Making $ With COMPUTER$

Queen City Con 0x3

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John

Hacker

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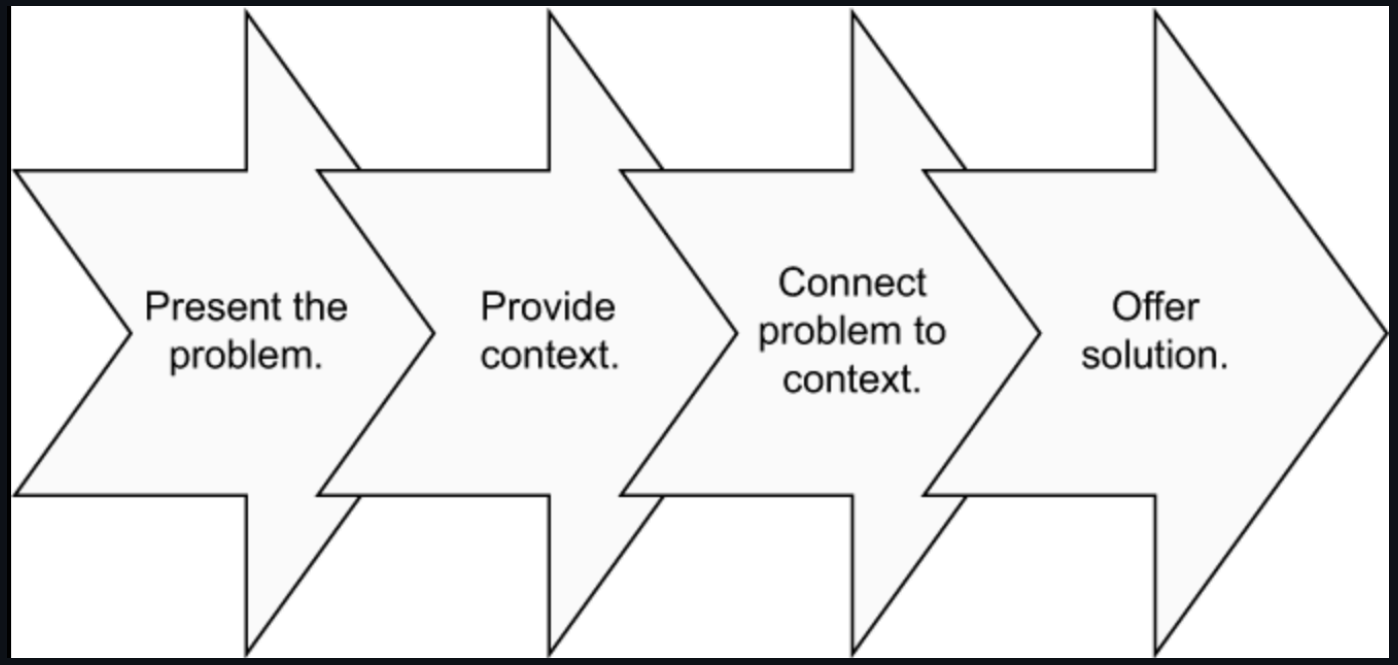
Security Consultant

Agenda

- The Problem
- Some Context
- A Demo or Two
- Some Solutions



The Problem

If a user can join a computer to your domain

they can own your Active Directory forest

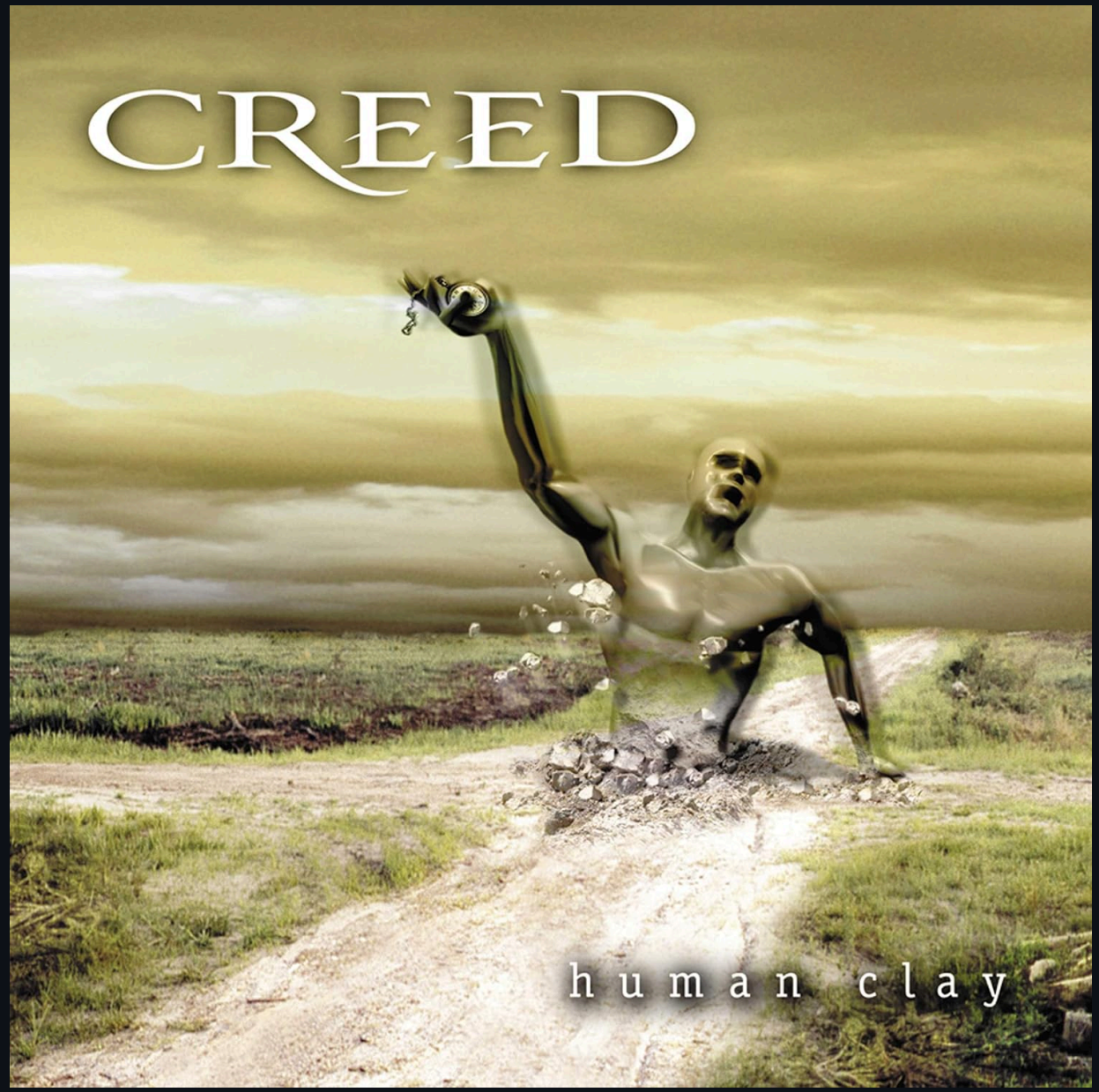
If a user can join a computer to your domain

they can own your Active Directory forest in minutes

The Problem

- `ms-DS-MachineAccountQuota` attribute
  - Number of computers a single user can add to the domain
  - Active Directory (AD) default value: 10
- `SeMachineAccountPrivilege` User Right
  - Who is allowed to add computers to a domain
  - AD default: Authenticated Users
- Made sense 25 years ago
- But now computers are more dangerous!

This Also Made Sense 25 Years Ago:



Why This Matters:

- MACHINE$ accounts are valuable to attackers!
- MANY attack chains need an attacker-controlled machine account
- Defaults = easier to create one than to compromise one
- Remove defaults -> break attack chains

Some Context

What Makes Computer Accounts Special?

- Password differences:
  - Complex & 120 characters long
  - Changed automatically every 30 days
- Service Principal Names (SPNs)
  - Tells others what services are available
- Note: local admin password is NOT the computer account password

The Attacker's Advantage

- Machine accounts...
  - tend to be less scrutinized (evasion, persistence)
  - often have different permissions (privilege escalation)
  - can be created without creds using relaying (initial access)
- Controlling an SPN is a powerful attack primitive!
  - (You are a legitimate Active Directory service)

Real-World Experience

- How common is this?
  - Jake: 80% at default
  - John: never seen it set properly when first engaging a customer
- Why hasn't this been fixed?
  - Relatively unknown outside security circles
  - Conflicting hardening guidance
  - Operations > Security

A Demo or Two

A Demo or Two (It's Actually Three)

Demo Environment

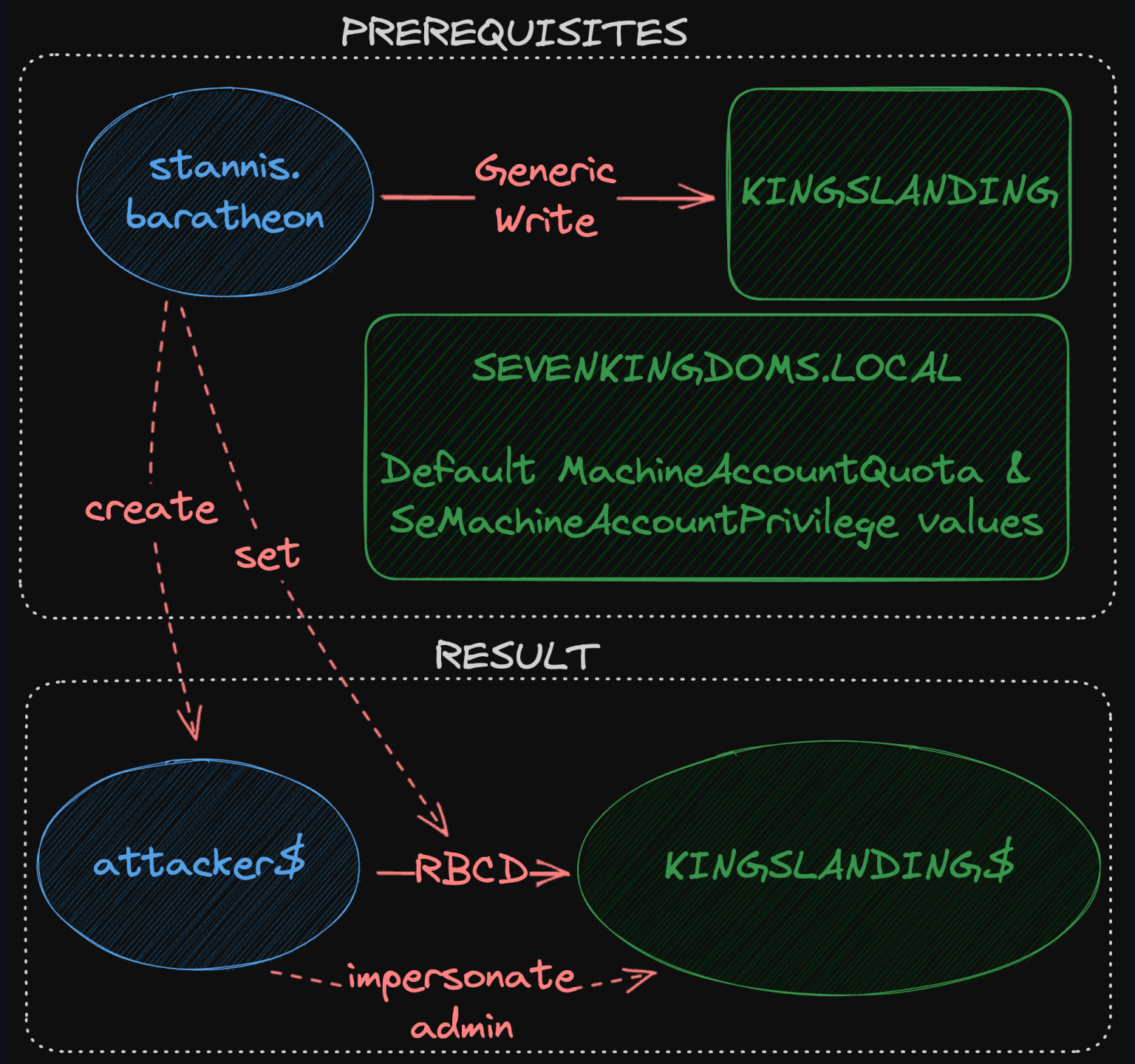
- Game of Active Directory (by Mayfly277)
  - https://github.com/Orange-Cyberdefense/GOAD
- Tools used:
  - https://github.com/fortra/impacket
  - https://github.com/Pennyw0rth/NetExec
  - https://github.com/CravateRouge/bloodyAD
  - https://github.com/ly4k/Certipy

Demo: Privilege Abuse

- Look for extra permissions granted to Domain Computers
  - Added to privileged groups?
  - Access to other AD objects via ACLs?
- Create a machine account and you can abuse those permissions

Demo: Delegation Abuse

- Active Directory account delegation is EASY to misconfigure
- "Resource-Based Constrained Delegation" is maybe the most commonly abused
- Turn a "GenericWrite" permission on a computer object into a full compromise
- https://eladshamir.com/2019/01/28/Wagging-the-Dog.html


PREREQUISITES
stannis.
baratheon
Generic
Write
KINGSLANDING
SEVENKINGDOMS.LOCAL
Default MachineAccountQuota &
SeMachineAccountPrivilege values
create
set
RESULT
attacker$
RBCD
KINGSLANDING$
impersonate
admin

Demo: AD CS Abuse

- Active Directory Certificate Services is EASY to misconfigure
- Domain Computers are often allowed to enroll templates (ESC1)
- Turn `altSecurityIdentities` write access into a full compromise (ESC14A)
  - (The default Domain Computers cert template meets all other attack requirements)
- References:
  - https://posts.specterops.io/certified-pre-owned-d95910965cd2
  - https://posts.specterops.io/adcs-esc14-abuse-technique-333a004dc2b9

Many Other Attacks

- Persistence using "stale" machine accounts
- Unconstrained Delegation & Constrained Delegation attacks
- CVE-2021-42278 & 42287 ("noPAC" privilege escalation)
- "SPN-in-the-Middle"
- "DumpGuard" technique
  - https://specterops.io/blog/2025/10/23/catching-credential-guard-off-guard/
- Whatever next thing comes out

Some Solutions

Prevention:

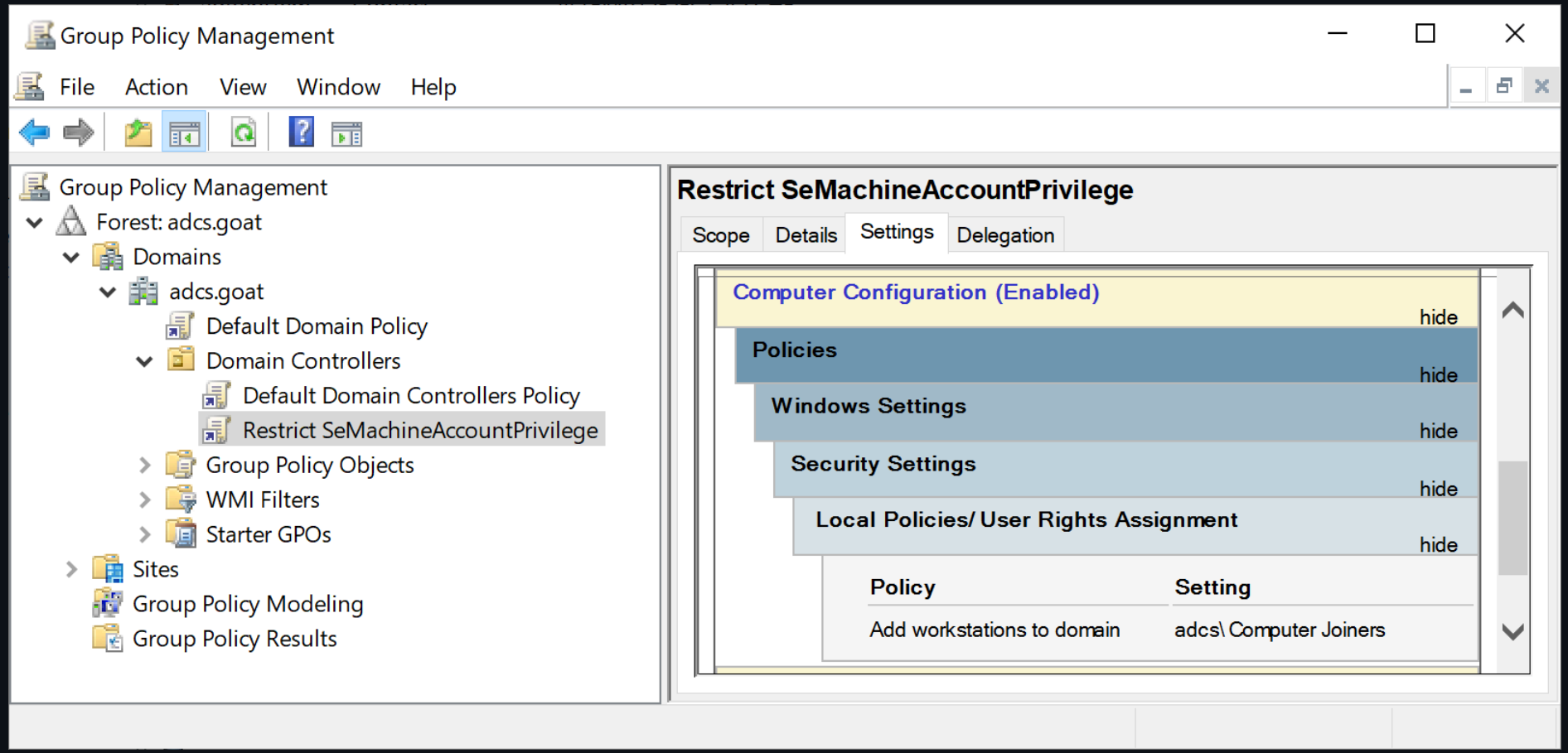
Set `ms-DS-MachineAccountQuota` to 0

```
#requires -Modules ActiveDirectory

# Set variables
$MAQ = 'ms-DS-MachineAccountQuota'
$Domain = Get-ADDomain -Identity example.com

# Set Correct Value
Set-ADDomain -Identity $Domain -Replace @{$MAQ=0}
```

Now only Administrators can add computers to domain without first precreating a computer account.

Prevention:

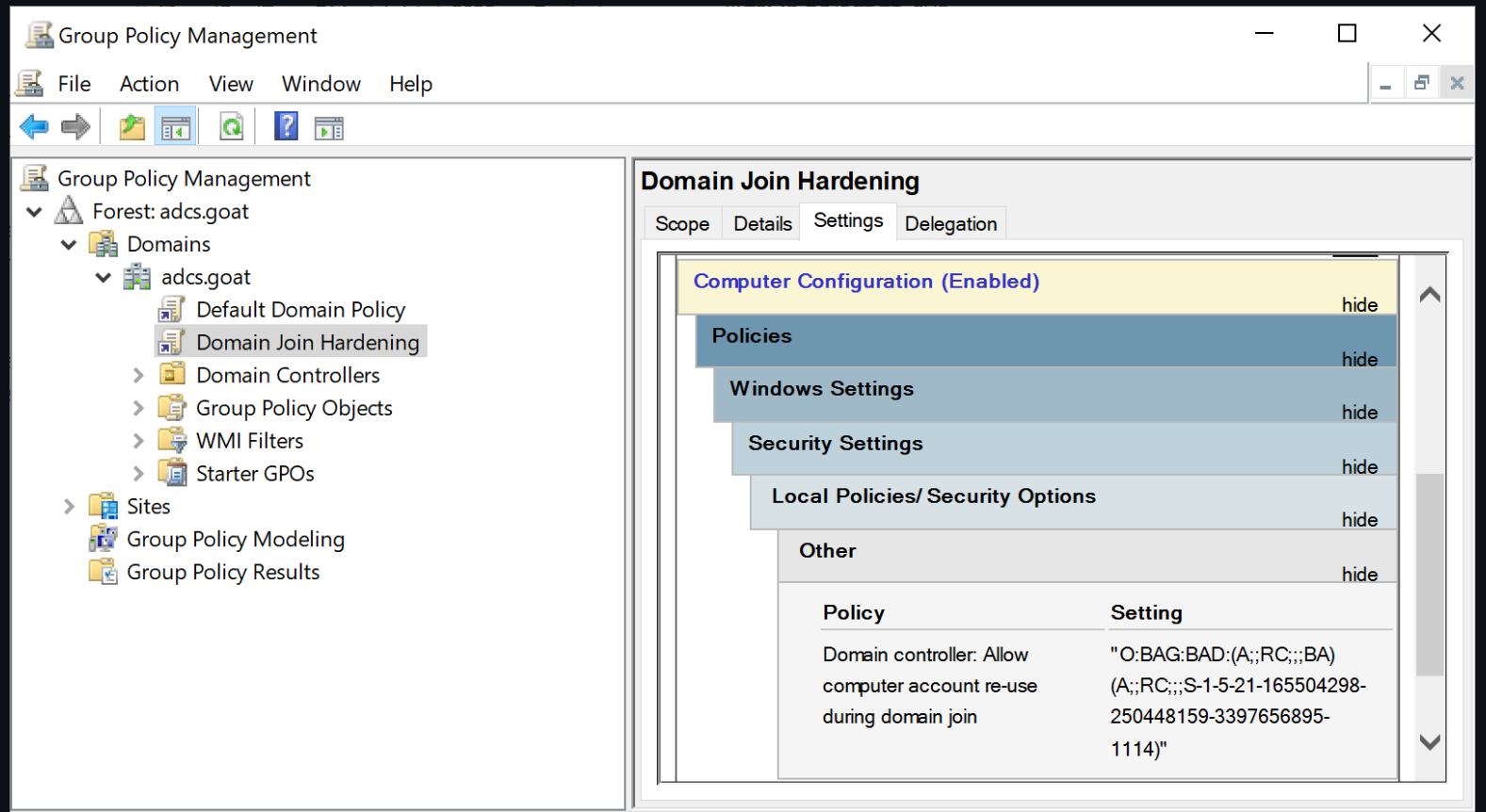
Restrict `SeMachineAccountPrivilege`



Prevention:

Follow New Domain Join Guidance: Additional Prep

Configure Trusted Computer Account Owners:



Prevention:

Follow New Domain Join Guidance: Perform

1. Admin01, *a Trusted Computer Account Owner,* pre-creates the Computer object in a target OU/container
2. Admin02, *a Computer Joiner,* performs domain join w/minimal privileges required

More details, including required permissions for each admin:

https://learn.microsoft.com/en-us/windows-server/identity/ad-ds/manage/active-directory-domain-join-permissions

Prevention:

Offline Domain Join (more secure!)

1. Using a *Trusted Computer Account Owner* with appropriate permissions, provision a new computer object:

```
djoin /provision /domain contoso.com /machine NewComputer /savefile offlinedomainjoin.txt
```

2. On physical computer, complete the join:

```
djoin /requestODJ /loadfile offlinedomainjoin.txt /windowspath %SystemRoot% /localos
```

No additional permissions are required!

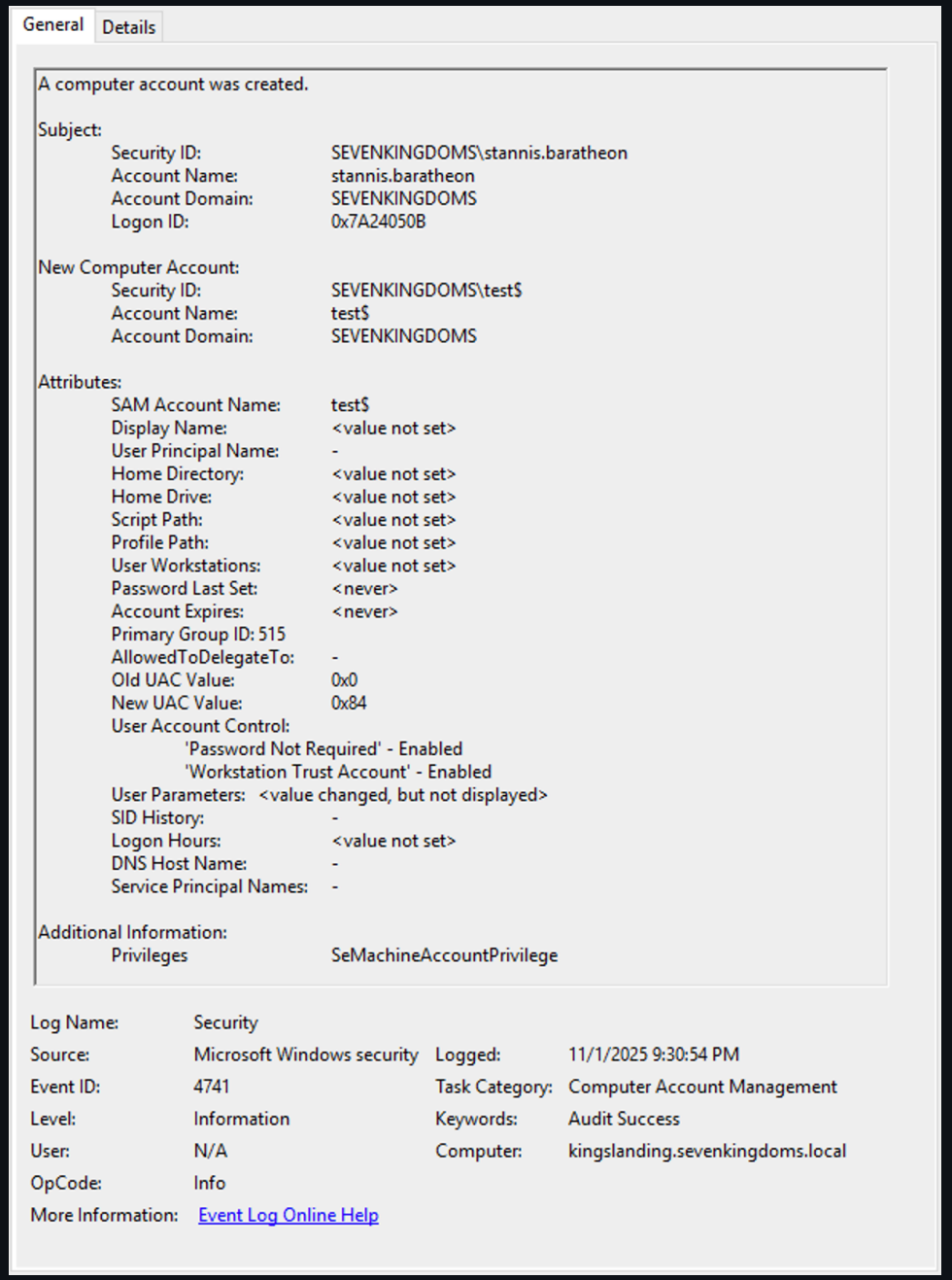
More details:

https://learn.microsoft.com/en-us/windows-server/remote/remote-access/directaccess/directaccess-offline-domain-join

Detection

Monitor for New Machine Accounts

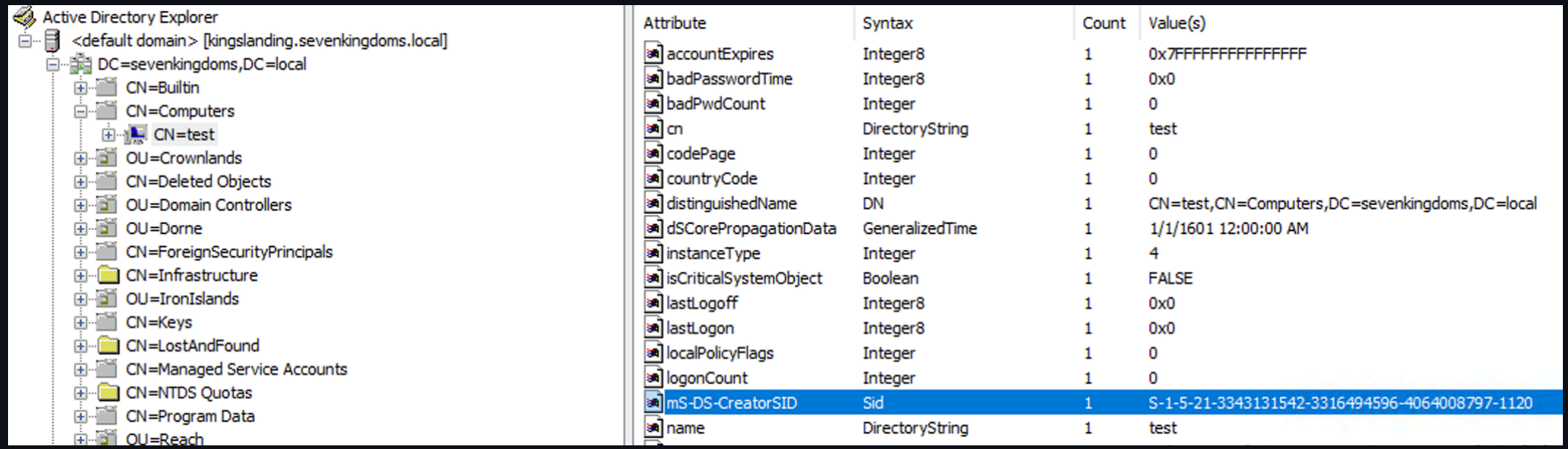
- Event ID 4741 is logged on Domain Controllers
- (you ARE collecting logs from ALL your domain controllers… right!?)



Detection

Investigate Machine Accounts

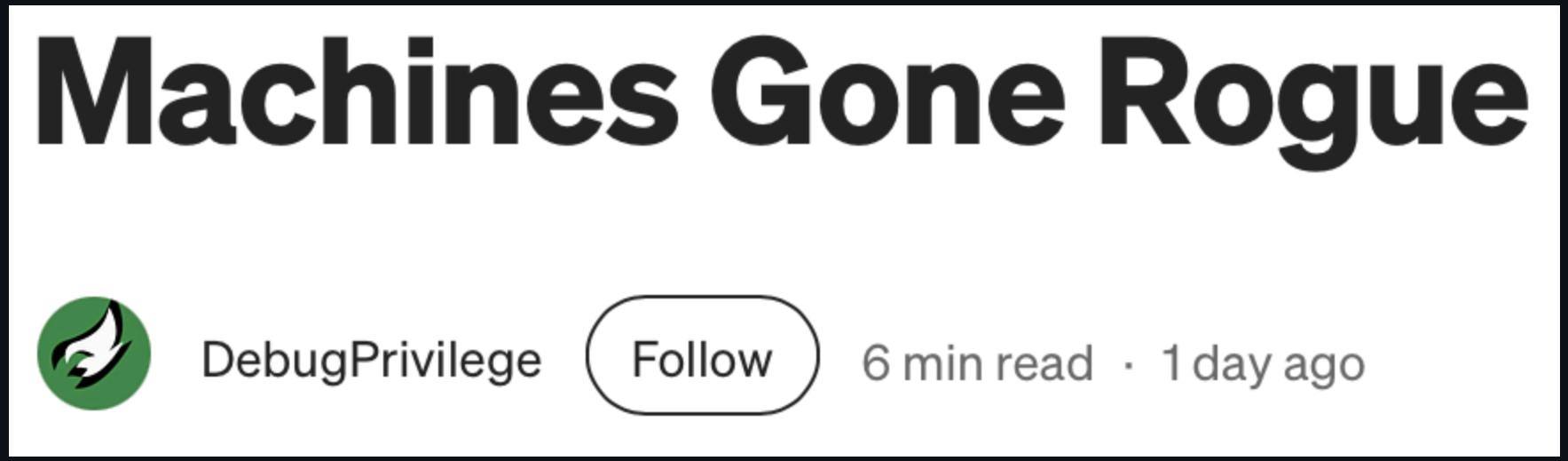
- The machine account creator is indicated in the `mS-DS-CreatorSID` field
- By default the user account cannot delete the machine account it created
- https://learn.microsoft.com/en-us/windows/win32/adschema/a-ms-ds-creatorsid



Remediation:

Find Inactive and Suspicious Computer Objects:

Huy Kha (aka DebugPrivilege) wrote an article with an easy-to-use script that finds computer accounts that look *funky*



https://medium.com/@Debugger/machines-gone-rogue-a01d726f5f10

Outro 

Key Takeaways

- Design decisions from 25 years ago aren't always so great
- Computer accounts are more dangerous than most people realize
- There are multiple attack paths from COMPUTER$ to $
- Defense requires technical controls AND organizational change

Call to Action

- Check your environment TODAY
- Start the conversation with your security and identity teams
- Don't wait for an incident to fix this

Resources

https://github.com/jakehildreth/QueenCityCon25

Thanks!

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