TPM and certificate logon

Ing. Ondřej Ševeček | GOPAS a.s. |
MCSM:Directory | MVP:Enterprise Security | CEH | CHFI | CISA |
ondrej@sevecek.com | www.sevecek.com |

moje kurzy v GOPASu

GLAB007 - capture the flag 1 - hackni si podnikovou síť
GLAB008 - capture the flag 2 - hackni si podnikovou síť
GOC175 - implementace bezpečnosti
GOC169 - ISO 27001
GOC172 - Kerberos troubleshooting
GOC161 - Cryptography

Agenda

- Why not passwords?
- Why two-factor authentication?
- What is TPM and how it is 1.5 authentication?
- AD CS installation quickly
- DC certificates
- TPM virtual smart card
- Can users obtain logon certificates by themselves?
- Registration authority for issuing TPM logon certificates
- TPM attestation

Passwords

- Easily compromised
  - hardware keyloggers
  - software keyloggers
  - surveillance cameras
- Very long validity
  - can be used from anywhere without user knowing
  - no incident investigation when compromised
- Bad quality
  - lockout vs. availability vs. DoS

Multifactor authentication

- know
  - password
  - PIN
- have
  - card
  - phone
  - notebook
- be
  - biometrics

1.5 authentication

- biometrics on mobile phones
- TPM module on laptops

- must have the device
- must not allow others to the device

Certificate logon with TPM

- bound to the device
- certificate using strong keys
- incident investigation

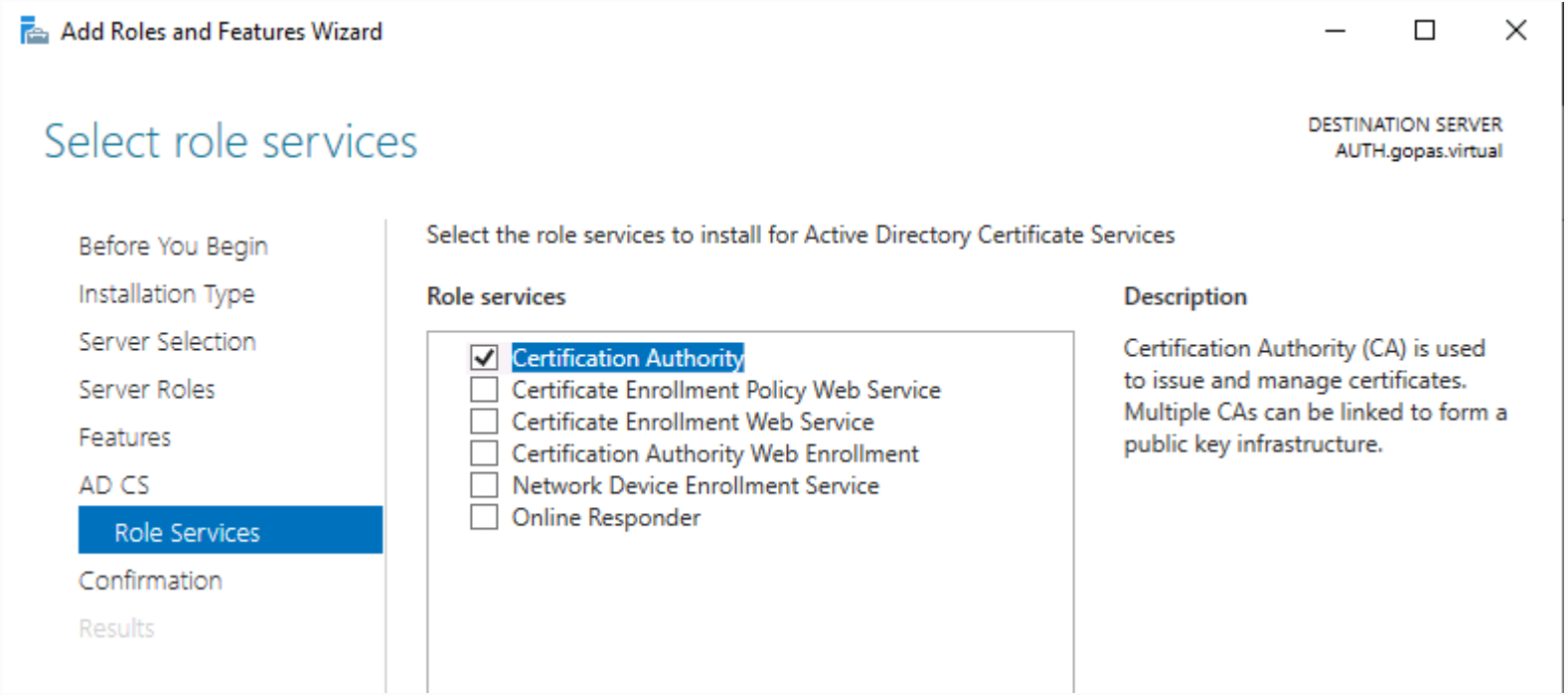
Certificate logon

- Active Directory
  - AD CS
  - DC certificates
  - user logon certificates
  - RA certificates
  - usage
    - CTRL-ALT-DEL
    - RDP
    - HTTPS
    - VPN
    - ADFS vs. Office365
    - Outlook, ActiveSync
- AAD and Office365
  - CA trusted - Get-AzureADTrustedCertificateAuthority
  - individual certificates mapped to user accounts in AAD

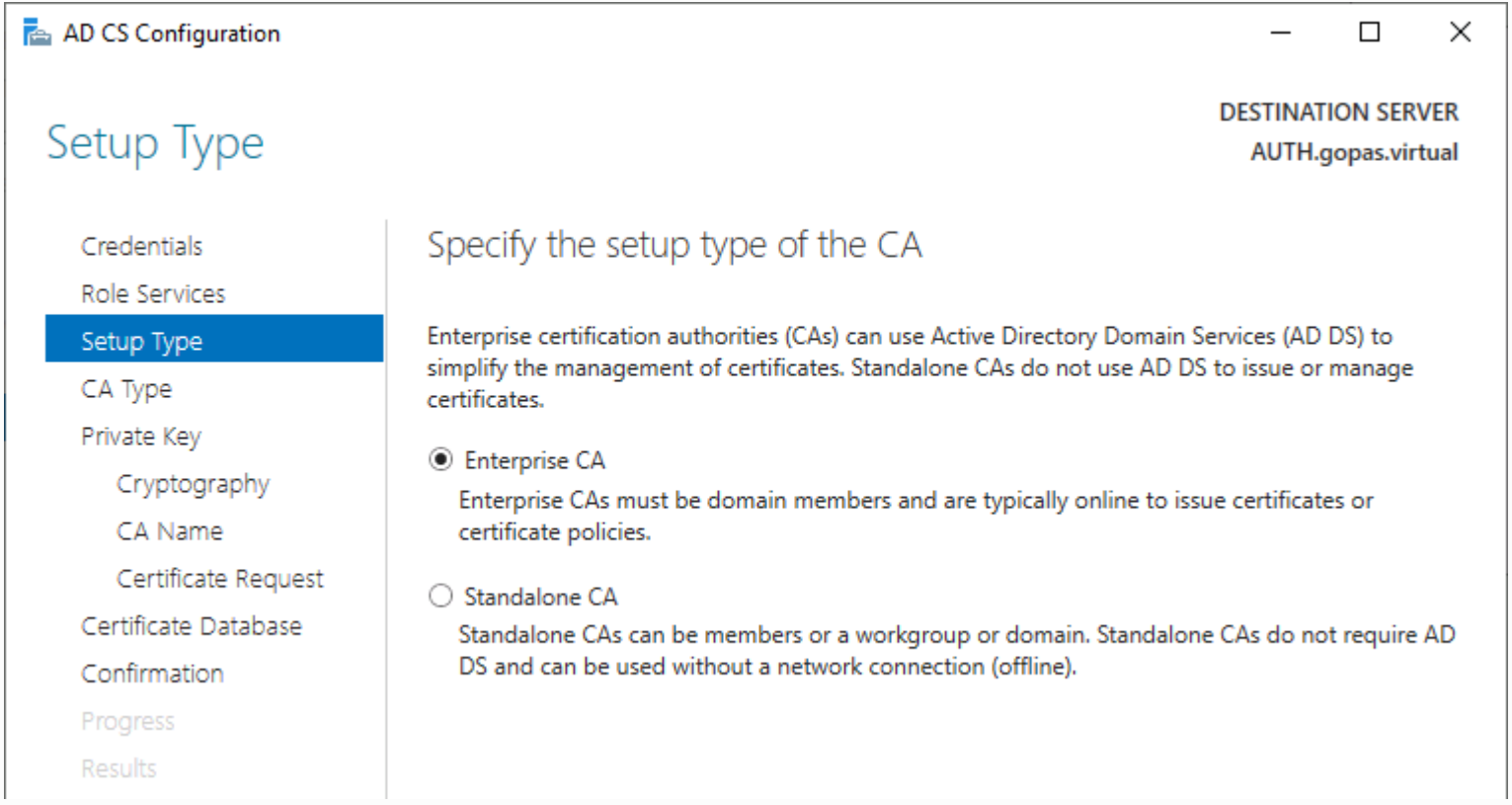
AD CS installation

- keep it safe
  - install on a DC guarantees security
    - Domain Admins
    - physical security

Simplest AD CS installation



Simplest AD CS installation



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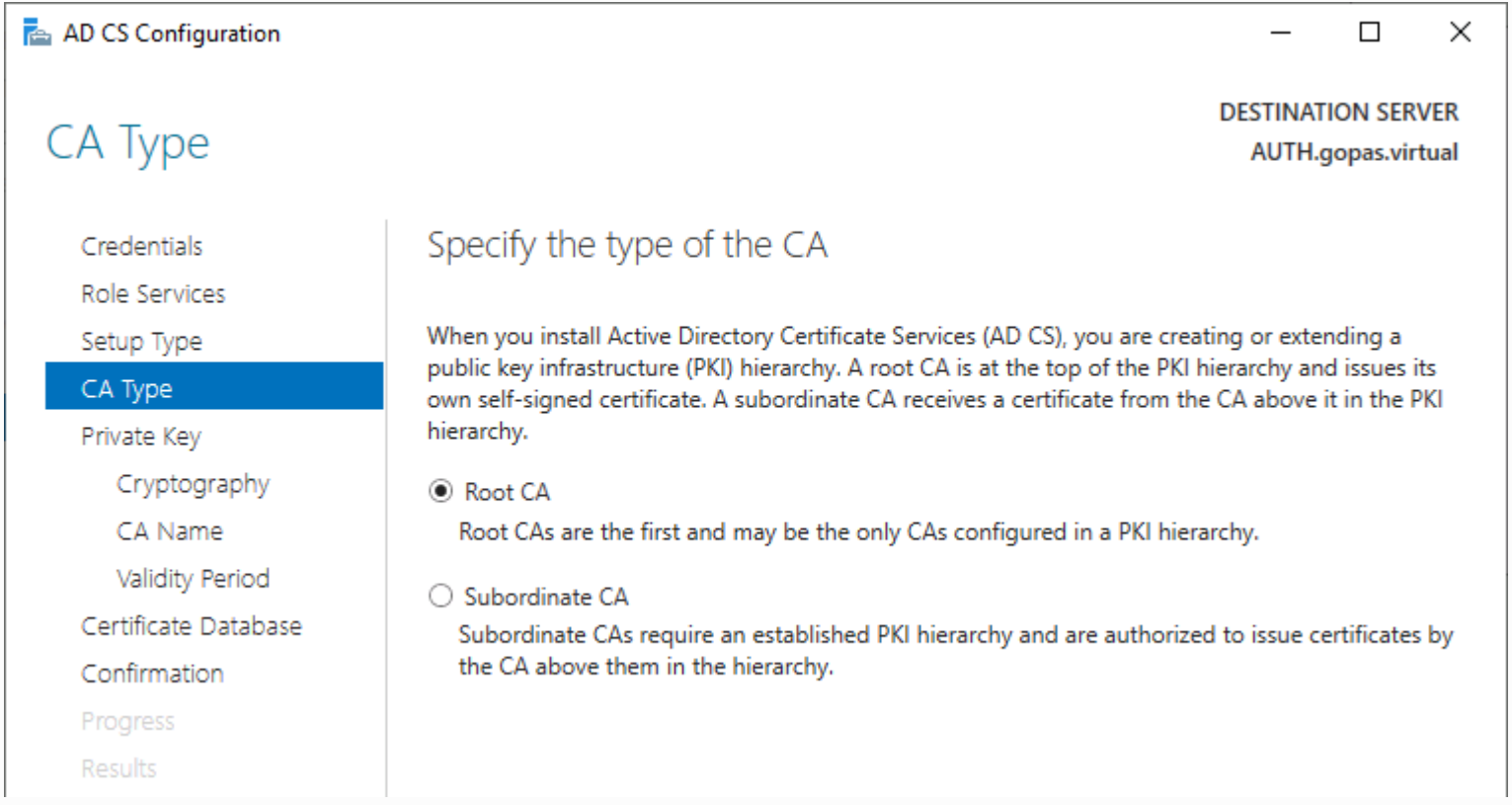

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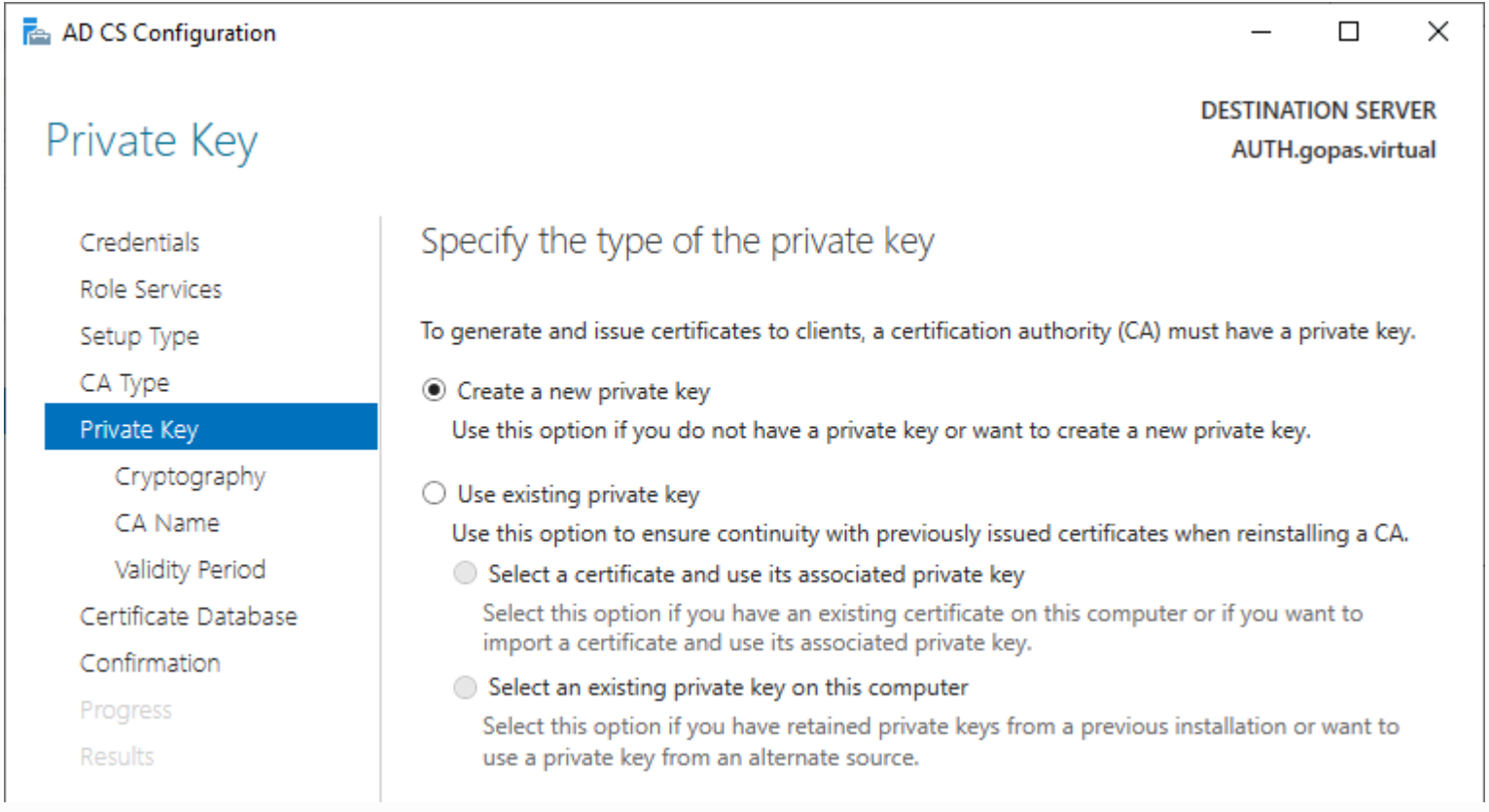

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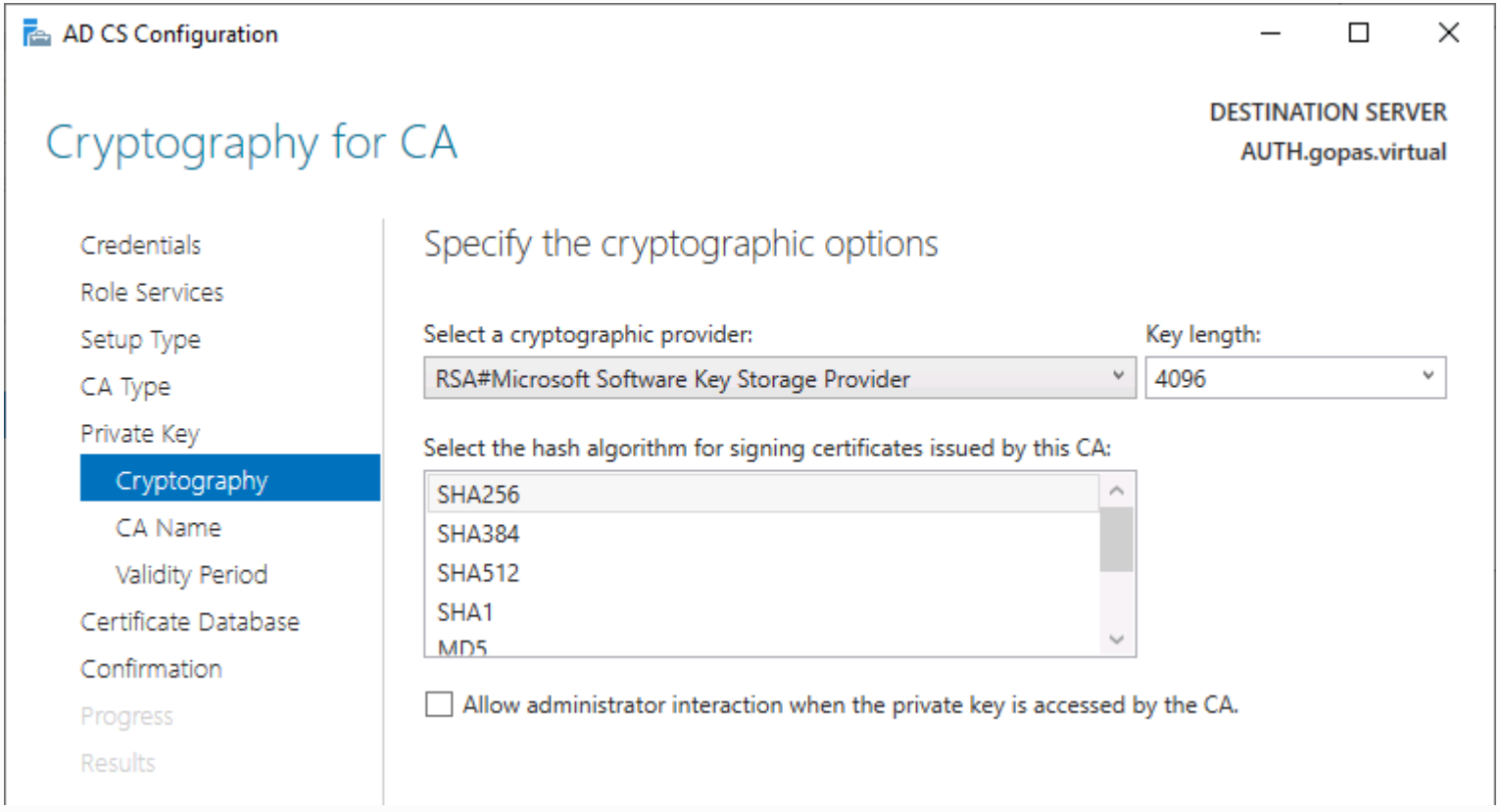
Simplest AD CS installation



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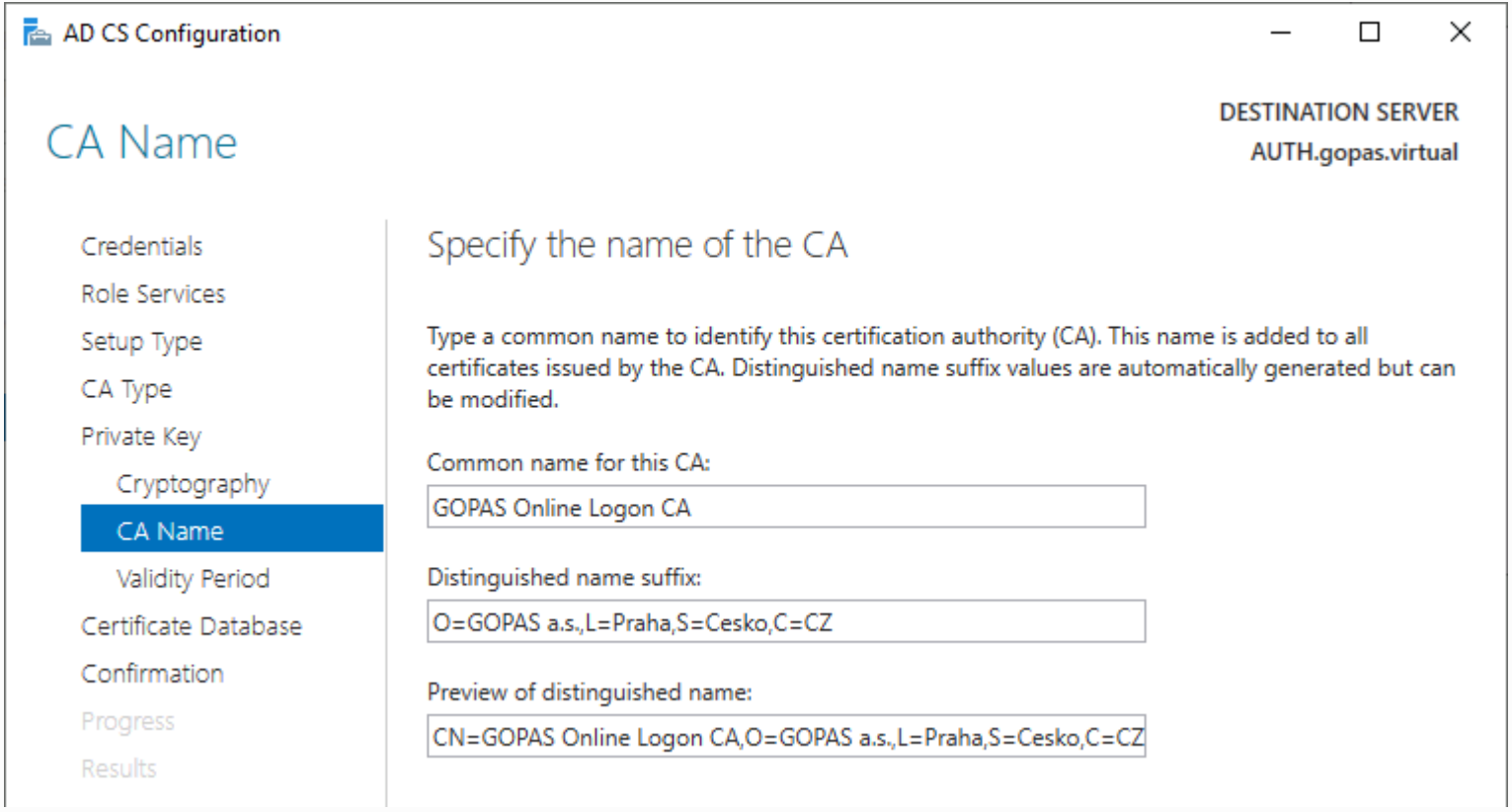

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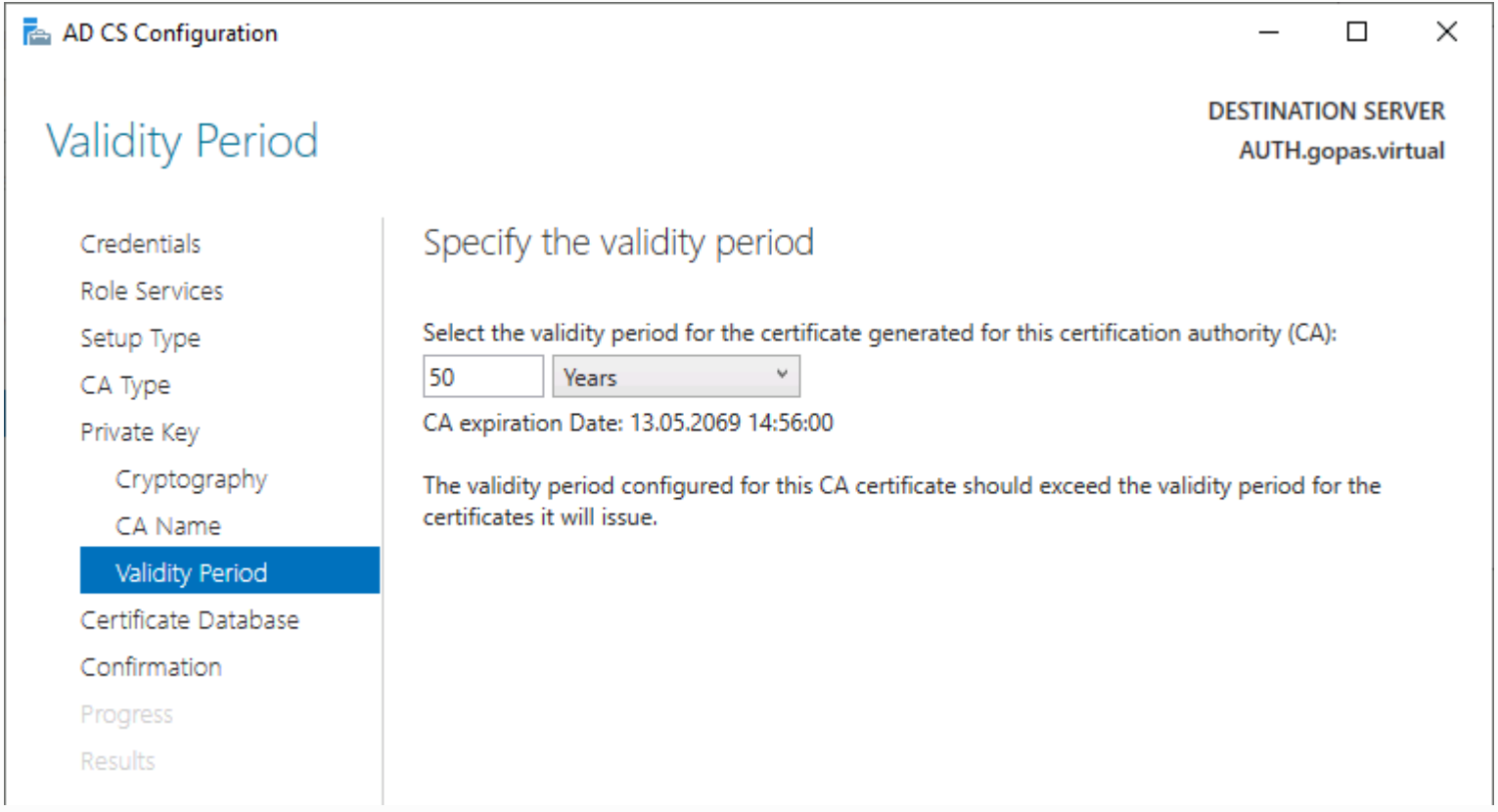
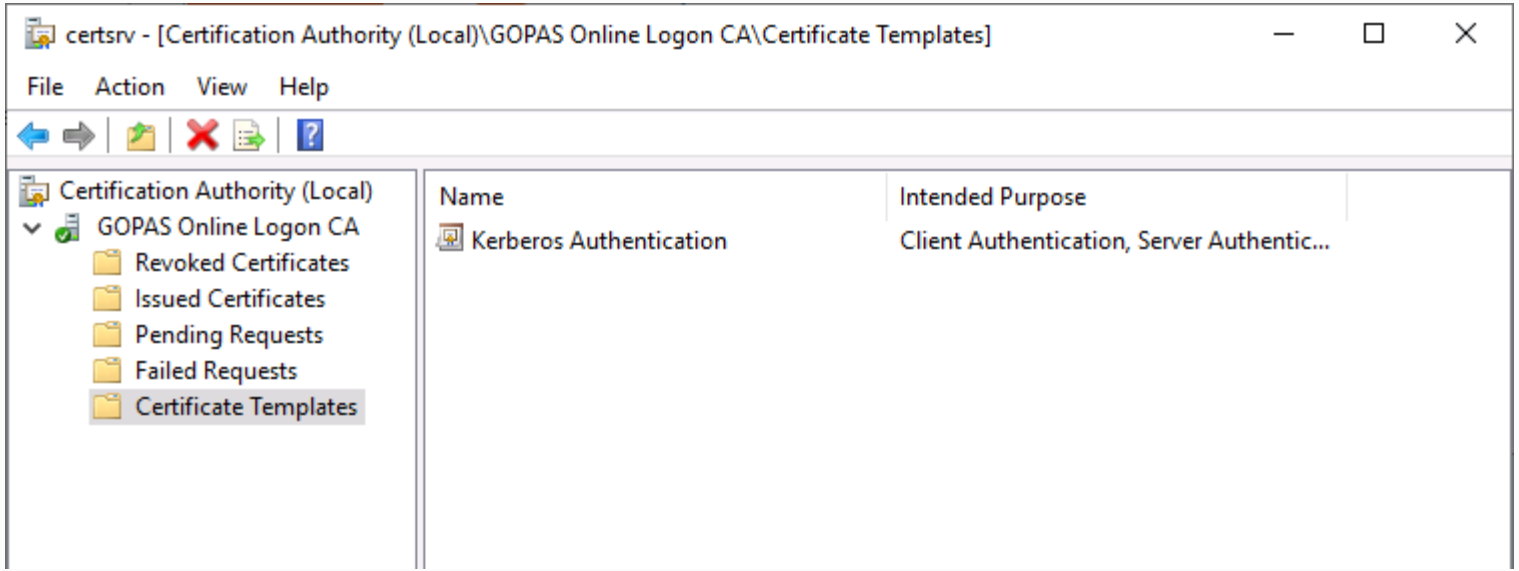


Simplest DC certificates with auto-enrollment



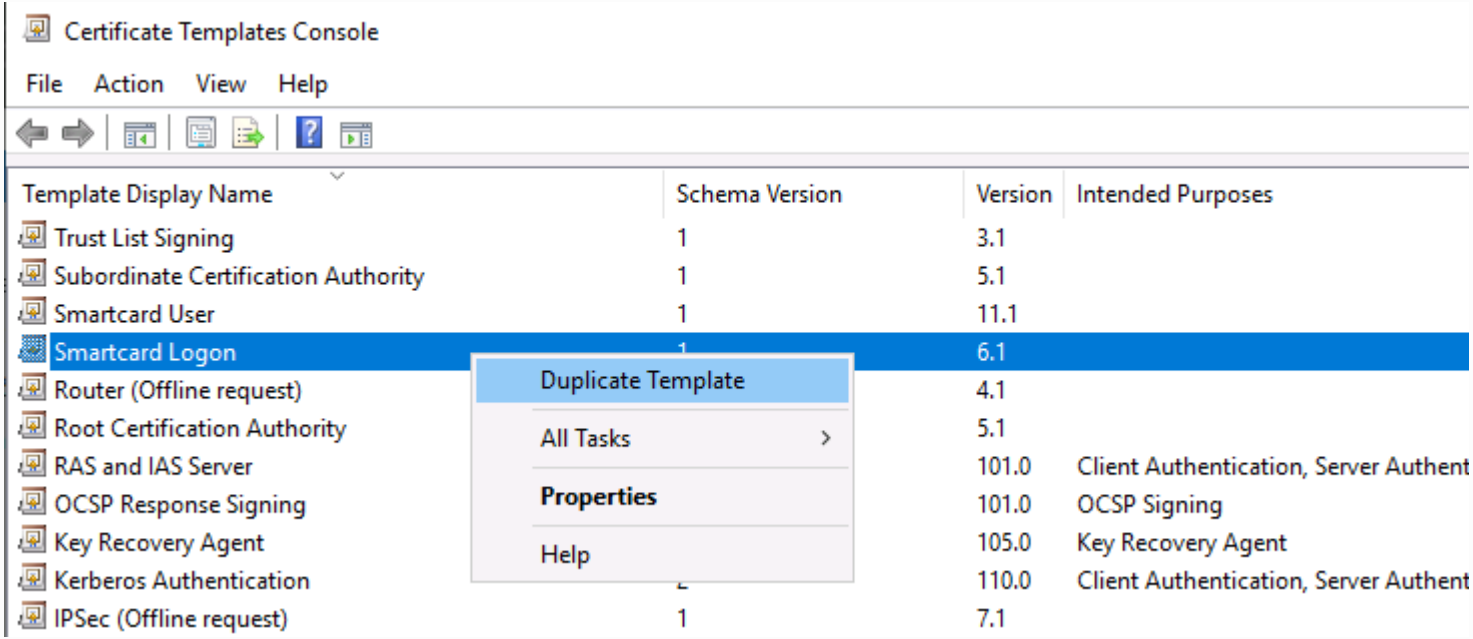
TPM virtual smart card

- TPMVSCMGR
  - create /name ... /pinpolicy minlen 4 uppercase ALLOWED lowercase ALLOWED digits ALLOWED ... /generate
- PUK
  - user knows
- AdminKey
  - 48 digits
  - admin PIN reset by computing a challenge

Issuing logon certificates

- Self service
  - free "duplication" and renewal
  - no attestation
- Attestation by workstation admins
- Attestation by TPM key hash
  - machine certificates for 802.1x VPN and WiFi

Simple user logon certificate template



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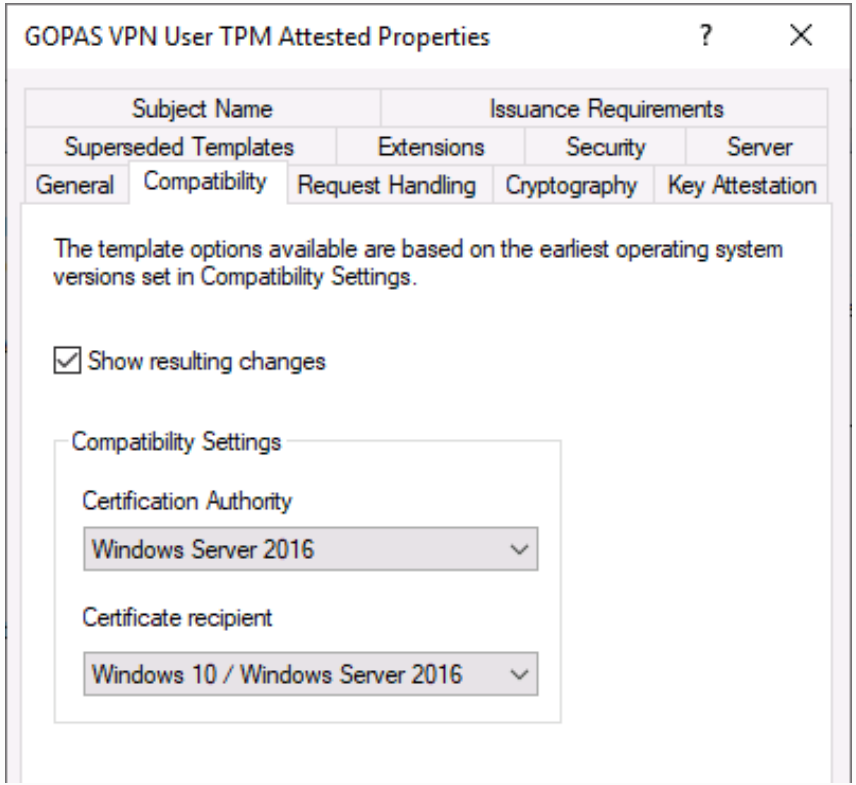

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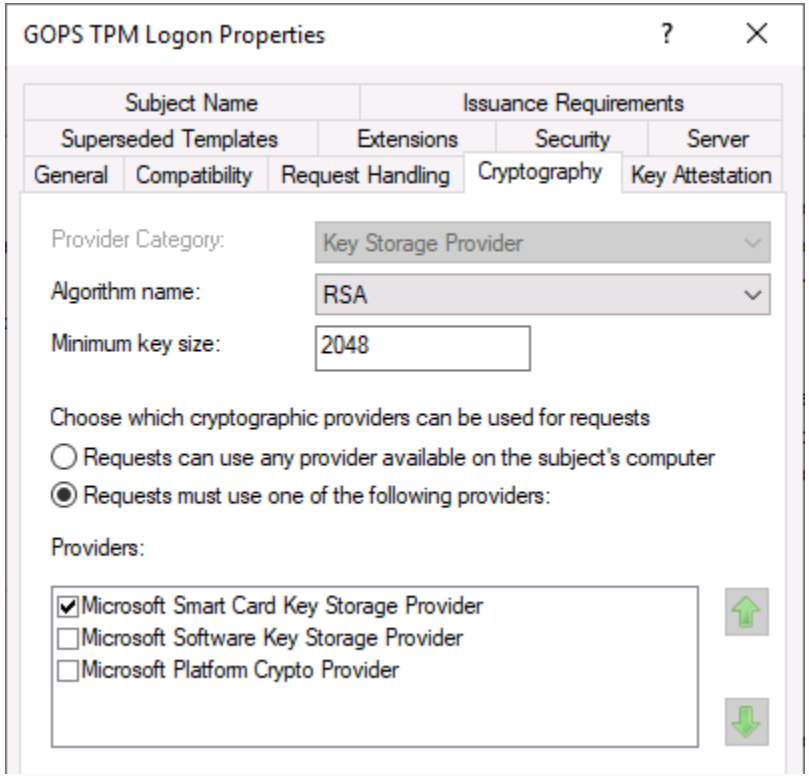

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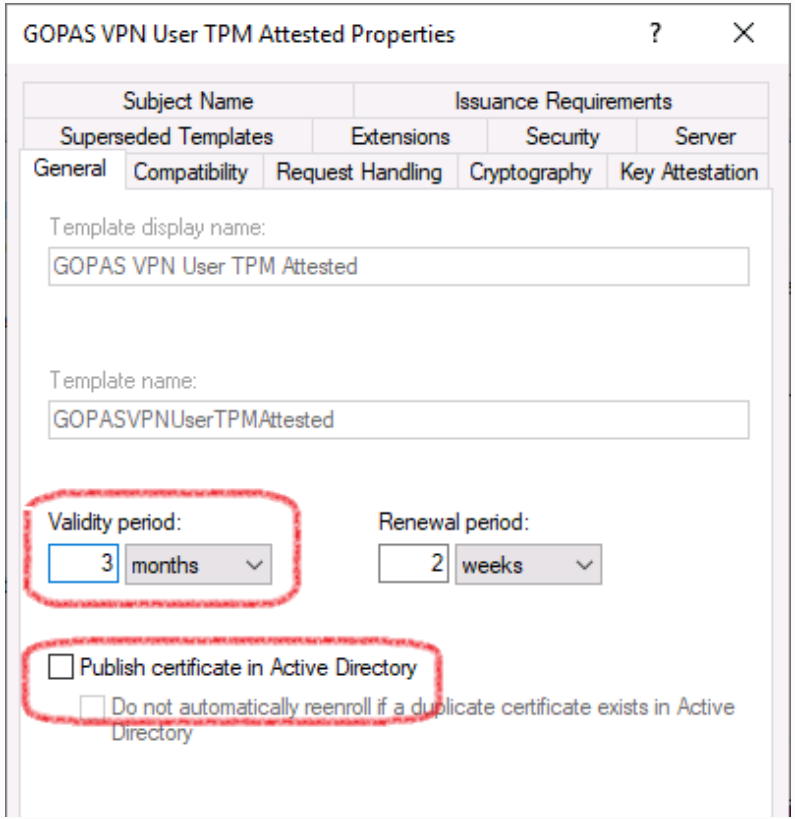

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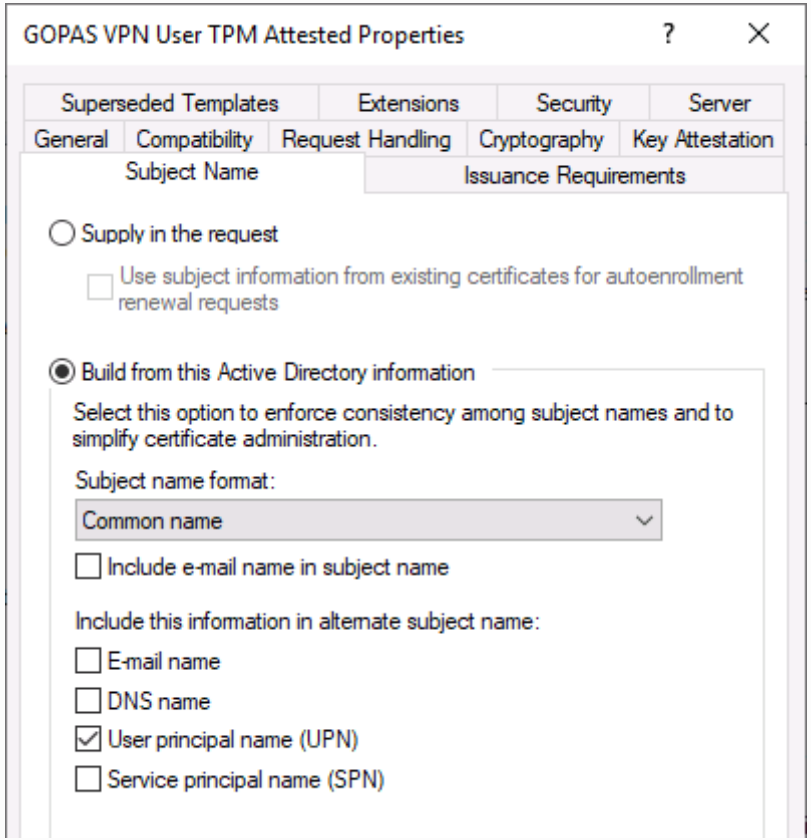

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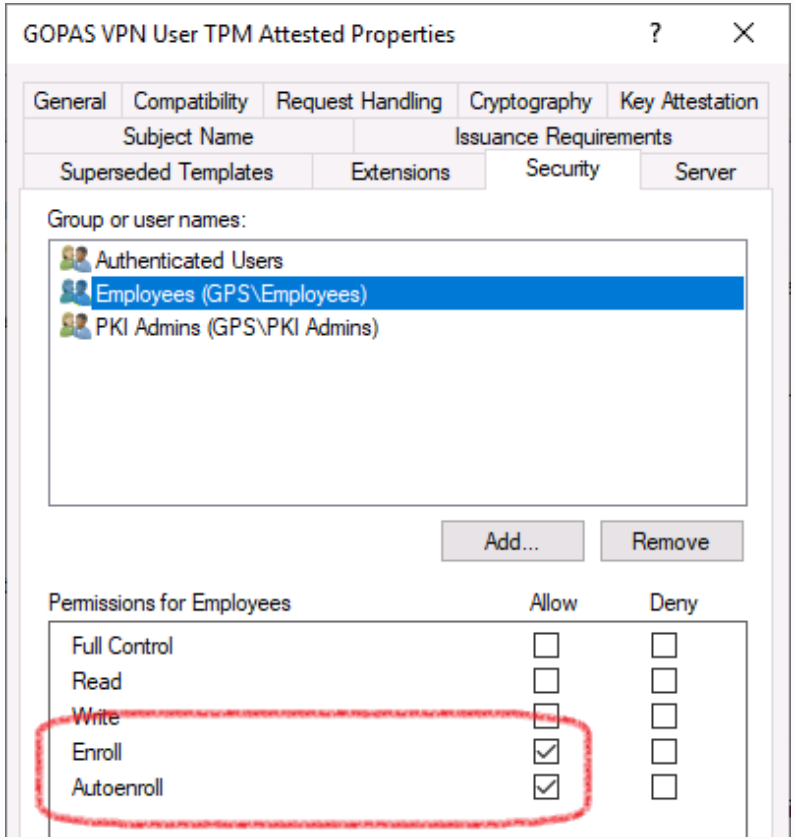
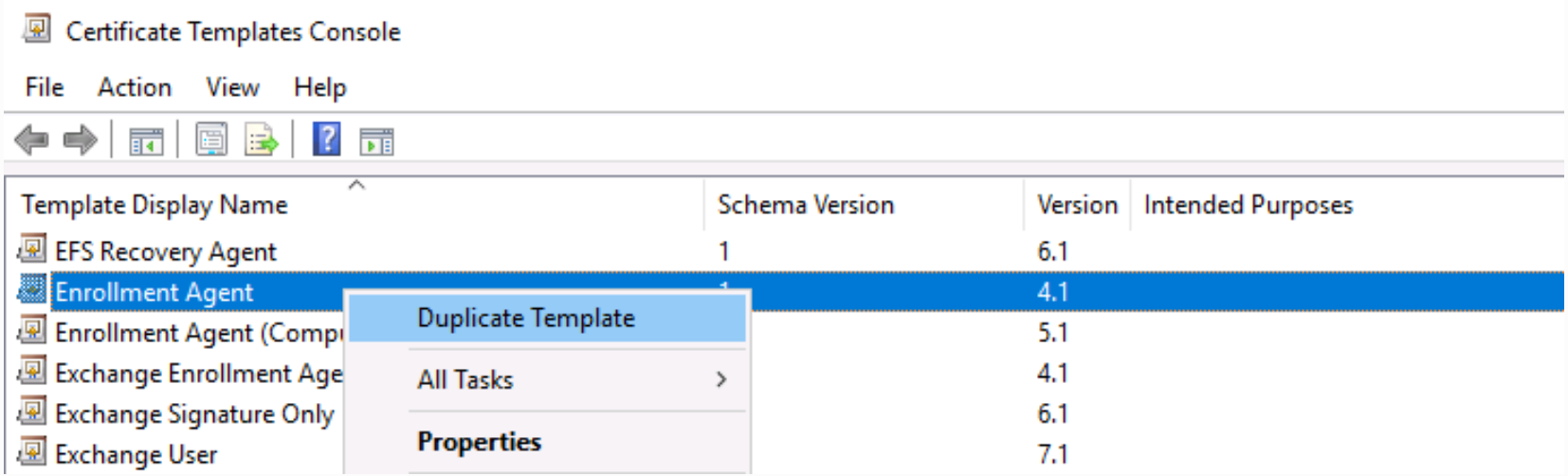


Attestation with RA

- Enrollment Agent = Registration Authority

- workstation admins issue certificates on behalf of the users
- using RA smart-card

RA certificate for workstation admins



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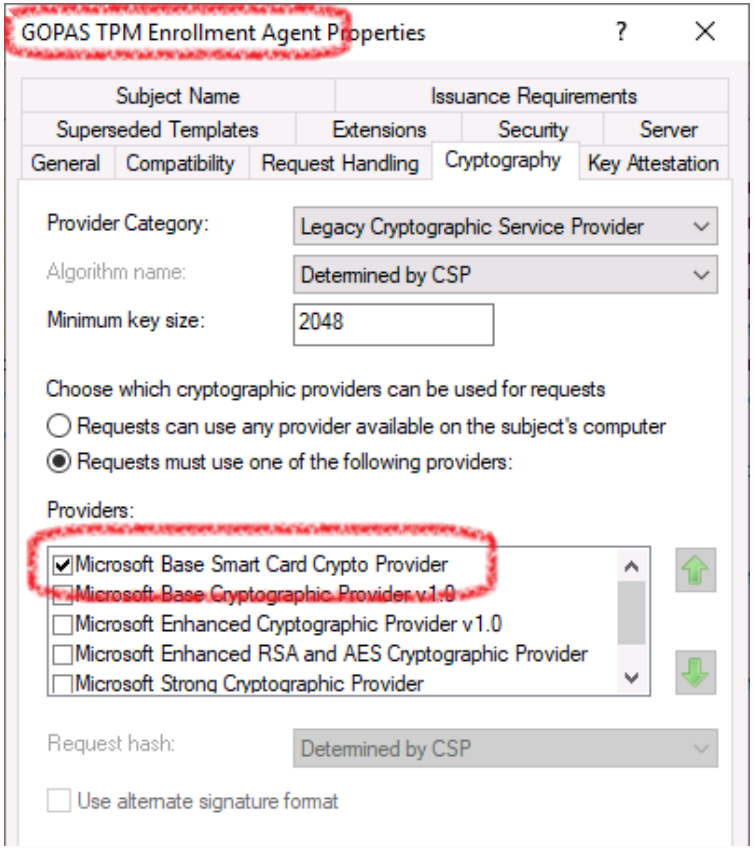

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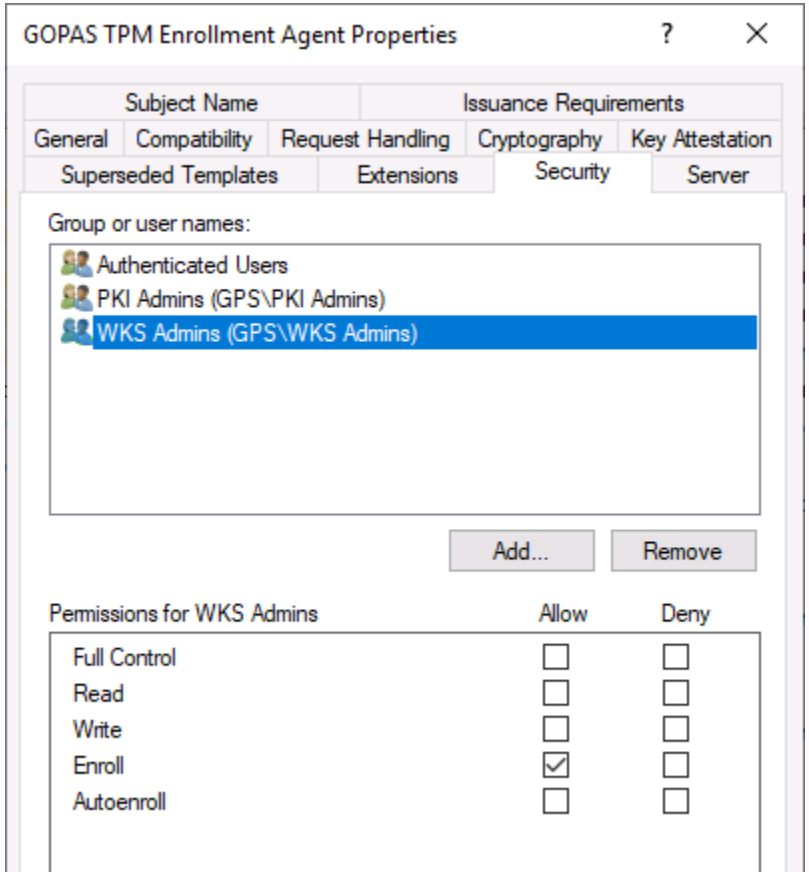
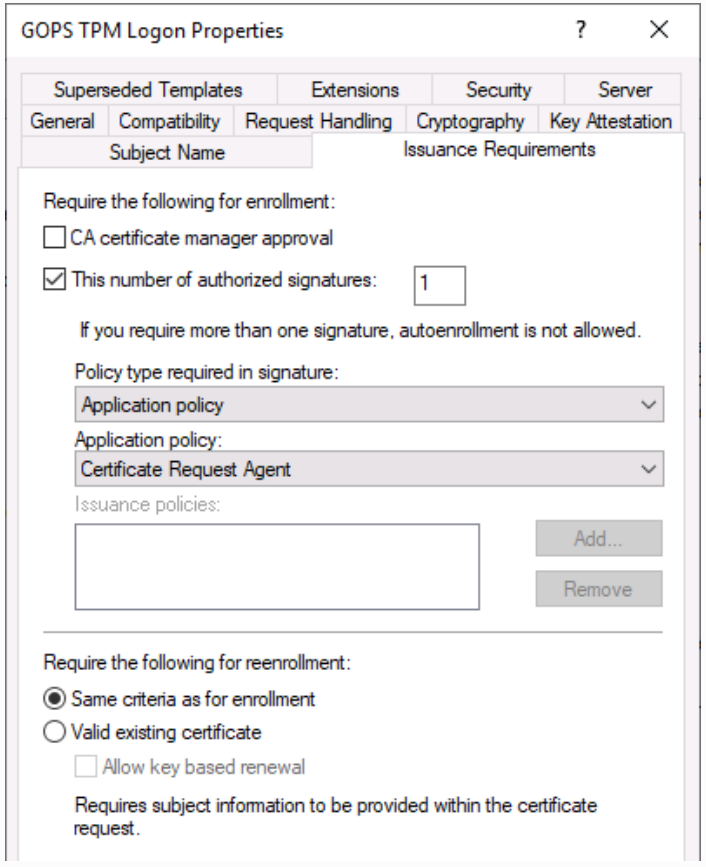


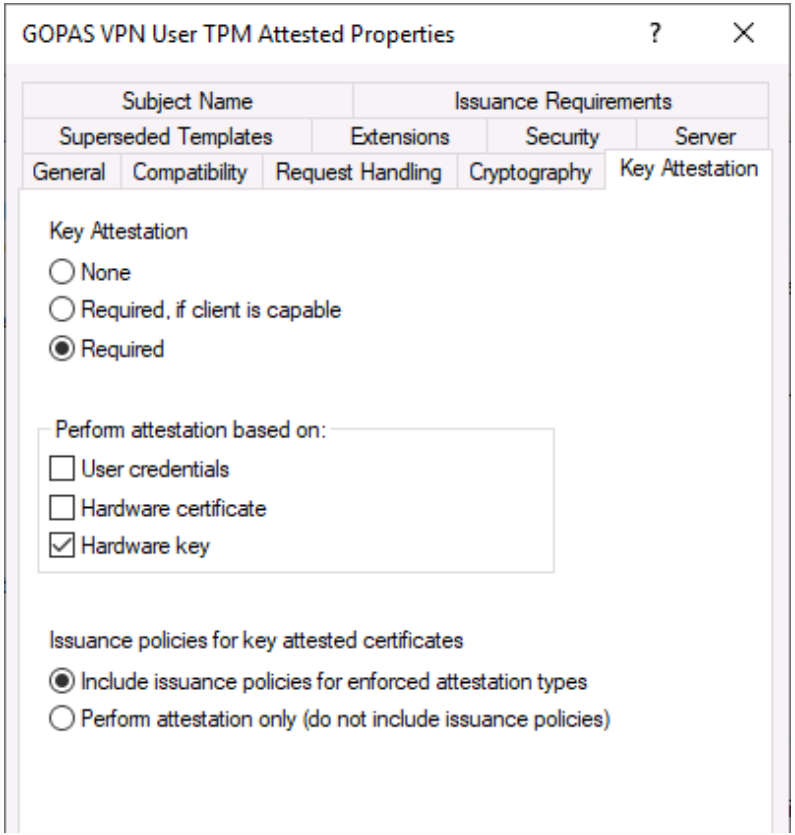
User certificate requiring the RA signature



TPM attestation for machine certificates

- Get-TpmEndorsementInfo -Hash sha256
- certutil.exe -setreg CA\EndorsementKeyListDirectories +"C:\TpmEndorsement"

TPM attestation for machine certificates



Summary

- Strong credentials bound to device

Děkuji za pozornost

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