

# Protecting RDP Passwords from Mimikatz Using Remote Credential Guard



# THE FULL CREDENTIALS HAVE ALWAYS BEEN SENT AS PART OF THE RDP NETWORK LEVEL AUTHENTICATION PROTOCOL

There was a bit of a stir recently when someone noticed that the password used to connect with RDP remained in memory and therefore could be <u>grabbed by the popular mimikatz tool</u>. The reality is that this "discovery" wasn't really a secret, <u>because the full credentials have always</u> <u>been sent</u> as part of the RDP Network Level Authentication (NLA) protocol. The only reason why it didn't get so much attention until now is that nobody bothered to look in the right place.

The best way to mitigate against RDP credential grabbing is to use <u>RDP Remote Credential</u> Guard (RCG), but this feature had so far been restricted to the built-in Windows RDP client (mstsc.exe). That was before <u>we found a way</u> to add <u>Remote Credential Guard (RCG)</u> support in Remote Desktop Manager for embedded RDP sessions on Windows, after which we <u>shared the undocumented way to do it with our competitors</u>. As if it wasn't enough, we went beyond the limitations of the original RDP client to <u>support explicit credentials in RCG-enabled RDP sessions</u>, meaning you can log in under a different user, not just the current one.

#### I'm Sold! How Does This Work?

Feeling lost? You are not alone. Let's begin by covering how to use Remote Credential Guard in Remote Desktop Manager. The complete technical explanation would require an entire blog post of its own. For now, the only thing you need to know is that an RCG-enabled RDP session does not send the full credentials to the RDP server, which is why mimikatz cannot grab them in memory.

## **Enabling RCG in the RDP Server**

Remote Credential Guard only works <u>between recent versions of Windows</u> joined to the same domain. It should be supported on Windows Server 2016 and later, and on Windows 10 1607 and later. Since Kerberos is also required, make sure to use the machine FQDN when connecting to avoid an NTLM fallback. Last but not least, the target RDP server needs the "DisableRestrictedAdmin" registry key set to zero:

```
$Params = @{
    Path = «HKLM:\SYSTEM\CurrentControlSet\Control\Lsa»;
    Name = «DisableRestrictedAdmin»;
    PropertyType = «DWORD»;
    Value = 0;
}
New-ItemProperty @Params -Force
```

If you forget to set this registry key and attempt connecting with Remote Credential Guard, Winlogon will show the following error: "Account restrictions are preventing this user from signing in. For example: blank passwords are not allowed, sign-in times are limited, or a policy restriction has been enforced."

### **Testing RCG with mstsc**

Let's make our first Remote Credential Guard connection with mstsc to make sure that it works, after which we'll do it in Remote Desktop Manager. From a domain-joined machine, launch mstsc with the "/remoteGuard" parameter, enter the hostname of the RDP server and then click Connect:

🖅 Run	×	ng Remote Desktop Connection
0	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.	Remote Desktop Connection
Open:	mstsc.exe / remoteGuard 🗸 🗸	Computer: IT-HELP-DVLS.ad.it-help.ninia
	This task will be created with administrative privileges.	User name: Administrator@ad.it.help.ninja
		Your Windows logon credentials will be used to connect.

If everything worked, it should connect without prompting for the credentials, which feels like magic the first time you try it. In a way, Remote Credential Guard is a form of single sign-on (SSO) for RDP, even if Microsoft never marketed it this way. This is also the only way you can use RCG with mstsc: the interface restricts you to the current user, and you cannot manually enter credentials for a different user.

#### **Enabling RCG in Remote Desktop Manager**

In Remote Desktop Manager, create an embedded RDP session entry. Enter the same RDP server hostname, but leave the credentials empty for now.

Remote Desktop Manager Free - IT-H	IELP-WAYK									– ×
Common ^	Name	IT-HELP-WAYK					3			
General	Folder				*		$\mathbf{V}$			
Description	Display	Embedded (tabbed	i)	•	_					
User Interface	Host	Custom	m •							
Entry Information	Credentials	Custom		*						
Connection										
VPN/SSH/Gateway	General Display	Local Resources	Programs	Experience	Connection	Advanced				
	Host RDP typ Usernan Domain Passwor	e Norm	ure AD host ELP-WAYK.ad.it- ial	help.ninja		• •	··· Port J	Default 🤇	a	
		Alv	vays ask passwo ore password lo	ord cally						
			Save	Password		<				
Advanced Mode		Op	en console (Adr	min mode)						
BDP (Microsoft Remote Desktop)										
Configured *										
Variables	Search property								OK	Cancel

In the Advanced tab, enable the Remote Credential Guard option. This particular option was previously restricted to the external display mode, so if you can't see it, make sure that you are running RDM 2021.1.29 or later:

Remote Desktop Manager Free - IT-H	ELP-WAYK									□ ×
Common ^	Name	IT-HELP-WAYK								
General	Folder	Embedded (tabbed)					U	2		
Description	Display									
User Interface	Host									
Entry Information	Credentials	Custom		*						
Connection ^										
	Log off Automa Reconn RDP Ve Minimal Pul RC	mode tically log off when o ext mode rsion input send interval slic mode mpt for credentials ( mpt for credentials func- mote Credential Gua High Availability — ace ID	disconnecting on client		Default Default Standa Latest 100 Back	rd rd 0 0 ms kground input ble super pan Use redirection s	* * *			
Advanced Mode	Alternat	e full address								
RDP (Microsoft Remote	Load ba	lance info								

Save the new connection entry, then launch it. If it connects without prompting for credentials, it worked!



You can now edit the RDP connection entry to add your own credentials for a different user, and try connecting again. It should work the same way as the default mode which uses the current user to connect, but with the added security of Remote Credential Guard!

# **Closing Thoughts**

While Remote Credential Guard is a good way to avoid exposing the full credentials to the RDP servers you connect to, it is a security feature currently restricted to Windows. Unfortunately, the underlying protocol that makes Remote Credential Guard possible is extremely difficult to port to other platforms, making its potential usage limited. We hope that Microsoft realizes the importance of interoperability and decides to revamp the protocol to make it easier to implement in third-party clients. Until then, stay tuned for updates, as we will keep looking for ways to help you improve security in RDP connections.

