Microsoft

April 17-18, 2024

sambaXP Conference

Microsoft Interoperability Track

Next generation SMB in Windows Server 2025 & Windows

Microsoft

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Windows Server Engineering

Microsoft

Agenda

Security mindset

Coming next

Demos

Windows Server 2025 & Windows security campaign

Security 1st

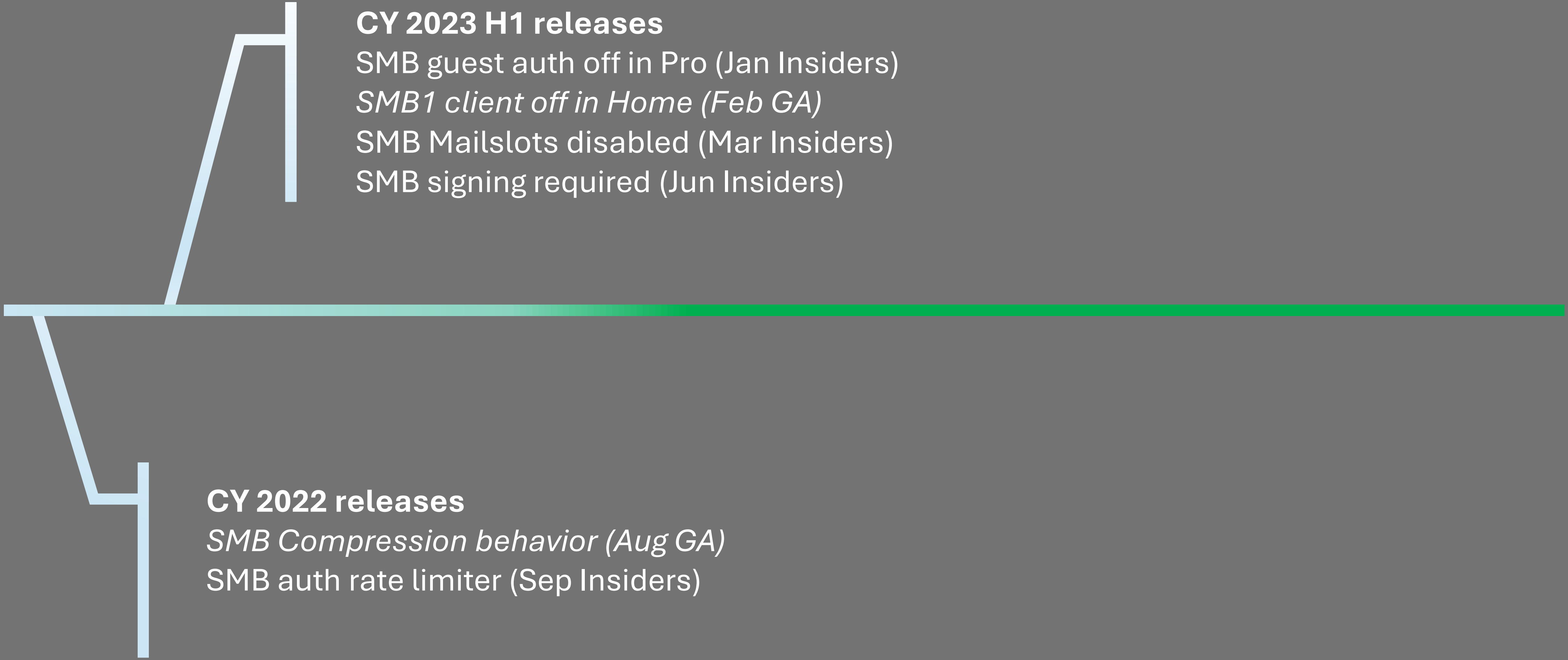
Performance 2nd

Compatibility 3rd

Microsoft

New capabilities

SMB in Windows and Windows Server 2025



CY 2023 H1 releases

SMB guest auth off in Pro (Jan Insiders)

SMB1 client off in Home (Feb GA)

SMB Mailslots disabled (Mar Insiders)

SMB signing required (Jun Insiders)

CY 2022 releases

SMB Compression behavior (Aug GA)

SMB auth rate limiter (Sep Insiders)

SMB auth rate limiter

Throttle bad NTLM, PKU2U, Local KDC passwords

- Not AD-based Kerberos

2-second delay between each fail (configurable)

- On by default

Control with PowerShell, Group Policy

```
Set-SmbServerConfiguration -InvalidAuthenticationDelayTimeInMs n
```

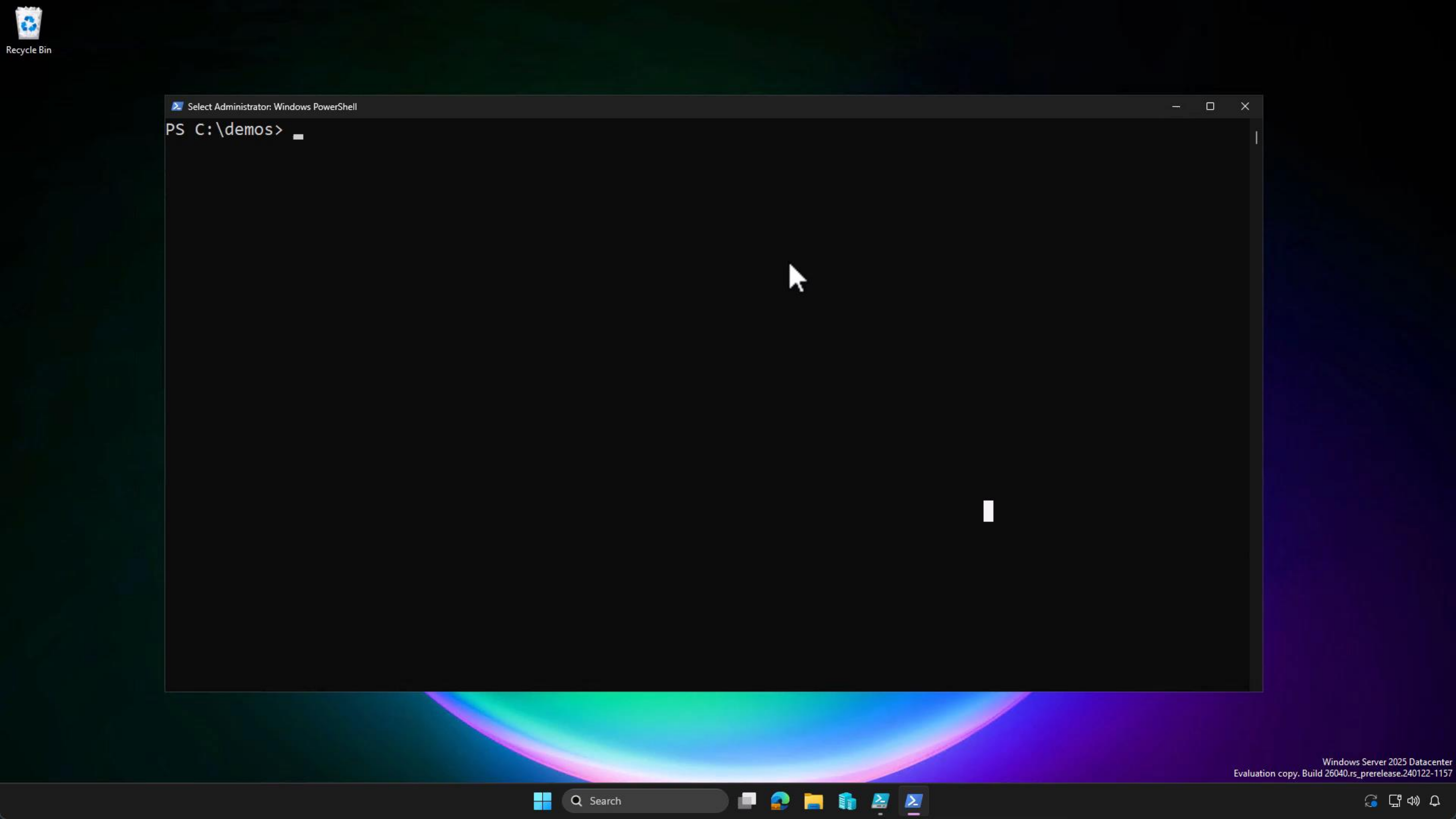
Ex: 300 brute force attempt/sec for 5 minutes = 90,000 PW

Now takes 50 *hours*

SMB auth rate limiter

Demo

Microsoft



```
PS C:\demos> _
```

Windows Server 2025 Datacenter
Evaluation copy. Build 26040.rs_prerelease.240122-1157

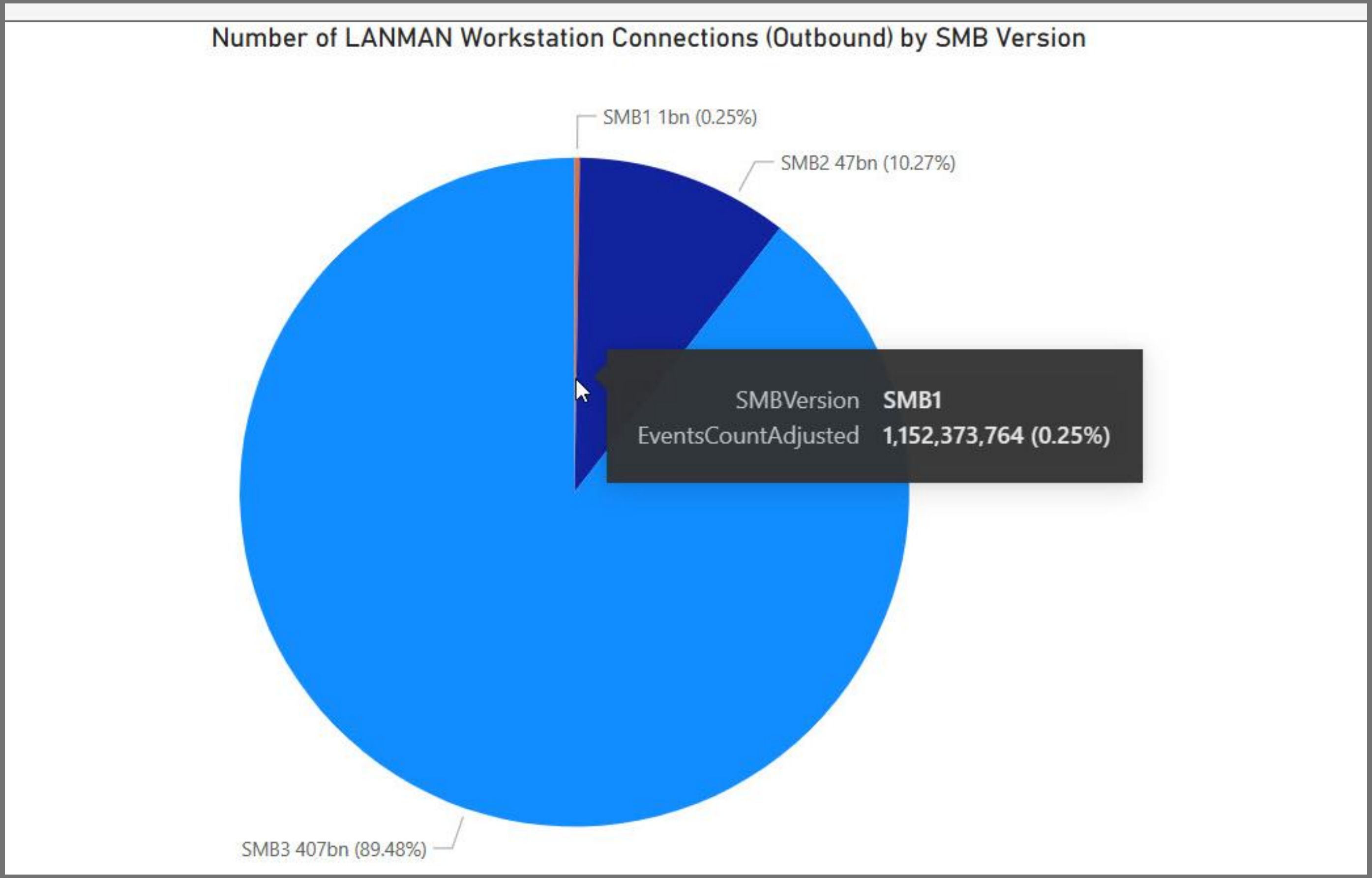
SMB guest auth off in Pro

- Guest auth still common in NAS
- None of **yours**, *right?*
- Easy method to attack phished client
  - Send them UNC
  - Allows connection without cred
  - User executes a remote payload
- Pro defaults to *off* now
- Only Home edition remains

SMB1 client off in Home

SMB1 usage 8 years ago: 45%

Usage now: 0.25%



Microsoft

That’s all, folks: SMB1 disabled in every edition

SMB Mailslots disabled

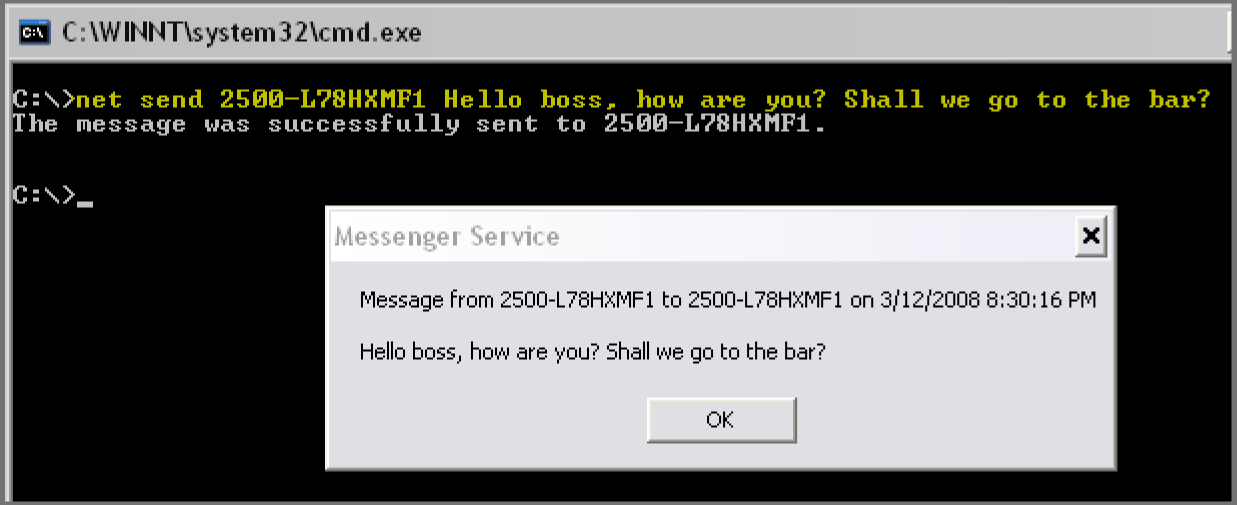
Old, simple, unreliable, insecure IPC method

SMB and AD (DCLOCATOR) mailslot disabled by default

Control with PowerShell & GP

- Set-SmbClientConfiguration -EnableMailslots $true

Officially deprecated



```
C:\>net send 2500-L78HXMF1 Hello boss, how are you? Shall we go to the bar?
The message was successfully sent to 2500-L78HXMF1.

C:\>_
```

Message from 2500-L78HXMF1 to 2500-L78HXMF1 on 3/12/2008 8:30:16 PM

Hello boss, how are you? Shall we go to the bar?

SMB signing required

- Signing required by default now
  - Previously required only for domain controller, SYSVOL, NETLOGON
  - Now Windows + Windows Server
  - SMB server signing required: Windows client SKUs only
  - SMB client signing required: Windows and Windows Server
- Stop relay attacks, AitM, phishing
- Control with Powershell, Group Policy
  - Don’t query registry!

SMB signing required

Errors when signing prevented:

0xc000a000 / -1073700864

STATUS_INVALID_SIGNATURE

The cryptographic signature is invalid

Performance considerations

Core speed, count & utilization

Ned tests on 4 vCPU Xenon 3.9Ghz: about -15% throughput (60 sec copy now 68 sec)

Don’t forget about SMB compression savings

Customers must test & decide

SMB signing required

The next big campaign

- https://aka.ms/wontsignsmb
- wontsignsmb@microsoft.com

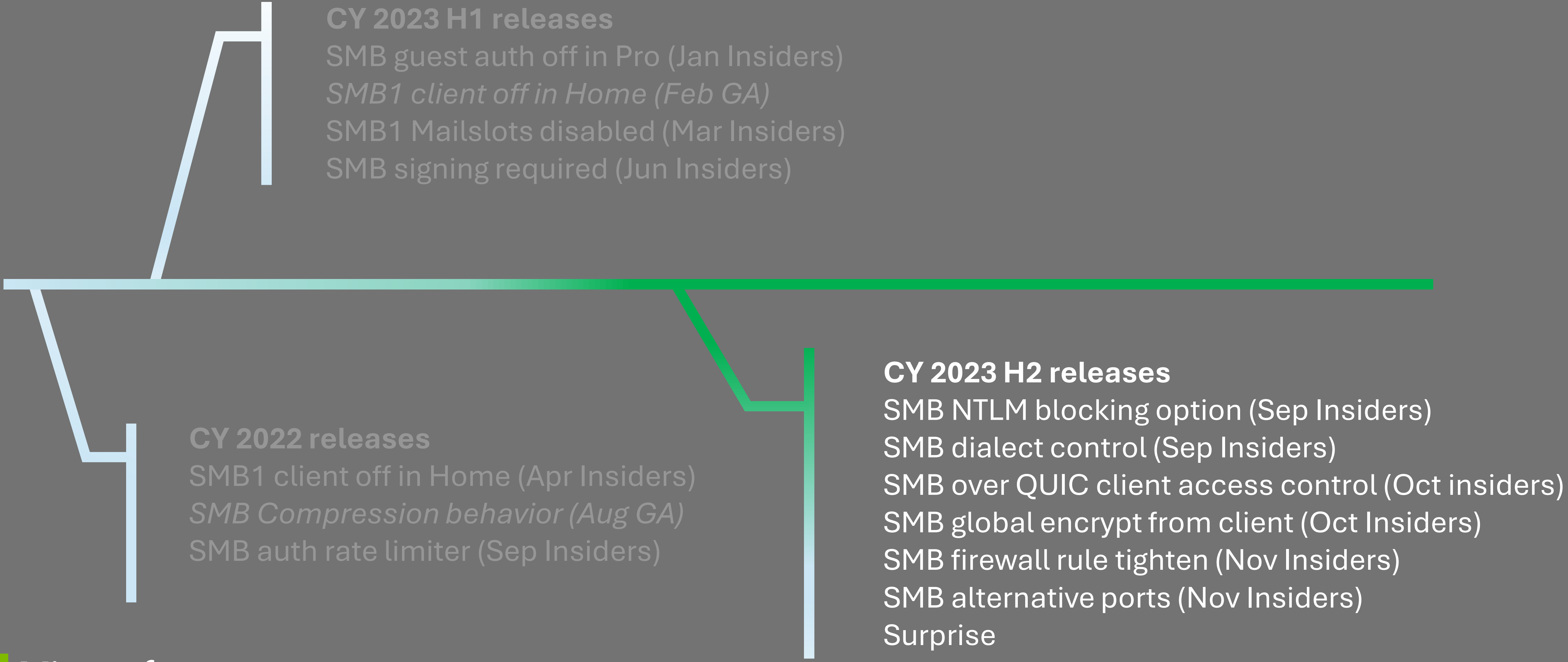
All Windows versions support signing & it’s always enabled

Signing required by pre-auth integrity in 3.1.1

If a device or app won’t sign by default, turn it on

If you can’t turn it on, upgrade the device or app

SMB in Windows and Windows Server 2025



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SMB over QUIC client access control (Oct insiders)

SMB global encrypt from client (Oct Insiders)

SMB firewall rule tighten (Nov Insiders)

SMB alternative ports (Nov Insiders)

Surprise

SMB NTLM disable option

Stop emitting NTLM secrets for PtH and offline crack

LSA change for SPNEGO that an app/service utilizes

Off by default (currently)

Remote NTLM only

Control with Powershell, Group Policy, mapping tools

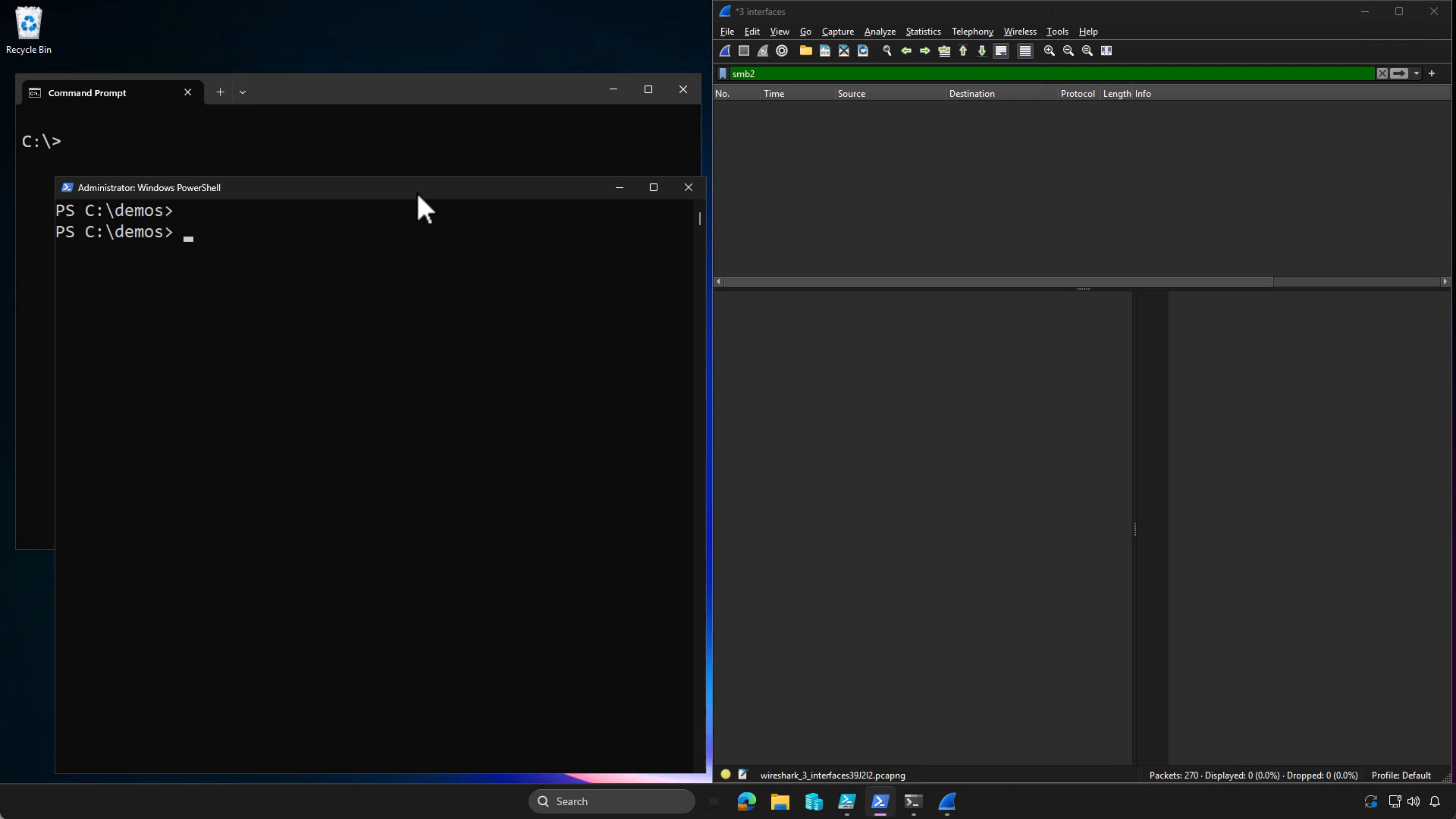
```
Set-SmbClientConfiguration –DisableNTLM $true
```

Exception list in group policy, Powershell *(coming)*

SMB NTLM blocking

Demo

Microsoft



```
C:\>
```

```
PS C:\demos>
PS C:\demos> _
```

smb2

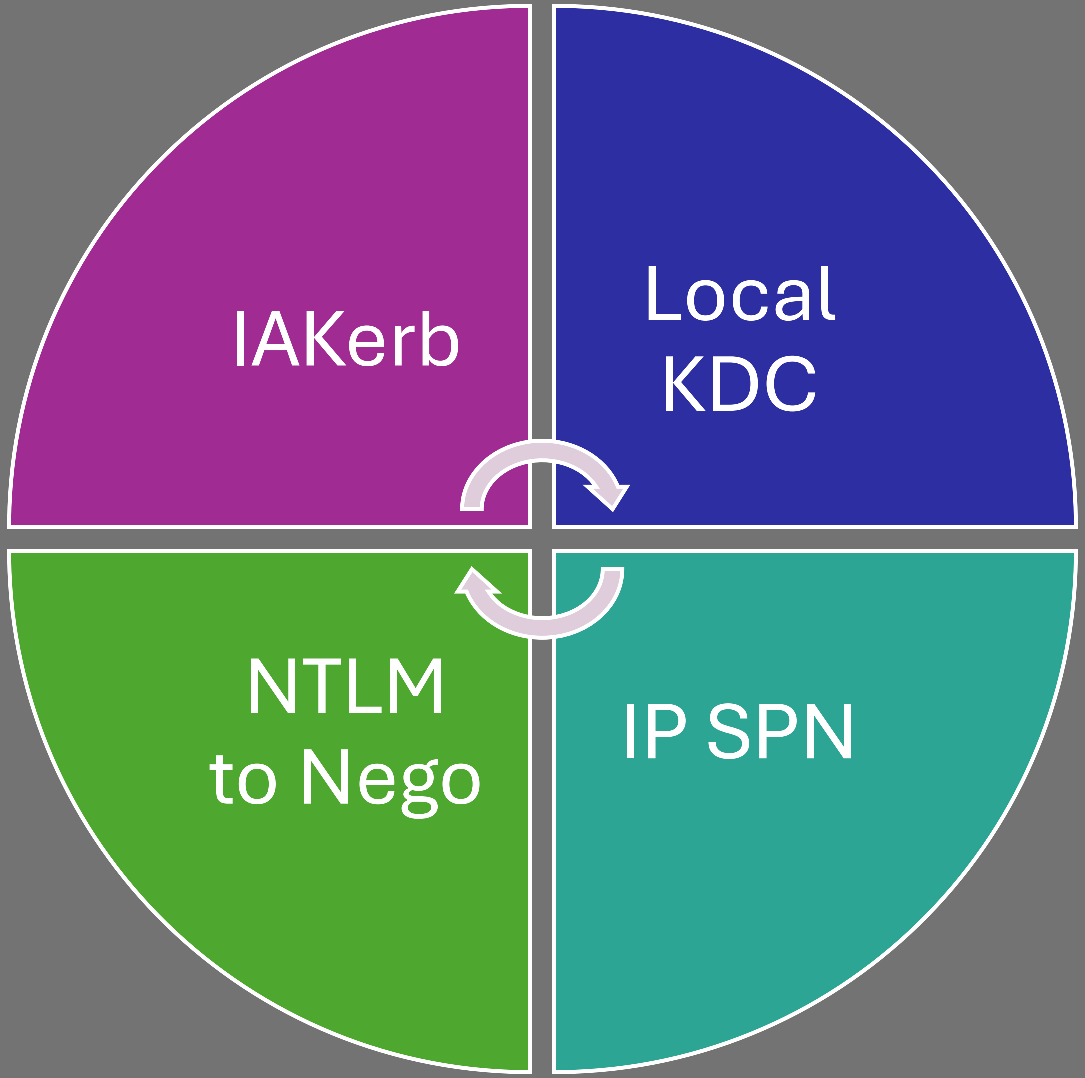
No. Time Source Destination Protocol Length Info

wireshark_3_interfaces39J2l2.pcapng

Packets: 270 · Displayed: 0 (0.0%) · Dropped: 0 (0.0%)

Profile: Default

Phase out NTLM, use Kerberos



Microsoft

Kerberos Replacements for NTLM

Scenario	Solution
Client lacks line-of-sight to the KDC	IAKerb
Workgroup / P2P / Local Auth	Local KDC
IP Address for target server	TryIPSPN
Hard-coded or unnecessary NTLM	Move to Nego

IAKerb

Initial and pass-thru authentication

Kerberos V5 and the GSS-API

New security package in existing SPNEGO

Need updated client and target

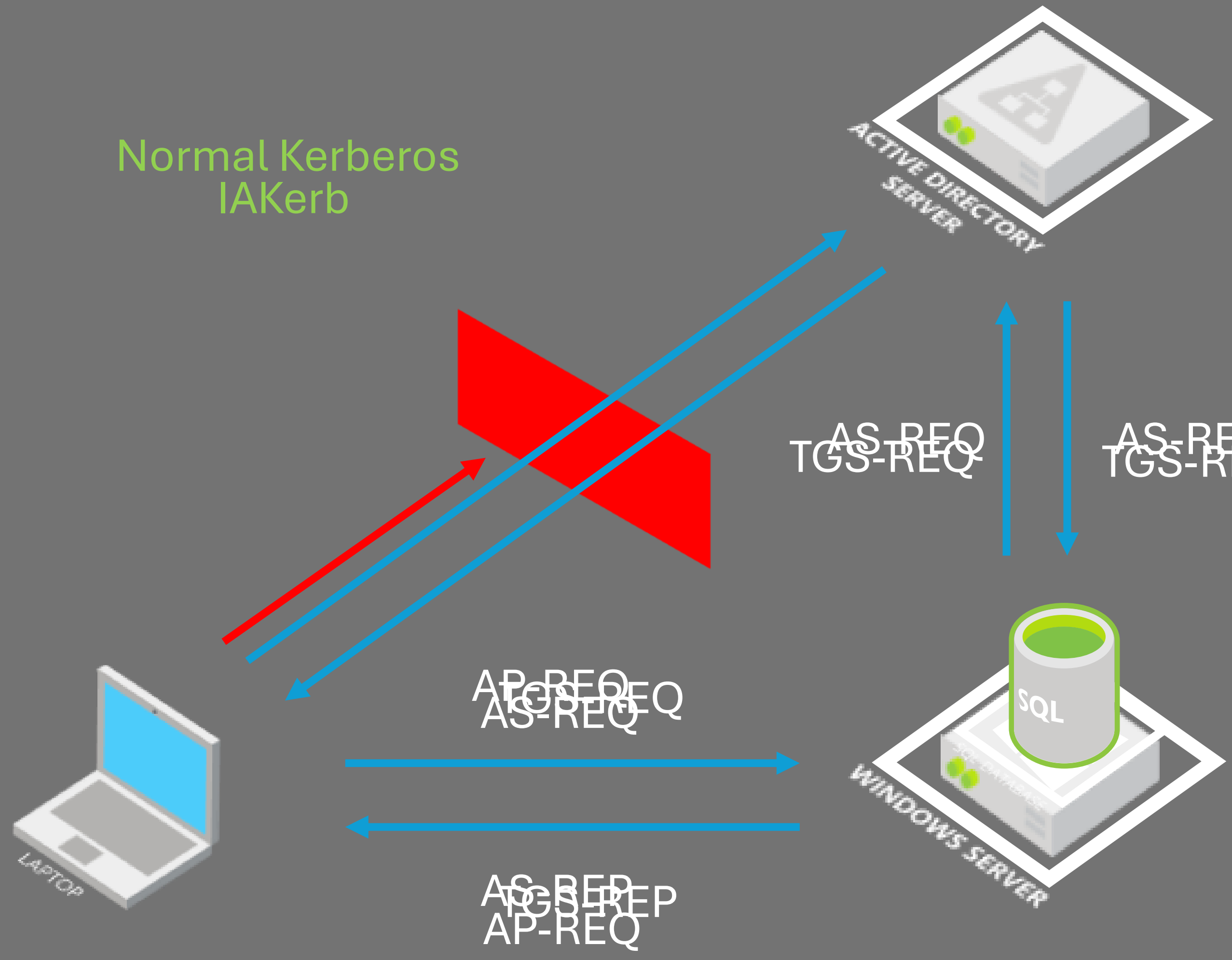
- Not DC

Kerberos mostly unchanged

IAKerb client forwards thru IAKerb target to DC

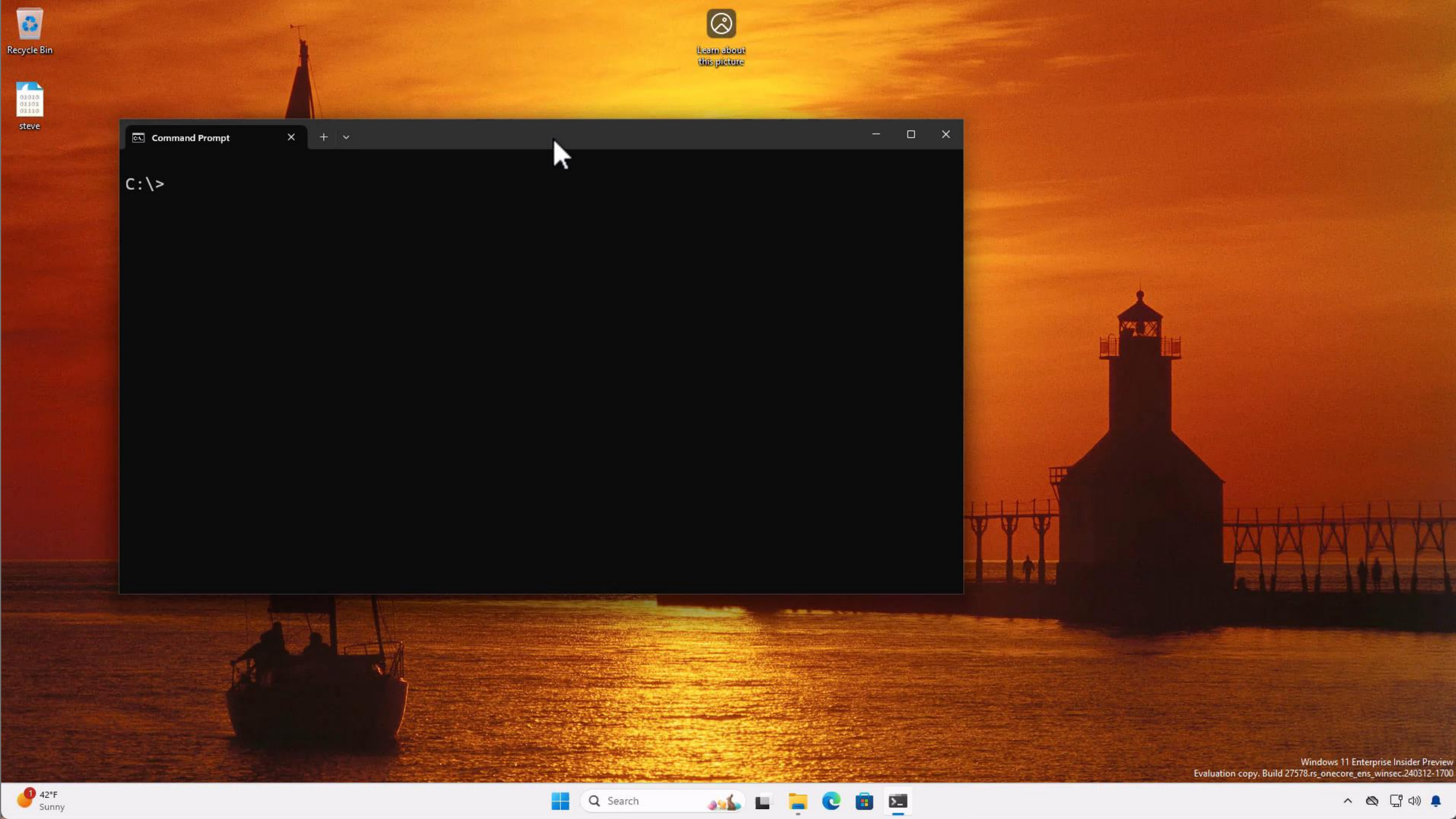
- No line of site needed by client to DC

IAKerb in action



IAKerb (with SMB)

Demo

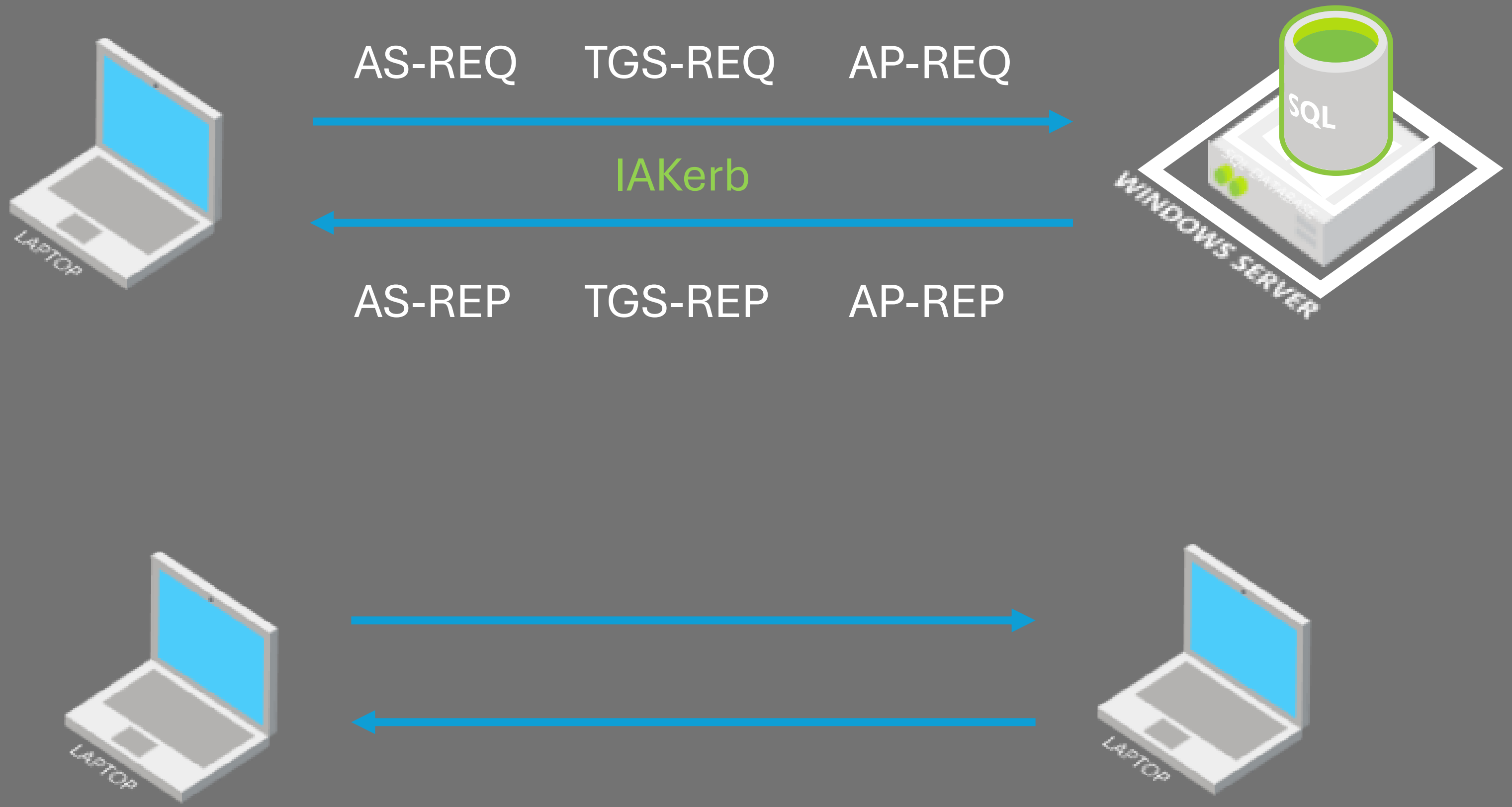

Recycle Bin
steve
Learn about this picture
Command Prompt
42°F
Sunny
Search
Windows 11 Enterprise Insider Preview
Evaluation copy. Build 27578.rs_onecore_ens_winsec.240312-1700

```
C:\>
```

Local KDC

- Local users and groups
- KDC without domain controller
  - On top of SAM
- Requires IAKerb-enabled client
  - No SPNs or DNS, after all
- No NTLM in Windows workgroups
- Open standards interop (in progress)

Local KDC in action



AS-REQ TGS-REQ AP-REQ

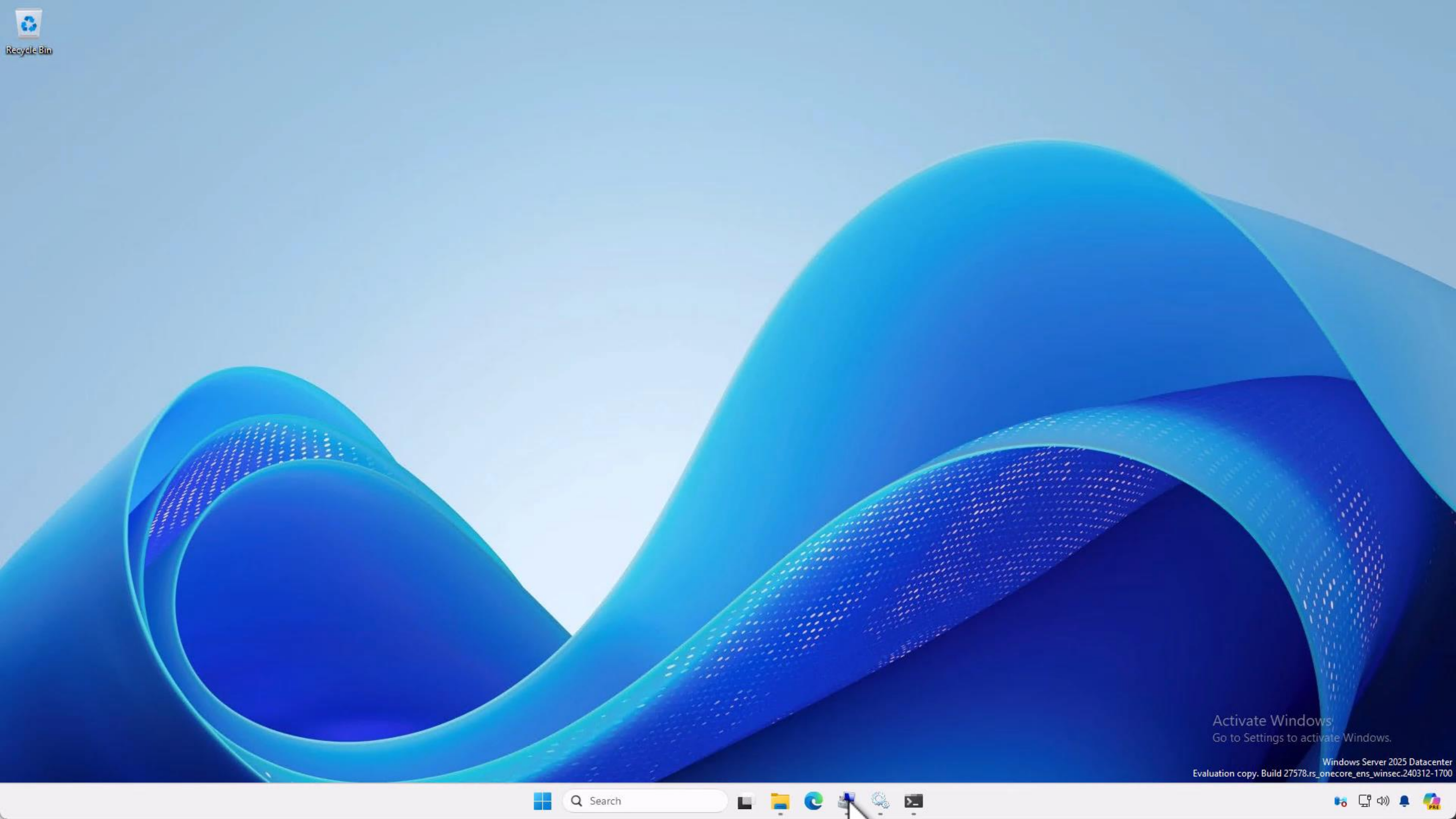
IAKerb

AS-REP TGS-REP AP-REP

Local KDC (with SMB)

Demo

Microsoft



Activate Windows
Go to Settings to activate Windows.

Windows Server 2025 Datacenter
Evaluation copy. Build 27578.rs_onecore_ens_winsec.240312-1700

SMB server dialect control

Allow and refuse a range of SMB 2 & 3

Better security control in modern environments

Improve SMB client option introduced in Win10

PowerShell

```
Set-SmbClientConfiguration -Smb2DialectMax -Smb2DialectMin
Set-SmbServerConfiguration -Smb2DialectMax -Smb2DialectMin
```

Group policy

No need to set max!

Reintroducing: SMB over QUIC

QUIC: secure and reliable transport built on UDP

Encryption is always required

Handshake is authenticated using TLS 1.3

Does not require VPN

Runs over 443

- By default

SMB for telecommuters, mobile devices, cloud, high security

Came in Windows Server 2022 Azure Edition

SMB over QUIC

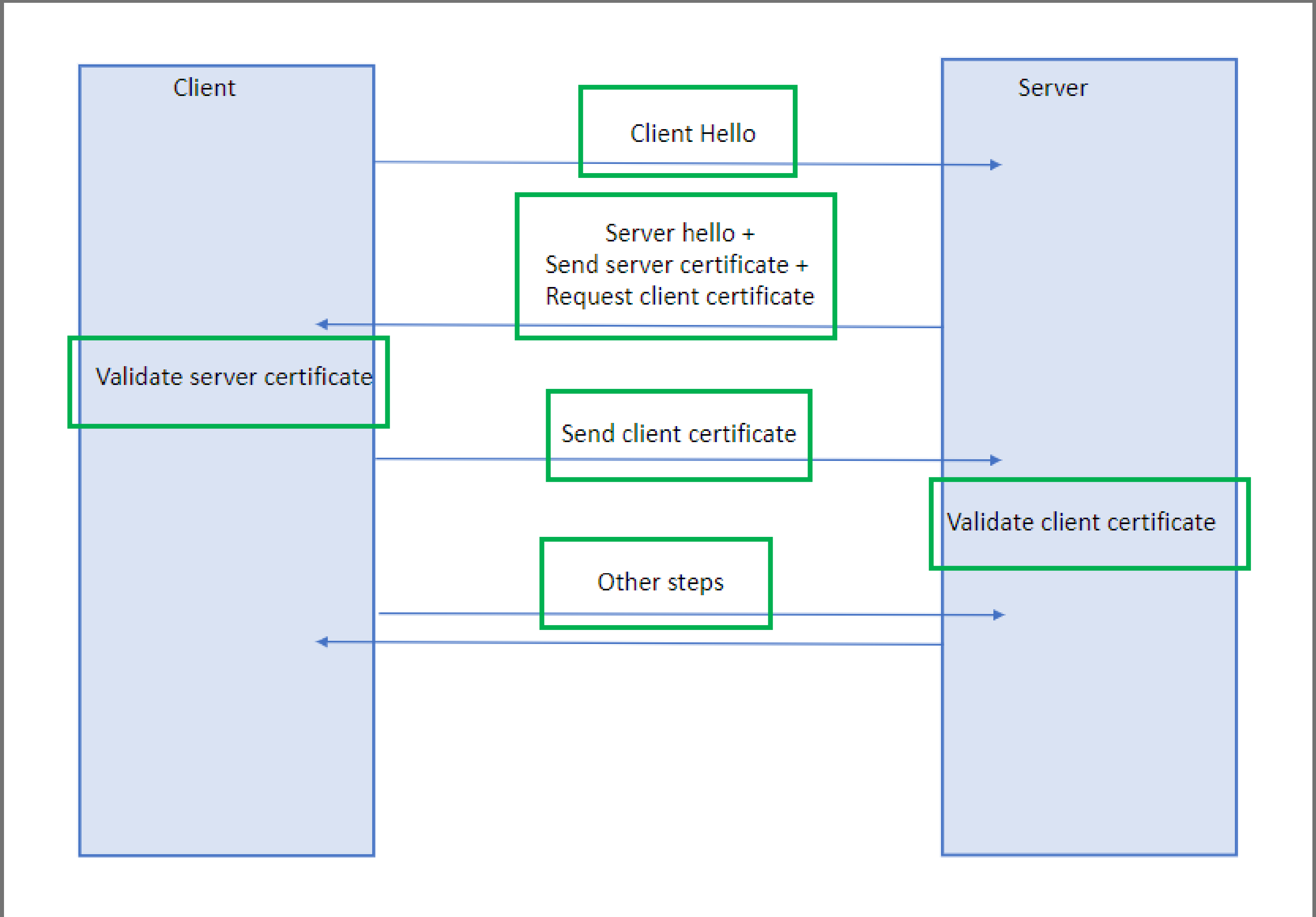
Demo

Microsoft

SMB over QUIC client access control

- Mutual auth through certificate exchange
- Allow and block specific client access
- ACL based on client certificate + chain
- Certificates identified by SHA256 hash or issuer name
- Access granted if no deny entry + allow entry
- Very granular control
  - With operational overhead

SMB over QUIC mutual auth



Client

Server

Client Hello

Server hello +
Send server certificate +
Request client certificate

Validate server certificate

Send client certificate

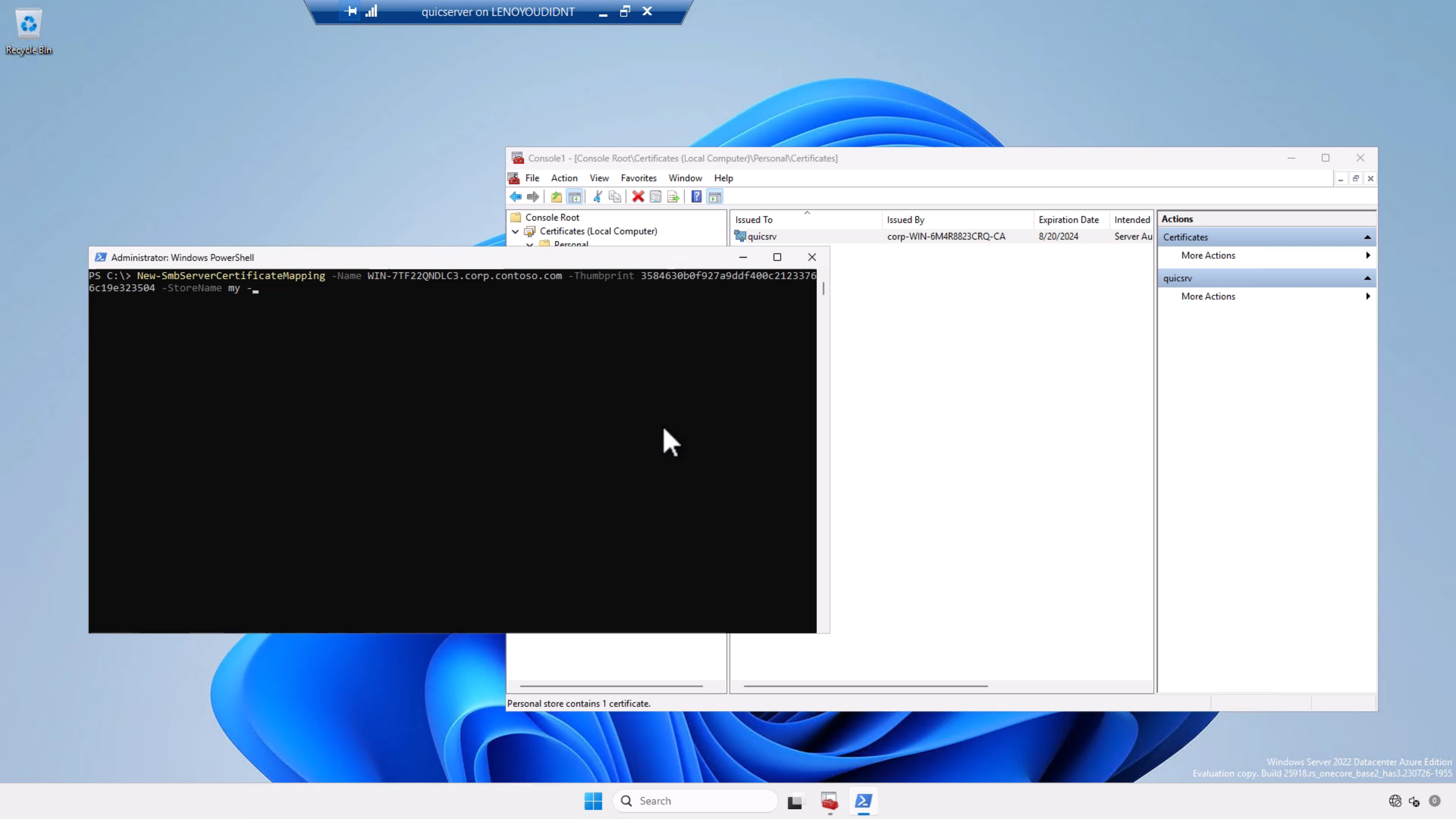
Validate client certificate

Other steps

SMB over QUIC client access control

Demo

Microsoft



Recycle Bin
quicserver on LENOYOUDIDNT
Console1 - [Console Root\Certificates (Local Computer)\Personal\Certificates]
File
Action
View
Favorites
Window
Help
Console Root
Certificates (Local Computer)
Personal
Actions
Certificates
More Actions
quicsrv
More Actions
Administrator: Windows PowerShell
Search

```
PS C:\> New-SmbServerCertificateMapping -Name WIN-7TF22QNDLC3.corp.contoso.com -Thumbprint 3584630b0f927a9ddf400c2123376
6c19e323504 -StoreName my -
```

Issued To	Issued By	Expiration Date	Intended
quicsrv	corp-WIN-6M4R8823CRQ-CA	8/20/2024	Server Au

Personal store contains 1 certificate.

Windows Server 2022 Datacenter Azure Edition
Evaluation copy. Build 25918.rs_onecore_base2_hss3.230726-1955

SMB alternative ports

Azure Files’ problem: ISPs blocking port 445

- VPN options to Azure Files not ideal

SMB over QUIC: port 443 admin irritation

Solution: alternative ports in SMB

- SMB server: QUIC only
- SMB client: QUIC, TCP, RDMA
- Azure Files: TCP only *(coming)*

Configure & use SMB alternative ports

Server

```
New-SmbServerAlternativePort –TransportType QUIC –Port 555
–EnableInstances Default
```

Client

```
Net use Z: \\contoso.azurefiles.com /tcpport:4444
New-SmbMapping –LocalPath Z: -RemotePath \\srv\sales -QuicPort 3333
New-SmbGlobalMapping -RemotePath \\srv\app1 -Rdmaport 2222
```

SMB global encrypt from client

Always encrypt all SMB from client

Match SMB signing management

For highest security posture environments

Control with Powershell, Group Policy

```
SmbClientConfiguration –RequireEncryption $true
```

New audit option in GP

SMB firewall rule tighten

End legacy firewall rules

Installing File Server role opens

- SMB 445/5445, WMI, DCOM

Create share opens

- SMB 445/5445, ICMP, LLMNR, NetBT Datagram, NetBT Name, NetBT Session, Spooler RPC

Now: creating share doesn’t open NB 137-139

Plan: stop also opening ICMP, LLMNR, Spooler RPC

SMB over QUIC in all editions

SMB over QUIC server

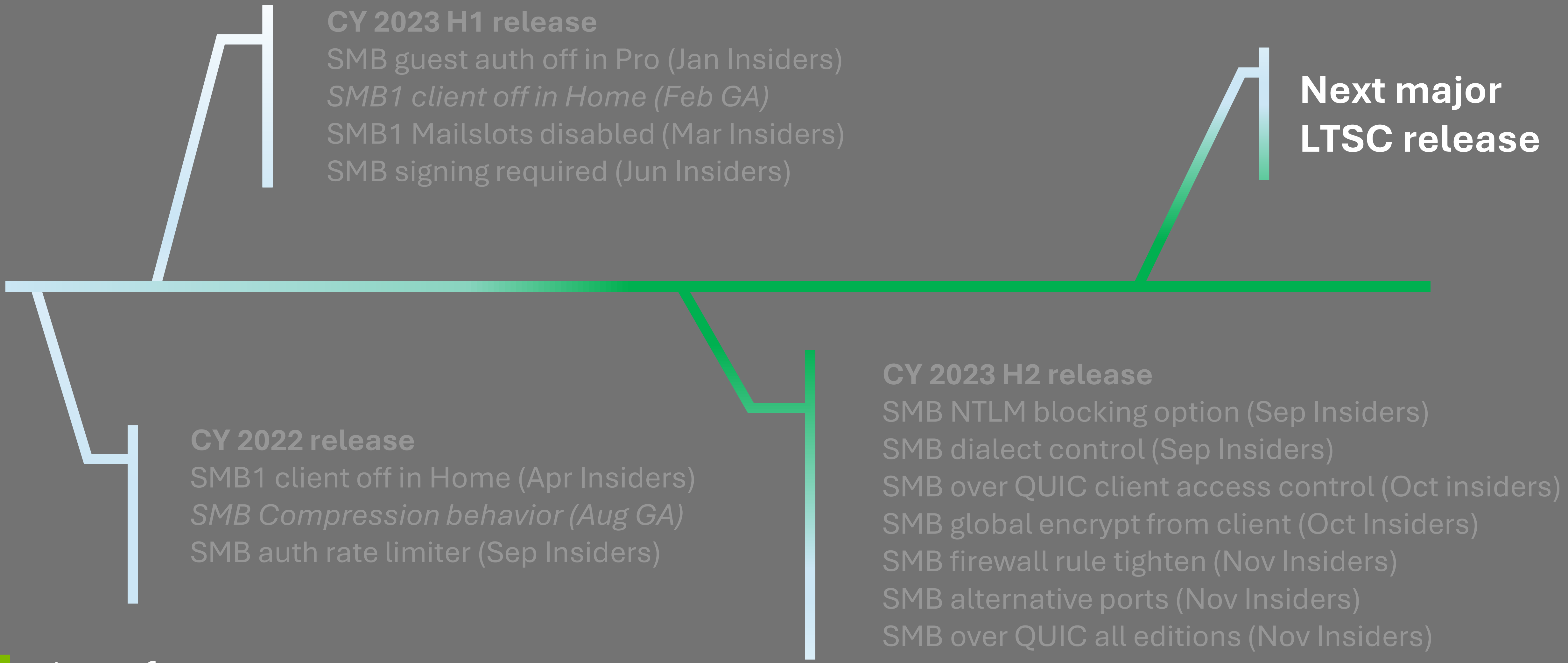
- Windows Server 2025 Azure Edition
- Windows Server 2025 Datacenter
- Windows Server 2025 Standard

Free

No Arc, no subscription

Nothing up my sleeve

SMB in Windows and Windows Server 2025



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Questions & Feedback?

Thank you!

Microsoft