

# Information Security Guidelines for HP® Z2 Mini G4 Workstations

For BD® Biosciences products using  
Microsoft® Windows® 10 Enterprise

23-22367-00  
2/2020



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## FCC information

**WARNING:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**NOTICE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense. Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits. This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## History

Revision	Date	Change made
23-22367-00	2/2020	Initial release

# Contents

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<b>Chapter 1: Introduction</b>	<b>5</b>
About this guide .....	6
Technical support .....	7
<b>Chapter 2: Information Security Guidelines</b>	<b>9</b>
Software policies .....	10
Overview of product .....	11
Malware protection software .....	13
Microsoft Windows update guidelines .....	19
Microsoft Windows limited-user-account settings .....	21
Microsoft Windows firewall, Internet Information Server (IIS), and proxy settings 23	
File shares in Windows 10 .....	28
BitLocker Encryption Management .....	36
AppLocker Execution Control .....	38
Removable media guidelines .....	41
<b>Chapter 3: Operating System hardening</b>	<b>43</b>
Operating System hardening and other guidelines .....	44
Summary of STIGs applied to the OS configuration .....	44



# 1

## Introduction

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This chapter includes the following topics:

- [About this guide \(page 6\)](#)
- [Technical support \(page 7\)](#)

## About this guide

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### Overview

This guide provides recommendations to customers regarding security on BD Biosciences workstations. This includes use of antivirus software, management of Microsoft® Windows® user account settings, firewall settings, and removable media guidelines.

This guide applies to BD Biosciences workstations running Microsoft Windows 10 Enterprise LTSC.

**Note:** At the time of publication of this document, the testing was performed using the Microsoft Windows 10 Enterprise 2019 LTSC (Long-term Servicing Channel) operating system (OS).

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### Who should read this guide

All IT system administrators of BD Biosciences instrument workstations should read this guide. Users who are interested in the operation of the computer workstation can read this guide to learn more about BD recommendations for maintaining a secure system.

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### Guide contents

This guide describes:

- Our recommendations, responsibilities, warranty, and liability regarding the installation and maintenance of virus protection software and Windows security updates and hotfixes.
- Instructions on the setup and use of third-party anti-malware software on BD Biosciences workstations.
- Our policy on the management of Windows limited user account settings on BD Biosciences workstations.
- Our policy on the management of software firewall settings on BD Biosciences workstations.
- Instructions for enabling and managing security features such as BitLocker and AppLocker.
- Our guidelines on the use and management of removable media on BD Biosciences workstations.
- A summary of the operating system hardening configuration applied to the system.

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**Where to store this guide** Store this guide near your BD Biosciences workstation for reference.

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## Technical support

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**Introduction** This topic describes how to get technical support.

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**Before contacting technical support** Try the following options for answering technical questions and solving problems:

- Read the section of this guide specific to the operation you are performing.
- Read topics about related information, which are listed in the *More Information* section (at the bottom of some topics).

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**When contacting technical support** If assistance is required, contact your local BD Biosciences technical support representative or supplier. Visit our website, [bdbiosciences.com](http://bdbiosciences.com), for up-to-date contact information.

When contacting BD Biosciences, have the following information available:

- Product name, part number, and serial number
- Software application and version number
- Any error messages

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# 2

## Information Security Guidelines

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This chapter includes the following topics:

- [Software policies \(page 10\)](#)
- [Overview of product \(page 11\)](#)
- [Malware protection software \(page 13\)](#)
- [Microsoft Windows update guidelines \(page 19\)](#)
- [Microsoft Windows limited-user-account settings \(page 21\)](#)
- [Microsoft Windows firewall, Internet Information Server \(IIS\), and proxy settings \(page 23\)](#)
- [File shares in Windows 10 \(page 28\)](#)
- [BitLocker Encryption Management \(page 36\)](#)
- [AppLocker Execution Control \(page 38\)](#)
- [Removable media guidelines \(page 41\)](#)

## Software policies

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### Introduction

This topic describes BD Biosciences software policies concerning responsibility, warranty, and liability. It also explains the testing of the information security guidelines using virus protection software.

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### Responsibility, warranty, and liability

BD Biosciences delivers software and workstations that are intended for running the instruments supplied by BD Biosciences. It is your responsibility to ensure that all workstations are updated with approved Windows security updates and hotfixes. It is your responsibility to install and maintain Windows security updates and hotfixes.

BD Biosciences does not provide any warranty with respect to Windows security updates and hotfixes or their compatibility with BD Biosciences products, nor does BD Biosciences make any representation with respect to the workstation remaining virus-free after installation. BD Biosciences is not liable for any claims related to or resulting from failure to install and maintain Windows security.

BD Biosciences does not provide any warranty with respect to virus protection software or its compatibility with BD Biosciences products, nor does BD Biosciences make any representation with respect to the workstation remaining virus-free after installation. BD Biosciences is not liable for any claims related to or resulting from failure to install and maintain virus protection. It is your responsibility to ensure that all electronic files (including software and transport media) are virus-free. It is your responsibility to maintain up-to-date virus protection software.

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### Testing

The guidelines in this document are based on tests performed with CylancePROTECT versions 2.0.1480 and 2.0.1540 and Windows Defender version 1.233.969.0. Testing of BD Biosciences software applications with enabled BitLocker and AppLocker features of Microsoft Windows 10 Enterprise LTSC was also performed. BD Biosciences cannot claim that future versions of CylancePROTECT or Windows Defender virus protection

software or virus protection software from other vendors will be compatible with these guidelines.

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## Overview of product

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### Introduction

This topic provides an overview of the cybersecurity controls and third-party solutions provided by BD Biosciences with its commercial products, in this case computer workstations featuring the Microsoft Windows 10 Enterprise LTSC operating system. It also provides some general recommendations for maintaining the security of the computer system, the BD software applications and data produced by the instrument system.

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### Summary

- BD Biosciences follows the BD Corporate Product Security policy and framework adopted in 2016. The policy states BD's commitment to providing products to our customers that are designed with security and privacy as fundamental aspects of the product lifecycle. The framework establishes the key activities that align with our global product development system to continuously improve security, incorporate industry best practice, and meet our customer's expectations. These guiding elements help ensure that our products are secure by design, in use and through partnership.
- BD Biosciences has selected Microsoft Windows 10 Enterprise LTSC to provide our customers with a secure and feature stable operating system from the Windows family. The workstations that BD provides with our instrument products should be considered part of that medical device system rather than general purpose computing workstations. Microsoft recommends the use of Microsoft Windows 10 Enterprise LTSC for fixed purpose devices such as medical devices and industrial automation.
- The BD Biosciences workstation operating system is based on Microsoft Windows 10 Enterprise LTSC. The operating system image is configured with security features enabled and

unnecessary applications and services removed or disabled. Windows firewall is enabled and configured to protect the connection to the instrument and close unneeded ports while allowing for connection of the workstation to the user's local network. Depending on the BD product, additional features of Windows may be enabled such as time synchronization, Internet Information Services (IIS) and AppLocker software whitelisting. Lastly, BD adds third-party applications and security solutions to the operating system such as the Google Chrome browser, Adobe Reader for PDF files and CylancePROTECT anti-malware.

- In order to maintain operating compatibility with cybersecurity controls and solutions on BD Biosciences workstations, BD Biosciences software applications should be installed to the default application path provided during the installation process. Installing applications to a custom path on a BD workstation may cause the software to become quarantined or restricted from access by certain user accounts. BD software applications can be installed to a customized folder path for offline data analysis on user-provided computer workstations.
- Some Windows 10 standard security features are noticeably different from similar features in Windows 7 and may impact user workflows. Two examples are periodic expiration of user account passwords and enabling of the screen saver password lock with an inactivity timeout. The intention of these features is to help prevent unauthorized access due to static passwords and to reduce unintentional exposure to sensitive customer information. Please contact BD Technical Support for recommendations if these features significantly affect you.

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**More information**

- Regarding BD's Product Security policy and framework: <https://www.bd.com/en-us/support/product-security-and-privacy>
- Regarding Windows 10 LTSC 2019: <https://docs.microsoft.com/en-us/windows/whats-new/ltsc/whats-new-windows-10-2019>

- Regarding Windows 10 IoT Enterprise and LTSC:  
<https://docs.microsoft.com/en-us/windows/iot-core/windows-iot-enterprise>

## Malware protection software

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### Introduction

This topic provides general guidelines for BD Biosciences workstations running the Microsoft Windows 10 Enterprise LTSC operating system with third-party antivirus or malware protection software installed by the customer. Follow these guidelines to reduce the risk of impacting the performance and functionality of BD Biosciences software.

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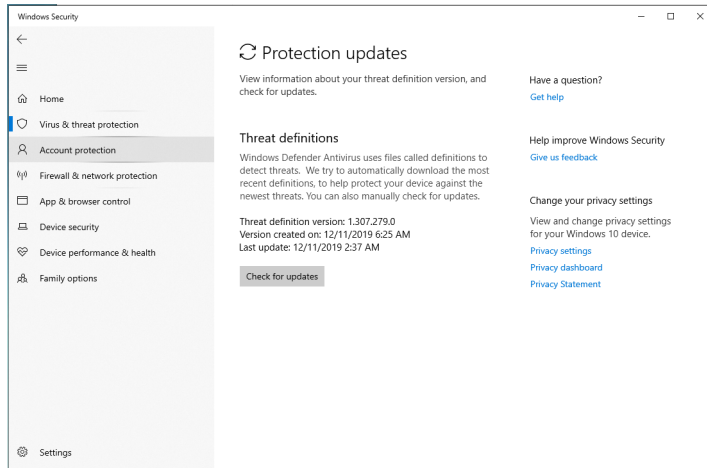
### Installation

Windows Defender (and additionally CylancePROTECT on some products) is pre-installed and pre-configured on BD Biosciences workstations with Microsoft Windows 10 Enterprise LTSC. Windows Defender is designed to work with third-party anti-malware software and should be left enabled on the workstation even if another protection solution is installed. CylancePROTECT can be uninstalled if a different third-party anti-malware software is required. From the Windows menu, go to Settings, then Apps and select Cylance from the applications list to uninstall it.

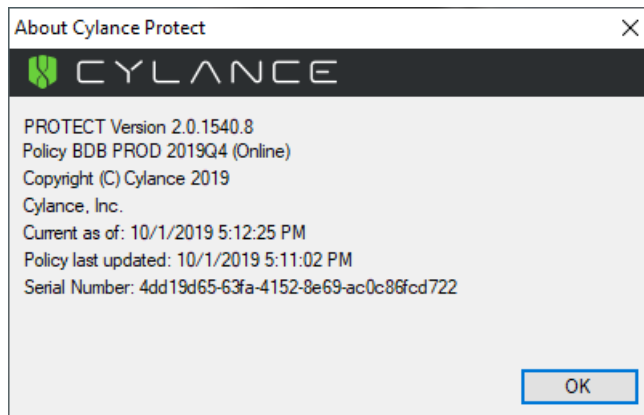
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### Updates

Products with Windows Defender enabled will be automatically updated with the latest threat definitions if the workstation is connected to a network with Internet access. The threat definition version and date of creation along with the date of the last definition update is shown on the Protection Updates page. It is also possible to manually check for threat definition updates from this page.

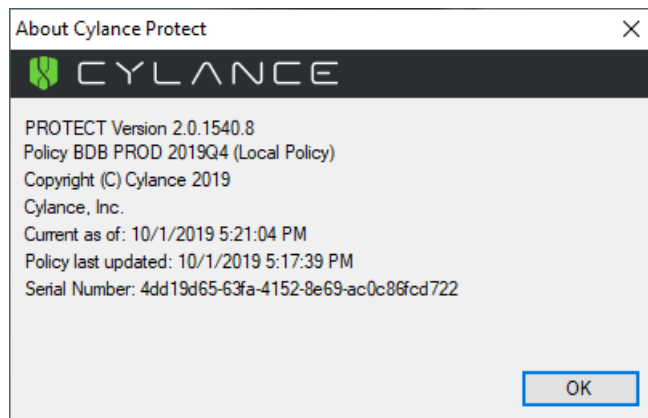


Products with CylancePROTECT installed will be automatically updated to the BD-approved agent version and the latest device policy if the workstation is connected to a network with Internet access. To check the current agent version and device policy, right-click the Cylance icon in the system tray and select **About**. The About dialog displays both the agent version and policy name as well as the update date and time.



If the workstation is not connected to a network, the device policy can be updated from a file using a USB media. Contact your BD Service representative to request the policy file. Use the following steps to apply the policy.

1. Copy the Cylance policy file from the USB media device to the workstation desktop.
2. Rename the file to “Policy.xml”.
3. Copy the file to the folder “C:\Program Files\Cylance\Desktop”.
4. Reboot the workstation.
5. After the workstation has restarted, wait 1-2 minutes for the Cylance icon to appear in the system tray. Right-click the icon and select **About**. The About dialog should display (Local Policy) as shown in the following image.



## Scanning guidelines

Third-party malware protection software that performs virus signature-based scanning is processor intensive and could adversely affect the performance of BD Biosciences software if executing

simultaneously. Exclude the following BD folders from on-access scanning for systems running on Windows 10.

Software	Files and folders
BD FACSchorus™ software v1.3 or later	C:\Program Files\BD\FACSchorus C:\ProgramData\BD C:\Program Files\Microsoft SQL Server
BD FACSuite™ software v1.4 or later	C:\BD Import C:\BD Export C:\ProgramData\BD
BD FACSuite™ Clinical software v1.4 or later	C:\BD Import Clinical C:\BD Export Clinical C:\ProgramData\BD



Software	Files and folders
BD FACSCanto™ Clinical software v4.0 or later	C:\Program Files\BD FACSCanto Software C:\ProgramData\BD\FACSCanto C: or D: \BD\FACSCanto C: or D: \BDFACSCantoFCSFiles C:\Program Files\Java C:\Program Files\SQL Anywhere 12 C:\Program Files\BD FACSDiva Software\CST C:\ProgramData\BD\FACSDiva\CST C:\ProgramData\BD\Shared C: or D: \BD\FACSDiva\CST C: or D: \BDExport
BD FACSTM SPA software v6.0 or later	C:\Program Files\BD FACS SPA Software C:\ProgramData\BD\FACS SPA C:\BD\FACS SPA
BD FACSDiva™ software v9.0 or later	C:\Program Files\BD FACSDiva Software C:\Program Files\Java C:\Program Files\SQL Anywhere 12 C: or D: \BDDatabase C:\ProgramData\BD\FACSDiva C:\ProgramData\BD\Shared C: or D: \BD\FACSDiva\CST C: or D: \BDExport



**Caution!** BD Biosciences is not responsible for data corruption or loss if full-system scanning occurs while BD Biosciences software is running.

- Schedule full-system scanning when the instrument system is not in use and include all files and folders (BD files and folders as well).
  - Schedule automatic updates of virus definitions during times when the instrument is not in use.
  - To prevent unnecessary scanning by the on-access scanner, do not insert removable storage media or try to access information on such media while BD Biosciences software is running.
- 

**Virus detection**

**If the software detects a virus:**

- Infected files will be moved to a quarantine folder by the protection software.
  - If BD Biosciences software becomes infected, reinstall it.
  - Consult your IT department about whether to delete the infected files.
- 

**BD Biosciences software installation**

Temporarily disable third-party anti-malware protection software before installing BD Biosciences software, then enable it again after installation is complete.

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**Virus protection software upgrades**

Upgrading third-party anti-malware software may cause changes in the configuration of the software and the exclusion list for on-access scanning. We recommend that you verify that the configuration settings and exclusion list have not been altered by the software upgrade.

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**Troubleshooting**

If you follow these guidelines, but the performance and functionality of BD Biosciences software is still affected, contact your virus protection software vendor for additional software-specific guidelines.

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# Microsoft Windows update guidelines

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## Introduction

This topic describes how to manage Windows 10 updates and hotfixes on BD Biosciences workstations without affecting the performance or functionality of BD Biosciences software.

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## Before you begin

Contact your company's IT system administrator for the download and installation of Windows security updates and hotfixes on workstations.

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## Update and hotfixes policy

- Windows 10 initiates mandatory auto-updates (new features and security patches) when connected to the internet. A Defer button instructs the system to defer updates for up to two major OS update releases before Microsoft OS support expires. If the OS is within two versions of the latest, critical patches are applied automatically, even if the Defer button is enabled. Once the system is more than two OS versions out of date, it cannot load critical patches until it is upgraded to an OS within two releases of the latest version. The system continues to work even if the OS updates are expired and there is no Microsoft support.
- BD Biosciences reviews and tests newly released Windows security patches and cumulative rollups from Microsoft. Patch testing includes operation of live instruments and execution of standard product quality-control methods. Patch bulletins are published to the BD.com website and organized by product name. Patches that pass testing are indicated as whitelisted (recommended) and patches which affect product operation are blacklisted (not recommended). Patch testing is performed approximately once per quarter unless critical vulnerability patches are released by Microsoft. Security patch installation is deferred for 30 days on BD workstations to allow for priority testing of critical patches. IT administrators managing BD workstations may need to adjust their patch deployment schedule to allow for BD review.

- Your IT system administrator should test and approve the Windows security updates and hotfixes. Only download updates from an official vendor site.
- 

**Auto-update for Java**

Do not enable Auto-update in Java v6. When Auto-update in Java is enabled, it will uninstall v6 and install v7, causing issues with BD FACSDiva software.

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**More information**

- For Windows patch testing bulletins:  
<https://www.bd.com/en-us/support/product-security-and-privacy/product-security-patches>
-

# Microsoft Windows limited-user-account settings

**Introduction** This topic describes how to manage the security permission settings for Windows limited user accounts. Your company's IT system administrator is responsible for ensuring that the Windows limited user accounts have full access permissions to the settings listed in these guidelines. Recommendations for tasks that should not be delegated to limited user accounts are listed.

**Limited user account settings** Pre-configured Windows limited user accounts (BDOperator) are created with a default password that expires every 60 days. New passwords must include 1 upper case, 1 lower case, 1 number and 1 symbolic character and must be at least 8 characters in length. Limited user accounts do not have rights to install software or change the OS configuration.

**Security permission settings for driver files** If the workstation is connected to a BD FACSAria™ flow cytometer, the Windows limited user accounts must have full access to the following driver files.

- C:\Windows\System32\ipl.dll
- C:\Windows\System32\iplw7.dll
- C:\Windows\System32\Cpuinf32.dll

**Security permission** Windows limited user accounts must have full access to the following folders:

Software	Folders
BD FACSchorus™ software v1.3 or later	C:\Program Files\BD\FACSchorus C:\ProgramData\BD C:\Program Files\Microsoft SQL Server
BD FACSuite™ software v1.4 or later	All folders and subfolders in the following: C:\ProgramData\BD\FACSuite

Software	Folders
BD FACSuite™ Clinical software v1.4 or later	All folders and subfolders in the following: C:\ProgramData\BD\FACSuite Clinical
BD FACSCanto™ Clinical software v4.0 or later	C:\Program Files\BD FACSCanto Software C:\ProgramData\BD\FACSCanto C: or D: \BD\FACSCanto C: or D: \BDFACSCantoFCSFiles C:\Program Files\Java C:\Program Files\SQL Anywhere 12 C:\Program Files\BD FACSDiva Software\CST C:\ProgramData\BD\FACSDiva\CST C:\ProgramData\BD\Shared C: or D: \BD\FACSDiva\CST C: or D: \BDEExport
BD FACS™ SPA software v6.0 or later	C:\Program Files\BD FACS SPA Software C:\ProgramData\BD\FACS SPA C:\BD\FACS SPA
BD FACSDiva™ software v9.0 or later	C:\Program Files\BD FACSDiva Software C:\Program Files\Java C:\Program Files\SQL Anywhere 12 C: or D: \BDDatabase C:\ProgramData\BD\FACSDiva C:\ProgramData\BD\Shared C: or D: \BD\FACSDiva\CST C: or D: \BDEExport

### Security permissions for database restoration

Windows limited user accounts do not have the administrative rights required to restore the database in BD FACSDiva software. We recommend that a lab administrator or the IT group perform database restoration if needed.

## Microsoft Windows firewall, Internet Information Server (IIS), and proxy settings

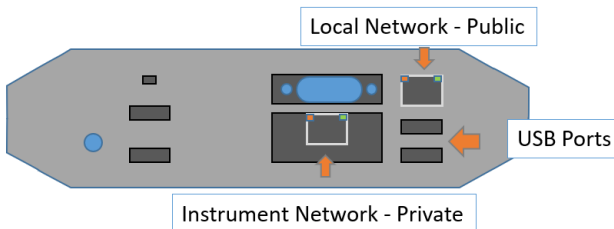
### Introduction

This topic describes how to set the firewall exclusions and proxy settings for the workstation. It also discusses IIS configuration for certain BD instrument products.

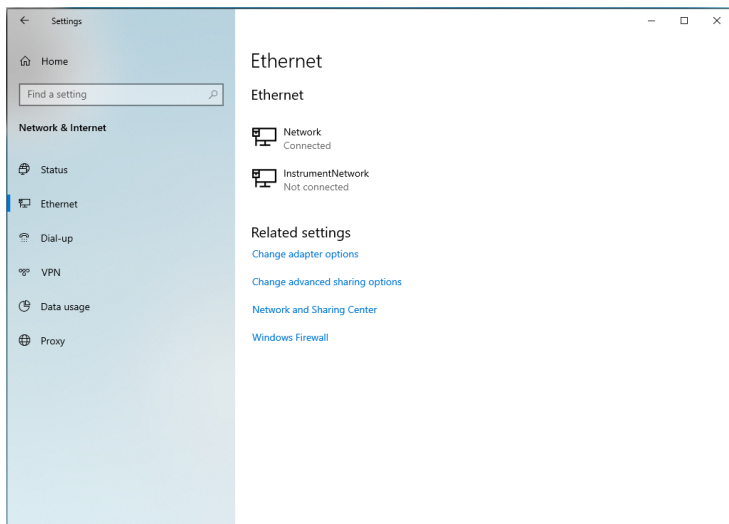
### Microsoft Windows firewall settings

BD Biosciences workstations ship with the Windows firewall enabled and pre-configured with the necessary firewall exclusions. The workstation has two NIC physical ports, one is provided for connecting the workstation to the local network and the other is dedicated to the instrument connection. This section discusses various aspects of the networking and firewall configuration that are important to maintaining communication between the instrument and workstation.

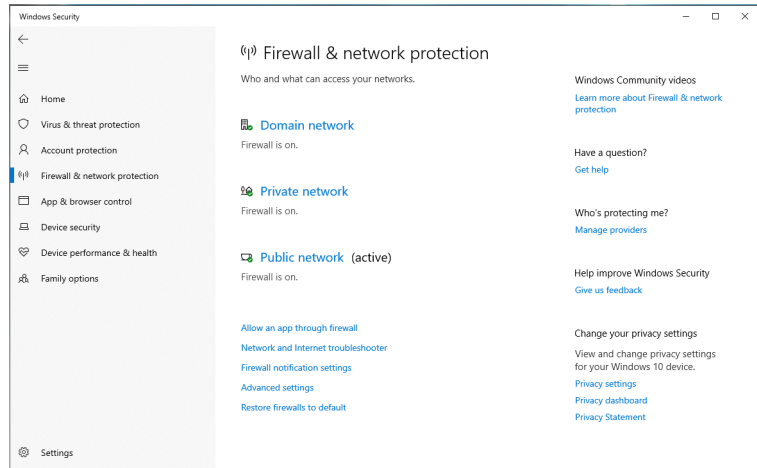
On the HP Z2 Mini G4 workstation, the first RJ-45 port is located on the far right of the back panel above the USB ports as illustrated in the following drawing.



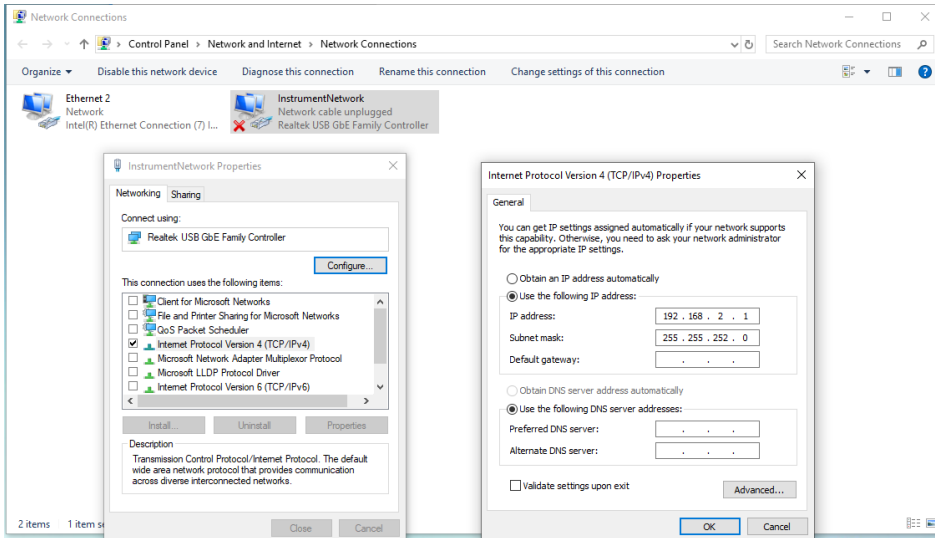
This port is intended for local network access with the firewall configured as Public. The second RJ-45 port uses the IO Expansion interface with the connector located in the cutout to the left of the USB ports. This port is configured as Private in the firewall and must be used for the connection to the instrument. The first illustration shows the Ethernet connections and the second shows the Windows firewall.







The Instrument Network interface is configured with a static IP address of 192.168.2.1 and subnet mask of 255.255.252.0 for the IPv4 protocol. This is the only protocol required for the instrument communication, the other protocols have been disabled for security.



## Internet Information Server configuration

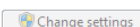
Internet Information Server (IIS) may be configured on the workstation for communication with certain instruments including BD FACSCanto, BD FACSAria, and BD FACSMelody™. The IIS configuration includes an FTP service to transfer files to the instrument for configuration and updates. For security, the FTP is configured with a static route only to the instrument NIC address and the instrument network connection is also configured to be Private as mentioned earlier. These settings are configured to prevent users from changing them through the local security policy.

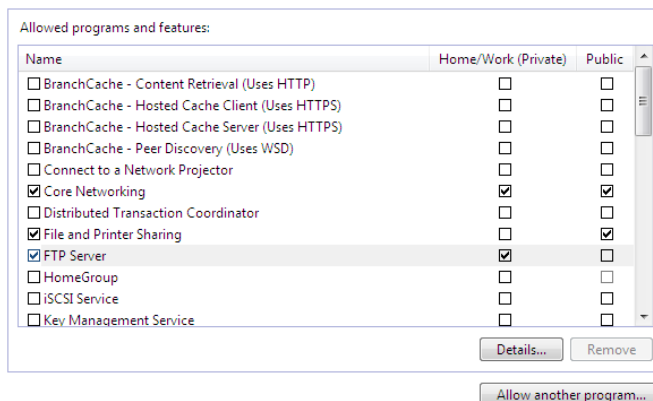
The FTP Server must be allowed to communicate through the Windows firewall, however it should only be allowed to pass through the Private side of the firewall (over the instrument network connection) as shown in the following image. For security reasons the FTP Service should not be exposed on the Public side of the firewall. If the instrument fails to complete the Power On sequence, the FTP Server access through the Private side should be checked.

### Allow programs to communicate through Windows Firewall

To add, change, or remove allowed programs and ports, click Change settings.

[What are the risks of allowing a program to communicate?](#)





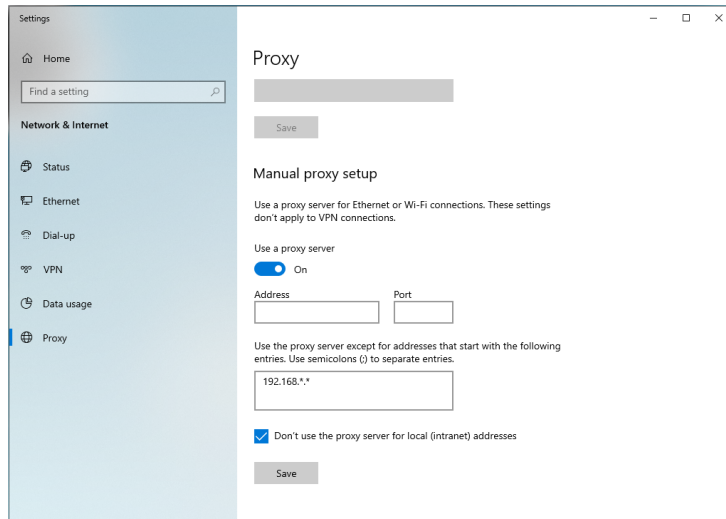
## Configuring the Proxy server

If the BD Biosciences workstation is connected to an internal network, and you are using a proxy server, instrument IP requests might get directed to the proxy server. To avoid this, configure exceptions for internal instrument IP addresses.

If you do not have your proxy server or the appropriate exception configured correctly, you might not be able to access the instrument from the application.

Make sure to configure the proxy server and the exceptions in the Windows Network & Internet settings as shown in the following image.

1. In the **Exceptions** field, enter the IP address of the internal instrument network, for example 192.168.\*.\*.
2. Enable **Don't use the proxy server for local (intranet) addresses**.



## File shares in Windows 10

### Introduction

This topic provides a brief discussion on sharing files or folders in Windows 10 along with related recommendations from BD and Microsoft for maintaining workstation security. It also presents a procedure for creating a basic shared folder on BD Biosciences workstations. At the end of the topic are links to Microsoft support documentation and technical guides.

### File sharing basics

While individual files can be shared in Windows 10, it is more common that specific folders will be shared to support network backups or automated data analysis. The folder can be located on the hard disk of the instrument workstation or it can be on a server or device connected to the local network. Access to the folder and the type of permissions (read /write) are managed by the folder host OS. The steps presented below illustrate the case where the folder is on the workstation, which is the arrangement sometimes used for sharing data from BD FACSCanto and BD FACS SPA systems with the BD FACSLink middleware solution.

In the case where the shared folder is located on a network device, it may be most efficient to create a mapped drive on the BD workstation to automatically reconnect to the drive after rebooting the PC. In addition, creating a drive mapping allows credentials for a different user account to be used when first opening the drive. Creating a mapped drive is illustrated in steps 9-11 of the example below.

Shared folders on Windows 7 workstations or legacy network devices may only support the Server Message Block (SMB) v1 protocol. If you observe errors when attempting to connect to a shared folder from a Windows 10 workstation, see the section on [SMBv1 and legacy device support \(page 35\)](#) near the end of this topic.

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### **Creating a shared folder on the BD workstation**

This example is limited to creation of a shared folder on the workstation local drive for remote access using local credentials and does not cover access of network-supported file shares or network storage devices. Access of the local file share using domain-based accounts is also not presented. This procedure can be used to share the common folder BD Export used with several BD Biosciences software applications.

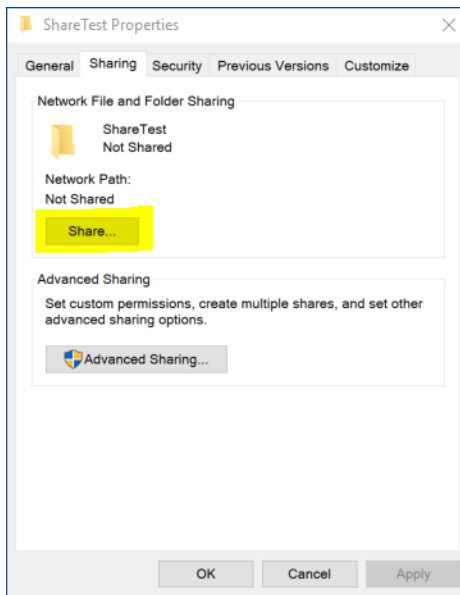
**Note:** You must be logged into an account with local administrator rights (such as the BDAdmin account) to complete these steps.

**To create a local file share folder, follow these steps.**

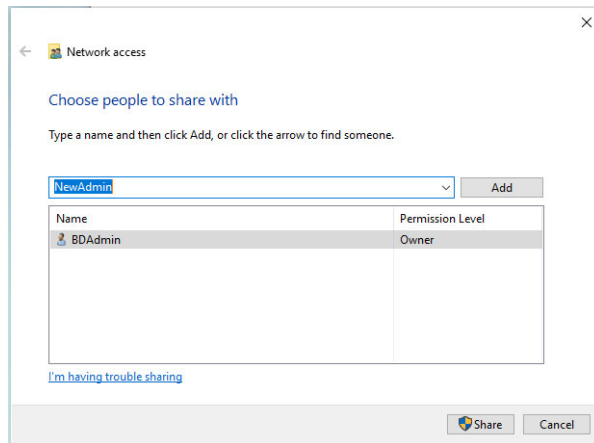
1. Before starting the procedure, determine if a new local administrator account will be used to authenticate remotely. If so, create that account now and be sure to configure the account appropriately to maintain security of the workstation. Settings such as password expiration interval should be reviewed if the account will be used by automated archiving processes, etc. In this example we named the account NewAdmin.
2. Local share folders should be created from the root of the C: drive (or alternatively on the D: drive if present on the workstation). In this example the folder is named ShareTest.

**Note:** If the shared folder is located deeper in the directory tree, folders above the shared folder may be visible or even accessible to remote users if sharing or security settings are not properly set.

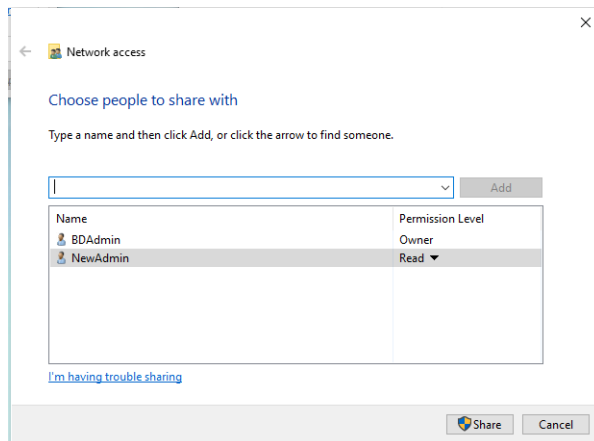
3. After creating the folder, right-click and select **Properties**. Select the **Sharing** tab and click the **Share...** button.



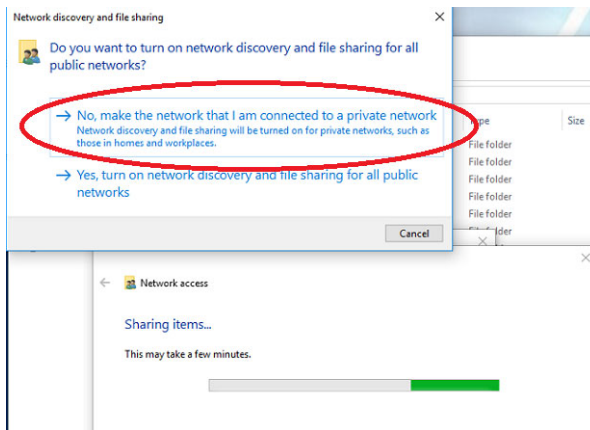
4. In the Network access dialog, enter the account name *NewAdmin* and click **Add**.



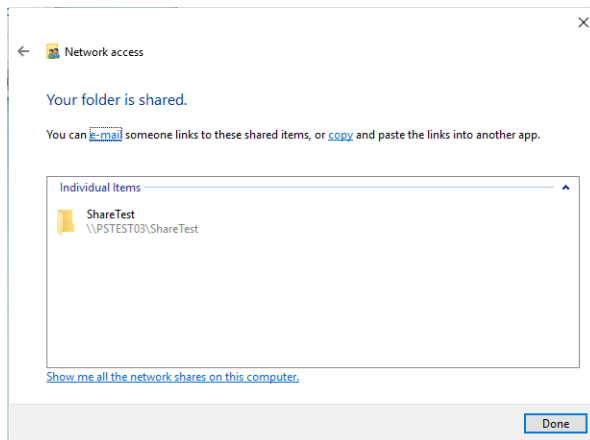
5. The NewAdmin account will appear with Read-only permissions by default. If Read/Write access is required, click the down carat to change the permission level. Click the **Share** button when done.



- The Network discovery and file sharing dialog may open. Be sure to select the option to use settings for Private networks as shown below.

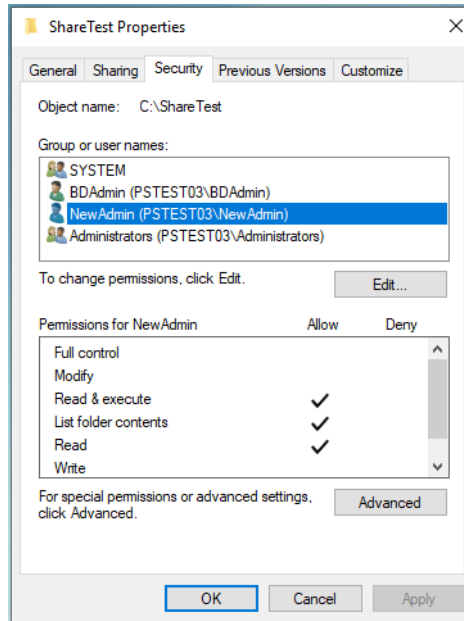


- The final dialog shows the user accounts with access and the path to use when accessing the folder. Write down the exact path before closing the dialog because it is needed in the following step.



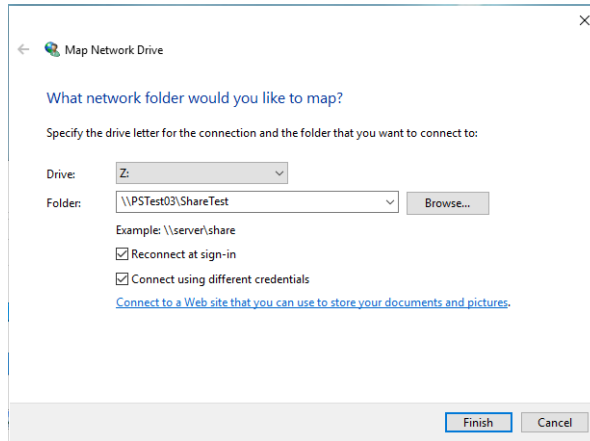


8. The new account will also appear in the Security tab of the folder properties.

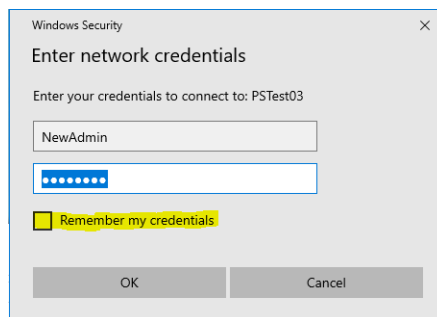


9. On the remote system, double-click the **This PC** icon to open the Explorer and select **Map Network Drive** from the Computer ribbon. Enter the folder path from the previous step

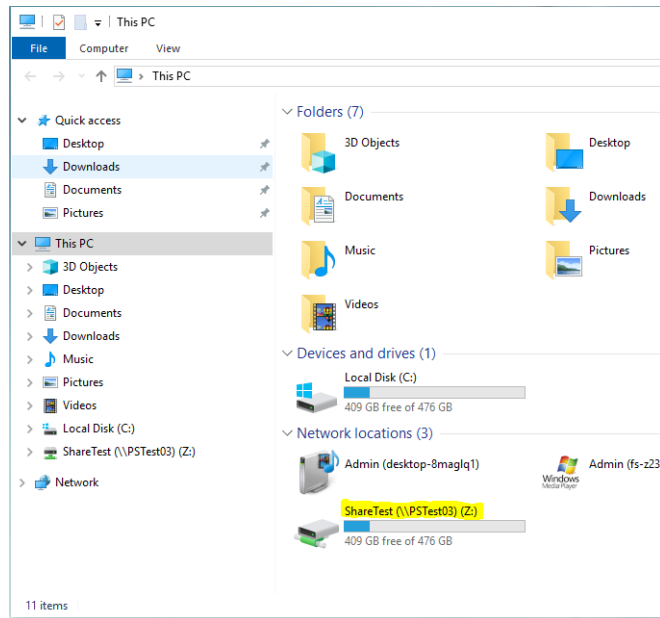
in the Folder box and check the box **Connect using different credentials**. Click the **Finish** button when done.



10. A login dialog appears to request the username and password of the account from Step 1. Optionally, you can check the box to remember the credentials.



## 11. The mapped drive appears in the section for Network locations.



### SMBv1 and legacy device support

SMBv2 (and newer protocols) is the Microsoft recommended protocol for sharing files and folders in Windows 10 operating systems. File / Folder Shares which require SMBv1 protocol are not recommended due to known vulnerabilities with ransomware exploits. You may see various warning messages when trying to connect to devices that support only SMBv1, including ‘Unspecified error 0x80004005’ or ‘The specified network name is no longer available’.

Microsoft deprecated the SMBv1 protocol in 2014 and strongly recommends that SMBv1 not be used. BD recommends that network-based file shares or storage devices which do not support more secure protocols be replaced or upgraded. The vendor of your device may be able to provide a firmware update for the device to support SMBv2 or newer protocols.

If you need to support for network shares that require SMBv1 protocol for access, please contact your BD Service representative for assistance or refer to the Microsoft guidance regarding SMBv1 with Windows 10 at: <https://docs.microsoft.com/en-us/windows-server/storage/file-server/troubleshoot/smbv1-not-installed-by-default-in-windows>

The Microsoft Technical Community has also published recommendations to guide users on moving away from SMBv1. Please refer to this article from the Windows Server Storage team at: <https://techcommunity.microsoft.com/t5/storage-at-microsoft/stop-using-smb1/ba-p/425858>

For general information and troubleshooting regarding file sharing in Windows 10: <https://support.microsoft.com/en-us/help/4092694/windows-10-file-sharing-over-a-network>

## BitLocker Encryption Management

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### Introduction

This topic describes BD Biosciences guidelines for activating BitLocker and managing encryption keys. BitLocker is an integrated feature of Windows 10 used to secure files stored on the workstation local drive. It can also encrypt files on removable media such as USB. BD FACSCorus software was tested by enabling full-disk encryption with Microsoft BitLocker® version 2.0 for Windows 10. BD Biosciences cannot claim that future versions of BitLocker will be compatible with these guidelines.

### BitLocker configuration

BD Biosciences workstations are shipped with BitLocker drive encryption disabled.

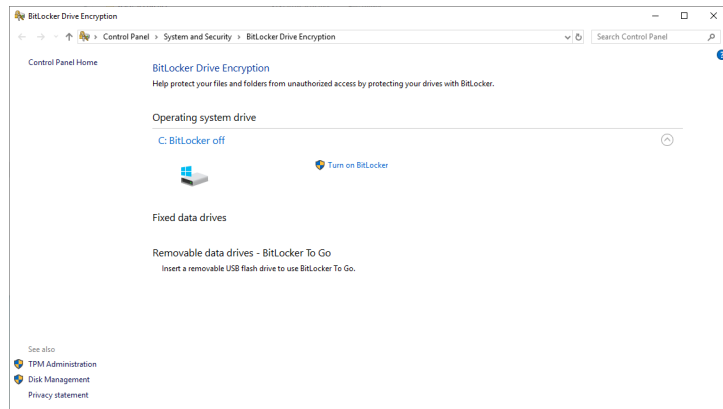
**Note:** You must be logged into an account with local administrator rights (such as the BDAdmin account) to complete these steps.

**To enable BitLocker, follow these steps.**

1. Before starting the drive encryption process, be sure to have a USB drive available to store the BitLocker key.

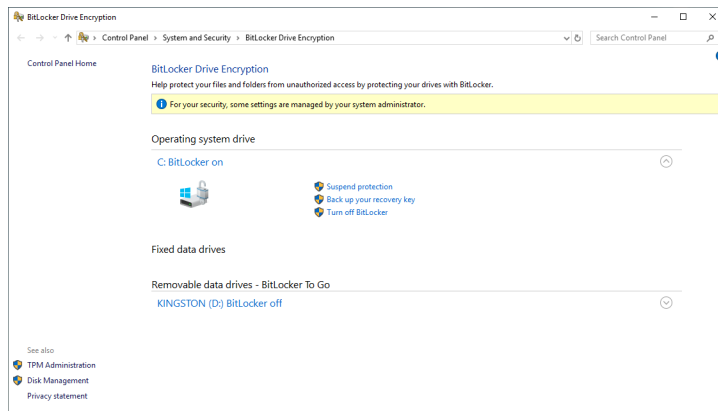
If the workstation has printer access, the key can be printed instead.

2. Click **Search** on the task bar and type *BitLocker* and select **Manage BitLocker** to open the BitLocker tool from the Control Panel.
3. Insert the USB drive and select **Turn on BitLocker** to start the setup as shown in the following image.



4. The BitLocker setup walks through several options:
  - a. In **Choose which encryption mode to use**, select **New encryption mode**.
  - b. In **How do you want to back up your recovery key**, select **Save to a File**. A file save dialog will open and you can select the USB drive.
  - c. In **Choose how much of your drive to encrypt**, select **Encrypt used disk space only**.
5. In the last step of the setup, check the option to **Run BitLocker system check** and click **Continue** to begin the encryption process.
6. The workstation will request to reboot. Close any open applications and restart the workstation.

- When the process is complete, the BitLocker tool will indicate the drive is encrypted and additional options will be available, including backing up the key as shown in the following image.



**Note:** Be sure to store encryption keys (either paper or electronic) appropriately to prevent them from being compromised.

## AppLocker Execution Control

### Introduction

This topic describes default settings for AppLocker configuration on BD Biosciences workstations and how to add custom rules for a third-party application installed on a BD configured workstation. AppLocker is an integrated feature of Windows 10 used to manage programs, installers and scripts and prevent execution of malware.

### AppLocker configuration

For BD Biosciences workstations with AppLocker enabled, the default rules are configured to allow the BDAdmin and BDFSE user accounts full rights to install software, run software applications from any folder on the local drive and run scripts. For the BDOperator and other non-Administrator accounts, if created, AppLocker is configured to allow programs in the Windows folder path and the Program Files folder path to execute. Non-administrator accounts are not allowed to install software, run

scripts or run software that is not installed along these folder paths. If software is installed on a custom path outside of these paths, custom application rules must be created.

**Note:** Script execution is also restricted by the operating system hardening configuration. For more information, see [Chapter 3: Operating System hardening \(page 43\)](#).

### Adding a custom application rule

**Note:** Installing BD software applications to custom paths is not recommended on BD configured workstations.

**Note:** Pre-configured application rules do not need modification. Do not modify these settings as change may affect execution of BD software applications.

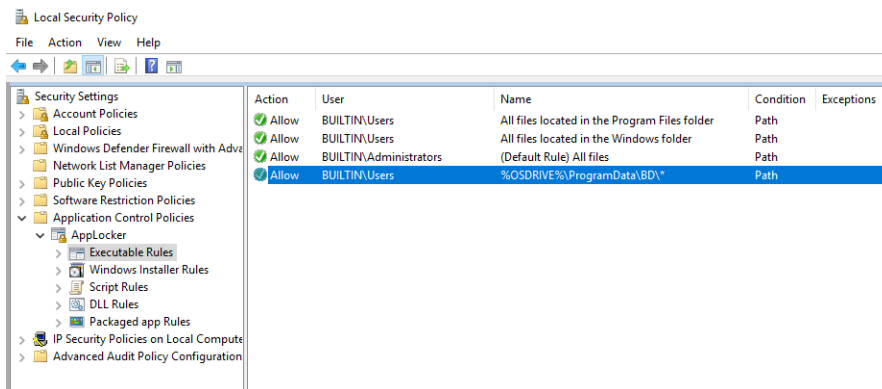
**To allow execution of third-party software installed on a BD configured workstation, follow these steps.**

1. Determine the folder path for the new application. It is recommended that applications be installed to the default path C:\Program Files\*Program Name* where *<Program Name>* is the name of the application or manufacturer of the software.

For the steps here, we use the example:  
C:\CompanyX\NewApp.

2. Click **Start** and type *secpol.msc* for Local Security Policy.
3. Go to Security Settings > Application Control Policies > AppLocker and expand the tree.
4. For Executable Rules, follow these steps.
  - a. Select **Executable Rules** and right-click. Select **Create New Rule...**
  - b. Click the **Next** button on the **Before You Begin** page.
  - c. In the **Permission** page, in User or Group section, click the **Select...** button, then click the **Advanced...** button. In the right-hand side, click the **Find Now** button. In the Search results window, scroll down and select/highlight **Users** and click **OK**. Click **OK** again and click **Next**.

- d. In the **Conditions** page, select **Path** and click **Next**.
- e. In the **Path** page and in the **Path:** box, type %OSDRIVE%\CompanyX\NewApp\\*. Then click the **Create** button.
- f. The following screen lists the rules configured. Other category of rules such as Windows Installer Rules, Script Rules and DLL Rules will look similar.



5. For Windows Installer Rules, follow these steps.
  - a. Select **Installer Rules** and right-click. Select **Create New Rule...**
  - b. Click the **Next** button on the **Before You Begin** page.
  - c. In the **Permission** page, in User or Group section, click the **Select...** button, then click the **Advanced...** button. In the right-hand side, click the **Find Now** button. In the Search results window, scroll down and select/highlight **Users** and click **OK**. Click **OK** again and click **Next**.
  - d. In the **Conditions** page, select **Path** and click **Next**.
  - e. In the **Path** page and in the **Path:** box, type %OSDRIVE%\CompanyX\NewApp\\*. Then click the **Create** button.
6. For Script Rules, follow these steps.



- a. Select **Script Rules** and right-click. Select **Create New Rule...**
  - b. Click the **Next** button on the **Before You Begin** page.
  - c. In the **Permission** page, in User or Group section, click the **Select...** button, then click the **Advanced...** button. In the right-hand side, click the **Find Now** button. In the Search results window, scroll down and select/highlight **Users** and click **OK**. Click **OK** again and click **Next**.
  - d. In the **Conditions** page, select **Path** and click **Next**.
  - e. In the **Path** page and in the *Path:* box, type `%OSDRIVE%\CompanyX\NewApp\*`. Then click the **Create** button.
7. For DLL Rules, follow these rules.
- a. Select **DLL Rules** and right-click. Select **Create New Rule...**
  - b. Click the **Next** button on the **Before You Begin** page.
  - c. In the **Permission** page, in the User or Group section, click the **Select...** button, then click the **Advanced...** button. In the right-hand side, click the **Find Now** button. In the Search results window, scroll down and select/highlight **Users** and click **OK**. Click **OK** again and click **Next**.
  - d. In the **Conditions** page, select **Path** and click **Next**.
  - e. In the **Path** page and in the *Path:* box, type `%OSDRIVE%\CompanyX\NewApp\*`. Then click the **Create** button.
8. Reboot the workstation

## Removable media guidelines

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### Introduction

This topic describes BD Biosciences guidelines for the use of removable media.

### Anti-malware protection

Windows Defender is configured with on-access scanning and scheduled full-system scanning of all removable media. To prevent adverse performance of BD Biosciences software removable media,

install removable media only when you are not running any BD Biosciences software.

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**Restricting user access**

BD Biosciences workstations require the use of one or more USB ports to connect to the instrument or in some cases to back up data or configurations from the workstation. Do not disable the USB ports on your BD Biosciences workstations.

If you want to restrict users from accessing removable media on products featuring Microsoft Windows 10 Enterprise LTSC, follow Microsoft's recommendations to prevent users from connecting to USB storage devices. Go to [support.microsoft.com](https://support.microsoft.com).

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# 3

## Operating System hardening

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This chapter covers the following topics:

- [Operating System hardening and other guidelines \(page 44\)](#)
- [Summary of STIGs applied to the OS configuration \(page 44\)](#)

## Operating System hardening and other guidelines

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### Introduction

This topic lists the Operating System hardening measures and related security configurations applied to BD Biosciences products using Microsoft Windows 10 Enterprise LTSC. These settings are recommended by the Defense Information Systems Agency (DISA) as part of their Security Technical Implementation Guidelines (STIG).

For more information regarding security recommendations for operating systems, see the Defense Information Security Administration web site at <http://iase.disa.mil/stigs/Pages/a-z.aspx>.

## Summary of STIGs applied to the OS configuration

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The following content lists the STIGs by number and description.

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<b>V-63797</b>	System must be configured to prevent storage of the LAN manager HASH of passwords.
<b>V-63651</b>	Solicited Remote Assistance must not be allowed
<b>V-63325</b>	The Windows Installer Always install with elevated privileges must be disabled.
<b>V-63667</b>	Autoplay must be turned off for non-volume devices.
<b>V-63673</b>	Autoplay must be disabled for all drives.
<b>V-63671</b>	The default autorun behavior must be configured to prevent autorun commands.

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<b>V-63379</b>	The Enhanced Mitigation Experience Toolkit (EMET) v5.5 or later must be installed on the system.
<b>V-63759</b>	Anonymous access to Named Pipes and Shares must be restricted.
<b>V-63745</b>	Anonymous enumeration of SAM accounts must not be allowed.
<b>V-68845</b>	Data Execution Prevention (DEP) must be configured to at least OptOut.
<b>V-68849</b>	(SEHOP) Structured Exception Handling Overwrite Protection (SEHOP) must be turned on.
<b>V-63801</b>	The LanMan authentication level must be set to send NTLMv2 response only, and to refuse LM and NTLM.
<b>V-63347</b>	The Windows Remote Management (WinRM) service must not use Basic authentication.
<b>V-63349</b>	Systems must be maintained at a supported servicing level.
<b>V-63749</b>	Anonymous enumeration of shares must be restricted.
<b>V-63335</b>	The Windows Remote Management (WinRM) client must not use Basic authentication.
<b>V-63413</b>	The period of time before the bad logon counter is reset must be configured to 15 minutes. The account lockout feature, when enabled, prevents brute-force password attacks on the system.

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- V-63411** The enhanced mitigation experience toolkit (EMET) system wide structure exception handler overwrite protection SEHOP must be configured to application opt out.
- 
- V-63415** The password history must be configured to 8 passwords remembered.
- 
- V-63419** The maximum password age must be configured to 60 days or less.
- 
- V-63795** Kerberos encryption types must be configured to prevent the use of DES and RC4 encryption suites.
- 
- V-63711** Unencrypted passwords must not be sent to third party SMB Servers.
- 
- V-63713** The SmartScreen filter for Microsoft Edge must be enabled.
- 
- V-63719** The Windows SMB server must be configured to always perform SMB packet signing.
- 
- V-63723** (SMBPacketSigning\_LanManServer) The Windows SMB server must be configured to always perform SMB packet signing.
- 
- V-63657** Unauthenticated RPC clients must be restricted from connecting to the RPC server.
- 
- V-70639** (SMBv1Disabled) The Server Message Block (SMB) v1 protocol must be disabled on the system.
- 
- V-63519** The Application event log size must be configured to 32768 KB or greater.

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<b>V-71769</b>	Remote calls to the Security Account Manager (SAM) must be restricted to Administrators.
<b>V-71765</b>	Internet connection sharing must be disabled.
<b>V-71763</b>	WDigest Authentication must be disabled.
<b>V-71761</b>	The system must be configured to audit Policy Change - Authorization Policy Change successes.
<b>V-63527</b>	The System event log size must be configured to 32768 KB or greater.
<b>V-68817</b>	Command line data must be included in process creation events.
<b>V-63329</b>	Users must be notified if a web-based program attempts to install software.
<b>V-63487</b>	The system must be configured to audit Privilege Use - Sensitive Privilege Use successes.
<b>V-63481</b>	The system must be configured to audit Policy Change - Authentication Policy Change successes.
<b>V-63665</b>	The system must be configured to require a strong session key.
<b>V-63387</b>	The Enhanced Mitigation Experience Toolkit (EMET) Default Protections for Internet Explorer must be enabled.
<b>V-63385</b>	The Telnet Client must not be installed on the system.

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<b>V-63513</b>	The system must be configured to audit System - Security System Extension successes.
<b>V-63389</b>	The TFTP Client must not be installed on the system.
<b>V-63669</b>	The machine inactivity limit must be set to 15 minutes, locking the system with the screensaver.
<b>V-63467</b>	The system must be configured to audit Logon/Logoff - Logon successes.
<b>V-63707</b>	The Windows SMB client must be enabled to perform SMB packet signing when possible.
<b>V-63705</b>	InPrivate browsing in Microsoft Edge must be disabled.
<b>V-63703</b>	The Windows SMB client must be configured to perform SMB packet signing when possible.
<b>V-63469</b>	The system must be configured to audit Logon/Logoff - Special Logon successes.
<b>V-63701</b>	(SmartScreenFilt) Users must not be allowed to ignore SmartScreen filter warnings for unverified files in Microsoft Edge.
<b>V-63423</b>	Passwords must, at a minimum, be 8 characters.
<b>V-63499</b>	The system must be configured to audit System - Other System Events successes.
<b>V-63555</b>	IPv6 source routing must be configured to highest protection.

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V-63559	The system must be configured to prevent IP source routing. Configuring the system to disable IP source routing protects against spoofing.
V-63491	The system must be configured to audit System - IPSec Driver failures.
V-63677	Enhanced anti-spoofing when available must be enabled for facial recognition.
V-63675	The required legal notice must be configured to display before console logon.
V-63375	The Windows Remote Management (WinRM) service must not store RunAs credentials. Storage of administrative credentials could allow unauthorized access.
V-63679	Administrator accounts must not be enumerated during elevation. Enumeration of administrator accounts when elevating can provide part of the logon information to an unauthorized user.
V-63475	The system must be configured to audit Policy Change - Audit Policy Change failures. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.
V-63845	The accounts with the <b>Access this computer from the network</b> user right must only be assigned to the Administrators group.

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**V-63453** The system must be configured to audit Detailed Tracking - Process Creation successes.

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**V-63549** The display of slide shows on the lock screen must be disabled. Slide shows that are displayed on the lock screen could display sensitive information to unauthorized personnel.

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**V-63369** The Windows Remote Management (WinRM) service must not allow unencrypted traffic.

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**V-63683** Windows Telemetry must be configured to Security or Basic. Some features may communicate with the vendor, sending system information or downloading data or components for the feature.

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**V-63441** The system must be configured to audit Account Management - Other Account Management Events successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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**V-63445** The system must be configured to audit Account Management - Security Group Management successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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**V-63449** The system must be configured to audit Account Management - User Account Management successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service

disruptions, and analyze compromises that have occurred, as well as detect attacks.

- 
- V-63763** Services using Local System that use Negotiate when reverting to NTLM authentication must use the computer identity vs. authenticating anonymously. Services using Local System that use Negotiate when reverting to NTLM authentication may gain unauthorized access if allowed to authenticate anonymously vs. using the computer identity.
- 
- V-63765** NTLM must be prevented from falling back to a Null session. NTLM sessions that are allowed to fall back to Null (unauthenticated) sessions may gain unauthorized access.
- 
- V-63609** Group Policy objects must be reprocessed even if they have not changed. Enabling this setting and then selecting the **Process even if the Group Policy objects have not changed** option ensures that the policies will be reprocessed even if none have been changed.
- 
- V-63767** PKU2U authentication using online identities must be prevented. PKU2U is a peer-to-peer authentication protocol. This setting prevents online identities from authenticating to domain-joined systems.
- 
- V-63607** Early Launch Antimalware, Boot-Start Driver Initialization Policy must prevent boot drivers identified as bad. Compromised boot drivers can introduce malware prior to protection mechanisms that load after initialization.
- 
- V-63725** The use of OneDrive for storage must be disabled. OneDrive provides access to external services for data storage that must not be used. Enabling this setting will prevent such access from the OneDrive app, as well as from File Explorer.

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<b>V-72329</b>	Run as different user must be removed from context menus. The <b>Run as different user</b> selection from context menus allows the use of credentials other than the currently logged on user.
<b>V-63633</b>	Local users on domain-joined computers must not be enumerated. The username is one part of logon credentials that could be used to gain access to a system. Preventing the enumeration of users limits this information to authorized personnel.
<b>V-63577</b>	Hardened UNC Paths must be defined to require mutual authentication and integrity for at least the \\*\SYSVOL and \\*\NETLOGON shares. Additional security requirements are applied to Universal Naming Convention (UNC) paths specified in Hardened UNC paths before allowing access them.
<b>V-63721</b>	The minimum pin length for Windows Hello for Business must be six characters or greater. Windows Hello for Business allows the use of PINs as well as biometrics for authentication without sending a password to a network or website where it could be compromised.
<b>V-63755</b>	The system must be configured to prevent anonymous users from having the same rights as the Everyone group. Access by anonymous users must be restricted. If this setting is enabled, then anonymous users have the same rights and permissions as the built-in Everyone group.
<b>V-63751</b>	Indexing of encrypted files must be turned off. Indexing of encrypted files may expose sensitive data. This setting prevents encrypted files from being indexed.

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<b>V-63753</b>	The system must be configured to prevent the storage of passwords and credentials. This setting controls the storage of passwords and credentials for network authentication on the local system.
<b>V-63517</b>	The system must be configured to audit System - System Integrity successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.
<b>V-63695</b>	File Explorer shell protocol must run in protected mode. The shell protocol will limit the set of folders applications can open when run in protected mode.
<b>V-63697</b>	The Smart Card removal option must be configured to Force Logoff or Lock Workstation. Unattended systems are susceptible to unauthorized use and must be locked. Configuring a system to lock when a smart card is removed will ensure the system is inaccessible when unattended.
<b>V-63511</b>	The system must be configured to audit System - Security System Extension failures. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.
<b>V-63597</b>	Local administrator accounts must have their privileged token filtered to prevent elevated privileges from being used over the network on domain systems. A compromised local administrator account can provide means for an attacker to move laterally between domain systems.
<b>V-63615</b>	Downloading print driver packages over HTTP must be prevented. Some features may communicate with the vendor,

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sending system information or downloading data or components for the feature.

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**V-63685**

Windows smart screen will help system from program download from the internet that may be malicious.

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**V-63617**

Local accounts with blank passwords must be restricted to prevent access from the network. An account without a password can allow unauthorized access to a system as only the username would be required.

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**V-63425**

The Enhanced Mitigation Experience Toolkit (EMET) Default Actions and Mitigations Settings must enable Anti Detours. Attackers are constantly looking for vulnerabilities in systems and applications.

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**V-63591**

Wi-Fi Sense must be disabled. Wi-Fi Sense automatically connects the system to known hotspots and networks that contacts have shared. It also allows the sharing of the systems known networks to contacts.

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**V-63459**

The system must be configured to audit Logon/Logoff - Logoff successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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**V-63829**

User Account Control must run all administrators in Admin Approval Mode, enabling UAC. User Account Control (UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized. This setting enables UAC.

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**V-63819**

User Account Control must run all administrators in Admin Approval Mode, enabling UAC. User Account Control

(UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized. This setting enables UAC.

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**V-63321**

Users must be prevented from changing installation options. Installation options for applications are typically controlled by administrators. This setting prevents users from changing installation options that may bypass security features.

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**V-63827**

User Account Control must only elevate UIAccess applications that are installed in secure locations. User Account Control (UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized.

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**V-63825**

User Account Control must be configured to detect application installations and prompt for elevation. User Account Control (UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized.

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**V-63821**

User Account Control must automatically deny elevation requests for standard users. User account Control (UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized.

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**V-63569**

Insecure logons to an SMB server must be disabled. Insecure guest logons allow unauthenticated access to shared folders. Shared resources on a system must require authentication to establish proper access.

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**V-71759**

The system must be configured to audit Logon/Logoff - Account Lockout failures. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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<b>V-63523</b>	The Security event log size must be configured to 196608 KB or greater. Inadequate log size will cause the log to fill up quickly. This may prevent audit events from being recorded properly and require frequent attention by administrative personnel.
<b>V-63743</b>	Attachments must be prevented from being downloaded from RSS feeds. Attachments from RSS feeds may not be secure. This setting will prevent attachments from being downloaded from RSS feeds.
<b>V-63741</b>	Remote Desktop Services must be configured with the client connection encryption set to the required level. Remote connections must be encrypted to prevent interception of data or sensitive information. Selecting <b>High Level</b> will ensure encryption of Remote Desktop Services sessions in both directions.
<b>V-63747</b>	Basic authentication for RSS feeds over HTTP must not be used. Basic authentication uses plain text passwords that could be used to compromise a system.
<b>V-63507</b>	The system must be configured to audit System - Security State Change successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.
<b>V-63699</b>	Users must not be allowed to ignore SmartScreen filter warnings for malicious websites in Microsoft Edge. The SmartScreen filter in Microsoft Edge provides warning messages and blocks potentially malicious websites and file downloads.



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<b>V-63621</b>	Web publishing and online ordering wizards must be prevented from downloading a list of providers. Some features may communicate with the vendor, sending system information or downloading data or components for the feature.
<b>V-63585</b>	Connections to non-domain networks when connected to a domain authenticated network must be blocked. Multiple network connections can provide additional attack vectors to a system and should be limited. When connected to a domain, communication must go through the domain connection.
<b>V-63581</b>	Simultaneous connections to the Internet or a Windows domain must be limited. Multiple network connections can provide additional attack vectors to a system and must be limited.
<b>V-63627</b>	Systems must at least attempt device authentication using certificates. Using certificates to authenticate devices to the domain provides increased security over passwords.
<b>V-63629</b>	The network selection user interface (UI) must not be displayed on the logon screen. Enabling interaction with the network selection UI allows users to change connections to available networks without signing into Windows.
<b>V-63421</b>	The minimum password age must be configured to at least 1 day. Permitting passwords to be changed in immediate succession within the same day allows users to cycle passwords through their history database.
<b>V-63837</b>	The screen Saver must be password protected.

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- V-63831** User Account Control must virtualize file and registry write failures to per-user locations. User Account Control (UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized.
- 
- V-63709** The password manager function in the Edge browser must be disabled. Passwords save locally for re-use when browsing may be subject to compromise. Disabling the Edge password manager will prevent this for the browser.
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- V-63737** The Remote Desktop Session Host must require secure RPC communications. Allowing unsecure RPC communication exposes the system to man in the middle attacks and data disclosure attacks.
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- V-63439** The system must be configured to audit Account Management - Other Account Management Events failures. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.
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- V-63733** Remote Desktop Services must always prompt a client for passwords upon connection. This setting controls the ability of users to supply passwords automatically as part of their remote desktop connection.
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- V-63731** Local drives must be prevented from sharing with Remote Desktop Session Hosts. Preventing users from sharing the local drives on their client computers to Remote Session Hosts that they access helps reduce possible exposure of sensitive data.
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- V-63639** Outgoing secure channel traffic must be encrypted or signed. Requests sent on the secure channel are authenticated, and

sensitive information (such as passwords) is encrypted, but not all information is encrypted.

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**V-63637**

Signing in using a PIN must be turned off. Strong sign-on must be used to protect a system. The PIN feature is limited to 4 numbers and caches the domain password in the system vault.

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**V-63433**

The Enhanced Mitigation Experience Toolkit (EMET) Default Actions and Mitigations Settings must enable Banned Functions. Attackers are constantly looking for vulnerabilities in systems and applications.

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**V-63635**

Audit policy using subcategories must be enabled. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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**V-63803**

The system must be configured to the required LDAP client signing level. This setting controls the signing requirements for LDAP clients. This setting must be set to Negotiate signing or Require signing, depending on the environment and type of LDAP server in use.

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**V-63805**

The system must be configured to meet the minimum session security requirement for NTLM SSP based clients. Microsoft has implemented a variety of security support providers for use with RPC sessions. All of the options must be enabled to ensure the maximum security level.

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**V-63807**

The system must be configured to meet the minimum session security requirement for NTLM SSP based servers. Microsoft has implemented a variety of security support providers for use with RPC sessions. All of the options must be enabled to ensure the maximum security level.

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**V-63435** The system must be configured to audit Account Logon - Credential Validation successes. Maintaining an audit trail of system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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**V-63341** The Windows Remote Management (WinRM) client must not use Digest authentication. Digest authentication is not as strong as other options and may be subject to man-in-the-middle attacks.

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**V-63405** The lockout duration must be configured to require an administrator to unlock an account. The account lockout feature, when enabled, prevents brute-force password attacks on the system.

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**V-63407** The Enhanced Mitigation Experience Toolkit (EMET) system-wide Data Execution Prevention (DEP) must be enabled and configured to at least Application Opt Out. Attackers are constantly looking for vulnerabilities in systems and applications.

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**V-63401** The Enhanced Mitigation Experience Toolkit (EMET) system-wide Address Space Layout Randomization (ASLR) must be enabled and configured to Application Opt In. Attackers are constantly looking for vulnerabilities in systems and applications.

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**V-63409** The number of allowed bad logon attempts must be configured to 5 or less. The account lockout feature, when enabled, prevents brute-force password attacks on the system.

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**V-63817** User Account Control approval mode for the built-in Administrator must be enabled. User Account Control

(UAC) is a security mechanism for limiting the elevation of privileges, including administrative accounts, unless authorized.

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<b>V-63813</b>	The system must be configured to require case insensitivity for non-Windows subsystems. This setting controls the behavior of non-Windows subsystems when dealing with the case of arguments or commands.
<b>V-63643</b>	Outgoing secure channel traffic must be encrypted when possible. Requests sent on the secure channel are authenticated, and sensitive information (such as passwords) is encrypted, but not all information is encrypted.
<b>V-63641</b>	The system must be configured to block untrusted fonts from loading. Attackers may use fonts that include malicious code to compromise a system.
<b>V-63647</b>	Outgoing secure channel traffic must be signed when possible. Requests sent on the secure channel are authenticated, and sensitive information (such as passwords) is encrypted, but the channel is not integrity checked.
<b>V-63729</b>	Passwords must not be saved in the Remote Desktop Client. Saving passwords in the Remote Desktop Client could allow an unauthorized user to establish a remote desktop session to another system.
<b>V-63645</b>	Users must be prompted for a password on resume from sleep (on battery). Authentication must always be required when accessing a system. This setting ensures the user is prompted for a password on resume from sleep (on battery).
<b>V-63431</b>	The system must be configured to audit Account Logon - Credential Validation failures. Maintaining an audit trail of

system activity logs can help identify configuration errors, troubleshoot service disruptions, and analyze compromises that have occurred, as well as detect attacks.

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<b>V-63623</b>	Printing over HTTP must be prevented. Some features may communicate with the vendor, sending system information or downloading data or components for the feature.
<b>V-63333</b>	Automatically signing in the last interactive user after a system-initiated restart must be disabled. Windows can be configured to automatically sign the user back in after a Windows Update restart.
<b>V-70637</b>	WindowsPowerShell - The Windows PowerShell 2.0 feature must be disabled on the system.
<b>V-68819</b>	The Application Compatibility Program Inventory must be prevented from collecting data and sending the information to Microsoft.
<b>V-63659</b>	The setting to allow Microsoft accounts to be optional for modern style apps must be enabled. Control of credentials and the system must be maintained within the enterprise.
<b>V-63715</b>	The amount of idle time required before suspending a session must be configured to 15 minutes or less. Open sessions can increase the avenues of attack on a system. This setting is used to control when a computer disconnects an inactive SMB session.
<b>V-63653</b>	The computer account password must not be prevented from being reset. Computer account passwords are changed automatically on a regular basis. Disabling automatic password changes can make the system more vulnerable to malicious access.

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<b>V-63419</b>	The maximum age for machine account passwords must be configured to 60 days or less. Computer account passwords are changed automatically on a regular basis. This setting controls the maximum password age that a machine account may have.
<b>V-63663</b>	The Application Compatibility Program Inventory must be prevented from collecting data and sending the information to Microsoft. Some features may communicate with the vendor, sending system information or downloading data or components for the feature.
<b>V-71771</b>	Microsoft consumer experiences must be turned off. Microsoft consumer experiences provides suggestions and notifications to users which may include the installation of Windows Store apps.
<b>V-63687</b>	Caching of logon credentials must be limited. The default Windows configuration caches the last logon credentials for users who log on interactively to a system.
<b>V-63691</b>	Turning off File Explorer heap termination on corruption must be disabled. Legacy plug-in applications may continue to function when a File Explorer session has become corrupt. Disabling this feature will prevent this.
<b>V-63563</b>	The system must be configured to prevent Internet Control Message Protocol (ICMP) redirects from overriding Open Shortest Path First (OSPF) generated routes. Allowing ICMP redirect of routes can lead to traffic not being routed properly. When disabled, this forces ICMP to be routed via shortest path first.
<b>V-63567</b>	The system must be configured to ignore NetBIOS name release requests except from WINS servers. Configuring the

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system to ignore name release requests, except from WINS servers, prevents a denial of service (DoS) attack.

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**V-65681**

Windows Update must not obtain updates from other PCs on the Internet. Windows 10 allows Windows Update to obtain updates from additional sources instead of Microsoft.

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**V-63815**

The default permissions of global system objects must be increased. Windows systems maintain a global list of shared system resources such as DOS device names, mutexes, and semaphores.

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