Microsoft

Remote Desktop Protocol IO Lab
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RDP IO Lab

Microsoft

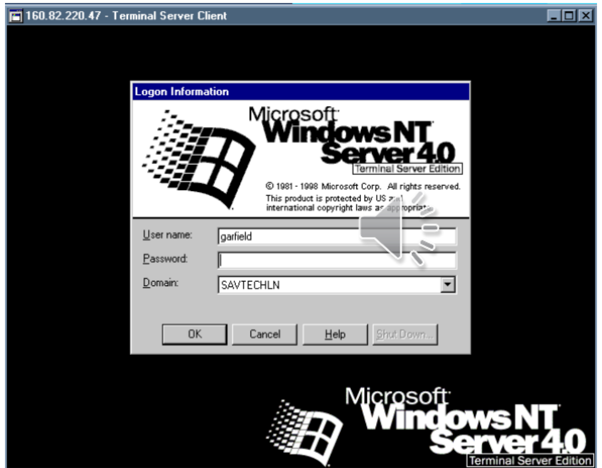
RDP Updates

Jordan Marchese
Senior Product Manager
Windows 365 and Azure Virtual Desktop

Remote Desktop Journey

Remote Desktop – 25 years ago

- Introduced with Windows NT 4.0 Terminal Server Edition (Hydra) in 1998
- First version was RDP 4.0
- Based on Netmeeting protocol released in 1996
- RDP is based on and is an extension of the T-120 family of protocol standards (a multichannel capable protocol allows for separate virtual channels)


160.82.220.47 - Terminal Server Client

Logon Information

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User name: garfield
Password:
Domain: SAVTECHLN

Remote Desktop Protocol (RDP) Evolution

RDP 10.1

Windows 10 1511

- RemoteApp H.264 mode with 4:4:4 profile
- Hardware H.264 encoding
- Hardware H.264 decoding

RDP 10.2

Windows Server 2016

- OpenGL 4.4 and OpenCL 1.1 support
- Remote Credential Guard

RDP 10.3

Windows 10 1703

- 8k monitor support
- Improved video detection
- EDP policies for clipboard redirection

RDP 10.4

Windows 10 1709

- Multiple Pen redirection
- H.264 mixed mode improvements
- Printer redirection improvements
- Location sensor redirection
- Selective monitor configuration

RDP 10.5

Windows 10 1803

- Camera redirection
- 4K remoting improvements
- Support for multiple GPUs
- Improve graphics encoding performance
- Drive and file redirection improvements
- Dynamic smartcard redirection

RDP 10.6

Windows 10 1809

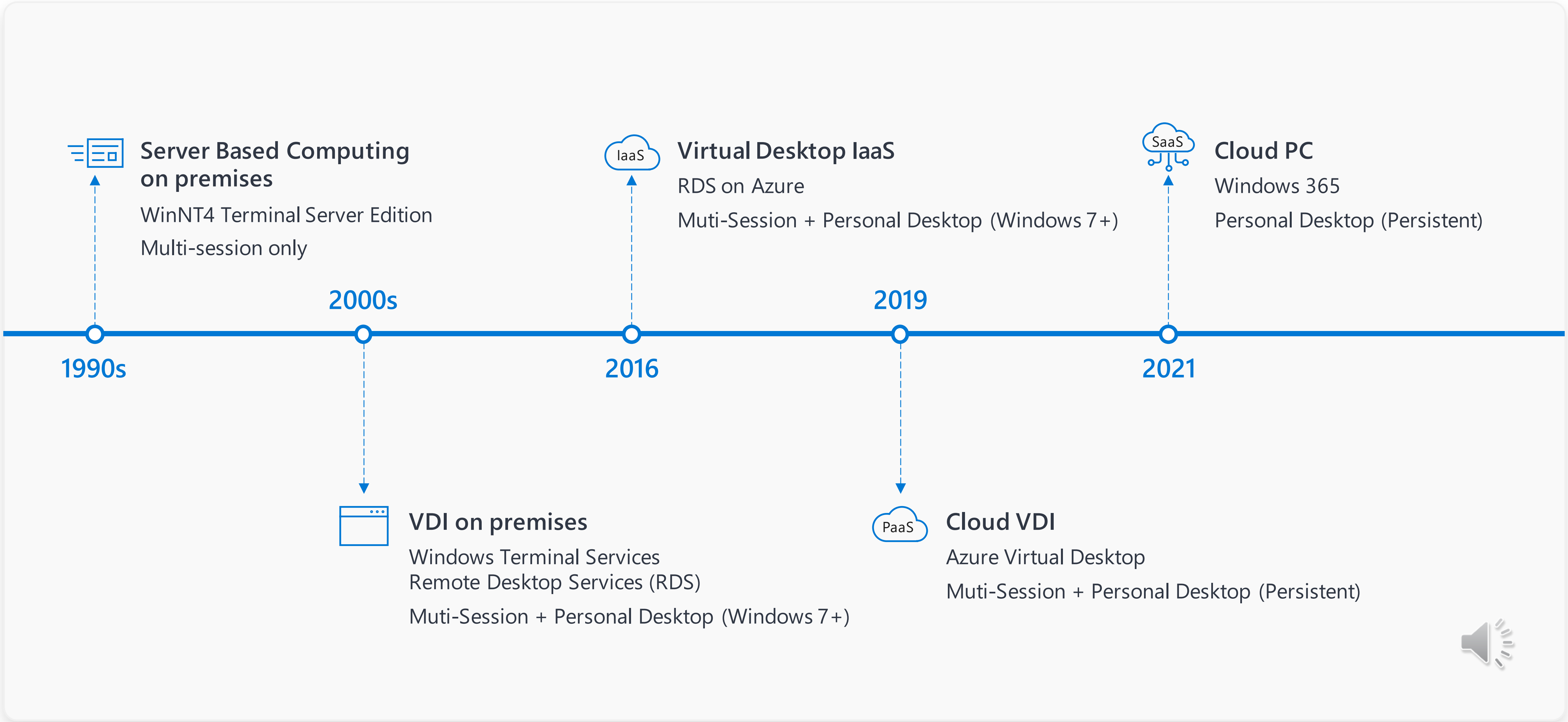
- URCP transport
- 4K Dynamic Down-sampling
- Camera Controls Redirection
- MFT-based codecs
- Toast notifications for RemoteApp

RDP 10.7

Windows 10 1903

- Indirect Display Driver
- Dynamic printer redirection
- Ease of Access improvements

Windows Desktop Virtualization Evolution



1990s

Server Based Computing on premises

WinNT4 Terminal Server Edition

Multi-session only

2000s

VDI on premises

Windows Terminal Services
Remote Desktop Services (RDS)

Muti-Session + Personal Desktop (Windows 7+)

2016

Virtual Desktop IaaS

RDS on Azure

Muti-Session + Personal Desktop (Windows 7+)

2019

Cloud VDI

Azure Virtual Desktop

Muti-Session + Personal Desktop (Persistent)

2021

Cloud PC

Windows 365

Personal Desktop (Persistent)

What is RDP now?

- RDP enables interactive streaming of Windows & applications from the cloud to a local client.
- Microsoft RDP Protocol is just one piece of the collection of services that enables interactive streaming. Some examples are:

Microsoft Edge – Multimedia Redirection Service	• Re-direction of HTML5 multimedia content when using Microsoft Remote Desktop for Azure Virtual Desktop and Windows 365.
Microsoft Teams Optimizations	• High-performance peer-to-peer streaming facilitated by WebRTC • Devices are redirected as the same hardware device, resulting in better hardware redirection support • Windows 10/11 and macOS endpoints get all the benefits of the modern media stack, including HW video decoding
Azure AD SSO & Passwordless Authentication	• Enable a single sign-on experience to Azure AD-joined and Hybrid Azure AD-joined session hosts • Use passwordless authentication to sign in to the host using Azure AD & inside the session when using the Windows client • Use third-party Identity Providers (IdP) that integrate with Azure AD to sign in to the host

RDP Goals

Connectivity & Reliability

The connection always feels reliable regardless of location.

- TCP & UDP
- STUN/TURN
- RDP Shortpath

Performance & Quality

All user experiences are performant and high quality regardless of their client & bandwidth, with additional optimizations for key Microsoft apps.

- Multimedia Redirection (MMR)
- Teams Optimizations
- GPU Encode/Decode
- Image Quality
- Bitrate Controller

Natural & Like Local Experience

Streaming Windows & apps from the cloud feels like you were using a local device.

- Multimon Support
- Remote App
- Input Redirections

Security & Authentication

The client to cloud connection is safe & secure, seamlessly authenticates a user, and easily enables IT to configure & monitor their resources.

- Azure AD SSO
- Passwordless Auth
- Watermarking
- Screen Capture Protection
- Device Redirections

RDP Product Innovations

3 years of features in RDP

Connectivity & Reliability

- RDP Shortpath
  - Managed
  - Public Networks
  - STUN/TURN
- QoS Policies
- Required URLs documentation

Performance & Quality

- RTT Experience Estimator
- Teams Optimizations
- Multimedia Redirection (MMR)
- Bandwidth Estimation
- RDPIDD enabled in Multisession SKU and Server 2022
- Hardware encode improvements for RDSH/AVD

Natural & Like Local Experience

- Universal Print
- Location Redirection

Security & Authentication

- Security Baseline
- Azure AD SSO & Passwordless Auth (Preview)
  - Azure AD Auth
  - WebAuthn
- AD FS SSO
- Azure AD Smart Card Authentication
- Screen Capture Protection in Client & Session Host
- Watermarking (Preview)

▭ RDS Support

⇆ Peer to Peer Support

3 years of features in RDP

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RDP Shortpath

What is RDP Shortpath

Connection/transport improvement part of the RDP experience

Shortpath establishes a UDP-based transport between Windows Remote Desktop client and session host.

Goal is real-time streaming with high throughput and low latency between client and session host.

Types of Shortpath

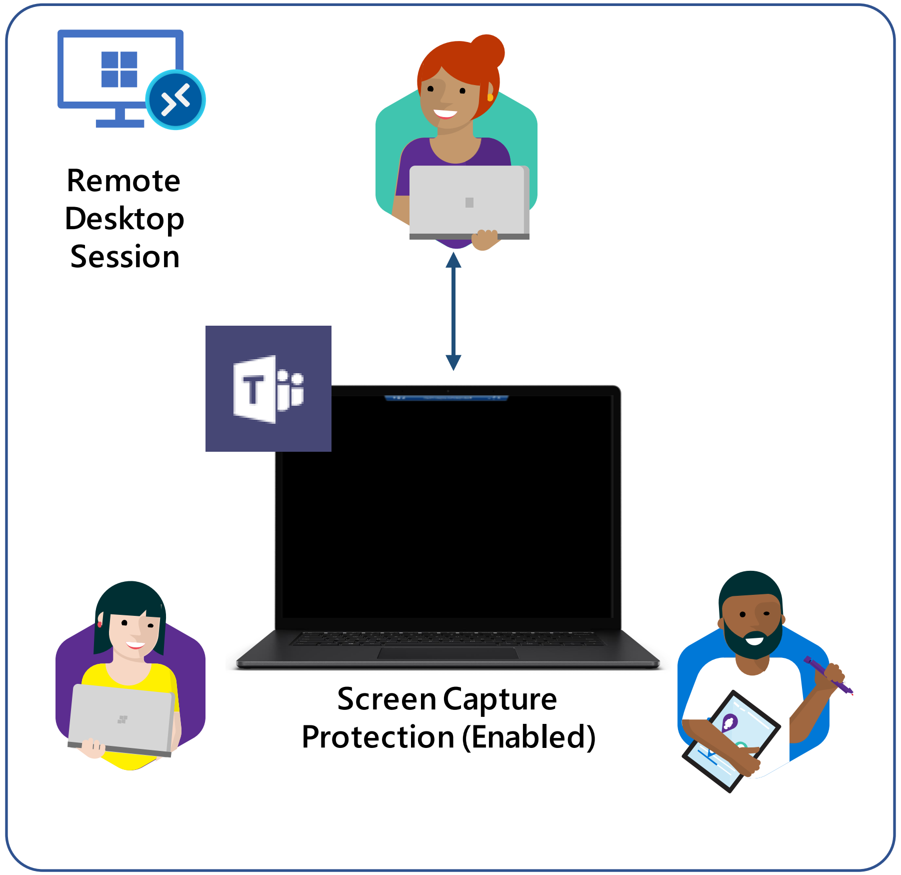
- **Managed networks:** Direct connectivity is established between the client and the session host when using a private connection, such as a virtual private network (VPN).
- **Public networks**: Direct connectivity is established between the client and the session host when using a public connection. There are two connection types when using a public connection, which are listed here in order of preference:
  - A *direct* UDP connection using the *Simple Traversal Underneath NAT (STUN) protocol* between a client and session host.
  - An *indirect* UDP connection using the *Traversal Using Relay NAT (TURN) protocol* with a relay between a client and session host.

STUN/ICE	TURN
Direct UDP connection between session host and client.	Indirect UDP connection through relay between session host and client.
Needs UDP friendly network.	Can work with non UDP friendly network.
Uses STUN protocol.	Uses TURN server.
Improved RTT by 27%.	Improved RTT by 25%.
Improved connection uptime by 40%.	Connection uptime is same as TCP/websocket.

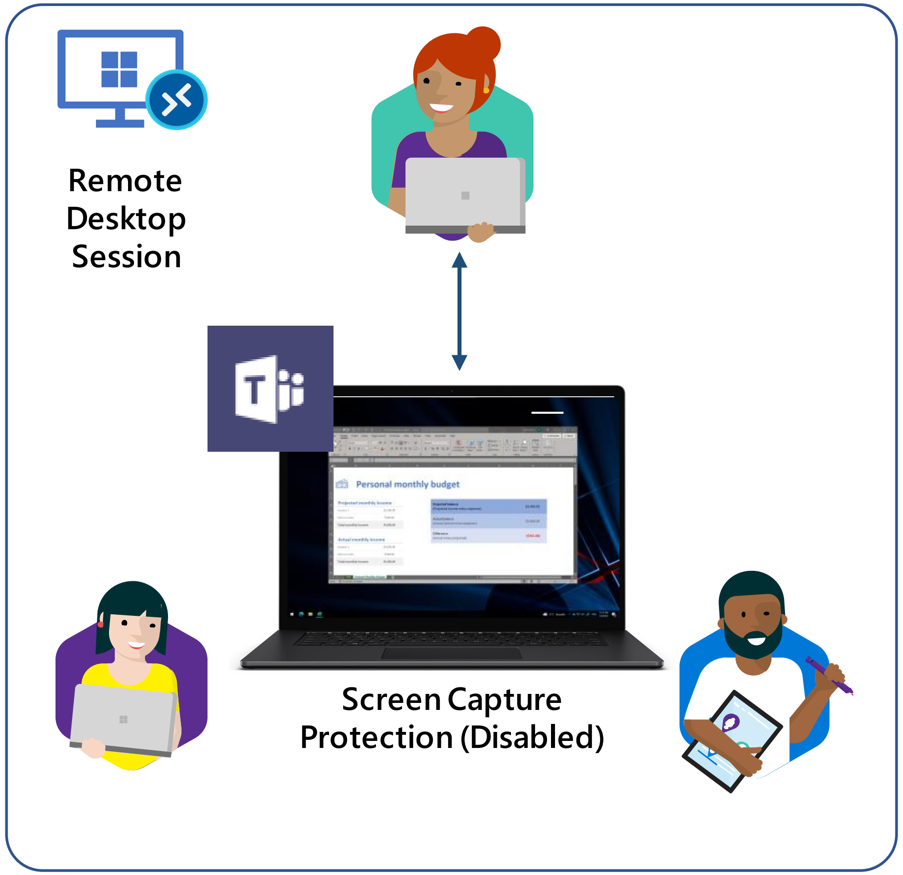
Watermarking + Screen Capture Protection

Screen Capture Protection – Screen Sharing

Screen Capture Protection (Enabled)
User is sharing their remote desktop screen on a Teams call, the users in the meeting can't see any content shared as screen capture protection is enabled

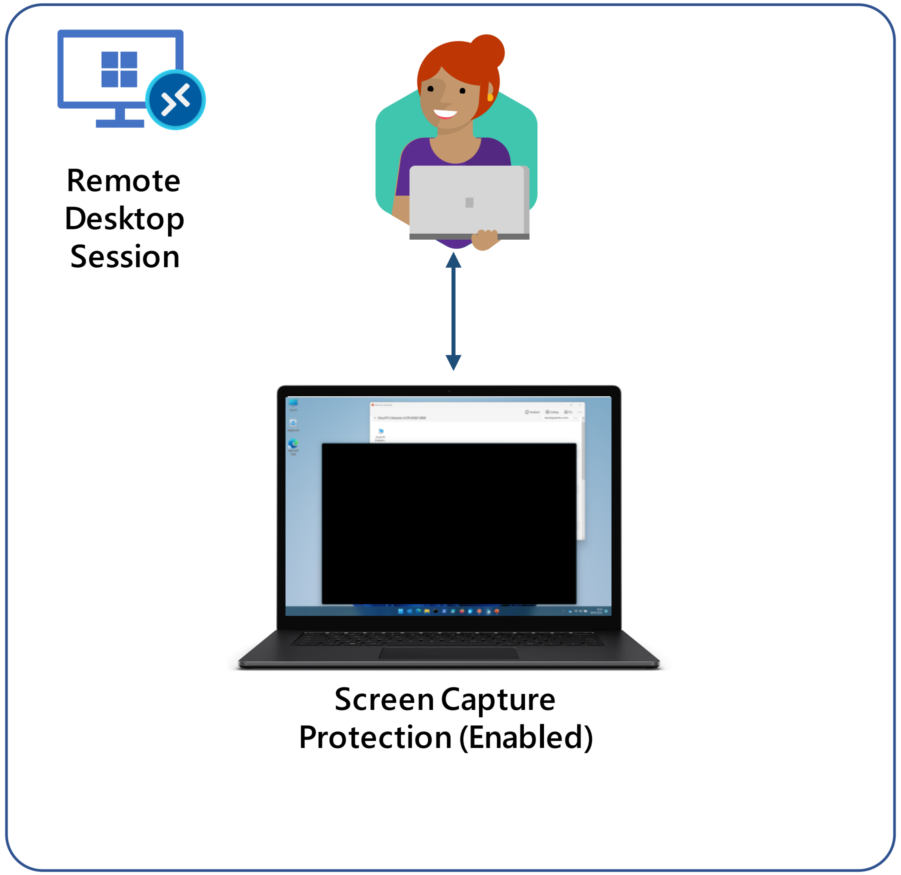


Screen Capture Protection (Disabled)
If screen capture protection is disabled or not configured, when you share your screen or application content, it will be shown to the users in the Teams meeting



Screen Capture Protection – Screenshot

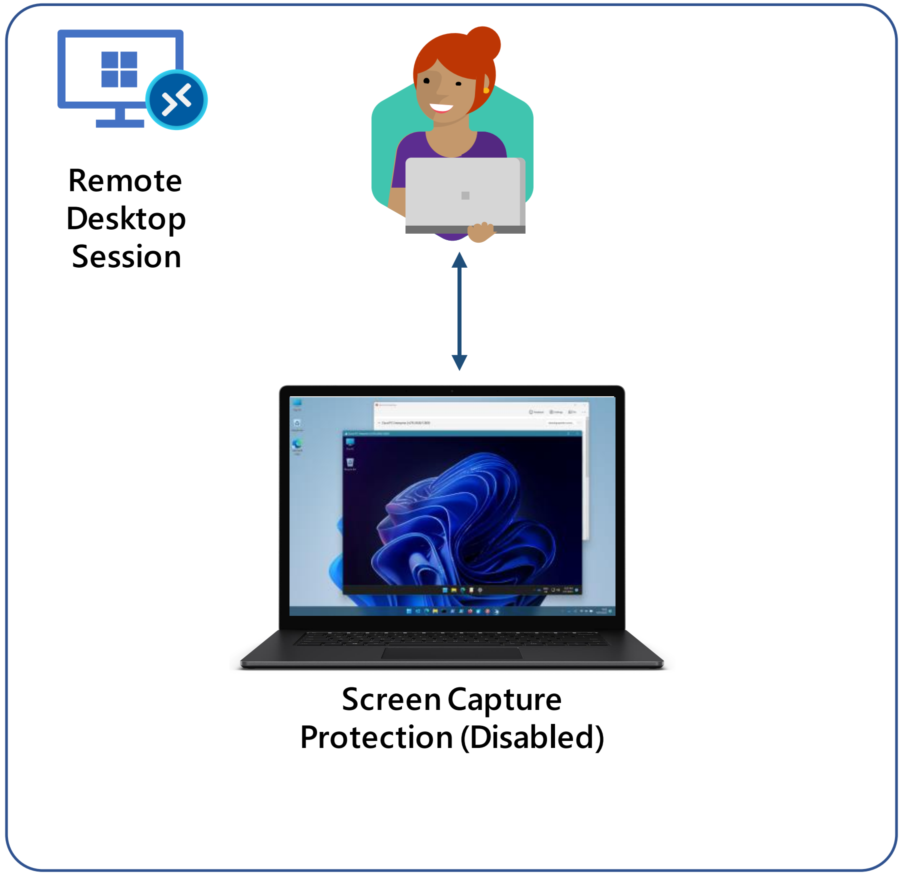
Screen Capture Protection (Enabled)
User is on the physical client but has the remote desktop session in Windows mode, when you got to take a screenshot, the session will be disabled



Remote Desktop Session

Screen Capture Protection (Enabled)

Screen Capture Protection (Disabled)
If screen capture protection is disabled or not configured, when you take a screenshot with the Remote session in windows mode it will be captured



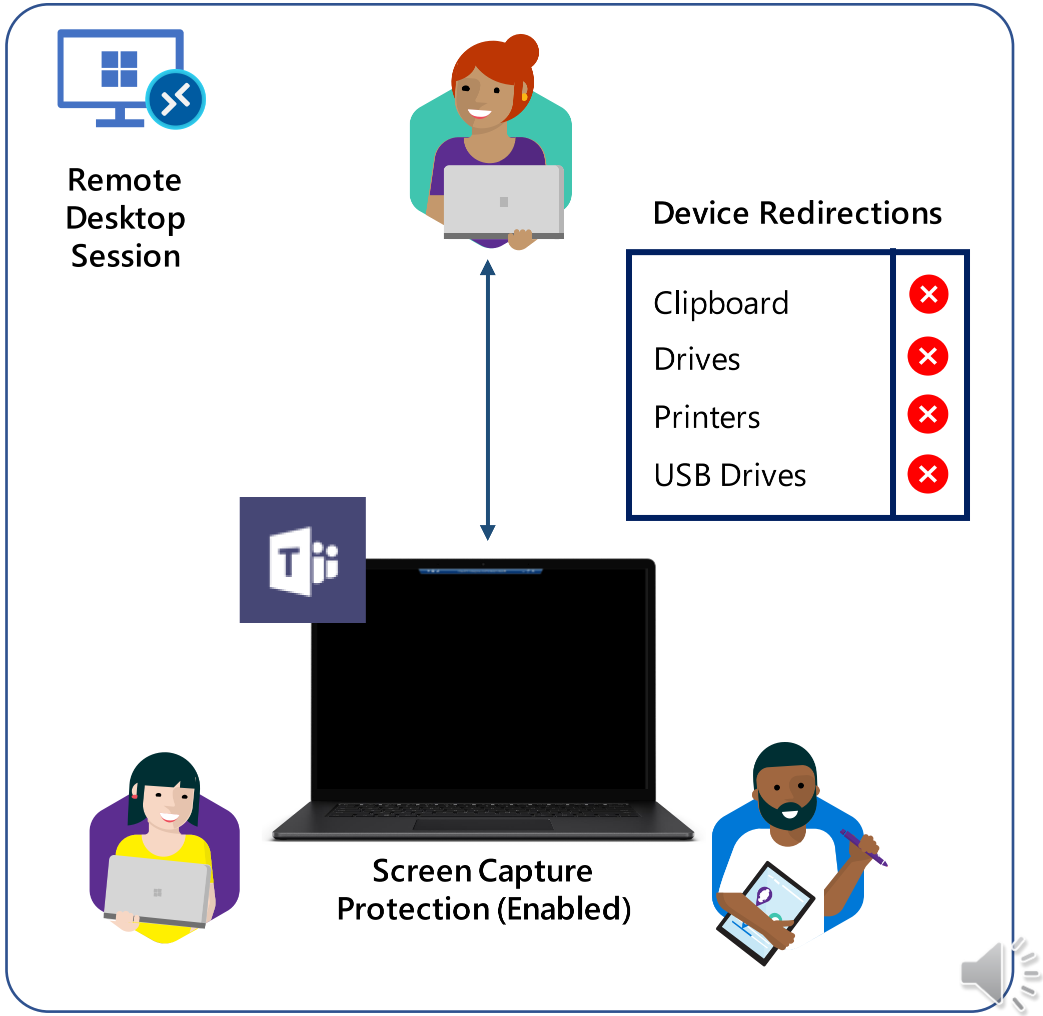
Remote Desktop Session

Screen Capture Protection (Disabled)

Screen Capture Protection + Redirections

For increased **security** scenarios, when customers use Screen Capture Protection they should also disable clipboard, drive, and printer redirection.

Disabling redirection prevents users from copying captured screen content off the device (mostly)



Remote Desktop Session

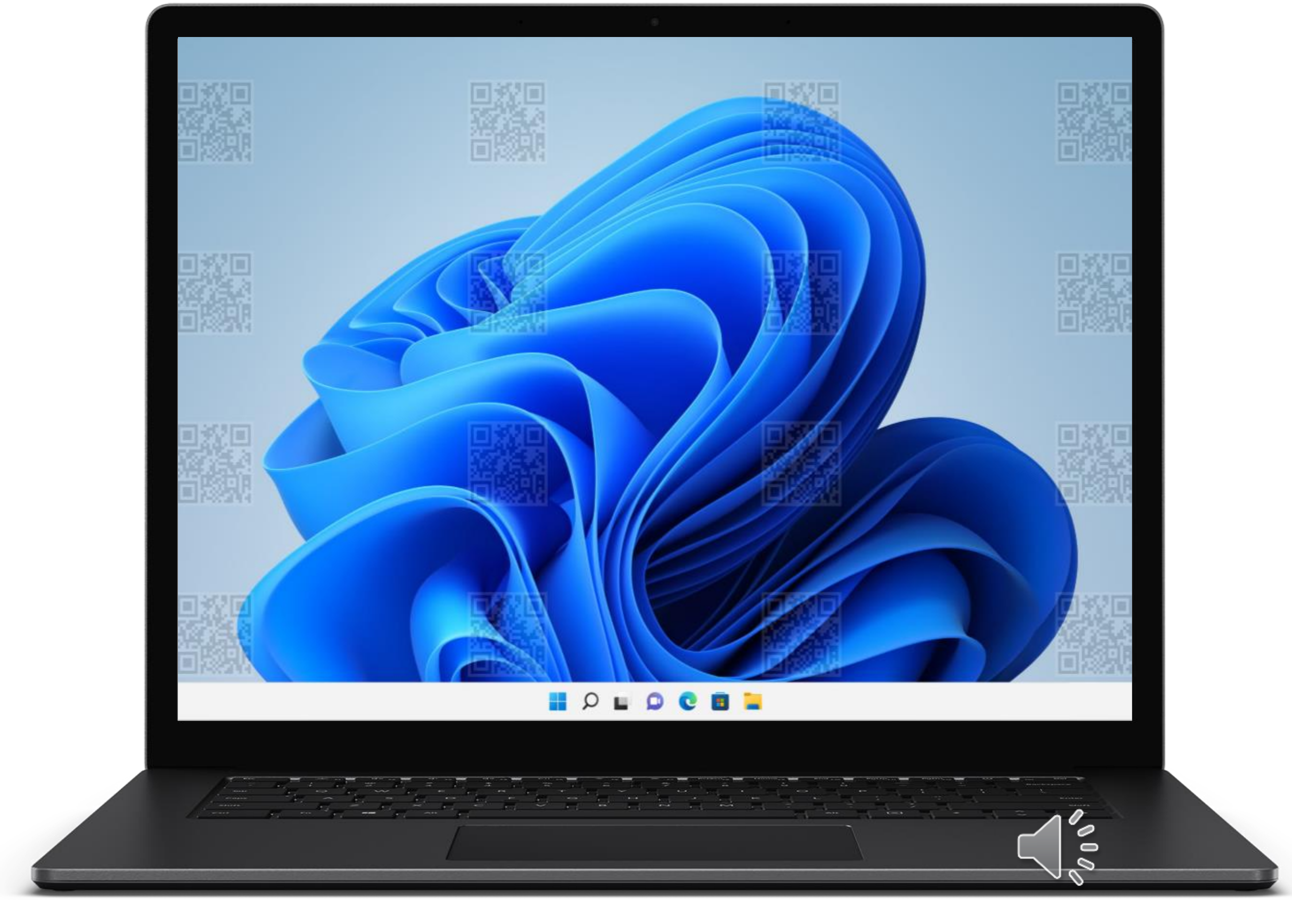
Device Redirections	
Clipboard	✗
Drives	✗
Printers	✗
USB Drives	✗

Screen Capture Protection (Enabled)

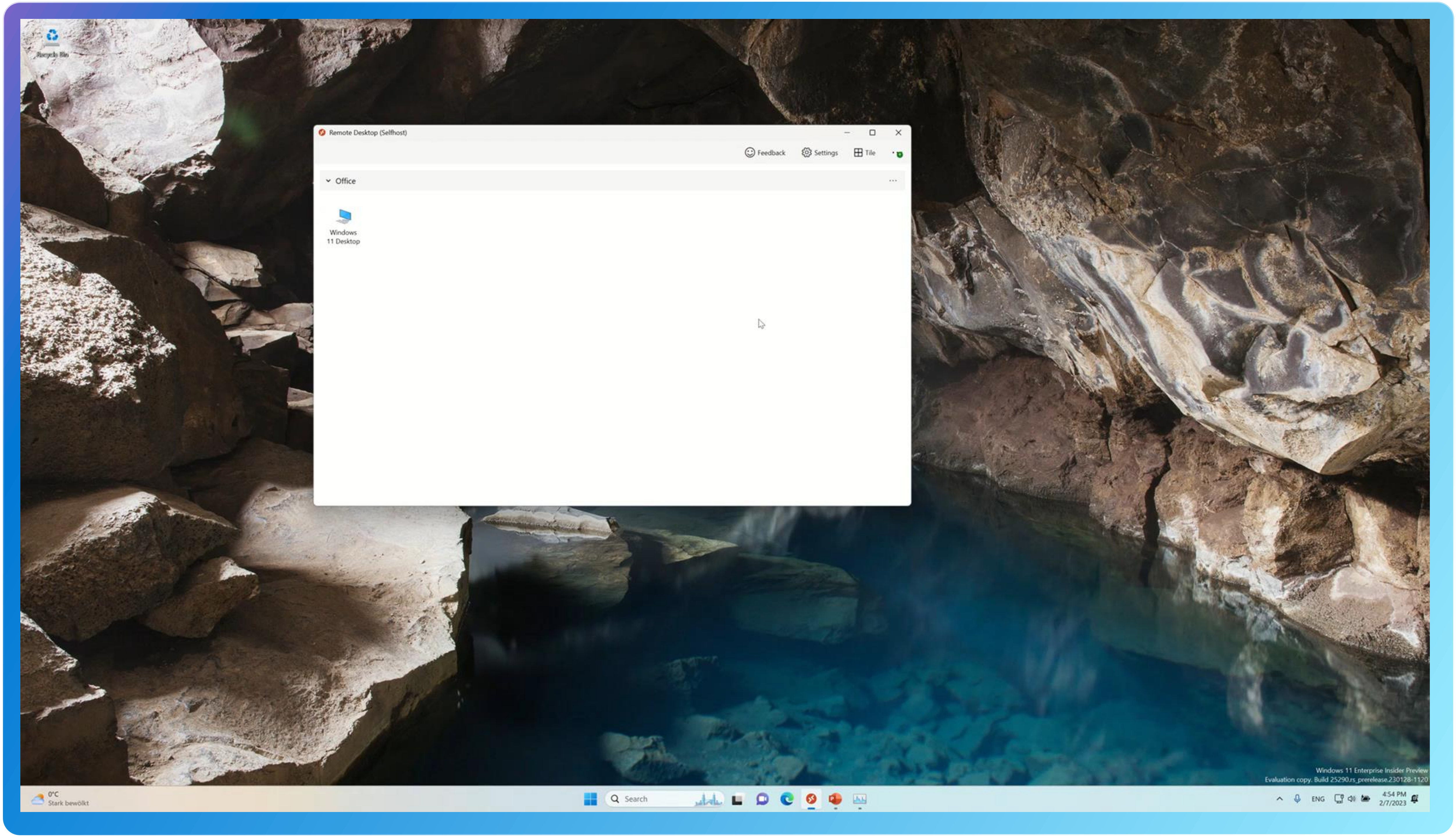
Add Watermarking to the mix

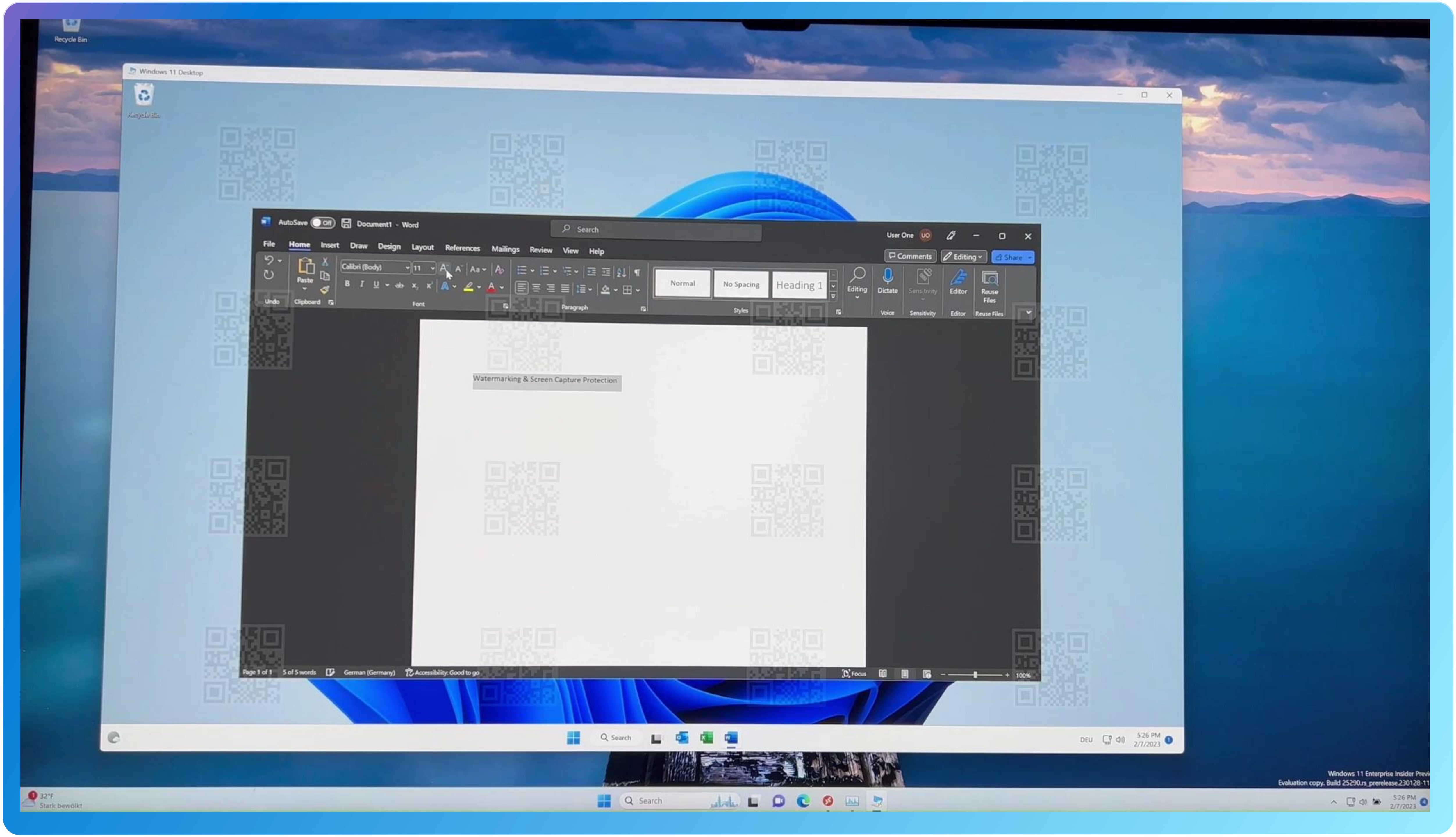
For highly **secure** scenarios, if customers use Screen Capture Protection + Redirections, they can also enable Watermarking (preview).

Watermarking enables a QR code on the remote desktop which contains the connection ID of the remote session for tracing. This helps discourage leaks from camera photos/recording



Watermarking & Screen Capture Protection Demo


Recycle Bin
Remote Desktop (Selfhost)
Feedback
Settings
Tile
Office
Windows 11 Desktop
Windows 11 Enterprise Insider Preview
Evaluation copy. Build 25290.rs_prerelease.230128-1120
0°C
Stark bewölkt
Search
ENG
4:54 PM
2/7/2023



Watermarking & Screen Capture Protection

Where do we go from here?

Feedback we receive

- Improved connection reliability
- Simple configuration options (high vs low bandwidth, etc.)
- Improved 4K+ monitor performance
- Printing improvements
- Simplify setup of device redirection

Call to Action

- What are we missing?
- What will make developing RDP Clients easier?
- What will help extend RDP integrations (ex: Auth)?

Questions?