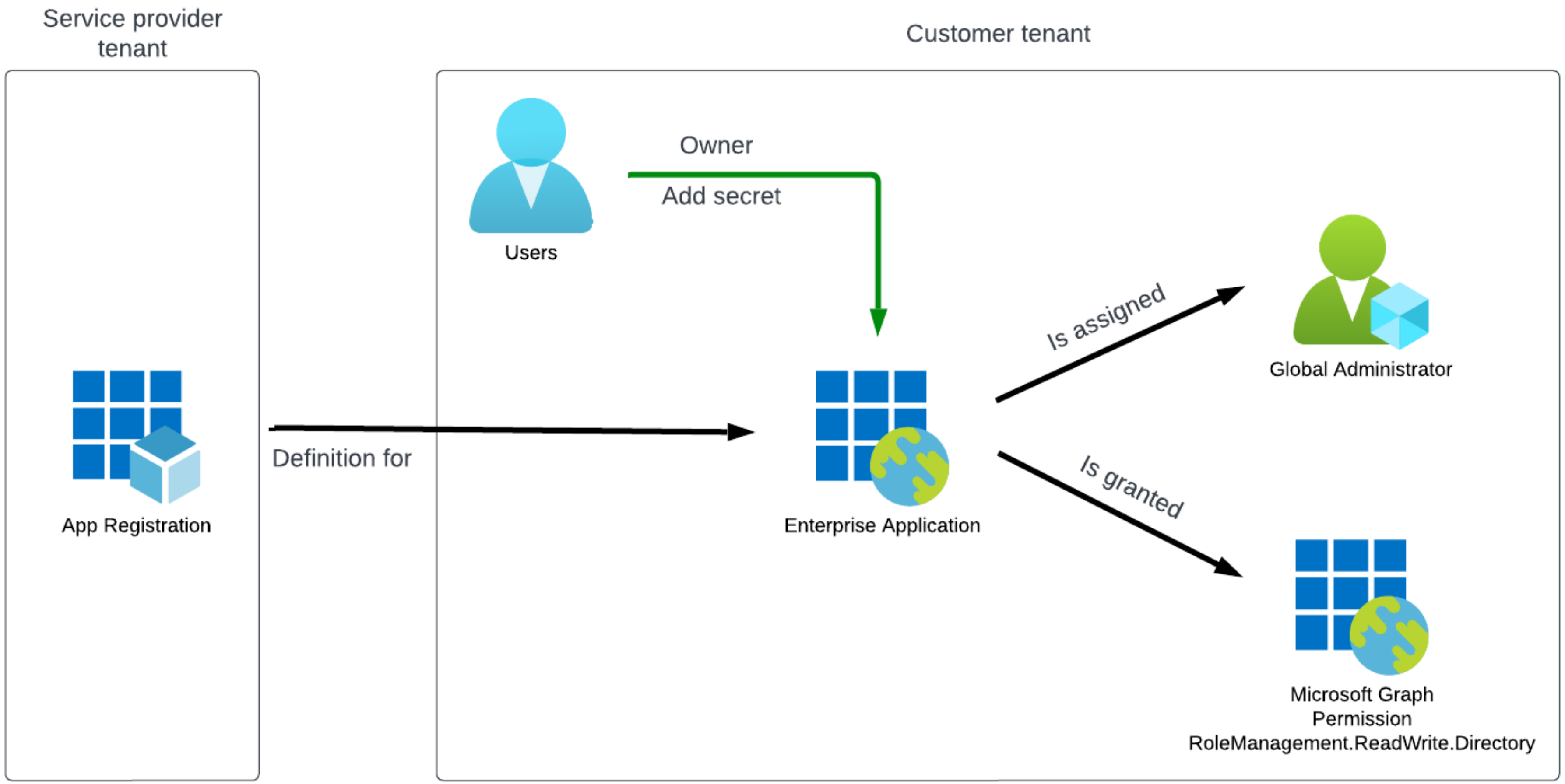
Also works for Multi-tenant applications!



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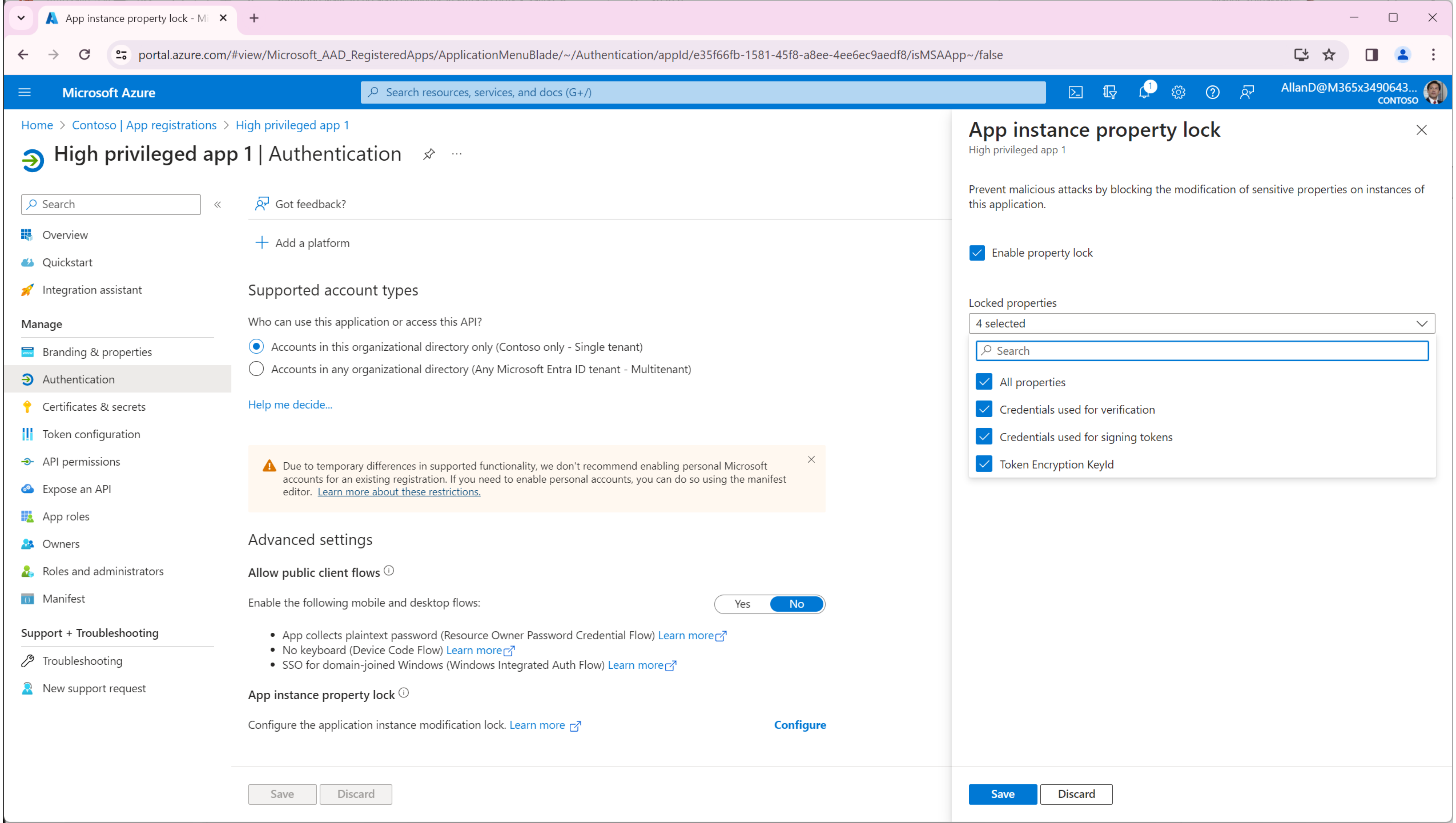


High privileged app 1 | Authentication

Supported account types

Who can use this application or access this API?

● Accounts in this organizational directory only (Contoso only - Single tenant)

○ Accounts in any organizational directory (Any Microsoft Entra ID tenant - Multitenant)

Help me decide...

Due to temporary differences in supported functionality, we don't recommend enabling personal Microsoft accounts for an existing registration. If you need to enable personal accounts, you can do so using the manifest editor. Learn more about these restrictions.

Advanced settings

Allow public client flows

Enable the following mobile and desktop flows: Yes [✓ No]

- App collects plaintext password (Resource Owner Password Credential Flow) Learn more
- No keyboard (Device Code Flow) Learn more
- SSO for domain-joined Windows (Windows Integrated Auth Flow) Learn more

App instance property lock

Configure the application instance modification lock. Learn more Configure

Save Discard

App instance property lock

High privileged app 1

Prevent malicious attacks by blocking the modification of sensitive properties on instances of this application.

☑ Enable property lock

Locked properties

4 selected

Search

☑ All properties

☑ Credentials used for verification

☑ Credentials used for signing tokens

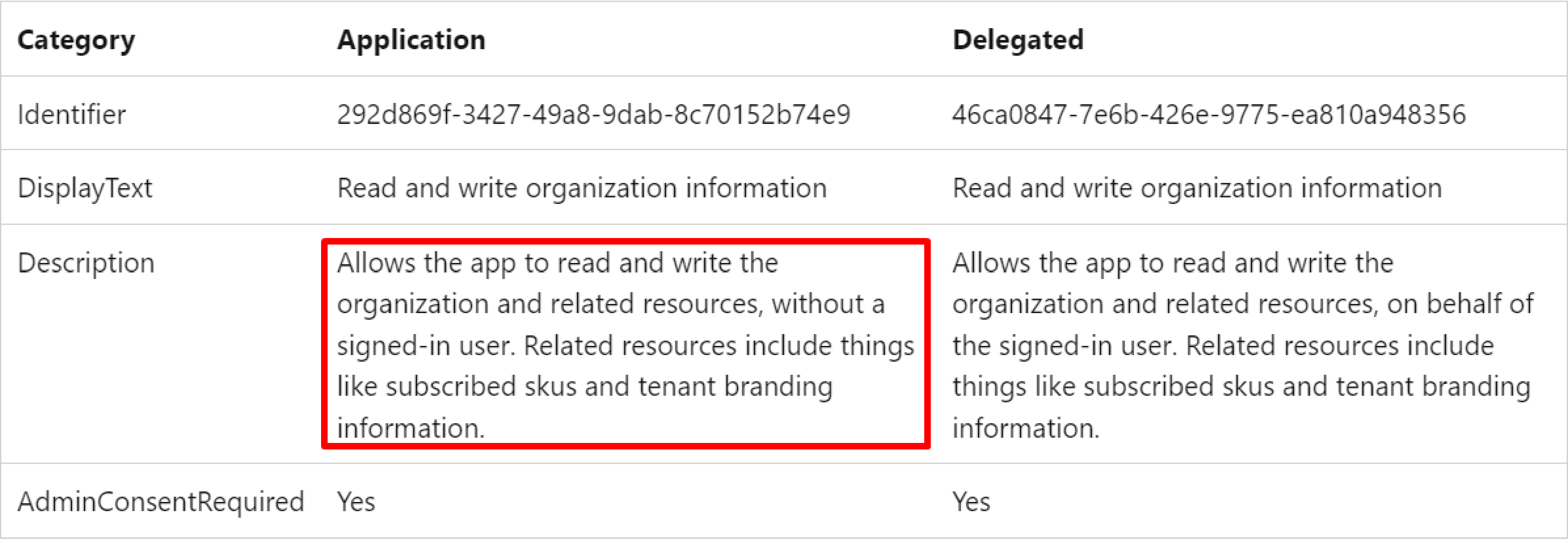
☑ Token Encryption KeyId

Save Discard

Microsoft Graph scopes

- <Object>.<Action>.<Scope>
- RoleManagement.ReadWrite.Directory
  - Able to assign all Entra ID roles, such as Global Administrator
- Application.ReadWrite.All
  - Able to add credentials to any app
- User.ReadWrite.All
  - Can CRUD all users except protected ones
  - Can update users to match dynamic group criteria, thus adding them to a group
  - Cannot update user passwords

Organization.ReadWrite.All



Category	Application	Delegated
Identifier	292d869f-3427-49a8-9dab-8c70152b74e9	46ca0847-7e6b-426e-9775-ea810a948356
DisplayText	Read and write organization information	Read and write organization information
Description	Allows the app to read and write the organization and related resources, without a signed-in user. Related resources include things like subscribed skus and tenant branding information.	Allows the app to read and write the organization and related resources, on behalf of the signed-in user. Related resources include things like subscribed skus and tenant branding information.
AdminConsentRequired	Yes	Yes

enabled, you can **impersonate** any user including **Global Administrators**

AppRoleAssignment.ReadWrite.All

“Ah, a useful scope that let’s my service principal assign app roles”

It also gives you access to grant **any application**, **any Microsoft Graph permission**, effectively being able to grant itself **Global Admin** through **RoleManagement.ReadWrite.Directory**

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Group.ReadWrite.All

“A useful permission for automating creation of Entra ID groups”

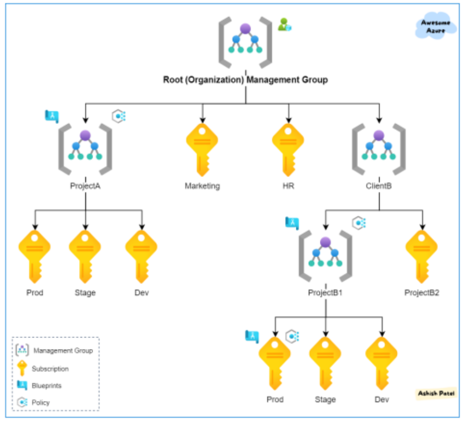
It also gives **you access to contents of all Teams** and Microsoft 365 groups

So what are we supposed to do?

- Utilize the least privileged scopes
    - Group.Create
    - GroupMember.ReadWrite.All
    - Application.ReadWrite.OwnedBy
- Monitor application credentials
- As an Entra ID admin, question whether permissions are needed
- Regularly review granted permissions

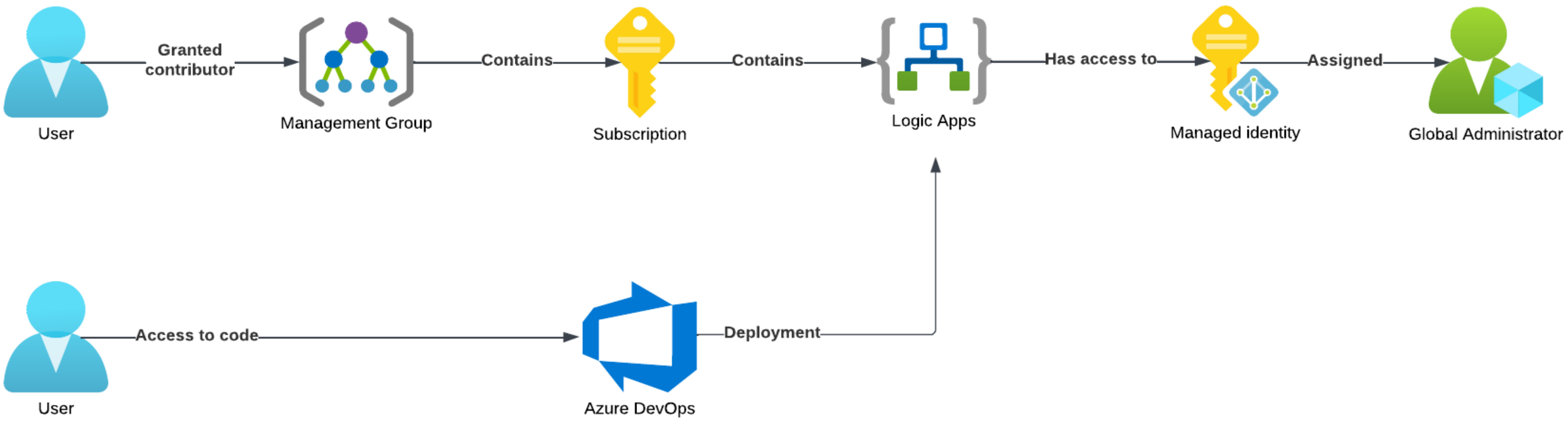
Managed service identities

Service principal linked to an Azure resource, with no credentials to handle



Azure RBAC is critical to security

New attack paths!



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AZURE CONTRIBUTOR
TO
ENTRA ID PERMISSIONS

Key takeaways

- Do not combine PIM for groups with role assignable groups
- Enable property lock on your app registrations
- Monitor app credentials
- Audit Microsoft Graph application consents
- Application owner can add credentials
- Least privilege
  - Scoped directory roles
  - 105 Entra ID roles
  - 400+ Azure RBAC roles
  - Something.ReadWrite.All may give you more than you thing
- Use Managed Service Identity, but watch out for RBAC based attack paths

Questions?

marius.solbakken@fortytwo.io

goodworkaround.com

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BY AMESTO

Thank you

marius.solbakken@fortytwo.io

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