Windows Authentication

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Get Started

Using host authentication (trusted scanning) allows our service to log in to each target system during scanning. For this reason we can perform in depth security assessment and get better visibility into each system's security posture. Running authenticated scans gives you the most accurate scan results with fewer false positives.

Do I have to use authentication?

For vulnerability scans, authentication is optional but recommended. For compliance scans, authentication is required.

Are my credentials safe?

Credentials are securely handled by the service and are only used for the duration of the scan.

In most cases, we do not modify or write to the device unless the user enables optional scan features Dissolvable Agent and Agentless Tracking and accepts the agreement regarding terms of use.

Dissolvable Agent: When enabled, we write the dissolvable agent file to the device and remove it when the scan is finished.

Agentless Tracking: When enabled, we write a host ID file to the device at the time of the first scan. Note - the Manager primary contact for the subscription can do a cleanup action to remove the host ID file from hosts at any time.

Cleanup Issues: In rare cases, if a scan terminates before cleaning up temporary files or the dissolvable agent, the files may persist. This generally should not occur.

Our security service uses credentials at scan time to log in with elevated privileges and read security information from the target. Using the information collected, the scanner runs the largest number of security tests, checking the most settings and configurations. You'll see this information gathered as part of your scan reports.

Which technologies are supported?

For the most current list of supported authentication technologies and the versions that have been certified for VM and PC by record type, please refer to the following article:

Authentication Technologies Matrix

What login credentials are required?

Windows Clients and Servers

For VM: Administrator privileges are recommended for the most accurate security assessment and recommended fixes for your system.

For PC/SCA: Administrator privileges (Build-in administrator or 'Domain Admins' groups member account) are required. The administrator privileges are required in order for the compliance scan engine to validate settings on the operating system.

Using an account with administrator privileges allows us to collect information based on registry keys, administrative file shares (such as C$) and running services. For VM, it's possible to use an account with less than administrator rights, however this limits scanning to fewer checks and scans will return less accurate, less complete results.

Windows uses an ACL-based approach. Each object (file, registry key) can have it's own ACL listing the accounts that have specific types of access (read, write, etc.) to that object. We must have access to a few objects or authentication will fail, including "IPC%$" pipe, the registry API and others. Missing access rights will simply cause the corresponding vulnerability checks (QIDs) and compliance checks (controls) to fail. Most security checks require access to multiple objects and the detailed list can vary depending on operating system version, patch level, configuration settings, etc. The only way to know whether access is sufficient is by running a scan and reviewing the reported access failures.

Windows Domain Controllers

Only Domain Administrator accounts can be used to scan Domain Controllers. We suggest you create a domain account to be used for authentication and add the account to the Domain Administrators Group. There are certain Group Policy settings that we recommend as best practice for scanning Windows systems. See Windows Domain Account Setup to learn more.

If you have any security concerns running scans on Domain Controllers with Domain Administrator privileges, consider using Qualys Cloud Agent. To learn more about Cloud Agent, see the Qualys Cloud Agent Getting Started Guide.

What Authentication Schemes are used?

Our service will attempt to use authentication schemes on the target host from the most secure scheme to the least secure scheme. We support the following authentication schemes, from highest to lowest:

1) Kerberos with AES-128/256

2) Kerberos with RC4-128

3) NTLMv2

4) NTLMv1 (disabled by default, and you can enable it within a Windows authentication record)

Steps for authenticated scans

The steps below describe how to set up Windows trusted scanning for a Qualys scan. For vulnerability scans, authentication to the target host is optional but recommended. For compliance scans, authentication is required.

Step 1 – Set up a Windows user account to be used by our security service for authentication.

Step 2 – Using Qualys: 1) Create Windows authentication records. 2) Select an option profile. For a vulnerability scan be sure to select "Windows" in the Authentication section. 3) Launch a scan. 4) Verify that authentication passed for each target host. Tip - Run the Authentication Report to view the authentication status (Passed or Failed).

Windows Domain Account Setup

This section describes how to create a domain account for authentication, how to add this account to the Domain Administrators Group, and how to set group policy settings. It is recommended that you verify the functionality of the account before using it for trusted scanning. If possible, configure the user account so that the password does not expire.

Create an Administrator Account

1) Log into the Domain Controller with an account that has administrator rights.

2) Open the Active Directory Users and Computers MMC snap-in.

3) Create a new user called "qualys_scanner" (or something similar). Please do not use "qualys" as this account is reserved for use by Qualys and may get locked out during scanning.

4) Select the "qualys_scanner" user and go to Properties (Action > Properties).

5) In the Properties window, go to the "Member Of" tab. Click Add to add the "qualys_scanner" user to the "Domain Admins" group. Click OK to save the change.

Group Policy Settings

Best practice Group Policy settings for authenticated scanning of Windows systems are described below. Please consult your network administrator before making changes to Group Policy as changes may have an adverse impact on your network operations, depending on your network configuration and security policies in place. Note that detailed descriptions for many Group Policy settings listed below is available online when using the Group Policy Editor.

Important! We highly recommended that you discuss making changes to Group Policy with your network administrator before implementation, as your local network configuration may depend on certain settings being in place. Qualys does not verify that these settings are appropriate for your network. If you do make any Group Policy changes, it may take several hours before the changes take effect on the client.

Security Options

Computer Configuration > Windows Settings ?> Security Settings > Local Policies > Security Options

Network access: Sharing and security model for local accounts	Classic
Accounts: Guest account status	Disabled (recommended)
Network access: Let Everyone permissions apply to anonymous users	Disabled (recommended)

System Services

Computer Configuration > Windows Settings > Security Settings > System Services

Remote registry	Automatic
Server	Automatic
Windows Firewall	Automatic

Administrative Templates

Computer Configuration > Administrator Templates > Network > Network Connections > Windows Firewall > Domain Profile

Windows Firewall: Protect all network connections	Disabled (recommended) or Enabled. Your network administrator should decide on the best option for your environment. If Enabled, 3 settings are required (below).
Windows Firewall: Allow remote administration exception	Enabled (1)
Windows Firewall: Allow file and printer sharing exception	Enabled (1)
Windows Firewall: Allow ICMP exceptions	Enabled (2)

(1) In the "Allows unsolicited messages from" field, enter "*" (do not enter quotes) or the IP address assigned to your scanner appliance(s). (2) This is optional for a vulnerability scan, and required for a compliance scan.

Verify Functionality of the New Account (recommended)

After configuring group policy settings, we recommend you verify the functionality of your new Windows domain account to confirm it is suitable for Windows authenticated scanning.

Select Run from the Start menu and enter cmd.exe and click OK. Use the commands below to test administrative share access and registry access. Variables are enclosed in <>. You need to replace variables with appropriate values. For example replace <USER> with a username like jsmith (i.e. remove the brackets).

Run this command to test administrative share access:

```
net use Z: \\<IP ADDRESS>\C$ /PERSISTENT:no /USER:<DOMAIN>\<USER>
```

Run this command to test registry access:

```
runas /USER:<DOMAIN>\<USER> "cmd /k reg.exe query \\<IP
ADDRESS>\HKLM\Software"
```

Note: There's a space after "query" and before \\<IP ADDRESS>

WMI Service Configuration

Some of our compliance checks require secure access to WMI service to successfully perform compliance assessment. For this reason we recommend you to set the WMI service to run securely by increasing the authentication level to Packet Privacy.

We require high authentication level to scan the following namespaces and associated controls:

Namespace: **root\cimv2\security\microsofttpm**

CID 11279 - Status of the 'Trusted Platform Module (TPM)' (Activated) on Windows

CID 11287 - Status of the 'Trusted Platform Module (TPM)' (Enabled) on Windows

CID 11288 - Status of the 'Trusted Platform Module (TPM)' (Owned) on Windows

Namespace: **root\CIMV2\TerminalServices**

CID 11478 - Current list of Groups and User Accounts granted the Remote Desktop Connection privilege

How to increase WMI authentication level

You need to run the following command on each host that you'll scan for the above mentioned namespaces and controls.

```
winmgmt /standalonehost 6
```

Then restart the Winmgmt service

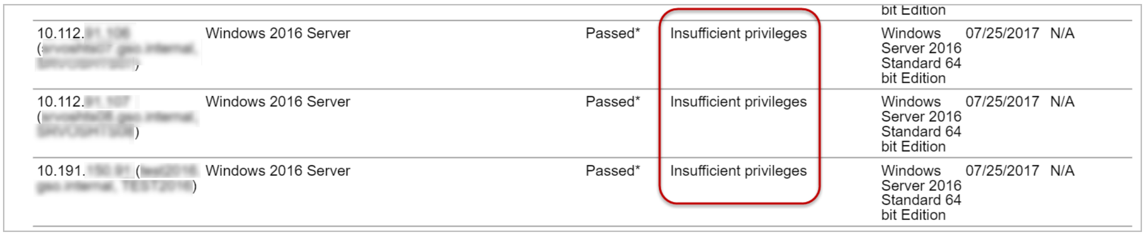
```
net stop winmgmt
net start winmgmt
```

For information on authentication levels see https://msdn.microsoft.com/en-us/library/aa393972(v=vs.85).aspx

What happens when high level authentication is not provided?

You may see Insufficient Privileges or WMI query failures when scanning namespaces and controls that require high level authentication.

Sample error from Windows Authentication Report:



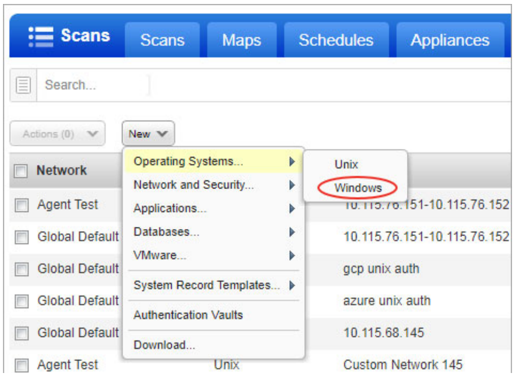
				bit Edition		
10.112.[redacted] ([redacted])	Windows 2016 Server	Passed*	Insufficient privileges	Windows Server 2016 Standard 64 bit Edition	07/25/2017	N/A
10.112.[redacted] ([redacted])	Windows 2016 Server	Passed*	Insufficient privileges	Windows Server 2016 Standard 64 bit Edition	07/25/2017	N/A
10.191.[redacted] ([redacted])	Windows 2016 Server	Passed*	Insufficient privileges	Windows Server 2016 Standard 64 bit Edition	07/25/2017	N/A

Manage Authentication Records

Create Windows records to allow our service to authenticate to your Windows hosts at scan time. Each record identifies the 1) credentials for logging in, and 2) the IP addresses we'll attempt to log in to using these credentials.

Create one or more Windows Records

Go to Scans > Authentication and select New > Operating Systems > Windows.



Which users have permission to create records?

Managers can add authentication records. Unit Managers may be granted this permission. Scanners may be granted this permission ONLY when the subscription is configured to allow it.

Which credentials are used if I have multiple records?

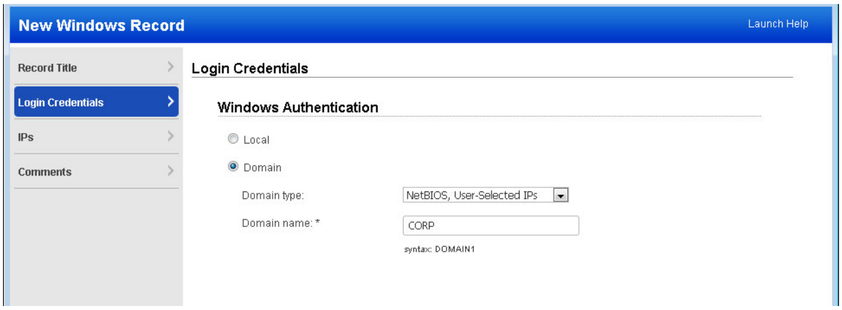
When you have multiple records, we match each target host to one record at scan time. See Login Credentials.

Can I edit my Windows record once it's created?

Yes you can edit your record at any time to change the login credential, target hosts and other settings. You can also make a copy of the record before making changes to keep your original in place. Go to Scans > Authentication and find the Windows record you want to edit. Hover over the record in the list and then select Edit from the Quick Actions menu.

Note for non-Manager users editing the record - You'll only see the IPs in the record that you have permission to view. The record may actually contain more IPs and any changes you make will affect all hosts defined in the record including the ones you don't see.

Windows Authentication Settings



Login Credentials

Windows Authentication

○ Local

● Domain

Domain type: NetBIOS, User-Selected IPs

Domain name: * CORP

syntax: DOMAIN1

Local Authentication

If you select Local authentication, authentication will be performed locally on the hosts you enter in the IPs section. Please see Appendix A - Non-Domain (Local) Scanning for account requirements.

Domain Authentication

You'll choose the domain type and enter the domain name.

NetBIOS, User-Selected IPs. When selected we'll use NetBIOS to authenticate to IP addresses in the domain configuration. You enter IPs in the IPs section of the record. A single authentication record may be defined for an entire domain (tree) using this method.

NetBIOS, Service-Selected IPs. When selected we'll use NetBIOS to authenticate to hosts in the domain using credentials stored on the domain. If trust relationships exist and the account's permissions are properly propagated, it's possible for us to authenticate to hosts which are not members of the same domain.

Active Directory. When selected we'll use an Active Directory forest to authenticate to hosts in a certain domain within the framework. You'll need to enter a Fully Qualified Domain Name (FQDN). If "Follow trust relationships" is selected and trust relationships exist, we'll authenticate to hosts in other domains having a trust relationship with the domain you've defined in the record.

Trust Relationships

Support for trust relationships

We support trust relationships in Windows domain logins. In other words, you can use credentials stored on one domain to authenticate to one or more hosts stored on another domain when trust relationships are present. This is done by the scan targets automatically, using pass-through authentication.

When to follow trust relationships

The "Follow trust relationships" setting (available with Active Directory domain type) is only intended for Small to Midsize businesses that have all of their domains in a single place (for example, a single office). This setting is NOT intended for Enterprise customers with hundreds of domains spread over many locations with firewalls between them.

When this setting is enabled, the scanner needs access to ALL domain controllers of ALL domains in the forest which have a trust relationship with the domain used in the authentication record. If firewalls block the connections to those domain controllers or if they block connections to the DNS servers resolving those domains then this can lead to authentication failures.

NetBIOS vs. Active Directory - Common Use Cases

Not sure which option to pick in your record? Generally, Active Directory records are preferred over NetBIOS because of the way cross-domain setups interact with name mapping. With NetBIOS records there are more situations in which the Kerberos protocol cannot be used. We support manually configured cross-domain setups with NetBIOS and Active Directory.

Check out these use cases and the record settings you should make for each one.

IP-based authentication

Domain Type: NetBIOS, User-Selected IPs
Domain Name: DOMAIN
User Name: USER

Host-based authentication

Domain Type: NetBIOS, Service-Selected IPs
Domain Name: DOMAIN
User Name: USER

Service-based auth for NTLM (no Kerberos available)

no trust relationships
We'll try to upgrade this to Kerberos if "DOMAIN" can be mapped to "domain.foo.com".

Domain Type: NetBIOS, Service-Selected IPs
Domain Name: DOMAIN
User Name: USER

Service-based auth for NTLM (no Kerberos available)

with manually configured trusts
This cannot be upgraded to Kerberos.

Domain Type: NetBIOS, Service-Selected IPs
Domain Name: TARGETDOMAIN
User Name: USERDOMAIN\USER

Service-based auth for Kerberos

no trust relationships
This always tries Kerberos first.

Domain Type: Active Directory
Domain Name: domain.foo.com
User Name: USER
Follow trust relationships: OFF

Service-based auth for Kerberos

with manually configured trusts
This always tries Kerberos first.
Recommended for Enterprise organizations for cross-domain authentication.

Domain Type: Active Directory
Domain Name: targetdomain.foo.com
User Name: USER@userdomain.foo.com
Follow trust relationships: OFF

Service-based auth for Kerberos

with automatic trust discovery
ONLY recommended for Small to Midsize Businesses.

Domain Type: Active Directory
Domain Name: userdomain.foo.com
User Name: USER
Follow trust relationships: ON

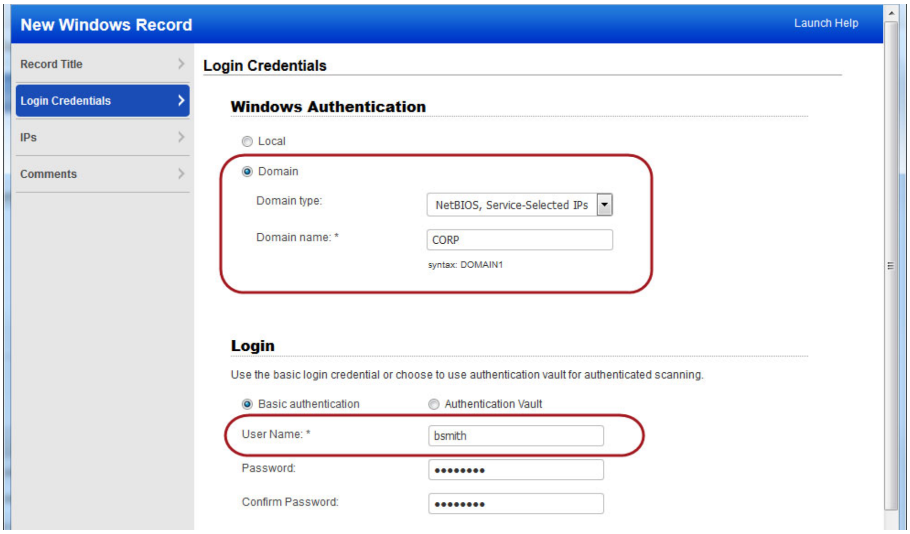
Examples for NetBIOS, Service-Selected IPs

For the Windows domain authentication option with service-selected IPs, please review how authentication occurs in these scenarios.

When Hosts Are Members of the Domain

Our security service will use NetBIOS to authenticate to hosts in a user-specified domain using credentials stored on this domain. If trust relationships exist and the account's permissions are properly propagated, it's possible for our service to authenticate to hosts which are not members of the same domain.

Example: CORP is a top-level domain. The account credentials are stored in domain CORP.



Login Credentials

Windows Authentication

○ Local
● Domain
Domain type: NetBIOS, Service-Selected IPs
Domain name: * CORP
syntax: DOMAIN1

Login

Use the basic login credential or choose to use authentication vault for authenticated scanning.

● Basic authentication ○ Authentication Vault
User Name: * bsmith
Password: ••••••••
Confirm Password: ••••••••

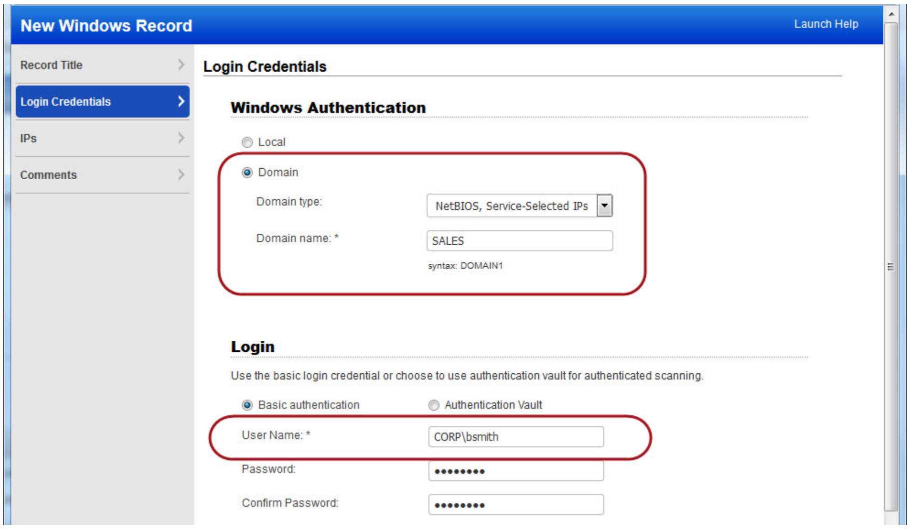
When Hosts Are Not Members of the Domain

This option may be used when a proper trust exists between the domain, on which the account credentials reside, and a child domain on which the target hosts exist. The account permissions must be properly propagated to the hosts' domain.

Specify the format "domain\user" in the User Name field. Note: The format "user@domain" is not supported. Using the "domain\user" format makes it possible to create one Windows authentication record per trusted domain in the case where hosts to be scanned are members of one domain and authentication credentials are stored on another domain.

In the Domain Type drop-down, select "NetBIOS, Service-Selected IPs". Enter the domain name identifying the hosts to be scanned. In the User Name field, enter the value "domain\user", where "domain" is the domain containing the authentication credentials, and "user" is the account name for these credentials stored on another domain.

Example: CORP is the top-level domain (forest root) where proper trust relationships exist. Credentials for account "vsmith" are stored in the top-level domain "CORP". Target hosts are members of the child domain "SALES". Enter "CORP\vsmith" in the User Name field and "SALES" in the Domain Name field.



Login Credentials

Windows Authentication

○ Local

● Domain

Domain type: NetBIOS, Service-Selected IPs

Domain name: * SALES

syntax: DOMAIN1

Login

Use the basic login credential or choose to use authentication vault for authenticated scanning.

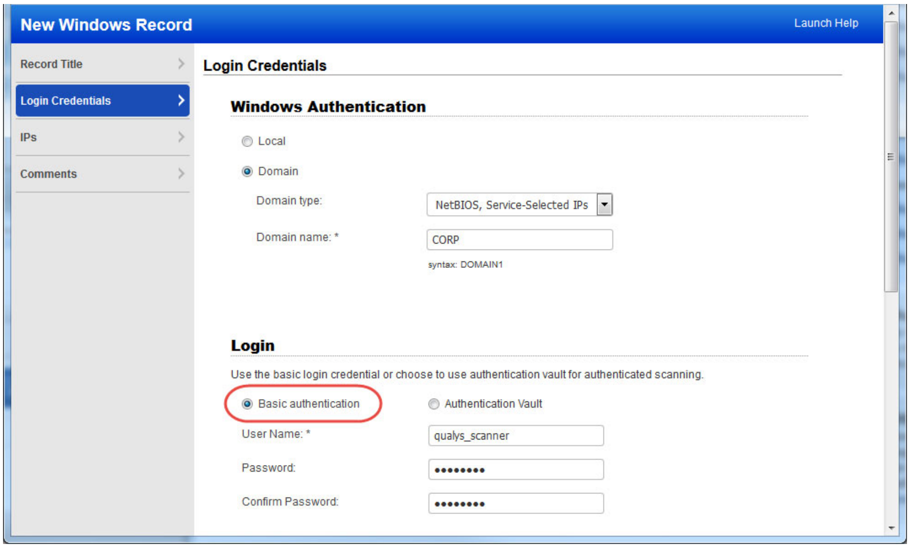
● Basic authentication ○ Authentication Vault

User Name: * CORP\bsmith

Password: ••••••••

Confirm Password: ••••••••

Login Credentials



Login Credentials

Windows Authentication

○ Local

● Domain

Domain type: NetBIOS, Service-Selected IPs

Domain name: * CORP

syntax: DOMAIN1

Login

Use the basic login credential or choose to use authentication vault for authenticated scanning.

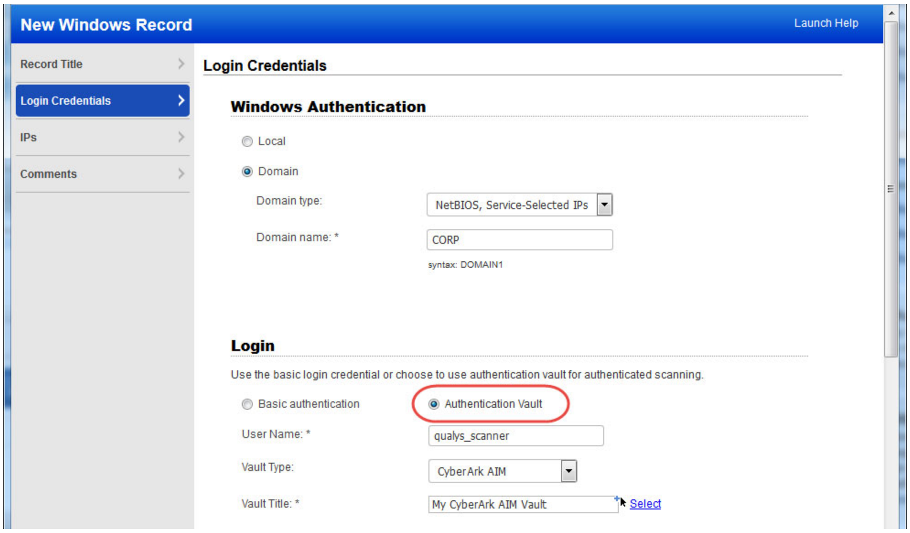
● Basic authentication ○ Authentication Vault

User Name: * qualys_scanner

Password: ••••••••

Confirm Password: ••••••••

If you choose Basic Authentication you'll enter the user name and password to be used for authentication at scan time.



Login Credentials

Windows Authentication

○ Local

● Domain

Domain type: NetBIOS, Service-Selected IPs

Domain name: * CORP

syntax: DOMAIN1

Login

Use the basic login credential or choose to use authentication vault for authenticated scanning.

○ Basic authentication ● Authentication Vault

User Name: * qualys_scanner

Vault Type: CyberArk AIM

Vault Title: * My CyberArk AIM Vault

If your organization stores passwords in a third party password manager we can access these passwords. You just need to create a vault configuration in your account. The vault configuration settings allow us to access the password manager application, and the record settings tell us how to retrieve the password(s) for the hosts you want to scan.

Go to Scans > Authentication > Vaults to tell us about your vault system. Then choose Authentication Vault in your record and select your vault name.

Authentication Protocols

Our scanners will attempt authentication to your target hosts using one of the authentication protocols selected in your record, starting with the most secure protocol to the least secure protocol. For domain level authentication, all three protocols are supported. For local host authentication, NTLMv2 and NTLMv1 protocols are supported.

IPs

Select the Windows hosts (IPs) you want to authenticate to using the login credentials defined for this record. Each IP may be included in one Windows record. For domain level authentication, you only select IPs when domain type "NetBIOS, User-Selected IPs" is used. All IPs specified in this section must be part of the domain configuration.

SMB Options

SMB signing required - This option is unchecked by default, meaning SMB signing is not required. This is the recommended setting. When unchecked, we can authenticate to any Windows version regardless of how SMB signing is configured on the target. You are not protected, however, against man-in-the-middle (MITM) attacks.

When selected, we will require each Windows target to support SMB signing, whether configured through Local Policy or Group Policy. If SMB signing is disabled on a target host, authentication will fail and the host will not be scanned. This option protects against MITM attacks but we won't be able to authenticate to some hosts.

Minimum SMB version - Select a minimum SMB protocol version, such as version 1, 2.0.2, 2.1, etc, and we'll require that each Windows target has that version or later. If the target has an older version of the SMB protocol, authentication will fail and the host will not be scanned.

Agentless Tracking

Agentless Tracking is a feature that allows customers to track hosts by host ID, instead of relying on the IP address (or DNS name or NetBIOS name) to identify the host. This provides a scan option for customers who would like to scan systems with multiple IP addresses and parse the results in order to consolidate all vulnerability data for a unique host ID.

Select the option "Enable agentless tracking" to track the hosts in the record by host ID. During the scanning process, the service assigns a unique host ID to each target host.

The host ID is stored on the host's local file system in the registry under:

Key: HKLM\SOFTWARE\Qualys

Value Name: HostID

You can read more about it in the Qualys online help.

Multiple Windows Records

You can configure as many Windows authentication records as you like. We'll always try to match each Windows host to one Windows record. Once a match is found we'll use the matching record for authenticating to the host, and we'll stop looking for other possible matches.

Do you have multiple Windows records? The order used to match a host to a Windows record depends on a couple of things.

Record types are evaluated in this order

1) Records set to NetBIOS, Service-Selected IPs

We'll look at Windows records with service-selected IPs (records set to "Domain: NetBIOS, Service-Selected IPs") to see if the host is registered with a domain in one of those records. If a match is found, the credentials in the record are used for authentication.

2) Records set to NetBIOS, User-Selected IPs

We'll look at Windows records where users configure the target host IPs (records that enable "Domain: NetBIOS: User- Selected IPs" and "Local") to see if the host is included in one of those records. We'll attempt to match domain records first, then local records. In the case where credentials in a service-selected IPs record were used for authentication to the host and authentication failed, we'll look to see if the host is included in a user-selected IPs record for local authentication only. If a match is found, the credentials in the record are used for authentication.

3) Records set to Active Directory

We'll look at Windows records set to "Active Directory" and attempt to authenticate to hosts found in the Fully Qualified Domain Name (FQDN) defined for each.

Administrator vs another account

Records with an Administrator account are attempted first

First we'll attempt to match the host to a Windows record with an administrator account in this order: 1) Records set to NetBIOS, Service-Selected IPs, 2) Records set to NetBIOS, User-Selected IPs, and 3) Records set to Active Directory.

Records with another account

If we do not match the host to a record with an Administrator account, we'll attempt to match the host to a Windows record with another account in this order: 1) Records set to NetBIOS, Service-Selected IPs, 2) Records set to NetBIOS, User-Selected IPs, and 3) Records set to Active Directory.

Appendix A - Non-Domain (Local) Scanning

When preparing to run trusted scans on local systems, be sure that the following system settings are enabled when the system is not joined to a domain. Without these settings enabled, our security service cannot perform Windows trusted scanning on target hosts in your network.

Windows 2000, 2003, XP | Windows Vista, 2008, 2012, 2016, 2019 | Windows 7, 8

Windows 2000, 2003, XP

Local Account

A local account which is in the Administrator’s group must be used.

Enable Server Service

The Server Service is typically enabled. If disabled, you can enable it via policies or scripts. Note that File and Printer Sharing, which is required for trusted scanning, will function only when the Server Service is enabled.

Enable File and Printer Sharing on Network Interface

File and Printer Sharing must be enabled on the network interface of all hosts to be scanned (note that it is enabled by default). You can enable this manually via the Network Interface properties, or using a script with a tool such as “netset.exe” or “netcfg.exe”. Netset.exe is a Windows command-line tool that supports changing network interface settings. Snetcfg.exe is a Microsoft Development Kit tool. Compiled versions of snetcfg are available for Windows 2000 and XP.

Disable Simple File Sharing (SFS): Windows XP

Simple File Sharing (SFS) must be disabled on Windows XP systems to be scanned. SFS is disabled by default when a Windows XP Pro system joins a domain, so no configuration should be necessary to support trusted scanning on Windows XP Pro systems in an enterprise network. It's possible for users to enable SFS so there may be a need to use a Group Policy or other means to ensure that this is disabled.

If you wish to scan a Windows XP Home system or a Windows XP Pro system, which has not been added to a domain, then SFS must be disabled on these systems.

It’s possible to disable this option manually per machine. To do this on the local machine, open Windows Explorer and go to Tools > Folder Options > View. Under Advanced settings, clear the setting “Use simple file sharing (Recommended)” and then click OK.

Enable Remote Registry Service

Our security service must access the system registry to perform Windows trusted scanning. To allow this access, the Remote Registry service must be enabled. To check this, go to Control Panel > Administrative Tools > Services and verify that the service is running and set to start automatically.

Allow Remote Administration on Windows Firewall: Windows 2003, XP

To allow access through Windows Firewall (if used), be sure to set the Remote Administration Exception within the Windows Firewall. Using Group Policy, this setting can be found under:

Computer Configuration\Administrative Templates\Network\Network Connections\Windows Firewall\Standard Profile (Or replace Standard Profile with Domain Profile if your computer is a member of a Windows domain.)

If you manage your firewall through the Control Panel, enable TCP ports 135 and 445.

Windows Vista, 2008, 2012, 2016, 2019

Windows Firewall Settings

For each target host, there are certain Windows Firewall settings that must be enabled.

Step 1: Allow “File and Print Sharing” traffic

Activate firewall rules that are relevant to non-domain profiles in order to allow traffic for File and Print Sharing.

1) Go to the Control Panel Home window.

2) Do one of the following:

- For Vista and 2008: Go to Security and click the link “Allow a program through Windows Firewall”.

- For 2012, 2016, 2019: Go to System and Security > Windows Firewall and click the link “Allow an app of feature through Windows Firewall”.

3) Select the “File and Print Sharing” check box.

4) Click OK.

Step 2: Allow scanner appliance traffic

By default, in a non-domain profile, a Windows system (Vista, 2008, 2012, 2016, 2019) does not allow traffic from outside its own local subnet even when a firewall rule has been activated. For this reason, you must also provide the IP address or subnet of the scanner appliance.

1) Go to Start > Control Panel.

2) Do one of the following:

- For Vista, 2008, 2016: Go to System and Maintenance > Administrative Tools > Windows Firewall with Advanced Security.

- For 2012: Go to System and Maintenance > Administrative Tools > Windows Firewall > Advanced Settings.

- For 2019: Go to System and Security > Administrative Tools > Windows Defender Firewall with Advanced Security.

3) Click Inbound Rules.

4) For each entry in the "File and Printer Sharing" group with a green check mark (Vista, 2008 and 2012) and each entry in the "Remote Administration" group with a green check mark (Vista and 2008) follow these steps: a) Right-click on the entry and select Properties, b) Select the Scope tab, and c) Select "Any IP address" or click the Add button to add the IP address (or subnet) for the scanner appliance configured to scan the target host.

5) Click OK.

Enable File Sharing

File sharing must be turned on for each target host. Go to the Control Panel Home window and follow these steps.

For Vista and 2008:

1) Under Network and Internet, click the link "Set up file sharing".

2) In the Network and Sharing Center window, make sure these settings are correct: File sharing is On and Public folder sharing is Off.

For 2012, 2016, 2019:

1) Under Network and Sharing Center, click the link "Change advanced sharing settings".

2) Change sharing options for the current network profile.

- For a non-domain target, select "Guest or Public".

- For a domain target, select "Private".

3) Make sure these settings are correct: turn on network discovery and turn on file and printer sharing.

4) For All Networks, turn off Public Folder Sharing and turn on Password Protected Sharing.

Enable Remote Registry Service

Our service must access the system registry to perform Windows trusted scanning. To allow this access, the Remote Registry service must be started.

1) Go to Control Panel > Control Panel Home.

2) Choose "System And Maintenance" (for Vista, 2008, 2012, 2016) or "System and Security" (for 2019)

3) Go to Administrative Tools > Services.

4) Start the Remote Registry Service. You could set this to Automatic to make sure it starts automatically at reboot.

Configure User Access Control (UAC)

Do I need to configure UAC? Yes. There are 2 methods you can use: 1) change Remote UAC settings, or 2) disable UAC policy.

Method 1: Change Remote UAC settings

1) Launch Registry Editor (regedit.exe) in “Run as administrator” mode and grant Admin Approval, if requested

2) Navigate to HKEY_LOCAL_MACHINE hive

3) Open SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System key

4) Create a new DWORD (32-bit) value with these properties:

Name: LocalAccountTokenFilterPolicy
Value: 1

5) Close Registry Editor

Warning: The value data types of DWORD (32-bit) and QWORD (64-bit) are located next to each other in the data type selection menu on 64-bit Windows versions. It may be easy to mistake one for another and select the incorrect data type. The required value data type must be DWORD (32-bit). Selecting QWORD (64-bit) and setting it to 1 will not enable Remove UAC.

The requirement to reboot the system or restart the Server service is questionable. Despite what some documents recommend, our tests have shown that disabling Remote UAC in the registry takes effect immediately and remote access to ADMIN$ is granted during the scan.

Method 2: Disable UAC policy

Go to the Control Panel Home window and follow these steps.

For Vista, 2008, 2016:

1) Click “Add or remove user accounts”.

2) Select a user account.

3) Under the account, click the link “Go to the main User Accounts Page”.

4) On the page “Make changes to your user account”, click “Change security settings”.

5) On the page “Turn on User Account Control (UAC) to make your computer more secure”, de-select (clear) the check box “Use User Account Control (UAC) to help protect your computer” and click OK.

6) Reboot your computer.

For 2012, 2019:

1) Click User Accounts.

2) Change User Account Control settings.

3) Set the tab to “Notify me only when apps try to make changes to my computer (do not dim my desktop)”.

4) Reboot your computer.

Want more info about UAC?

Check out our document Microsoft Windows User Access Control (UAC).

Windows 7, 8

Windows Firewall Settings

For each target host, there are certain Windows Firewall settings that must be enabled. First activate firewall rules that are relevant to non-domain profiles in order to allow traffic for File and Print Sharing. Then for each activated rule, add the scanner appliance IP address or subnet so that the scanner appliance traffic can reach the host.

Allow “File and Print Sharing” traffic. Follow these steps: 1) Go to the Control Panel Home window, 2) Under System and Security > Windows Firewall, click the link “Allow a program through Windows Firewall”, 3) Select the “File and Print Sharing” check box and 4) Click OK.

By default, a non-domain network profile system does not allow traffic from outside its own local subnet even when a firewall rule has been activated. You must change the scope of the firewall rule to include the IP address or subnet of the scanner appliance.

Follow these steps to allow scanner appliance traffic:

1) Go to the “Windows Firewall with Advanced Security” program located in Start > Control Panel > System and Security > Administrative Tools.

2) Click Inbound Rules.

3) For each entry in the “File and Printer Sharing” group with a green check mark follow these steps: a) Right-click on the entry and select Properties, b) Select the Scope tab, and c) Select “Any IP address” or click the Add button to add the IP address (or subnet) for the scanner appliance that has been configured to scan the target host. Then click OK.

Enable File Sharing

File sharing must be turned on for each target host following these steps: 1) Go to the Control Panel Home window, 2) Under Network and Internet > HomeGroup, click the link “Change advanced sharing settings” and 3) Change sharing options for the current network profile. For a non-domain target, select “Home or Work”. For a domain target, select “Domain”. Make sure these settings are correct: File sharing is On and Public folder sharing is Off.

Enable Remote Registry Service

Our security service must be able to access the system registry to perform Windows trusted scanning. To allow the service access to the system registry, the Remote Registry service must be started. Go to Control Panel > Control Panel Home > System And Maintenance > Administrative Tools > Services and start the Remote Registry Service. You could set it to Automatic to make sure it starts automatically at reboot.

Enable Server Service (Windows 8)

On Windows 8 systems, the Server Service must also be started. By default, this is started and set to Automatic. Please verify that this true for your particular version and configuration. You can check by going to Control Panel > Control Panel Home > System And Maintenance > Administrative Tools > Services. Start the Server Service if it is not already started.

Configure User Access Control (UAC)

Do I need to configure UAC? Yes. There are 2 methods you can use: 1) change Remote UAC settings, or 2) disable UAC policy.

Method 1: Change Remote UAC settings

1) Launch Registry Editor (regedit.exe) in "Run as administrator" mode and grant Admin Approval, if requested

2) Navigate to HKEY_LOCAL_MACHINE hive

3) Open SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System key

4) Create a new DWORD (32-bit) value with the following properties:

Name: LocalAccountTokenFilterPolicy
Value: 1

5) Close Registry Editor

Warning: The value data types of DWORD (32-bit) and QWORD (64-bit) are located next to each other in the data type selection menu on 64-bit Windows versions. It may be easy to mistake one for another and select the incorrect data type. The required value data type must be DWORD (32-bit). Selecting QWORD (64-bit) and setting it to 1 will not enable Remote UAC.

The requirement to reboot system or restart Server service is questionable. Despite what some documents recommend, our tests have shown that disabling Remote UAC in the registry takes effect immediately and remote access to ADMIN$ is granted during the Qualys scan.

Method 2: Disable UAC Policy

Follow these steps:

1) Open the Control Panel. Then click "Add or remove user accounts".

2) Select a user account. Then, under the account, click the link "Go to the main User Accounts Page".

3) On the page “Make changes to your user account”, click “Change security settings”.

4) On the page “Turn on User Account Control (UAC) to make your computer more secure”, de-select (clear) the check box “Use User Account Control (UAC) to help protect your computer” and click OK.

5) Reboot your computer.

Appendix B - Windows NT Domains

When NT domains are used, you may use one of the options described below to create and configure an account with privileges that allow read access to remote registries and minimal domain access otherwise. After creating and configuring an account following the steps provided, it's best practice to make the Group Policy settings described earlier (see Windows Domain Account Setup).

Option 1 – Using an Administrator Group

You can create a new user account in the Global administrator group. This option may be used with Windows NT based domains.

Steps for account creation and configuration:

1) Log into the Domain Controller with an account that has administrator rights.

2) Create a new user account called "qualys_account".

3) Make the "qualys_account" a member of the Global group called "Domain Admins".

4) In the "Member of" section of the group properties, keep only the group "Domain Admins" and remove any other groups.

The Global group "Domain Admins" should be used for access to remote systems as this group is automatically added to the "Administrators" Local group on each system when it becomes a member of the Windows NT domain.

Option 2 – Set ACL Remotely Using SetACL Command-Line Tool

It's possible to automate the process of changing permissions of registry keys remotely using a command-line tool such as SetACL. This option may be used with Windows NT domains.

Note — In some environments with Windows Active Directory domains and workstations running different versions of Windows, this method may be used to set registry keys remotely on certain workstations. In this case if you set a domain-wide policy, as described in Option 1, registry keys are set for Windows 2000/2003/XP workstations only. For workstations running earlier versions of Windows, use the SetACL tool to change registry keys on these systems.

The SetACL command-line tool is available for download from http://setacl.sourceforge.net/.

Steps for account creation and configuration:

1) Log into the Domain Controller with an account that has administrator rights.

2) Create a new Global group called "qualys_scanners".

3) In the group properties, be sure that there are no members of the group.

4) Create a new user account called “qualys_account” and put it in the “qualys_scanners” group.

5) In the “Member of” section of the account properties, keep only the “Administrators” group and remove any other entries.

6) At the command line, run SetACL to set the remote access registry key on a target host, using the syntax shown below.

```
setacl on "\\NETBIOS_NAME\MACHINE\SYSTEM\CurrentControlSet\Control\
SecurePipeServers\winreg"
-ot reg -actn ace -ace "n:DOMAIN\GROUPNAME;p:read;m:grant;w:dacl;i:np"
```

where GROUPNAME is “qualys_scanners” group (the Global group you created).

Appendix C - Windows Authentication QIDs

These vulnerability checks (QIDs) return valuable information useful for verifying Windows trusted scanning and testing the user accounts used for login.

Windows Authentication Status

QID	Severity	Title
70053	■□□□□	Windows Authentication Method for User-Provided Credentials
70028	■□□□□	Windows Authentication Method
105015	■□□□□	Windows Authentication Failed
105296	■□□□□	Windows Authentication Not Attempted

Windows Information — Registry and File Access

QID	Severity	Title
70038	■□□□□	File and Print Access Denied
90035	■■□□□	Missing AllowedPaths Registry Key
90331	■□□□□	Access to File Share is Enabled
90399	■□□□□	Windows File Access Denied
90194	■■□□□	Windows Registry Pipe Access Level
90195	■□□□□	Windows Registry Key Access Denied
105025	■□□□□	Windows Registry Access Level
105177	■■□□□	Microsoft Windows Registry Critical Checks Security Policy

Contact Support

Qualys is committed to providing you with the most thorough support. Through online documentation, telephone help, and direct email support, Qualys ensures that your questions will be answered in the fastest time possible. We support you 7 days a week, 24 hours a day. Access online support information at www.qualys.com/support/.