MALWARE PROTECTION WINDOWS 10

White paper | Version 01.00

ROHDE&SCHWARZ

Make ideas real

CONTENTS

Rohde&Schwarz recognizes the potential risk of computer virus infection when connecting Windows based test instrumentation to other computers via local area networks (LAN), or using removable storage devices.

This white paper introduces measures to minimize malware threats and discusses ways to mitigate risks while insuring that instrument performance is not compromised.

The white paper discusses the use of anti-virus software. It also outlines how to keep the Windows 10 operating system properly updated through regular installation of operating system patches.

For further information regarding malware protection please visit:
www.rohde-schwarz.com/cybersecurity/malware-schutz

1 INTRODUCTION

Rohde&Schwarz is dedicated to ensure that all Rohde&Schwarz products are shipped virus-free. Instruments that run Windows 10 operating systems should be protected from malware just like any other PC. Users are strongly advised to take such measures to protect their instruments as using anti-virus software and installing Windows updates on a regular basis. We highly recommend that you work closely with your IT department or system administrator to ensure compliance with your company policies when connecting instruments to your company's network. This document does not make any difference between 32-bit and 64-bit versions of Windows 10. When using anti-virus software make sure it is designed for your instrument's operating system.

1.1 Overview

Rohde&Schwarz recognizes the potential risk of computer virus infections on Windows based instrumentation that are connected to local area networks (LAN).

Rohde&Schwarz has established processes within the company to take all reasonable precautions to prevent the spread of viruses from instruments to our customers' computers and networks:

- All computers used within Rohde&Schwarz that may be connected to instruments destined for customers are equipped with centrally managed firewall and anti-virus software and maintain the latest virus definitions. Computers and removable storage devices are scanned regularly to prevent the spread of computer viruses.
- Strict virus control protocols have been established in manufacturing, service, support, sales, distribution and demonstration environments. This includes the use of isolated LANs, scanning of instruments and removable storage devices and/or re-imaging hard drives, depending on instrument configuration.
- Procedures have been established for all Rohde&Schwarz employees who come in contact with customer instruments to reinforce anti-virus security protocols. This includes all personnel from manufacturing, service, support, sales and distribution.

1.2 General considerations

The steps described above help to guarantee that any instrument from Rohde&Schwarz will be virus-free when delivered to the customer. From that point on it is the user's responsibility to ensure the security of the instrument.

Before connecting the instrument to your company's network, please consult with your IT department or system administrator to determine what specific policies apply. Bear in mind that the instrument appears to be a standard computer to the network. If applicable, consider the possibility to connect the instrument to a network separated from your company's network (e.g. using virtual LANs, VLANs). Follow your company's policies with regard to computer security and virus protection.

If supported by the instrument, using an IEEE-488 (GPIB) connection for SCPI remote control can be considered as a secure alternative instead of connecting the instrument to your company's network.

Like any computer, all instruments face a possible threat by malware. Therefore it is essential to maintain a high level of security by installing the latest Windows updates, using anti-malware software and keep the system settings as restrictive as possible, while staying operational.

Windows 10 offers a lot of safety and security features to aid to that goal, including user account control (UAC), a built-in firewall and anti-malware protection. AppLocker application control policies make it possible to specify exactly what software can be used by a specific user account. In addition, the unified write filter (UWF) can prevent persistent changes to the data on the instrument's hard disk.

2 ACTIVE DIRECTORY AND GROUP POLICIES

Condition as supplied to customer

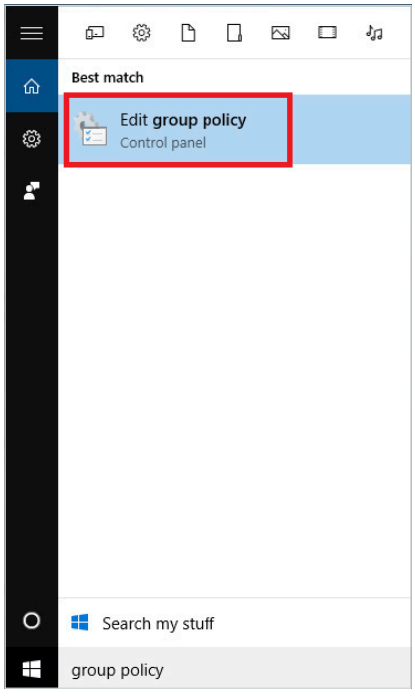
- Several group policies are preconfigured to ensure functionality and safety of the instrument
- Since group policies defined in an active directory take precedence over local group policies, it has to be ensured that local group policies aren't overwritten if the instrument is joined to a domain

Group policies are an easy way to manage system settings of instruments. Your local system administrator or IT department can set all settings concerning security from a central point for all instruments connected to your corporate network. If the instrument is joined to an active directory (AD), group policies that are defined in the AD take precedence over the group policies defined locally. By default Rohde&Schwarz instruments have several group policies preconfigured. Please ensure that no important policies conflict with group policies from your AD.

The group policies are subdivided into computer configuration and user configuration. User configuration only applies to a specific user account. Computer configuration applies to the system and includes all security-related settings. Some settings can be configured both in computer configuration and user configuration, for example "Turn off Autoplay". If these conflict, the setting in computer configuration takes precedence over the setting in user configuration.

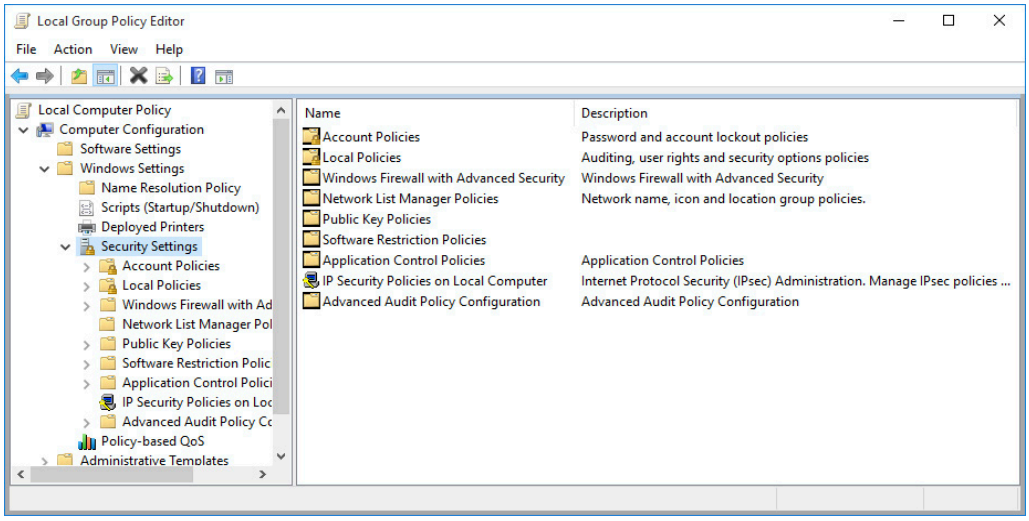
2.1 Change group policies

To review or change local group policies open the Start menu and type "group policy". Select the option "Edit group policy". This requires administrator rights.

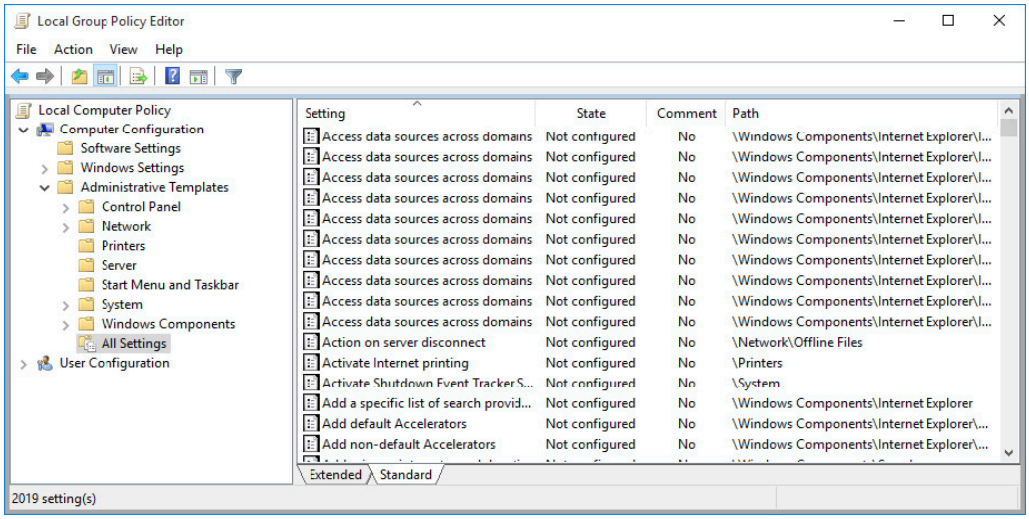


2.2 Computer configuration

The settings in computer configuration apply to all users. In particular the security settings are very important. They include password policies, firewall settings and application control policies. Their usage is described in the following chapters.

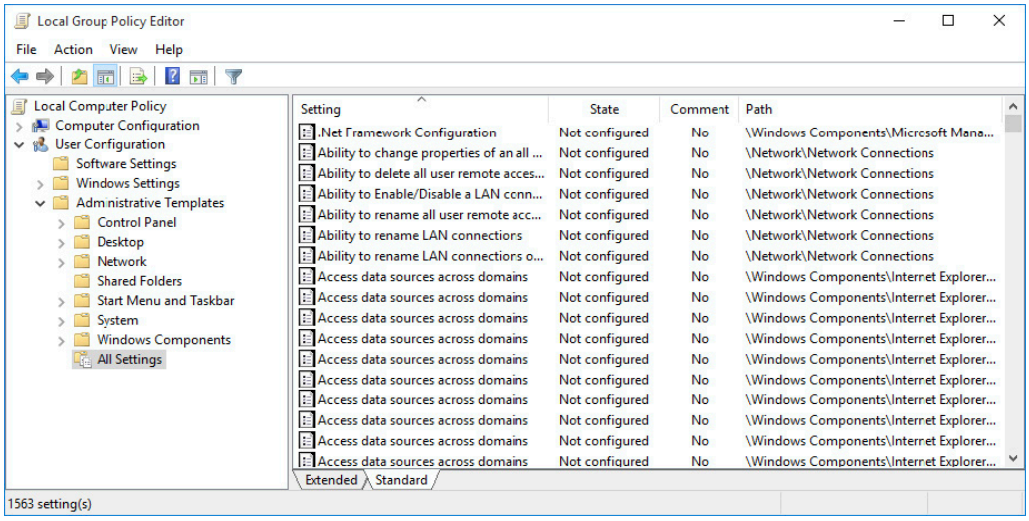


Administrative templates consists of 2019 settings. They are sorted in several categories and subcategories and use telling names, making it easier to find a specific setting. Regardless it is helpful to know the name of certain policies, because there is no search functionality. Group policies in administrative templates include for example Windows update, OneDrive and autoplay policies.



2.3 User configuration

The settings in user configuration apply to a specific user. As mentioned above, settings in computer configuration take precedence over settings in user configuration. Most relevant settings are in administrative templates. Therein is a total of 1563 user-specific settings subdivided in several categories. The most important ones are described in the corresponding chapters.



3 USER ACCOUNTS AND GROUPS

Condition as supplied to customer

- The Instrument user account is logged on automatically
- The default passwords are commonly known and thus not secure

Most Rohde&Schwarz instruments with Windows 10 come preconfigured with two user accounts: the built in local “Administrator” account and a restricted user account called “Instrument”. In most cases the user Instrument is in the remote desktop users group as well, allowing to connect to the instrument via remote desktop protocol (RDP). Members of the administrators group are allowed to connect remotely by default.

Rohde&Schwarz instruments offer an auto-logon feature that logs in the Instrument user account on startup. This behavior can be disabled by changing the data of the value “AutoAdminLogon” in the following registry key to “0”:

HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon

The username and password of the auto login user are defined in the values “DefaultUserName” and “DefaultPassword“ of the same registry key.

These values should be adjusted when passwords are changed. We strongly recommend that you neither add nor remove any user accounts on your instrument!

3.1 Administrators

Members of the administrators group have full access on all files excluding critical system files. They are allowed to install software, change system settings and connect to the instrument remotely.

3.2 Users

Members of the users group have limited access on most files. This means they can read but cannot delete, create or change files in the Windows and Program Files folders. They don't have access to files stored in the users folder of other users. It is possible to view system settings, registry keys and most event logs. The security event log is not visible. Changes to the registry are only allowed in HKEY_CLASSES_ROOT and HKEY_CURRENT_USER. Only changes to user-specific, non-critical system settings are allowed. Members of the users group are not allowed to connect remotely to the instrument by default.

3.3 Remote desktop users

Members of the remote desktop users are usually members of the users group as well and therefore have the same rights. Additionally they are allowed to connect to the instrument remotely.

3.4 User account control

On some Rohde&Schwarz instruments, the user account control (UAC) is active by default. In that case, we highly recommend keeping the UAC turned on, as it prevents undetected changes to the system's configuration. Nevertheless the UAC is considered rather a convenience feature than a security feature as it only prevents the user from changing a setting or installing software inadvertently.

3.4.1 Levels

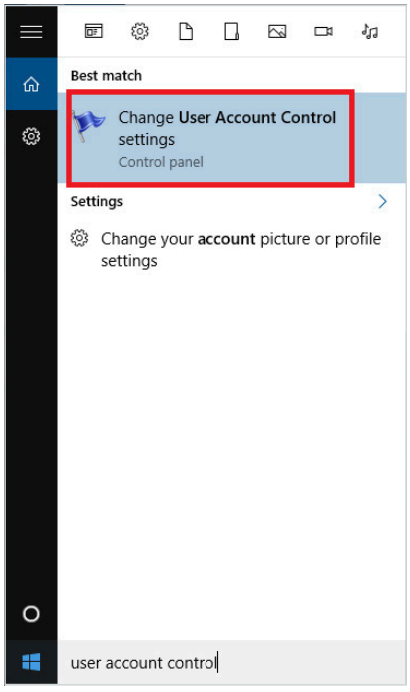
There are four different levels that can be selected when configuring the UAC. The highest level (level 3), which is the default level for restricted users, notifies if apps try to install software or make changes to the computer as well as if the user changes Windows settings. The second highest level, which is default for users with administrator rights, doesn't notify if the user changes Windows settings. The third highest level doesn't dim the desktop when notifying. This setting should only be used if the system is unable to dim the desktop due to technical reasons. The lowest level doesn't notify if apps try to install software or make changes to the computer or when the user changes Windows settings.

UAC levels

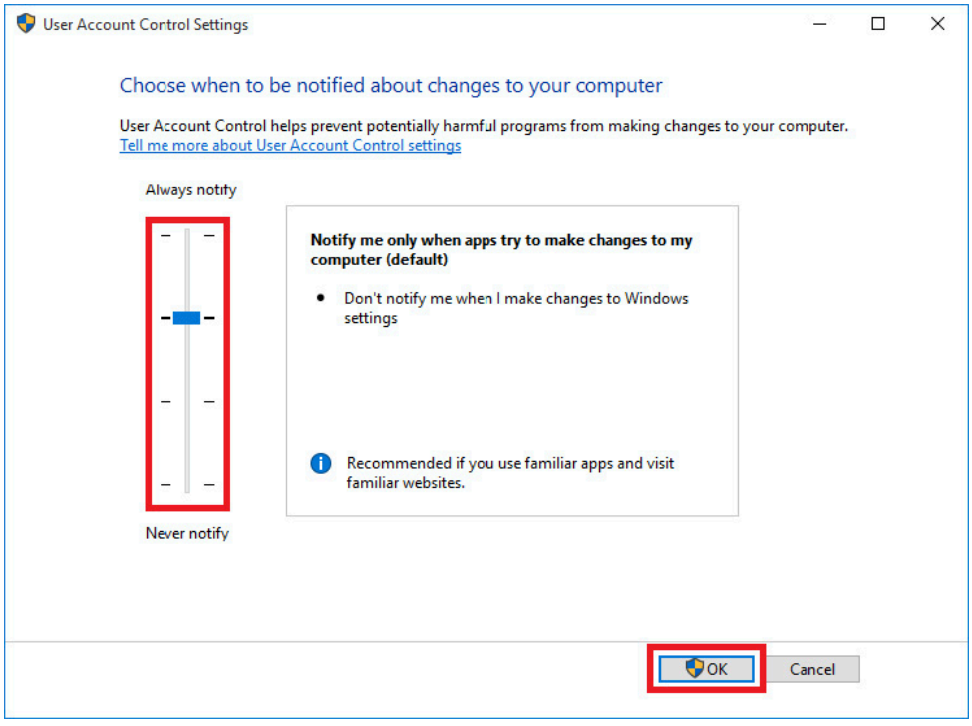
	Level 3	Level 2	Level 1	Level 0
Notification if apps try to install software or change Windows settings	•	•	•	–
Dimming of the desktop when a notification is displayed	•	•	–	–
Notification if the user changes Windows settings	•	–	–	–

3.4.2 Changing UAC settings

In order to change UAC settings on your instrument, open the Start menu and type “user account control”. Select the option “Change User Account Control settings”. Administrator rights are required to change the UAC level.



The UAC level can be adjusted with the slider on the left. Click “OK” to confirm the setting.



3.5 Passwords

Rohde&Schwarz instruments have default passwords for all user accounts. Please refer to the instrument's manual for details. It is important to change these passwords, because anybody with knowledge of the administrator's password has full control over the instrument, both locally and via network.

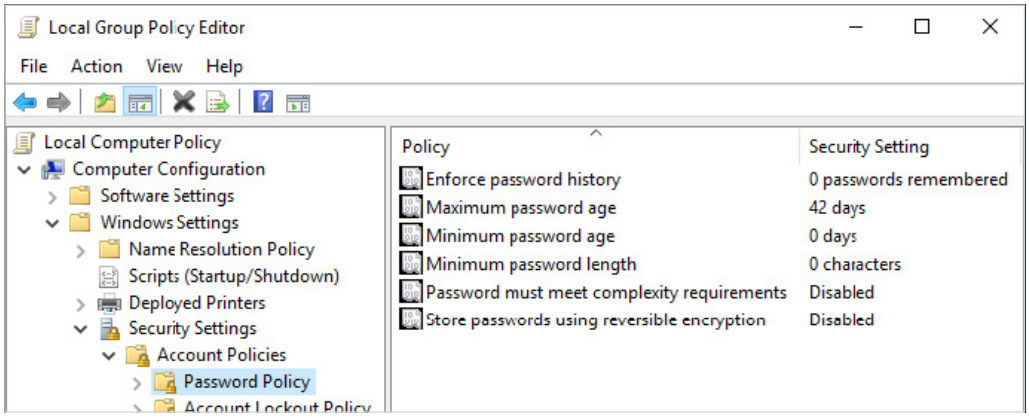
We recommend using a secure password and replacing it on a regular basis. A secure password should meet the complexity requirements. These define that a password must not contain the user's account name, and must be at least six characters in length and contain characters from three of the following four categories:

- English uppercase characters (A through Z)
- English lowercase characters (a through z)
- Base 10 digits (0 through 9)
- Non-alphabetic characters (for example !, $, #, %)

There are group policies enforcing the use of a secure password. Among other things, they can define how often the password has to be changed and whether it has to meet the complexity requirements. These group policies can be set by your local system administrator or IT department if the instrument is in an active directory. Otherwise they can be configured locally on the instrument.

3.5.1 Changing the account policies

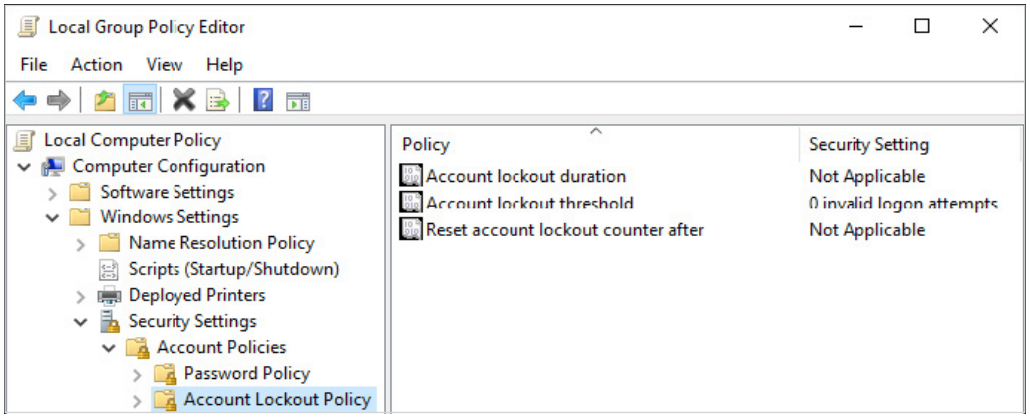
Open the local group policy editor as described in the chapter "Change group policies". Navigate to "Local Computer Policy" ▷ "Computer Configuration" ▷ "Windows Settings" ▷ "Security Settings" ▷ "Account Policies" ▷ "Password Policy".



As shown in the figure above, there are different policies that can be activated to force the use of a secure password. The policy "Enforce password history" can be configured to store between 0 and 24 passwords. This prevents the re-use of passwords.

"Maximum password age" defines after how many days a password has to be changed. This can be a value between 0 and 999, where 0 means disabled. "Minimum password age" defines after how many days a password can be changed. The value has to be lower than the maximum password age and should be combined with the "Enforce password history" policy.

"Minimum password length" can be a value between 1 and 14. When activated, the "Password must meet complexity requirements" policy enforces the use of a complex password as mentioned above. "Store password using reversible encryption" should not be activated, because it is less secure.



In addition, account lockout policies can be configured, so a user account is locked if too many failed logon attempts are made. “Account lockout threshold” determines after how many failed logon attempts a user account gets locked out. The value can be from 0 to 999, where 0 means this feature is disabled. The following policies can only be activated if a value larger than 0 is set.

“Account lockout duration” determines for how many minutes a user account gets locked out before it gets unlocked automatically. The value can be from 0 to 99999 minutes, where 0 means the user account gets locked out until an administrator explicitly unlocks it. “Reset account lockout counter after” determines the number of minutes that must elapse before the failed logon attempt counter is reset to 0. The value can be from 1 to 99999 minutes and has to be less than or equal to the account lockout duration.

4 FIREWALL

Condition as supplied to customer

- Windows firewall is enabled for all profiles
- Inbound connections are blocked by default
- Exceptions for all services used by the instrument's firmware are preconfigured
- Remote desktop is allowed for all profiles

Rohde&Schwarz instruments with Windows 10 use the built-in firewall to protect itself from attacks over the network. We highly recommend that you not turn off the instrument's firewall. Even in the controlled environment of a corporate network, malware infection over the network is a possible security threat.

There are three different firewall profiles in Windows 10: public, private and domain. By default the public profile is used when connecting the instrument to a network. It is possible to choose the private profile instead. If the instrument is joined to an active directory, the domain profile has to be used. This is done automatically.

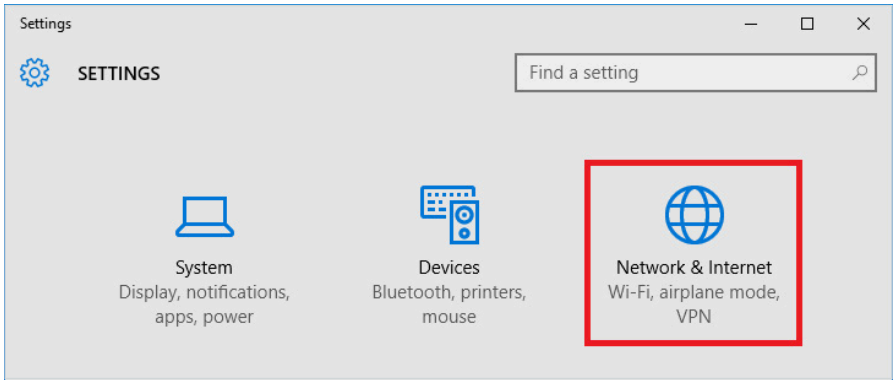
4.1 Default rules

The following table shows the commonly used default firewall rules of Rohde&Schwarz instruments. These rules apply to all three different network profiles. The firewall rules of your instrument may vary.

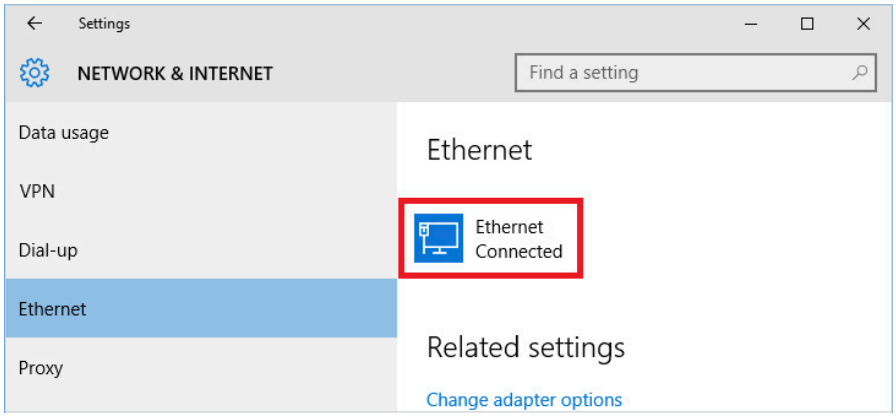
Ports	Service	Description
21 TCP	FTP	Instrument web server, FTP port
80 TCP	Web server	Instrument web server (LXI)
111 TCP and UDP	Portmapper	Portmapper service for VXI-11/LXI
161, 162 UDP, 705 TCP	SNMP	Standard port for SNMP agent
319, 320 TCP and UDP	1588 PTP	LXI clock synchronization, IEEE 1588 precision pime protocol (PTP)
2525 TCP	RSIB	Rohde&Schwarz SCPI socket connection
4880 TCP, 48800 to 48840 UDP	HiSLIP	High-speed LAN Interface protocol
5025 to 5030 TCP (data) 5125 to 5130 TCP (control)	TCP socket	'Raw SCPI' socket connection
5353 TCP and UDP, 5354 TCP and UDP	Bonjour	Multicast DNS responder (mDNS)
5044 TCP and UDP	LXI event messaging	LXI LAN messages and events, multicast address UDP: 224.0.23.159
5800 TCP	VNC	Instrument soft front panel via web server (browser interface)
13217 TCP and UDP	RS installer	Rohde&Schwarz software distributor service
14142 to 16383 TCP and UDP (dynamic assignment)	ONC-RPC	SUN ONC-RPC protocol, VXI-11

4.2 Changing the network profile

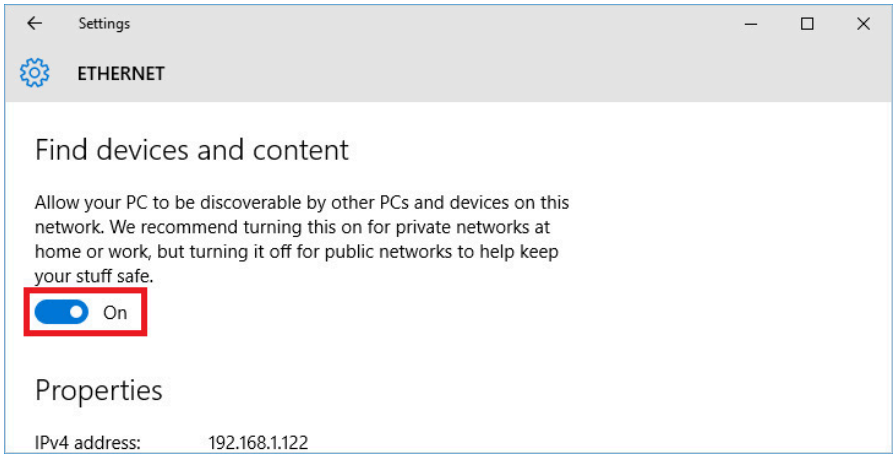
The network profile can be changed by using the Settings app. Please note that this option could be disabled by a group policy. Select the option “Network & Internet”.



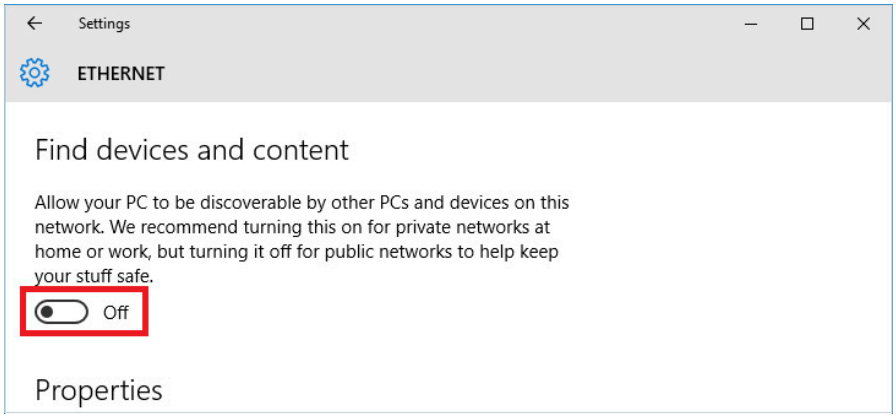
Select “Ethernet” on the left side and open the option “Ethernet” on the right side. The option's name will differ when connected to a corporate network.



If the option “Find devices and content” is on, the network profile is private.

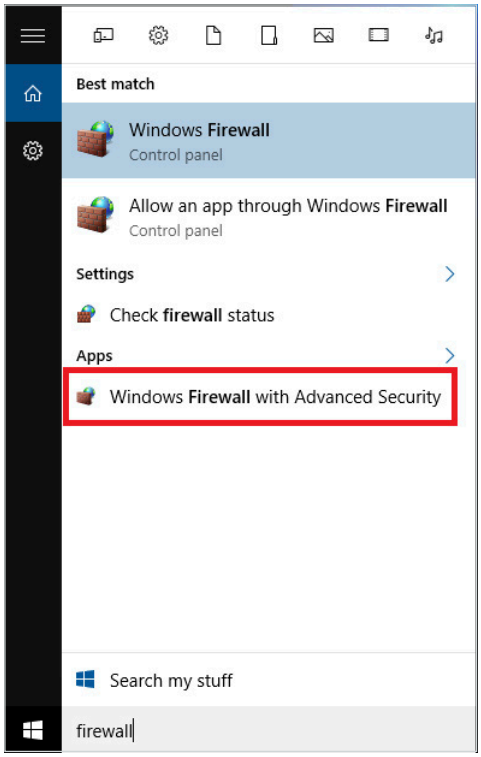


If the option “Find devices and content” is off, the network profile is public.

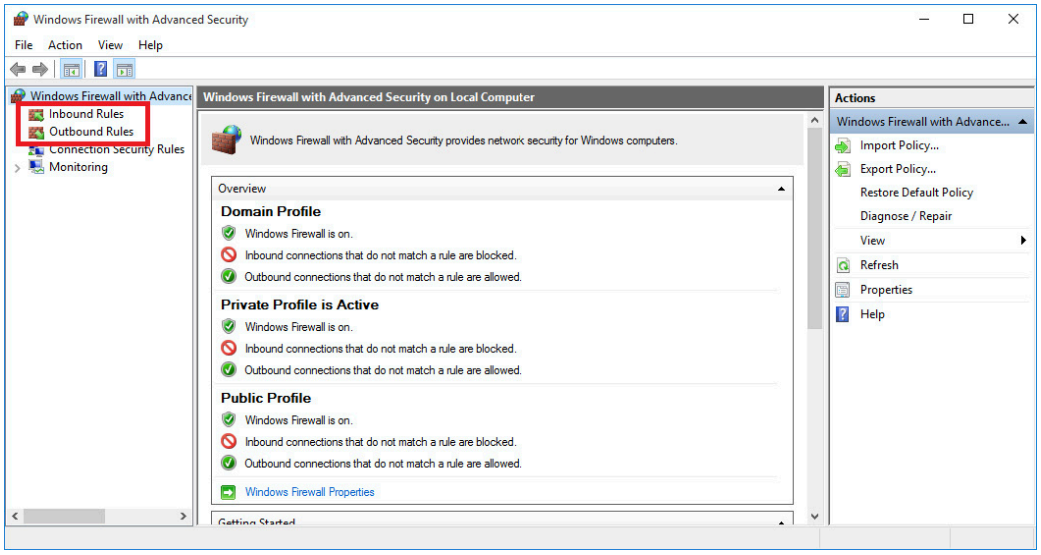


4.3 Adding and removing rules

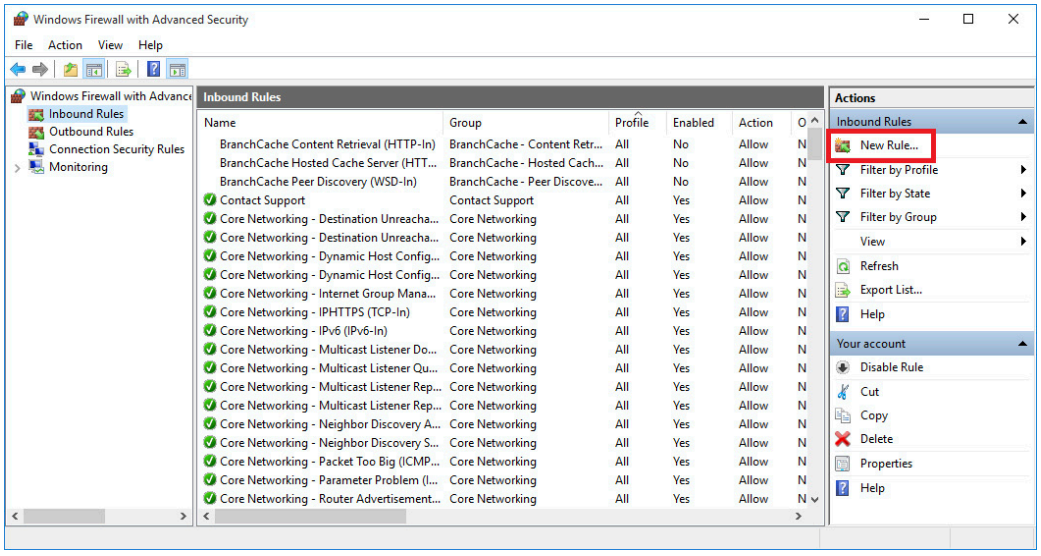
When using additional software, it may be necessary to add exceptions to the firewall rules. Likewise, these exceptions should be removed if the software is uninstalled. Most installers set the necessary rules on their own, but in some cases it might be necessary to do this manually. To do so, open the firewall settings by typing “firewall” in the Start menu and select the option “Windows Firewall with Advanced Security”.



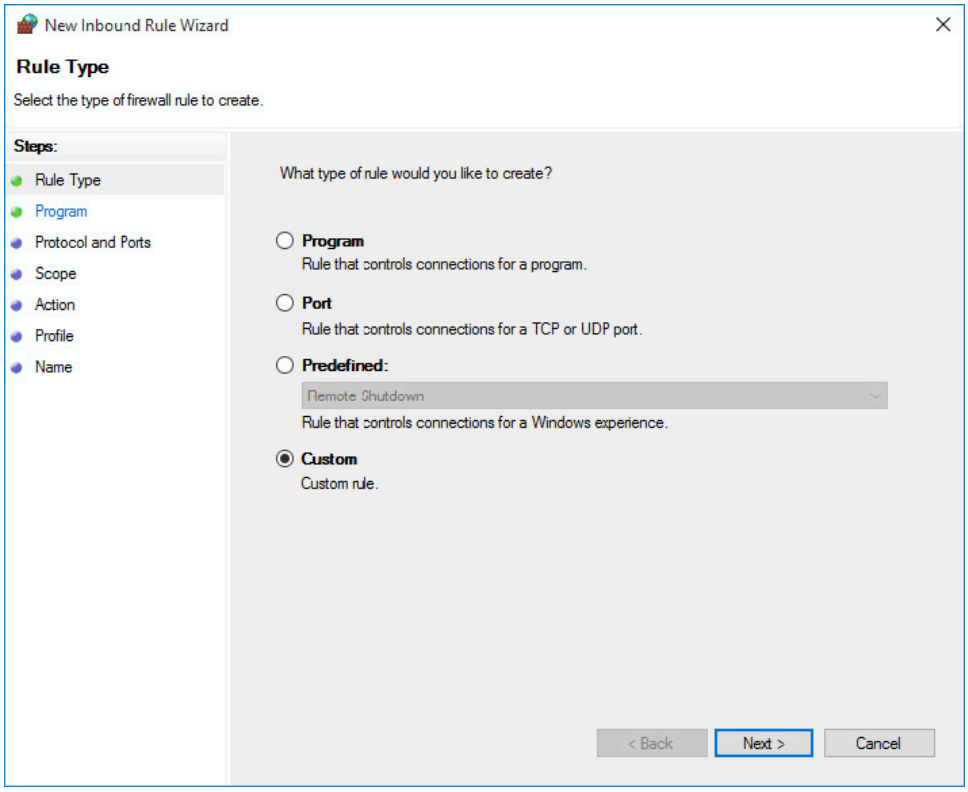
Depending on requirements, select either “Inbound Rules” or “Outbound Rules” on the left side.



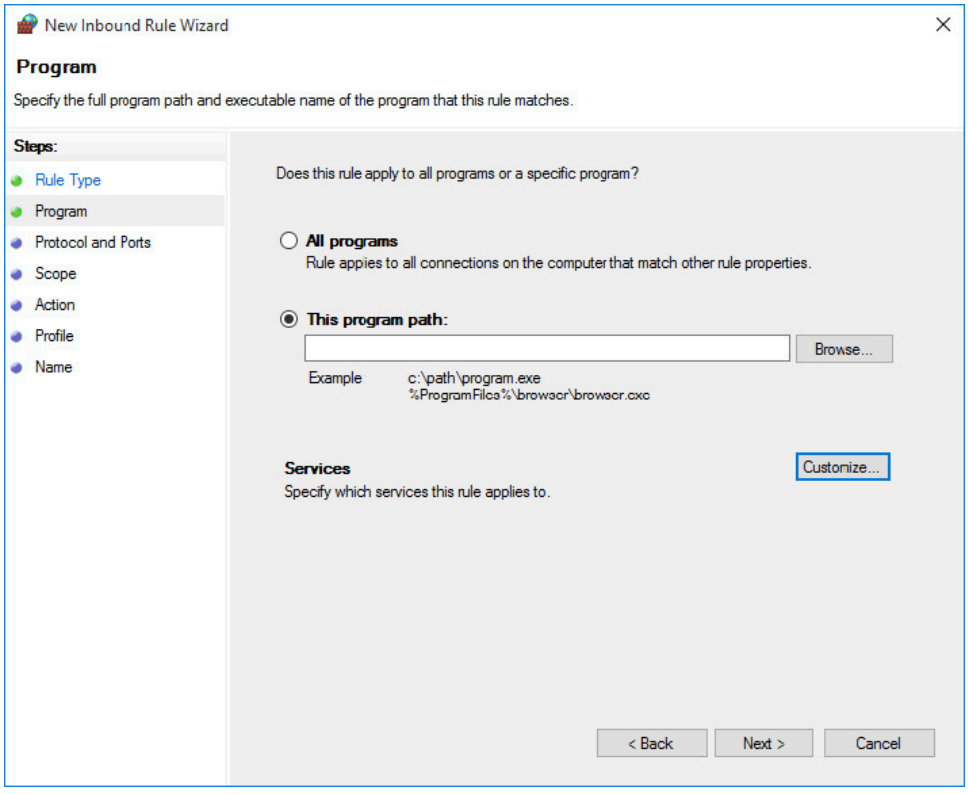
Select the option “New rule” on the right side. The process is the same for inbound rules and outbound rules.



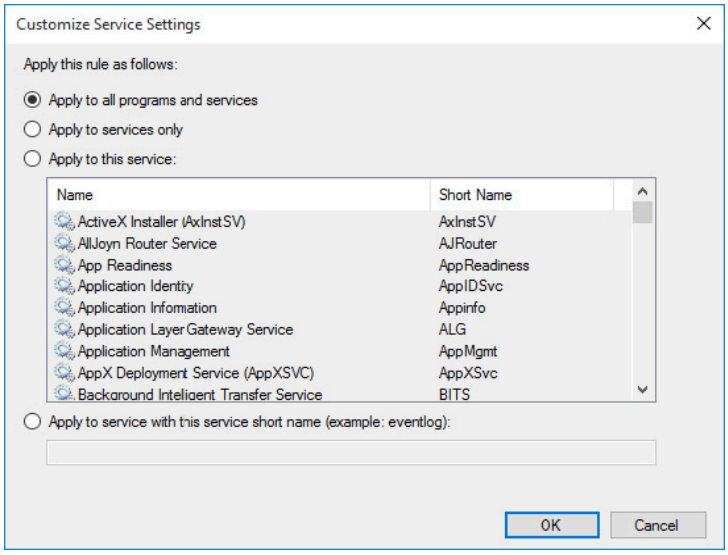
Select what kind of rule you want to create. The option "Custom rule" grants the most flexibility. Otherwise you can select to allow or block a certain program, a certain range of ports or to enable a predefined rule. Press “Next” to continue.



If you chose “Custom”, you can now select whether this rule applies to a specific program or all programs. In addition, you can specify what services this rule applies to by clicking “Customize”.



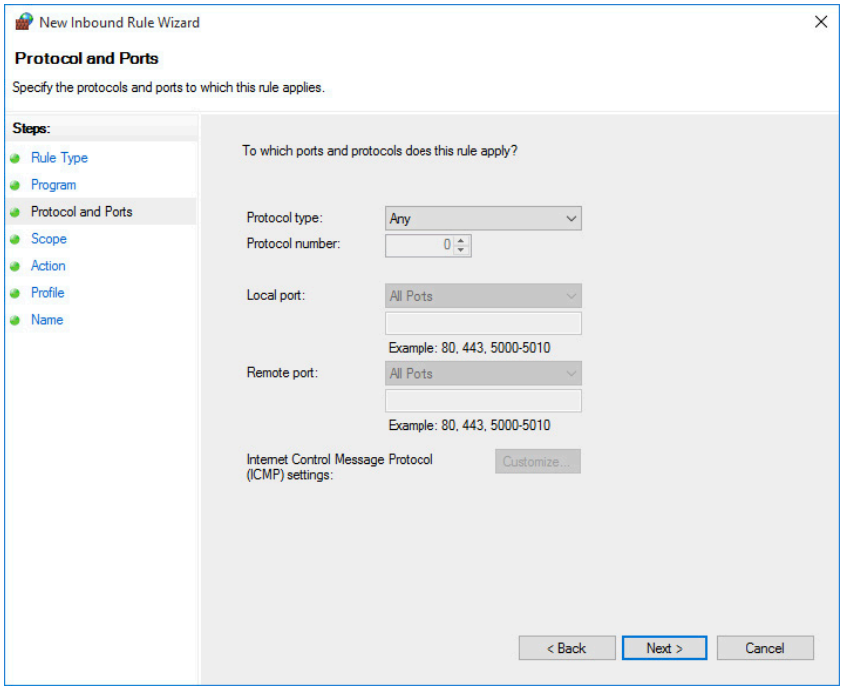
Here you can select either all programs and services, services only or a specific service. A specific service can either be chosen from a list of existing services or stated by its short name.



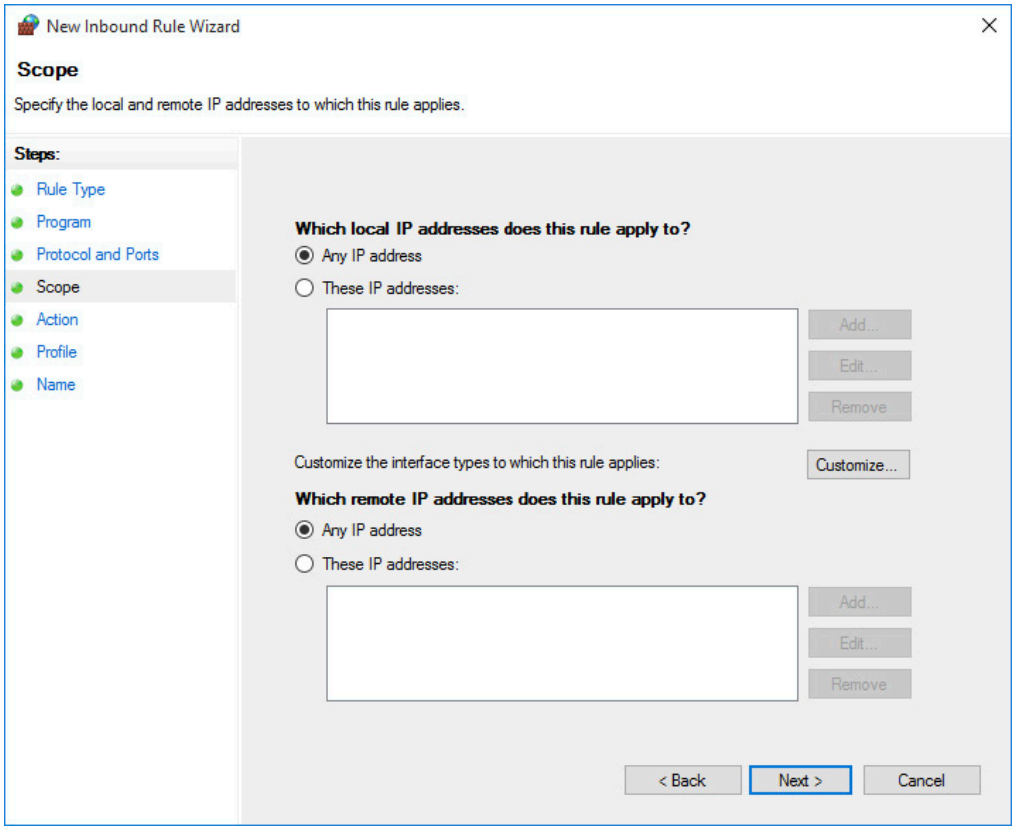
On the next page a protocol can be stated. The list of available options includes HOPOPT, ICMPv4, IGMP, TCP, UDP, IPv6, IPv6-Route, IPv6-Frag, GRE, ICMPv6, IPv6-NoNxt, IPv6-Opts, VRRP, PGM and L2TP. In addition, a custom protocol can be selected by stating its protocol number.

When creating an inbound rule, the local port is the port a certain datagram is received on your instrument and the remote port is the one the sender used.

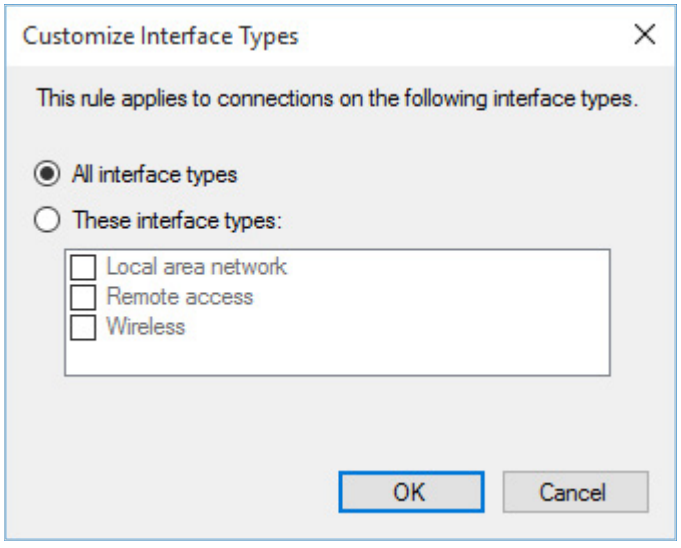
In case you create a rule for either ICMPv4 or ICMPv6, you can limit it to specific ICMP types by clicking “Customize”.



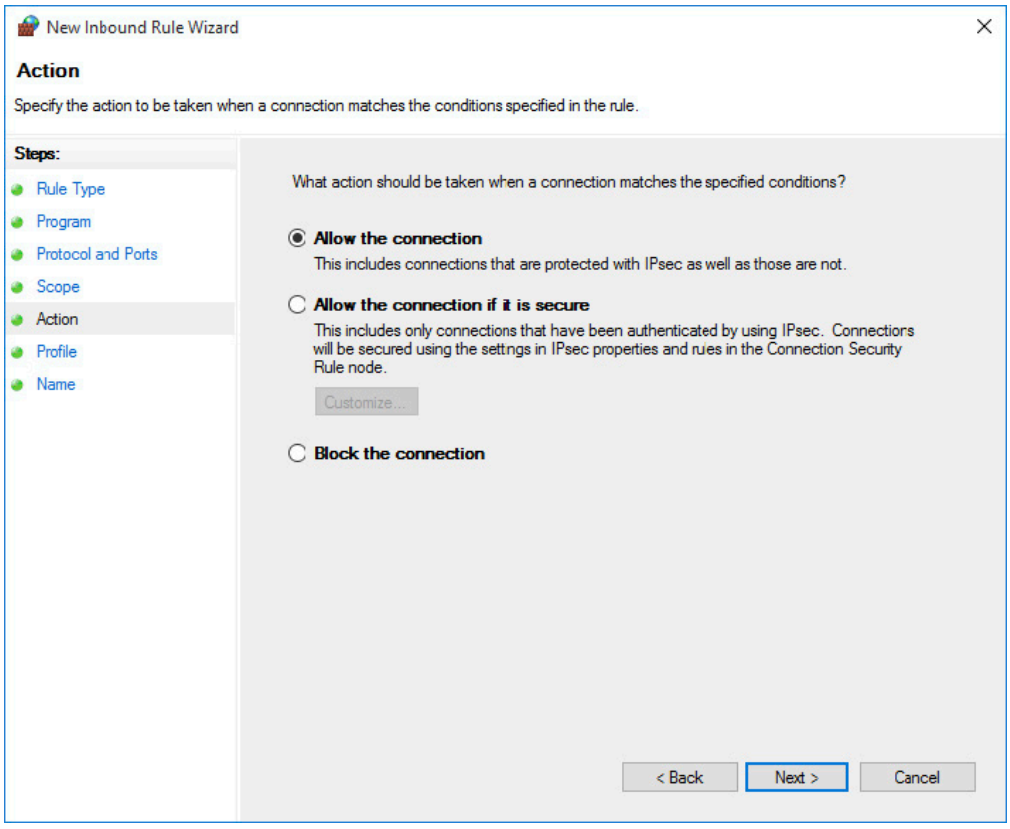
The rule can be limited to apply only to certain IP addresses and interfaces.



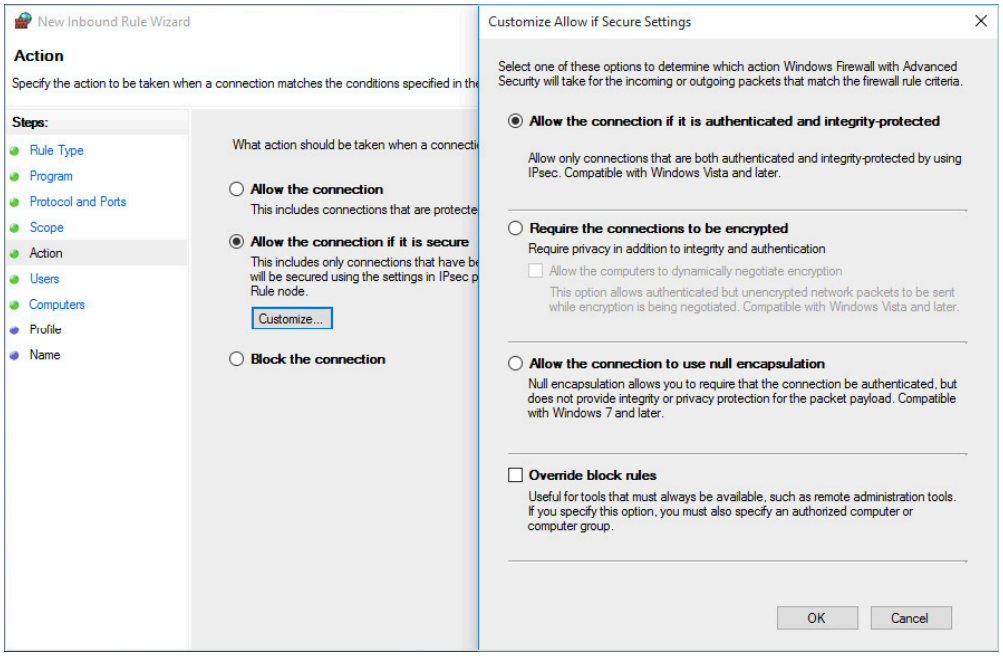
The interfaces are differentiated in “Local area network”, “Remote access” and “Wireless”. They can be specified by clicking “Customize”.



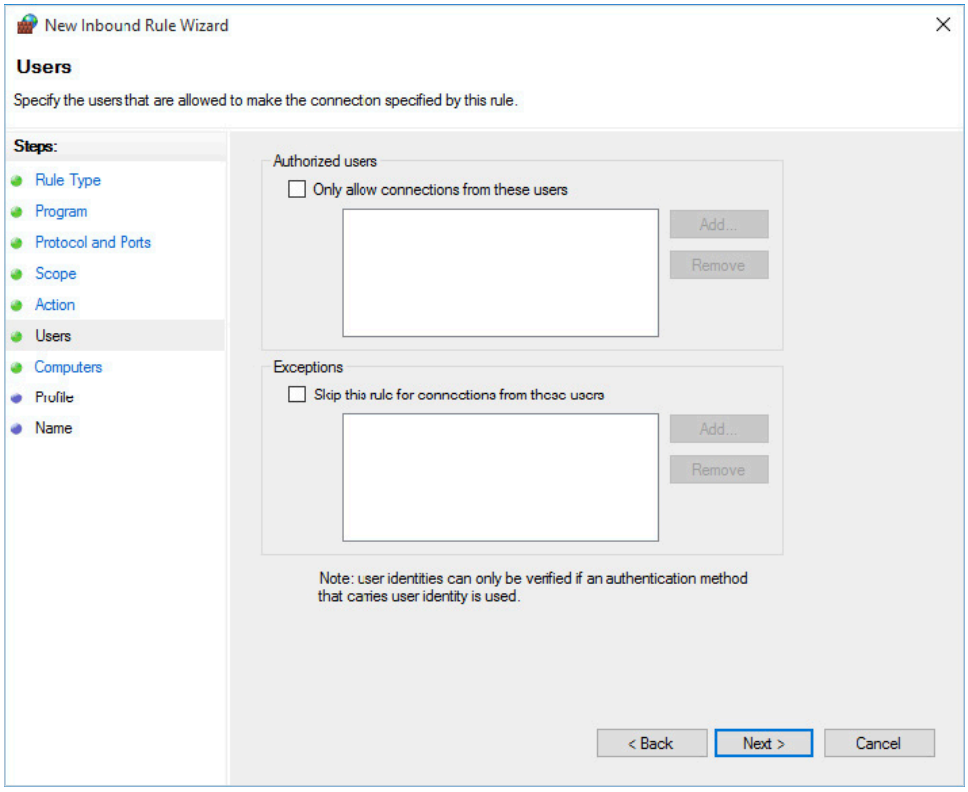
The connection can either be allowed, blocked or allowed if it is secure when it matches the previous settings. Since the default inbound rule is to block all incoming connections, we recommend selecting “Allow the connection” or “Allow the connection if it is secure”. In case an outbound rule is created, “Block the connection” should be selected, because all outgoing connections are allowed by default.

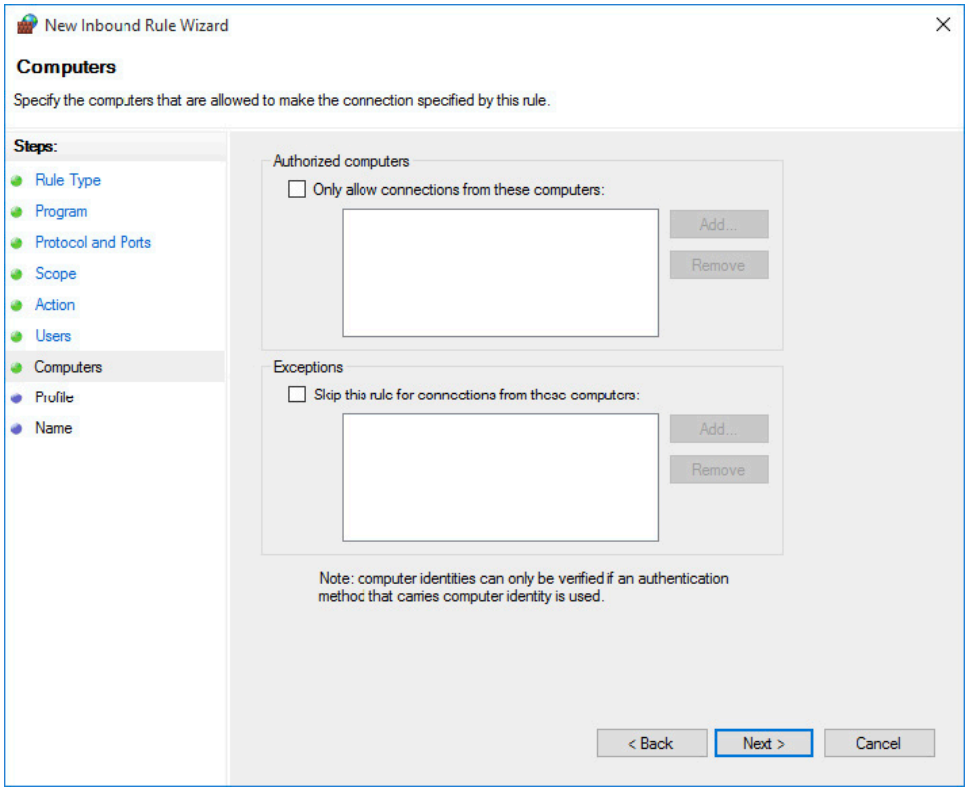


In case “Allow the connection if it is secure” is selected, additional options are available. Click “Customize” to specify whether the connection has to be authenticated or encrypted.

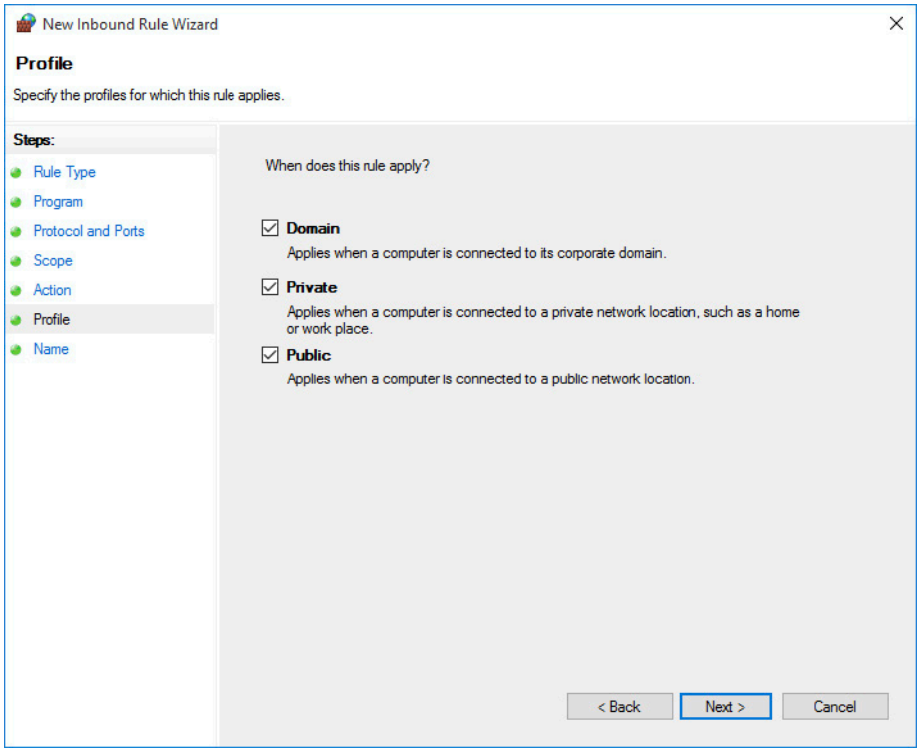


In addition, specific user accounts and groups can be stated to have access. If “Override block rules” is selected, a computer or a group of computer accounts has to be specified.

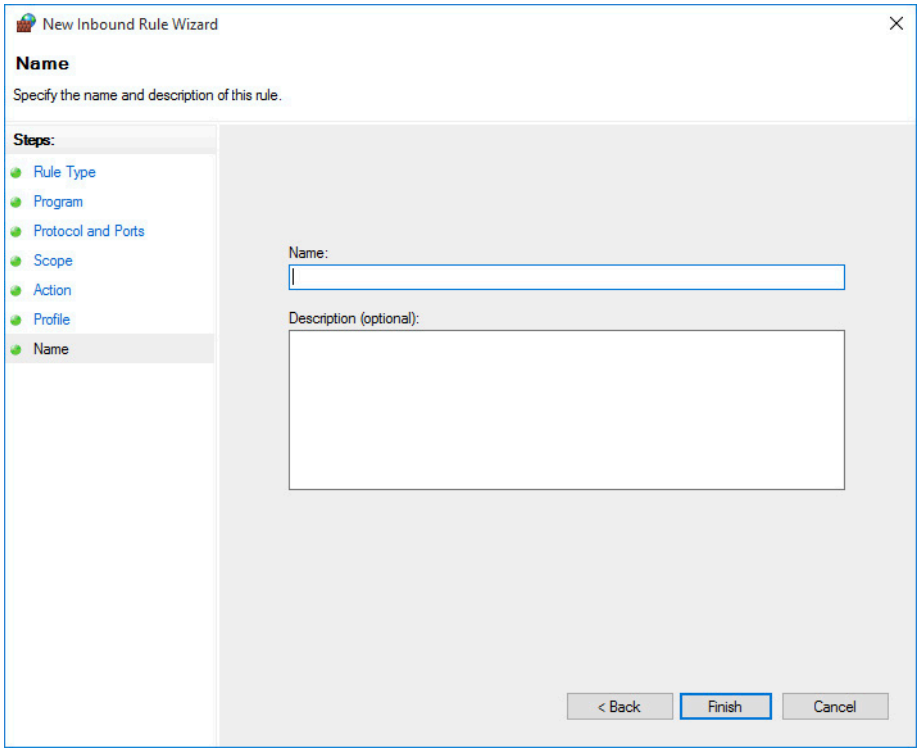




The next step is to decide which profiles the rule applies to. The choices are “Domain”, “Private” and “Public”.



Finally the rule has to be named. Choose a name that shows its purpose, for example include the name of the program or port that gets enabled. Writing a description is optional but recommended.



5 NETWORK SHARES

Condition as supplied to customer

- ▶ Administrative network shares are enabled by default
- ▶ Administrative network shares grant full access to the instrument's hard disk

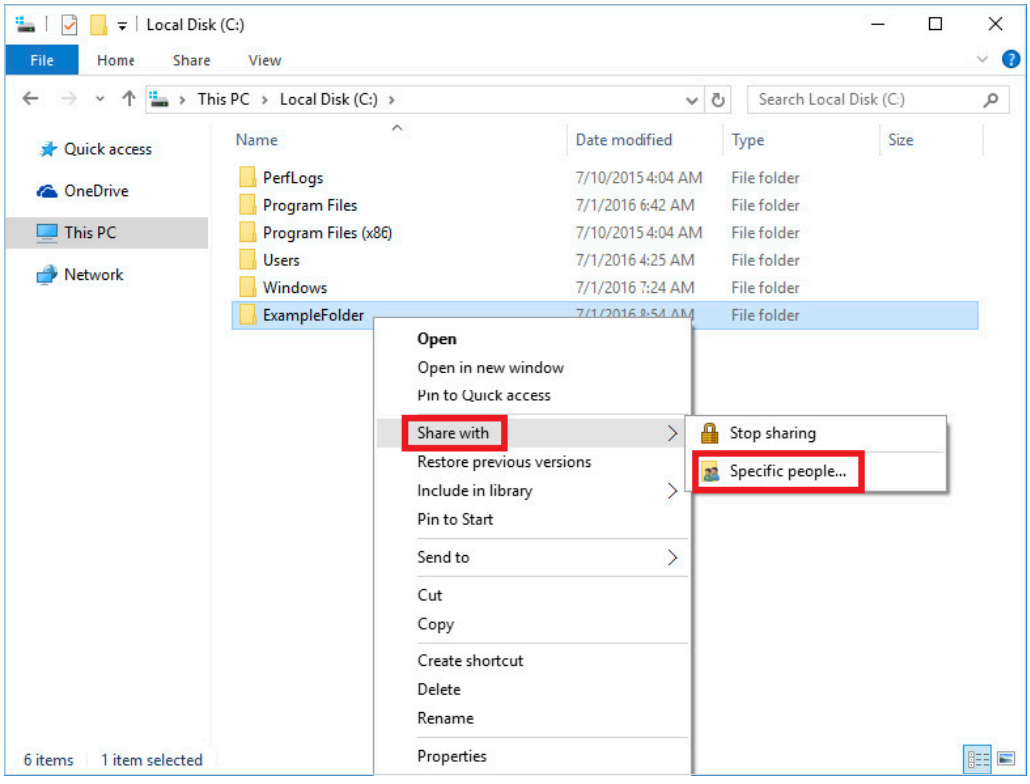
Network shares can be used to scan an instrument's hard disk drive from a different computer. Therefore, the chapter "Scanning from a different PC". describes how to connect to an instrument's network share.

5.1 Administrative network shares

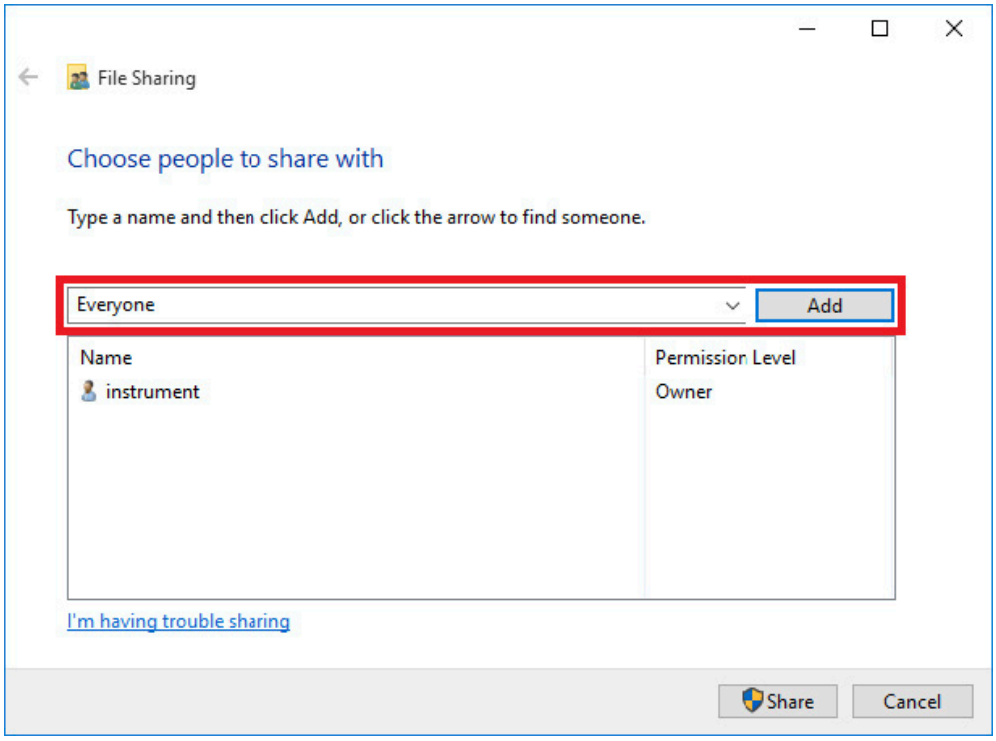
As on any device with a Windows operating system there is an administrative share for every volume of the instrument by default. The volumes can be accessed by adding the character $ after the drive letter of the volume. For example, the UNC path \\RS-100000\C$
can be used for the Windows partition of an instrument with the computer name "RS-100000". The username and password of an instrument's user with administrator rights is required to connect to an administrative share.

5.2 Creating and removing network shares

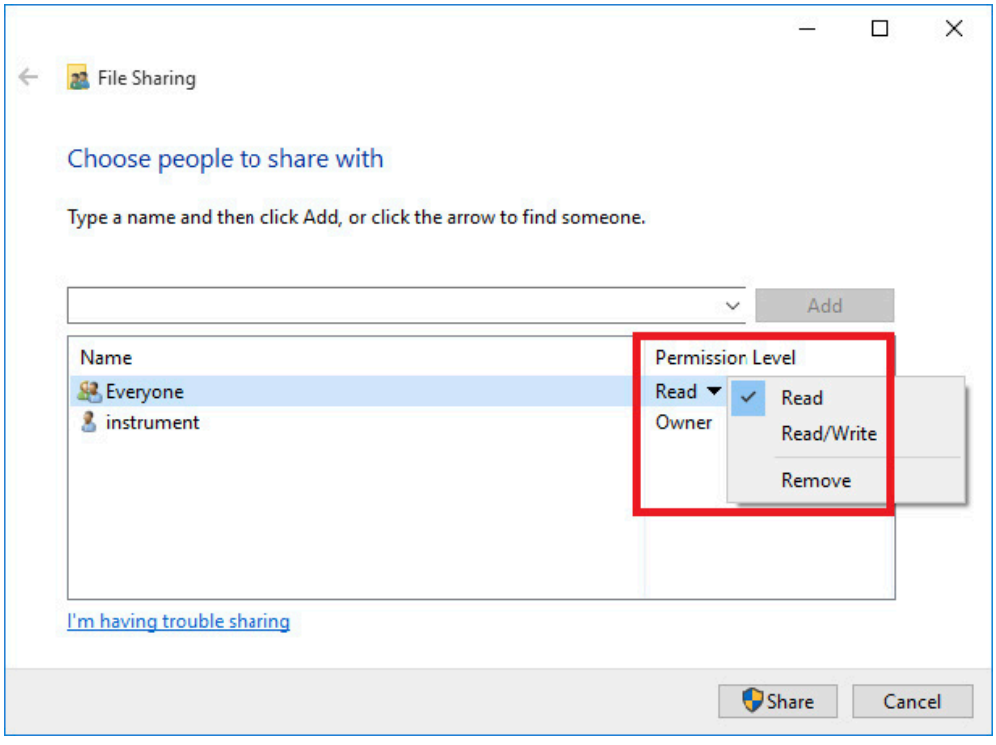
Besides administrative shares, custom network shares can be created with in-depth configuration of user permissions. Please note that permissions on network shares should be set as restrictive as possible. In order to create a new share, open the File tab in Windows Explorer and navigate to the folder you want to share. Right-click the folder and select "Share with" ▷ "Specific people".



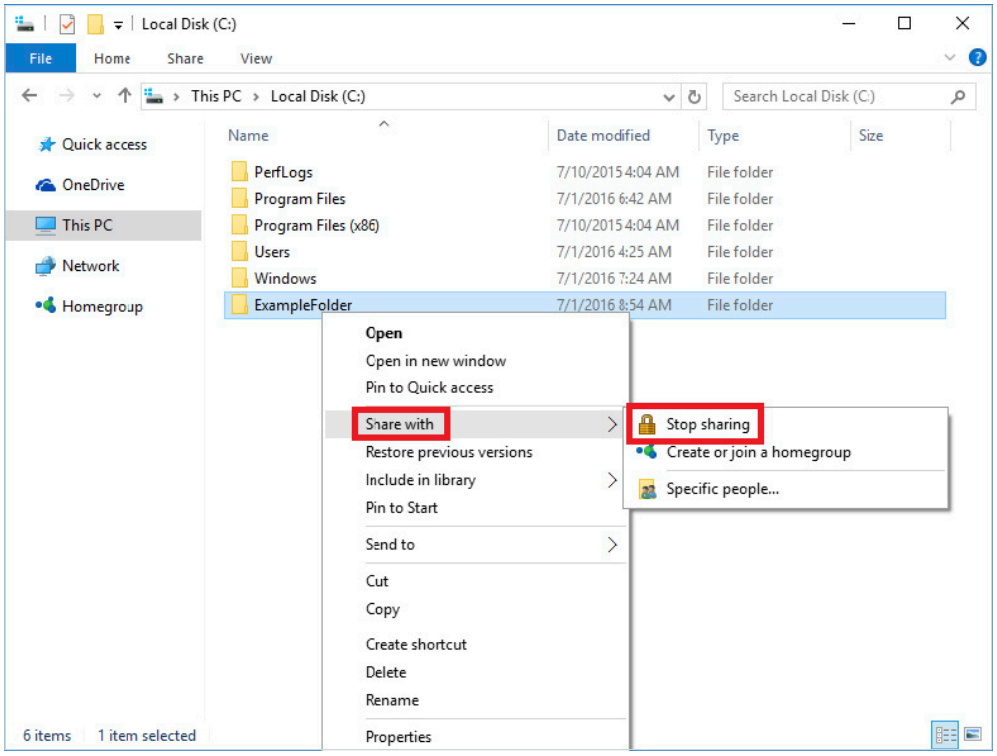
Select the name of the user or group you want to give access to from the dropdown list or enter the name directly, for example “Everyone”. Click “Add” to set the user’s or group’s permissions.



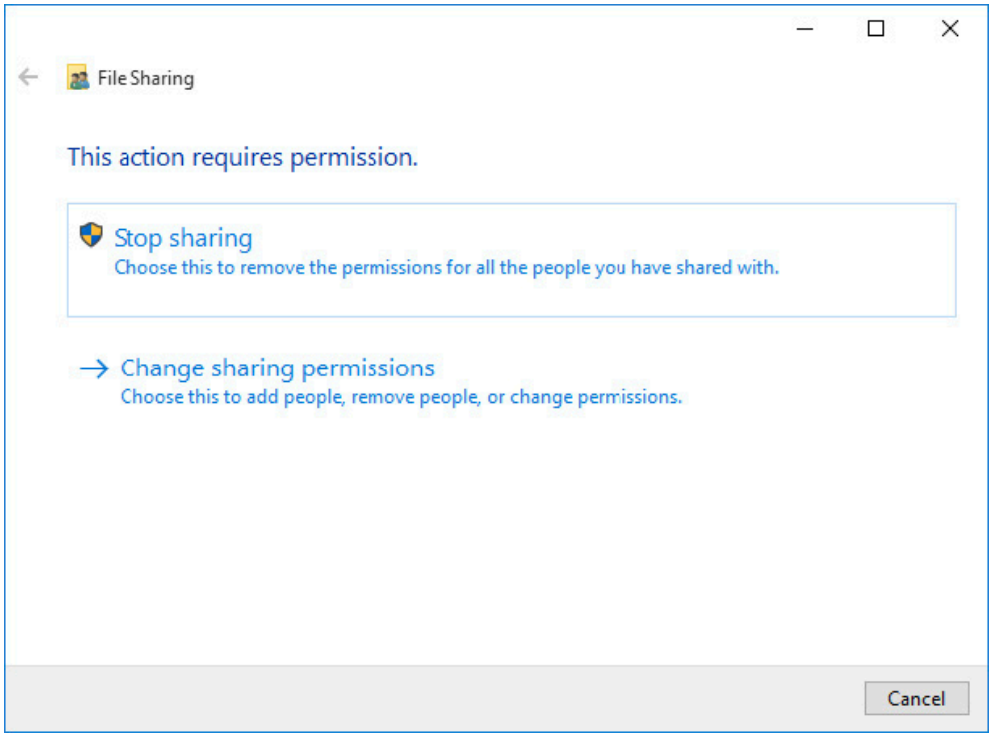
The default permission level is “Read”. Change this setting according to requirements. The option “Remove” removes the user or group from the list.



In order to remove a network share, right-click the folder and select “Share with” ▷ “Stop sharing”.



Now you can select whether to remove all permissions or only permissions of single users and groups.



6 WINDOWS UPDATES

Condition as supplied to customer

- On some Rohde&Schwarz instruments, Windows updates are disabled by default to eliminate influence on the instrument's performance
- Windows updates are enabled by activating the service

Microsoft regularly creates security updates and other patches to protect Windows based operating systems. Instruments using Windows 10 – especially those that connect to a network – should be updated regularly. Usually Windows updates are released on the second Tuesday of each month, but critical updates may be released more frequently.

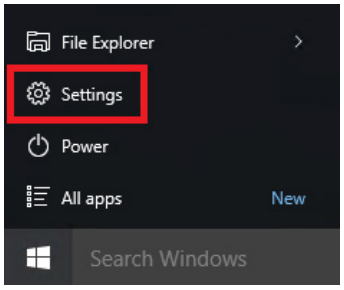
It is important to distinguish servicing updates from feature upgrades. Rohde&Schwarz instruments use the enterprise long-term servicing channel (LTSC). The servicing lifetime of each LTSC release is at least 10 years. There are no feature upgrades in LTSC to enable long-term deployment of Windows 10 releases in low-change configurations. It is not possible to switch to a different LTSC release by Windows update.

6.1 Configuring Windows updates

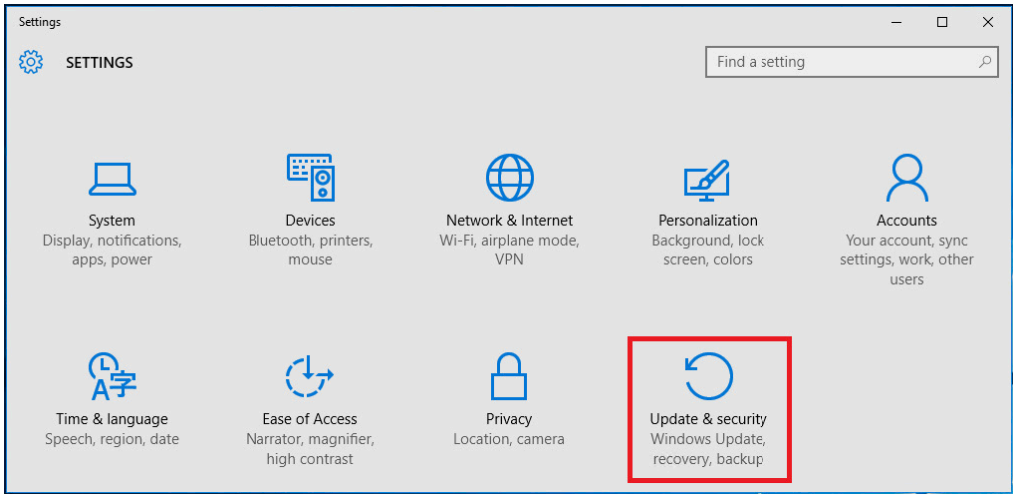
Windows updates are configured in the Settings app as well as by group policies. Among others things, it is possible to select where Windows updates shall be received from – this could be either a Microsoft server, your company's WSUS server, any computer on your local network or even any computer on the internet. Please comply with your company's guidelines. We recommend using a WSUS server if available. The receiving of updates from computers on the internet should be disabled.

6.1.1 Distribution of updates in local network

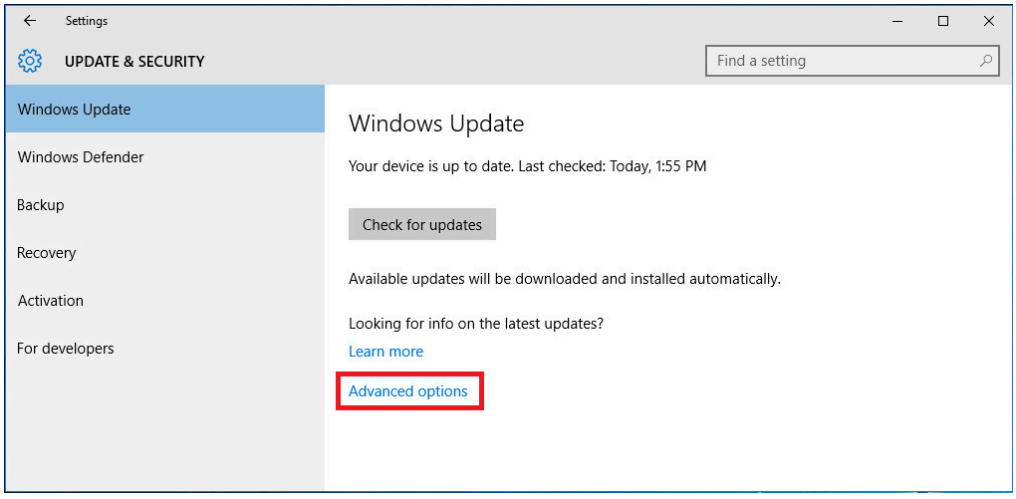
Windows 10 offers the possibility to receive and send Windows updates from and to other devices on the local network and even the internet. In order to disable this feature, open the Start menu und select the Settings app.



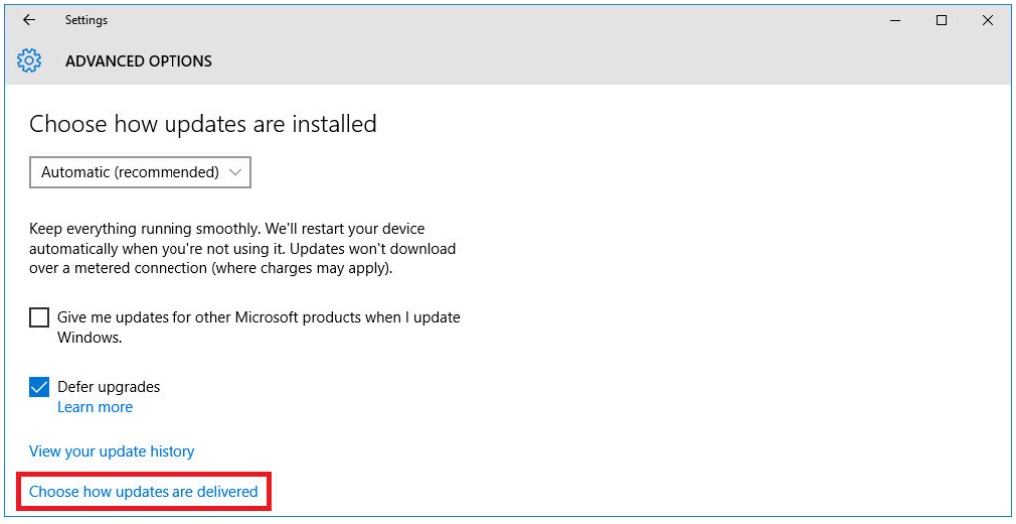
Select the option “Update & security” in the Settings app.



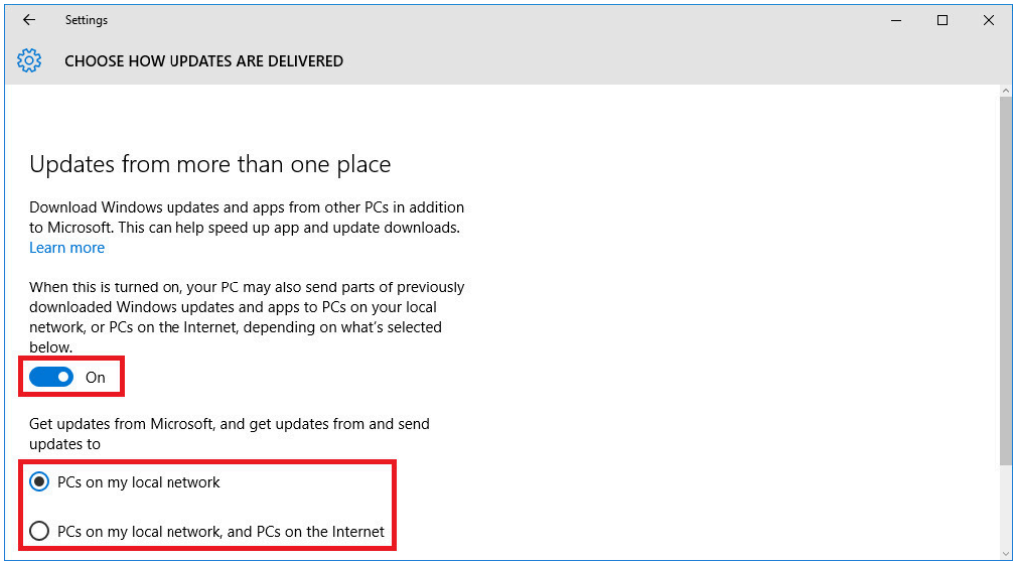
Select the option Windows update and click “Advanced options”.



Click “Choose how updates are delivered”.



By default the sending and receiving of updates from other devices on the local network is enabled. You can disable this by clicking the switch next to “On”. The options below will then be shown grayed out.

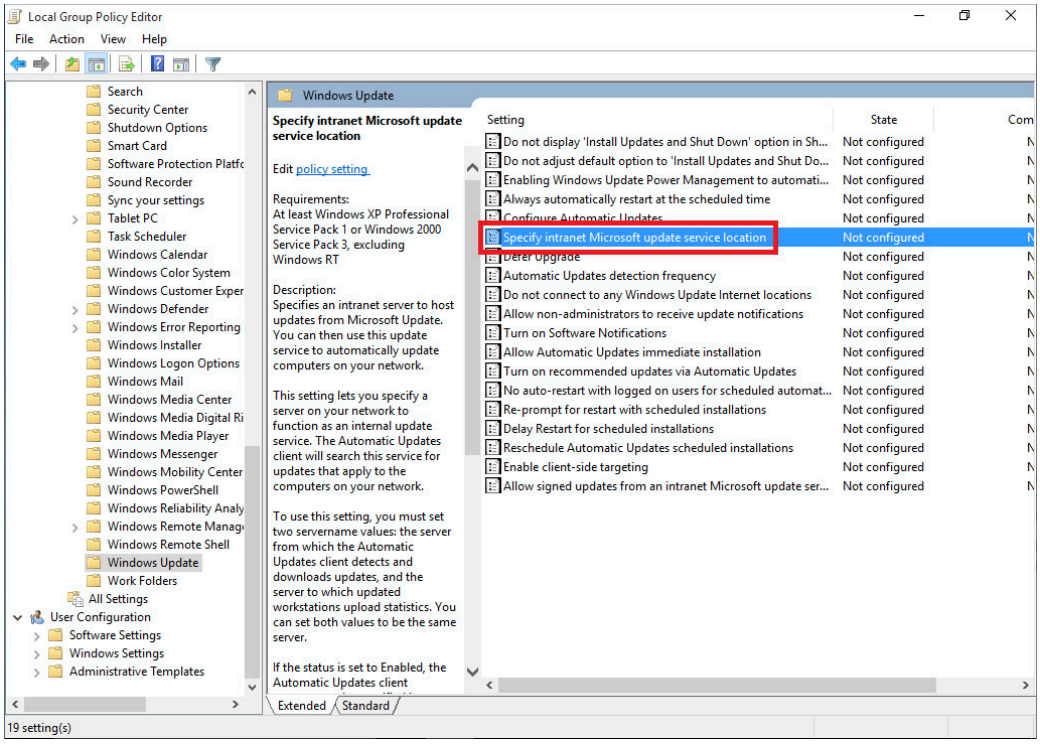


Sharing Windows updates on the local network can save internet bandwidth when there is no WSUS server available. The option to share Windows updates with computers on the internet should never be used, because it significantly increases the usage of upload bandwidth.

6.1.2 Distribution of updates using WSUS

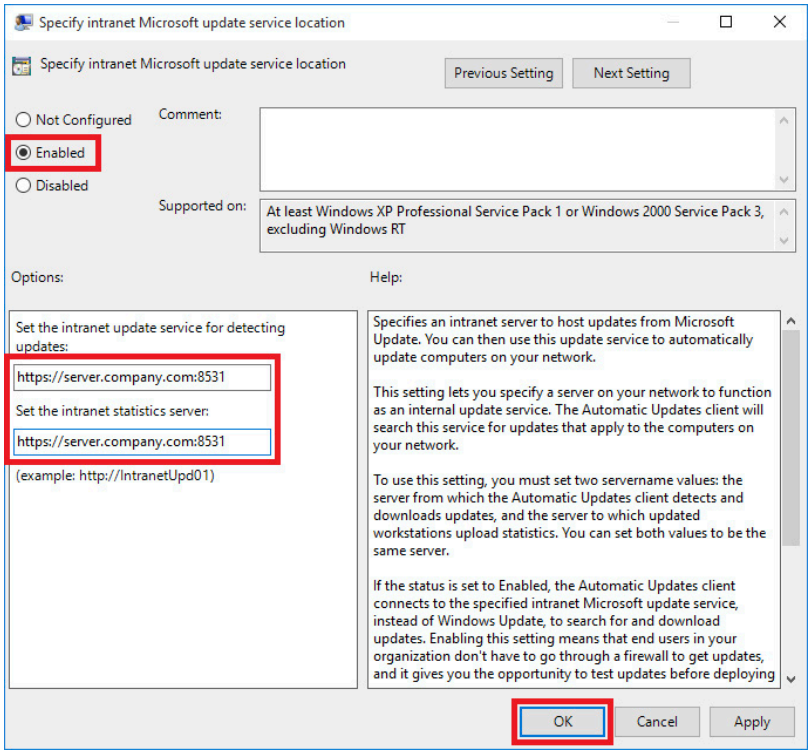
Your company may use Windows server update services (WSUS) to deploy updates. Contact your local system administrator or IT department for information about your company's update strategy and ensure that updates for Windows 10 are distributed via your company's WSUS server. The usage of a WSUS server can be configured in a group policy, either locally or in the active directory.

In order to set this group policy locally, open the local group policy editor as shown in chapter "Change group policies". Navigate to "Local Computer Policy" ▷ "Computer Configuration" ▷ "Administrative Templates" ▷ "Windows Components" ▷ "Windows Update".

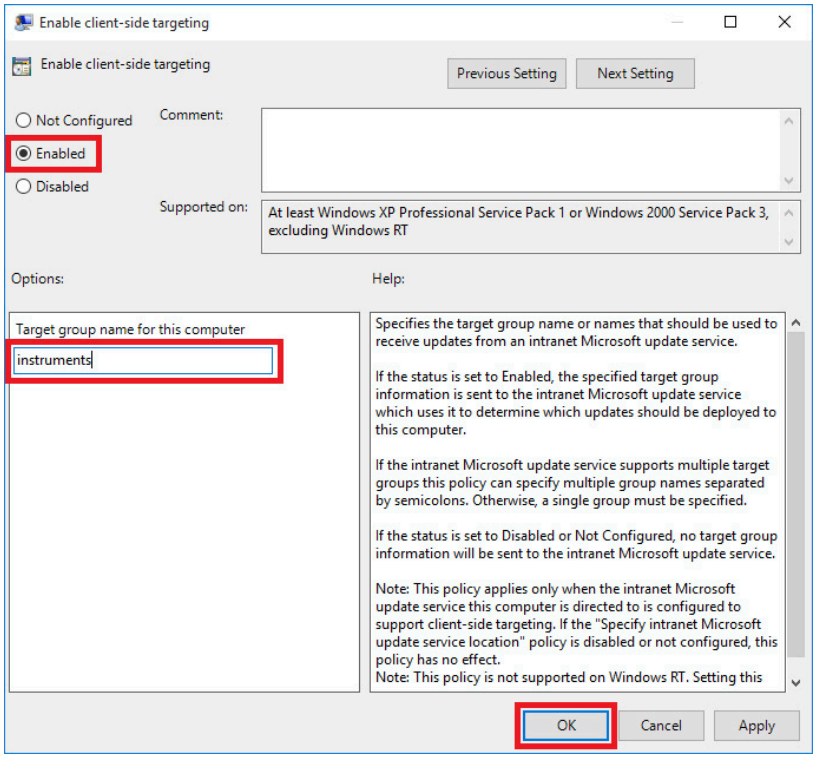


Open the policy "Specify intranet Microsoft update service location" by selecting it and clicking "Edit policy setting".

By default this policy is set to "Not Configured". Select "Enabled" and fill the options with the information provided by your local system administrator or IT department. Usually the update service and the statistics server have the same address. The prefix can either be http or https, where the latter is encrypted and therefore the more secure option. The server address can either be a DNS name or an IP address. If the port number is different than 80, it has to be appended with a leading colon. The default port numbers are 8530 for http and 8531 for https. Apply the setting by clicking "OK".

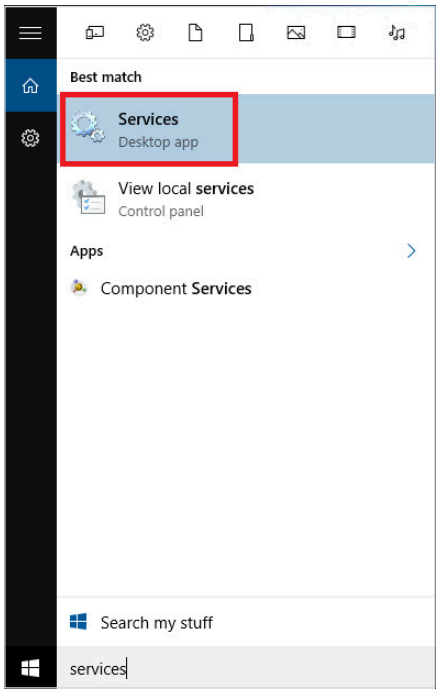


Optionally the policy “Enable client-side targeting” can be enabled to determine the group the instrument shall be added to automatically. The group must already exist on the WSUS server. Multiple groups can be specified, separated by semicolons. If this policy is not enabled, a server administrator has to add the instrument to a group manually.

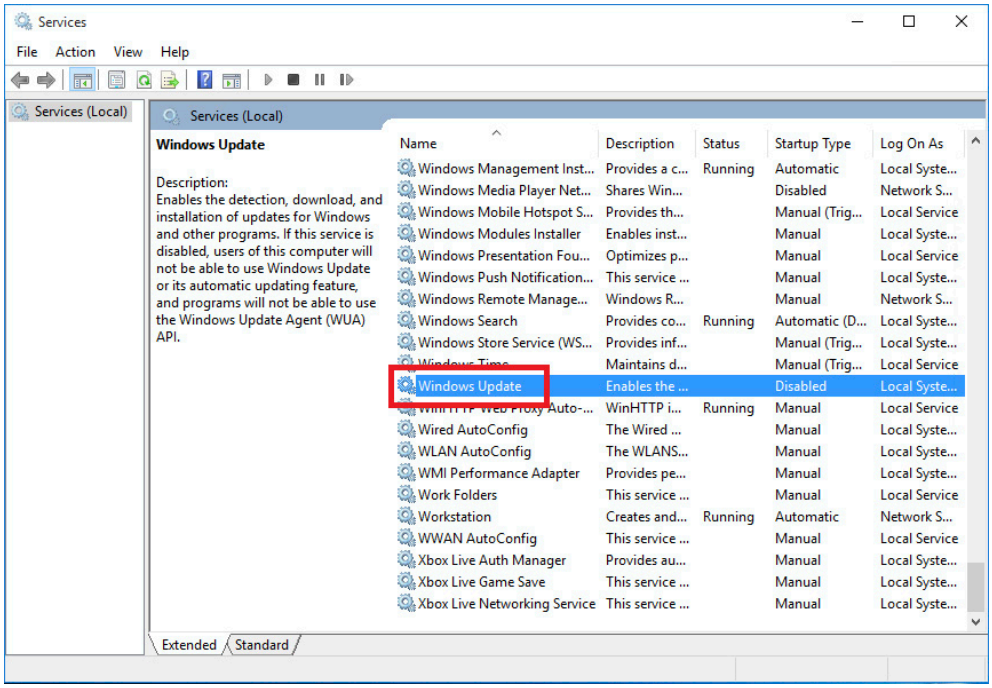


6.2 Enabling the Windows Update service

On some Rohde&Schwarz instruments, the Windows Update service is not active by default. This is intended to prevent disturbance of the instrument's functionality. In order to install Windows updates, you have to activate this service temporarily. To enable the Windows Update service, the service management console has to be started. Open the Start menu and type “services”. Select the option “Services”.

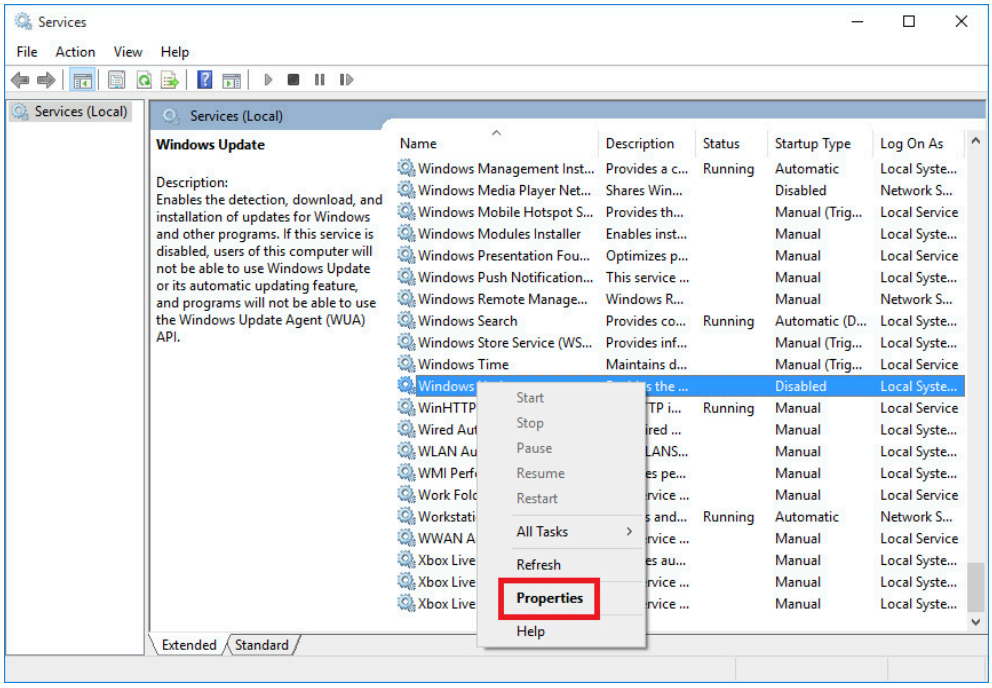


Once the "Services" console is displayed, search for the "Windows Update" service:

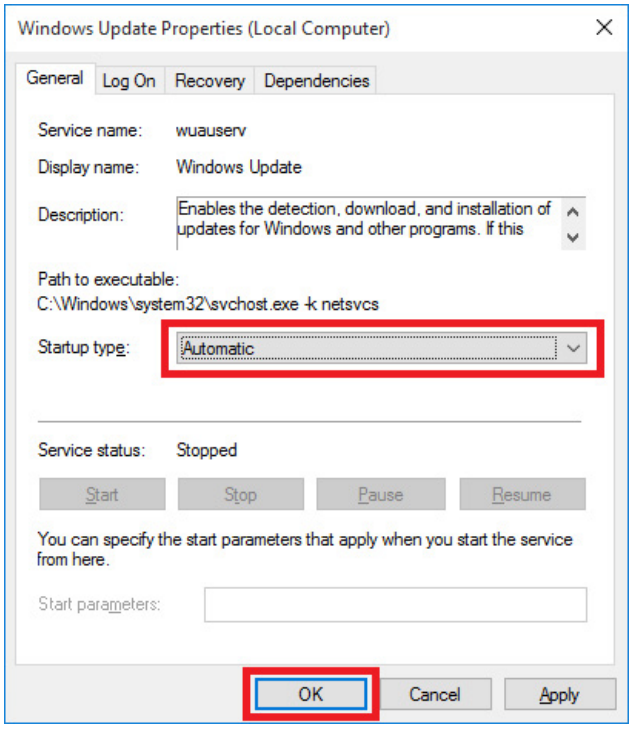


If the service is disabled (as shown in the figure above), the service must be enabled. To do this, proceed with the next steps. If the service is enabled, you can proceed with installing Windows updates as described in the next chapter.

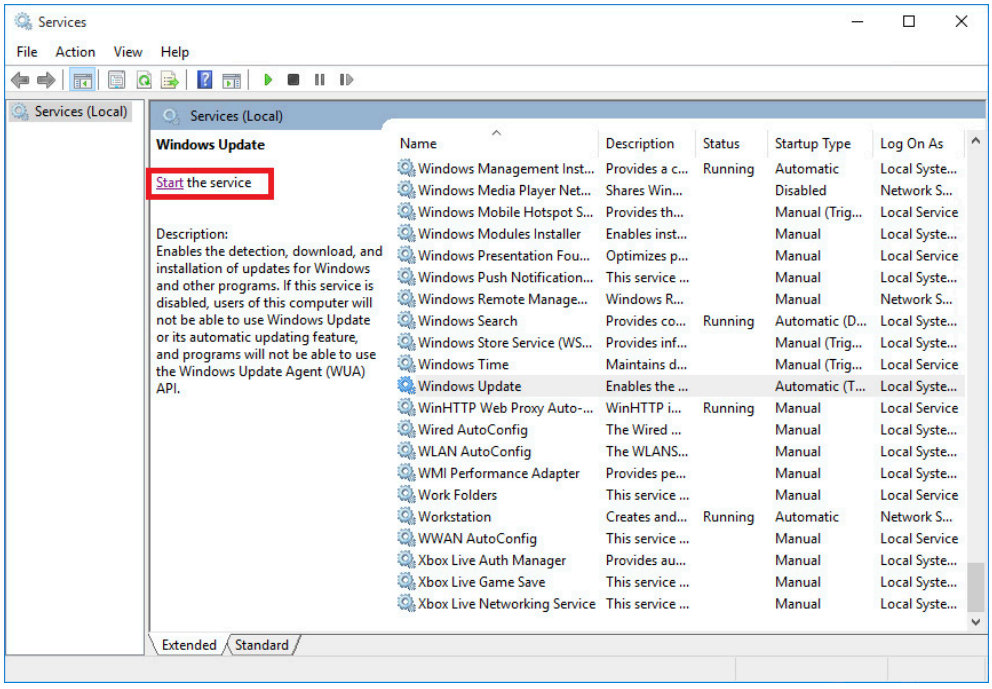
To enable the service, select the "Windows Update" service, open the context menu and select "Properties".



Afterwards the "Windows Update Properties" will be displayed, set "Startup type" to "Automatic" and confirm the dialog with "OK".

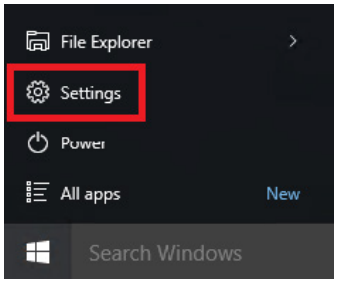


Start the Windows Update service by clicking “Start”.

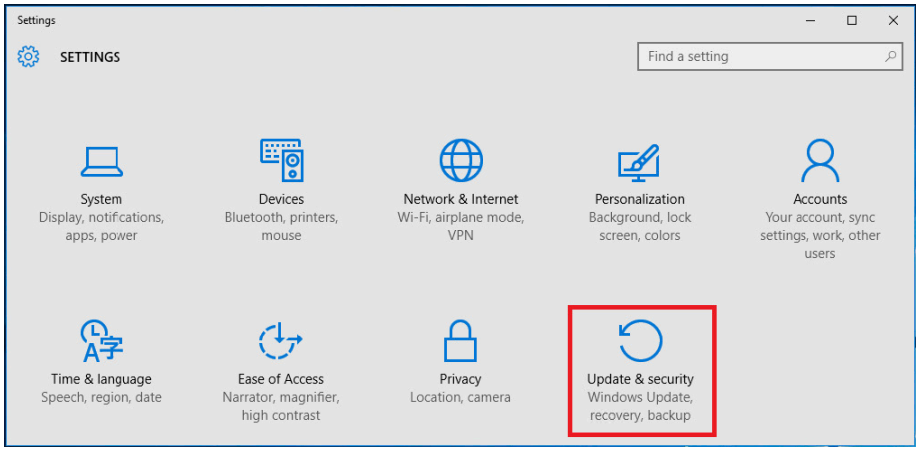


6.3 Installing Windows updates

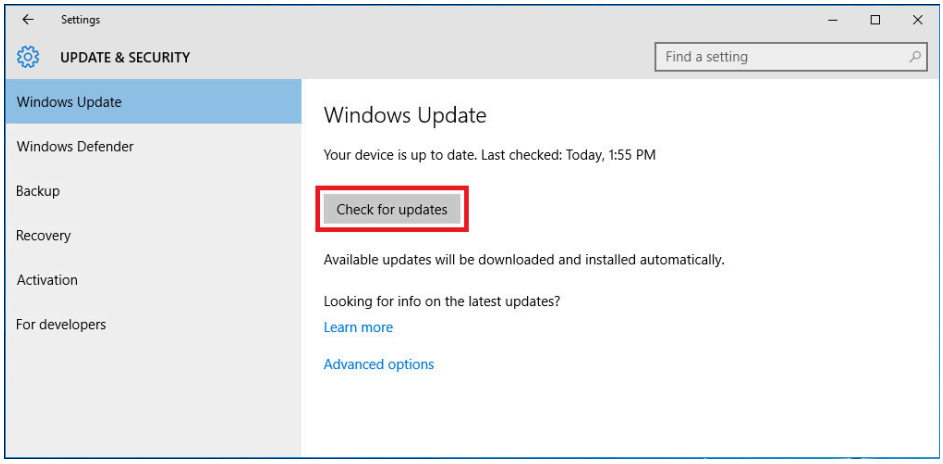
In order to install Windows updates, open the Start menu und select the Settings app.



Select the option “Update & security” in the Settings app.



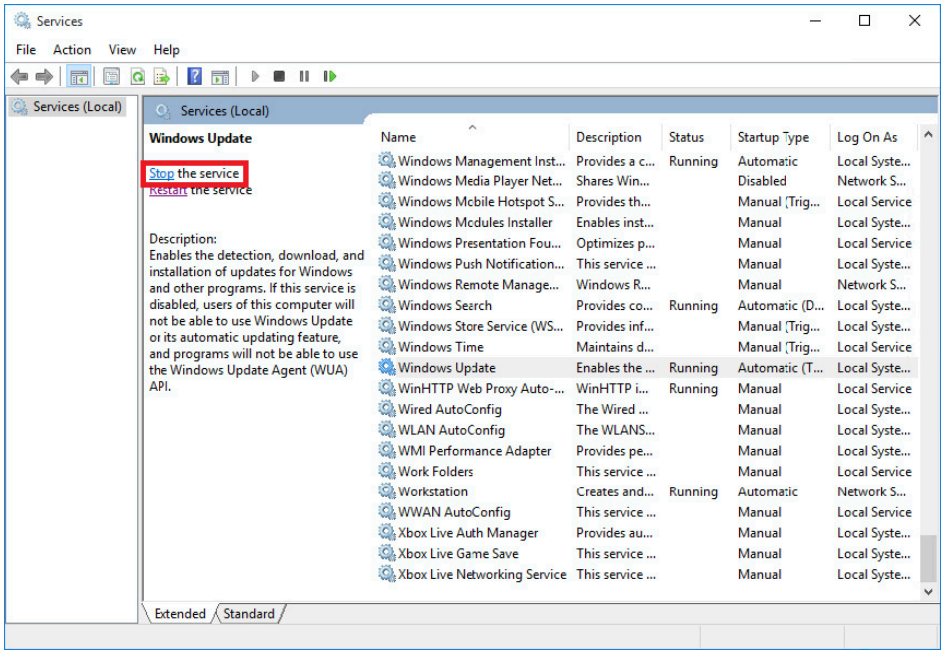
Select “Windows Update” on the left side and click “Check for updates”.



Windows Update will search for updates and install them automatically. Once this is done a reboot may be required. In that case select “Reboot now”. After the reboot, repeat the steps described above until all updates have been installed. Continue with stopping and disabling the Windows Update service.

6.4 Disabling the Windows Update service

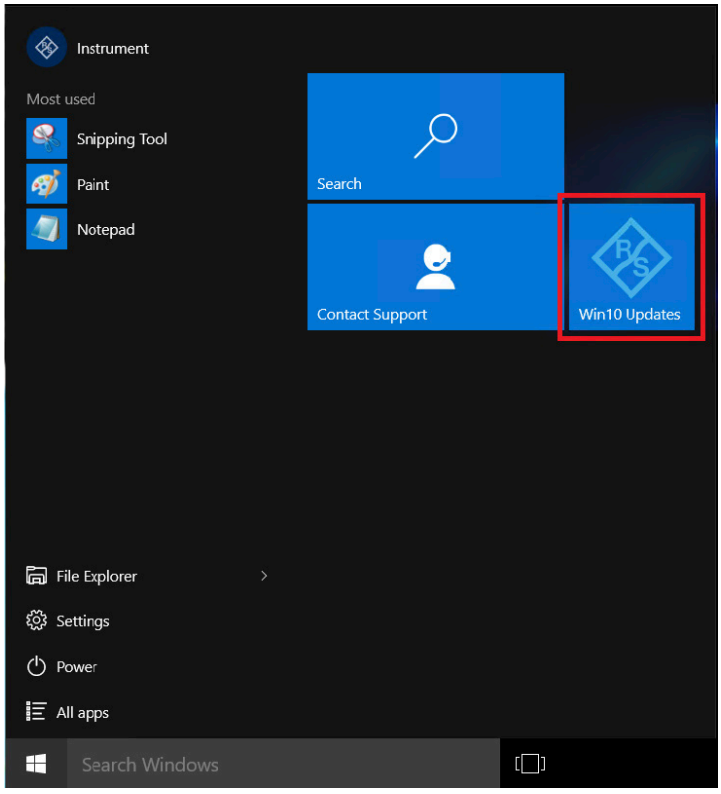
To disable the Windows Update service, start the services management console as described in the chapter “Enabling the Windows Update service”. Select the Windows Update service and press “Stop”.



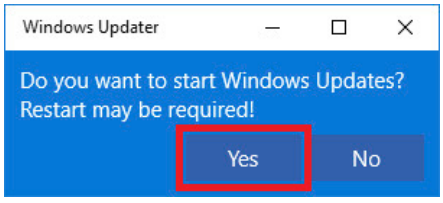
Right-click the Windows Update service to open the context menu and select “Properties”. Change the startup type to “Disabled”.

6.5 Using the Windows Updater app

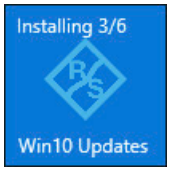
Some Rohde&Schwarz instruments offer the Windows Updater app, a convenient and easy way to install Windows updates. Open the Start menu as the instrument user. Click the tile “Win10 Updates”.



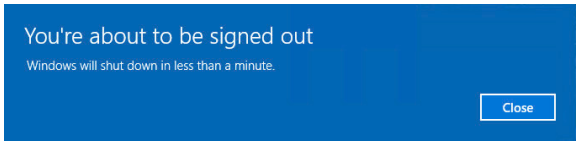
A dialog will ask whether you want to continue or not. Click “Yes” to continue.



Enter the administrator password in the user account control dialog and continue with “Yes”. The app will automatically search for updates and security updates and install them. The progress is displayed on the tile in the Start menu.



In case a reboot is required, the following message is displayed and the instrument reboots automatically.

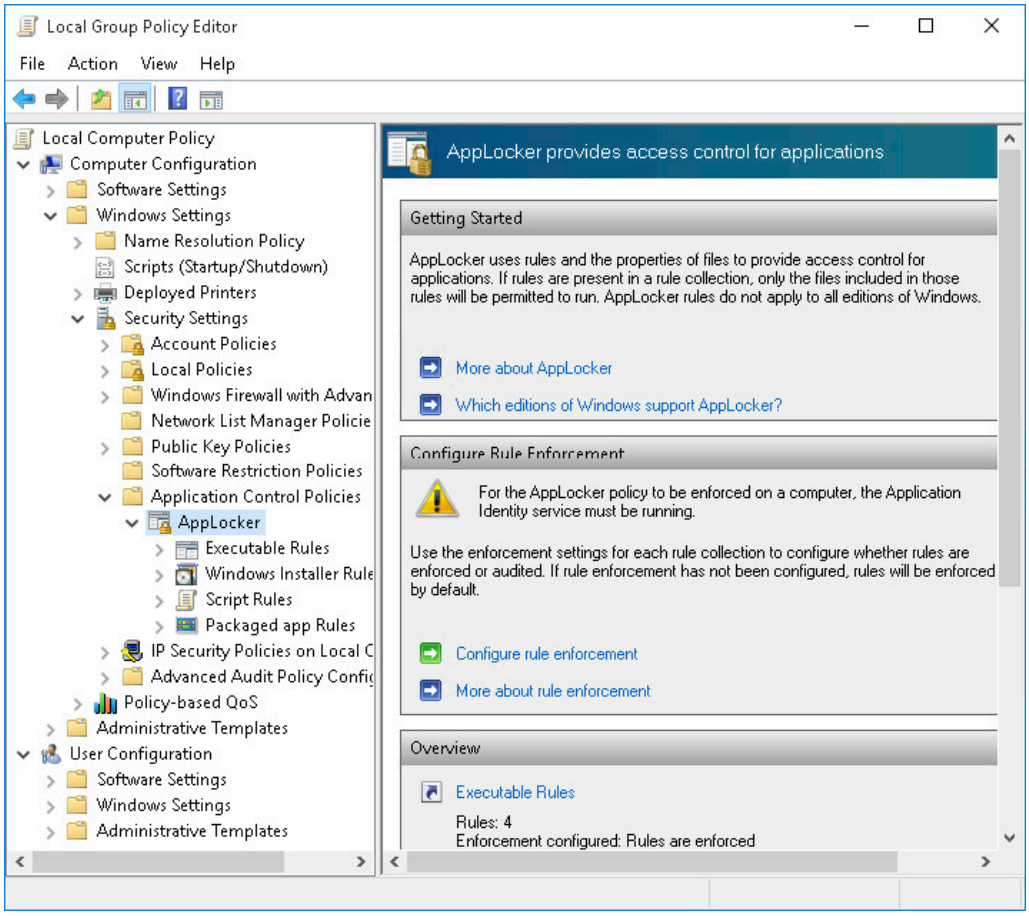


7 APPLICATION CONTROL POLICIES

Condition as supplied to customer

- The default AppLocker policies allow the execution of all files in the Windows and Program Files folders
- The administrator account is allowed to execute any software
- Any executables signed by Rohde&Schwarz are allowed to be executed
- Any other software cannot be executed by a standard user

AppLocker application control policies define which user account is allowed to run what software. It has two different modes of operation, determined by the default enforcement policy. One possibility would be to allow everything and block certain software. Rohde&Schwarz instruments use the opposite approach. By default the execution of any software is blocked and certain software is allowed to be executed.



7.1 Default rules

By default the execution of valid signed software from Rohde&Schwarz as well as software in the Program Files folder and the Windows folder is allowed for all users. All users with administrator rights are allowed to execute any software. These rules are divided into four categories:

Executable rules

Action	User	Name	Condition	Exceptions
Allow	Everyone	(Default Rule) All files located in the Program Files folder	Path	
Allow	Everyone	(Default Rule) All files located in the Windows folder	Path	
Allow	BUILTIN\Administrators	(Default Rule) All files	Path	
Allow	Everyone	Signed by O=ROHDE & SCHWARZ GMBH & CO. KG, L...	Publisher	

Windows installer rules

Action	User	Name	Condition	Exceptions
Allow	Everyone	(Default Rule) All files located in the Program Files folder	Path	
Allow	Everyone	(Default Rule) All files located in the Windows folder	Path	
Allow	BUILTIN\Administrators	(Default Rule) All files	Path	

Script rules

Action	User	Name	Condition	Exceptions
Allow	Everyone	(Default Rule) All files located in the Program Files folder	Path	
Allow	Everyone	(Default Rule) All files located in the Windows folder	Path	
Allow	BUILTIN\Administrators	(Default Rule) All files	Path	

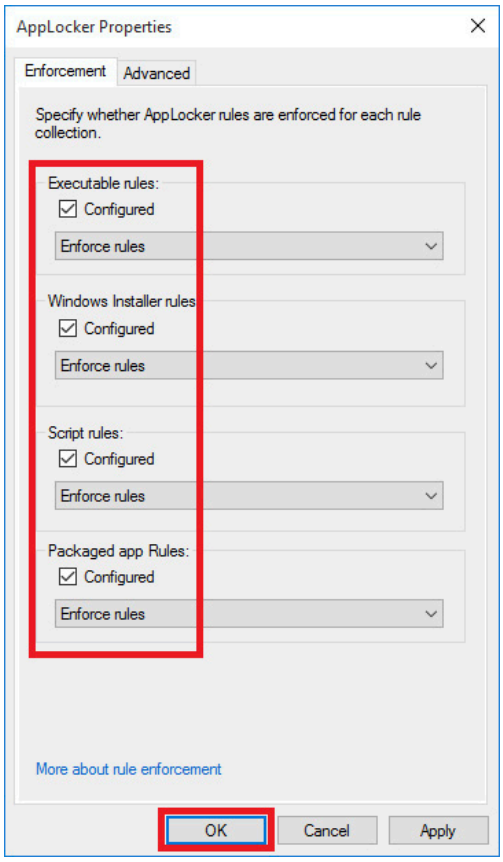
Packaged app rules

Action	User	Name	Condition	Exceptions
Allow	Everyone	(Default Rule) All files located in the Program Files folder	Path	
Allow	Everyone	(Default Rule) All files located in the Windows folder	Path	
Allow	BUILTIN\Administrators	(Default Rule) All files	Path	

There are three different kinds of rules based on either signature, hash value or location of a file. The default rules are based on file location, as it is easy to allow all programs in the Windows folder. Since a user without admin rights isn't allowed to copy files there, this is considered secure. The same applies to the Program Files folder. Rules based on a file's hash value are a good way to allow a specific version of a software to run. The downside is that with each update a new AppLocker policy has to be created. We therefore recommend using rules based on signatures when adding new rules. These can allow some or all software signed by a certain publisher.

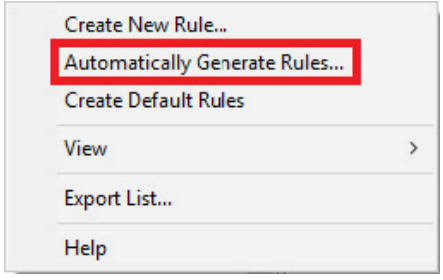
7.2 Enabling and disabling AppLocker

AppLocker can be configured in the local group policy editor. Navigate to “Local Computer Policy” ▷ “Computer Configuration” ▷ “Windows Settings” ▷ “Security Settings” ▷ “Application Control Policies” ▷ “AppLocker”. In the main window select “Configure rule enforcement”. Select or deselect the categories of rules that shall be enforced and confirm your selection by clicking “OK”.

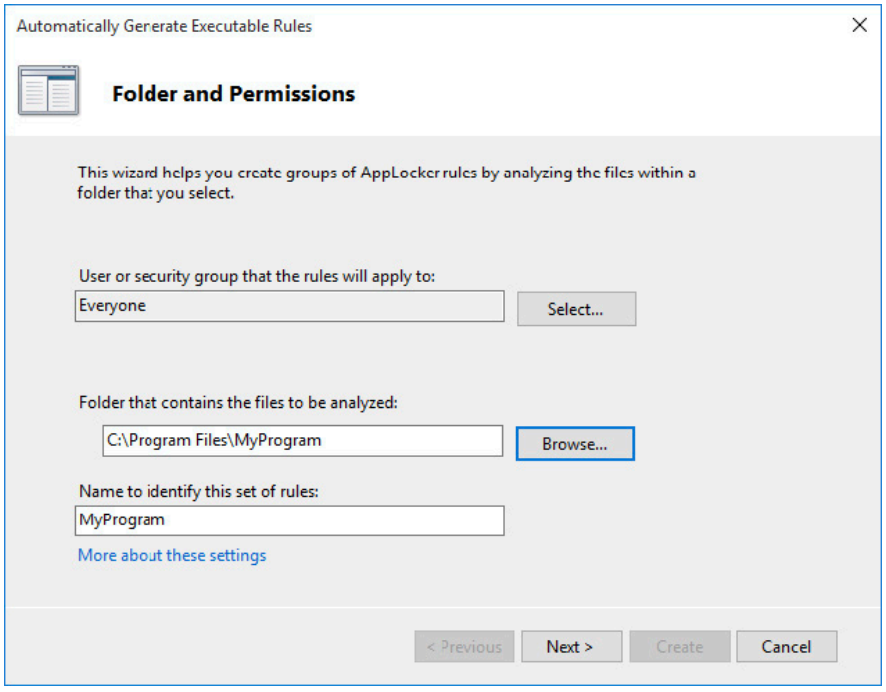


7.3 Adding and removing rules

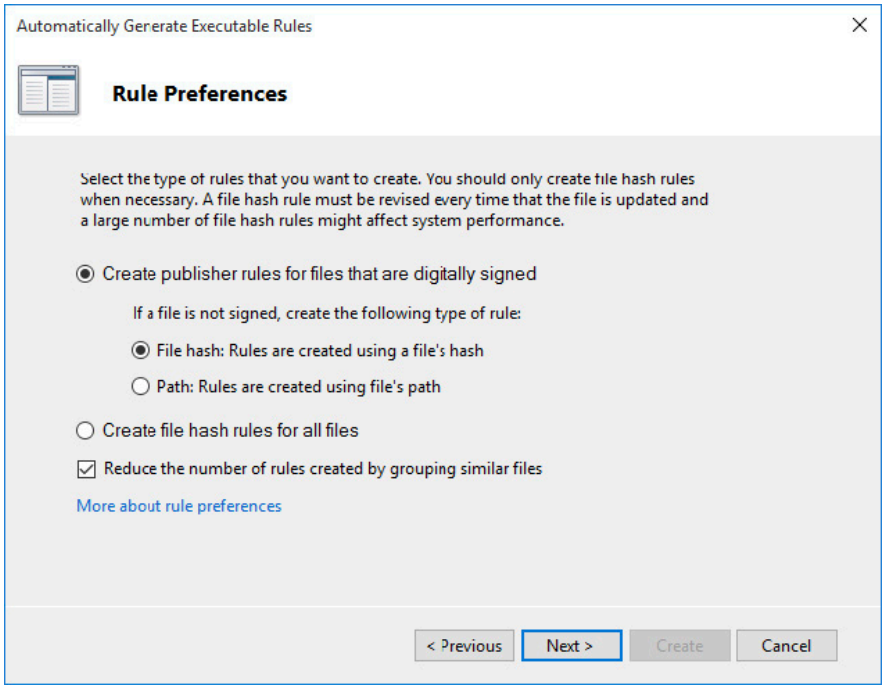
The easiest way to add new rules is to right-click one of the groups and select “Automatically Generate Rules”. It is possible to generate specific in-depth rules by selecting “Create New Rule” as well.



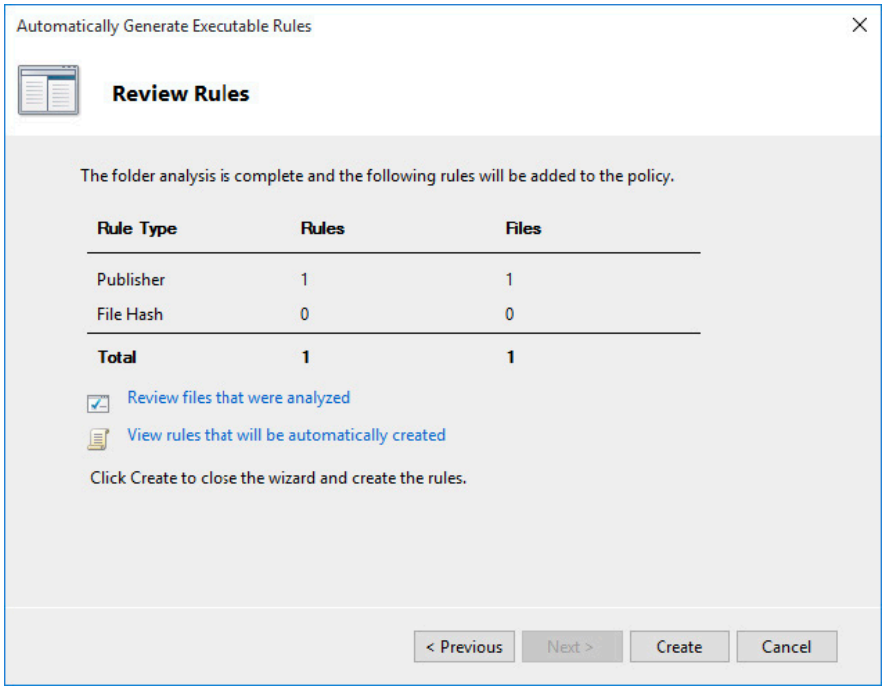
The dialog that opens is basically the same for each category of rules. In this example, executable rules shall be created. First select the user or security group the rules shall apply to. Second, select the folder containing the software you want to allow. Enter a name for this set of rules and proceed by clicking “Next”.



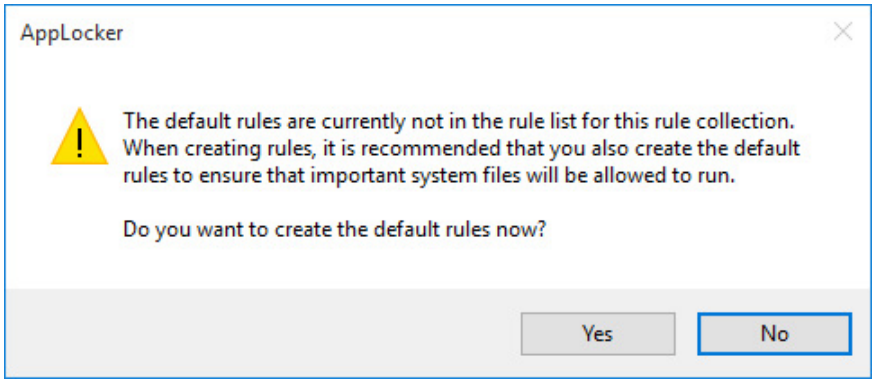
Now you can specify how the rules shall be generated. The default settings are recommended for most use cases. Rules are generated for each valid signature. If no signature is found, a rule based on the file’s hash value is generated. Proceed by clicking “Next”.



You can review the analyzed files and the rules to be generated. Finish the operation by clicking “Create”.



In case the default rules are not present, the system queries whether to create them automatically.



Any rules can be removed by right-clicking a rule and selecting “Delete”. You will be prompted to confirm the deletion by clicking “Yes”.

8 UNIFIED WRITE FILTER

Condition as supplied to customer

- Unified write filter (UWF) is optional and not applicable to all instruments
- If enabled, UWF prevents persistent changes to the hard disk

UWF is included in every Windows 10 IoT Enterprise image but by default not active on all instruments. It provides the capability to redirect any write access on the hard disk drive to a virtual overlay. This means all changes to the system are wiped when turning off or rebooting the instrument. Note that UWF cannot be used to protect any removable devices, USB devices or flash drives. Individual files, folders and registry keys can be excluded from the overlay. UWF replaces the previously used file based write filter (FBWF) and enhanced write filter (EWF).

UWF can be configured by using Windows management instrumentation (WMI, for example in a PowerShell script) or the command line tool uwfmgr.exe. We do not recommend changing the UWF's configuration on your own, as it affects the instrument's functionality.

9 WINDOWS APPS

Condition as supplied to customer

- There are no Windows apps on Rohde&Schwarz instruments because of usage of long-term servicing channel (LTSC)
- The browser Microsoft Edge is not available
- Cortana is not available
- Apps from the Microsoft Store cannot be installed
- Microsoft OneDrive is disabled by default

Rohde&Schwarz instruments with Windows 10 use the long-term servicing channel (LTSC), where no Microsoft Store apps are included. This includes Cortana, the browser Microsoft Edge and the Microsoft Store itself. Therefore no new apps can be installed using the store mechanic. Instead of Microsoft Edge, the included Internet Explorer 11 can be used. Otherwise any third-party browser can be installed and used.

9.1 Microsoft OneDrive

Microsoft OneDrive is disabled by group policy on all Rohde&Schwarz instruments to prevent the upload of sensitive data to the cloud.

10 ANTI-VIRUS SOFTWARE

Condition as supplied to customer

- Windows Defender is disabled by default
- No additional anti-virus solution is installed

Anti-virus software is an essential part of software security on Rohde&Schwarz instruments as well as on any PC or server. While Windows 10 comes with a reasonable anti-virus software included (i.e. Windows Defender), We recommend using third-party software to protect your instrument from malware.

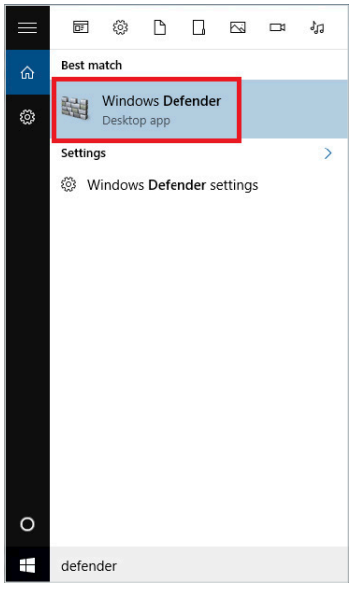
There are different anti-virus software solutions available from different manufacturers that offer good protection against malware. Although they differ in their requirement of system resources and handling, they have quite equally good detection rates. Please abide by your company's policy and use the anti-virus software solution provided by your IT department.

General recommendation

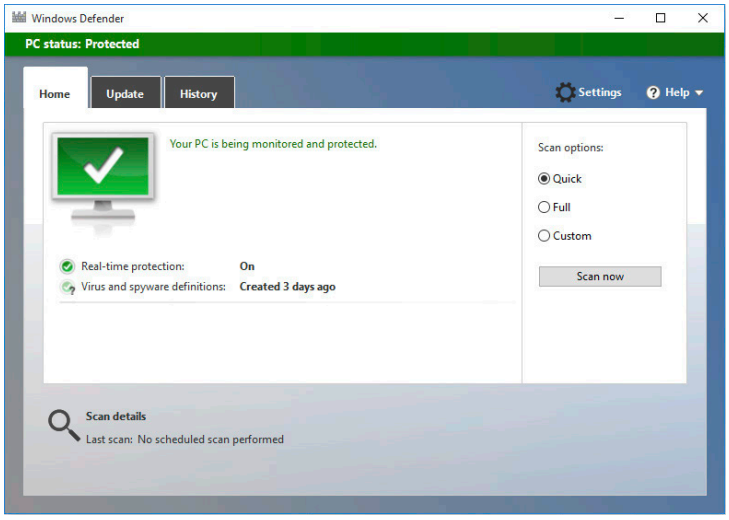
- Disable any on-access scanner and additional features to prevent performance influences on the instrument's firmware
- Always update virus definitions before performing a scan
- Perform a full system scan at least once a week

10.1 Windows Defender

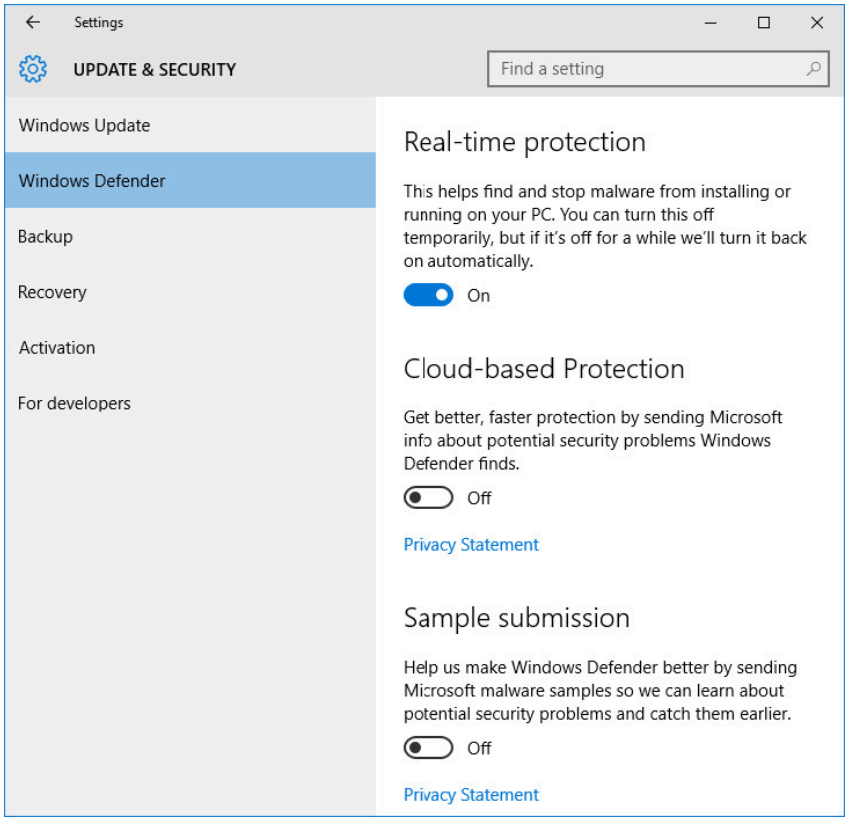
Windows Defender is built-in anti-virus software that provides reasonable protection against malware. It offers real-time scans as well as the option to scan the hard disk on demand. In order to perform a scan, type "defender" in the Start menu and select "Windows Defender".



In the main dialog you can select whether to perform a “Quick”, “Full” or “Custom” scan. By selecting “Quick”, Windows Defender will scan for viruses, spyware and unwanted software on certain parts of the hard disk. This scan will take a few minutes. By selecting “Full”, Windows Defender will scan the entire hard disk as well as all running programs. This scan can take more than one hour. You can scan a subset of folders by selecting a “Custom” scan. The virus and spyware definitions are automatically updated through the Windows Update service on a weekly basis.



Windows Defender can be configured in the Settings app. The real-time scanner can only be disabled temporarily.



Please note that Windows Defender will be disabled if third-party anti-virus software is installed.

10.2 Scanning from a USB device

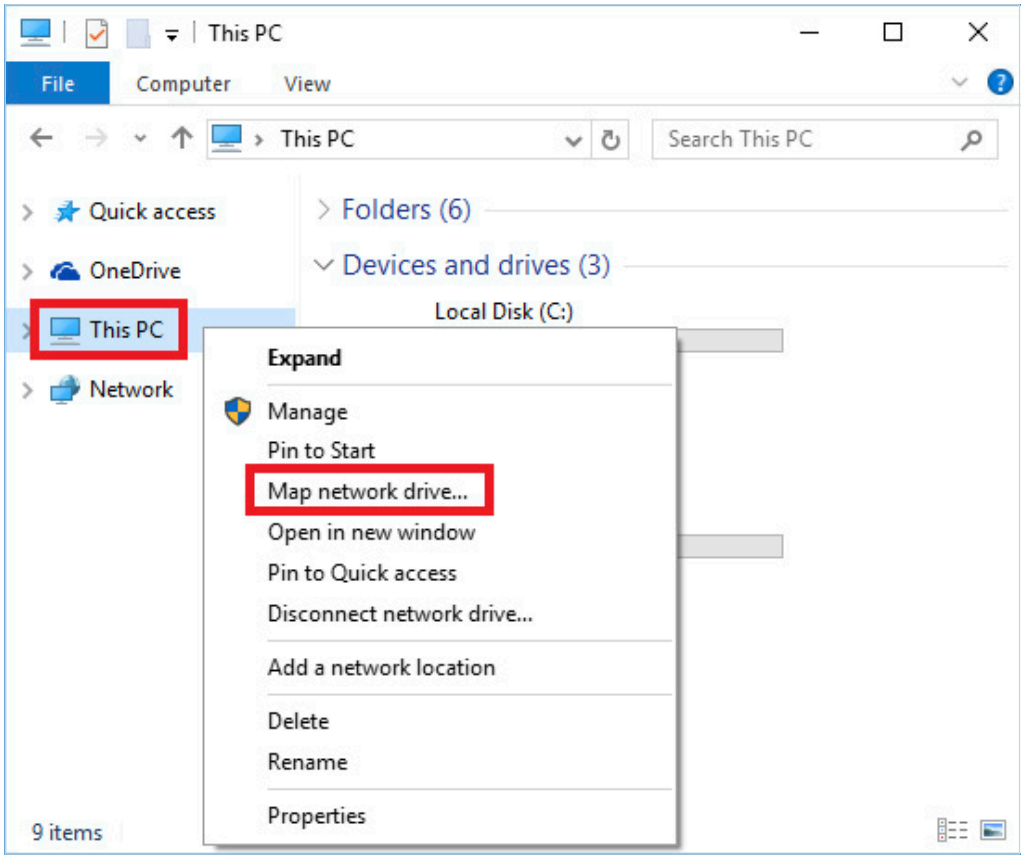
Most anti-virus software solutions offer the possibility to create bootable USB flash drives. This is a safe way to scan your instrument outside production time. Please refer to the manual of your anti-virus software for further information.

10.3 Scanning from a different PC

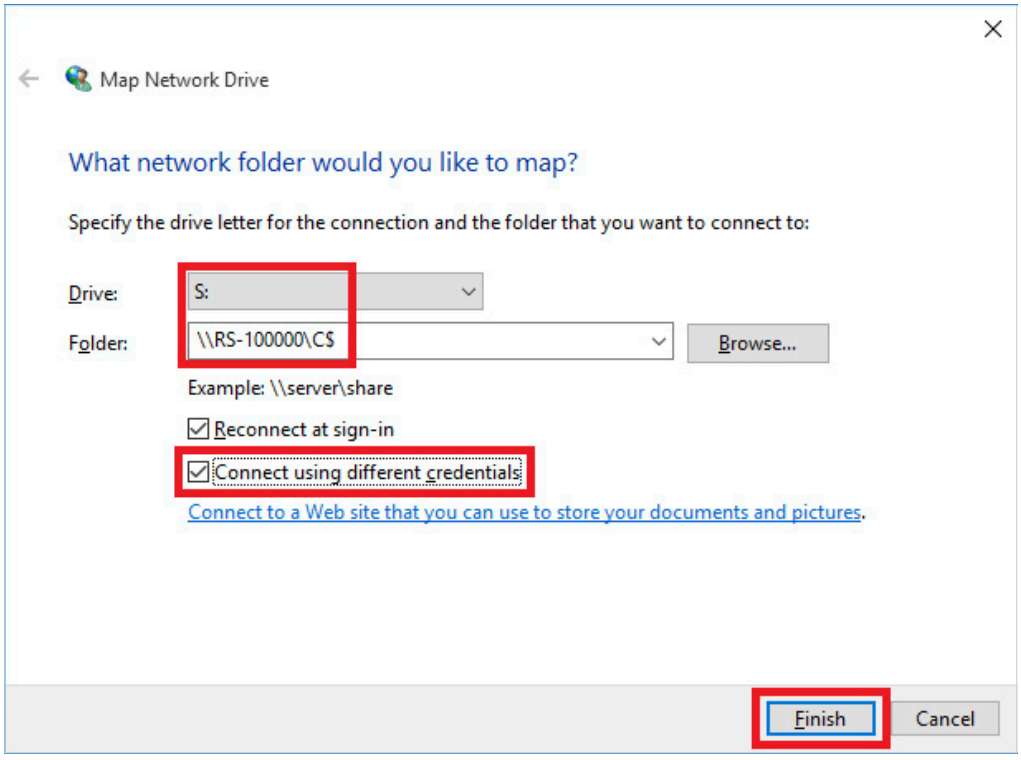
Scanning your instrument's hard disk drive from a different PC is an easy and convenient way to scan multiple instruments in an automated way. This only works if the instruments are connected to the same network as the scanning PC.

10.3.1 Mapping instrument drives on a computer with Windows 10

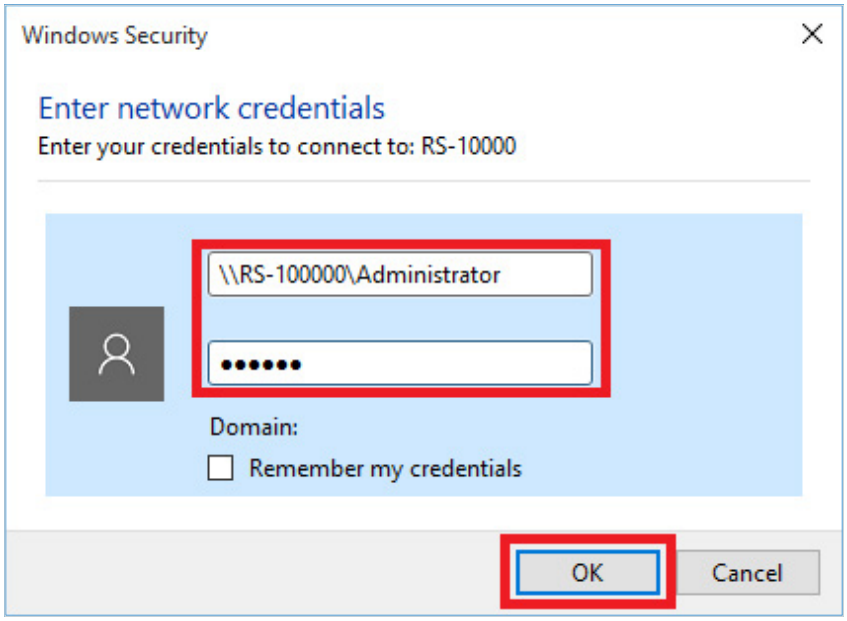
Open the File tab in Windows Explorer and right-click the folder “This PC” on the left side to open the context menu and select “Map network drive”.



Select the drive, folder and the option “Connect using different credentials” and confirm the dialog with the “Finish” button. We recommend using the administrative share “C$”.

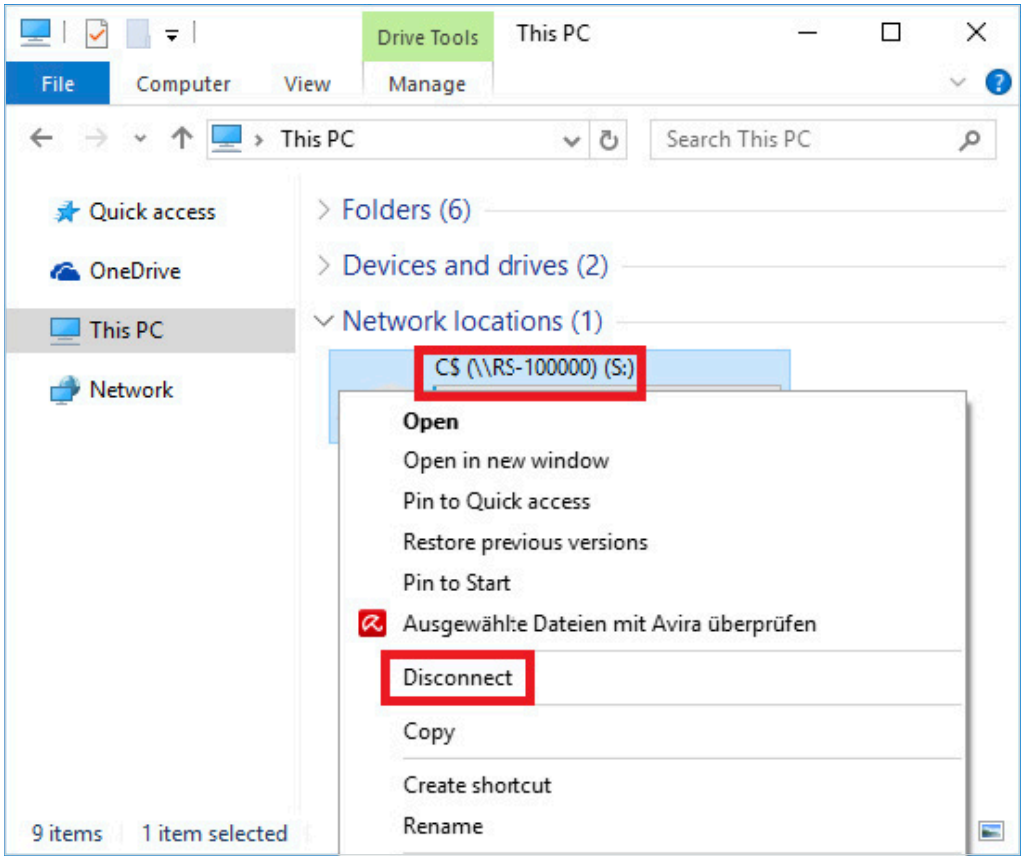


Enter the login information of your instrument’s administrator account. Please refer to the instrument's manual for details. It might be necessary to add the instrument’s computer name in front of the name of the instrument’s administrator account name.



To scan the instrument’s hard drive, start the anti-virus software on the control PC. Select one of the mapped drives of the instrument and run a virus scan. Please refer to the anti-virus software’s user manual for how to scan a network drive.

In order to return the PC to its original state, the network share should be removed. Open the File tab in Windows Explorer and expand the folder “This PC” to see all drives. Right-click the network share to open the context menu and select “Disconnect”.


Drive Tools
This PC
File
Computer
View
Manage
This PC
Search This PC
Quick access
OneDrive
This PC
Network
Folders (6)
Devices and drives (2)
Network locations (1)
C$ (\\RS-100000) (S:)
Open
Open in new window
Pin to Quick access
Restore previous versions
Pin to Start
Ausgewählte Dateien mit Avira überprüfen
Disconnect
Copy
Create shortcut
Rename
9 items
1 item selected

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White paper | Malware Protection Windows 10
Data without tolerance limits is not binding | Subject to change

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