Dell Encryption Enterprise

Advanced Installation Guide v11.9

January 2023
Rev. A01

DELL Technologies

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Contents

1

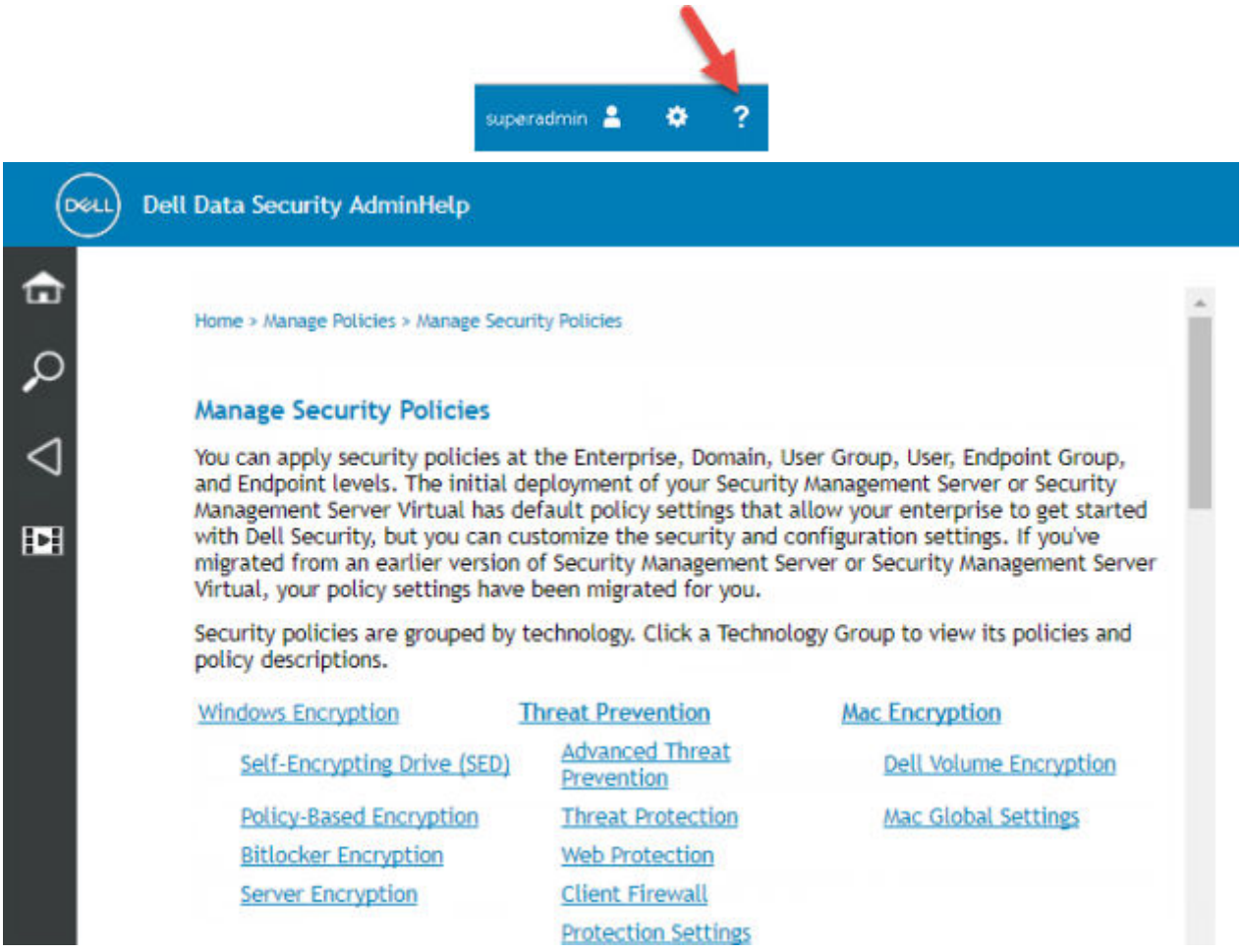
Introduction

This guide details how to install and configure Encryption, SED management, Full Disk Encryption, Web Protection and Client Firewall, and BitLocker Manager.

All policy information and their descriptions are found in the AdminHelp.

Before You Begin

1. Install the Dell Server before deploying clients. Locate the correct guide as shown below, follow the instructions, and then return to this guide.
   - *Security Management Server Installation and Migration Guide*
   - *Security Management Server Virtual Quick Start Guide and Installation Guide*
   - Verify that polices are set as desired. Browse through the AdminHelp, available from the **?** at the top right of the screen. AdminHelp is page-level help designed to help you set and modify policy and understand your options with your Dell Server.



2. Thoroughly read the Requirements chapter of this document.
3. Deploy clients to users.

Using This Guide

Use this guide in the following order.

- See Requirements for client prerequisites, computer hardware and software information, limitations, and special registry modifications needed for features.
- If needed, see Pre-Installation Configuration for SED UEFI, and BitLocker.
- If your clients will be entitled using Dell Digital Delivery, see Set GPO on Domain Controller to Enable Entitlements.
- If installing clients using the master installer, see:
  - Install Interactively Using the Master Installer

    or
  - Install by Command Line Using the Master Installer
- If installing clients using the child installers, the child installer executable files must be extracted from the master installer. See Extract the Child Installers from the Master Installer, then return here.
  - Install Child Installers by Command line:
    - Install Encryption - use these instructions to install Encryption, which is the component that enforces security policy, whether a computer is connected to the network, disconnected from the network, lost, or stolen.
    - Install Full Disk Encryption Client - use these instructions to install the Full Disk Encryption, which is a component that enforces security policy, whether a computer is connected to the network, disconnected from the network, lost, or stolen.
    - Install SED Manager - use these instructions to install encryption software for SEDs. Although SEDs provide their own encryption, they lack a platform to manage their encryption and policies. With SED Manager, all policies, storage, and retrieval of encryption keys are available from a single console, reducing the risk that computers are unprotected in the event of loss or unauthorized access.
    - Install BitLocker Manager - use these instructions to install BitLocker Manager, designed to improve the security of BitLocker deployments and to simplify and reduce the cost of ownership.

      NOTE:

      Most child installers can be installed interactively, but are not described in this guide.
- See Commonly Used Scenarios for scripts of our most commonly used scenarios.

Contact Dell ProSupport for Software

Call 877-459-7304, extension 4310039 for 24x7 phone support for your Dell product.

Additionally, online support for Dell products is available at dell.com/support. Online support includes drivers, manuals, technical advisories, FAQs, and emerging issues.

Be sure to help us quickly connect you to the right technical expert by having your Service Tag or Express Service Code available when you call.

For phone numbers outside of the United States, see Dell ProSupport for Software international phone numbers.

2

Requirements

All Clients

These requirements apply to all clients. Requirements listed in other sections apply to specific clients.

- IT best practices should be followed during deployment. This includes, but is not limited to, controlled test environments for initial tests, and staggered deployments to users.
- The user account performing the installation/upgrade/uninstallation must be a local or domain administrator user, which can be temporarily assigned by a deployment tool such as Microsoft SCCM. A non-administrator user that has elevated privileges is not supported.
- Back up all important data before beginning installation/uninstallation.
- Do not make changes to the computer, including inserting or removing external (USB) drives during installation.
- Administrators should ensure all necessary ports are available.
- Be sure to periodically check dell.com/support for the most current documentation and Technical Advisories.
- The Dell Data Security line of products does not support Windows Insider Preview releases.

Prerequisites

- Microsoft .Net Framework 4.5.2 (or later) is required for the master and child installer's clients. The installer *does not* install the Microsoft .Net Framework components.
- To verify the version of Microsoft .Net installed, follow these instructions on the computer targeted for installation. See these instructions to install Microsoft .Net Framework 4.5.2.
- If installing Encryption in FIPS mode, Microsoft .Net Framework 4.6 is required.

Hardware

- The following table details the **minimum** supported computer hardware.

Hardware
○ Intel Pentium or AMD Processor ○ 110 MB of available disk space ○ 512MB RAM **NOTE:** Additional free disk space is required to encrypt files on the endpoint. Size varies based on enabled policies and drive capacity.

Localization

- Dell Encryption, SED Manager, PBA advanced authentication, and BitLocker Manager are multilingual user interface compliant and are localized in the following languages.

Language Support		
EN - English	IT - Italian	KO - Korean
ES - Spanish	DE - German	PT-BR - Portuguese, Brazilian
FR - French	JA - Japanese	PT-PT - Portuguese, Portugal (Iberian)

Encryption

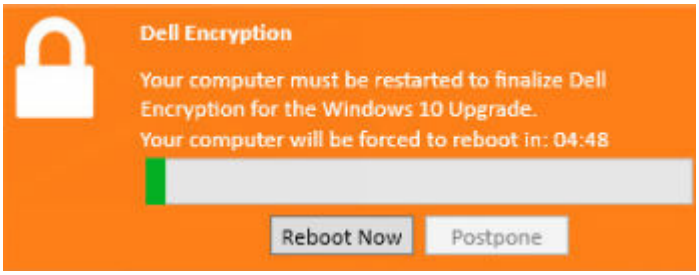
- The client computer must have network connectivity to activate.
- To activate a Microsoft Live account with Dell Encryption, refer to this KB article 124722.
- To reduce initial encryption time, run the Windows Disk Cleanup Wizard to remove temporary files and any other unnecessary data.
- Windows Hello for Business support requires Encryption Enterprise v11.0 or later running on Windows 10.
- Windows Hello for Business support requires activation against a Dell Server running v11.0 or later.
- Turn off sleep mode during the initial encryption sweep to prevent an unattended computer from going to sleep. Encryption cannot occur on a sleeping computer (nor can decryption).
- Encryption does not support dual boot configurations since it is possible to encrypt system files of the other operating system, which would interfere with its operation.
- Dell Encryption cannot be upgraded to v10.7.0 from versions earlier than v8.16.0. Endpoints running versions prior to v8.16.0 must upgrade to v8.16.0 then upgrade to v10.7.0.
- The master installer does not support upgrades from pre-v8.0 components. Extract the child installers from the master installer and upgrade the component individually. See Extract the Child Installers from the Master Installer for extraction instructions.
- Encryption now supports Audit Mode. Audit Mode allows administrators to deploy Encryption as part of the corporate image, rather than using a third-party SCCM or similar solution. For instructions about how to install Encryption on a corporate image, see KB article 129990.
- Encryption client is tested against and is compatible with several popular signature-based antiviruses and AI-driven antivirus solutions including McAfee Virus Scan Enterprise, McAfee Endpoint Security, Symantec Endpoint Protection, CylancePROTECT, CrowdStrike Falcon, Carbon Black Defense, and several others. Hard-coded exclusions are included by default for many antivirus providers to prevent incompatibilities between antivirus scanning and encryption.

  If your organization uses an unlisted antivirus provider or any compatibility issues are being seen, please see KB article 126046 or Contact Dell ProSupport for assistance validating configuration for interoperation between your software solutions and Dell Data Security solutions.

- Dell Encryption utilizes Intel's encryption instruction sets, Integrated Performance Primitives (IPP). For more information, see KB article 126015.
- The TPM is used for sealing the General Purpose Key. Therefore, if running Encryption, clear the TPM in the BIOS before installing a new operating system on the target computer.
- In-place operating system re-install is not supported. To re-install the operating system, perform a backup of the target computer, wipe the computer, install the operating system, then recover the encrypted data following established recovery procedures.
- The master installer installs these components if not already installed on the target computer. **When using the child installer**, you must install these components before installing the clients.

Prerequisite
○ Visual C++ 2012 Update 4 or later Redistributable Package (x86 or x64) ○ Visual C++ 2017 or later Redistributable Package (x86 or x64) ○ As of January 2020, SHA1 signing certificates are no longer valid and cannot be renewed. Devices running Windows Server 2008 R2 must install Microsoft KBs https://support.microsoft.com/help/4474419 and https://support.microsoft.com/help/4490628 to validate SHA256 signing certificates on applications and installation packages. Applications and installation packages signed with SHA1 certificates will function but an error will display on the endpoint during installation or execution of the application without these updates installed

- The *Secured Windows Hibernation File* and *Prevent Unsecured Hibernation* policies are not supported in UEFI mode.
- Deferred activation allows the Active Directory user account used during activation to be independent of the account used to login to the endpoint. Instead of the network provider capturing the authentication information, the user instead manually specifies the Active Directory-based account when prompted. Once the credentials are entered, the authentication information is securely sent to the Dell Server which validates it against the configured Active Directory domains. For more information, see KB article 124736.
- Following Windows 10 feature upgrade, a restart is **required** to finalize Dell Encryption. The following message displays in the notification area after Windows 10 feature upgrades:



Hardware

- The following table details supported hardware.

Optional Embedded Hardware
○ TPM 1.2 or 2.0

Operating Systems

- The following table details supported operating systems.

Windows Operating Systems (32- and 64-bit)
○ Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ▪ Windows 10 2019 LTSC ▪ Windows 10 2021 LTSC ○ Windows 11: Enterprise, Pro v21H2 - 22H2 ○ **Deferred Activation** includes support for all of the above

Encryption External Media

Operating Systems

- External media must have approximately 55MB available plus open space on the media that is equal to the largest file to be encrypted to host Encryption External Media.
- The following table details the operating systems supported when accessing media protected by Encryption External Media:

Windows Operating Systems Supported to Access Encrypted Media (32- and 64-bit)
○ Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ▪ Windows 10 2019 LTSC ▪ Windows 10 2021 LTSC ○ Windows 11: Enterprise, Pro v21H2 - 22H2 ○ **Deferred Activation** includes support for all of the above

Mac Operating Systems Supported to Access Encrypted Media (64-bit kernels)
○ macOS High Sierra 10.13.5 - 10.13.6 ○ macOS Mojave 10.14.0 - 10.14.4 ○ macOS Catalina 10.15.5 - 10.15.6

Full Disk Encryption

- Full Disk Encryption requires activation against a Dell Server running v9.8.2 or later.
- Full Disk Encryption is not currently supported within virtualized host computers.
- Full Disk Encryption requires a discrete hardware TPM. PTT and firmware-based TPMs are not supported at this time.
- Third-party credential providers will not function with FDE features installed and all third-party credential providers will be disabled when the PBA is enabled.
- The client computer must have network connectivity or access code to activate.
- The computer must have a wired network connection for a smartcard user to log in through pre-boot authentication for the first time.
- Operating system Feature updates are not supported with Full Disk Encryption.
- A wired connection is required for the PBA to communicate with the Dell Server.
- An SED cannot be present on the target computer.
- Full Disk Encryption is not supported with BitLocker or BitLocker Manager. Do not install Full Disk Encryption on a computer on which BitLocker or BitLocker Manager is installed.
- Dell recommends the latest Intel Rapid Storage Technology Driver with NVMe drives.
- Any NVMe drive that is being leveraged for PBA:
  - If the Dell device was manufactured in 2018 or later: Either RAID ON or AHCI may be leveraged with NVMe drives.
  - The BIOS boot mode must be set to Unified Extensible Firmware Interface (UEFI). Legacy operation ROMs must be disabled.
- Any non-NVMe drive that is being leveraged for PBA:
  - BIOS SATA operation can be set to either AHCI or RAID ON.
  - The operating system crashes when switched from RAID ON > AHCI if the AHCI controller drivers are not pre-installed. For instructions on how to switch from RAID > AHCI (or conversely), see KB article 124714.
- Full Disk Encryption management does not support dual boot configurations since it is possible to encrypt system files of the other operating system, which would interfere with its operation.
- In-place operating system re-install is not supported. To re-install the operating system, perform a backup of the target computer, wipe the computer, install the operating system, then recover the encrypted data following established recovery procedures.
- Direct Feature Updates from Windows 10 v1607 (Anniversary Update/Redstone 1), to the Windows 10 v1903 (May 2019 Update/19H1) are not supported with FDE. Dell recommends updating the operating system to a newer Feature Update if updating to Windows 10 v1903. Any attempts to update directly from Windows 10 v1607 to v1903 results in an error message and the update is prevented.
- All disks must be initialized and formatted before enabling Full Disk Encryption.
- Multi-disk encryption configurations with Full Disk Encryption require the following:
  - All disks in the target system must have the following configuration:
    - Non-SED drives
    - Configured in the same boot mode
    - Initialized as GUID Partition Table (GPT)
    - Disks must be primary partitions
    - Disks must have an assigned drive letter
  - A reboot is required to encrypt new disks after initial configuration.
  - A maximum of 16 disks can be encrypted.
  - In UEFI boot mode, the operating system can be installed on any target disk.
  - In Legacy boot mode, the operating system must be installed on the first disk (Disk #0). If the operating system is not installed on the first disk, Multi-disk encryption is disabled.

    Enable Multi-Disk encryption in the Management Console. See Registry Settings to see Windows Registry values for Multi-disk encryption and multi-sweep.

- Full Disk Encryption requires the use of the Dell custom Credential Provider to synchronize Windows password changes and data encryption keys. If you require use of third-party applications that use custom Credential Providers running on computers protected Full Disk Encryption, you must initiate Windows password changes through the Data Security Console. For information about changing your password in the Data Security Console, see the *Password* chapter in the Data Security Console User Guide.

- The master installer installs these components if not already installed on the target computer. **When using the child installer**, you must install these components before installing the clients.

Prerequisite
○ Visual C++ 2017 or later Redistributable Package (x86 or x64) ○ As of January 2020, SHA1 signing certificates are no longer valid and cannot be renewed. Devices running Windows Server 2008 R2 must install Microsoft KBs https://support.microsoft.com/help/4474419 and https://support.microsoft.com/help/4490628 to validate SHA256 signing certificates on applications and installation packages. Applications and installation packages signed with SHA1 certificates will function but an error will display on the endpoint during installation or execution of the application without these updates installed

- **NOTE:** A password is required with pre-boot authentication. Dell recommends a minimum password setting compliant with internal security policies.

- **NOTE:** When PBA is used, the Sync All Users policy should be enabled if a computer has multiple users. Additionally, all users must have passwords. Zero-length password users will be locked out of the computer following activation.

- **NOTE:** Computers protected by Full Disk Encryption must be updated to Windows 10 v1703 (Creators Update/Redstone 2) or later before updating to Windows 10 v1903 (May 2019 Update/19H1) or later. If this upgrade path is attempted, an error message displays.

NOTE: Full Disk Encryption must be configured with Encryption Algorithm set to AES-256 and Encryption Mode set to CBC.

Hardware

- The following table details supported hardware.

Optional Embedded Hardware
○ TPM 1.2 or 2.0

Authentication Options with Full Disk Encryption Client

- Specific hardware is required, to use smart cards and to authenticate on UEFI computers. Configuration is required to use smart cards with pre-boot authentication. The following tables show authentication options available by operating system, when hardware and configuration requirements are met.

UEFI				
	PBA - on supported Dell Computers			
	Password	**Fingerprint**	**Contacted Smart card**	**SIPR Card**
Windows 10	X[1]		X[1]	
Windows 11	X[1]		X[1]	
1. Available with supported UEFI computers.				

Dell Computer Models Supported with UEFI Boot Mode

- For the most up-to-date list of platforms supported with the Full Disk Encryption, see KB article 126855.
- For a list of docking stations and adapters supported with Full Disk Encryption, see KB article 124241.

Operating Systems

- The following table details supported operating systems.

Windows Operating Systems (64-bit)
○ Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ▪ Windows 10 2019 LTSC ▪ Windows 10 2021 LTSC ○ Windows 11: Enterprise, Pro v21H2 - 22H2

Encryption on Server Operating Systems

Encryption of server operating systems is intended for use on computers running in server mode, particularly file servers.

- Encryption on server operating systems is compatible only with Encryption Enterprise and Endpoint Security Suite Enterprise.
- Encryption on server operating systems provides:
  - Software encryption
  - Removable media encryption
  - Port controls

    NOTE:

    The server must support port controls.

    Port Control System policies affect removable media on protected servers, for example, by controlling access and usage of the server's USB ports by USB devices. USB port policy applies to external USB ports. Internal USB port functionality is not affected by USB port policy. If USB port policy is disabled, the client USB keyboard and mouse do not function and the user cannot use the computer unless a Remote Desktop Connection is set up before the policy is applied.
- The master installer installs these components if not already installed on the target computer. **When using the child installer**, you must install these components before installing the clients.

Prerequisite
○ Visual C++ 2012 Update 4 or later Redistributable Package (x86 or x64) ○ Visual C++ 2017 or later Redistributable Package (x86 or x64) ○ As of January 2020, SHA1 signing certificates are no longer valid and cannot be renewed. Devices running Windows Server 2008 R2 must install Microsoft KBs https://support.microsoft.com/help/4474419 and https://support.microsoft.com/help/4490628 to validate SHA256 signing certificates on applications and installation packages. Applications and installation packages signed with SHA1 certificates will function but an error will display on the endpoint during installation or execution of the application without these updates installed

Encryption of server operating systems is for use with:

- File servers with local drives
- Virtual Machine (VM) guests running a server operating system or non-server operating system as a simple file server

- Supported configurations:
  - Servers equipped with RAID 5 or 10 drives; RAID 0 (striping) and RAID 1 (mirroring) are supported independent of each other.
  - Servers equipped with multi TB RAID drives
  - Servers equipped with drives that can be changed out without shutting down the computer
  - Server Encryption is validated against industry-leading antivirus providers.. Hard-coded exclusions are in place for these anti-virus providers to prevent incompatibilities between anti-virus scanning and encryption. If your organization uses an anti-virus provider that is not listed, see KB article 126046 or contact Dell ProSupport for help.

Encryption of server operating systems is not for use with:

- Security Management Servers/Security Management Server Virtuals or servers running databases for Security Management Servers/Security Management Server Virtual.
- Encryption Personal.
- SED Manager, PBA advanced authentication or BitLocker Manager.
- Servers that are part of distributed file systems (DFS).
- Migration to or from Encryption on a server operating system. Upgrade from External Media Edition to Encryption of server operating systems requires that the previous product is uninstalled completely before installing Encryption on server operating systems.
- VM hosts (A VM Host typically contains multiple VM guests.)
- Domain Controllers
- Exchange Servers
- Servers hosting databases (SQL, Sybase, SharePoint, Oracle, MySQL, Exchange, etc.)
- Servers using any of the following technologies:
  - Resilient file systems
  - Fluid file systems
  - Microsoft storage spaces
  - SAN/NAS network storage solutions
  - iSCSI connected devices
  - Deduplication software
  - Hardware deduplication
  - Split RAIDs (multiple volumes across a single RAID)
  - SEDs (RAIDs and NON-RAID)
  - Microsoft Storage Server 2012
- Encryption on a server operating system does not support dual boot configurations since it is possible to encrypt system files of the other operating system, which would interfere with its operation.
- In-place operating system re-installs are not supported. To re-install the operating system, perform a backup of the target computer, wipe the computer, install the operating system, then recover the encrypted data by following recovery procedures. For more information about recovering encrypted data, refer to the *Recovery Guide*.

Operating Systems

The following table details supported operating systems.

Operating Systems (32- and 64-bit)
• Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ○ Windows 10 2019 LTSC ○ Windows 10 2021 LTSC • Windows 11: Enterprise, Pro v21H2 - 22H2 • **Deferred Activation** includes support for all of the above

Supported Server Operating Systems
• Windows Server 2008 R2 SP1: Standard Edition, Datacenter Edition, Enterprise Edition, Webserver Edition • Windows Server 2012: Standard Edition, Essentials Edition, Datacenter Edition (Server Core is not supported) • Windows Server 2012 R2: Standard Edition, Essentials Edition, Datacenter Edition(Server Core is not supported) • Windows Server 2016: Standard Edition, Essentials Edition, Datacenter Edition (Server Core is not supported) • Windows Server 2019: Standard Edition, Datacenter Edition • Windows Server 2022: Standard Edition, Datacenter Edition

Operating Systems Supported with UEFI Mode
• Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ○ Windows 10 2019 LTSC ○ Windows 10 2021 LTSC • Windows 11: Enterprise, Pro v21H2 - 22H2

NOTE:

On a supported UEFI computer, after selecting **Restart** from the main menu, the computer restarts and then displays one of two possible logon screens. The logon screen that displays is determined by differences in computer platform architecture.

Encryption External Media

Operating Systems

- External media must have approximately 55MB available plus open space on the media that is equal to the largest file to be encrypted to host Encryption External Media.
- The following details the supported operating systems when accessing Dell-protected media:

Windows Operating Systems Supported to Access Encrypted Media (32- and 64-bit)
• Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ○ Windows 10 2019 LTSC ○ Windows 10 2021 LTSC • Windows 11: Enterprise, Pro v21H2 - 22H2 • **Deferred Activation** includes support for all of the above

Supported Server Operating Systems
• Windows Server 2012 R2

Mac Operating Systems Supported to Access Encrypted Media (64-bit kernels)
• macOS High Sierra 10.13.5 - 10.13.6 • macOS Mojave 10.14.0 - 10.14.4 • macOS Catalina 10.15.1 - 10.15.4

SED Manager

- The computer must have a wired network connection to successfully install SED Manager.
- The computer must have a wired network connection for a smart card user to log in through pre-boot authentication for the first time.
- Third-party credential providers will not function with SED Manager installed and all third-party credential providers will be disabled when the PBA is enabled.
- IPv6 is not supported.
- SED Manager is not currently supported within virtualized host computers.
- Be prepared to shut down and restart the computer after you apply policies and are ready to begin enforcing them.
- Computers equipped with self-encrypting drives cannot be used with HCA cards. Incompatibilities exist that prevent the provisioning of the HCA. Dell does not sell computers with self-encrypting drives that support the HCA module. This unsupported configuration would be an after-market configuration.
- If the computer targeted for encryption is equipped with a self-encrypting drive, ensure that the Active Directory option, *User Must Change Password at Next Logon*, is disabled. Pre-boot authentication does not support this Active Directory option.
- Dell recommends that you do not change the authentication method after the PBA has been activated. If you must switch to a different authentication method, you must either:
  - Remove all the users from the PBA.

    or
  - Deactivate the PBA, change the authentication method, and then re-activate the PBA.
- Configuration of self-encrypting drives for SED Manager differ between NVMe and non-NVMe (SATA) drives, as follows.
  - Any NVMe drive that is being leveraged for PBA:
    - If the Dell device was manufactured in 2018 or later: Either RAID ON or AHCI may be leveraged with NVMe drives.
    - The BIOS boot mode must be set to Unified Extensible Firmware Interface (UEFI). Legacy operation ROMs must be disabled.
  - Any non-NVMe drive that is being leveraged for PBA:
    - BIOS SATA operation can be set to either AHCI or RAID ON.
    - The operating system will crash when switched from RAID ON > AHCI if the AHCI controller drivers are not pre-installed. For instructions on how to switch from RAID > AHCI (or vice versa), see KB article 124714.

  Supported OPAL compliant SEDs require updated Intel Rapid Storage Technology Drivers, located at www.dell.com/support. Dell recommends the latest Intel Rapid Storage Technology Driver.

  NOTE: The Intel Rapid Storage Technology Drivers are platform dependent. You can find your system's driver at the link above based on your computer model.

- SED Manager requires the use of the Dell custom Credential Provider to synchronize Windows password changes and data encryption keys. If you require use of third-party applications that use custom Credential Providers running on computers protected SED Manager, you must initiate Windows password changes through the Data Security Console. For information about changing your password in the Data Security Console, see the *Password* chapter in the Data Security Console User Guide.
- The master installer installs these components if not already installed on the target computer. **When using the child installer**, you must install these components before installing the clients.

Prerequisite
○ Visual C++ 2017 or later Redistributable Package (x86 or x64) ○ As of January 2020, SHA1 signing certificates are no longer valid and cannot be renewed. Devices running Windows Server 2008 R2 must install Microsoft KBs https://support.microsoft.com/help/4474419 and https://support.microsoft.com/help/4490628 to validate SHA256 signing certificates on applications and installation packages. Applications and installation packages signed with SHA1 certificates will function but an error will display on the endpoint during installation or execution of the application without these updates installed

- SED Manager is not supported with Encryption on server operating systems .
- Multi-disk encryption configurations with SED Manager require the following:

- All disks in the target system must have the following configuration:
  - SED drives
  - Disks must have an assigned drive letter
- In UEFI boot mode, the operating system can be installed on any target disk.
- In Legacy boot mode, the operating system must be installed on the first disk (Disk #0). If the operating system is not installed on the first disk, Multi-disk encryption is disabled.

  Enable Multi-Disk encryption in the Management Console. See Registry Settings to see Windows Registry values for Multi-disk encryption and multi-sweep.

- **NOTE:** A password is required with pre-boot authentication. Dell recommends a minimum password setting compliant with internal security policies.

- **NOTE:** When PBA is used, the Sync All Users policy should be enabled if a computer has multiple users. Additionally, all users must have passwords. Zero-length password users will be locked out of the computer following activation.
- **NOTE:** Computers protected by SED Manager must be updated to Windows 10 v1703 (Creators Update/Redstone 2) or later before updating to Windows 10 v1903 (May 2019 Update/19H1) or later. If this upgrade path is attempted, an error message displays.
-

Hardware

OPAL Compliant SEDs

- For the most up-to-date list of Opal compliant SEDs supported with the SED Manager, refer to this KB article 126855
- For the most up-to-date list of platforms supported with the SED Manager, see KB article 126855.
- For a list of docking stations and adapters supported with SED Manager, see KB article 124241.

Pre-Boot Authentication Options with SED Manager

- Specific hardware is required to use smart cards and to authenticate on UEFI computers. Configuration is required to use smart cards with pre-boot authentication. The following tables show authentication options available by operating system, when hardware and configuration requirements are met.

Non-UEFI				
	PBA			
	Password	**Fingerprint**	**Contacted Smart card**	**SIPR Card**
Windows 10	X[1]		X[1 2]	
Windows 11	X[1]		X[1 2]	
1. Available when authentication drivers are downloaded from dell.com/support 2. Available with a supported OPAL SED				

UEFI				
	PBA - on supported Dell Computers			
	Password	**Fingerprint**	**Contacted Smart card**	**SIPR Card**
Windows 10	X[1]		X[1]	

UEFI				
	PBA - on supported Dell Computers			
	Password	Fingerprint	Contacted Smart card	SIPR Card
Windows 11	X[1]		X[1]	
1. Available with a supported OPAL SED on supported UEFI computers				

International Keyboards

The following table lists international keyboards supported with Pre-boot Authentication on UEFI and non-UEFI computers.

International Keyboard Support - UEFI	
DE-FR - (French Swiss)	EN-GB - English (British English)
DE-CH - (German Swiss)	EN-CA - English (Canadian English)
EN-US - English (American English)	

International Keyboard Support - Non-UEFI	
AR - Arabic (using Latin letters)	EN-US - English (American English)
DE-FR - (French Swiss)	EN-GB - English (British English)
DE-CH - (German Swiss)	EN-CA - English (Canadian English)

Operating Systems

- The following table details the supported operating systems.

Windows Operating Systems (32- and 64-bit)
○ Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ■ Windows 10 2019 LTSC ■ Windows 10 2021 LTSC ○ Windows 11: Enterprise, Pro v21H2 - 22H2

Localization

SED Manager is a multilingual user interface compliant and is localized the following languages. UEFI mode and PBA advanced authentication are supported in the following languages:

Language Support	
EN - English	JA - Japanese
FR - French	KO - Korean
IT - Italian	PT-BR - Portuguese, Brazilian

Language Support	
DE - German	PT-PT - Portuguese, Portugal (Iberian)
ES - Spanish	

BitLocker Manager

- Consider reviewing Microsoft BitLocker requirements if BitLocker is not yet deployed in your environment,
- Ensure that the PBA partition is already set up. If BitLocker Manager is installed before the PBA partition is set up, BitLocker cannot be enabled and BitLocker Manager will not be operational. See Pre-Installation Configuration to Set Up a BitLocker PBA Partition.
- A Dell Server is required to use BitLocker Manager.
- Ensure a signing certificate is available within the database. For more information, see KB article 124931.
- The keyboard, mouse, and video components must be directly connected to the computer. Do not use a KVM switch to manage peripherals as the KVM switch can interfere with the computer's ability to properly identify hardware.
- Turn on and enable the TPM. BitLocker Manager takes ownership of the TPM and does not require a reboot. However, if a TPM ownership already exists, BitLocker Manager begins the encryption setup process (no restart is required). The point is that the TPM must be owned and enabled.
- The BitLocker Manager uses the approved AES FIPS validated algorithms if FIPS mode is enabled for the GPO security setting "System cryptography: Use FIPS compliant algorithms for encryption, hashing, and signing" on the device and you manage that device via our product. BitLocker Manager does not force this mode as default for BitLocker-encrypted clients because Microsoft now suggests customers not use their FIPS validated encryption due to numerous issues with application compatibility, recovery, and media encryption: http://blogs.technet.com.
- BitLocker Manager is not supported with Encryption of server operating systems.
- When using a Remote Desktop connection with an endpoint leveraging BitLocker Manager, Dell recommends running any Remote Desktop sessions in console mode to avoid any UI interaction issues with the existing user session via the following command:

  ```
  mstsc /admin /v:<target_ip_address>
  ```

- The master installer installs these components if not already installed on the target computer. **When using the child installer**, you must install these components before installing the clients.

Prerequisite
○ Visual C++ 2017 or later Redistributable Package (x86 or x64) ○ As of January 2020, SHA1 signing certificates are no longer valid and cannot be renewed. Devices running Windows Server 2008 R2 must install Microsoft KBs https://support.microsoft.com/help/4474419 and https://support.microsoft.com/help/4490628 to validate SHA256 signing certificates on applications and installation packages. Applications and installation packages signed with SHA1 certificates will function but an error will display on the endpoint during installation or execution of the application without these updates installed

- **NOTE:** Computers protected by Bitlocker Manager must be updated to Windows 10 v1703 (Creators Update/Redstone 2) or later before updating to Windows 10 v1903 (May 2019 Update/19H1) or later. If this upgrade path is attempted, an error message displays.
- **NOTE:** In-place operating system upgrades to a newer version - such as Windows 10 - to Windows 11 is not supported.

Hardware

- The following table details supported hardware.

Optional Embedded Hardware
○ TPM 1.2 or 2.0

Operating Systems

- The following tables detail supported operating systems.

Windows Operating Systems
○ Windows 10: Education, Enterprise, Pro v1909-v22H2 (November 2019 Update/19H2 - November 2022 Update/22H2) **Note:** OEMs and ODMs do not ship Windows 10 v2004 (May 2020 Update/20H1 and later) with 32-bit architecture. For more information, see https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview. ▪ Windows 10 2019 LTSC ▪ Windows 10 2021 LTSC ○ Windows 11: Enterprise, Pro v21H2 - 22H2

Windows Server Operating Systems
○ Windows Server 2008 R2: Standard Edition, Enterprise Edition (64-bit) ○ Windows Server 2012 R2: Standard Edition, Enterprise Edition (64-bit) ○ Windows Server 2016: Standard Edition, Datacenter Edition (64-bit) ○ Windows Server 2019: Standard Edition, Datacenter Edition (64-bit) ○ Windows Server 2022: Standard Edition, Datacenter Edition

3

Registry Settings

- This section details all Dell ProSupport approved registry settings for local **client** computers, regardless of the reason for the registry setting. If a registry setting overlaps two products, it is listed in each category.
- These registry changes should be done by administrators only and may not be appropriate or function in all scenarios.

Encryption

- If a self-signed certificate is used on the Dell Server. For Windows, certificate trust validation must remain disabled on the client computer (trust validation is *disabled* by default with Dell Server). Before *enabling* trust validation on the client computer, the following requirements must be met.
  - A certificate signed by a root authority, such as EnTrust or Verisign, must be imported into Dell Server.
  - The full chain of trust of the certificate must be stored in the Microsoft keystore on the client computer.
  - To *enable* trust validation for Encryption, change the value of the following registry entry to 0 on the target computer.

    [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield]

    "IgnoreCertErrors"=DWORD:00000000

    0 = Fail if a certificate error is encountered

    1= Ignores errors

- To create an Encryption Removal Agent log file, create the following registry entry on the computer targeted for decryption. See (Optional) Create an Encryption Removal Agent Log File.

  [HKLM\Software\Credant\DecryptionAgent]

  "LogVerbosity"=DWORD:2

  0: no logging

  1: logs errors that prevent the service from running

  2: logs errors that prevent complete data decryption (recommended level)

  3: logs information about all decrypting volumes and files

  5: logs debugging information

- To disable prompting the user to reboot their computer after the Encryption Removal Agent finishes its final state in the decryption process, modify the following registry value or modify the *Force Reboot on Update* policy in the Management Console.

  [HKLM\Software\Dell\Dell Data Protection]

  "ShowDecryptAgentRebootPrompt"=DWORD

  1 = enabled (displays prompt)

  0 = disabled (hides prompt)

- By default, during installation, the notification area icon is displayed. Use the following registry setting to hide the notification area icon for all managed users on a computer after the original installation. Create or modify the registry setting:

  [HKLM\Software\CREDANT\CMGShield]

  "HIDESYSTRAYICON"=DWORD:1

- By default, all temporary files in the c:\windows\temp directory are automatically deleted during installation. Deletion of temporary files speeds initial encryption and occurs before the initial encryption sweep.

  However, if your organization uses a third-party application that requires the file structure within the \temp directory to be preserved, you should prevent this deletion.

  To disable temporary file deletion, create or modify the registry setting as follows:

[HKLM\SOFTWARE\CREDANT\CMGShield]

"DeleteTempFiles"=REG_DWORD:0

Not deleting temporary files increases initial encryption time.

- Encryption displays the *length of each policy update delay* prompt for five minutes each time. If the user does not respond to the prompt, the next delay begins. The final delay prompt includes a countdown and progress bar, and it displays until the user responds, or the final delay expires and the required logoff/reboot occurs.

  You can change the behavior of the user prompt to begin or delay encryption, to prevent encryption processing after no user response to the prompt. To do this, set the value:

  [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield]

  "SnoozeBeforeSweep"=DWORD:1

  Any non-zero value changes the default behavior to snooze. With no user interaction, encryption processing is delayed up to the number of configurable allowed delays. Encryption processing begins when the final delay expires.

  Calculate the maximum possible delay as follows (a maximum delay would involve the user never responding to a delay prompt, each of which displays for 5 minutes):

  (NUMBER OF POLICY UPDATE DELAYS ALLOWED × LENGTH OF EACH POLICY UPDATE DELAY) + (5 MINUTES × [NUMBER OF POLICY UPDATE DELAYS ALLOWED - 1])

- Use the registry setting to have Encryption poll the Dell Server for a forced policy update. Create or modify the registry setting:

  [HKLM\SOFTWARE\Credant\CMGShield\Notify]

  "PingProxy"=DWORD value:1

  The registry setting automatically disappears when done.

- Use the registry settings to allow Encryption to send an optimized, full (activated and unactivated users), or full (activated users only) inventory to the Dell Server.
  - Send Optimized Inventory to Dell Server:

    Create or modify the registry setting:

    [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield]

    "OnlySendInvChanges"=REG_DWORD:1

    If no entry is present, optimized inventory is sent to the Dell Server.

  - Send Full Inventory to Dell Server:

    Create or modify the registry setting:

    [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield]

    "OnlySendInvChanges"=REG_DWORD:0

    If no entry is present, optimized inventory is sent to the Dell Server.

  - Send Full Inventory for All Activated Users

    [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield]

    "RefreshInventory"=REG_DWORD:1

    This entry is deleted from the registry as soon as it is processed. The value is saved in the vault, so even if the computer is rebooted before the inventory upload takes place, Encryption still honors this request the next successful inventory upload.

    This entry supersedes the OnlySendInvChanges registry value.

- Slotted Activation is a feature that allows you to spread activations of clients over a set time period to ease Dell Server load during a mass deployment. Activations are delayed based on algorithmically generated time slots to provide a smooth distribution of activation times.

  For users requiring activation through VPN, a slotted activation configuration for the client may be required, to delay initial activation for long enough to allow time for the VPN client to establish a network connection.

  These registry entries require a restart of the computer for the updates to take effect.

  - **Slotted Activation**

To enable or disable this feature, create a DWORD with the name **SlottedActivation** under the parent key:

[HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\]

- **Activation Slot**

  To enable or disable this feature, create a subkey with the name **ActivationSlot** under the parent key:

  [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\]

  Activation Slot - a string that defines the period within which Encryption attempts to activate with the Dell Server. These values are defined in seconds, and the syntax is defined by <lowervalue>,<uppervalue>. An example would be 120,300. This means that Encryption attempts to activate at a random time between 2 minutes and 5 minutes after user login.

  - **Calendar Repeat**

    To enable or disable this feature, create a subkey with the name **CalRepeat** under the parent key:

    [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\ActivationSlot]

    CalRepeat - A DWORD that defines the time period in seconds that the activation slot interval occurs. Use this setting to override the time period in seconds that the activation slot interval occurs. 25200 seconds are available for slotting activations during a seven-hour period. The default setting is 86400 seconds, which represents a daily repeat. The suggested decimal value is 600, which represents 10 minutes.

  - **Slot Interval**

    To enable or disable this feature, create a subkey with the name **SlotInterval** under the parent key:

    [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\ActivationSlot]

    Slot Interval - A string value that defines the intervals between slot activations. The suggested setting is 45,120. This represents activation time being randomly assigned between 45 and 120 seconds.

  - **Missed Threshold**

    To enable or disable this feature, create a subkey with the name **MissThreshold** under the parent key:

    [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\ActivationSlot]

    MissThreshold - a DWORD value that contains a positive integer that defines the number of attempts to activate before a log off is required. If the MissThreshold is reached, activation attempts cease until the next login for the unactivated user. The count for MissThreshold is always reset on logoff.

    The registry keys collect slotted activation user data:

    [HKCU/Software/CREDANT/ActivationSlot] (per-user data)

    Deferred time to attempt the slotted activation, which is set when the user logs onto the network for the first time after slotted activation is enabled. The activation slot is recalculated for each activation attempt.

    [HKCU/Software/CREDANT/SlotAttemptCount] (per-user data)

    Number of failed or missed attempts, when the time slot arrives and activation is attempted but fails. When this number reaches the value set in ACTIVATION_SLOT_MISSTHRESHOLD, the computer attempts one immediate activation upon connecting to the network.

- To detect unmanaged users on the client computer, set the registry value on the client computer:

  [HKLM\SOFTWARE\Credant\CMGShield\ManagedUsers\]

  "UnmanagedUserDetected"=DWORD value:1

  Detect unmanaged users on this computer=1

  Do not detect unmanaged users on this computer=0

- Access to external media encrypted with Encryption External Media can be restricted to computers with access to the Dell Server that produced the encryption keys with which the media was encrypted.

  This feature is enabled by setting the registry:

  [HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield]

  "EnterpriseUsage"=DWORD:0

  Off (default)=0

  File Access Restricted to Enterprise=1

If this value is changed after files on external media are encrypted, the files are re-encrypted based on the updated registry key value when the media is connected to the computer on which the registry setting was updated.

- To enable silent automatic reactivation in the rare case that a user becomes deactivated, the registry value must be set on the client computer.

  [HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CMGShield]

  "AutoReactivation"=DWORD:00000001

  0=Disabled (default)

  1=Enabled

- System Data Encryption (SDE) is enforced based on the policy value for SDE Encryption Rules. Additional directories are protected by default when the SDE Encryption Enabled policy is Selected. For more information, search "SDE Encryption Rules" in AdminHelp. When Encryption is processing a policy update that includes an active SDE policy, the current user profile directory is encrypted by default with the SDUser key (a User key) rather than the SDE key (a Device key). The SDUser key is also used to encrypt files or folders that are copied (not moved) into a user directory that is not a encrypted with SDE.

  To disable the SDUser key and use the SDE key to encrypt these user directories, create the registry on the computer:

  [HKEY_LOCAL_MACHINE\SOFTWARE\Credant\CMGShield]

  "EnableSDUserKeyUsage"=DWORD:00000000

  If this registry key is not present or is set to anything other than 0, the SDUser key will be used to encrypt these user directories.

  For more information about SDUser, see KB article 131035

- Setting the registry entry, EnableNGMetadata, if issues occur related with Microsoft updates on computers with Common key-encrypted data or with encrypting, decrypting, or unzipping large numbers of files within a folder.

  Set the EnableNGMetadata registry entry in the following location:

  [HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\CmgShieldFFE]

  "EnableNGMetadata" = DWORD:1

  0=Disabled (default)

  1=Enabled

- The non-domain activation feature can be enabled by contacting Dell ProSupport and requesting instructions.
- The Encryption Management Agent no longer outputs policies by default. To output future consumed policies, create the following registry key:

  HKLM\Software\Dell\Dell Data Protection\

  " DumpPolicies" = DWORD

  Value=1

  Note: Logs are written to C:\ProgramData\Dell\Dell Data Protection\Policy .

- To disable or enable the *Encrypt for Sharing* option in the right-click menu use the following registry key.

  HKEY_LOCAL_MACHINE\SOFTWARE\Dell\Dell Data Protection\Encryption

  "DisplaySharing"=DWORD

  0 = disable the Encrypt for Sharing option in the right-click context menu

  1 = enable the Encrypt for Sharing option in the right-click context menu

SED Manager

- To set the retry interval when the Dell Server is unavailable to communicate with SED Manager, add the following registry value.

  [HKLM\System\CurrentControlSet\Services\DellMgmtAgent\Parameters]

  "CommErrorSleepSecs"=DWORD:300

This value is the number of seconds SED Manager waits to attempt to contact the Dell Server if it is unavailable to communicate. The default is 300 seconds (5 minutes).

- If a self-signed certificate is used on the Dell Server for SED Manager, SSL/TLS trust validation must remain disabled on the client computer (SSL/TLS trust validation is *disabled* by default with SED Manager). Before *enabling* SSL/TLS trust validation on the client computer, the following requirements must be met.
  - A certificate signed by a root authority, such as EnTrust or Verisign, must be imported into Dell Server.
  - The full chain of trust of the certificate must be stored in the Microsoft keystore on the client computer.
  - To *enable* SSL/TLS trust validation for SED Manager, change the value of the following registry entry to 0 on the client computer.

    [HKLM\System\CurrentControlSet\Services\DellMgmtAgent\Parameters]

    "DisableSSLCertTrust"=DWORD:0

    0 = Enabled

    1 = Disabled

- To determine if the PBA is activated, ensure that the following value is set:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent\Parameters]

  "PBAIsActivated"=DWORD (32-bit):1

  A value of 1 means that the PBA is activated. A value of 0 means the PBA is not activated.

- To determine if a smart card is present and active, ensure the following value is set:

  HKLM\SOFTWARE\Dell\Dell Data Protection\

  "SmartcardEnabled"=DWORD:1

  If SmartcardEnabled is missing or has a value of zero, the Credential Provider will display only Password for authentication.

  If SmartcardEnabled has a non-zero value, the Credential Provider will display options for Password and smart card authentication.

- The following registry value indicates whether Winlogon should generate a notification for logon events from smart cards.

  HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\Notify

  "SmartCardLogonNotify"=DWORD:1

  0 = Disabled

  1 = Enabled

- To prevent SED Manager from disabling third-party credential providers, create the following registry key:

  HKLM\SOFTWARE\Dell\Dell Data Protection\

  "AllowOtherCredProviders" = DWORD:1

  0=Disabled (default)

  1=Enabled

  NOTE: This value may prevent the Dell credential provider from properly syncing credentials initially due to third-party credential providers being disabled. Ensure the devices using this registry key can properly communicate with the Dell Server.

- To set the interval that SED Manager attempts to contact the Dell Server when it is unavailable to communicate, set the following value on the target computer:

  [HKLM\System\CurrentControlSet\Services\DellMgmtAgent\Parameters]

  "CommErrorSleepSecs"=DWORD Value:300

  This value is the number of seconds SED Manager waits to attempt to contact the Dell Server if it is unavailable to communicate. The default is 300 seconds (5 minutes).

- The Security Server host may be changed from the original installation location if needed. The host information is read every time a policy poll occurs. Change the following registry value on the client computer:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent]

  "ServerHost"=REG_SZ:<newname>.<organization>.com

- The Security Server port may be changed from the original installation location if needed. This value is read every time a policy poll occurs. Change the following registry value on the client computer:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent]

  ServerPort=REG_SZ:8888

- The Security Server URL may be changed from the original install location if needed. This value is read by the client computer every time a policy poll occurs. Change the following registry value on the client computer:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent]

  "ServerUrl"=REG_SZ:https://<newname>.<organization>.com:8888/agent

- (With pre-boot authentication only) If you **do not** want PBA advanced authentication to change the services associated with smart cards and biometric devices to a startup type of "automatic", disable the service startup feature. Disabling this feature also suppresses warnings associated with the required services not running.

  When **disabled**, PBA advanced authentication does not attempt to start these services:

  - SCardSvr - Manages access to smart cards read by the computer. If this service is stopped, this computer is unable to read smart cards. If this service is disabled, any services that explicitly depend on it fail to start.
  - SCPolicySvc - Allows the system to be configured to lock the user desktop upon smart card removal.
  - WbioSrvc - The Windows biometric service gives client applications the ability to capture, compare, manipulate, and store biometric data without gaining direct access to any biometric hardware or samples. The service is hosted in a privileged SVCHOST process.

    By default, if the registry key does not exist or the value is set to 0, this feature is enabled.

    [HKLM\SOFTWARE\DELL\Dell Data Protection]

    SmartCardServiceCheck=REG_DWORD:0

    0 = Enabled

    1 = Disabled

- To use smart cards with SED PBA Authentication, the following registry value must be set on the client computer that is equipped with an SED.

  [HKLM\SOFTWARE\DigitalPersona\Policies\Default\SmartCards]

  "MSSmartcardSupport"=DWORD:1

  Set the Authentication Method policy to Smart Card in the Management Console, and commit the change.

- To suppress all Toaster notifications from the Encryption Management Agent, the following registry value must be set on the client computer.

  [HKEY_LOCAL_MACHINE\SOFTWARE\Dell\Dell Data Protection]

  "PbaToastersAllowClose" =DWORD:1

  0=Enabled (default)

  1=Disabled

Full Disk Encryption

- This section details all Dell ProSupport approved registry settings for local computers, regardless of the reason for the registry setting. If a registry setting overlaps two products, it is listed in each category.
- These registry changes should be done by administrators only and may not be appropriate or function in all scenarios.
- To set the retry interval when the Dell Server is unavailable to communicate with Full Disk Encryption, add the following registry value.

  [HKLM\System\CurrentControlSet\Services\DellMgmtAgent\Parameters]

  "CommErrorSleepSecs"=DWORD:300

  This value is the number of seconds Full Disk Encryption waits to attempt to contact the Dell Server if it is unavailable to communicate with Full Disk Encryption. The default is 300 seconds (5 minutes).

- If a self-signed certificate is used on the Dell Server for Full Disk Encryption, SSL/TLS trust validation must remain disabled on the client computer (SSL/TLS trust validation is *disabled* by default with Full Disk Encryption). Before *enabling* SSL/TLS trust validation on the client computer, the following requirements must be met.
  - A certificate signed by a root authority, such as EnTrust or Verisign, must be imported into Dell Server.
  - The full chain of trust of the certificate must be stored in the Microsoft keystore on the client computer.
  - To *enable* SSL/TLS trust validation for Dell Encryption management, change the value of the following registry entry to 0 on the client computer.

    [HKLM\System\CurrentControlSet\Services\DellMgmtAgent\Parameters]

    "DisableSSLCertTrust"=DWORD:0

    0 = Enabled

    1 = Disabled
- To determine if the PBA is activated, ensure that the following value is set:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent\Parameters]

  "PBAIsActivated"=DWORD (32-bit):1

  A value of 1 means that the PBA is activated. A value of 0 means the PBA is not activated.

  NOTE: Manually deleting this key can create unintended results for users syncing with the PBA resulting in the need for manual recovery.
- To determine if a smart card is present and active, ensure the following value is set:

  HKLM\SOFTWARE\Dell\Dell Data Protection\

  "SmartcardEnabled"=DWORD:1

  If SmartcardEnabled is missing or has a value of zero, the Credential Provider will display only Password for authentication.

  If SmartcardEnabled has a non-zero value, the Credential Provider will display options for Password and smart card authentication.
- The following registry value indicates whether Winlogon should generate a notification for logon events from smart cards.

  HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\Notify

  "SmartCardLogonNotify"=DWORD:1

  0 = Disabled

  1 = Enabled
- The Security Server host may be changed from the original installation location if needed. The host information is read by the client computer every time a policy poll occurs. Change the following registry value on the client computer:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent]

  "ServerHost"=REG_SZ:<newname>.<organization>.com
- The Security Server port may be changed from the original installation location if needed. This value is read by the client computer every time a policy poll occurs. Change the following registry value on the client computer:

  [HKLM\SYSTEM\CurrentControlSet\services\DellMgmtAgent]

  ServerPort=REG_SZ:8888
- (With pre-boot authentication only) If you **do not** want PBA advanced authentication to change the services associated with smart cards and biometric devices to a startup type of "automatic", disable the service startup feature. Disabling this feature also suppresses warnings associated with the required services not running.

  When **disabled**, PBA advanced authentication does not attempt to start these services:
  - SCardSvr - Manages access to smart cards read by the computer. If this service is stopped, this computer is unable to read smart cards. If this service is disabled, any services that explicitly depend on it fail to start.
  - SCPolicySvc - Allows the system to be configured to lock the user desktop upon smart card removal.
  - WbioSrvc - The Windows biometric service gives client applications the ability to capture, compare, manipulate, and store biometric data without gaining direct access to any biometric hardware or samples. The service is hosted in a privileged SVCHOST process.

    By default, if the registry key does not exist or the value is set to 0, this feature is enabled.

[HKLM\SOFTWARE\DELL\Dell Data Protection]

SmartCardServiceCheck=REG_DWORD:0

0 = Enabled

1 = Disabled

- To prevent Full Disk Encryption from disabling third-party credential providers, create the following registry key:

  HKLM\SOFTWARE\Dell\Dell Data Protection\

  "AllowOtherCredProviders" = DWORD:1

  0=Disabled (default)

  1=Enabled

  NOTE: This value may prevent the Dell credential provider from properly syncing credentials initially due to third-party credential providers being disabled. Ensure the devices using this registry key can properly communicate with the Dell Server.

- To suppress all Toaster notifications from the Encryption Management Agent, the following registry value must be set on the client computer.

  [HKEY_LOCAL_MACHINE\SOFTWARE\Dell\Dell Data Protection]

  "PbaToastersAllowClose" =DWORD:1

  0=Enabled (default)

  1=Disabled

- To allow installation of Full Disk Encryption with Policy Based Encryption, the following registry value must be set on the client computer.

  [HKEY_LOCAL_MACHINE\SOFTWARE\Dell\Dell Data Protection]

  " EnableFDE" = DWORD: 1

  0=Disabled (default)

  1=Enabled

BitLocker Manager

- If a self-signed certificate is used on the Dell Server for BitLocker Manager, SSL/TLS trust validation must remain disabled on the client computer (SSL/TLS trust validation is *disabled* by default with BitLocker Manager). Before *enabling* SSL/TLS trust validation on the client computer, the following requirements must be met.
  - A certificate signed by a root authority, such as EnTrust or Verisign, must be imported into Dell Server.
  - The full chain of trust of the certificate must be stored in the Microsoft keystore on the client computer.
  - To *enable* SSL/TLS trust validation for BitLocker Manager, change the value of the following registry entry to 0 on the client computer.

    [HKLM\System\CurrentControlSet\Services\DellMgmtAgent\Parameters]

    "DisableSSLCertTrust"=DWORD:0

    0 = Enabled

    1 = Disabled

  - To prevent Bitlocker Manager from detecting removable disks as fixed disks, add the following registry key:

    HKLM\Software\Dell\Dell Data Protection\

    "UseEncryptableVolumeType" = DWORD:1

    0=Disabled (default)

    1=Enabled

4

Install Using the Master Installer

- Command line switches and parameters are case-sensitive.
- To install using non-default ports, use the child installers instead of the master installer.
- Master installer log files are located at `C:\ProgramData\Dell\Dell Data Protection\Installer`.

  NOTE: If Policy-Based Encryption is installed before the Encryption Management Agent, computer crash may occur. This issue is caused by failure to load the encryption Sleep driver that manages the PBA environment. As a workaround, use the master installer or ensure that Policy-Based Encryption is installed after the Encryption Management Agent.

- Instruct users to see the following document and help files for application assistance:
  - See the *Dell Encrypt Help* to learn how to use the features of Encryption. Access the help from `<Install dir>\Program Files\Dell\Dell Data Protection\Encryption\Help`.
  - See the *Encryption External Media Help* to learn how the features of Encryption External Media. Access the help from `<Install dir>\Program Files\Dell\Dell Data Protection\Encryption\EMS`.
  - See the *Encryption Enterprise Help* to learn how to use the features of . Access the help from `<Install dir>\Program Files\Dell\Dell Data Protection\Client Security Framework\Help`.
- Users should update their policies by right-clicking the Dell Encryption icon in the notification area and selecting **Check for Policy Updates** after installation completes.
- The master installer installs the entire suite of products. There are two methods to install using the master installer. Choose one of the following.
  - Install Interactively Using the Master Installer

  or

  - Install by Command Line Using the Master Installer

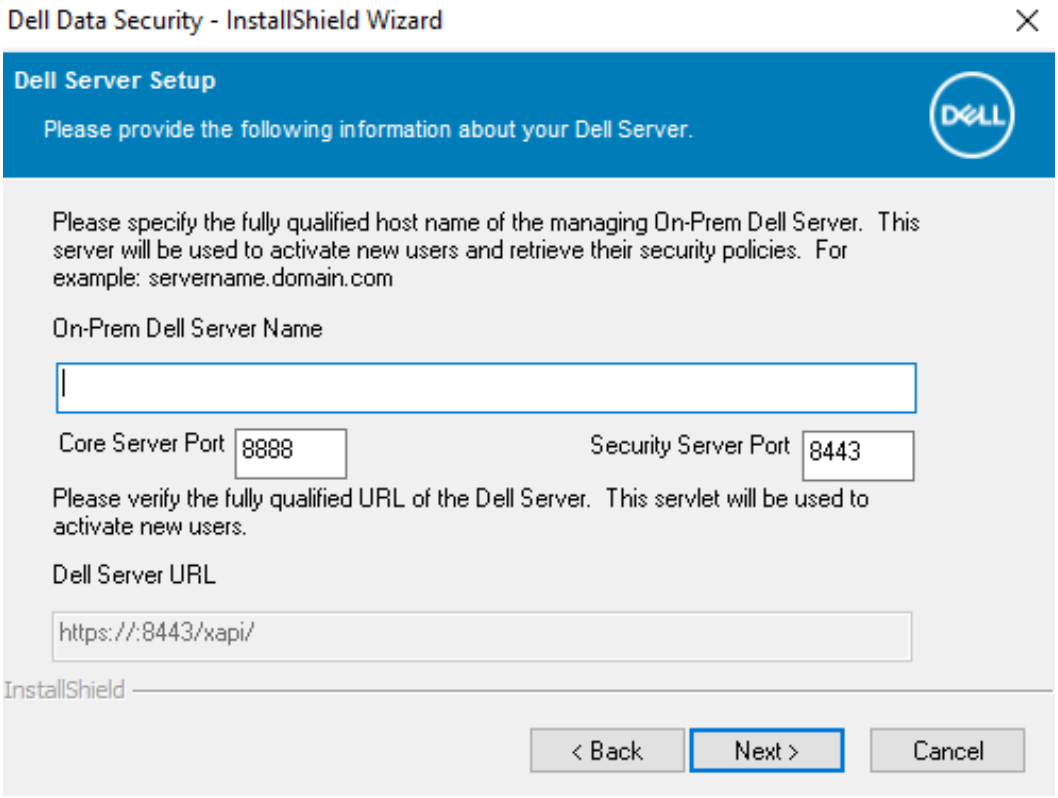
Install Interactively Using the Master Installer

- The master installer can be located at:
  - **From dell.com/support** - If needed, Obtain the Software from **dell.com/support**
  - **From Your Dell FTP Account** - Locate the installation bundle at Dell-Encryption-8.x.x.xxx.zip
- Use these instructions to install or update Dell Encryption Enterprise interactively using the master installer. This method can be used to install the suite of products on one computer at a time.

1. Locate **DDSSetup.exe** in the Dell installation media. Copy it to the local computer.
2. Double-click to launch the installer. This may take several minutes.
3. Click **Next** in the Welcome dialog.
4. Read the license agreement, accept the terms, and click **Next**.
5. In *On-Prem Dell Server Name*, enter the fully qualified hostname of the Dell Server to manage the target user.

   Enter port values in *Core Server Port* and *Security Server Port* if your organization uses non-standard ports.

   Click **Next.**



6. Click **Next** to install the product in the default location of `C:\Program Files\Dell\Dell Data Protection\`. `Dell recommends installing in the default location only`, as problems may arise when installing in other locations.
7. Select the components to be installed.

   Security Framework installs the underlying security framework, the Encryption Management Agent, and PBA authentication.

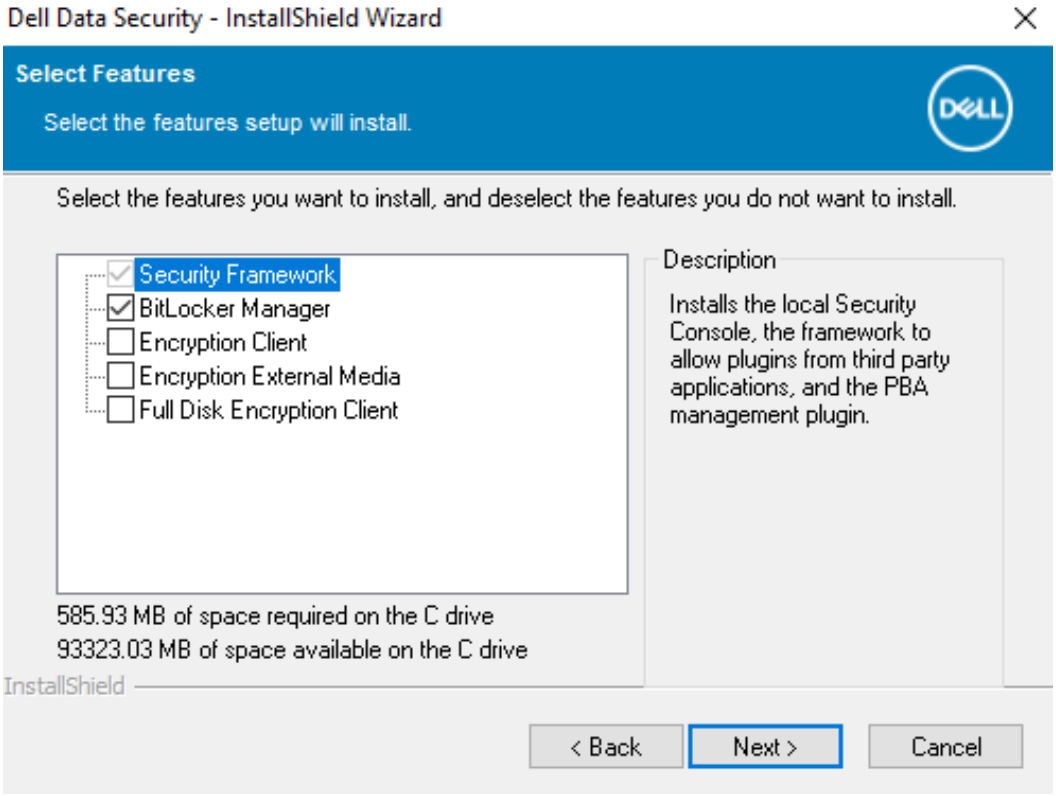
   BitLocker Manager installs the BitLocker Manager client, designed to enhance the security of BitLocker deployments by simplifying and reducing the cost of ownership through centralized management of BitLocker encryption policies.

   Encryption installs the component that enforces security policy, whether a computer is connected to the network, disconnected from the network, lost, or stolen.

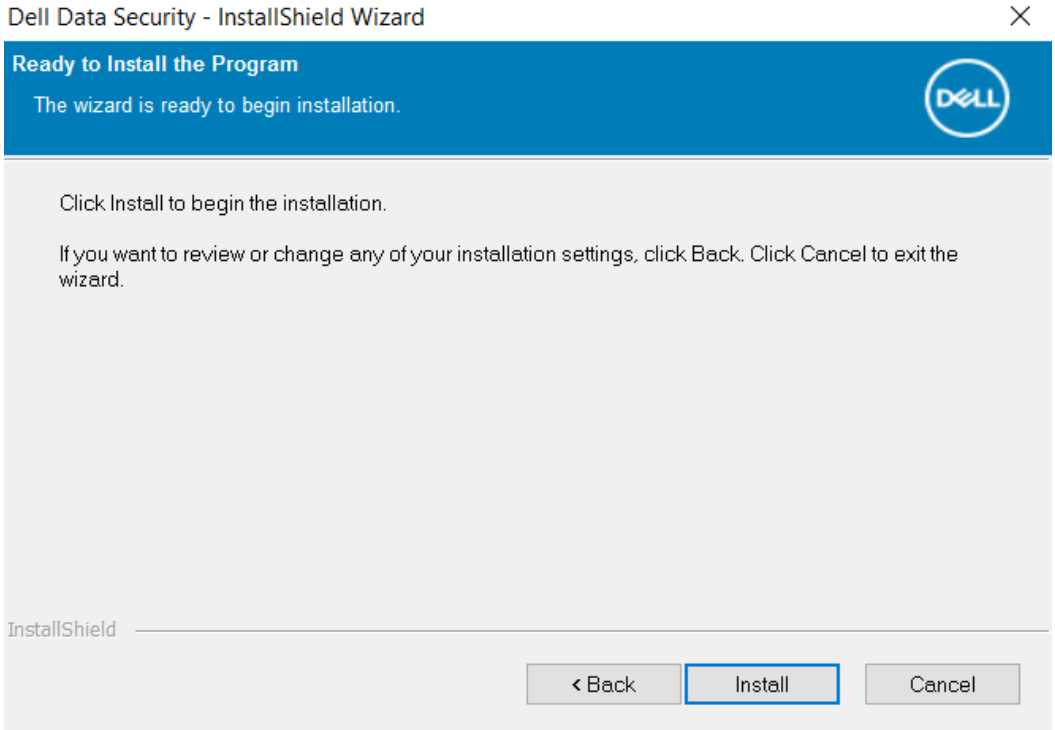
   Encryption External Media installs the component that enforces Encryption External Media.

   Full Disk Encryption installs the component that enforces Full Disk Encryption.

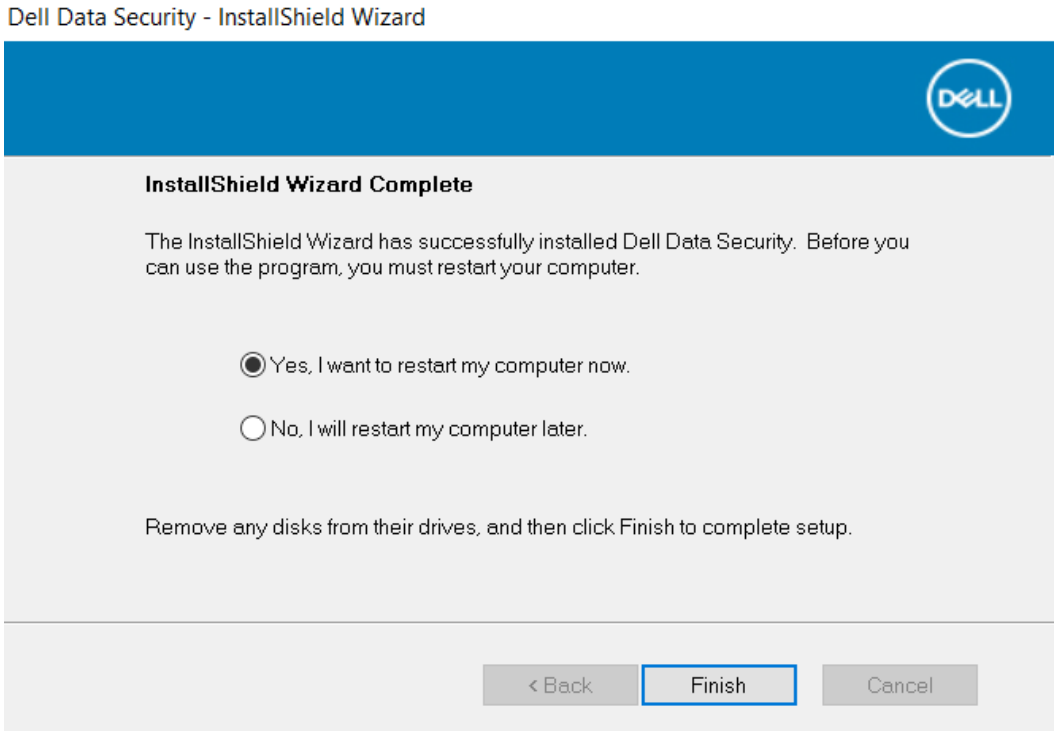
   Click **Next** when your selections are complete.



8. Click **Install** to begin the installation. Installation takes several minutes.



9. Select **Yes, I want to restart my computer now** and click **Finish**.



Installation is complete.

Install by Command Line Using the Master Installer

- The switches must be specified first in a command line installation. Other parameters go inside an argument that is passed to the /v switch.

Switches

- The following table describes the switches that can be used with the master installer.

NOTE: If your organization requires the use of third-party credential providers, the Encryption Management Agent must be installed or upgraded with the FEATURE=BLM or FEATURE=BASIC parameter.

Switch	Description
/s	Silent installation
/z	Pass variables to the .msi inside the DDSSetup.exe

Parameters

- The following table describes the parameters that can be used with the master installer.

Parameter	Description
SUPPRESSREBOOT	Suppresses the automatic reboot after the installation completes. Can be used in SILENT mode.
SERVER	Specifies the URL of the Dell Server.
InstallPath	Specifies the path for the installation. Can be used in SILENT mode.
FEATURES	Specifies the components that can be installed in SILENT mode. DE = Drive Encryption client only

Parameter	Description
	EME = Encryption External Media only BLM = BitLocker Manager SED = SED Manager (Encryption Management Agent/Manager, PBA/GPE Drivers)
BLM_ONLY=1	Must be used when using FEATURES=BLM in the command line to exclude the SED Manager plugin.

Example Command Line

- Command line parameters are case-sensitive.
- This example installs all components using the master installer on standard ports, silently, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com\""
  ```
- This example installs SED Manager and Encryption External Media with the master installer, on standard ports, silently, with a suppressed reboot, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com, FEATURES=EME-SED,
  SUPPRESSREBOOT=1\""
  ```
- This example installs SED Manager with the master installer, on standard ports, silently, with a suppressed reboot, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com, FEATURES=SED, SUPPRESSREBOOT=1\""
  ```
- This example installs SED Manager with the master installer, on standard ports, silently, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com, FEATURES=SED\""
  ```
- This example installs Encryption and BitLocker Manager (without the SED Manager plugin), with the master installer, on standard ports, silently, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com, FEATURES=DE-BLM, BLM_ONLY=1\""
  ```
- This example installs BitLocker Manager (with the SED Manager plugin) and Encryption External Media, with the master installer, on standard ports, silently, with a suppressed reboot, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com, FEATURES=BLM-EME,
  SUPPRESSREBOOT=1\""
  ```
- This example installs BitLocker Manager (without the SED Manager plugin) and Encryption External Media, with the master installer, on standard ports, silently, with a suppressed reboot, in the default location of `C:\Program Files\Dell\Dell Data Protection\`, and configures it to use the specified Dell Server.

  ```
  "DDSSetup.exe" /s /z"\"SERVER=server.organization.com, FEATURES=BLM-EME, BLM_ONLY=1,
  SUPPRESSREBOOT=1\""
  ```

5

Uninstall the Master Installer

- Dell recommends using the Data Security Uninstaller to remove the Data Security suite.
- Each component must be uninstalled separately, followed by uninstallation of the master installer. The clients must be uninstalled in a **specific order to prevent uninstallation failures**.
- Follow the instructions in Extract the Child Installers from the Master Installer to obtain child installers.
- Ensure that the same version of master installer (and thereby clients) is used for uninstallation as installation.
- This chapter refers you to other chapters that contain *detailed* instructions of how to uninstall the child installers. This chapter explains the last step **only**, uninstalling the master installer.
- Uninstall the clients in the following order.
  1. Uninstall Encryption .
  2. Uninstall SED Manager.
  3. Uninstall Full Disk Encryption
  4. Uninstall BitLocker Manager.
- Proceed to Uninstall the Master Installer.

Uninstall the Master Installer

Now that all of the individual clients have been uninstalled, the master installer can be uninstalled.

Command Line Uninstallation

- The following example silently uninstalls the master installer.

  ```
  "DDSSetup.exe" /s /x
  ```

  Reboot the computer when finished.

6

Install Using the Child Installers

- To install or upgrade each client individually, the child executable files must first be extracted from the master installer, as shown in Extract the Child Installers from the Master Installer.
- Command examples included in this section assume the commands are run from `C:\extracted`.
- Command line switches and parameters are case-sensitive.
- Be sure to enclose a value that contains one or more special characters, such as a blank space in the command line, in escaped quotation marks.
- Use these installers to install the clients using a scripted installation, batch files, or any other push technology available to your organization.
- The reboot has been suppressed in the command line examples. However, an eventual reboot is required.

  Note: Policy-Based Encryption cannot begin until the computer has rebooted.

- Log files - Windows creates unique child installer installation log files for the logged in user at %temp%, located at `C:\Users\<UserName>\AppData\Local\Temp`.

  If you decide to add separate a log file when you run the installer, ensure that the log file has a unique name, as child installer log files do not append. The standard .msi command can be used be create a log file by using `/l*v C:\<any directory>\<any log file name>.log`.

- All child installers use the same basic .msi switches and display options, except where noted, for command line installations. The switches must be specified first. The `/v` switch is required and takes an argument. Other parameters go inside an argument that is passed to the `/v` switch.

  Display options can be specified at the end of the argument passed to the `/v` switch to achieve the expected behavior. Do not use both `/q` and `/qn` in the same command line. Only use ! and - after `/qb`.

Switch	Meaning
`/v`	Pass variables to the .msi inside the setup.exe. The content must always be enclosed in plain-text quotes.
`/s`	Silent mode
`/x`	Uninstall mode

NOTE:

With `/v`, the Microsoft default options are available. For a list of options, see this article.

Option	Meaning
`/q`	No Progress dialog, restarts itself after process completion
`/qb`	Progress dialog with **Cancel** button, prompts for restart
`/qb-`	Progress dialog with **Cancel** button, restarts itself after process completion
`/qb!`	Progress dialog without **Cancel** button, prompts for restart
`/qb!-`	Progress dialog without **Cancel** button, restarts itself after process completion
`/qn`	No user interface
`/norestart`	Suppress reboot

- Instruct users to see the following document and help files for application assistance:

- See the *Dell Encrypt Help* to learn how to use the features of Encryption. Access the help from `<Install dir>\Program Files\Dell\Dell Data Protection\Encryption\Help`.
- See the *Encryption External Media Help* to learn how the features of Encryption External Media. Access the help from `<Install dir>\Program Files\Dell\Dell Data Protection\Encryption\EMS`.
- See the *Encryption Enterprise* to learn how to use the features of PBA authentication . Access the help from `<Install dir>\Program Files\Dell\Dell Data Protection\Client Security Framework\Help`.

Install Drivers

- Drivers and firmware for ControlVault, fingerprint readers and smart cards are not included in the master installer or child installer executable files. The drivers and firmware must be kept up-to-date, and can be downloaded from http://www.dell.com/support and selecting your computer model. Download the appropriate drivers and firmware based on your authentication hardware.
  - ControlVault
  - NEXT Biometrics Fingerprint Driver
  - Validity Fingerprint Reader 495 Driver
  - O2Micro Smart Card Driver

  If installing on non-Dell hardware, download updated drivers and firmware from that vendor's website.

Install Encryption

- Review Encryption Requirements if your organization is using a certificate signed by a root authority, such as EnTrust or Verisign. A registry setting change is needed on the client computer to enable certificate validation.
- Users should update their policies by right-clicking the Dell Encryption icon in the notification area and selecting *Check for Policy Updates* after installation completes.
- The Encryption installer can be located at:
  - **From dell.com/support** - If needed, Obtain the Software from dell.com/support and then Extract the Child Installers from the Master Installer. After extraction, locate the file at `C:\extracted\Encryption`.
  - **From Your Dell FTP Account** - Locate the installation bundle at Encryption-Enterprise-10.x.x.xxx.zip and then Extract the Child Installers from the Master Installer. After extraction, locate the file at `C:\extracted\Encryption`.
  - **NOTE:** Dell Encryption logs do not specify if insufficient disk storage caused installation failure.

Command Line Installation

- The following table details the parameters available for the installation.

Parameters
SERVERHOSTNAME=<ServerName> (FQDN of the Dell Server for re-activation)
POLICYPROXYHOSTNAME=<RGKName> (FQDN of the default Policy Proxy)
MANAGEDDOMAIN=<MyDomain> (Domain to be used for the device)
DEVICESERVERURL=<DeviceServerName/SecurityServerName> (URL used for activation; usually includes server name, port, and xapi)
GKPORT=<NewGKPort> (Gatekeeper port)
MACHINEID=<MachineName> (Computer name)
RECOVERYID=<RecoveryID> (Recovery ID)

Parameters
REBOOT=ReallySuppress (Null allows for automatic reboots, ReallySuppress disables reboot)
HIDEOVERLAYICONS=1 (0 enables overlay icons, 1 disables overlay icons)
HIDESYSTRAYICON=1 (0 enables the icon in the notification area, 1 disables the icon in the notification area)
ENABLE_FDE_LM=1 (Allows installation of Dell Encryption on a computer with active Full Disk Encryption)
EME=1 (Install Encryption External Media mode)

For a list of basic .msi switches and display options that can be used in command lines, refer to Install Using the Child Installers.

- The following table details additional optional parameters related with activation.

Parameters
SLOTTEDACTIVATON=1 (0 disables delayed/scheduled activations, 1 enables delayed/scheduled activations)
SLOTINTERVAL=45,120 (Schedules activations through x,x notation where the first value is the lower limit of the schedule and the second value is the upper limit - in seconds)
CALREPEAT=600 (MUST match or exceed the upper limit set in SLOTINTERVAL. Number of seconds Encryption waits before generating an activation attempt based on SLOTINTERVAL.)

Example Command Line

NOTE: Replace `DEVICESERVERURL=https://server.organization.com:8081/xapi` (without the trailing forward slash) if your Security Management Server is pre-v7.7.

- The following example installs Dell Encryption with default parameters (Encryption, Encrypt for Sharing, no dialogue, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ /qn"
```

MSI Command:

```
msiexec.exe /i "Dell Data Protection Encryption.msi" /qn REBOOT="ReallySuppress"
SERVERHOSTNAME="server.organization.com" POLICYPROXYHOSTNAME="rgk.organization.com"
MANAGEDDOMAIN="ORGANIZATION" DEVICESERVERURL="https://server.organization.com:8443/xapi/"
```

- The following example installs Encryption and Encrypt for Sharing, hides the Dell Encryption notification area icon, hides the overlay icons, no dialogue, no progress bar, suppresses restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`.

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ HIDESYSTRAYICON=1
HIDEOVERLAYICONS=1 REBOOT=ReallySuppress /qn"
```

MSI Command:

```
msiexec.exe /i "Dell Data Protection Encryption.msi" /qn REBOOT="ReallySuppress"
SERVERHOSTNAME="server.organization.com" POLICYPROXYHOSTNAME="rgk.organization.com"
MANAGEDDOMAIN="ORGANIZATION" DEVICESERVERURL="https://server.organization.com:8443/xapi/"
HIDESYSTRAYICON="1" HIDEOVERLAYICONS="1"
```

Example Command Line to Install Encryption External Media Only

- Silent installation, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`.

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ EME=1 /qn"
```

MSI Command:

```
msiexec.exe /i "Dell Data Protection Encryption.msi" /qn REBOOT="ReallySuppress"
SERVERHOSTNAME="server.organization.com" POLICYPROXYHOSTNAME="rgk.organization.com"
MANAGEDDOMAIN="ORGANIZATION" DEVICESERVERURL="https://server.organization.com:8443/xapi/"
```

- Silent installation, no reboot, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
DDPE_XXbit_setup.exe /s /v"EME=1
SERVERHOSTNAME=server.organization.com POLICYPROXYHOSTNAME=rgk.organization.com
DEVICESERVERURL=https://server.organization.com:8443/xapi/ MANAGEDDOMAIN=ORGANIZATION /
norestart /qn"
```

MSI Command:

```
msiexec.exe /i "Dell Data Protection Encryption.msi" /qn REBOOT="ReallySuppress" EME="1"
SERVERHOSTNAME="server.organization.com" POLICYPROXYHOSTNAME="rgk.organization.com"
DEVICESERVERURL="https://server.organization.com:8443/xapi/" MANAGEDDOMAIN="ORGANIZATION"
```

- **NOTE:**

  Although the About box in the client displays software version number information, it does not display whether Encryption (full install) or Encryption External Media only. To locate this information, go to `C:\ProgramData\Dell\Dell Data Protection\Encryption\CMGShield.log` and find the following entry:

  [<date/timestamp> DeviceInfo: < >] ***Shield Information - SM=External Media Only***, SB=DELL, UNF=FQUN, last sweep={0, 0}

Example Command Line to Convert Encryption External Media to Encryption (full install)

NOTE: Converting Encryption External Media to Encryption (full install) is not supported with upgrades.

- Decryption is not needed when converting Encryption External Media to Encryption (full install).

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ REINSTALL=ALL EME=0
REINSTALLMODE=vamus /qn"
```

MSI Command:

```
msiexec.exe /i "Dell Data Protection Encryption.msi" /qn REBOOT="ReallySuppress"
SERVERHOSTNAME="server.organization.com" POLICYPROXYHOSTNAME="rgk.organization.com"
MANAGEDDOMAIN="ORGANIZATION" DEVICESERVERURL="https://server.organization.com:8443/xapi/"
REINSTALL="ALL" EME="0" REINSTALLMODE="vamus"
```

- **Example Command Line to Install Dell Encryption with Full Disk Encryption**

  \Encryption

- The following example installs Dell Encryption with default parameters (Encryption, Encrypt for Sharing, no dialogue, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ /qn"
```

Then:

\Encryption Management Agent

The following example installs remotely managed Full Disk Encryption and allows installation on a Dell Encryption protected computer (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
EMAgent_64bit_setup.exe /s /v"CM_EDITION=1 ENABLE_FDE_LM=1
FEATURE=FDE SERVERHOST=server.organization.com SERVERPORT=8888
```

```
SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443 ARPSYSTEMCOMPONENT=1 /
norestart /qn"
```

- **Example Command Line to Install Encryption External Media and Full Disk Encryption.**

  \Encryption

  The following example installs Encryption External Media with Silent installation, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`.

  ```
  DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ EME=1 /qn"
  ```

  Then:

  \Encryption Management Agent

  The following example installs remotely managed Full Disk Encryption and allows installation on a Dell Encryption protected computer (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  EMAgent_64bit_setup.exe /s /v"CM_EDITION=1 ENABLE_FDE_LM=1
  FEATURE=FDE SERVERHOST=server.organization.com SERVERPORT=8888
  SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443 ARPSYSTEMCOMPONENT=1 /
  norestart /qn"
  ```

- **Example Command Line to Install Encryption External Media over an existing Full Disk Encryption installation.**

  The following example enables installation of Encryption External Media over an existing Full Disk Encryption installation with Silent installation, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`.

  ```
  DDPE_XXbit_setup.exe /s /v"EME=1 SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ ENABLE_FDE_LM=1 /
  norestart /qn"
  ```

- **Example Command Line to Install Remotely Managed Encryption client over an existing Full Disk Encryption installation.**

  The following example enables installation of Dell Encryption over an existing Full Disk Encryption installation with default parameters (Encryption client, Encrypt for Sharing, no dialogue, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`) and installation logs in `C:\Dell`. **Note:** For successful log generation, the directory `C:\Dell` must exist prior to installation.

  ```
  DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ ENABLE_FDE_LM=1 /
  norestart /qn /l*v C:\Dell\DellEncryptionInstall.log"
  ```

NOTE: Some older versions may require escape characters of \" around the values of parameters. For example:

DDPE_XXbit_setup.exe /v"CMG_DECRYPT=\"1\" CMGSILENTMODE=\"1\" DA_SERVER=\"server.organization.com\" DA_PORT=\"8050\" SVCPN=\"administrator@organization.com\" DA_RUNAS=\"domain\username\" DA_RUNASPWD=\"password\" /qn

Install Full Disk Encryption

- Review Full Disk Encryption Requirements if your organization is using a certificate signed by a root authority, such as EnTrust or Verisign. A registry setting change is needed on the client computer to enable SSL/TLS trust validation.
- Users log in to the PBA using their Windows credentials.

Command Line Installation

- The following table details the parameters available for the installation.

Parameters
CM_EDITION=1 (remote management)
INSTALLDIR=(change the installation destination)
SERVERHOST=(securityserver.organization.com)
SERVERPORT=8888
SECURITYSERVERHOST=(securityserver.organization.com)
SECURITYSERVERPORT=8443
FEATURE=FDE
ENABLE_FDE_LM=1 (Allows installation of Full Disk Encryption on a computer with active Dell Encryption)

For a list of basic .msi switches and display options that can be used in command lines, refer to Install Using the Child Installers.

Example Command Line

Encryption Management Agent

- The following example installs remotely managed Full Disk Encryption (silent installation, no reboot, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
EMAgent_64bit_setup.exe /s /v"CM_EDITION=1 FEATURE=FDE SERVERHOST=server.organization.com
SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443 /
norestart /qn"
```

- **Encryption Management Agent**
- The following example installs remotely managed Full Disk Encryption and allows installation on a Dell Encryption protected computer (silent installation, no reboot, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
EMAgent_64bit_setup.exe /s /v"CM_EDITION=1 ENABLE_FDE_LM=1
FEATURE=FDE SERVERHOST=server.organization.com SERVERPORT=8888
SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443 /norestart /qn"
```

- **Example Command Line to Install Full Disk Encryption and Encryption External Media.**

  Encryption

  The following example installs Encryption External Media with Silent installation, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption.`

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ EME=1 /qn"
```

  Then:

  Encryption Management Agent

  The following example installs remotely managed Full Disk Encryption and allows installation on a Dell Encryption protected computer (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
EMAgent_64bit_setup.exe /s /v"CM_EDITION=1 ENABLE_FDE_LM=1
FEATURE=FDE SERVERHOST=server.organization.com SERVERPORT=8888
SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443 /norestart /qn"
```

Install Encryption on Server Operating System

There are two methods available to install Encryption on server operating system. Choose one of the following methods:

- Install Encryption on server operating system Interactively

  Encryption on server operating system can be installed interactively only on computers running server operating systems. Installation on computers running non-server operating systems must be performed by command line, with the SERVERMODE=1 parameter specified.

- Install Encryption on server operating system Using the Command Line

Virtual User Account

- As part of the installation, a **virtual server user account** is created for the exclusive use of Encryption on server operating system. Password and DPAPI authentication are disabled so that only the virtual server user can access encryption keys.

Before You Begin

- The user account performing the installation must be a domain user with administrator-level permissions.
- To override this requirement, or to run Encryption on server operating system on non-domain or multi-domain servers, set the *ssos.domainadmin.verify* property to *false* in the application.properties file. The file is stored in the following file paths, based on the Dell Server you are using:

  Security Management Server - *<installation dir>*/Security Server/conf/application.properties

  Security Management Server Virtual - /opt/dell/server/security-server/conf/application.properties

- The server must support port controls.

  Port Control System policies affect removable media on protected servers, for example, by controlling access and usage of the server's USB ports by USB devices. USB port policy applies to external USB ports. Internal USB port functionality is not affected by USB port policy. If USB port policy is disabled, a USB keyboard and mouse do not function and the user cannot use the computer unless a Remote Desktop Connection is set up before the policy is applied.

- To successfully activate, the computer must have network connectivity.
- When the Trusted Platform Module (TPM) is available, it is used for sealing the General Purpose Key on Dell hardware. If a TPM is not available, Microsoft's Data Protection API (DPAPI) is used to protect the General Purpose Key.

  When installing a new operating system on a Dell computer with TPM that is running Server Encryption, clear the TPM in the BIOS. See this article for instructions.

- The installation log file is located in the user's %temp% directory, located at `C:\Users\<user name>\AppData\Local\Temp`. To locate the correct log file, find the file name that begins with MSI and ends with a .log extension. The file includes a date/time stamp matching the time when the installer was run.
- Encryption is not supported on servers that are part of distributed file systems (DFS).

Extract the Child Installer

- To install Encryption on server operating system, you must first extract the child installer, **DDPE_xxbit_setup.exe**, from the master installer. See Extract the Child Installers from the Master Installer.

Install Interactively

- Use these instructions to install Encryption on server operating system interactively. This installer includes the components needed for software encryption.

1. Locate **DDPE_XXbit_setup.exe** in the `C:\extracted\Encryption` folder. Copy it to the local computer.
2. If you are installing Encryption on server operating system, double-click **DDPE_XXbit_setup.exe** to launch the installer.

   NOTE:

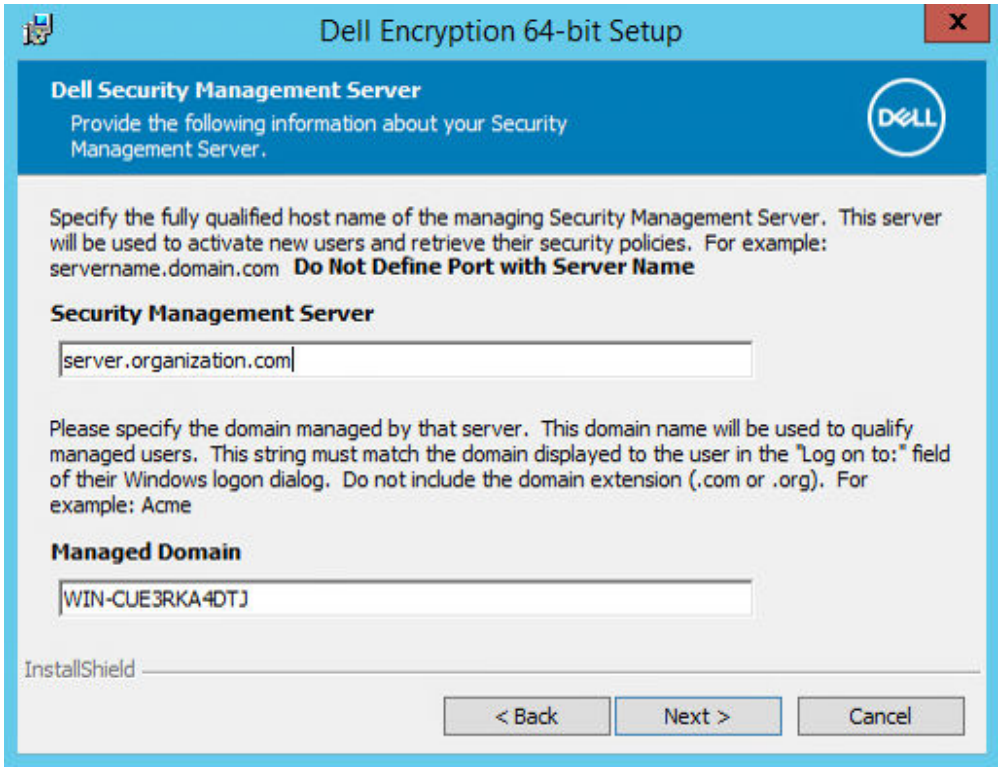
   When Encryption on server operating system is installed on a computer that is running a server operating system, such as Windows Server 2012 R2, the installer automatically installs in SERVERMODE.

3. In the Welcome dialog, click **Next.**
4. In the License Agreement screen, read the license agreement, agree to the terms, and click **Next**.

5. Select *On-Prem Dell Management Server* then click **Next**.

6. Click **Next** to install in the default location.
7. Click **Next** to skip the *Management Type* dialog.
8. In *Security Management Server Name*, enter/validate the fully qualified host name of the Dell Server to manage the target user (example, *server.organization.com)*.

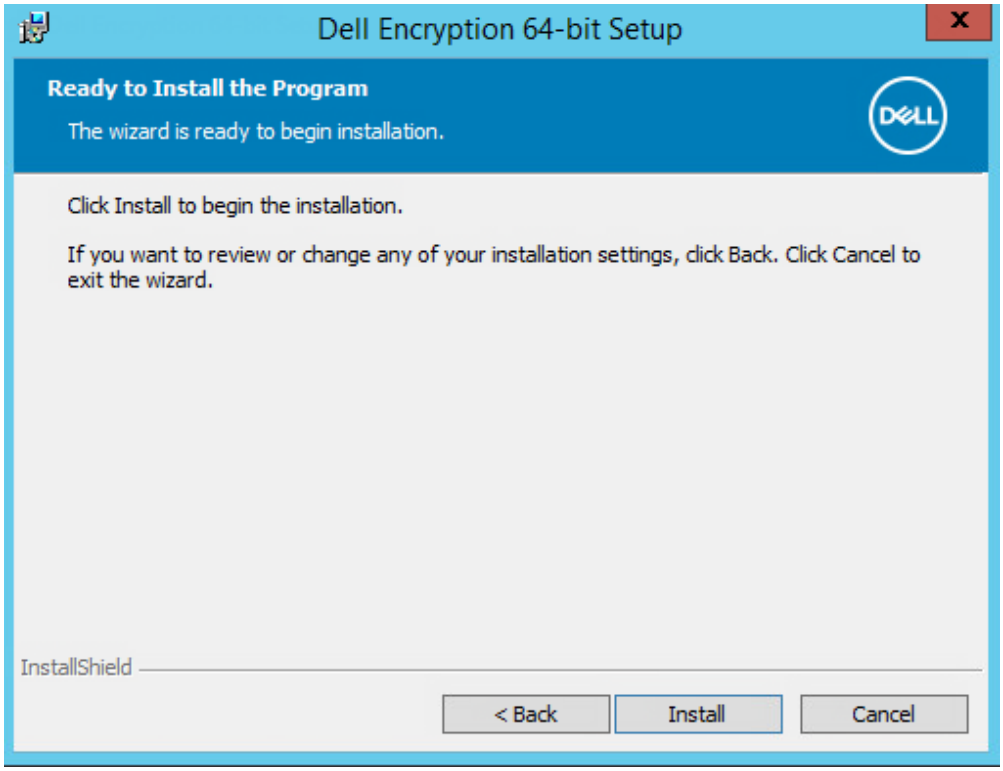
   Enter the domain name in *Managed Domain* (example, organization). Click **Next**.



9. In Policy Proxy hostname and port, enter/validate the information and click **Next**.

10. In Device Server URL, enter/validate the information and click **Next**.

11. Click **Install** to begin the installation.



Installation may take several minutes.

12. Once the configuration is complete, click **Finish**.

Installation is complete.

13. Restart the computer. Dell recommends snoozing the reboot only if time is needed to save your work and close applications. Encryption cannot begin until the computer has rebooted.

Install Using the Command Line

Locate the installer in `C:\extracted\Encryption`

- Use **DDPE_xxbit_setup.exe** to install or upgrade using a scripted installation, using batch files, or any other push technology available to your organization.

Switches

The following table details the switches available for the installation.

Switch	Meaning
/v	Pass variables to the .msi inside the DDPE_XXbit_setup.exe
/a	Administrative installation
/s	Silent mode

Parameters

The following table details the parameters available for the installation.

Component	Log File	Command Line Parameters
All	/l*v [fullpath][filename].log *	SERVERHOSTNAME=<Security Management Server Name>
		SERVERMODE=1
		POLICYPROXYHOSTNAME=<RGK Name>
		MANAGEDDOMAIN=<My Domain>
		DEVICESERVERURL=<Activation Server Name>
		GKPORT=<New GK Port>
		MACHINEID=<Machine Name>
		RECOVERYID=<Recovery ID>
		REBOOT=ReallySuppress
		HIDEOVERLAYICONS=1
		HIDESYSTRAYICON=1
		EME=1

NOTE:

Although the reboot can be suppressed, an eventual reboot is required. Encryption cannot begin until the computer has rebooted.

Options

The following table details the display options that can be specified at the end of the argument passed to the /v switch.

Option	Meaning
/q	No Progress dialog, restarts itself after process completion
/qb	Progress dialog with **Cancel** button, prompts for restart

Option	Meaning
/qb-	Progress dialog with **Cancel** button, restarts itself after process completion
/qb!	Progress dialog without **Cancel** button, prompts for restart
/qb!-	Progress dialog without **Cancel** button, restarts itself after process completion
/qn	No user interface

NOTE:

Do not use both **/q** and **/qn** in the same command line. Only use **!** and - after **/qb**.

- The command line parameter, SERVERMODE=1, is honored only during new installations. The parameter is ignored for uninstallations.
- Enclose a value that contains one or more special characters, such as a blank space, in escaped quotation marks.
- The DEVICESERVERURL parameter is case sensitive.

Example Command Line Installation

- The following example installs Encryption in server operating system mode with default parameters (Encryption, silent installation, Encrypt for Sharing, no dialogue, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  DDPE_XXbit_setup.exe /s /v"SERVERMODE=1 SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ /qn"
  ```

  MSI Command:

  ```
  msiexec.exe /i "Dell Data Protection Encryption.msi" /qn
  REBOOT="ReallySuppress" SERVERMODE="1" SERVERHOSTNAME="server.organization.com"
  POLICYPROXYHOSTNAME="rgk.organization.com" MANAGEDDOMAIN="ORGANIZATION"
  DEVICESERVERURL="https://server.organization.com:8443/xapi/"
  ```

- The following example installs Encryption in server operating system mode with a log file and default parameters (Encryption, silent installation, Encrypt for Sharing, no dialogue, no progress bar, no restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`) and specifies a custom log file name ending with a number (DDP_ssos-090.log) that is incremented if the command line is run more than once on the same server. To specify a log location other than the default location where the executable is located, provide the complete path in the command. For example, /l*v C:\Logs\DDP_ssos-090.log creates install logs in C:\Logs.

  ```
  DDPE_XXbit_setup.exe /s /v"SERVERMODE=1 SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ /l*v DDP_ssos-090.log /
  norestart/qn"
  ```

  MSI Command:

  ```
  msiexec.exe /i "Dell Data Protection Encryption.msi" /qn SERVERMODE="1"
  SERVERHOSTNAME="server.organization.com" POLICYPROXYHOSTNAME="rgk.organization.com"
  MANAGEDDOMAIN="ORGANIZATION" DEVICESERVERURL="https://server.organization.com:8443/
  xapi/" /l*v DDP_ssos-090.log /norestart/qn"
  ```

Restart the computer after installation. Dell recommends snoozing the reboot only if time is needed to save your work and close applications. Encryption cannot begin until the computer has rebooted.

Activate

- Ensure that the computer name of the server is the endpoint name to display in the Management Console.
- An interactive user with domain administrator credentials must log on to the server at least once for the purpose of the initial activation. The logged on user can be of any type - domain or non-domain, remote desktop-connected or interactive user at the server, but activation requires domain administrator credentials.
- Following the restart after installation, the Activation dialog displays. The administrator must enter domain administrator credentials with a user name in User Principal Name (UPN) format. Encryption of server operating systems does not activate automatically.

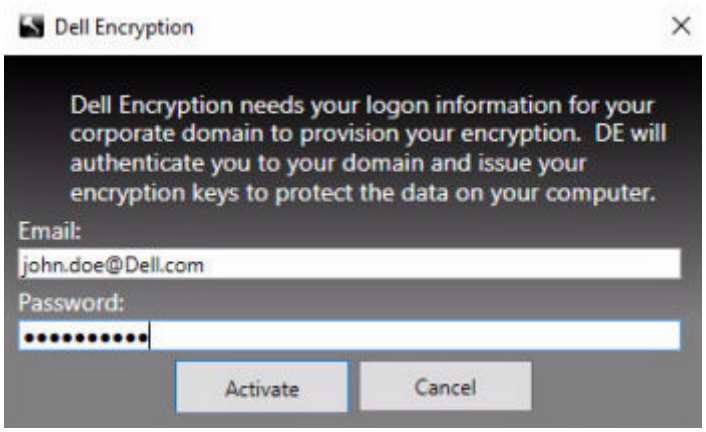
- During initial activation, a virtual server user account is created. After initial activation, the computer is restarted so that device activation can begin.
- During the authentication and device activation phase, the computer is assigned a unique Machine ID, encryption keys are created and bundled, and a relationship is established between the encryption key bundle and the virtual server user. The encryption key bundle associates the encryption keys and policies with the new virtual server user to create an unbreakable relationship between the encrypted data, the specific computer, and the virtual server user. After device activation, the virtual server user displays in the Management Console as SERVER-USER@<*fully qualified server name*>. For more information about activation, see Activation on a Server Operating System.

NOTE:

If you rename the server after activation, its display name does not change in the Management Console. However, if Encryption of server operating systems activates again after the server name is changed, the new server name will then display in the Management Console.

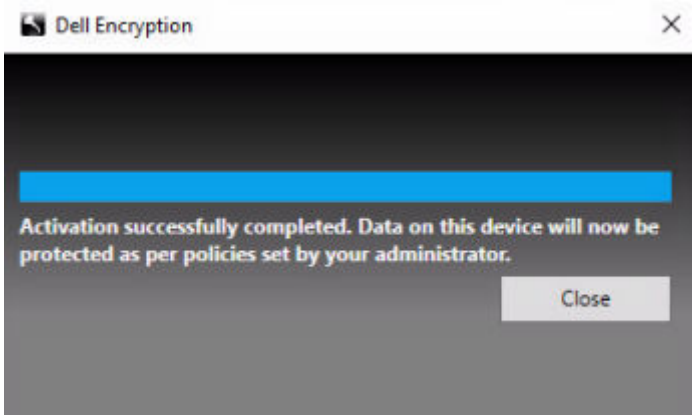
An Activation dialog displays once after each restart to prompt the user to activate Encryption on a server operating system. To complete activation, follow these steps:

1. Log on to the server either at the server or through Remote Desktop Connection.
2. Enter the user name of a domain administrator in UPN format and password and click **Activate**. This is the same Activation dialog that displays each time an unactivated system is restarted.



The Dell Server issues an encryption key for the Machine ID, creates the **virtual server user account**, creates an encryption key for the user account, bundles the encryption keys, and creates the relationship between the encryption bundle and the virtual server user account.

3. Click **Close**.



After activation, encryption begins.

4. After the encryption sweep has finished, restart the computer to process any files that were previously in use. This is an important step for security purposes.

NOTE:

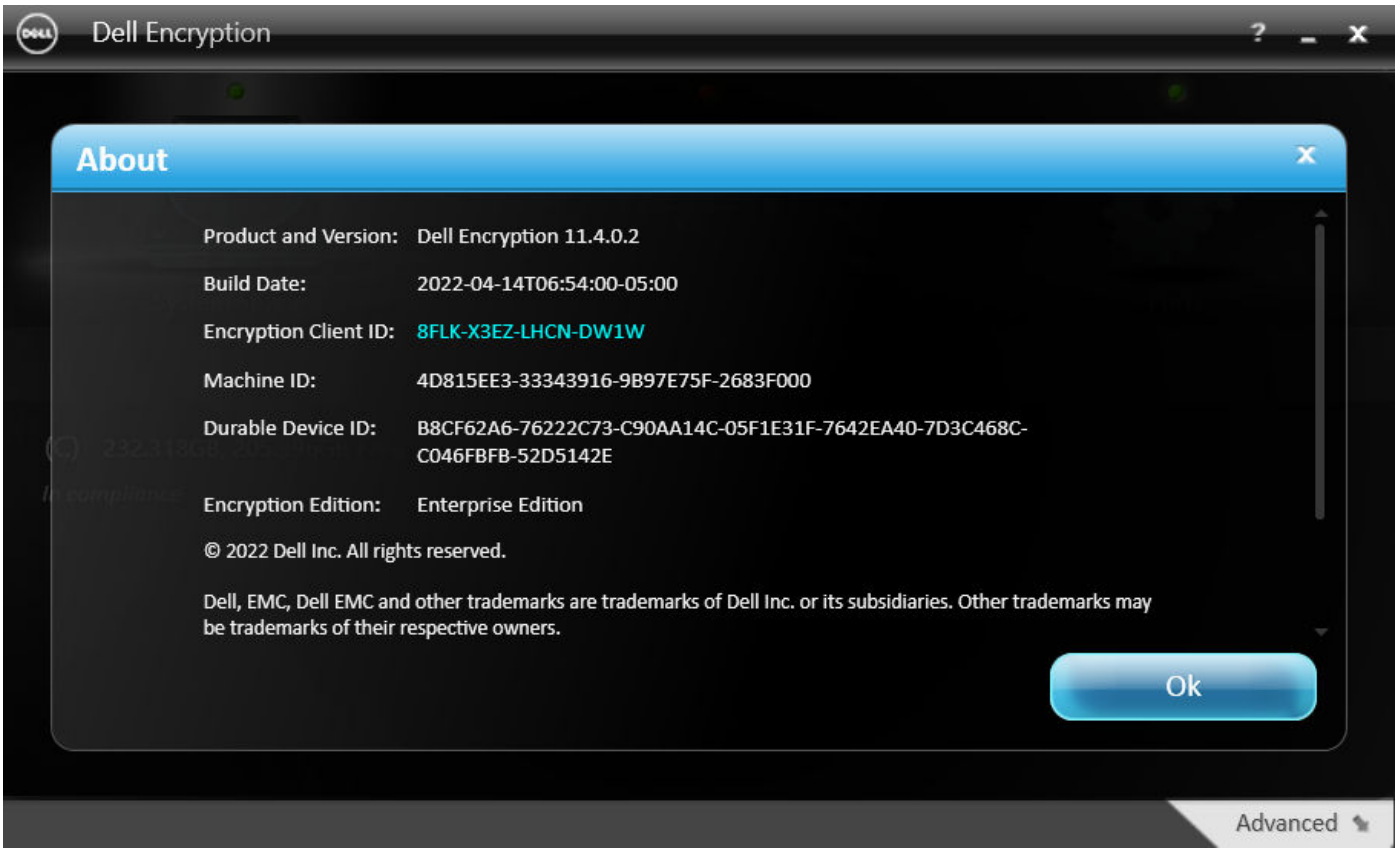
If the *Secure Windows Credentials* policy is enabled, Encryption of server operating systems encrypts the `\Windows\system32\config` files, which includes Windows credentials. The files in `\Windows\system32\config` are encrypted even if the *SDE Encryption Enabled* policy is disabled. By default, the *Secure Windows Credentials* policy is selected.

NOTE:

After restarting the computer, authentication to the Common encryption key *always* requires the protected server's Machine key. The Dell Server returns an unlock key to access the encryption keys and policies in the vault (The keys and policies are for the server, not for the user). Without the server's Machine key, the Common encryption key cannot be unlocked, and the computer cannot receive policy updates.

Confirm Activation

From the local console, open the **About** dialog to confirm that Encryption of server operating systems is installed, authenticated, and in Server mode. If the Encryption Client ID is **red**, encryption has not yet been activated.



Virtual Server User

- In the Management Console, a protected server can be found under its machine name. In addition, each protected server has its own virtual server user account. Each account has a unique static user name and unique machine name.
- The virtual server user account is only used by Encryption on server operating systems and is otherwise transparent to the operation of the protected server. The virtual server user is associated with the encryption key bundle and the Policy Proxy.
- After activation, the virtual server user account is the user account that is activated and associated with the server.
- After the virtual server user account is activated, all server logon/logoff notifications are ignored. Instead, during startup, the computer automatically authenticates with the virtual server user, and then downloads the Machine key from the Dell Server.

Install SED Manager and PBA Advanced Authentication

- Review SED Requirements if your organization is using a certificate signed by a root authority, such as EnTrust or Verisign. A registry setting change is needed on the client computer to enable SSL/TLS trust validation.
- Users log in to the PBA using their Windows credentials.
- The SED Manager and PBA Advanced Authentication installers can be located at:
  - **From dell.com/support** - If needed, Obtain the Software from dell.com/support and then Extract the Child Installers from the Master Installer. After extraction, locate the file at `C:\extracted\Encryption Management Agent`.
  - **From Your Dell FTP Account** - Locate the installation bundle at Encryption-Enterprise-10.x.x.xxx.zip and then Extract the Child Installers from the Master Installer. After extraction, locate the file at `C:\extracted\Encryption Management Agent`.

Command Line Installation

- The following table details the parameters available for the installation.

Parameters
CM_EDITION=1 <remote management>
INSTALLDIR=<change the installation destination>
SERVERHOST=<securityserver.organization.com>
SERVERPORT=8888
SECURITYSERVERHOST=<securityserver.organization.com>
SECURITYSERVERPORT=8443
ARPSYSTEMCOMPONENT=1 <no entry in the Control Panel Programs list>

For a list of basic .msi switches and display options that can be used in command lines, refer to Install Using the Child Installers.

The following example commands install or upgrade the Encryption Management Agent.

Example Command Line

\Encryption Management Agent

- The following example installs remotely managed SED Manager, the Encryption Management Agent, and the local security console (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

```
EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
ARPSYSTEMCOMPONENT=1 /norestart /qn"
```

Install BitLocker Manager

- **NOTE:** If your organization requires the use of third-party credential providers, the Encryption Management Agent must be installed or upgraded with the FEATURE=BLM or FEATURE=BASIC parameter.

- Review BitLocker Manager Client Requirements if your organization is using a certificate signed by a root authority, such as EnTrust or Verisign. A registry setting change is needed on the client computer to enable SSL/TLS trust validation.
- The BitLocker Manager client installers can be located at:

- **From dell.com\support** - If needed, Obtain the Software from dell.com\support and then Extract the Child Installers from the Master Installer. After extraction, locate the file at `C:\extracted\Encryption Management Agent`.
- **From Your Dell FTP Account** - Locate the installation bundle at Encryption-Enterprise-10.x.x.xxx.zip and then Extract the Child Installers from the Master Installer. After extraction, locate the file at `C:\extracted\Encryption Management Agent`.

Command Line Installation

- The following table details the parameters available for the installation.

Parameters
CM_EDITION=1 <remote management>
INSTALLDIR=<change the installation destination>
SERVERHOST=<securityserver.organization.com>
SERVERPORT=8888
SECURITYSERVERHOST=<securityserver.organization.com>
SECURITYSERVERPORT=8443
FEATURE=BLM <install BitLocker Manager only>
FEATURE=BLM,SED <install BitLocker Manager with SED>
ARPSYSTEMCOMPONENT=1 <no entry in the Control Panel Programs list>

For a list of basic .msi switches and display options that can be used in command lines, refer to Install Using the Child Installers.

Example Command Line

- The following example installs BitLocker Manager only (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`)

```
EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
FEATURE=BLM /norestart /qn"
```

- The following example installs BitLocker Manager with SED (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`)

```
EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
FEATURE=BLM,SED /norestart /qn"
```

- **Example Command Line to Install BitLocker Manager and Dell Encryption**

  The following example installs BitLocker Manager only (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`)

```
EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
FEATURE=BLM /norestart /qn"
```

  Then:

  The following example installs the client with default parameters (Encryption client, Encrypt for Sharing, no dialogue, no progress bar, automatic restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

```
DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
DEVICESERVERURL=https://server.organization.com:8443/xapi/ /qn"
```

7

Uninstall Using the Child Installers

- Dell recommends using the Data Security Uninstaller to remove the Data Security suite.
- To uninstall each client individually, the child executable files must first be extracted from the master installer, as shown in Extract the Child Installers from the Master Installer Alternatively, run an administrative installation to extract the .msi.
- Ensure that the same versions of client are used for uninstallation as installation.
- Command line switches and parameters are case-sensitive.
- Be sure to enclose a value that contains one or more special characters, such as a blank space in the command line, in escaped quotation marks. Command line parameters are case-sensitive.
- Use these installers to uninstall the clients using a scripted installation, batch files, or any other push technology available to your organization.
- Log files - Windows creates unique child installer uninstallation log files for the logged in user at %temp%, located at `C:\Users\<UserName>\AppData\Local\Temp`.

  If you decide to add separate a log file when you run the installer, ensure that the log file has a unique name, as child installer log files do not append. The standard .msi command can be used be create a log file by using /l `C:\<any directory>\<any log file name>.log`. Dell does not recommend using "/l*v" (verbose logging) in a command line uninstallation, as the username/password is recorded in the log file.

- All child installers use the same basic .msi switches and display options, except where noted, for command line uninstallations. The switches must be specified first. The /v switch is required and takes an argument. Other parameters go inside an argument that is passed to the /v switch.

  Display options can be specified at the end of the argument passed to the /v switch to achieve the expected behavior. Do not use both /q and /qn in the same command line. Only use ! and - after /qb.

Switch	Meaning
/v	Pass variables to the .msi inside the setup.exe. The content must always be enclosed in plain-text quotes.
/s	Silent mode
/x	Uninstall mode
/a	Administrative install (copies all files inside the .msi)

NOTE:

With /v, the Microsoft default options are available. For a list of options, see https://msdn.microsoft.com/en-us/library/windows/desktop/aa367988(v=vs.85).aspx.

Option	Meaning
/q	No Progress dialog, restarts itself after process completion
/qb	Progress dialog with **Cancel** button, prompts for restart
/qb-	Progress dialog with **Cancel** button, restarts itself after process completion
/qb!	Progress dialog without **Cancel** button, prompts for restart
/qb!-	Progress dialog without **Cancel** button, restarts itself after process completion
/qn	No user interface

Uninstall Encryption and Encryption on Server Operating System

- To reduce decryption time, run the Windows Disk Cleanup Wizard to remove temporary files and other unneeded data.
- Plan to decrypt overnight, if possible.
- Turn off sleep mode to prevent an unattended computer from going to sleep. Decryption cannot occur on a sleeping computer.
- Shut down all processes and applications to minimize decryption failures because of locked files.
- Once the uninstall is complete and decryption is in progress, disable all network connectivity. Otherwise, new policies may be acquired that re-enable encryption.
- Follow your existing process for decrypting data, such as issuing a policy update.
- Encryption and Encryption External Media update the Dell Server to change the status to *Unprotected* at the beginning of a client uninstall process. However, in the event that the client cannot contact the Dell Server, regardless of the reason, the status cannot be updated. In this case, you will need to manually *Remove Endpoint* in the Management Console. If your organization uses this workflow for compliance purposes, Dell recommends that you verify that *Unprotected* has been set as expected, either in the Management Console or Managed Reports.

Process

- **Before beginning the uninstall process**, see (Optional) Create an Encryption Removal Agent Log File. This log file is useful for troubleshooting an uninstall/decryption operation. If you do not intend to decrypt files during the uninstall process, you do not need to create an Encryption Removal Agent log file.
- The Key Server (and Security Management Server) must be configured prior to uninstallation if using the **Encryption Removal Agent's Download Keys from Server** option. See Configure Key Server for Uninstallation of Encryption Client Activated Against Security Management Server for instructions. No prior action is needed if the client to uninstall is activated against a Security Management Server Virtual, as Security Management Server Virtual does not use the Key Server.
- You must use the Dell Administrative Utility (CMGAd) prior launching the Encryption Removal Agent if using the **Encryption Removal Agent's Import Keys from a file** option. This utility is used to obtain the encryption key bundle. See Use the Administrative Download Utility (CMGAd) for instructions. The utility can be located in the Dell installation media.
- Run WSScan to ensure that all data is decrypted after uninstallation is complete, but before restarting the computer. See Use WSScan for instructions.
- Periodically Check Encryption Removal Agent Status. Data decryption is still in process if the Encryption Removal Agent service still exists in the services panel.

Command Line Uninstallation

- Once extracted from the master installer, the Encryption installer can be located at `C:\extracted\Encryption\DDPE_XXbit_setup.exe`.
- The following table details the parameters available for the uninstallation.

Parameter	Selection
CMG_DECRYPT	Property for selecting the type of Encryption Removal Agent installation: 3 - Use LSARecovery bundle 2 - Use previously downloaded forensics key material 1 - Download keys from the Dell Server 0 - Do not install Encryption Removal Agent
CMGSILENTMODE	Property for silent uninstallation: 1 - Silent - required when running with msiexec variables containing /q or /qn

Parameter	Selection
	0 - Not Silent - only possible when msiexec variables containing /q are not present in the command line syntax
Required Properties	
DA_KM_PATH	The fully qualified path to the keybundle.
DA_KM_PW	The password set on the keybundle.
DA_SERVER	FQHN for the Security Management Server hosting the negotiate session.
DA_PORT	Port on the Security Management Server for request (default is 8050).
SVCPN	User name in UPN format that the Key Server service is logged on as on the Security Management Server.
DA_RUNAS	User name in SAM compatible format under whose context the key fetch request is made. This user must be in the Key Server list in the Security Management Server.
DA_RUNASPWD	Password for the runas user.
FORENSIC_ADMIN	The forensic administrator account on the Dell Server, which can be used for forensic requests for uninstalls or keys.
FORENSIC_ADMIN_PWD	The password for the forensic administrator account.
Optional Properties	
SVCLOGONUN	User name in UPN format for Encryption Removal Agent service log on as parameter.
SVCLOGONPWD	Password for log on as user.

- The following example silently uninstalls Encryption and downloads the encryption keys from the Security Management Server.

  ```
  DDPE_XXbit_setup.exe /s /x /v"CMG_DECRYPT=1 CMGSILENTMODE=1
  DA_SERVER=server.organization.com DA_PORT=8050 SVCPN=administrator@organization.com
  DA_RUNAS=domain\username DA_RUNASPWD=password /qn"
  ```

  MSI Command:

  ```
  msiexec.exe /s /x "Dell Data Protection Encryption.msi" /qn REBOOT="ReallySuppress"
  CMG_DECRYPT="1" CMGSILENTMODE="1" DA_SERVER="server.organization.com" DA_PORT="8050"
  SVCPN="administrator@domain.com" DA_RUNAS="domain\username" DA_RUNASPWD="password" /qn
  ```

  Reboot the computer when finished.

- The following example silently uninstalls Encryption and downloads the encryptions keys using a forensic administrator account.

  ```
  DDPE_XXbit_setup.exe /s /x /v"CMG_DECRYPT=1 CMGSILENTMODE=1
  FORENSIC_ADMIN=forensicadmin@organization.com FORENSIC_ADMIN_PWD=tempchangeit /qn"
  ```

  MSI Command:

  ```
  msiexec.exe /s /x "Dell Data Protection Encryption.msi" /qn
  CMG_DECRYPT=1 CMGSILENTMODE=1 FORENSIC_ADMIN=forensicadmin@organization.com
  FORENSIC_ADMIN_PWD=tempchangeit REBOOT=REALLYSUPPRESS
  ```

  Reboot the computer when finished.

- The following example silently uninstalls Encryption using pre-downloaded keys located at C:\Users\administrator\Desktop\Admin\ using the forensic administrator password and writing logs to C:\SheildUninstall.

  ```
  DDPE_XXbit_setup.exe /s /x /v"CMG_DECRYPT=2 CMGSILENT=1 DA_KM_PATH=C:
  \Users\administrator\Desktop\Admin\<HOSTNAME>.bin DA_KM_PW=qwert12345 /l*v c:
  \ShieldUninstall.log /qn /norestart"
  ```

  MSI Command

  ```
  msiexec.exe /s /x "Dell Data Protection Encryption.msi" CMG_DECRYPT=2 CMGSILENT=1
  DA_KM_PATH=C:\Users\administrator\Desktop\Admin\<HOSTNAME>.bin DA_KM_PW=qwert12345 /l*v
  c:\ShieldUninstall.log /qn /norestart
  ```

NOTE:

Dell recommends the following actions when using a forensic administrator password on the command line:

1. Create a forensic administrator account in the Management Console for the purpose of performing the silent uninstallation.
2. Use a temporary password for that account that is unique to that account and time period.
3. After the silent uninstallation has been completed, remove the temporary account from the list of administrators or change its password.

Some older clients may require escape characters of \" around the values of parameters. For example:

```
DDPE_XXbit_setup.exe /x /v"CMG_DECRYPT=\"1\"
CMGSILENTMODE=\"1\" DA_SERVER=\"server.organization.com\" DA_PORT=\"8050\"
SVCPN=\"administrator@organization.com\" DA_RUNAS=\"domain\username\"
DA_RUNASPWD=\"password\" /qn"
```

Uninstall Encryption External Media

Once extracted from the master installer, the Encryption installer can be located at `C:\extracted\Encryption\DDPE_XXbit_setup.exe`.

Command Line Uninstallation

Run a command line similar to the following:

```
DDPE_XXbit_setup.exe /s /x /v"/qn"
```

Reboot the computer when finished.

Uninstall Full Disk Encryption

- Network connection to the Dell Server is required for PBA deactivation.

Process

- Deactivate the PBA, which removes all PBA data from the computer and unlocks the Full Disk Encryption keys.
- Uninstall Full Disk Encryption.

Deactivate the PBA

1. As a Dell administrator, log in to the Management Console.
2. In the left pane, click **Populations** > **Endpoints**.
3. Select the appropriate Endpoint Type.
4. Select Show >*Visible*, *Hidden*, or *All*.
5. If you know the Hostname of the computer, enter it in the Hostname field (wildcards are supported). You may leave the field blank to display all computers. Click **Search**.

   If you do not know the Hostname, scroll through the list to locate the computer.

A computer or list of computers displays based on your search filter.

6. Select the hostname of the desired computer.
7. Click **Security Policies** on the top menu.
8. Select **Full Disk Encryption** from the **Windows Encryption** group.
9. Change the **Full Disk Encryption** and policy from *On* to ***Off***.
10. Click **Save**.
11. In the left pane, click the **Commit Policies** banner.
12. Click **Commit Policies**.

    Wait for the policy to propagate from the Dell Server to the computer targeted for deactivation.

    Uninstall Full Disk Encryption and PBA Advanced Authentication after the PBA is deactivated.

Uninstall Full Disk Encryption Client

Command Line Uninstallation

- Once extracted from the master installer, the Full Disk Encryption can be located at `C:\extracted\Encryption Management Agent\EMAgent_XXbit_setup.exe`.
  - The following example silently uninstalls Full Disk Encryption.

    ```
    EMAgent_XXbit_setup.exe /x /s /v" /qn"
    ```

    Shut down and restart the computer when finished.

Uninstall SED Manager

- Network connection to the Dell Server is required for PBA deactivation.

Process

- Deactivate the PBA, which removes all PBA data from the computer and unlocks the SED keys.
- Uninstall SED Manager.

Deactivate the PBA

1. As a Dell administrator, log in to the Management Console.
2. In the left pane, click **Populations** > **Endpoints**.
3. Select the appropriate Endpoint Type.
4. Select Show >*Visible*, *Hidden*, or *All*.
5. If you know the Hostname of the computer, enter it in the Hostname field (wildcards are supported). You may leave the field blank to display all computers. Click **Search**.

   If you do not know the Hostname, scroll through the list to locate the computer.

   A computer or list of computers displays based on your search filter.

6. Select the hostname of the desired computer.
7. Click **Security Policies** on the top menu.
8. Select **Self-Encrypting Drives** from the **Policy Category** page.
9. Change the **Self-Encrypting Drive (SED)** and policy from *On* to ***Off***.
10. Click **Save**.
11. In the left pane, click the **Commit Policies** banner.
12. Click **Commit Policies**.

    Wait for the policy to propagate from the Dell Server to the computer targeted for deactivation.

    Uninstall SED Manager and PBA Advanced Authentication after the PBA is deactivated.

Uninstall SED Client

Command Line Uninstallation

- Once extracted from the master installer, the SED Manager installer can be located at `C:\extracted\Encryption Management Agent\EMAgent_XXbit_setup.exe`.
  - The following example silently uninstalls SED Manager.

    ```
    EMAgent_XXbit_setup.exe /x /s /v" /qn"
    ```

    Shut down and restart the computer when finished.

Uninstall BitLocker Manager

Command Line Uninstallation

- Once extracted from the master installer, the BitLocker Manager installer can be located at `C:\extracted\Encryption Management Agent\EMAgent_XXbit_setup.exe`.
- The following example silently uninstalls BitLocker Manager.

  ```
  EMAgent_XXbit_setup.exe /x /s /v" /qn"
  ```

  Reboot the computer when finished.

8

Data Security Uninstaller

Uninstall

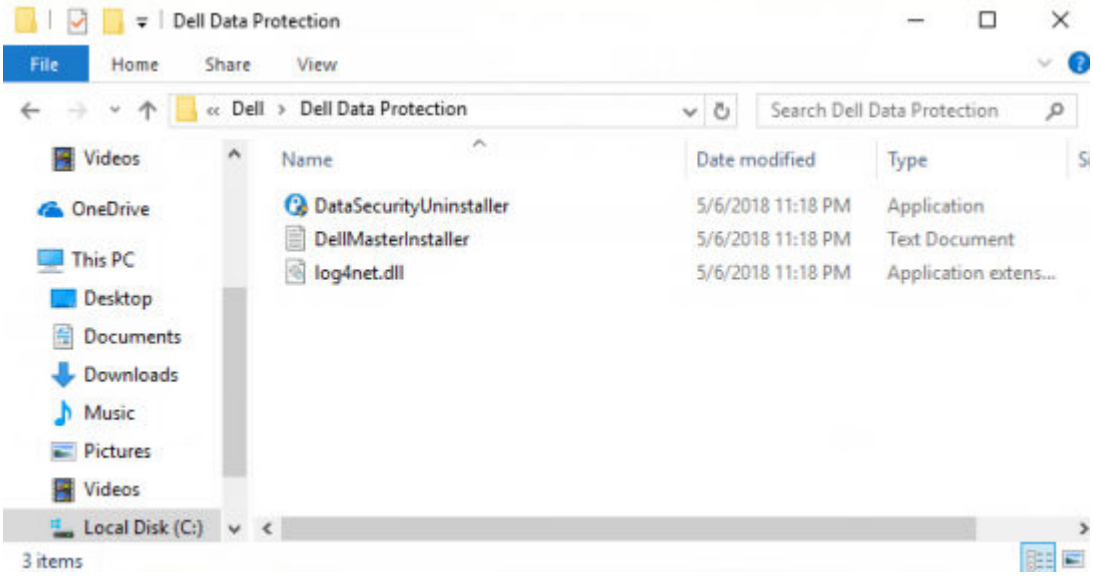
Dell provides the Data Security Uninstaller as a master uninstaller. This utility gathers the currently installed products and removes them in the appropriate order.

This Data Security Uninstaller is available in: `C:\Program Files (x86)\Dell\Dell Data Protection`

For more information or to use command line interface (CLI), see KB article 125052.

Logs are generated in `C:\ProgramData\Dell\Dell Data Protection\` for all of the components that are removed.

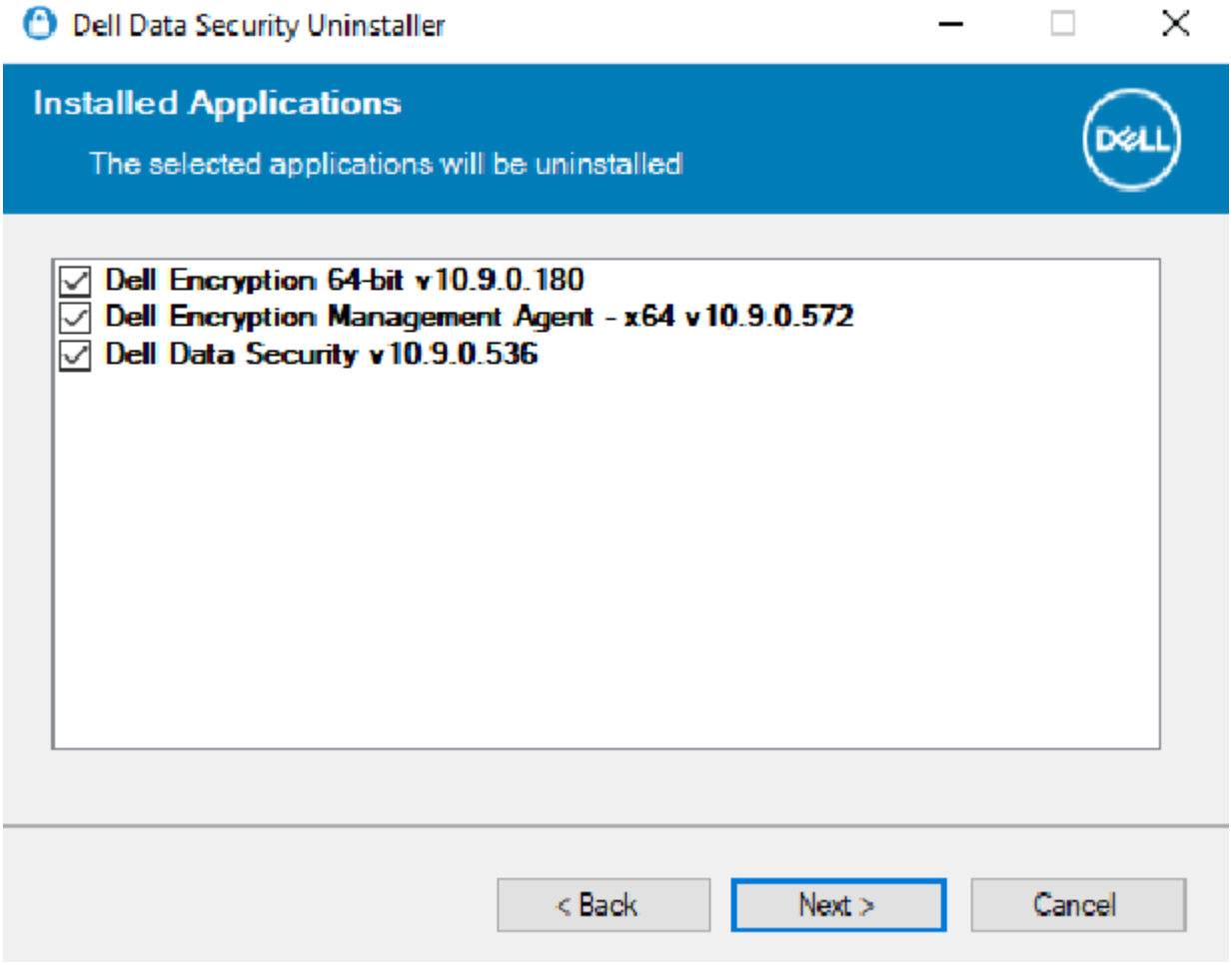
To run the utility, open the containing folder, right-click **DataSecurityUninstaller.exe**, and select **Run as administrator**.



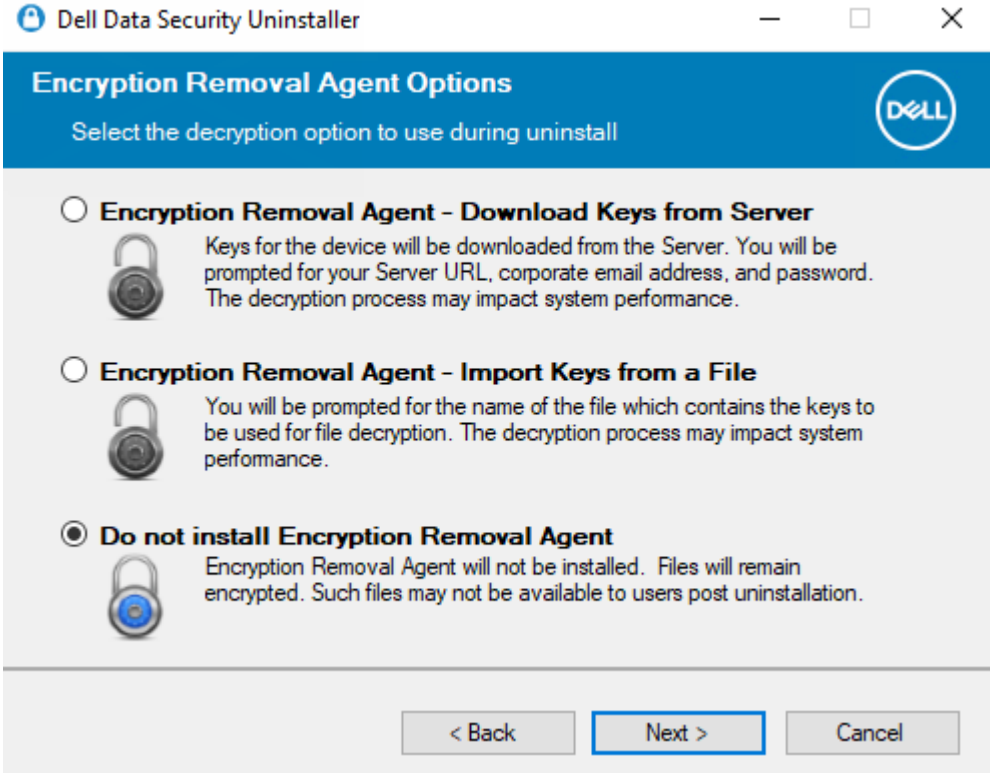
Click **Next**.

Optionally clear any application from removal and click **Next**.

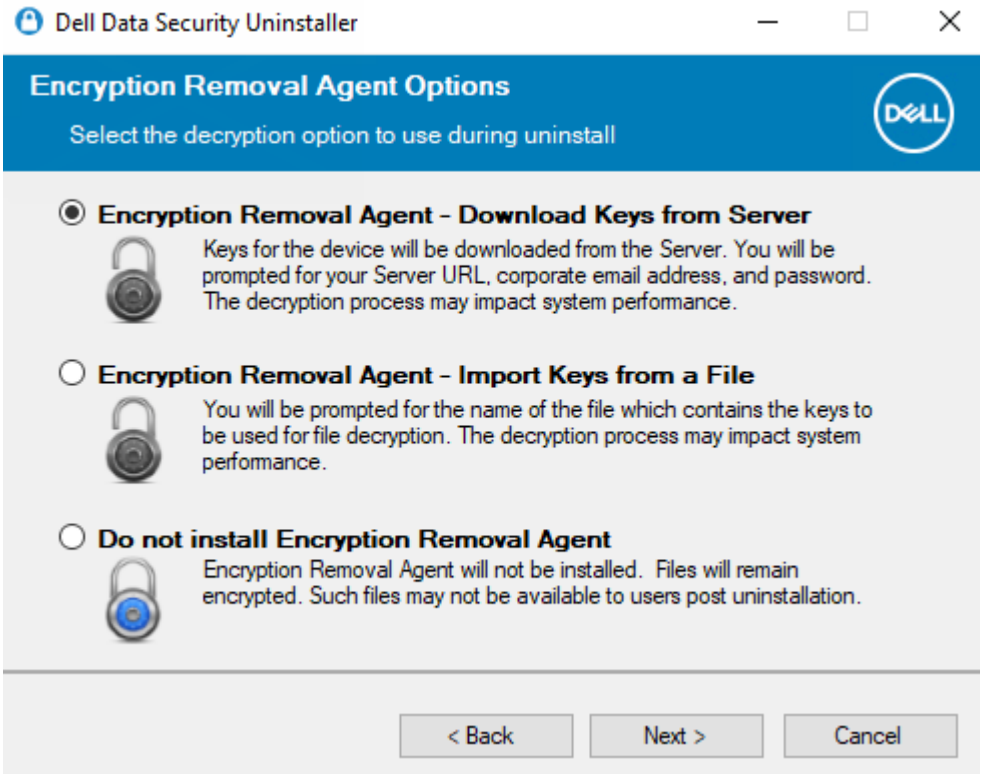
Required dependencies are automatically selected or cleared.



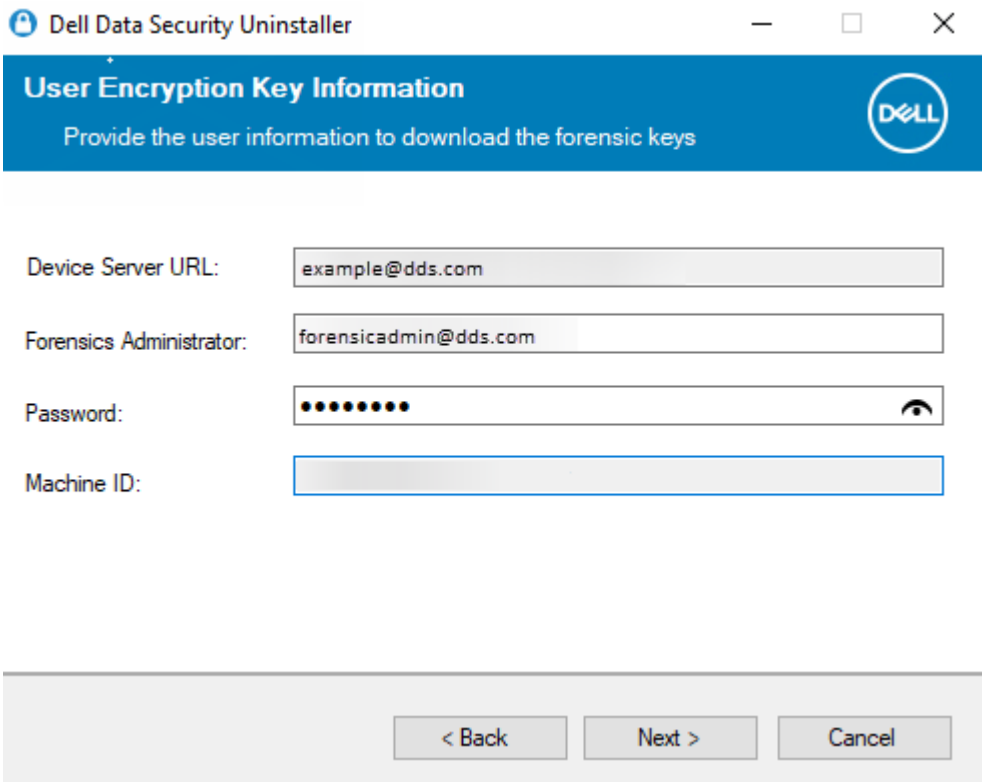
To remove applications without installing the Encryption Removal Agent, choose **Do not install Encryption Removal Agent** and select **Next**.



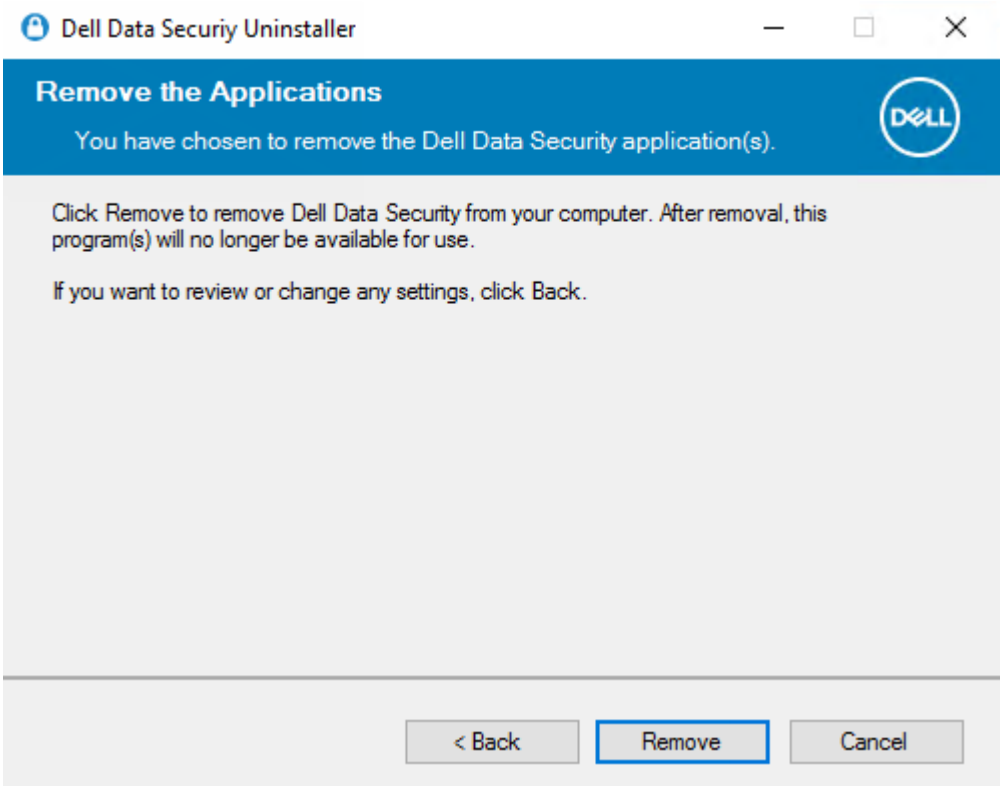
Select **Encryption Removal Agent - Download Keys from Server**.



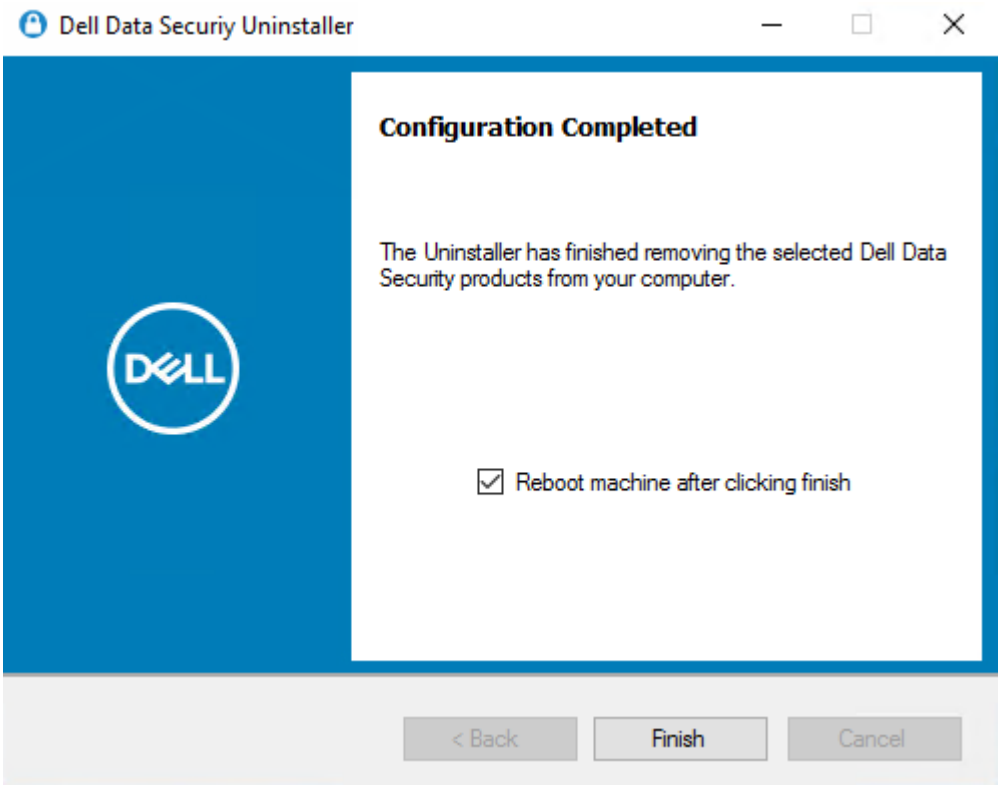
Enter the fully qualified credentials of a forensic administrator and select **Next**.



Select **Remove** to begin the uninstall.



Click **Finish** to complete removal and reboot the computer. **Reboot machine after clicking finished** is selected by default.



Uninstallation and removal is complete.

9

Commonly Used Scenarios

- To install each client individually, the child executable files must first be extracted from the master installer, as shown in Extract the Child Installers from the Master Installer.
- Command line switches and parameters are case-sensitive.
- Be sure to enclose a value that contains one or more special characters, such as a blank space in the command line, in escaped quotation marks.
- Use these installers to install the clients using a scripted installation, batch files, or any other push technology available to your organization.
- The reboot has been suppressed in the command line examples. However, an eventual reboot is required. Encryption cannot begin until the computer has rebooted.
- Log files - Windows creates unique child installer installation log files for the logged in user at %temp%, located at `C:\Users\<UserName>\AppData\Local\Temp`.

  If you decide to add separate a log file when you run the installer, ensure that the log file has a unique name, as child installer log files do not append. The standard .msi command can be used be create a log file by using `/l*v C:\<any directory>\<any log file name>.log`.

- All child installers use the same basic .msi switches and display options, except where noted, for command line installations. The switches must be specified first. The `/v` switch is required and takes an argument. Other parameters go inside an argument that is passed to the `/v` switch.

  Display options can be specified at the end of the argument passed to the `/v` switch to achieve the expected behavior. Do not use both `/q` and `/qn` in the same command line. Only use ! and - after `/qb`.

Switch	Meaning
/v	Pass variables to the .msi inside the *.exe
/s	Silent mode
/i	Install mode

Option	Meaning
/q	No Progress dialog, restarts itself after process completion
/qb	Progress dialog with **Cancel** button, prompts for restart
/qb-	Progress dialog with **Cancel** button, restarts itself after process completion
/qb!	Progress dialog without **Cancel** button, prompts for restart
/qb!-	Progress dialog without **Cancel** button, restarts itself after process completion
/qn	No user interface

- Instruct users to see the following document and help files for application assistance:
  - See the *Dell Encrypt Help* to learn how to use the features of Encryption. Access the help from `<Install dir>:\Program Files\Dell\Dell Data Protection\Encryption\Help`.
  - See the *Encryption External Media Help* to learn how the features of Encryption External Media. Access the help from `<Install dir>:\Program Files\Dell\Dell Data Protection\Encryption\EMS`
  - See the *Encryption Enterprise Help* to learn how to use the features of. Access the help from `<Install dir>:\Program Files\Dell\Dell Data Protection\Authentication \Help`.

Encryption Client

- The following example installs SED management and the Encryption Management Agent (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

  ```
  EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
  SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
  ARPSYSTEMCOMPONENT=1 /norestart /qn"
  ```

  Then:

- The following example installs Encryption with default parameters (Encryption and Encrypt for Sharing, no dialogue, no progress bar, no restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

  ```
  DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ /norestart /qn"
  ```

  Replace `DEVICESERVERURL=https://server.organization.com:`**8081/xapi** (without the trailing forward slash) if your Security Management Server is pre-v7.7.

SED Manager (including Advanced Authentication) and Encryption Client

- The following example installs drivers for Trusted Software Stack (TSS) for the TPM and Microsoft hotfixes at the specified location, does not create an entry in the Control Panel Programs list, and suppresses the reboot.

  These drivers must be installed when installing the Encryption client.

  ```
  setup.exe /S /z"\"InstallPath=<c:\location>, ARPSYSTEMCOMPONENT=1, SUPPRESSREBOOT=1\""
  ```

  Then:

- The following example installs remotely managed SED Manager (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
  SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
  ARPSYSTEMCOMPONENT=1 /norestart /qn"
  ```

  Then:

- The following example installs Advanced Authentication (silent installation, no reboot, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Authentication`).

  ```
  setup.exe /s /v"/norestart /qn ARPSYSTEMCOMPONENT=1"
  ```

  Then:

- The following example installs the client with default parameters (Encryption client and Encrypt for Sharing, no dialogue, no progress bar, no restart, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  DDPE_XXbit_setup.exe /s /v"SERVERHOSTNAME=server.organization.com
  POLICYPROXYHOSTNAME=rgk.organization.com MANAGEDDOMAIN=ORGANIZATION
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ /norestart /qn"
  ```

  Replace `DEVICESERVERURL=https://server.organization.com:`**8081/xapi** (without the trailing forward slash) if your Security Management Server is pre-v7.7.

SED Manager and Encryption External Media

- The following example installs SED Manager, the Encryption Management Agent, and the local security console (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection\Encryption`).

  ```
  EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
  SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
  ARPSYSTEMCOMPONENT=1 /norestart /qn"
  ```

  Then:

- The following example installs Encryption External Media only (silent installation, no reboot, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  DDPE_XXbit_setup.exe /s /v"EME=1
  SERVERHOSTNAME=server.organization.com POLICYPROXYHOSTNAME=rgk.organization.com
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ MANAGEDDOMAIN=ORGANIZATION /
  norestart /qn"
  ```

  Replace `DEVICESERVERURL=https://server.organization.com:`**8081/xapi** (without the trailing forward slash) if your Security Management Server is pre-v7.7.

BitLocker Manager and Encryption External Media

- BitLocker Manager and Encryption External Media interact based on encryption sequence. If a BitLocker Manager encrypted drive is inserted to a computer with Encryption External Media, the BitLocker Manager password **must** be entered before Encryption External Media can read and encrypt the drive.
- If Encryption External Media is active on a drive, BitLocker Manager encryption can be applied to the same drive.
- The following example installs BitLocker Manager (silent installation, no reboot, no entry in the Control Panel Programs list, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  EMAgent_XXbit_setup.exe /s /v"CM_EDITION=1 SERVERHOST=server.organization.com
  SERVERPORT=8888 SECURITYSERVERHOST=server.organization.com SECURITYSERVERPORT=8443
  FEATURE=BLM /norestart /qn"
  ```

  Then:

- The following example installs Encryption External Media only (silent installation, no reboot, installed in the default location of `C:\Program Files\Dell\Dell Data Protection`).

  ```
  DDPE_XXbit_setup.exe /s /v"EME=1
  SERVERHOSTNAME=server.organization.com POLICYPROXYHOSTNAME=rgk.organization.com
  DEVICESERVERURL=https://server.organization.com:8443/xapi/ MANAGEDDOMAIN=ORGANIZATION /
  norestart /qn"
  ```

Replace `DEVICESERVERURL=https://server.organization.com:`**8081/xapi** (without the trailing forward slash) if your Security Management Server is pre-v7.7.

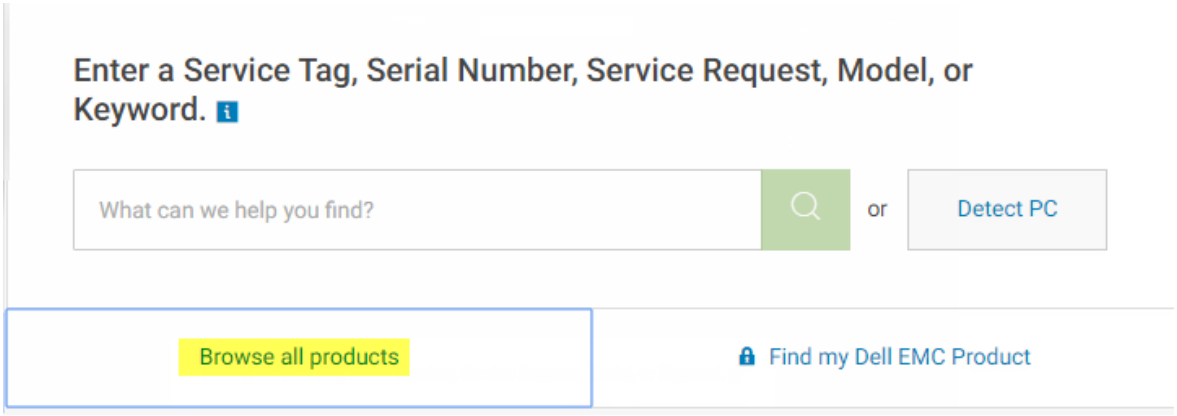
10

Download the Software

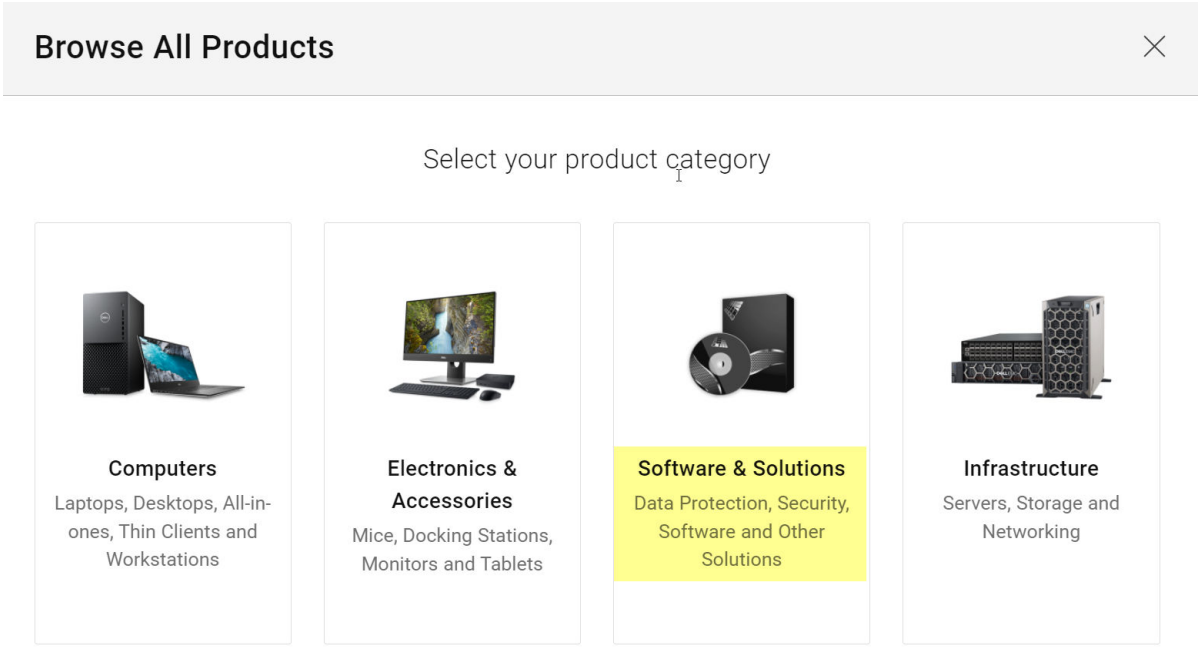
This section details obtaining the software from dell.com/support. If you already have the software, you can skip this section.

Go to dell.com/support to begin.

1. On the Dell Support webpage, select **Browse all products**.

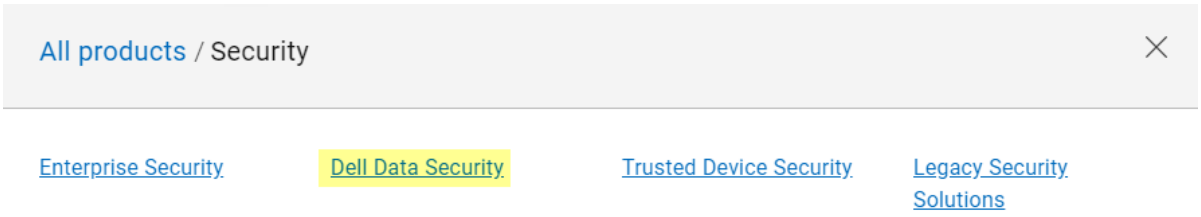


2. Select **Security** from the list of products.



3. Select **Dell Data Security**.

   After this selection has been made once, the website remembers.



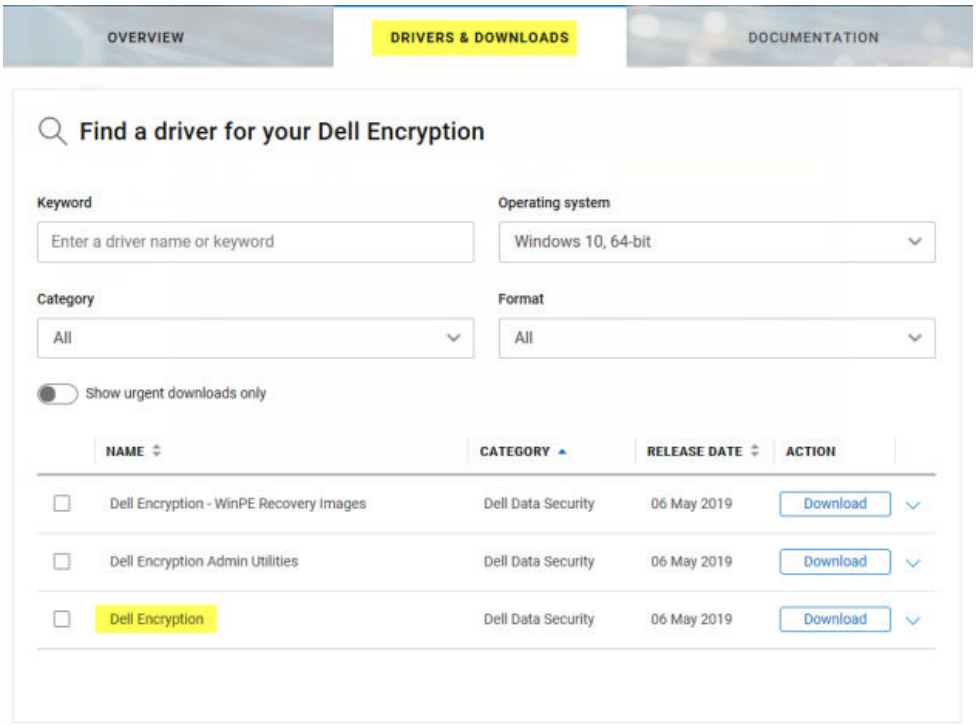
4. Select the Dell product.

   Examples:

   Dell Encryption Enterprise

   Dell Endpoint Security Suite Enterprise

5. Select **Drivers & downloads**.
6. Select the desired client operating system type.
7. Select **Dell Encryption** in the matches. This is only an example, so it will likely look slightly different. For example, there may not be four files to choose from.



8. Select **Download** .

11

Pre-Installation Configuration for SED UEFI, and BitLocker Manager

Initialize the TPM

- You must be a member of the local administrators group, or equivalent.
- The computer must be equipped with a compatible BIOS and a TPM.
- Follow the instructions located at http://technet.microsoft.com/en-us/library/cc753140.aspx.

Pre-Installation Configuration for UEFI Computers

Enable Network Connectivity During UEFI Pre-boot Authentication

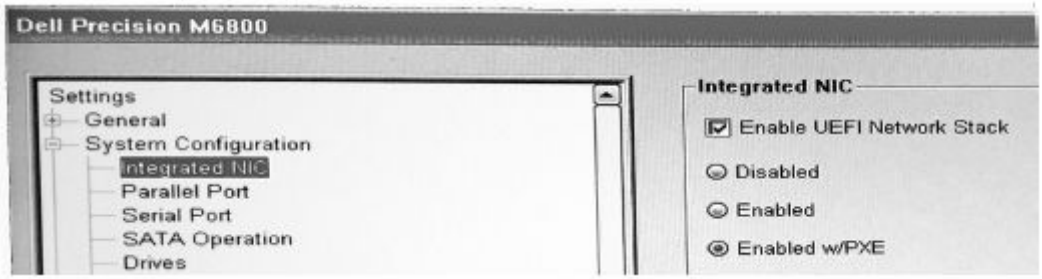
For pre-boot authentication to succeed on a computer with UEFI firmware, the PBA must have network connectivity. By default, computers with UEFI firmware do not have network connectivity until the operating system is loaded, which occurs after PBA mode.

The following procedure enables network connectivity during PBA for UEFI-enabled computers. Because the configuration steps vary from one UEFI computer model to the next, the following procedure is only an example.

1. Boot into the UEFI firmware configuration.
2. Press F2 continuously during boot until you see a message in the upper right screen similar to "preparing one-time boot menu."
3. Enter the BIOS administrator password, if prompted.

   NOTE:

   Typically, you will not see this prompt if this is a new computer since the BIOS password has not yet been configured.
4. Select **System Configuration**.
5. Select **Integrated NIC**.
6. Select the **Enable UEFI Network Stack** check box.
7. Select either **Enabled** or **Enabled w/PXE**.



8. Select **Apply**

   NOTE:

   Computers *without* UEFI firmware do not require configuration.

Disable Legacy Option ROMs

Ensure that the **Enable Legacy Option ROMs** setting is disabled in the BIOS.

1. Restart the computer.
2. As it is restarting, press **F12** repeatedly to bring up the UEFI computer's boot settings.
3. Press the down arrow, highlight the **BIOS Settings** option, and press **Enter**.
4. Select **Settings** > **General** > **Advanced Boot Options**.
5. Clear the **Enable Legacy Option ROMs** check box and click **Apply**.

Pre-Installation Configuration to Set Up a BitLocker PBA Partition

- You must create the PBA partition **before** installing BitLocker Manager.
- Turn on and activate the TPM **before** installing BitLocker Manager. BitLocker Manager takes ownership of the TPM (a reboot is not required). However, if the TPM's ownership already exists, BitLocker Manager begins the encryption setup process. The point is that the TPM must be owned and enabled.
- You may need to partition the disk manually. See Microsoft's description of the BitLocker Drive Preparation Tool for further information.
- Use the BdeHdCfg.exe command to create the PBA partition. The default parameter indicates that the command line tool follows the same process as the BitLocker Setup Wizard.

  ```
  BdeHdCfg -target default
  ```

  NOTE:

  For more options available for the BdeHdCfg command, see Microsoft's BdeHdCfg.exe Parameter Reference.

12

Designate the Dell Server through Registry

- If your clients are entitled through Dell Digital Delivery, follow these instructions to set a registry through Group Policy Objects to preset the Dell Server to use after installation.
- The workstation must be a member of the OU where the Group Policy Objects is applied or the registry settings must be manually set on the endpoint.
- Ensure that outbound port 443 is available to communicate from the Dell Server to cloud.dell.com. If port 443 is blocked (for any reason), acquiring the entitlement fails and an entitlement is consumed from the available pool.

  NOTE: If you do not set this registry value when attempting to install through Dell Digital Delivery or do not specifying a SERVER in the Master Installer, the activation URL defaults to 199.199.199.199.

Manually Set the Registry Key

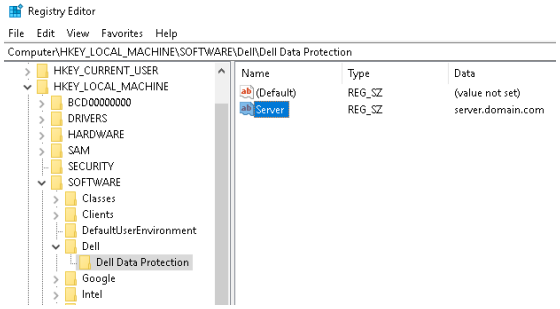
For endpoints that not domain-joined or setting a Group Policy Object is not possible, pre-set a registry key to activate against a specific Dell Server during installation.

1. In the search box on the taskbar, type **regedit** then right-click and select **Run as administrator**.
2. Navigate to and create the following registry key:

   HKEY_LOCAL_MACHINE\SOFTWARE\Dell\Dell Data Protection

   REG_SZ: Server

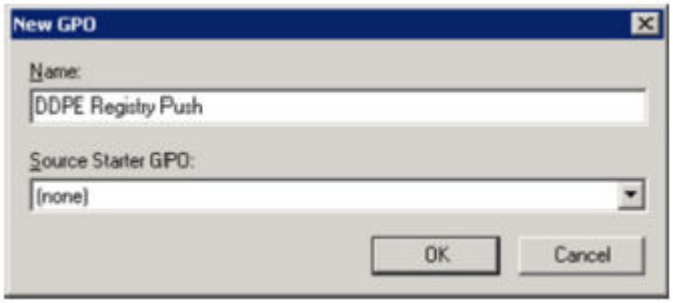
   Value: <FQDN or IP address of the Dell Server>



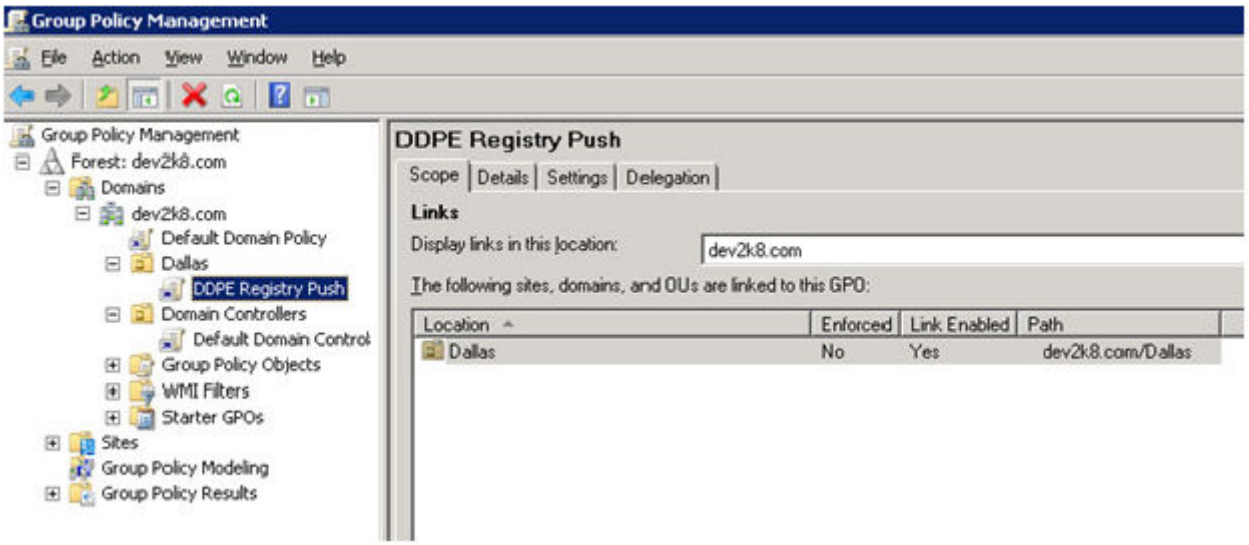
3. Install Encryption through Dell Digital Delivery or the Master Installer.

Create the Group Policy Object

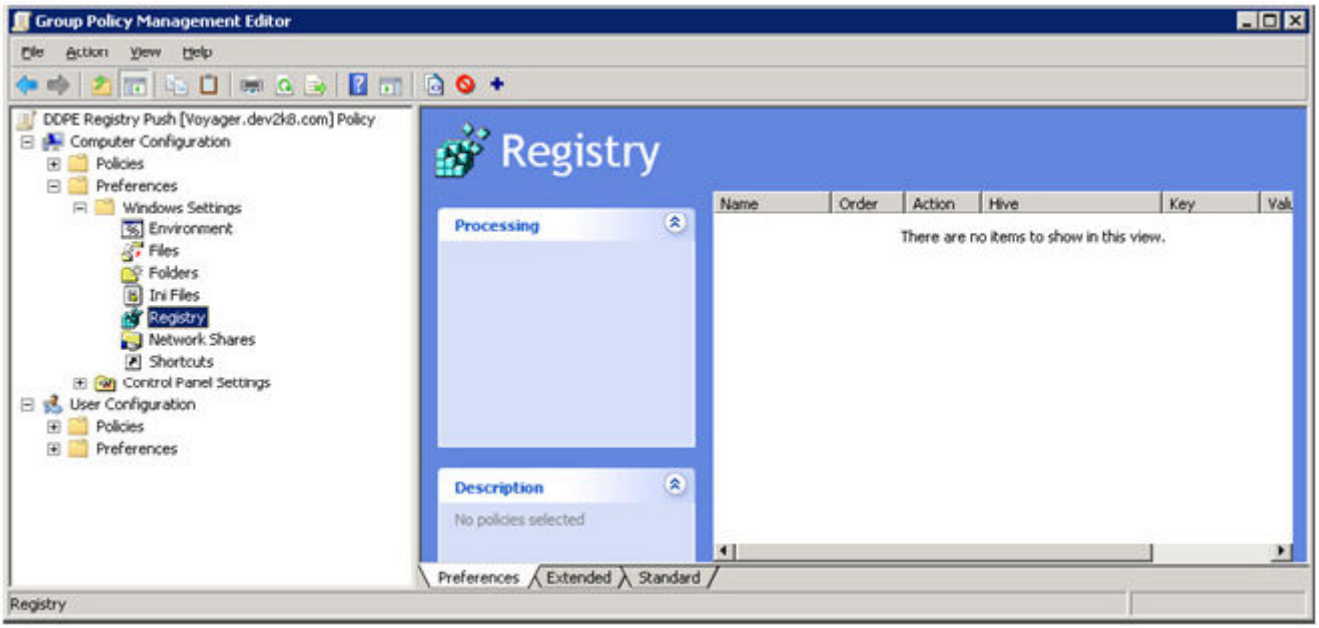
1. On the Domain Controller to manage the clients, click **Start** > **Administrative Tools** > **Group Policy Management**.
2. Right-click the OU where the policy should be applied and select **Create a GPO in this domain**, and **Link it here**.
3. Enter a name for the new GPO, select (none) for Source Starter GPO, and click **OK**.



4. Right-click the GPO that was created and select **Edit**.



5. The Group Policy Management Editor loads. Access **Computer Configuration** > **Preferences** > **Windows Settings** > **Registry**.



6. Right-click the Registry and select **New** > **Registry Item**. Complete the following.

   Action: Create

   Hive: HKEY_LOCAL_MACHINE

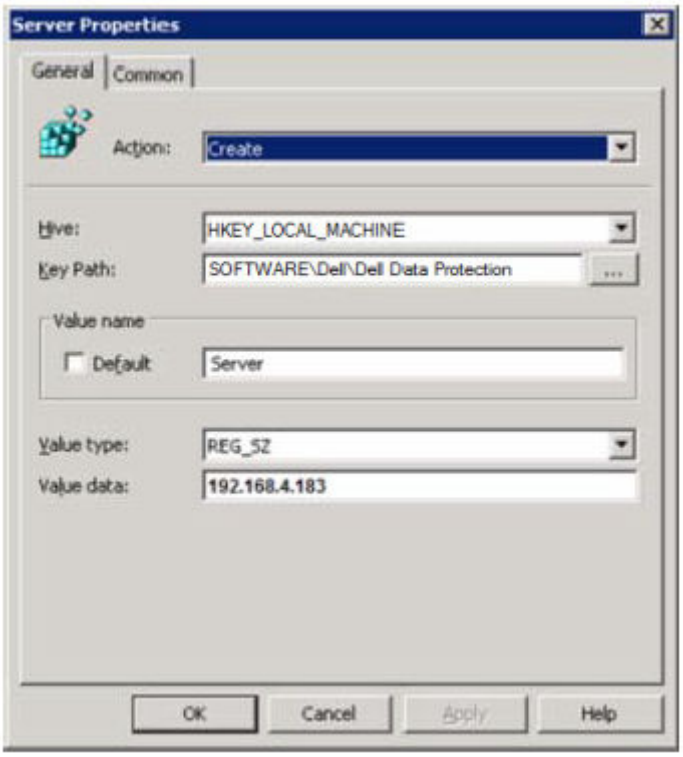
   Key Path: SOFTWARE\Dell\Dell Data Protection

   Value name: Server

   Value type: REG_SZ

   Value data: <FQDN or IP address of the Dell Server>

7. Click **OK**.



8. Log out and then back into the workstation, or run **`gpupdate /force`** to apply the group policy.

13

Extract Child Installers

- To install each client individually, extract the child executable files from the installer.
- The master installer is not a master *uninstaller*. Each client must be uninstalled individually, followed by uninstallation of the master installer. Use this process to extract the clients from the master installer so that they can be used for uninstallation.

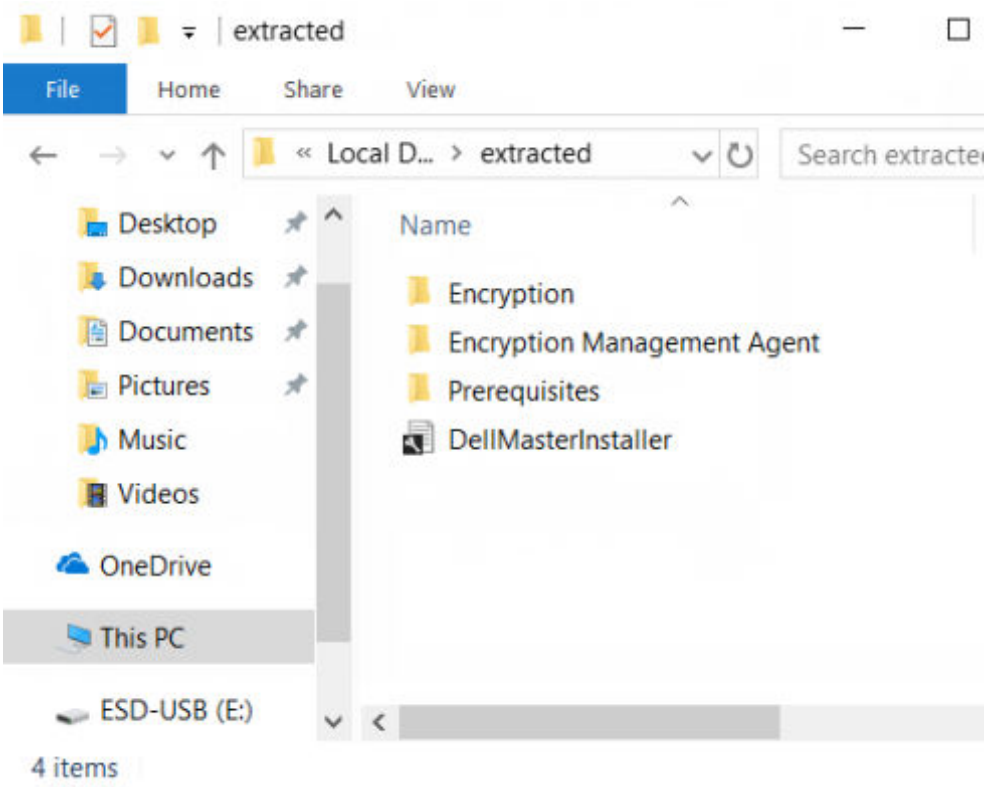
1. From the Dell installation media, copy the **DDSSetup.exe** file to the local computer.
2. Open a command prompt in the same location as the **DDSSetup.exe** file and enter:

   ```
   DDSSetup.exe /s /z"\"EXTRACT_INSTALLERS=C:\Extracted""
   ```

   The extraction path cannot exceed 63 characters.

   Before you begin installation, ensure that all prerequisites have been met and all required software has been installed for each child installer that you plan to install. Refer to Requirements for details.

   The extracted child installers are located at `C:\extracted\.`



14

Configure Key Server

- This section explains how to configure components for use with Kerberos Authentication/Authorization when using an Security Management Server. The Security Management Server Virtual does not use the Key Server.

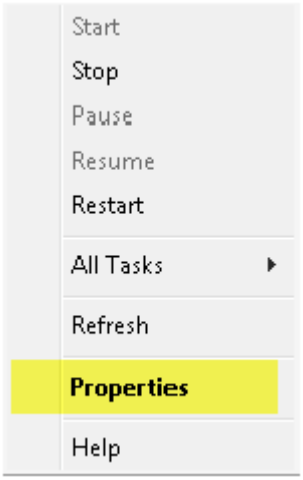
  The Key Server is a service that listens for clients to connect on a socket. Once a client connects, a secure connection is negotiated, authenticated, and encrypted using Kerberos APIs (if a secure connection cannot be negotiated, the client is disconnected).

  The Key Server then checks with the Security Server (formerly the Device Server) to see if the user running the client is allowed to access keys. This access is granted via individual domains in the Management Console.

- If Kerberos Authentication/Authorization is to be used, then the server that contains the Key Server component needs to be part of the affected domain.
- Because the Security Management Server Virtual does not use the Key Server, typical uninstallation is affected. When an Encryption client that is activated against a Security Management Server Virtual is uninstalled, standard forensic key retrieval through the Security Server is used, instead of the Key Server's Kerberos method. See Command Line Uninstallation for more information.

Services Panel - Add Domain Account User

1. On the Security Management Server, navigate to the services panel (Start > Run > services.msc > OK).
2. Right-click Key Server and select **Properties**.

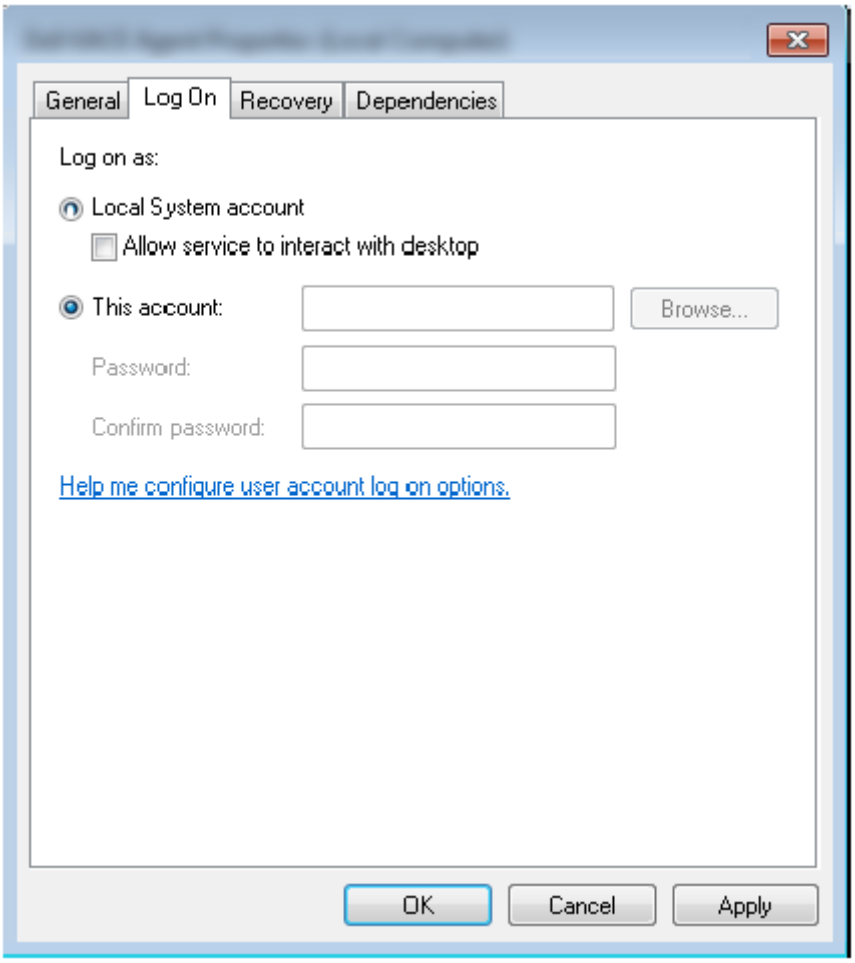


3. Select the Log On tab and select the **This account:** option.

   In *This account:*, add the domain account user. This domain user must have at least local administrator rights to the Key Server folder (must be able to write to the Key Server config file, as well as the ability to write to the log.txt file).

   Enter and confirm the password for the domain user.

   Click **OK**.



4. Restart the Key Server service (leave the services panel open for further operation).
5. Navigate to <Key Server install dir> log.txt to verify that the service started properly.

Key Server Config File - Add User for Security Management Server Communication

1. Navigate to <Key Server install dir>.
2. Open *Credant.KeyServer.exe.config* with a text editor.
3. Go to <add key="user" value="superadmin" /> and change the "superadmin" value to the name of the appropriate user (you may also leave as "superadmin").

   The "superadmin" format can be any method that can authenticate to the Security Management Server. The SAM account name, UPN, or DOMAIN\Username is acceptable. Any method that can authenticate to the Security Management Server is acceptable because validation is required for that user account for authorization against Active Directory.

   For example, in a multi-domain environment, only entering a SAM account name such as "jdoe" will likely fail because the Security Management Server cannot authenticate "jdoe" because it cannot find "jdoe". In a multi-domain environment, the UPN is recommended, although the DOMAIN\Username format is acceptable. In a single domain environment, the SAM account name is acceptable.

4. Go to <add key="epw" value="<encrypted value of the password>" /> and change "epw" to "password". Then change "<encrypted value of the password>" to the password of the user from Step 3. This password is re-encrypted when the Security Management Server restarts.

   If using "superadmin" in Step 3, and the superadmin password is not "changeit", it must be changed here. Save and close the file.

Sample Configuration File

<?xml version="1.0" encoding="utf-8" ?>

<configuration>

<appSettings>

<add key="port" value="8050" /> [TCP port the Key Server will listen to. Default is 8050.]

<add key="maxConnections" value="2000" /> [number of active socket connections the Key Server will allow]

<add key="url" value="https://keyserver.domain.com:8443/xapi/" /> [Security Server (formerly Device Server) URL (the format is 8081/xapi for a pre-v7.7 Security Management Server)]

<add key="verifyCertificate" value="false" /> [true verifies certs/set to false to not verify or if using self-signed certs]

<add key="user" value="superadmin" /> [User name used to communicate with the Security Server. This user must have the administrator role selected in the Management Console. The "superadmin" format can be any method that can authenticate to the Security Management Server. The SAM account name, UPN, or DOMAIN\Username is acceptable. Any method that can authenticate to the Security Management Server is acceptable because validation is required for that user account for authorization against Active Directory. For example, in a multi-domain environment, only entering a SAM account name such as "jdoe" will likely fail because the Security Management Server cannot authenticate "jdoe" because it cannot find "jdoe". In a multi-domain environment, the UPN is recommended, although the DOMAIN\Username format is acceptable. In a single domain environment, the SAM account name is acceptable.]

<add key="cacheExpiration" value="30" /> [How often (in seconds) the Service should check to see who is allowed to ask for keys. The Service keeps a cache and keeps track of how old it is. Once the cache is older than the value, it gets a new list. When a user connects, the Key Server needs to download authorized users from the Security Server. If there is no cache of these users, or the list has not been downloaded in the last "x" seconds, it is downloaded again. There is no polling, but this value configures how stale the list can become before it is refreshed when it is needed.]

<add key="epw" value="encrypted value of the password" /> [Password used to communicate with the Security Management Server. If the superadmin password has been changed, it must be changed here.]

</appSettings>

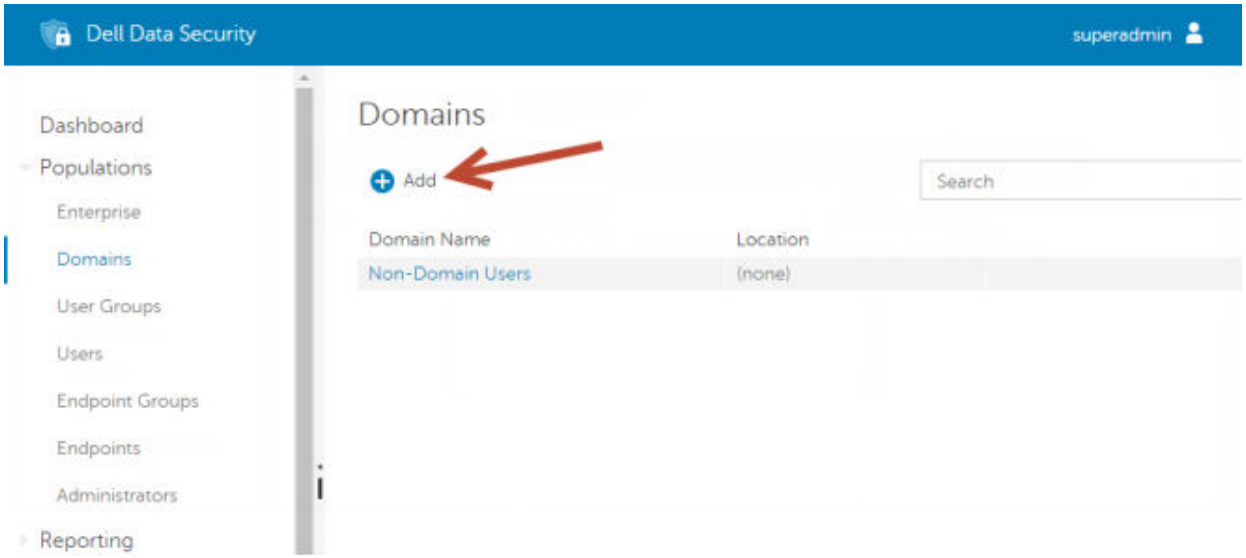
</configuration>

Services Panel - Restart Key Server Service

1. Go back to the services panel (Start > Run > services.msc > OK).
2. Restart the Key Server service.
3. Navigate to <Key Server install dir> log.txt to verify that the service started properly.
4. Close the services panel.

Management Console - Add Forensic Administrator

1. As a Dell administrator, log in to the Management Console.
2. Click **Populations** > **Domains**.
3. Select the appropriate Domain.
4. Click the **Key Server** tab.
5. In *Account*, add the user to perform the administrator activities. The format is DOMAIN\Username. Click **Add Account**.



6. Click **Users** in the left menu. In the search box, search for the user name added in Step 5. Click **Search**.
7. Once the correct user is located, click the **Admin** tab.
8. Select **Forensic Administrator** and click **Update**.

   The components are now configured for Kerberos Authentication/Authorization.

15

Use the Administrative Download Utility (CMGAd)

- This utility allows the download of a key material bundle for use on a computer that is not connected to a Dell Server.
- This utility uses one of the following methods to download a key material bundle, depending on the command line parameter passed to the application:
  - Forensic Mode - Used if -f is passed on the command line or if no command line parameter is used.
  - Admin Mode - Used if -a is passed on the command line.

    Log files can be located at `C:\ProgramData\CmgAdmin.log`

Use Forensic Mode

1. Double-click **`cmgad.exe`** to launch the utility or open a command prompt where CMGAd is located and type **`cmgad.exe -f`** (or **`cmgad.exe`**).
2. Enter the following information (some fields may be pre-populated).

   Device Server URL: Fully qualified Security Server (Device Server) URL. The format is https://securityserver.domain.com:8443/xapi/. If your Dell Server is pre-v7.7, the format is https://deviceserver.domain.com:8081/xapi (different port number, without the trailing slash).

   Dell Admin: Name of the administrator with forensic administrator credentials, such as jdoe (Enabled in the Management Console)

   Password: Forensic administrator password

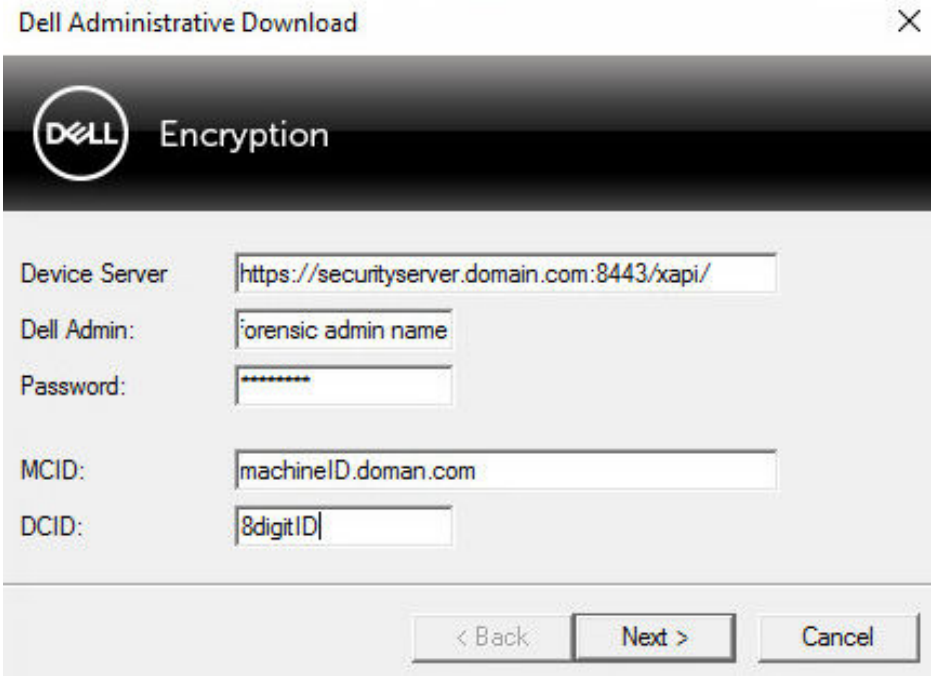
   MCID: Machine ID, such as machineID.domain.com

   DCID: First eight digits of the 16-digit Shield ID

   NOTE:

   Specifying either the MCID *or* DCID is usually sufficient. However, if both are known, it is helpful to enter both. Each parameter contains different information used by this utility.

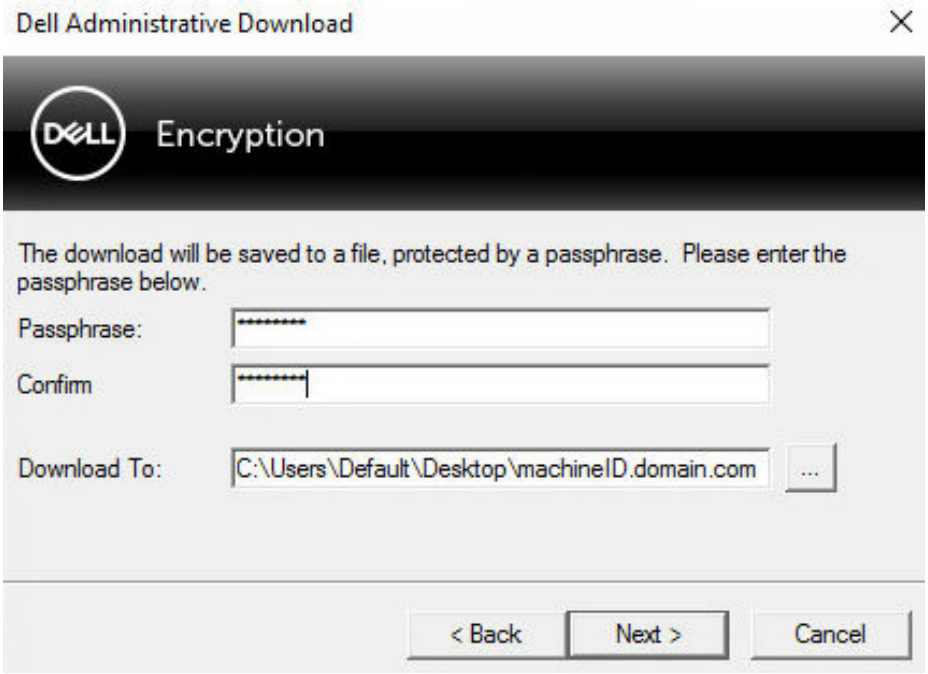
   Click **Next**.



3. In *Passphrase:*, enter a passphrase to protect the download file. The passphrase must be at least eight characters long, and contain at least one alphabetic and one numeric character. Confirm the passphrase.

   Either accept the default name and location of where the file will be saved or click ... to select another location.

   Click **Next**.



   A message displays, indicating that the key material was successfully unlocked. Files are now accessible.

4. Click **Finish** when complete.

Use Admin Mode

The Security Management Server Virtual does not use the Key Server, so Admin mode cannot be used to obtain a key bundle from a Security Management Server Virtual. Use Forensic mode to obtain the key bundle if the client is activated against a Security Management Server Virtual.

1. Open a command prompt where CMGAd is located and type **`cmgad.exe -a`**.
2. Enter the following information (some fields may be pre-populated).

   Server: Fully qualified hostname of the Key Server, such as keyserver.domain.com

   Port Number: The default port is 8050

   Server Account: The domain user the Key Server is running as. The format is DOMAIN\Username. The domain user running the utility must be authorized to perform the download from the Key Server

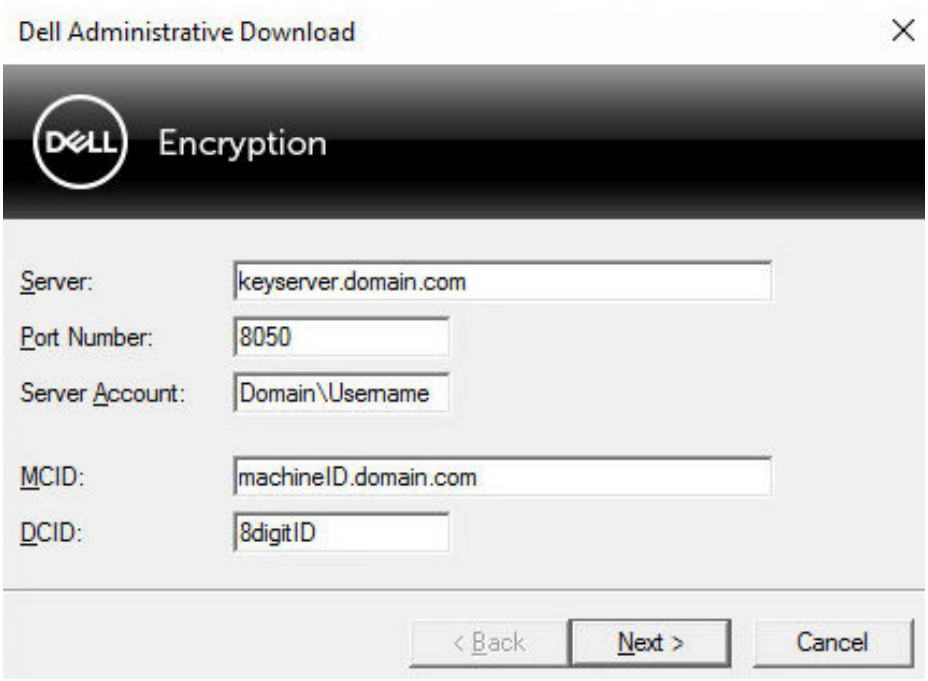
   MCID: Machine ID, such as machineID.domain.com

   DCID: First eight digits of the 16-digit Shield ID

   NOTE:

   Specifying either the MCID *or* DCID is usually sufficient. However, if both are known, it is helpful to enter both. Each parameter contains different information used by this utility.

   Click **Next**.

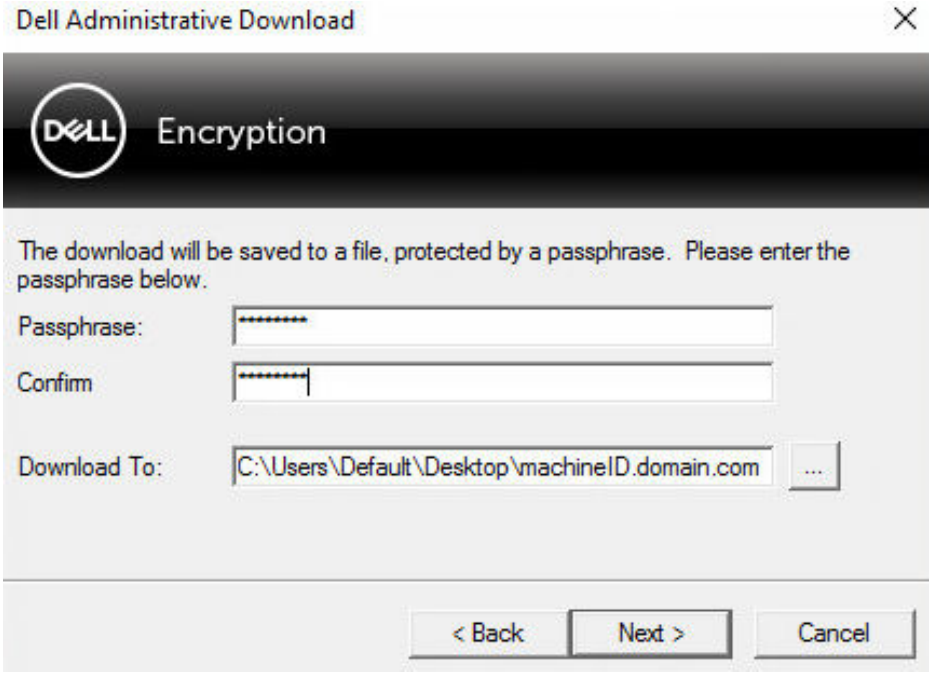


3. In *Passphrase:*, type a passphrase to protect the download file. The passphrase must be at least eight characters long, and contain at least one alphabetic and one numeric character.

   Confirm the passphrase.

   Either accept the default name and location of where the file will be saved or click ... to select another location.

   Click **Next**.



A message displays, indicating that the key material was successfully unlocked. Files are now accessible.

4. Click **Finish** when complete.

16

Configure Encryption on a Server Operating System

Enable Encryption on a Server Operating System

NOTE:

Encryption of server operating systems converts User encryption to Common encryption.

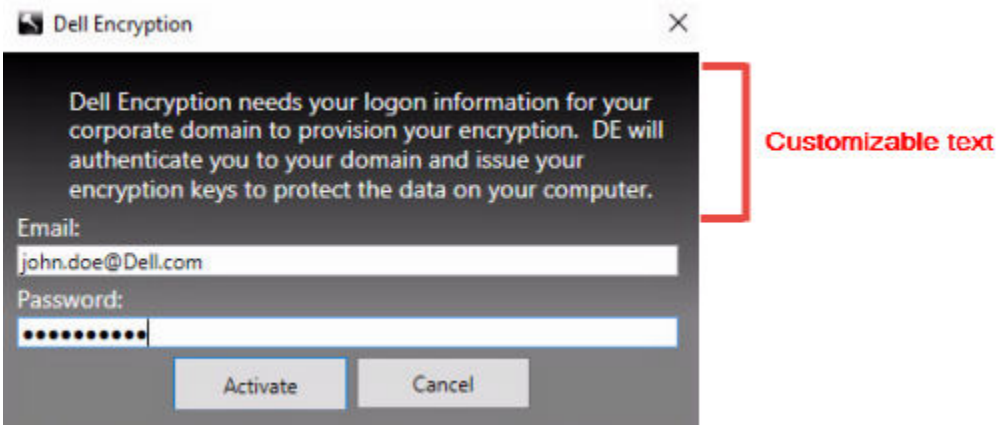
1. As a Dell administrator, log in to the Management Console.
2. Select **Endpoint Group** (or **Endpoint**), search for the endpoint or endpoint group to enable, select **Security Policies**, and then select the **Server Encryption** policy category.
3. Set the following policies:
   - Server Encryption - **Select** to enable Encryption on a server operating system and related policies.
   - SDE Encryption Enabled - **Select** to turn on SDE encryption.
   - Encryption Enabled - **Select** to turn on Common encryption.
   - Secure Windows Credentials - This policy is **Selected** by default.

     When the *Secure Windows Credentials* policy is **Selected** (the default), all files in the \Windows\system32\config files folder are encrypted, including Windows credentials. To prevent Windows credentials from being encrypted, set the *Secure Windows Credentials* policy to **Not Selected**. Encryption of Windows credentials occurs independently of the *SDE Encryption Enabled* policy setting.
4. Save and commit the policies.

Customize Activation Logon Dialog

The Activation Logon dialog displays:

- When an unmanaged user logs on.
- When the user selects Activate Dell Encryption from the Encryption icon's menu, located in the notification area.



Set Encryption External Media Policies

The ***original encrypting computer*** is the computer that originally encrypts a removable device. When the original computer is a ***protected server*** - a server with Encryption on a server operating system installed and activated - and the protected server first detects the presence of a removable device, the user is prompted to encrypt the removable device.

- Encryption External Media policies control removable media access to the server, authentication, encryption, and more.
- Port Control policies affect removable media on protected servers, for example, by controlling access and usage of the server's USB ports by USB devices.

The policies for removable media encryption can be found in the Management Console in the *Server Encryption* technology group.

Encryption on a Server Operating System and External Media

When the protected server's *EMS Encrypt External Media* policy is **Selected**, external media is encrypted. Encryption links the device to the protected server with the Machine key and to the user, with the User Roaming key of the removable device's owner/user. All files added to the removable device are then encrypted with those same keys, regardless of the computer it is connected to.

NOTE:

Encryption on a server operating system converts User encryption to Common encryption, except on removable devices. On removable devices, encryption is performed with the User Roaming key associated with the computer.

When the user does not agree to encrypt a removable device, the user's access to the device can be set to *blocked* when used on the protected server, *Read only* while used on the protected server, or *Full access*. The protected server's policies determine the level of access on an unprotected removable device.

Policy updates occur when the removable device is re-inserted into the original protected server.

Authentication and External Media

The protected server's policies determine authentication functionality.

After a removable device has been encrypted, only its owner/user can access the removable device on the protected server. Other users cannot access the encrypted files on the removable media.

Local automatic authentication allows the protected removable media to be automatically authenticated when inserted in the protected server when the owner of that media is logged in. When automatic authentication is disabled, the owner/user must authenticate to access the protected removable device.

When a removable device's original encrypting computer is a protected server, the owner/user must always log in to the removable device when using it in computers that are not the original encrypting computer, regardless of the Encryption External Media policy settings defined on the other computers.

Refer to AdminHelp for information on Server Encryption Port Control and Encryption External Media policies.

Suspend an Encryption on a Server Operating System

Suspending an encrypted server prevents access to its encrypted data after a restart. The virtual server user cannot be suspended. Instead, the encrypted server's Machine key is suspended.

NOTE:

Suspending the server endpoint does not immediately suspend the server. The suspension takes place the next time the key is requested, typically the next time the server is restarted.

NOTE:

Use with care. Suspending an encrypted server could result in instability, depending on policy settings and whether the protected server is suspended while disconnected from the network.

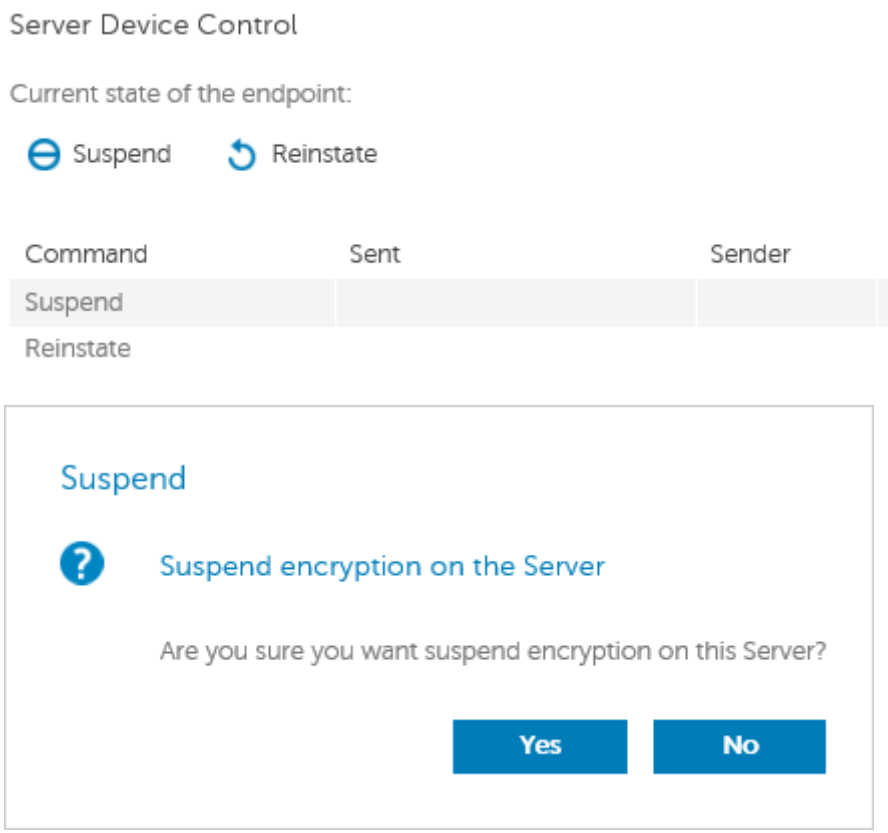
Prerequisites

- Help desk administrator rights, assigned in the Management Console, are required to suspend an endpoint.
- The administrator must be logged in to the Management Console.

In the left pane of the Management Console, click **Populations** > **Endpoints**.

Search or select a hostname, then click the **Details & Actions** tab.

Under *Server Device Control*, click **Suspend** then **Yes**.



NOTE:

Click **Reinstate** to allow Encryption of server operating systems to access encrypted data on the server after it restarts.

17

Configure Deferred Activation

The Encryption client with Deferred Activation differs from the Encryption client activation in two ways:

Device-based Encryption policies

The Encryption client policies are user-based; the Encryption client with Deferred Activation's encryption policies are device-based. User encryption is converted to Common encryption. This difference allows the user to bring a personal device to use within the organization's domain, while the organization maintains its security by centrally managing encryption policies.

Activation

With the Encryption client, activation is automatic. When with Deferred Activation is installed, automatic activation is disabled. Instead, the user chooses whether to activate encryption, and when to activate it.

NOTE:

Before a user permanently leaves the organization and while his email address is still active, the user must run the Encryption Removal Agent and uninstall the Encryption client from his personal computer.

Deferred Activation Customization

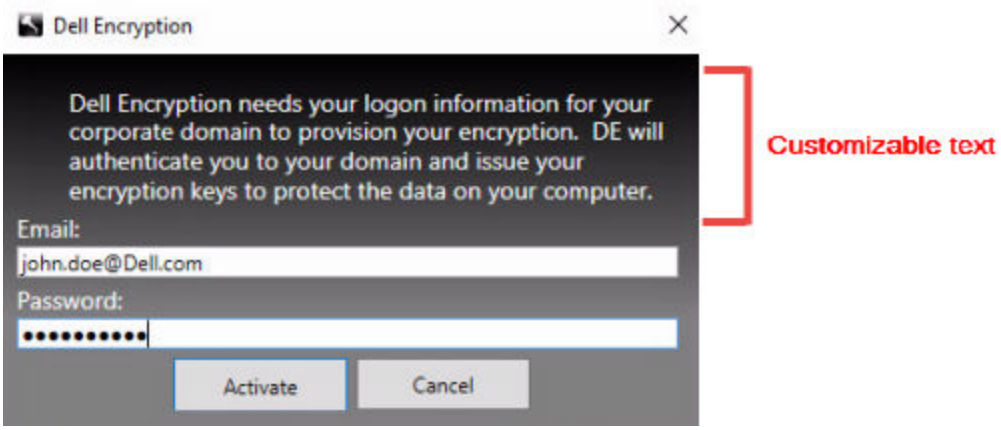
These client-side tasks allow Deferred Activation customization.

- Add a disclaimer to the Activation Logon dialog box
- Disable automatic re-activation (optional)

Add a disclaimer to the Activation Logon dialog box

The Activation Logon dialog displays at these times:

- When an unmanaged user logs on.
- When the user selects Activate Dell Encryption from the Encryption icon's menu, located in the notification area.



Prepare the Computer for Installation

If the data is encrypted with a non-Dell encryption product, before installing the Encryption client, decrypt data using the existing encryption software, and then uninstall the existing encryption software. If the computer does not restart automatically, restart the computer.

Create a Windows Password

Dell highly recommends that a Windows password be created (if one does not already exist) to protect access to the encrypted data. Creating a password for the computer prevents others from logging on to your user account without your password.

Uninstall Previous Versions of the Encryption Client

Before uninstalling a previous version of the Encryption client, stop or pause an encryption sweep, if necessary.

If the computer is running a version of Dell Encryption earlier than v8.6, uninstall the Encryption client from the command line. For instructions, see *Uninstall Encryption and Server Encryption Client*.

NOTE:

If you plan to install the latest version of the Encryption client immediately after uninstallation, it is not necessary to run the Encryption Removal Agent to decrypt the files.

To upgrade a previous version of the Encryption client installed with Deferred Activation, uninstall with the Data Security Uninstaller or the Child Installers. These uninstallation methods are possible even if OPTIN is disabled.

NOTE:

If no users were previously activated, the Encryption client clears the OPTIN setting from the SDE vault since the setting is left-over from a previous installation. The Encryption client blocks Deferred Activations if users previously activated but the OPTIN flag is not set in the SDE vault.

Install Encryption with Deferred Activation

To install the Encryption client with Deferred Activation, install the Encryption client with the OPTIN=1 parameter. For more information about client installation with the OPTIN=1 parameter, see Install Encryption.

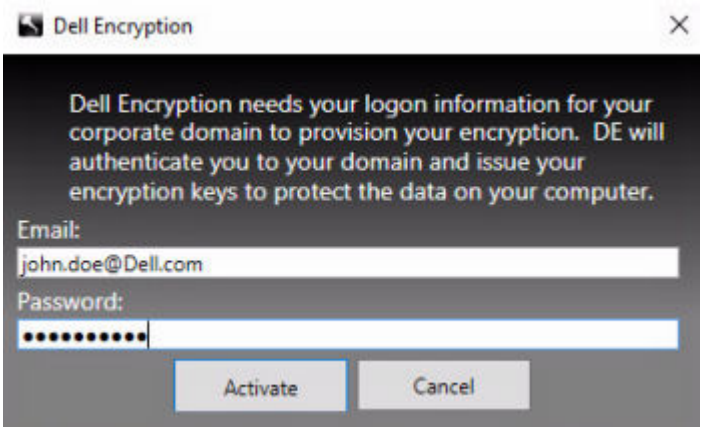
Activate Encryption with Deferred Activation

- Activation associates a domain user with a local user account and a specific computer.
- Multiple users can activate on the same computer, provided they use unique local accounts and have unique domain email addresses.
- A user can activate the Encryption client only once per domain account.

  Before you activate the Encryption client:

- Log in to the local account that you use the most often. The data associated with this account is the data to encrypt.
- Connect to your organization's network.

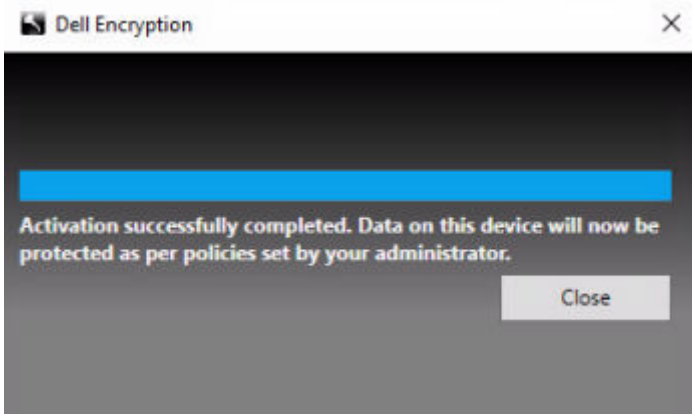
1. Log on to the workstation or server.
2. Enter the domain email address and password and click **Activate**.



NOTE:

Non-domain or personal email addresses cannot be used for activation.

3. Click **Close**.



The Dell Server combines the encryption key bundle with the user's credentials and with the computer's unique ID (machine ID), creating an unbreakable relationship between the key bundle, the specific computer, and the user.

4. Restart the computer to begin the encryption sweep.

NOTE:

The local Management Console, accessible from the notification area icon, shows the policies sent by the server, not the effective policy.

Troubleshoot Deferred Activation

Troubleshoot Activation

Problem: Cannot access certain files and folders

Inability to access certain files and folders is a symptom of being logged in with a different account than the one under which the user activated.

The Activation Logon dialog automatically displays even though the user has previously activated.

Possible Solution

Log out and log back in with the credentials of the activated account and try to access the files again.

In the rare event that the Encryption client cannot authenticate the user, the Activation Logon dialog prompts the user for credentials to authenticate and access encryption keys. To use the automatic re-activation feature, the *AutoReactivation* and *AutoPromptForActivation* registry keys must BOTH be enabled. Although the feature is enabled by default, it can be manually disabled. For more information, see Disable Automatic Re-activation.

Error Message: Server Authentication Failed

The server was not able to authenticate the email address and password.

Possible Solutions

- Use the email address associated with the organization. Personal email addresses cannot be used for activation.
- Re-enter the email address and password and ensure there are no typographical errors.
- Ask the administrator to verify that the email account is active and is not locked.
- Ask the administrator to reset the user's domain password.

Error Message: Network connection error

The Encryption client could not communicate with the Dell Server.

Possible Solutions

- Connect directly to the organization's network and try to activate again.
- If VPN access is required to connect to the network, check the VPN connection and try again.
- Check the Dell Server URL to ensure it matches the URL provided by the administrator.

The URL and other data that the user entered into the installer are stored in the registry. Check the accuracy of the data under [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield] and [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\Servlet]

- Disconnect and reconnect:

  Disconnect the computer from the network.

  Reconnect to the network.

  Restart the computer.

  Try to connect to the network again.

  Error Message: Legacy Server Not Supported

  Encryption cannot be activated against a legacy server; the Dell Server must be v9.1 or higher.

  Possible Solution

- Check the Dell Server URL to ensure it matches the URL provided by the administrator.

  The URL and other data that the user entered into the installer are stored in the registry.

- Check the accuracy of the data under [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield] and [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\Servlet]

  Error Message: Domain User Already Activated

  A second user has logged on to the local computer and tried to activate against a domain account that has already been activated.

  A user can activate the Encryption client only once per domain account.

  Possible Solution

  Decrypt and uninstall the Encryption client while logged in as the second activated user.

  Error Message: Server Error General

  An error has occurred on the server.

  Possible Solution

  The administrator should check the Server logs to ensure services are running.

  The user should try to activate later.

Tools

CMGAd

Use the CMGAd utility prior to launching the Encryption Removal Agent to obtain the encryption key bundle. The CMGAd utility and its instructions are located in the Dell installation media (Dell-Offline-Admin-XXbit)

Log Files

In `C:\ProgramData\Dell\Dell Data Protection\Encryption`, look for the log file called **CmgSysTray**.

Search for the phrase "Manual activation result".

The error code is on the same line, followed by " status = "; the status indicates what went wrong.

18

Troubleshooting

All Clients - Troubleshooting

- **Master Suite installer log files** are located at `C:\ProgramData\Dell\Dell Data Protection\Installer`.
- Windows creates unique **child installer installation log files** for the logged in user at %temp%, located at `C:\Users\<UserName>\AppData\Local\Temp`.
- Windows creates log files for client prerequisites, such as Visual C++, for the logged in user at %temp%, located at `C:\Users\<UserName>\AppData\Local\Temp`. For example, `C:\Users\<UserName>\AppData\Local\Temp\dd_vcredist_amd64_20160109003943.log`
- Follow the instructions at http://msdn.microsoft.com to verify the version of Microsoft .Net that is installed on the computer targeted for installation.

  Go to https://www.microsoft.com/en-us/download/details.aspx?id=30653to download the full version of Microsoft .Net Framework 4.5.2 or later.
- See *this document* if the computer targeted for installation has (or has had in the past) Dell Access installed. Dell Access is not compatible with this suite of products.

All Clients - Protection Status

A new method for deriving a device's protected status has been implemented in the Dell Server v9.8.2. Previously, the Endpoint Protected Status area in the Management Console's dashboard would only denote the state of Encryption per device.

As of Dell Server v9.8.2, Protected status is now denoted if any of the following criteria have been met:

- Advanced Threat Prevention is installed and enabled.
- Web Protection or Client Firewall is installed and either Web Protection or Client Firewall's policy is enabled.
- Self-Encrypting Drive Manager is installed, enabled, and the PBA is enabled.
- Full Disk Encryption is installed, enabled, and the PBA is enabled.
- BitLocker Manager is installed, enabled, and encryption has completed.
- Dell Encryption (Mac) is installed and enabled, and *Encrypt Using FileVault for Mac* has been enforced.
- Dell Encryption (Windows) is installed, enabled, Policy-Based Encryption has been set for the endpoint, and device sweeps are completed.

Dell Encryption Troubleshooting (client and server)

Activation on a Server Operating System

When Encryption is installed on a server operating system, activation requires two phases of activation: initial activation and device activation.

Troubleshooting Initial Activation

Initial activation fails when:

- A valid UPN cannot be constructed using the supplied credentials.
- The credentials are not found in the enterprise vault.
- The credentials used to activate are not domain administrator's credentials.

Error Message: Unknown user name or bad password

The user name or password does not match.

Possible Solution**:** Try to log in again, ensuring that you type the user name and password exactly.

Error Message: Activation failed because the user account does not have domain administrator rights.

The credentials used to activate do not have domain administrator rights, or the administrator's user name was not in UPN format.

Possible Solution**:** In the Activation dialog, enter credentials in UPN format for a domain administrator.

Error Messages: A connection with the server could not be established.

or

`The operation timed out.`

Server Encryption could not communicate with port 8449 over HTTPS to the Dell Server.

Possible Solutions

- Connect directly to your network and try to activate again.
- If connected by VPN, try connecting directly to the network and try again to activate.
- Check the Dell Server URL to ensure it matches the URL supplied by the administrator. The URL and other data that the user entered into the installer are stored in the registry. Check the accuracy of the data under [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield] and [HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\Servlet].
- Disconnect the server from the network. Restart the server and reconnect to the network.

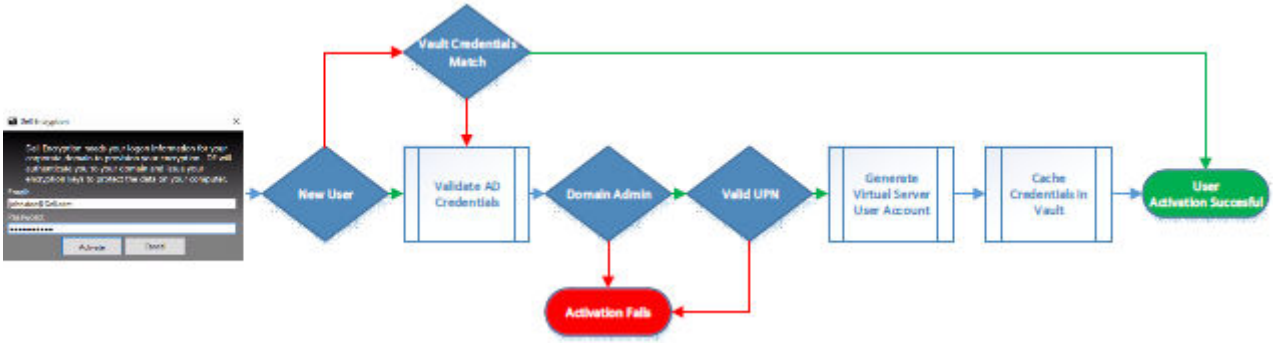
Error Message: Activation failed because the Server is unable to support this request.

Possible Solutions

- Server Encryption cannot be activated against a legacy server; the Dell Server version must be version 9.1 or higher. If necessary, upgrade your Dell Server to version 9.1 or higher.
- Check the Dell Server URL to ensure it matches the URL supplied by the administrator. The URL and other data that the user entered into the installer are stored in the registry.
- Check the accuracy of the data under [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield] and [HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\CMGShield\Servlet].

Initial Activation Process

The following diagram illustrates a successful initial activation.



The initial activation process of Encryption of server operating systems requires a live user to access the server. The user can be of any type: domain or non-domain, remote-desktop-connected or interactive user, but the user must have access to domain administrator credentials.

The Activation dialog displays when one of two workflows occur:

- A new (unmanaged) user logs on to the computer.
- When a new user right-clicks the *Encryption* icon in the notification area and selects *Activate Dell Encryption*.

The initial activation process is as follows:

1. The user logs in.
2. Upon detection of a new (unmanaged) user, the *Activate* dialog displays. The user clicks **Cancel**.
3. The user opens the Server Encryption About box to confirm that it is running in Server mode.
4. The user right-clicks the *Encryption* icon in the notification area and selects *Activate Dell Encryption*.
5. The user enters domain administrator credentials in the Activate dialog.

NOTE:

The requirement for domain administrator credentials is a safety measure that prevents Encryption of server operating systems from being rolled out to unsupported server environments. To disable the requirement for domain administrator credentials, see Before You Begin.

6. Dell Server checks for the credentials in the enterprise vault (Active Directory or equivalent) to verify that the credentials are domain administrator credentials.
7. A UPN is constructed using the credentials.
8. With the UPN, the Dell Server creates a new user account for the virtual server user, and stores the credentials in the Dell Server's vault.

   The **virtual server user account** is for the exclusive use of the Encryption client. It is used to authenticate with the server, to handle Common encryption keys, and to receive policy updates.

   NOTE:

   Password and DPAPI authentication are disabled for this account so that *only* the virtual server user can access encryption keys on the computer. This account does not correspond to any other user account on the computer or on the domain.
9. When activation is successful, the user restarts the computer, which kicks off the second phase, authentication and device activation.

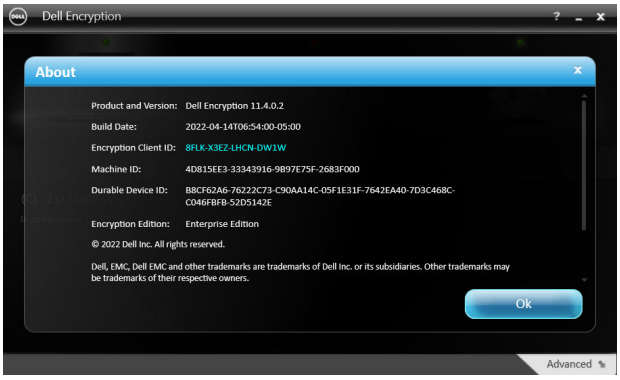
Troubleshooting Authentication and Device Activation

Device activation fails when:

- The initial activation failed.
- The connection to the server could not be established.
- The trust certificate could not be validated.

After activation, when the computer is restarted, Encryption for server operating systems automatically logs in as the virtual server user, requesting the Machine key from the Dell Server. This takes place even before any user can log in.

- Open the About dialog to confirm that Encryption for server operating systems is authenticated and in Server mode.

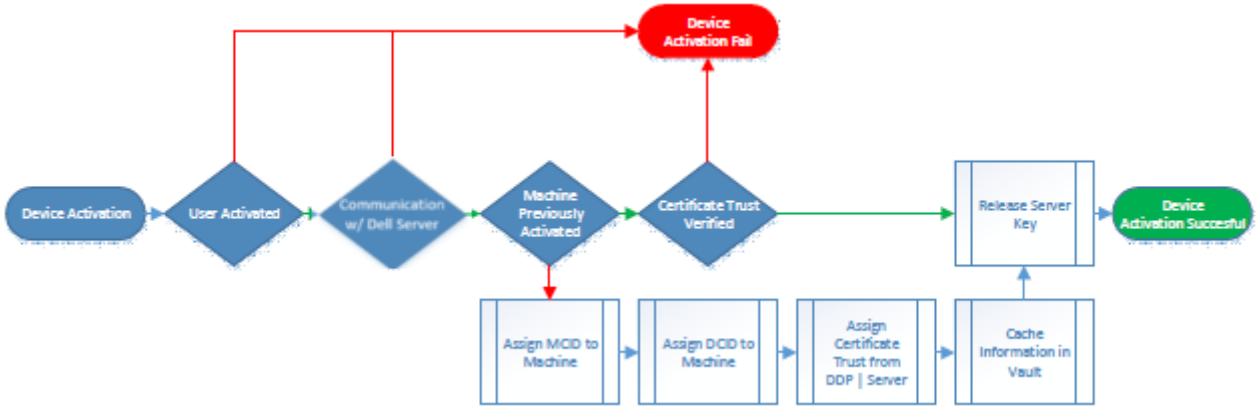


- If the Encryption client ID is red, encryption has not yet been activated.
- In the Management Console, the version of a server with Server Encryption installed is listed as *Shield for Server*.
- If the Machine key retrieval fails due to a network failure, Server Encryption registers for network notifications with the operating system.
- If the Machine key retrieval fails:
  - The virtual server user logon is still successful.
  - Set up the *Retry Interval Upon network Failure* policy to make key retrieval attempts on a timed interval.

    For details on the *Retry Interval Upon network Failure* policy, refer to AdminHelp, available in the Management Console.

Authentication and Device Activation

The following diagram illustrates successful authentication and device activation.



1. When restarted after a successful initial activation, a computer with Server Encryption automatically authenticates using the virtual server user account and runs the Encryption client in Server mode.
2. The computer checks its device activation status with the Dell Server:
   - If the computer has not previously device-activated, the Dell Server assigns the computer an MCID, a DCID, and a trust certificate, and stores all of the information in the Dell Server's vault.
   - If the computer had previously been device-activated, the Dell Server verifies the trust certificate.
3. After the Dell Server assigns the trust certificate to the server, the server can access its encryption keys.
4. Device activation is successful.

NOTE:

When running in Server mode, the Encryption client must have access to the same certificate as was used for device activation to access the encryption keys.

(Optional) Create an Encryption Removal Agent Log File

- Before beginning the uninstall process, you can optionally create an Encryption Removal Agent log file. This log file is useful for troubleshooting an uninstall/decryption operation. If you do not intend to decrypt files during the uninstall process, you do not need to create this log file.
- The Encryption Removal Agent log file is not created until after the Encryption Removal Agent service runs, which does not happen until the computer is restarted. Once the client is successfully uninstalled and the computer is fully decrypted, the log file is permanently deleted.
- The log file path is `C:\ProgramData\Dell\Dell Data Protection\Encryption.`
- Create the following registry entry on the computer targeted for decryption.

  [HKLM\Software\Credant\DecryptionAgent]

  "LogVerbosity"=DWORD:2

  0: no logging

  1: logs errors that prevent the service from running

  2: logs errors that prevent complete data decryption (recommended level)

  3: logs information about all decrypting volumes and files

  5: logs debugging information

Find TSS Version

- TSS is a component that interfaces with the TPM. To find the TSS version, go to (default location) `C:\Program Files\Dell\Dell Data Protection\Drivers\TSS\bin > tcsd_win32.exe`. Right-click the file and select **Properties**. Verify the file version on the **Details** tab.

Encryption External Media and PCS Interactions

To Ensure Media is Not Read-Only and the Port is Not Blocked

The EMS Access to unShielded Media policy interacts with the Port Control System - Class: Storage > Subclass Storage: External Drive Control policy. If you intend to set the EMS Access to unShielded Media policy to *Full Access*, ensure that the Subclass Storage: External Drive Control policy is also set to *Full Access* to ensure that the media is not set to read-only and the port is not blocked.

To Encrypt Data Written to CD/DVD

- Set Windows Media Encryption = On.
- Set EMS Exclude CD/DVD Encryption = not selected.
- Set Subclass Storage: Optical Drive Control = UDF Only.

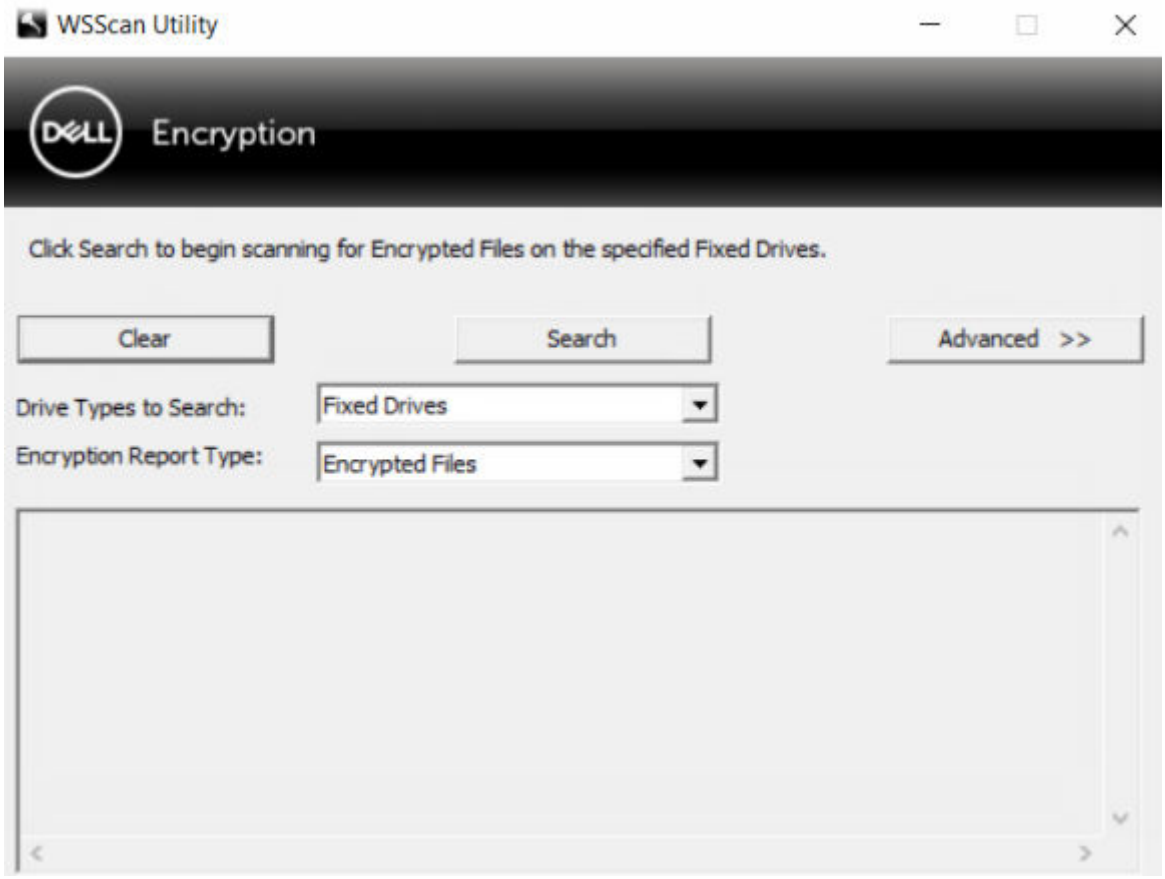
Use WSScan

- WSScan allows you to ensure that all data is decrypted when uninstalling Encryption as well as view encryption status and identify unencrypted files that should be encrypted.
- Administrator privileges are required to run this utility.

  NOTE: WSScan must be run in System Mode with the PsExec tool if a target file is owned by the system account.

Run WSScan

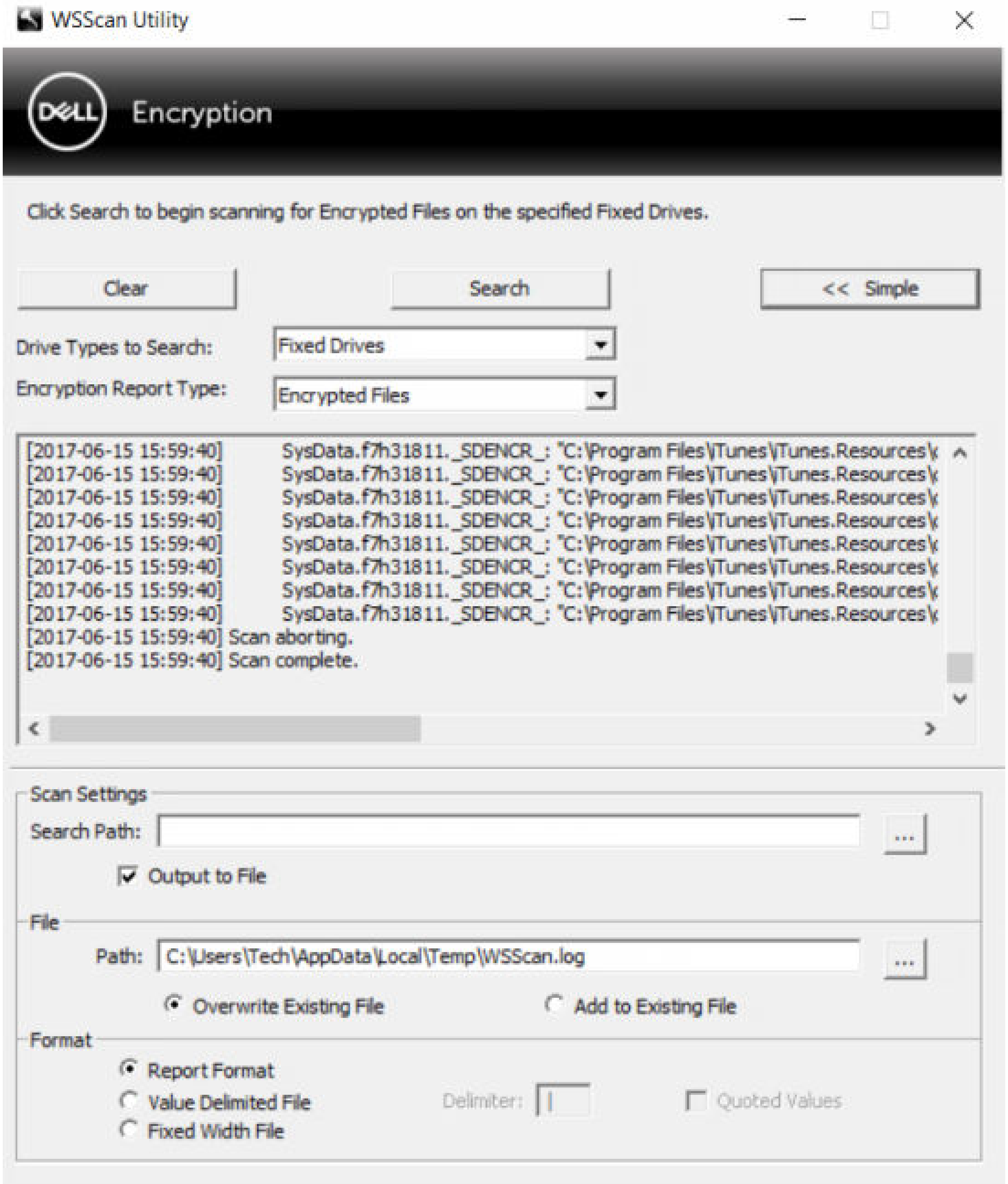
1. From the Dell installation media, copy WSScan.exe to the Windows computer to scan.
2. Launch a command line at the location above and enter **wsscan.exe** at the command prompt. WSScan launches.
3. Click **Advanced**.
4. Select the type of drive to scan: *All Drives, Fixed Drives*, *Removable Drives*, or *CDROMs/ DVDROMs*.
5. Select the Encryption Report Type: *Encrypted Flles*, *Unencrypted Flles*, *All Flles*, or *Unencrypted Flles in Violation*:
   - *Encrypted Flles* - To ensure that all data is decrypted when uninstalling Encryption. Follow your existing process for decrypting data, such as issuing a decryption policy update. After decrypting data, but before performing a restart in preparation for uninstall, run WSScan to ensure that all data is decrypted.
   - *Unencrypted Flles* - To identify files that are not encrypted, with an indication of whether the files should be encrypted (Y/N).
   - *All Flles* - To list all encrypted and unencrypted files, with an indication of whether the files should be encrypted (Y/N).
   - *Unencrypted Flles in Violation* - To identify files that are not encrypted that should be encrypted.
6. Click **Search**.



OR

1. Click **Advanced** to toggle the view to **Simple** to scan a particular folder.
2. Go to Scan Settings and enter the folder path in the *Search Path* field. If this field is used, the selection in the menu is ignored.
3. If you do not want to write WSScan output to a file, clear the **Output to File** check box.
4. Change the default path and file name in *Path*, if desired.
5. Select **Add to Existing File** if you do not want to overwrite any existing WSScan output files.
6. Choose the output format:
   - Select Report Format for a report style list of scanned output. This is the default format.
   - Select Value Delimited File for output that can be imported into a spreadsheet application. The default delimiter is "|", although it can be changed to up to 9 alphanumeric, space, or keyboard punctuation characters.
   - Select the Quoted Values option to enclose each value in double quotation marks.
   - Select Fixed Width File for non-delimited output containing a continuous line of fixed-length information about each encrypted file.
7. Click **Search**.

   Click **Stop Searching** to stop your search. Click **Clear** to clear displayed messages.



WSScan Command Line Usage

```
WSScan [-ta] [-tf] [-tr] [-tc] [drive] [-s] [-o<filepath>] [-a] [-f<format specifier>] [-r]
[-u[a][-|v]] [-d<delimeter>] [-q] [-e] [-x<exclusion directory>] [-y<sleep time>]
```

Switch	Meaning
Drive	Drive to scan. If not specified, the default is all local fixed hard drives. Can be a mapped network drive.
-ta	Scan all drives
-tf	Scan fixed drives (default)
-tr	Scan removable drives
-tc	Scan CDROMs/DVDROMs

Switch	Meaning
-s	Silent operation
-o	Output file path
-a	Append to output file. The default behavior truncates the output file.
-f	Report format specifier (Report, Fixed, Delimited)
-r	Run WSScan without administrator privileges. **Some files may not be visible in this mode.**
-u	Include unencrypted files in output file. This switch is sensitive to order: "u" must be first, "a" must be second (or omitted), "-" or "v" must be last.
-u-	Only include unencrypted files in output file
-ua	Report unencrypted files also, but use all user policies to display the "should" field.
-ua-	Report unencrypted files only, but use all user policies to display the "should" field.
-uv	Report unencrypted files that violate policy only (Is=No / Should=Y)
-uav	Report unencrypted files that violate policy only (Is=No / Should=Y), using all user policies.
-d	Specifies what to use as a value separator for delimited output
-q	Specifies the values that should be in enclosed in quotes for delimited output
-e	Include extended encryption fields in delimited output
-x	Exclude directory from scan. Multiple exclusions are allowed.
-y	Sleep time (in milliseconds) between directories. This switch results in slower scans, but potentially a more responsive CPU.

WSScan Output

WSScan information about encrypted files contains the following information.

Example Output:

[2015-07-28 07:52:33] SysData.7vdlxrsb._SDENCR_: "c:\temp\Dell - test.log" is still AES256 encrypted

Output	Meaning
Date/time stamp	The date and time the file was scanned.
Encryption type	The type of encryption used to encrypt the file. **SysData:** SDE key. **User:** User encryption key. **Common:** Common encryption key. WSScan does not report files encrypted using Encrypt for Sharing.
KCID	The Key Computer ID. As shown in the example above, "**7vdlxrsb**"

Output	Meaning
	If you are scanning a mapped network drive, the scanning report does not return a KCID.
UCID	The User ID. As shown in the example above, "**_SDENCR_**" The UCID is shared by all the users of that computer.
File	The path of the encrypted file. As shown in the example above, "**c:\temp\Dell - test.log**"
Algorithm	The encryption algorithm being used to encrypt the file. As shown in the example above, "**is still AES256 encrypted**" RIJNDAEL 128 RIJNDAEL 256 AES-128 AES-256 3DES

Use WSProbe

The Probing Utility is for use with all versions of Encryption, with the exception of Encryption External Media policies. Use the Probing Utility to:

- Scan or schedule scanning of an encrypted computer. The Probing Utility observes the Workstation Scan Priority policy.
- Temporarily disable or re-enable the current user Application Data Encryption List.
- Add or remove process names on the privileged list.
- Troubleshoot as instructed by Dell ProSupport.

Approaches to Data Encryption

If you specify policies to encrypt data on Windows devices, you can use any of the following approaches:

- The first approach is to accept the default behavior of the client. If you specify folders in Common Encrypted Folders or User Encrypted Folders, or set Encrypt "My Documents", Encrypt Outlook Personal Folders, Encrypt Temporary Files, Encrypt Temporary Internet Files, or Encrypt Windows Paging File to selected, affected files are encrypted either when they are created, or (after being created by an unmanaged user) when a managed user logs on. The client also scans folders specified in or related to these policies for possible encryption/decryption when a folder is renamed, or when the client receives changes to these policies.
- You can also set Scan Workstation on Logon to Selected. If Scan Workstation on Logon is Selected, when a user logs on, the client compares how files in currently- and previously-encrypted folders are encrypted to the user policies, and makes any necessary changes.
- To encrypt files that meet your encryption criteria but were created prior to your encryption policies going into effect, but do not want the performance impact of frequent scanning, you can use this utility to scan or schedule scanning of the computer.

Prerequisites

- The Windows device to work with must be encrypted.
- The user to work with must be logged on.

Use the Probing Utility

WSProbe.exe is located in the installation media.

Syntax

```
wsprobe [path]
```

```
wsprobe [-h]
wsprobe [-f path]
wsprobe [-u n] [-x process_names] [-i process_names]
```

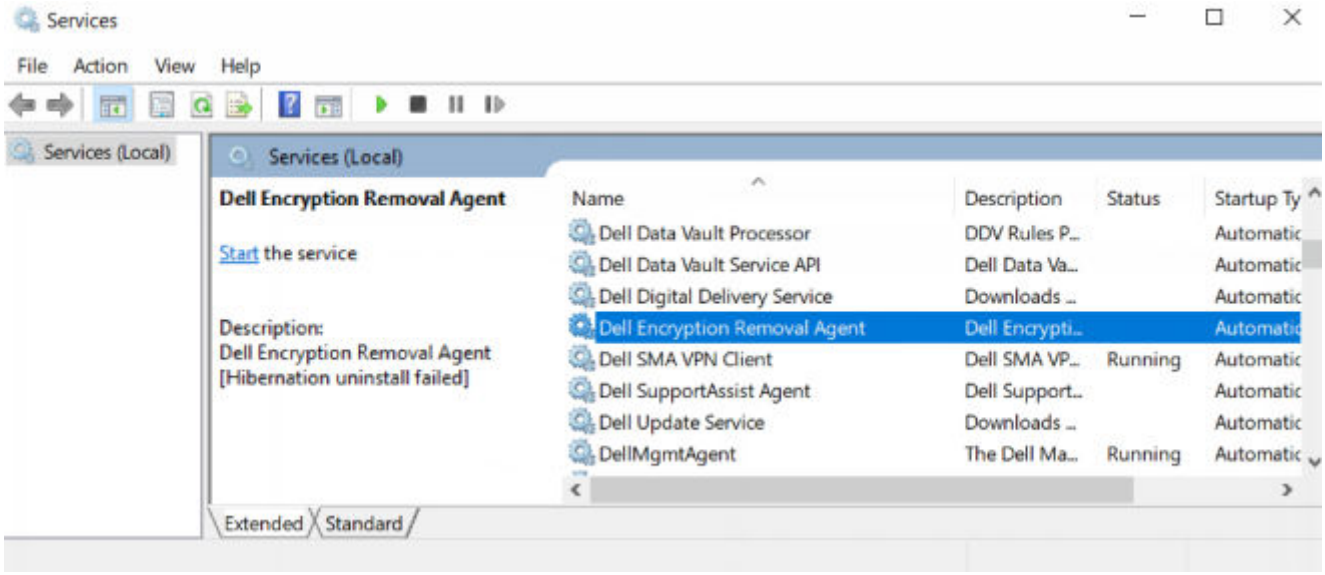
Parameters

Parameter	To
path	Optionally specify a particular path on the device to scan for possible encryption/ decryption. If you do not specify a path, this utility scans all folders related to your encryption policies.
-h	View command line Help.
-f	Troubleshoot as instructed by Dell ProSupport
-u	Temporarily disable or re-enable the user Application Data Encryption List. This list is only effective if Encryption Enabled is selected for the current user. Specify 0 to disable or 1 to re-enable. The current policy in force for the user is reinstated at the next logon.
-x	Add process names to the privileged list. The computer and installer process names on this list, plus those you add using this parameter or HKLM\Software\CREDANT\CMGShield\EUWPrivilegedList, are ignored if specified in the Application Data Encryption List. Separate process names with commas. If your list includes one or more spaces, enclose the list in double quotes.
-i	Remove process names previously added to the privileged list (you cannot remove hard-coded process names). Separate process names with commas. If your list includes one or more spaces, enclose the list in double quotes.

Check Encryption Removal Agent Status

The Encryption Removal Agent displays its status in the description area of the services panel (Start > Run > services.msc > OK) as follows. Periodically refresh the service (highlight the service > right-click > Refresh) to update its status.

- **Waiting for SDE Deactivation** - Encryption is still installed, is still configured, or both. Decryption does not start until Encryption is uninstalled.
- **Initial sweep** - The service is making an initial sweep, calculating the number of encrypted files and bytes. The initial sweep occurs one time.
- **Decryption sweep** - The service is decrypting files and possibly requesting to decrypt locked files.
- **Decrypt on Reboot (partial)** - The decryption sweep is complete and some locked files (but not all) are to be decrypted on the next restart.
- **Decrypt on Reboot** - The decryption sweep is complete and all locked files are to be decrypted on the next restart.
- **All files could not be decrypted** - The decryption sweep is complete, but all files could not be decrypted. This status means one of the following occurred:
  - The locked files could not be scheduled for decryption because they were too big, or an error occurred while making the request to unlock them.
  - An input/output error occurred while decrypting files.
  - The files could not be decrypted by policy.
  - The files are marked as should be encrypted.
  - An error occurred during the decryption sweep.
  - In all cases, a log file is created (if logging is configured) when LogVerbosity=2 (or higher) is set. To troubleshoot, set the log verbosity to 2 and restart the Encryption Removal Agent service to force another decryption sweep. See (Optional) Create an Encryption Removal Agent Log File for instructions.
- **Complete** - The decryption sweep is complete. The service, the executable, the driver, and the driver executable are all scheduled for deletion on the next restart.



SED Troubleshooting

Use the Initial Access Code

- This policy is used to log on to a computer when network access is unavailable. Meaning, access to the Dell Server and AD are both unavailable. Only use the *Initial Access Code* policy if absolutely necessary. Dell does not recommend this method to log in. Using the *Initial Access Code* policy does not provide the same level of security as the usual method of logging in using user name, domain, and password.

  In addition to being a less secure method of logging in, if a user is activated using the *Initial Access Code*, then there is no record on the Dell Server of that user activating on this computer. In turn, there is no way to generate a Response Code from the Dell Server for the user if they fail password and self help questions.

- The *Initial Access Code* can only be used **one** time, immediately after activation. After an end user has logged in, the *Initial Access Code* will not be available again. The first domain login that occurs after the *Initial Access Code* is entered will be cached, and the *Initial Access Code* entry field will not display again.
- The *Initial Access Code* **only** displays under the following conditions:
  - A user has never activated inside the PBA.
  - The client has no connectivity to the network or Dell Server.

Use Initial Access Code

1. Set a value for the **Initial Access Code** policy in the Management Console.
2. Save and commit the policy.
3. Start the local computer.
4. Enter the **Initial Access Code** when the Access Code screen displays.
5. Click the **blue arrow**.
6. Click **OK** when the Legal Notice screen displays.
7. Log in to Windows with the user credentials for this computer. These credentials must be part of the domain.
8. After logging in, open the Data Security Console and verify that the PBA user was successfully created.

   Click **Log** in the top menu and look for the message *Created PBA user for <DOMAIN\Username>*, which indicates the process was successful.

9. Shut down and restart the computer.
10. At the login screen, enter the user name, domain, and password that was previously used to log in to Windows.

    You must match the user name format that was used when creating the PBA user. Thus, if you used the format DOMAIN\Username, you must enter DOMAIN\Username for the Username.

11. Click **Login** when the Legal Notice screen displays.

Windows now launches and the computer can be used as usual.

Create a PBA Log File for Troubleshooting

- There may be cases when a PBA log file is needed for troubleshooting PBA issues, such as:
  - You are unable to see the network connection icon, yet you know there is network connectivity. The log file contains DHCP information to resolve the issue.
  - You are unable to see the Dell Server connection icon. The log file contains information to help diagnose connectivity issues.
  - Authentication fails even when entering correct credentials. The log file used with the Dell Server Server logs can help diagnose the issue.

Capture Logs When Booting Into the PBA (Legacy PBA)

1. Create a folder on a USB drive and name it **\CredantSED**, at the root level of the USB drive.
2. Create a file named actions.txt and place it in the **\CredantSED** folder.
3. In actions.txt, add the line:

   ```
   get logs
   ```
4. Save and close the file.

   Do not insert the USB drive when the computer is powered down. If the USB drive is already inserted during the shutdown state, remove the USB drive.
5. Power on the computer reproduce the issue. Insert the USB drive into the computer that the logs are to be collected from during this step.
6. After inserting the USB drive, wait for 5-10 seconds, then remove the drive.

   A credpbaenv.tgz file is created in the **\CredantSED** folder that contains the needed log files.

Capture Logs When Booting Into the PBA (UEFI PBA)

1. Create a file called **PBAErr.log** at the root level of the USB drive.
2. Insert the USB drive **before** powering on the computer.
3. Remove the USB drive **after** reproducing the issue requiring the logs.

The PBAErr.log file is updated and written in real-time.

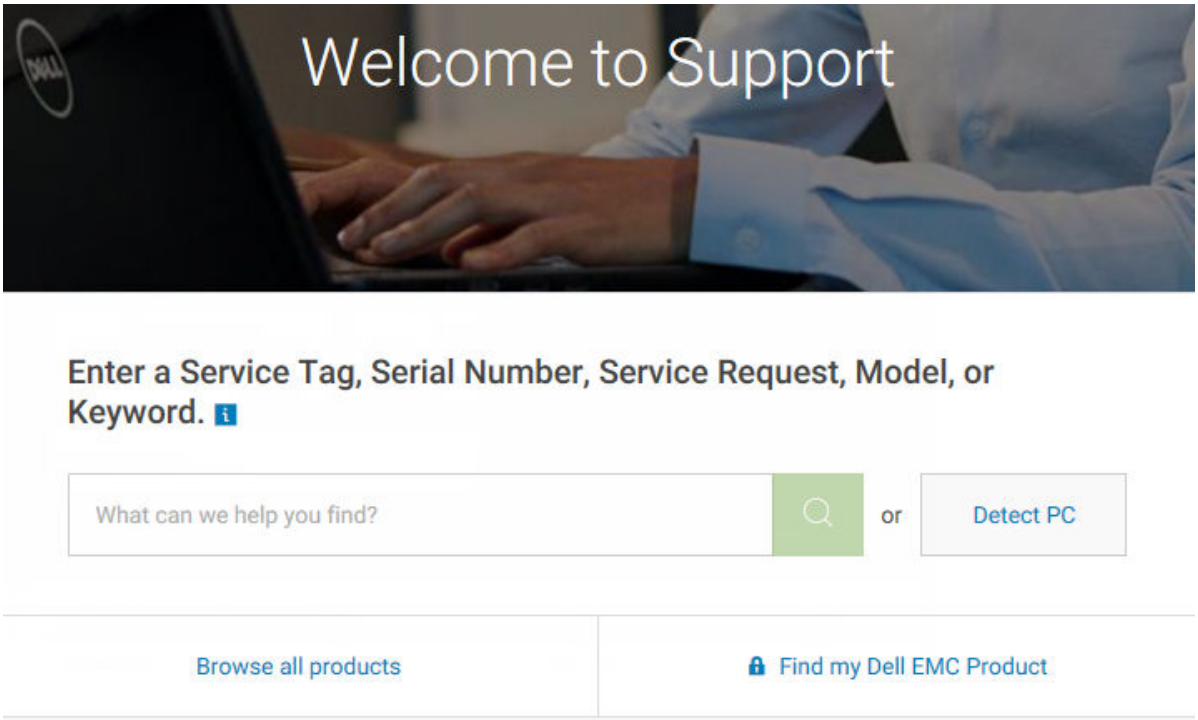
Dell ControlVault Drivers

Update Dell ControlVault Drivers and Firmware

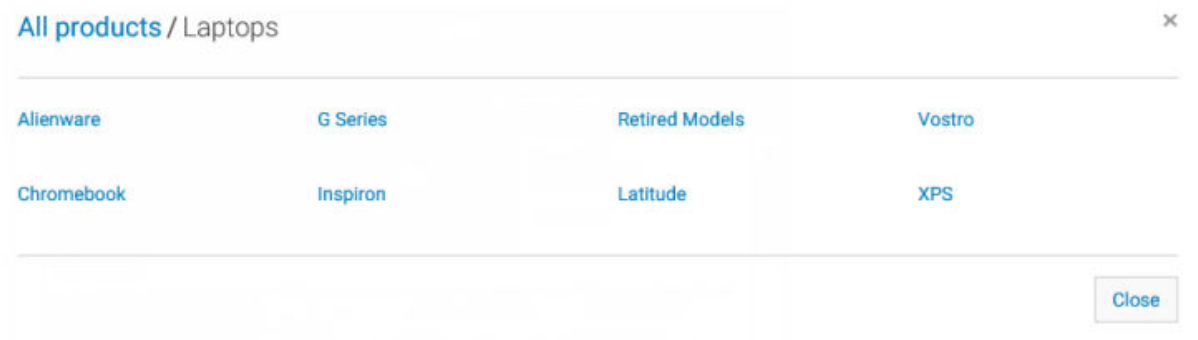
- Dell ControlVault drivers and firmware that are installed on Dell computers at the factory are outdated and should be updated by following this procedure, in this order.
- If an error message is received during client installation prompting you to exit the installer to update Dell ControlVault drivers, the message may be safely dismissed to continue with the installation of the client. The Dell ControlVault drivers (and firmware) can be updated after the client installation is complete.

Download Latest Drivers

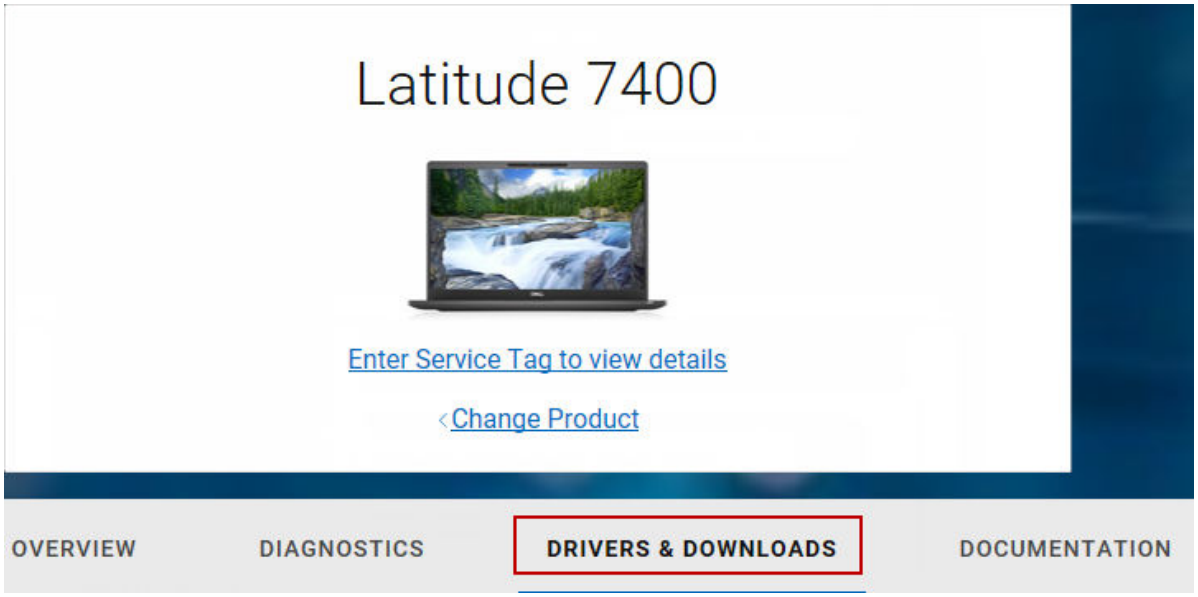
1. Go to dell.com/support.



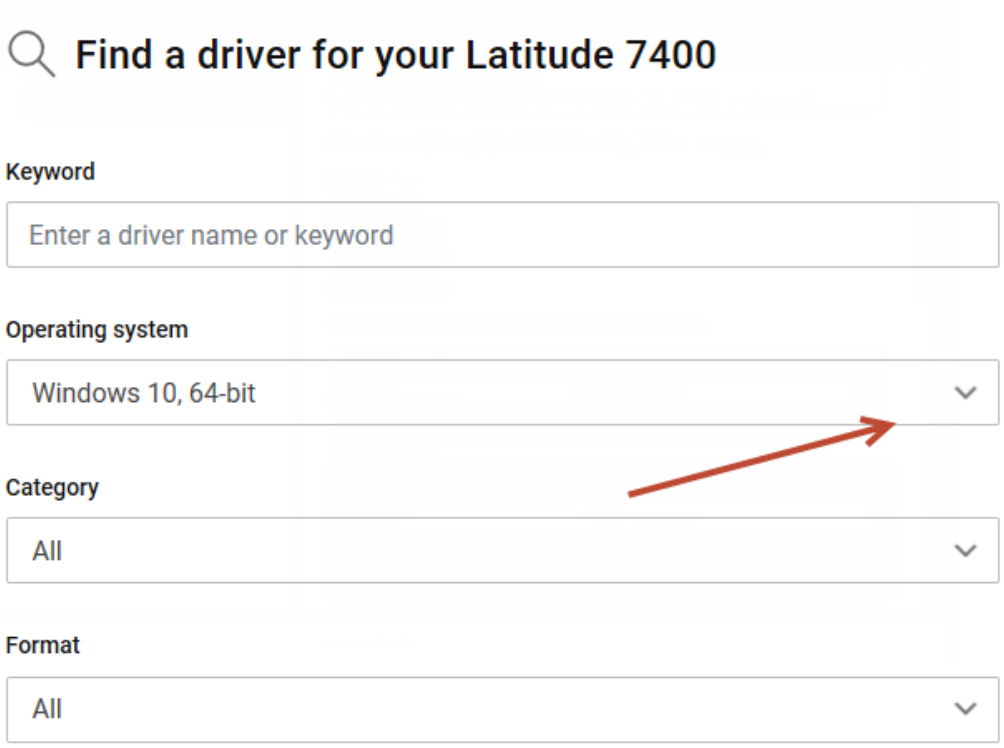
2. Select your computer model.



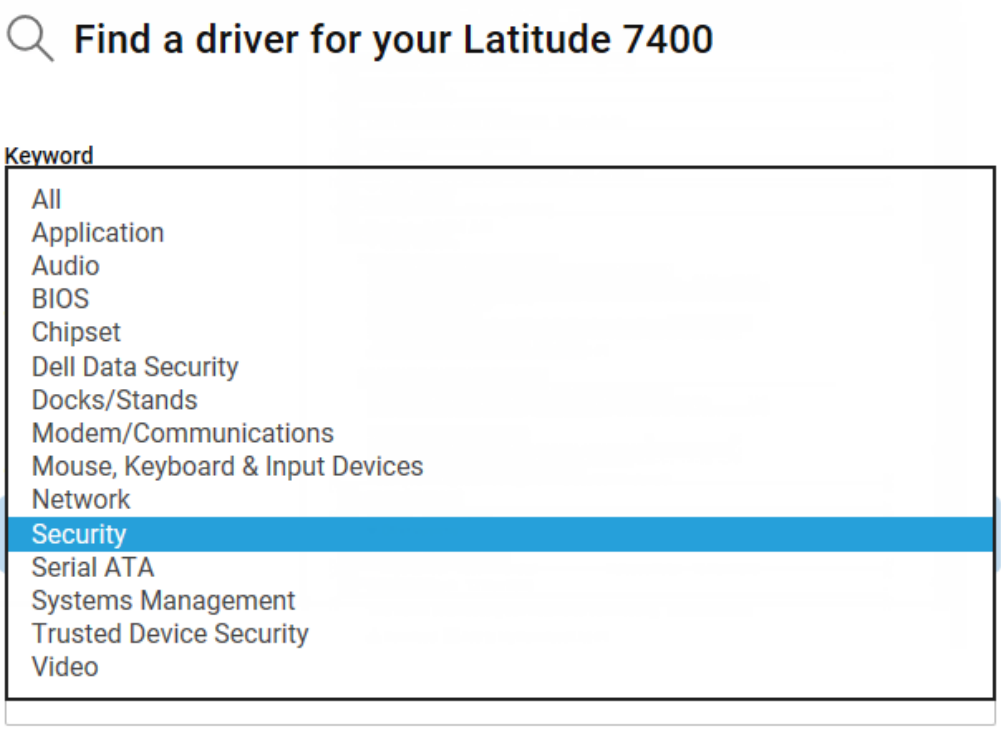
3. Select **Drivers & Downloads**.



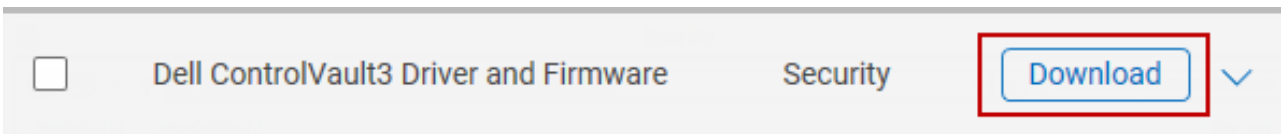
4. Select the **Operating System** of the target computer.



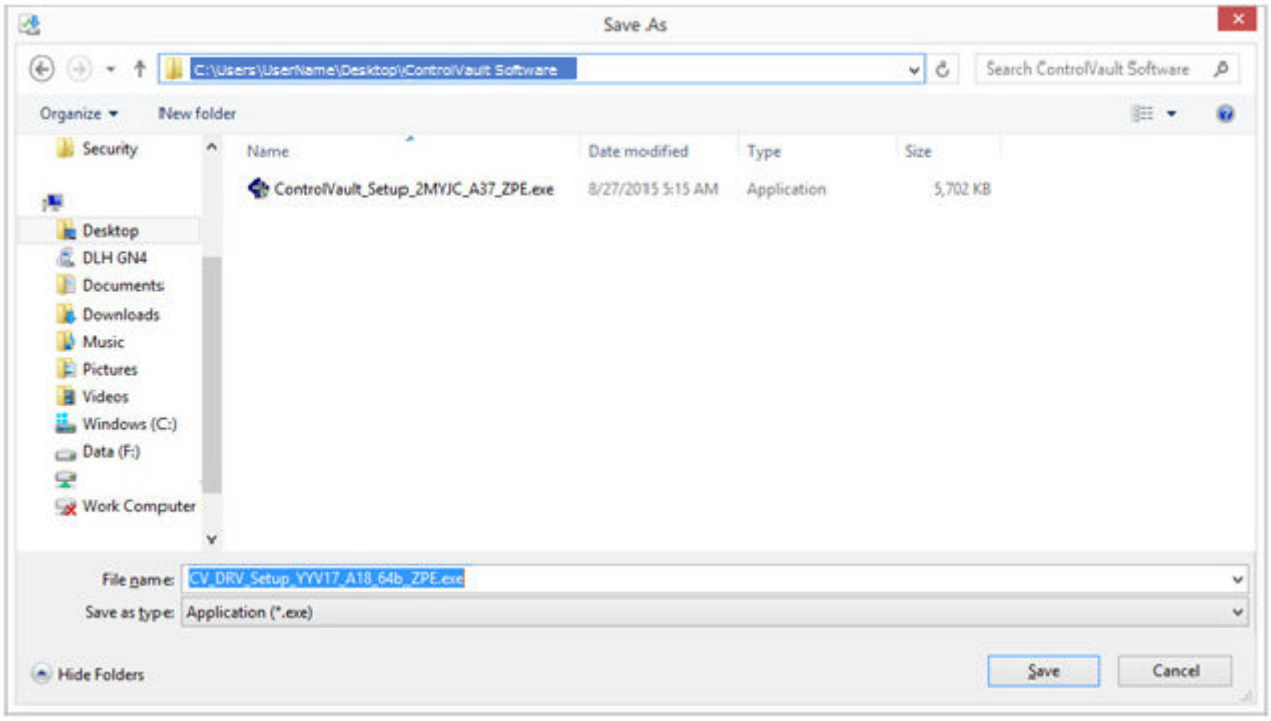
5. Select the **Security** category.



6. Download and save the Dell ControlVault Drivers.



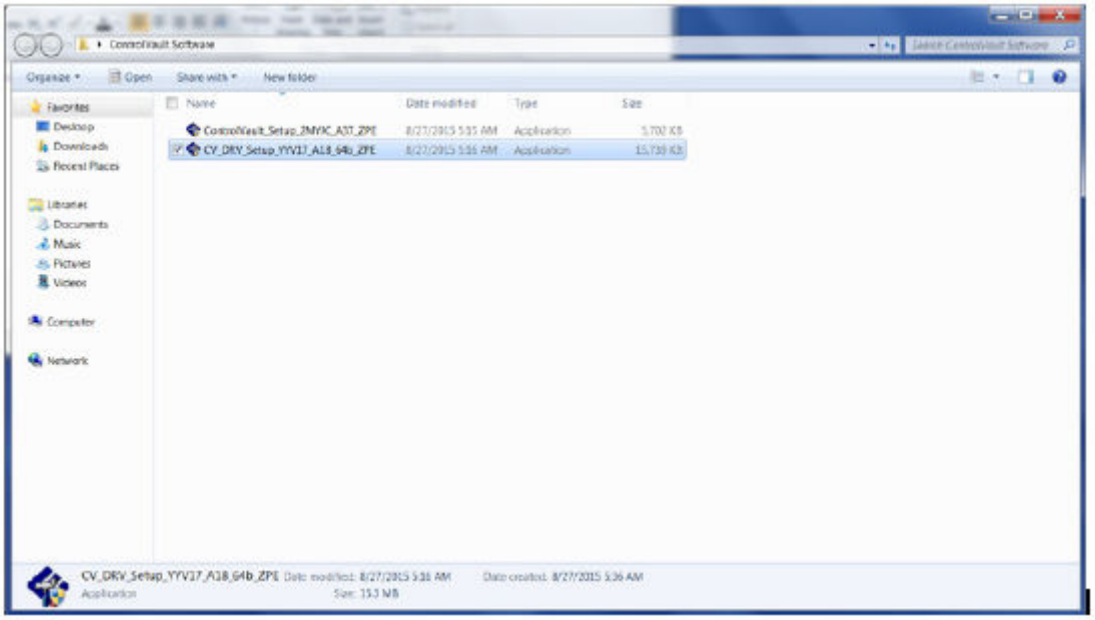
7. Download and save the Dell ControlVault Firmware.



8. Copy the drivers and firmware to the target computers, if needed.

Install Dell ControlVault Driver

1. Navigate to the folder which you downloaded the driver installation file.

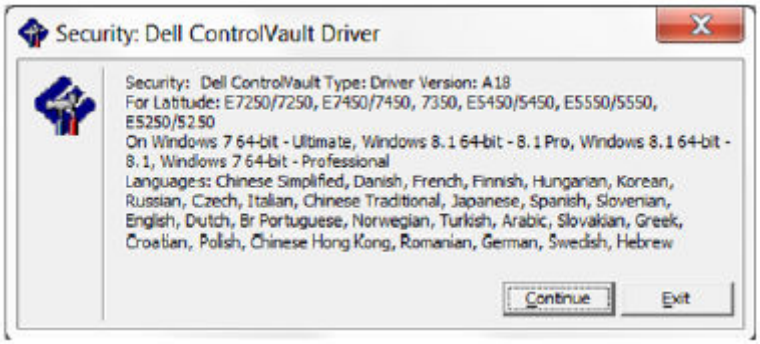


2. Double-click the Dell ControlVault driver to launch the self-extracting executable file.

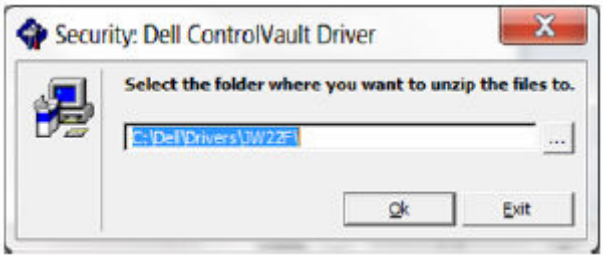
NOTE:

Be sure to install the driver first. The file name of the driver *at the time of this document creation* is ControlVault_Setup_2MYJC_A37_ZPE.exe.

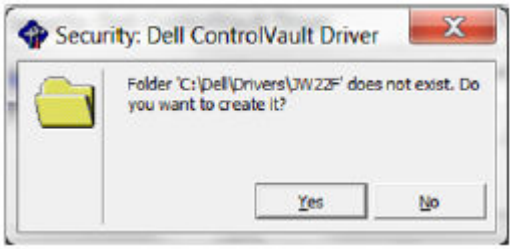
3. Click **Continue** to begin.



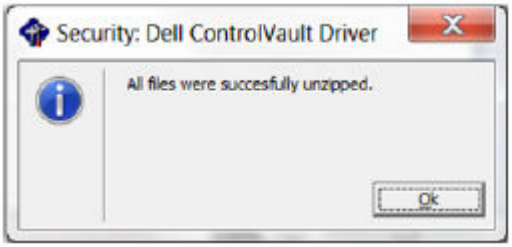
4. Click **Ok** to unzip the driver files in the default location of `C:\Dell\Drivers\<New Folder>`.



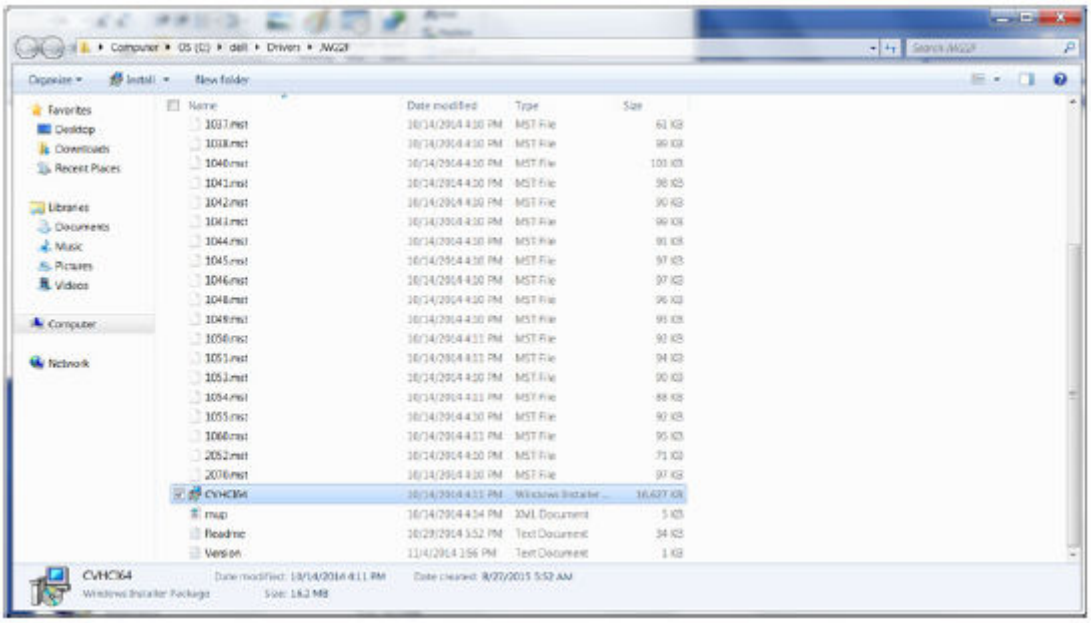
5. Click **Yes** to allow the creation of a new folder.



6. Click **Ok** when the successfully unzipped message displays.

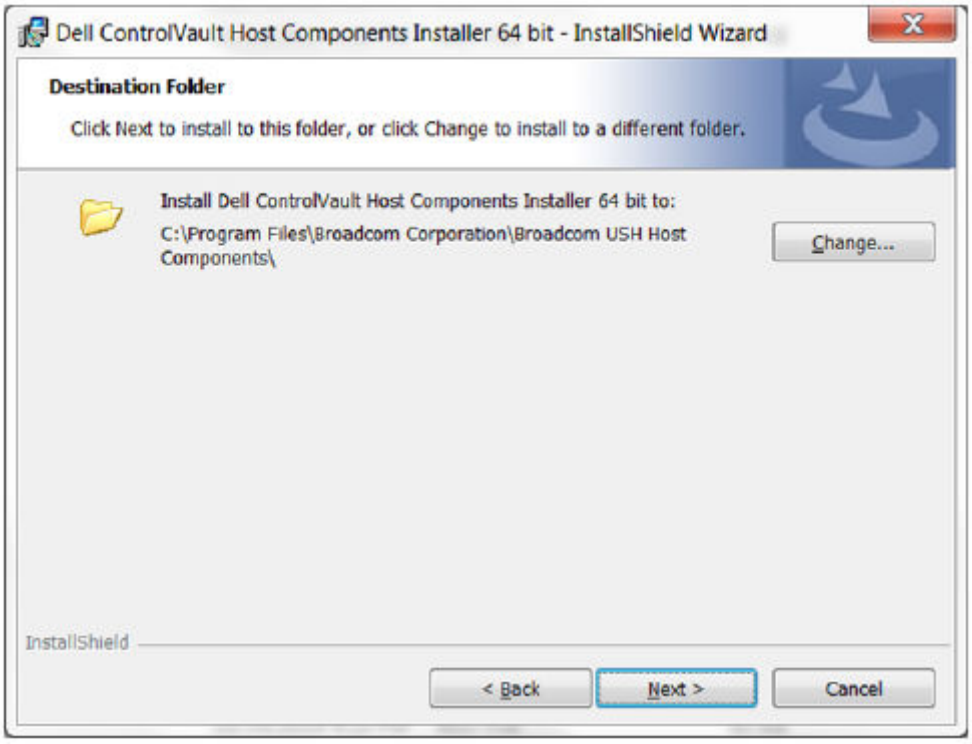


7. The folder which contains the files should display after extraction. If not, navigate to the folder to which you extracted the files. In this case, the folder is **JW22F**.

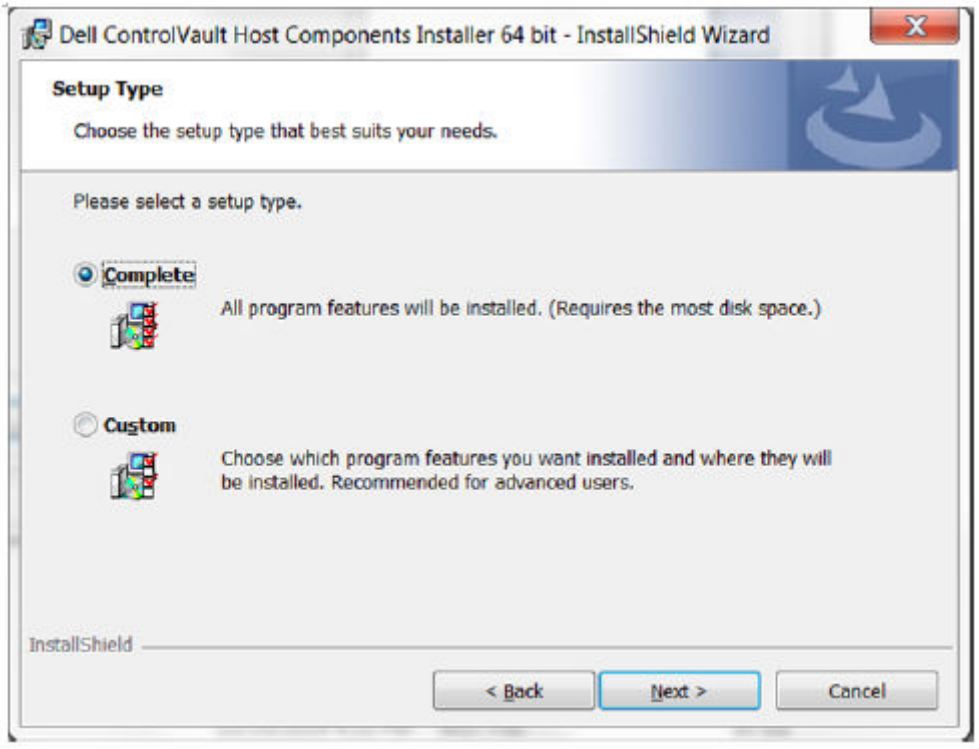


8. Double-click **CVHCI64.MSI** to launch the driver installer. [this example is **CVHCI64.MSI** in this example (CVHCI for a 32-bit computer)].
9. Click **Next** at the Welcome screen.

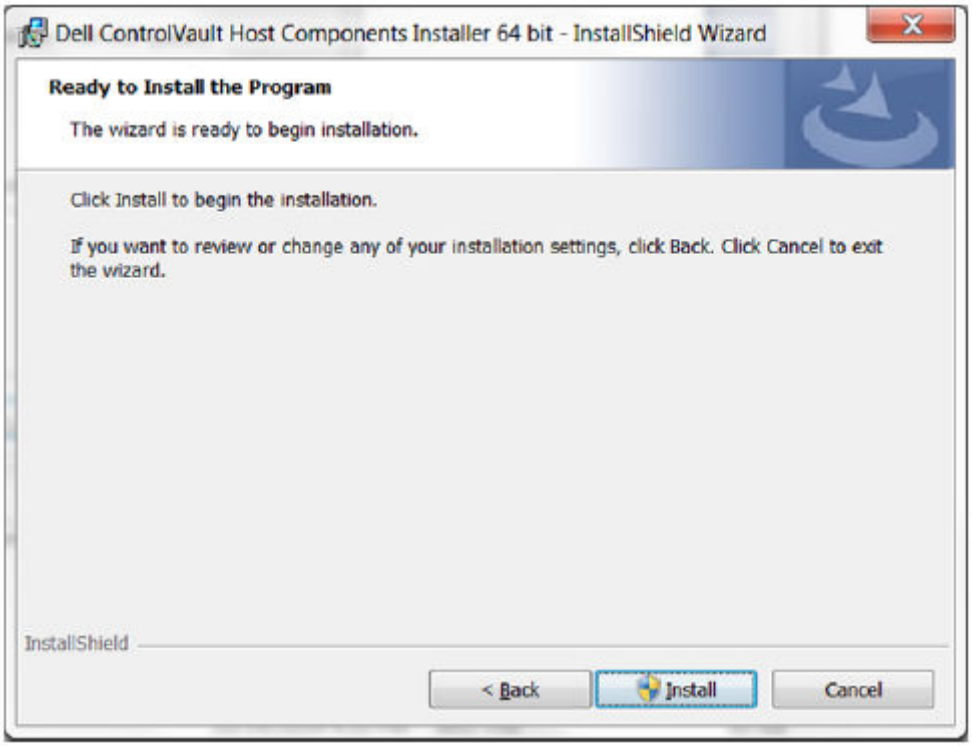
10. Click **Next** to install the drivers in the default location of `C:\Program Files\Broadcom Corporation\Broadcom USH Host Components\.`



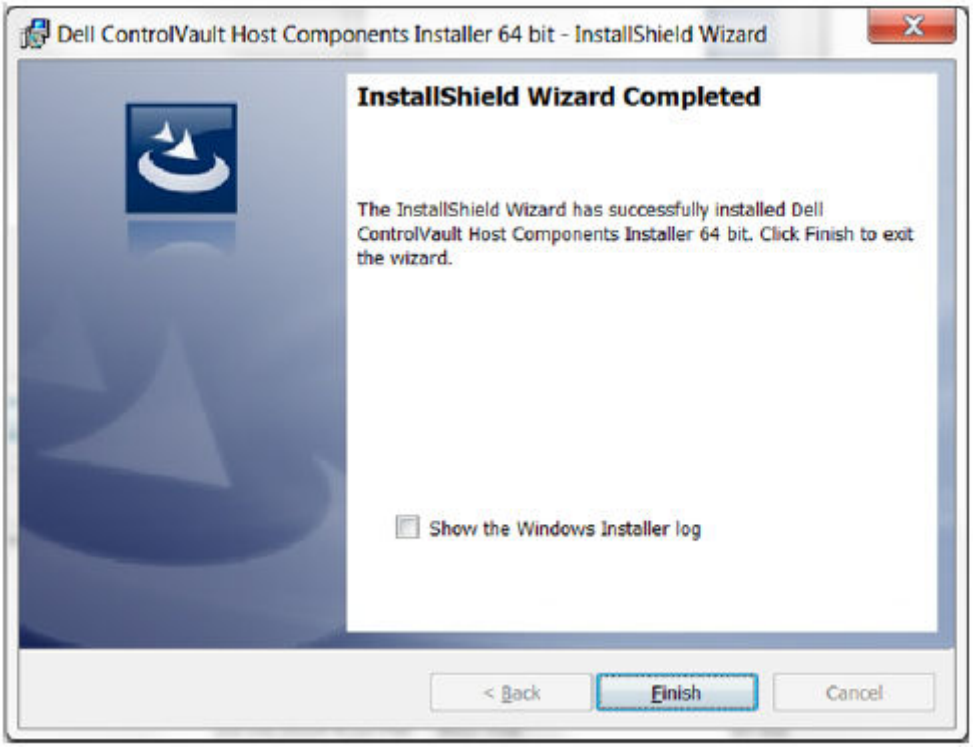
11. Select the **Complete** option and click **Next**.



12. Click **Install** to begin the installation of the drivers.



13. Optionally check the box to display the installer log file. Click **Finish** to exit the wizard.

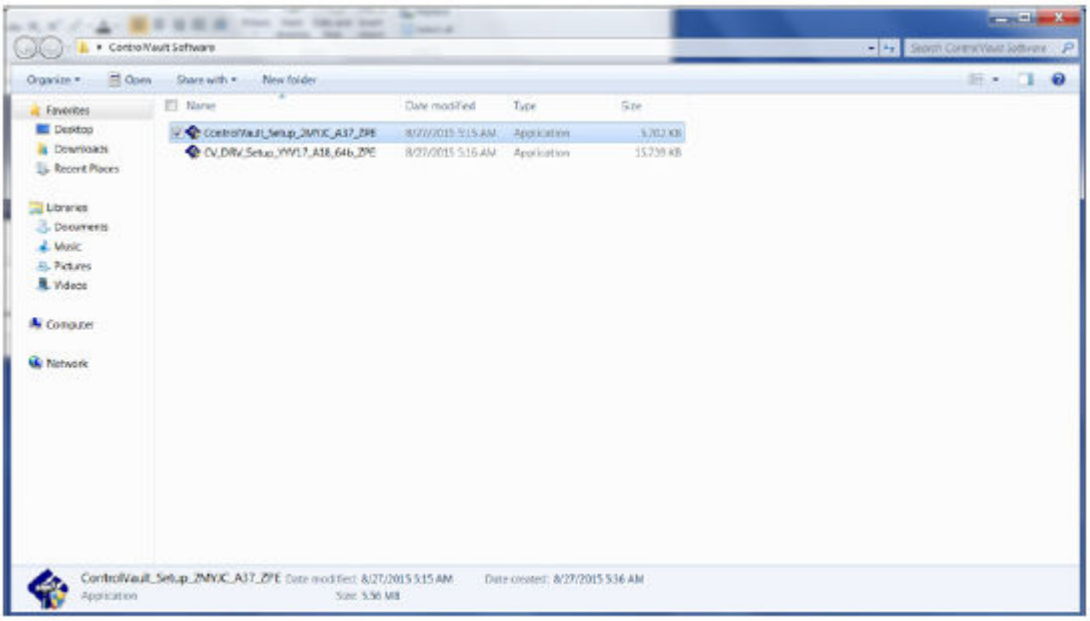


Verify Driver Installation

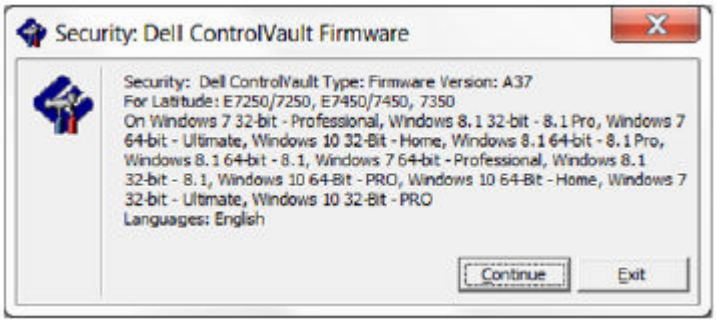
- The Device Manager will have a Dell ControlVault device (and other devices) depending on the operating system and hardware configuration.

Install Dell ControlVault Firmware

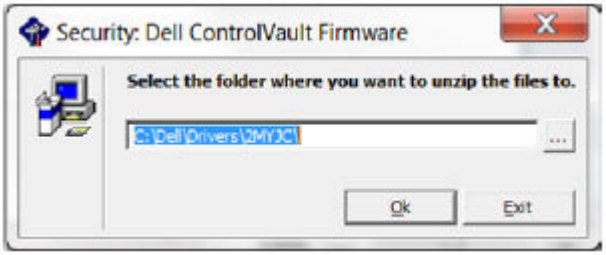
1. Navigate to the folder which you downloaded the firmware installation file.



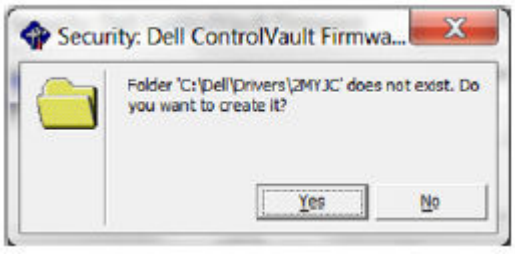
2. Double-click the Dell ControlVault firmware to launch the self-extracting executable file.
3. Click **Continue** to begin.



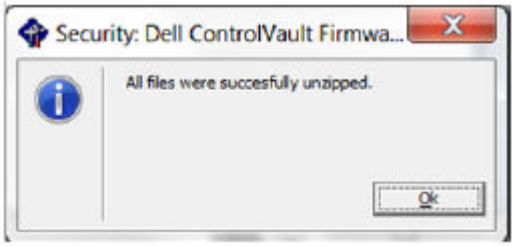
4. Click **Ok** to unzip the driver files in the default location of `C:\Dell\Drivers\<New Folder>`.



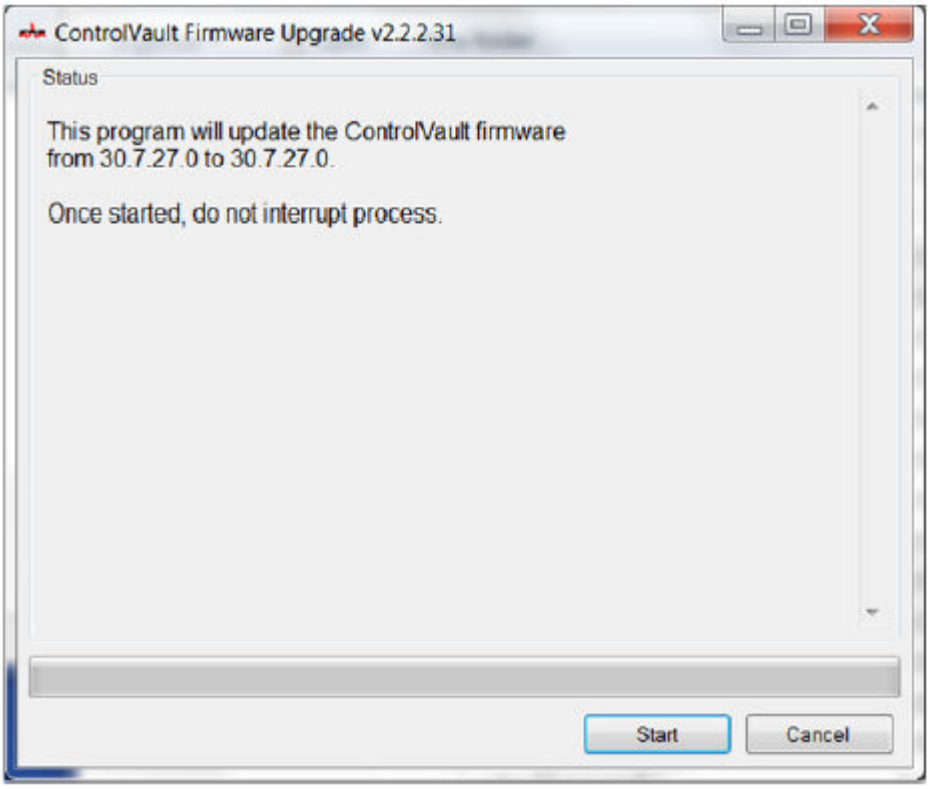
5. Click **Yes** to allow the creation of a new folder.



6. Click **Ok** when the successfully unzipped message displays.



7. The folder which contains the files should display after extraction. If not, navigate to the folder to which you extracted the files. Select the **firmware** folder.
8. Double-click **ushupgrade.exe** to launch the firmware installer.
9. Click **Start** to begin the firmware upgrade.



NOTE:

You may be asked to enter the administrator password if upgrading from an older version of firmware. Enter **Broadcom** as the password and click **Enter** if presented with this dialog.

Several status messages display.

10. Click **Restart** to complete the firmware upgrade.

    The update of the Dell ControlVault drivers and firmware is complete.

UEFI Computers

Troubleshoot Network Connection

- For pre-boot authentication to succeed on a computer with UEFI firmware, the PBA mode must have network connectivity. By default, computers with UEFI firmware do not have network connectivity until the operating system is loaded, which occurs after PBA mode. If the computer procedure outlined in Pre-Installation Configuration for UEFI Computers is successful and is configured properly, the network connection icon displays on the pre-boot authentication screen when the computer is connected to the network.

- Check the network cable to ensure it is connected to the computer if the network connection icon still does not display during pre-boot authentication. Restart the computer to restart PBA mode if it was not connected or was loose.

TPM and BitLocker

TPM and BitLocker Error Codes

Constant/Value	Description
TPM_E_ERROR_MASK 0x80280000	This is an error mask to convert TPM hardware errors to win errors.
TPM_E_AUTHFAIL 0x80280001	Authentication failed.
TPM_E_BADINDEX 0x80280002	The index to a PCR, DIR or other register is incorrect.
TPM_E_BAD_PARAMETER 0x80280003	One or more parameters is bad.
TPM_E_AUDITFAILURE 0x80280004	An operation completed successfully but the auditing of that operation failed.
TPM_E_CLEAR_DISABLED 0x80280005	The clear disable flag is set and all clear operations now require physical access.
TPM_E_DEACTIVATED 0x80280006	Activate the TPM.
TPM_E_DISABLED 0x80280007	Enable the TPM.
TPM_E_DISABLED_CMD 0x80280008	The target command has been disabled.
TPM_E_FAIL 0x80280009	The operation failed.
TPM_E_BAD_ORDINAL 0x8028000A	The ordinal was unknown or inconsistent.
TPM_E_INSTALL_DISABLED 0x8028000B	The ability to install an owner is disabled.
TPM_E_INVALID_KEYHANDLE 0x8028000C	The key handle cannot be interpreted.

Constant/Value	Description
TPM_E_KEYNOTFOUND 0x8028000D	The key handle points to an invalid key.
TPM_E_INAPPROPRIATE_ENC 0x8028000E	Unacceptable encryption scheme.
TPM_E_MIGRATEFAIL 0x8028000F	Migration authorization failed.
TPM_E_INVALID_PCR_INFO 0x80280010	PCR information could not be interpreted.
TPM_E_NOSPACE 0x80280011	No room to load key.
TPM_E_NOSRK 0x80280012	There is no Storage Root Key (SRK) set.
TPM_E_NOTSEALED_BLOB 0x80280013	An encrypted blob is invalid or was not created by this TPM.
TPM_E_OWNER_SET 0x80280014	The TPM already has an owner.
TPM_E_RESOURCES 0x80280015	The TPM has insufficient internal resources to perform the requested action.
TPM_E_SHORTRANDOM 0x80280016	A random string was too short.
TPM_E_SIZE 0x80280017	The TPM does not have the space to perform the operation.
TPM_E_WRONGPCRVAL 0x80280018	The named PCR value does not match the current PCR value.
TPM_E_BAD_PARAM_SIZE 0x80280019	The paramSize argument to the command has the incorrect value
TPM_E_SHA_THREAD 0x8028001A	There is no existing SHA-1 thread.
TPM_E_SHA_ERROR 0x8028001B	The calculation is unable to proceed because the existing SHA-1 thread has already encountered an error.
TPM_E_FAILEDSELFTEST 0x8028001C	The TPM hardware device reported a failure during its internal self test. Try restarting the computer to resolve the problem. If the problem continues, you might need to replace your TPM hardware or motherboard.
TPM_E_AUTH2FAIL 0x8028001D	The authorization for the second key in a 2 key function failed authorization.

Constant/Value	Description
TPM_E_BADTAG 0x8028001E	The tag value sent to for a command is invalid.
TPM_E_IOERROR 0x8028001F	An IO error occurred transmitting information to the TPM.
TPM_E_ENCRYPT_ERROR 0x80280020	The encryption process had a problem.
TPM_E_DECRYPT_ERROR 0x80280021	The decryption process did not complete.
TPM_E_INVALID_AUTHHANDLE 0x80280022	An invalid handle was used.
TPM_E_NO_ENDORSEMENT 0x80280023	The TPM does not have an Endorsement Key (EK) installed.
TPM_E_INVALID_KEYUSAGE 0x80280024	The usage of a key is not allowed.
TPM_E_WRONG_ENTITYTYPE 0x80280025	The submitted entity type is not allowed.
TPM_E_INVALID_POSTINIT 0x80280026	The command was received in the wrong sequence relative to TPM_Init and a subsequent TPM_Startup.
TPM_E_INAPPROPRIATE_SIG 0x80280027	Signed data cannot include additional DER information.
TPM_E_BAD_KEY_PROPERTY 0x80280028	The key properties in TPM_KEY_PARMs are not supported by this TPM.
TPM_E_BAD_MIGRATION 0x80280029	The migration properties of this key are incorrect.
TPM_E_BAD_SCHEME 0x8028002A	The signature or encryption scheme for this key is incorrect or not permitted in this situation.
TPM_E_BAD_DATASIZE 0x8028002B	The size of the data (or blob) parameter is bad or inconsistent with the referenced key.
TPM_E_BAD_MODE 0x8028002C	A mode parameter is bad, such as capArea or subCapArea for TPM_GetCapability, phsicalPresence parameter for TPM_PhysicalPresence, or migrationType for TPM_CreateMigrationBlob.
TPM_E_BAD_PRESENCE 0x8028002D	Either the physicalPresence or physicalPresenceLock bits have the wrong value.
TPM_E_BAD_VERSION 0x8028002E	The TPM cannot perform this version of the capability.

Constant/Value	Description
TPM_E_NO_WRAP_TRANSPORT 0x8028002F	The TPM does not allow for wrapped transport sessions.
TPM_E_AUDITFAIL_UNSUCCESSFUL 0x80280030	TPM audit construction failed and the underlying command was returning a failure code also.
TPM_E_AUDITFAIL_SUCCESSFUL 0x80280031	TPM audit construction failed and the underlying command was returning success.
TPM_E_NOTRESETABLE 0x80280032	Attempt to reset a PCR register that does not have the resettable attribute.
TPM_E_NOTLOCAL 0x80280033	Attempt to reset a PCR register that requires locality and locality modifier not part of command transport.
TPM_E_BAD_TYPE 0x80280034	Make identity blob not properly typed.
TPM_E_INVALID_RESOURCE 0x80280035	When saving context identified resource type does not match actual resource.
TPM_E_NOTFIPS 0x80280036	The TPM is attempting to execute a command only available when in FIPS mode.
TPM_E_INVALID_FAMILY 0x80280037	The command is attempting to use an invalid family ID.
TPM_E_NO_NV_PERMISSION 0x80280038	The permission to manipulate the NV storage is not available.
TPM_E_REQUIRES_SIGN 0x80280039	The operation requires a signed command.
TPM_E_KEY_NOTSUPPORTED 0x8028003A	Wrong operation to load an NV key.
TPM_E_AUTH_CONFLICT 0x8028003B	NV_LoadKey blob requires both owner and blob authorization.
TPM_E_AREA_LOCKED 0x8028003C	The NV area is locked and not writtable.
TPM_E_BAD_LOCALITY 0x8028003D	The locality is incorrect for the attempted operation.
TPM_E_READ_ONLY 0x8028003E	The NV area is read only and cannot be written to.
TPM_E_PER_NOWRITE 0x8028003F	There is no protection on the write to the NV area.

Constant/Value	Description
TPM_E_FAMILYCOUNT 0x80280040	The family count value does not match.
TPM_E_WRITE_LOCKED 0x80280041	The NV area has already been written to.
TPM_E_BAD_ATTRIBUTES 0x80280042	The NV area attributes conflict.
TPM_E_INVALID_STRUCTURE 0x80280043	The structure tag and version are invalid or inconsistent.
TPM_E_KEY_OWNER_CONTROL 0x80280044	The key is under control of the TPM Owner and can only be evicted by the TPM Owner.
TPM_E_BAD_COUNTER 0x80280045	The counter handle is incorrect.
TPM_E_NOT_FULLWRITE 0x80280046	The write is not a complete write of the area.
TPM_E_CONTEXT_GAP 0x80280047	The gap between saved context counts is too large.
TPM_E_MAXNVWRITES 0x80280048	The maximum number of NV writes without an owner has been exceeded.
TPM_E_NOOPERATOR 0x80280049	No operator AuthData value is set.
TPM_E_RESOURCEMISSING 0x8028004A	The resource pointed to by context is not loaded.
TPM_E_DELEGATE_LOCK 0x8028004B	The delegate administration is locked.
TPM_E_DELEGATE_FAMILY 0x8028004C	Attempt to manage a family other than the delegated family.
TPM_E_DELEGATE_ADMIN 0x8028004D	Delegation table management not enabled.
TPM_E_TRANSPORT_NOTEXCLUSIVE 0x8028004E	There was a command executed outside of an exclusive transport session.
TPM_E_OWNER_CONTROL 0x8028004F	Attempt to context save a owner evict controlled key.
TPM_E_DAA_RESOURCES 0x80280050	The DAA command has no resources available to execute the command.

Constant/Value	Description
TPM_E_DAA_INPUT_DATA0 0x80280051	The consistency check on DAA parameter inputData0 has failed.
TPM_E_DAA_INPUT_DATA1 0x80280052	The consistency check on DAA parameter inputData1 has failed.
TPM_E_DAA_ISSUER_SETTINGS 0x80280053	The consistency check on DAA_issuerSettings has failed.
TPM_E_DAA_TPM_SETTINGS 0x80280054	The consistency check on DAA_tpmSpecific has failed.
TPM_E_DAA_STAGE 0x80280055	The atomic process indicated by the submitted DAA command is not the expected process.
TPM_E_DAA_ISSUER_VALIDITY 0x80280056	The issuer's validity check has detected an inconsistency.
TPM_E_DAA_WRONG_W 0x80280057	The consistency check on w has failed.
TPM_E_BAD_HANDLE 0x80280058	The handle is incorrect.
TPM_E_BAD_DELEGATE 0x80280059	Delegation is not correct.
TPM_E_BADCONTEXT 0x8028005A	The context blob is invalid.
TPM_E_TOOMANYCONTEXTS 0x8028005B	Too many contexts held by the TPM.
TPM_E_MA_TICKET_SIGNATURE 0x8028005C	Migration authority signature validation failure.
TPM_E_MA_DESTINATION 0x8028005D	Migration destination not authenticated.
TPM_E_MA_SOURCE 0x8028005E	Migration source incorrect.
TPM_E_MA_AUTHORITY 0x8028005F	Incorrect migration authority.
TPM_E_PERMANENTEK 0x80280061	Attempt to revoke the EK and the EK is not revocable.
TPM_E_BAD_SIGNATURE 0x80280062	Bad signature of CMK ticket.

Constant/Value	Description
TPM_E_NOCONTEXTSPACE 0x80280063	There is no room in the context list for additional contexts.
TPM_E_COMMAND_BLOCKED 0x80280400	The command was blocked.
TPM_E_INVALID_HANDLE 0x80280401	The specified handle was not found.
TPM_E_DUPLICATE_VHANDLE 0x80280402	The TPM returned a duplicate handle and the command needs to be resubmitted.
TPM_E_EMBEDDED_COMMAND_BLOCKED 0x80280403	The command within the transport was blocked.
TPM_E_EMBEDDED_COMMAND_UNSUPPORTED 0x80280404	The command within the transport is not supported.
TPM_E_RETRY 0x80280800	The TPM is too busy to respond to the command immediately, but the command could be resubmitted at a later time.
TPM_E_NEEDS_SELFTEST 0x80280801	SelfTestFull has not been run.
TPM_E_DOING_SELFTEST 0x80280802	The TPM is currently executing a full self test.
TPM_E_DEFEND_LOCK_RUNNING 0x80280803	The TPM is defending against dictionary attacks and is in a time-out period.
TBS_E_INTERNAL_ERROR 0x80284001	An internal software error has been detected.
TBS_E_BAD_PARAMETER 0x80284002	One or more input parameters is bad.
TBS_E_INVALID_OUTPUT_POINTER 0x80284003	A specified output pointer is bad.
TBS_E_INVALID_CONTEXT 0x80284004	The specified context handle does not refer to a valid context.
TBS_E_INSUFFICIENT_BUFFER 0x80284005	A specified output buffer is too small.
TBS_E_IOERROR 0x80284006	An error occurred while communicating with the TPM.
TBS_E_INVALID_CONTEXT_PARAM 0x80284007	One or more context parameters is invalid.

Constant/Value	Description
TBS_E_SERVICE_NOT_RUNNING 0x80284008	The TBS service is not running and could not be started.
TBS_E_TOO_MANY_TBS_CONTEXTS 0x80284009	A new context could not be created because there are too many open contexts.
TBS_E_TOO_MANY_RESOURCES 0x8028400A	A new virtual resource could not be created because there are too many open virtual resources.
TBS_E_SERVICE_START_PENDING 0x8028400B	The TBS service has been started but is not yet running.
TBS_E_PPI_NOT_SUPPORTED 0x8028400C	The physical presence interface is not supported.
TBS_E_COMMAND_CANCELED 0x8028400D	The command was canceled.
TBS_E_BUFFER_TOO_LARGE 0x8028400E	The input or output buffer is too large.
TBS_E_TPM_NOT_FOUND 0x8028400F	A compatible TPM Security Device cannot be found on this computer.
TBS_E_SERVICE_DISABLED 0x80284010	The TBS service has been disabled.
TBS_E_NO_EVENT_LOG 0x80284011	No TCG event log is available.
TBS_E_ACCESS_DENIED 0x80284012	The caller does not have the appropriate rights to perform the requested operation.
TBS_E_PROVISIONING_NOT_ALLOWED 0x80284013	The TPM provisioning action is not allowed by the specified flags. For provisioning to be successful, one of several actions may be required. The TPM management console (tpm.msc) action to make the TPM Ready may help. For further information, see the documentation for the Win32_Tpm WMI method 'Provision'. (The actions that may be required include importing the TPM Owner Authorization value into the system, calling the Win32_Tpm WMI method for provisioning the TPM and specifying TRUE for either 'ForceClear_Allowed' or 'PhysicalPresencePrompts_Allowed' (as indicated by the value returned in the Additional Information), or enabling the TPM in the system BIOS.)
TBS_E_PPI_FUNCTION_UNSUPPORTED 0x80284014	The Physical Presence Interface of this firmware does not support the requested method.
TBS_E_OWNERAUTH_NOT_FOUND 0x80284015	The requested TPM OwnerAuth value was not found.

Constant/Value	Description
TBS_E_PROVISIONING_INCOMPLETE 0x80284016	The TPM provisioning did not complete. For more information on completing the provisioning, call the Win32_Tpm WMI method for provisioning the TPM ('Provision') and check the returned Information.
TPMAPI_E_INVALID_STATE 0x80290100	The command buffer is not in the correct state.
TPMAPI_E_NOT_ENOUGH_DATA 0x80290101	The command buffer does not contain enough data to satisfy the request.
TPMAPI_E_TOO_MUCH_DATA 0x80290102	The command buffer cannot contain any more data.
TPMAPI_E_INVALID_OUTPUT_POINTER 0x80290103	One or more output parameters was NULL or invalid.
TPMAPI_E_INVALID_PARAMETER 0x80290104	One or more input parameters is invalid.
TPMAPI_E_OUT_OF_MEMORY 0x80290105	Not enough memory was available to satisfy the request.
TPMAPI_E_BUFFER_TOO_SMALL 0x80290106	The specified buffer was too small.
TPMAPI_E_INTERNAL_ERROR 0x80290107	An internal error was detected.
TPMAPI_E_ACCESS_DENIED 0x80290108	The caller does not have the appropriate rights to perform the requested operation.
TPMAPI_E_AUTHORIZATION_FAILED 0x80290109	The specified authorization information was invalid.
TPMAPI_E_INVALID_CONTEXT_HANDLE 0x8029010A	The specified context handle was not valid.
TPMAPI_E_TBS_COMMUNICATION_ERROR 0x8029010B	An error occurred while communicating with the TBS.
TPMAPI_E_TPM_COMMAND_ERROR 0x8029010C	The TPM returned an unexpected result.
TPMAPI_E_MESSAGE_TOO_LARGE 0x8029010D	The message was too large for the encoding scheme.
TPMAPI_E_INVALID_ENCODING 0x8029010E	The encoding in the blob was not recognized.
TPMAPI_E_INVALID_KEY_SIZE 0x8029010F	The key size is not valid.

Constant/Value	Description
TPMAPI_E_ENCRYPTION_FAILED 0x80290110	The encryption operation failed.
TPMAPI_E_INVALID_KEY_PARAMS 0x80290111	The key parameters structure was not valid
TPMAPI_E_INVALID_MIGRATION_AUTHORIZATION_BLOB 0x80290112	The requested supplied data does not appear to be a valid migration authorization blob.
TPMAPI_E_INVALID_PCR_INDEX 0x80290113	The specified PCR index was invalid
TPMAPI_E_INVALID_DELEGATE_BLOB 0x80290114	The data given does not appear to be a valid delegate blob.
TPMAPI_E_INVALID_CONTEXT_PARAMS 0x80290115	One or more of the specified context parameters was not valid.
TPMAPI_E_INVALID_KEY_BLOB 0x80290116	The data given does not appear to be a valid key blob
TPMAPI_E_INVALID_PCR_DATA 0x80290117	The specified PCR data was invalid.
TPMAPI_E_INVALID_OWNER_AUTH 0x80290118	The format of the owner auth data was invalid.
TPMAPI_E_FIPS_RNG_CHECK_FAILED 0x80290119	The random number generated did not pass FIPS RNG check.
TPMAPI_E_EMPTY_TCG_LOG 0x8029011A	The TCG Event Log does not contain any data.
TPMAPI_E_INVALID_TCG_LOG_ENTRY 0x8029011B	An entry in the TCG Event Log was invalid.
TPMAPI_E_TCG_SEPARATOR_ABSENT 0x8029011C	A TCG Separator was not found.
TPMAPI_E_TCG_INVALID_DIGEST_ENTRY 0x8029011D	A digest value in a TCG Log entry did not match hashed data.
TPMAPI_E_POLICY_DENIES_OPERATION 0x8029011E	The requested operation was blocked by current TPM policy. Please contact your system administrator for assistance.
TBSIMP_E_BUFFER_TOO_SMALL 0x80290200	The specified buffer was too small.
TBSIMP_E_CLEANUP_FAILED 0x80290201	The context could not be cleaned up.

Constant/Value	Description
TBSIMP_E_INVALID_CONTEXT_HANDLE 0x80290202	The specified context handle is invalid.
TBSIMP_E_INVALID_CONTEXT_PARAM 0x80290203	An invalid context parameter was specified.
TBSIMP_E_TPM_ERROR 0x80290204	An error occurred while communicating with the TPM
TBSIMP_E_HASH_BAD_KEY 0x80290205	No entry with the specified key was found.
TBSIMP_E_DUPLICATE_VHANDLE 0x80290206	The specified virtual handle matches a virtual handle already in use.
TBSIMP_E_INVALID_OUTPUT_POINTER 0x80290207	The pointer to the returned handle location was NULL or invalid
TBSIMP_E_INVALID_PARAMETER 0x80290208	One or more parameters is invalid
TBSIMP_E_RPC_INIT_FAILED 0x80290209	The RPC subsystem could not be initialized.
TBSIMP_E_SCHEDULER_NOT_RUNNING 0x8029020A	The TBS scheduler is not running.
TBSIMP_E_COMMAND_CANCELED 0x8029020B	The command was canceled.
TBSIMP_E_OUT_OF_MEMORY 0x8029020C	There was not enough memory to fulfill the request
TBSIMP_E_LIST_NO_MORE_ITEMS 0x8029020D	The specified list is empty, or the iteration has reached the end of the list.
TBSIMP_E_LIST_NOT_FOUND 0x8029020E	The specified item was not found in the list.
TBSIMP_E_NOT_ENOUGH_SPACE 0x8029020F	The TPM does not have enough space to load the requested resource.
TBSIMP_E_NOT_ENOUGH_TPM_CONTEXTS 0x80290210	There are too many TPM contexts in use.
TBSIMP_E_COMMAND_FAILED 0x80290211	The TPM command failed.
TBSIMP_E_UNKNOWN_ORDINAL 0x80290212	The TBS does not recognize the specified ordinal.

Constant/Value	Description
TBSIMP_E_RESOURCE_EXPIRED 0x80290213	The requested resource is no longer available.
TBSIMP_E_INVALID_RESOURCE 0x80290214	The resource type did not match.
TBSIMP_E_NOTHING_TO_UNLOAD 0x80290215	No resources can be unloaded.
TBSIMP_E_HASH_TABLE_FULL 0x80290216	No new entries can be added to the hash table.
TBSIMP_E_TOO_MANY_TBS_CONTEXTS 0x80290217	A new TBS context could not be created because there are too many open contexts.
TBSIMP_E_TOO_MANY_RESOURCES 0x80290218	A new virtual resource could not be created because there are too many open virtual resources.
TBSIMP_E_PPI_NOT_SUPPORTED 0x80290219	The physical presence interface is not supported.
TBSIMP_E_TPM_INCOMPATIBLE 0x8029021A	TBS is not compatible with the version of TPM found on the system.
TBSIMP_E_NO_EVENT_LOG 0x8029021B	No TCG event log is available.
TPM_E_PPI_ACPI_FAILURE 0x80290300	A general error was detected when attempting to acquire the BIOS's response to a Physical Presence command.
TPM_E_PPI_USER_ABORT 0x80290301	The user failed to confirm the TPM operation request.
TPM_E_PPI_BIOS_FAILURE 0x80290302	The BIOS failure prevented the successful execution of the requested TPM operation (e.g. invalid TPM operation request, BIOS communication error with the TPM).
TPM_E_PPI_NOT_SUPPORTED 0x80290303	The BIOS does not support the physical presence interface.
TPM_E_PPI_BLOCKED_IN_BIOS 0x80290304	The Physical Presence command was blocked by current BIOS settings. The system owner may be able to reconfigure the BIOS settings to allow the command.
TPM_E_PCP_ERROR_MASK 0x80290400	This is an error mask to convert Platform Crypto Provider errors to win errors.
TPM_E_PCP_DEVICE_NOT_READY 0x80290401	The Platform Crypto Device is currently not ready. It needs to be fully provisioned to be operational.
TPM_E_PCP_INVALID_HANDLE 0x80290402	The handle provided to the Platform Crypto Provider is invalid.

Constant/Value	Description
TPM_E_PCP_INVALID_PARAMETER 0x80290403	A parameter provided to the Platform Crypto Provider is invalid.
TPM_E_PCP_FLAG_NOT_SUPPORTED 0x80290404	A provided flag to the Platform Crypto Provider is not supported.
TPM_E_PCP_NOT_SUPPORTED 0x80290405	The requested operation is not supported by this Platform Crypto Provider.
TPM_E_PCP_BUFFER_TOO_SMALL 0x80290406	The buffer is too small to contain all data. No information has been written to the buffer.
TPM_E_PCP_INTERNAL_ERROR 0x80290407	An unexpected internal error has occurred in the Platform Crypto Provider.
TPM_E_PCP_AUTHENTICATION_FAILED 0x80290408	The authorization to use a provider object has failed.
TPM_E_PCP_AUTHENTICATION_IGNORED 0x80290409	The Platform Crypto Device has ignored the authorization for the provider object, to mitigate against a dictionary attack.
TPM_E_PCP_POLICY_NOT_FOUND 0x8029040A	The referenced policy was not found.
TPM_E_PCP_PROFILE_NOT_FOUND 0x8029040B	The referenced profile was not found.
TPM_E_PCP_VALIDATION_FAILED 0x8029040C	The validation was not successful.
PLA_E_DCS_NOT_FOUND 0x80300002	Data Collector Set was not found.
PLA_E_DCS_IN_USE 0x803000AA	The Data Collector Set or one of its dependencies is already in use.
PLA_E_TOO_MANY_FOLDERS 0x80300045	Unable to start Data Collector Set because there are too many folders.
PLA_E_NO_MIN_DISK 0x80300070	Not enough free disk space to start Data Collector Set.
PLA_E_DCS_ALREADY_EXISTS 0x803000B7	Data Collector Set already exists.
PLA_S_PROPERTY_IGNORED 0x00300100	Property value will be ignored.
PLA_E_PROPERTY_CONFLICT 0x80300101	Property value conflict.

Constant/Value	Description
PLA_E_DCS_SINGLETON_REQUIRED 0x80300102	The current configuration for this Data Collector Set requires that it contain exactly one Data Collector.
PLA_E_CREDENTIALS_REQUIRED 0x80300103	A user account is required in order to commit the current Data Collector Set properties.
PLA_E_DCS_NOT_RUNNING 0x80300104	Data Collector Set is not running.
PLA_E_CONFLICT_INCL_EXCL_API 0x80300105	A conflict was detected in the list of include/exclude APIs. Do not specify the same API in both the include list and the exclude list.
PLA_E_NETWORK_EXE_NOT_VALID 0x80300106	The executable path you have specified refers to a network share or UNC path.
PLA_E_EXE_ALREADY_CONFIGURED 0x80300107	The executable path you have specified is already configured for API tracing.
PLA_E_EXE_PATH_NOT_VALID 0x80300108	The executable path you have specified does not exist. Verify that the specified path is correct.
PLA_E_DC_ALREADY_EXISTS 0x80300109	Data Collector already exists.
PLA_E_DCS_START_WAIT_TIMEOUT 0x8030010A	The wait for the Data Collector Set start notification has timed out.
PLA_E_DC_START_WAIT_TIMEOUT 0x8030010B	The wait for the Data Collector to start has timed out.
PLA_E_REPORT_WAIT_TIMEOUT 0x8030010C	The wait for the report generation tool to finish has timed out.
PLA_E_NO_DUPLICATES 0x8030010D	Duplicate items are not allowed.
PLA_E_EXE_FULL_PATH_REQUIRED 0x8030010E	When specifying the executable that you want to trace, you must specify a full path to the executable and not just a filename.
PLA_E_INVALID_SESSION_NAME 0x8030010F	The session name provided is invalid.
PLA_E_PLA_CHANNEL_NOT_ENABLED 0x80300110	The Event Log channel Microsoft-Windows-Diagnosis-PLA/Operational must be enabled to perform this operation.
PLA_E_TASKSCHED_CHANNEL_NOT_ENABLED 0x80300111	The Event Log channel Microsoft-Windows-TaskScheduler must be enabled to perform this operation.
PLA_E_RULES_MANAGER_FAILED 0x80300112	The execution of the Rules Manager failed.

Constant/Value	Description
PLA_E_CABAPI_FAILURE 0x80300113	An error occurred while attempting to compress or extract the data.
FVE_E_LOCKED_VOLUME 0x80310000	This drive is locked by BitLocker Drive Encryption. You must unlock this drive from Control Panel.
FVE_E_NOT_ENCRYPTED 0x80310001	The drive is not encrypted.
FVE_E_NO_TPM_BIOS 0x80310002	The BIOS did not correctly communicate with the TPM. Contact the computer manufacturer for BIOS upgrade instructions.
FVE_E_NO_MBR_METRIC 0x80310003	The BIOS did not correctly communicate with the master boot record (MBR). Contact the computer manufacturer for BIOS upgrade instructions.
FVE_E_NO_BOOTSECTOR_METRIC 0x80310004	A required TPM measurement is missing. If there is a bootable CD or DVD in your computer, remove it, restart the computer, and turn on BitLocker again. If the problem persists, ensure the master boot record is up to date.
FVE_E_NO_BOOTMGR_METRIC 0x80310005	The boot sector of this drive is not compatible with BitLocker Drive Encryption. Use the Bootrec.exe tool in the Windows Recovery Environment to update or repair the boot manager (BOOTMGR).
FVE_E_WRONG_BOOTMGR 0x80310006	The boot manager of this operating system is not compatible with BitLocker Drive Encryption. Use the Bootrec.exe tool in the Windows Recovery Environment to update or repair the boot manager (BOOTMGR).
FVE_E_SECURE_KEY_REQUIRED 0x80310007	At least one secure key protector is required for this operation to be performed.
FVE_E_NOT_ACTIVATED 0x80310008	BitLocker Drive Encryption is not enabled on this drive. Turn on BitLocker.
FVE_E_ACTION_NOT_ALLOWED 0x80310009	BitLocker Drive Encryption cannot perform requested action. This condition may occur when two requests are issued at the same time. Wait a few moments and then try the action again.
FVE_E_AD_SCHEMA_NOT_INSTALLED 0x8031000A	The Active Directory Domain Services forest does not contain the required attributes and classes to host BitLocker Drive Encryption or TPM information. Contact your domain administrator to verify that any required BitLocker Active Directory schema extensions have been installed.
FVE_E_AD_INVALID_DATATYPE 0x8031000B	The type of the data obtained from Active Directory was not expected. The BitLocker recovery information may be missing or corrupted.
FVE_E_AD_INVALID_DATASIZE 0x8031000C	The size of the data obtained from Active Directory was not expected. The BitLocker recovery information may be missing or corrupted.

Constant/Value	Description
FVE_E_AD_NO_VALUES 0x8031000D	The attribute read from Active Directory does not contain any values. The BitLocker recovery information may be missing or corrupted.
FVE_E_AD_ATTR_NOT_SET 0x8031000E	The attribute was not set. Verify that you are logged on with a domain account that has the ability to write information to Active Directory objects.
FVE_E_AD_GUID_NOT_FOUND 0x8031000F	The specified attribute cannot be found in Active Directory Domain Services. Contact your domain administrator to verify that any required BitLocker Active Directory schema extensions have been installed.
FVE_E_BAD_INFORMATION 0x80310010	The BitLocker metadata for the encrypted drive is not valid. You can attempt to repair the drive to restore access.
FVE_E_TOO_SMALL 0x80310011	The drive cannot be encrypted because it does not have enough free space. Delete any unnecessary data on the drive to create additional free space and then try again.
FVE_E_SYSTEM_VOLUME 0x80310012	The drive cannot be encrypted because it contains system boot information. Create a separate partition for use as the system drive that contains the boot information and a second partition for use as the operating system drive and then encrypt the operating system drive.
FVE_E_FAILED_WRONG_FS 0x80310013	The drive cannot be encrypted because the file system is not supported.
FVE_E_BAD_PARTITION_SIZE 0x80310014	The file system size is larger than the partition size in the partition table. This drive may be corrupt or may have been tampered with. To use it with BitLocker, you must reformat the partition.
FVE_E_NOT_SUPPORTED 0x80310015	This drive cannot be encrypted.
FVE_E_BAD_DATA 0x80310016	The data is not valid.
FVE_E_VOLUME_NOT_BOUND 0x80310017	The data drive specified is not set to automatically unlock on the current computer and cannot be unlocked automatically.
FVE_E_TPM_NOT_OWNED 0x80310018	You must initialize the TPM before you can use BitLocker Drive Encryption.
FVE_E_NOT_DATA_VOLUME 0x80310019	The operation attempted cannot be performed on an operating system drive.
FVE_E_AD_INSUFFICIENT_BUFFER 0x8031001A	The buffer supplied to a function was insufficient to contain the returned data. Increase the buffer size before running the function again.
FVE_E_CONV_READ 0x8031001B	A read operation failed while converting the drive. The drive was not converted. Please re-enable BitLocker.

Constant/Value	Description
FVE_E_CONV_WRITE 0x8031001C	A write operation failed while converting the drive. The drive was not converted. Please re-enable BitLocker.
FVE_E_KEY_REQUIRED 0x8031001D	One or more BitLocker key protectors are required. You cannot delete the last key on this drive.
FVE_E_CLUSTERING_NOT_SUPPORTED 0x8031001E	Cluster configurations are not supported by BitLocker Drive Encryption.
FVE_E_VOLUME_BOUND_ALREADY 0x8031001F	The drive specified is already configured to be automatically unlocked on the current computer.
FVE_E_OS_NOT_PROTECTED 0x80310020	The operating system drive is not protected by BitLocker Drive Encryption.
FVE_E_PROTECTION_DISABLED 0x80310021	BitLocker Drive Encryption has been suspended on this drive. All BitLocker key protectors configured for this drive are effectively disabled, and the drive will be automatically unlocked using an unencrypted (clear) key.
FVE_E_RECOVERY_KEY_REQUIRED 0x80310022	The drive you are attempting to lock does not have any key protectors available for encryption because BitLocker protection is currently suspended. Re-enable BitLocker to lock this drive.
FVE_E_FOREIGN_VOLUME 0x80310023	BitLocker cannot use the TPM to protect a data drive. TPM protection can only be used with the operating system drive.
FVE_E_OVERLAPPED_UPDATE 0x80310024	The BitLocker metadata for the encrypted drive cannot be updated because it was locked for updating by another process. Please try this process again.
FVE_E_TPM_SRK_AUTH_NOT_ZERO 0x80310025	The authorization data for the storage root key (SRK) of the TPM is not zero and is therefore incompatible with BitLocker. Please initialize the TPM before attempting to use it with BitLocker.
FVE_E_FAILED_SECTOR_SIZE 0x80310026	The drive encryption algorithm cannot be used on this sector size.
FVE_E_FAILED_AUTHENTICATION 0x80310027	The drive cannot be unlocked with the key provided. Confirm that you have provided the correct key and try again.
FVE_E_NOT_OS_VOLUME 0x80310028	The drive specified is not the operating system drive.
FVE_E_AUTOUNLOCK_ENABLED 0x80310029	BitLocker Drive Encryption cannot be turned off on the operating system drive until the auto unlock feature has been disabled for the fixed data drives and removable data drives associated with this computer.
FVE_E_WRONG_BOOTSECTOR 0x8031002A	The system partition boot sector does not perform TPM measurements. Use the Bootrec.exe tool in the Windows Recovery Environment to update or repair the boot sector.

Constant/Value	Description
FVE_E_WRONG_SYSTEM_FS 0x8031002B	BitLocker Drive Encryption operating system drives must be formatted with the NTFS file system in order to be encrypted. Convert the drive to NTFS, and then turn on BitLocker.
FVE_E_POLICY_PASSWORD_REQUIRED 0x8031002C	Group Policy settings require that a recovery password be specified before encrypting the drive.
FVE_E_CANNOT_SET_FVEK_ENCRYPTED 0x8031002D	The drive encryption algorithm and key cannot be set on a previously encrypted drive. To encrypt this drive with BitLocker Drive Encryption, remove the previous encryption and then turn on BitLocker.
FVE_E_CANNOT_ENCRYPT_NO_KEY 0x8031002E	BitLocker Drive Encryption cannot encrypt the specified drive because an encryption key is not available. Add a key protector to encrypt this drive.
FVE_E_BOOTABLE_CDDVD 0x80310030	BitLocker Drive Encryption detected bootable media (CD or DVD) in the computer. Remove the media and restart the computer before configuring BitLocker.
FVE_E_PROTECTOR_EXISTS 0x80310031	This key protector cannot be added. Only one key protector of this type is allowed for this drive.
FVE_E_RELATIVE_PATH 0x80310032	The recovery password file was not found because a relative path was specified. Recovery passwords must be saved to a fully qualified path. Environment variables configured on the computer can be used in the path.
FVE_E_PROTECTOR_NOT_FOUND 0x80310033	The specified key protector was not found on the drive. Try another key protector.
FVE_E_INVALID_KEY_FORMAT 0x80310034	The recovery key provided is corrupt and cannot be used to access the drive. An alternative recovery method, such as recovery password, a data recovery agent, or a backup version of the recovery key must be used to recover access to the drive.
FVE_E_INVALID_PASSWORD_FORMAT 0x80310035	The format of the recovery password provided is invalid. BitLocker recovery passwords are 48 digits. Verify that the recovery password is in the correct format and then try again.
FVE_E_FIPS_RNG_CHECK_FAILED 0x80310036	The random number generator check test failed.
FVE_E_FIPS_PREVENTS_RECOVERY_PASSWORD 0x80310037	The Group Policy setting requiring FIPS compliance prevents a local recovery password from being generated or used by BitLocker Drive Encryption. When operating in FIPS-compliant mode, BitLocker recovery options can be either a recovery key stored on a USB drive or recovery through a data recovery agent.
FVE_E_FIPS_PREVENTS_EXTERNAL_KEY_EXPORT 0x80310038	The Group Policy setting requiring FIPS compliance prevents the recovery password from being saved to Active Directory. When operating in FIPS-compliant mode, BitLocker recovery options can be either a recovery key

Constant/Value	Description
	stored on a USB drive or recovery through a data recovery agent. Check your Group Policy settings configuration.
FVE_E_NOT_DECRYPTED 0x80310039	The drive must be fully decrypted to complete this operation.
FVE_E_INVALID_PROTECTOR_TYPE 0x8031003A	The key protector specified cannot be used for this operation.
FVE_E_NO_PROTECTORS_TO_TEST 0x8031003B	No key protectors exist on the drive to perform the hardware test.
FVE_E_KEYFILE_NOT_FOUND 0x8031003C	The BitLocker startup key or recovery password cannot be found on the USB device. Verify that you have the correct USB device, that the USB device is plugged into the computer on an active USB port, restart the computer, and then try again. If the problem persists, contact the computer manufacturer for BIOS upgrade instructions.
FVE_E_KEYFILE_INVALID 0x8031003D	The BitLocker startup key or recovery password file provided is corrupt or invalid. Verify that you have the correct startup key or recovery password file and try again.
FVE_E_KEYFILE_NO_VMK 0x8031003E	The BitLocker encryption key cannot be obtained from the startup key or recovery password. Verify that you have the correct startup key or recovery password and try again.
FVE_E_TPM_DISABLED 0x8031003F	The TPM is disabled. The TPM must be enabled, initialized, and have valid ownership before it can be used with BitLocker Drive Encryption.
FVE_E_NOT_ALLOWED_IN_SAFE_MODE 0x80310040	The BitLocker configuration of the specified drive cannot be managed because this computer is currently operating in Safe Mode. While in Safe Mode, BitLocker Drive Encryption can only be used for recovery purposes.
FVE_E_TPM_INVALID_PCR 0x80310041	The TPM was not able to unlock the drive because the system boot information has changed or a PIN was not provided correctly. Verify that the drive has not been tampered with and that changes to the system boot information were caused by a trusted source. After verifying that the drive is safe to access, use the BitLocker recovery console to unlock the drive and then suspend and resume BitLocker to update system boot information that BitLocker associates with this drive.
FVE_E_TPM_NO_VMK 0x80310042	The BitLocker encryption key cannot be obtained from the TPM.
FVE_E_PIN_INVALID 0x80310043	The BitLocker encryption key cannot be obtained from the TPM and PIN.
FVE_E_AUTH_INVALID_APPLICATION 0x80310044	A boot application has changed since BitLocker Drive Encryption was enabled.
FVE_E_AUTH_INVALID_CONFIG 0x80310045	The Boot Configuration Data (BCD) settings have changed since BitLocker Drive Encryption was enabled.

Constant/Value	Description
FVE_E_FIPS_DISABLE_PROTECTION_NOT_ALLOWED 0x80310046	The Group Policy setting requiring FIPS compliance prohibits the use of unencrypted keys, which prevents BitLocker from being suspended on this drive. Please contact your domain administrator for more information.
FVE_E_FS_NOT_EXTENDED 0x80310047	This drive cannot be encrypted by BitLocker Drive Encryption because the file system does not extend to the end of the drive. Repartition this drive and then try again.
FVE_E_FIRMWARE_TYPE_NOT_SUPPORTED 0x80310048	BitLocker Drive Encryption cannot be enabled on the operating system drive. Contact the computer manufacturer for BIOS upgrade instructions.
FVE_E_NO_LICENSE 0x80310049	This version of Windows does not include BitLocker Drive Encryption. To use BitLocker Drive Encryption, please upgrade the operating system.
FVE_E_NOT_ON_STACK 0x8031004A	BitLocker Drive Encryption cannot be used because critical BitLocker system files are missing or corrupted. Use Windows Startup Repair to restore these files to your computer.
FVE_E_FS_MOUNTED 0x8031004B	The drive cannot be locked when the drive is in use.
FVE_E_TOKEN_NOT_IMPERSONATED 0x8031004C	The access token associated with the current thread is not an impersonated token.
FVE_E_DRY_RUN_FAILED 0x8031004D	The BitLocker encryption key cannot be obtained. Verify that the TPM is enabled and ownership has been taken. If this computer does not have a TPM, verify that the USB drive is inserted and available.
FVE_E_REBOOT_REQUIRED 0x8031004E	You must restart your computer before continuing with BitLocker Drive Encryption.
FVE_E_DEBUGGER_ENABLED 0x8031004F	Drive encryption cannot occur while boot debugging is enabled. Use the bcdedit command-line tool to turn off boot debugging.
FVE_E_RAW_ACCESS 0x80310050	No action was taken as BitLocker Drive Encryption is in raw access mode.
FVE_E_RAW_BLOCKED 0x80310051	BitLocker Drive Encryption cannot enter raw access mode for this drive because the drive is currently in use.
FVE_E_BCD_APPLICATIONS_PATH_INCORRECT 0x80310052	The path specified in the Boot Configuration Data (BCD) for a BitLocker Drive Encryption integrity-protected application is incorrect. Please verify and correct your BCD settings and try again.
FVE_E_NOT_ALLOWED_IN_VERSION 0x80310053	BitLocker Drive Encryption can only be used for limited provisioning or recovery purposes when the computer is running in pre-installation or recovery environments.
FVE_E_NO_AUTOUNLOCK_MASTER_KEY 0x80310054	The auto-unlock master key was not available from the operating system drive.

Constant/Value	Description
FVE_E_MOR_FAILED 0x80310055	The system firmware failed to enable clearing of system memory when the computer was restarted.
FVE_E_HIDDEN_VOLUME 0x80310056	The hidden drive cannot be encrypted.
FVE_E_TRANSIENT_STATE 0x80310057	BitLocker encryption keys were ignored because the drive was in a transient state.
FVE_E_PUBKEY_NOT_ALLOWED 0x80310058	Public key based protectors are not allowed on this drive.
FVE_E_VOLUME_HANDLE_OPEN 0x80310059	BitLocker Drive Encryption is already performing an operation on this drive. Please complete all operations before continuing.
FVE_E_NO_FEATURE_LICENSE 0x8031005A	This version of Windows does not support this feature of BitLocker Drive Encryption. To use this feature, upgrade the operating system.
FVE_E_INVALID_STARTUP_OPTIONS 0x8031005B	The Group Policy settings for BitLocker startup options are in conflict and cannot be applied. Contact your system administrator for more information.
FVE_E_POLICY_RECOVERY_PASSWORD_NOT_ALLOWED 0x8031005C	Group policy settings do not permit the creation of a recovery password.
FVE_E_POLICY_RECOVERY_PASSWORD_REQUIRED 0x8031005D	Group policy settings require the creation of a recovery password.
FVE_E_POLICY_RECOVERY_KEY_NOT_ALLOWED 0x8031005E	Group policy settings do not permit the creation of a recovery key.
FVE_E_POLICY_RECOVERY_KEY_REQUIRED 0x8031005F	Group policy settings require the creation of a recovery key.
FVE_E_POLICY_STARTUP_PIN_NOT_ALLOWED 0x80310060	Group policy settings do not permit the use of a PIN at startup. Please choose a different BitLocker startup option.
FVE_E_POLICY_STARTUP_PIN_REQUIRED 0x80310061	Group policy settings require the use of a PIN at startup. Please choose this BitLocker startup option.
FVE_E_POLICY_STARTUP_KEY_NOT_ALLOWED 0x80310062	Group policy settings do not permit the use of a startup key. Please choose a different BitLocker startup option.
FVE_E_POLICY_STARTUP_KEY_REQUIRED 0x80310063	Group policy settings require the use of a startup key. Please choose this BitLocker startup option.
FVE_E_POLICY_STARTUP_PIN_KEY_NOT_ALLOWED0x80310064	Group policy settings do not permit the use of a startup key and PIN. Please choose a different BitLocker startup option.
FVE_E_POLICY_STARTUP_PIN_KEY_REQUIRED 0x80310065	Group policy settings require the use of a startup key and PIN. Please choose this BitLocker startup option.

Constant/Value	Description
FVE_E_POLICY_STARTUP_TPM_NOT_ALLOWED 0x80310066	Group policy does not permit the use of TPM-only at startup. Please choose a different BitLocker startup option.
FVE_E_POLICY_STARTUP_TPM_REQUIRED 0x80310067	Group policy settings require the use of TPM-only at startup. Please choose this BitLocker startup option.
FVE_E_POLICY_INVALID_PIN_LENGTH 0x80310068	The PIN provided does not meet minimum or maximum length requirements.
FVE_E_KEY_PROTECTOR_NOT_SUPPORTED 0x80310069	The key protector is not supported by the version of BitLocker Drive Encryption currently on the drive. Upgrade the drive to add the key protector.
FVE_E_POLICY_PASSPHRASE_NOT_ALLOWED 0x8031006A	Group policy settings do not permit the creation of a password.
FVE_E_POLICY_PASSPHRASE_REQUIRED 0x8031006B	Group policy settings require the creation of a password.
FVE_E_FIPS_PREVENTS_PASSPHRASE 0x8031006C	The group policy setting requiring FIPS compliance prevented the password from being generated or used. Please contact your domain administrator for more information.
FVE_E_OS_VOLUME_PASSPHRASE_NOT_ALLOWED 0x8031006D	A password cannot be added to the operating system drive.
FVE_E_INVALID_BITLOCKER_OID 0x8031006E	The BitLocker object identifier (OID) on the drive appears to be invalid or corrupt. Use manage-BDE to reset the OID on this drive.
FVE_E_VOLUME_TOO_SMALL 0x8031006F	The drive is too small to be protected using BitLocker Drive Encryption.
FVE_E_DV_NOT_SUPPORTED_ON_FS 0x80310070	The selected discovery drive type is incompatible with the file system on the drive. BitLocker To Go discovery drives must be created on FAT formatted drives.
FVE_E_DV_NOT_ALLOWED_BY_GP 0x80310071	The selected discovery drive type is not allowed by the computer's Group Policy settings. Verify that Group Policy settings allow the creation of discovery drives for use with BitLocker To Go.
FVE_E_POLICY_USER_CERTIFICATE_NOT_ALLOWED 0x80310072	Group Policy settings do not permit user certificates such as smart cards to be used with BitLocker Drive Encryption.
FVE_E_POLICY_USER_CERTIFICATE_REQUIRED 0x80310073	Group Policy settings require that you have a valid user certificate, such as a smart card, to be used with BitLocker Drive Encryption.
FVE_E_POLICY_USER_CERT_MUST_BE_HW 0x80310074	Group Policy settings requires that you use a smart card-based key protector with BitLocker Drive Encryption.
FVE_E_POLICY_USER_CONFIGURE_FDV_AUTOUNLOCK_NOT_ALLOWED	Group Policy settings do not permit BitLocker-protected fixed data drives to be automatically unlocked.

Constant/Value	Description
0x80310075	
FVE_E_POLICY_USER_CONFIGURE_RDV_AUTOUNLOCK_NOT_ALLOWED 0x80310076	Group Policy settings do not permit BitLocker-protected removable data drives to be automatically unlocked.
FVE_E_POLICY_USER_CONFIGURE_RDV_NOT_ALLOWED 0x80310077	Group Policy settings do not permit you to configure BitLocker Drive Encryption on removable data drives.
FVE_E_POLICY_USER_ENABLE_RDV_NOT_ALLOWED 0x80310078	Group Policy settings do not permit you to turn on BitLocker Drive Encryption on removable data drives. Please contact your system administrator if you need to turn on BitLocker.
FVE_E_POLICY_USER_DISABLE_RDV_NOT_ALLOWED 0x80310079	Group Policy settings do not permit turning off BitLocker Drive Encryption on removable data drives. Please contact your system administrator if you need to turn off BitLocker.
FVE_E_POLICY_INVALID_PASSPHRASE_LENGTH 0x80310080	Your password does not meet minimum password length requirements. By default, passwords must be at least 8 characters in length. Check with your system administrator for the password length requirement in your organization.
FVE_E_POLICY_PASSPHRASE_TOO_SIMPLE 0x80310081	Your password does not meet the complexity requirements set by your system administrator. Try adding upper and lowercase characters, numbers, and symbols.
FVE_E_RECOVERY_PARTITION 0x80310082	This drive cannot be encrypted because it is reserved for Windows System Recovery Options.
FVE_E_POLICY_CONFLICT_FDV_RK_OFF_AUK_ON 0x80310083	BitLocker Drive Encryption cannot be applied to this drive because of conflicting Group Policy settings. BitLocker cannot be configured to automatically unlock fixed data drives when user recovery options are disabled. If you want BitLocker-protected fixed data drives to be automatically unlocked after key validation has occurred, please ask your system administrator to resolve the settings conflict before enabling BitLocker.
FVE_E_POLICY_CONFLICT_RDV_RK_OFF_AUK_ON 0x80310084	BitLocker Drive Encryption cannot be applied to this drive because of conflicting Group Policy settings. BitLocker cannot be configured to automatically unlock removable data drives when user recovery option are disabled. If you want BitLocker-protected removable data drives to be automatically unlocked after key validation has occurred, please ask your system administrator to resolve the settings conflict before enabling BitLocker.
FVE_E_NON_BITLOCKER_OID 0x80310085	The Enhanced Key Usage (EKU) attribute of the specified certificate does not permit it to be used for BitLocker Drive Encryption. BitLocker does not require that a certificate have an EKU attribute, but if one is configured it must be set to an object identifier (OID) that matches the OID configured for BitLocker.
FVE_E_POLICY_PROHIBITS_SELFSIGNED 0x80310086	BitLocker Drive Encryption cannot be applied to this drive as currently configured because of Group Policy settings. The certificate you provided for drive encryption is self-signed. Current Group Policy settings do not permit the use

Constant/Value	Description
	of self-signed certificates. Obtain a new certificate from your certification authority before attempting to enable BitLocker.
FVE_E_POLICY_CONFLICT_RO_AND_STARTUP_KEY_REQUIRED 0x80310087	BitLocker Encryption cannot be applied to this drive because of conflicting Group Policy settings. When write access to drives not protected by BitLocker is denied, the use of a USB startup key cannot be required. Please have your system administrator resolve these policy conflicts before attempting to enable BitLocker.
FVE_E_CONV_RECOVERY_FAILED 0x80310088	BitLocker Drive Encryption cannot be applied to this drive because there are conflicting Group Policy settings for recovery options on operating system drives. Storing recovery information to Active Directory Domain Services cannot be required when the generation of recovery passwords is not permitted. Please have your system administrator resolve these policy conflicts before attempting to enable BitLocker.
FVE_E_VIRTUALIZED_SPACE_TOO_BIG 0x80310089	The requested virtualization size is too big.
FVE_E_POLICY_CONFLICT_OSV_RP_OFF_ADB_ON 0x80310090	BitLocker Drive Encryption cannot be applied to this drive because there are conflicting Group Policy settings for recovery options on operating system drives. Storing recovery information to Active Directory Domain Services cannot be required when the generation of recovery passwords is not permitted. Please have your system administrator resolve these policy conflicts before attempting to enable BitLocker.
FVE_E_POLICY_CONFLICT_FDV_RP_OFF_ADB_ON 0x80310091	BitLocker Drive Encryption cannot be applied to this drive because there are conflicting Group Policy settings for recovery options on fixed data drives. Storing recovery information to Active Directory Domain Services cannot be required when the generation of recovery passwords is not permitted. Please have your system administrator resolve these policy conflicts before attempting to enable BitLocker.
FVE_E_POLICY_CONFLICT_RDV_RP_OFF_ADB_ON 0x80310092	BitLocker Drive Encryption cannot be applied to this drive because there are conflicting Group Policy settings for recovery options on removable data drives. Storing recovery information to Active Directory Domain Services cannot be required when the generation of recovery passwords is not permitted. Please have your system administrator resolve these policy conflicts before attempting to enable BitLocker.
FVE_E_NON_BITLOCKER_KU 0x80310093	The Key Usage (KU) attribute of the specified certificate does not permit it to be used for BitLocker Drive Encryption. BitLocker does not require that a certificate have a KU attribute, but if one is configured it must be set to either Key Encipherment or Key Agreement.
FVE_E_PRIVATEKEY_AUTH_FAILED 0x80310094	The private key associated with the specified certificate cannot be authorized. The private key authorization was either not provided or the provided authorization was invalid.

Constant/Value	Description
FVE_E_REMOVAL_OF_DRA_FAILED 0x80310095	Removal of the data recovery agent certificate must be done using the Certificates snap-in.
FVE_E_OPERATION_NOT_SUPPORTED_ON_VISTA_VOLUME 0x80310096	This drive was encrypted using the version of BitLocker Drive Encryption included with Windows Vista and Windows Server 2008 which does not support organizational identifiers. To specify organizational identifiers for this drive upgrade the drive encryption to the latest version using the "manage-bde -upgrade" command.
FVE_E_CANT_LOCK_AUTOUNLOCK_ENABLED_VOLUME 0x80310097	The drive cannot be locked because it is automatically unlocked on this computer. Remove the automatic unlock protector to lock this drive.
FVE_E_FIPS_HASH_KDF_NOT_ALLOWED 0x80310098	The default BitLocker Key Derivation Function SP800-56A for ECC smart cards is not supported by your smart card. The Group Policy setting requiring FIPS-compliance prevents BitLocker from using any other key derivation function for encryption. You have to use a FIPS compliant smart card in FIPS restricted environments.
FVE_E_ENH_PIN_INVALID 0x80310099	The BitLocker encryption key could not be obtained from the TPM and enhanced PIN. Try using a PIN containing only numerals.
FVE_E_INVALID_PIN_CHARS 0x8031009A	The requested TPM PIN contains invalid characters.
FVE_E_INVALID_DATUM_TYPE 0x8031009B	The management information stored on the drive contained an unknown type. If you are using an old version of Windows, try accessing the drive from the latest version.
FVE_E_EFI_ONLY 0x8031009C	The feature is only supported on EFI systems.
FVE_E_MULTIPLE_NKP_CERTS 0x8031009D	More than one Network Key Protector certificate has been found on the system.
FVE_E_REMOVAL_OF_NKP_FAILED 0x8031009E	Removal of the Network Key Protector certificate must be done using the Certificates snap-in.
FVE_E_INVALID_NKP_CERT 0x8031009F	An invalid certificate has been found in the Network Key Protector certificate store.
FVE_E_NO_EXISTING_PIN 0x803100A0	This drive is not protected with a PIN.
FVE_E_PROTECTOR_CHANGE_PIN_MISMATCH 0x803100A1	Please enter the correct current PIN.
FVE_E_PROTECTOR_CHANGE_BY_STD_USER_DISALLOWED 0x803100A2	You must be logged on with an administrator account to change the PIN or password. Click the link to reset the PIN or password as an administrator.

Constant/Value	Description
FVE_E_PROTECTOR_CHANGE_MAX_PIN_CHANGE_ATTEMPTS_REACHED 0x803100A3	BitLocker has disabled PIN and password changes after too many failed requests. Click the link to reset the PIN or password as an administrator.
FVE_E_POLICY_PASSPHRASE_REQUIRES_ASCII 0x803100A4	Your system administrator requires that passwords contain only printable ASCII characters. This includes unaccented letters (A-Z, a-z), numbers (0-9), space, arithmetic signs, common punctuation, separators, and the following symbols: # $ & @ ^ _ ~ .
FVE_E_FULL_ENCRYPTION_NOT_ALLOWED_ON_TP_STORAGE 0x803100A5	BitLocker Drive Encryption only supports used space only encryption on thin provisioned storage.
FVE_E_WIPE_NOT_ALLOWED_ON_TP_STORAGE 0x803100A6	BitLocker Drive Encryption does not support wiping free space on thin provisioned storage.
FVE_E_KEY_LENGTH_NOT_SUPPORTED_BY_EDRIVE 0x803100A7	The required authentication key length is not supported by the drive.
FVE_E_NO_EXISTING_PASSPHRASE 0x803100A8	This drive is not protected with a password.
FVE_E_PROTECTOR_CHANGE_PASSPHRASE_MISMATCH 0x803100A9	Please enter the correct current password.
FVE_E_PASSPHRASE_TOO_LONG 0x803100AA	The password cannot exceed 256 characters.
FVE_E_NO_PASSPHRASE_WITH_TPM 0x803100AB	A password key protector cannot be added because a TPM protector exists on the drive.
FVE_E_NO_TPM_WITH_PASSPHRASE 0x803100AC	A TPM key protector cannot be added because a password protector exists on the drive.
FVE_E_NOT_ALLOWED_ON_CSV_STACK 0x803100AD	This command can only be performed from the coordinator node for the specified CSV volume.
FVE_E_NOT_ALLOWED_ON_CLUSTER 0x803100AE	This command cannot be performed on a volume when it is part of a cluster.
FVE_E_EDRIVE_NO_FAILOVER_TO_SW 0x803100AF	BitLocker did not revert to using BitLocker software encryption due to group policy configuration.
FVE_E_EDRIVE_BAND_IN_USE 0x803100B0	The drive cannot be managed by BitLocker because the drive's hardware encryption feature is already in use.
FVE_E_EDRIVE_DISALLOWED_BY_GP 0x803100B1	Group Policy settings do not allow the use of hardware-based encryption.
FVE_E_EDRIVE_INCOMPATIBLE_VOLUME 0x803100B2	The drive specified does not support hardware-based encryption.

Constant/Value	Description
FVE_E_NOT_ALLOWED_TO_UPGRADE_WHILE_CONVERTING 0x803100B3	BitLocker cannot be upgraded during disk encryption or decryption.
FVE_E_EDRIVE_DV_NOT_SUPPORTED 0x803100B4	Discovery Volumes are not supported for volumes using hardware encryption.
FVE_E_NO_PREBOOT_KEYBOARD_DETECTED 0x803100B5	No pre-boot keyboard detected. The user may not be able to provide required input to unlock the volume.
FVE_E_NO_PREBOOT_KEYBOARD_OR_WINRE_DETECTED 0x803100B6	No pre-boot keyboard or Windows Recovery Environment detected. The user may not be able to provide required input to unlock the volume.
FVE_E_POLICY_REQUIRES_STARTUP_PIN_ON_TOUCH_DEVICE 0x803100B7	Group Policy settings require the creation of a startup PIN, but a pre-boot keyboard is not available on this device. The user may not be able to provide required input to unlock the volume.
FVE_E_POLICY_REQUIRES_RECOVERY_PASSWORD_ON_TOUCH_DEVICE 0x803100B8	Group Policy settings require the creation of a recovery password, but neither a pre-boot keyboard nor Windows Recovery Environment is available on this device. The user may not be able to provide required input to unlock the volume.
FVE_E_WIPE_CANCEL_NOT_APPLICABLE 0x803100B9	Wipe of free space is not currently taking place.
FVE_E_SECUREBOOT_DISABLED 0x803100BA	BitLocker cannot use Secure Boot for platform integrity because Secure Boot has been disabled.
FVE_E_SECUREBOOT_CONFIGURATION_INVALID 0x803100BB	BitLocker cannot use Secure Boot for platform integrity because the Secure Boot configuration does not meet the requirements for BitLocker.
FVE_E_EDRIVE_DRY_RUN_FAILED 0x803100BC	Your computer does not support BitLocker hardware-based encryption. Check with your computer manufacturer for firmware updates.
FVE_E_SHADOW_COPY_PRESENT 0x803100BD	BitLocker cannot be enabled on the volume because it contains a Volume Shadow Copy. Remove all Volume Shadow Copies before encrypting the volume.
FVE_E_POLICY_INVALID_ENHANCED_BCD_SETTINGS 0x803100BE	BitLocker Drive Encryption cannot be applied to this drive because the Group Policy setting for Enhanced Boot Configuration Data contains invalid data. Please have your system administrator resolve this invalid configuration before attempting to enable BitLocker.
FVE_E_EDRIVE_INCOMPATIBLE_FIRMWARE 0x803100BF	This PC's firmware is not capable of supporting hardware encryption.
FVE_E_PROTECTOR_CHANGE_MAX_PASSPHRASE_CHANGE_ATTEMPTS_REACHED 0x803100C0	BitLocker has disabled password changes after too many failed requests. Click the link to reset the password as an administrator.

Constant/Value	Description
FVE_E_PASSPHRASE_PROTECTOR_CHANGE_BY_STD_USER_DISALLOWED 0x803100C1	You must be logged on with an administrator account to change the password. Click the link to reset the password as an administrator.
FVE_E_LIVEID_ACCOUNT_SUSPENDED 0x803100C2	BitLocker cannot save the recovery password because the specified Microsoft account is Suspended.
FVE_E_LIVEID_ACCOUNT_BLOCKED 0x803100C3	BitLocker cannot save the recovery password because the specified Microsoft account is Blocked.
FVE_E_NOT_PROVISIONED_ON_ALL_VOLUMES 0x803100C4	This PC is not provisioned to support device encryption. Please enable BitLocker on all volumes to comply with device encryption policy.
FVE_E_DE_FIXED_DATA_NOT_SUPPORTED 0x803100C5	This PC cannot support device encryption because unencrypted fixed data volumes are present.
FVE_E_DE_HARDWARE_NOT_COMPLIANT 0x803100C6	This PC does not meet the hardware requirements to support device encryption.
FVE_E_DE_WINRE_NOT_CONFIGURED 0x803100C7	This PC cannot support device encryption because WinRE is not properly configured.
FVE_E_DE_PROTECTION_SUSPENDED 0x803100C8	Protection is enabled on the volume but has been suspended. This is likely to have happened due to an update being applied to your system. Please try again after a reboot.
FVE_E_DE_OS_VOLUME_NOT_PROTECTED 0x803100C9	This PC is not provisioned to support device encryption.
FVE_E_DE_DEVICE_LOCKEDOUT 0x803100CA	Device Lock has been triggered due to too many incorrect password attempts.
FVE_E_DE_PROTECTION_NOT_YET_ENABLED 0x803100CB	Protection has not been enabled on the volume. Enabling protection requires a connected account. If you already have a connected account and are seeing this error, please refer to the event log for more information.
FVE_E_INVALID_PIN_CHARS_DETAILED 0x803100CC	Your PIN can only contain numbers from 0 to 9.
FVE_E_DEVICE_LOCKOUT_COUNTER_UNAVAILABLE 0x803100CD	BitLocker cannot use hardware replay protection because no counter is available on your PC.
FVE_E_DEVICELOCKOUT_COUNTER_MISMATCH 0x803100CE	Device Lockout state validation failed due to counter mismatch.
FVE_E_BUFFER_TOO_LARGE 0x803100CF	The input buffer is too large.

19

Glossary

Activate - Activation occurs when the computer has been registered with the Dell Server and has received at least an initial set of policies.

Active Directory (AD) - A directory service created by Microsoft for Windows domain networks.

Application Data Encryption - Application Data Encryption encrypts any file written by a protected application, using a category 2 override. This means that any directory that has a category 2 protection or better, or any location that has specific extensions protected with category 2 or better, cause ADE to not encrypt those files.

BitLocker Manager - Windows BitLocker is designed to help protect Windows computers by encrypting both data and operating system files. To improve the security of BitLocker deployments and to simplify and reduce the cost of ownership, Dell provides a single, central management console that addresses many security concerns and offers an integrated approach to managing encryption across other non-BitLocker platforms, whether physical, virtual, or cloud-based. BitLocker Manager supports BitLocker encryption for operating systems, fixed drives, and BitLocker To Go. BitLocker Manager enables you to seamlessly integrate BitLocker into your existing encryption needs and to manage BitLocker with the minimum effort while streamlining security and compliance. BitLocker Manager provides integrated management for key recovery, policy management and enforcement, automated TPM management, FIPS compliance, and compliance reporting.

Cached Credentials - Cached credentials are credentials that are added to the PBA database when a user successfully authenticates with Active Directory. This information about the user is retained so that a user can log in when they do not have a connection to Active Directory (for example, when taking their laptop home).

Common Encryption – The Common key makes encrypted files accessible to all managed users on the device where they were created.

Deactivate - Deactivation occurs when SED Manager is turned OFF in the Management Console. Once the computer is deactivated, the PBA database is deleted and there is no longer any record of cached users.

Encryption External Media - This service within Encryption protects removable media and external storage devices.

Encryption External Media Access Code - This service allows for recovery of Encryption External Media protected devices where the user forgets their password and can no longer login. Completing this process allows the user to reset the password set on the media.

Encryption - On-device component that enforces security policies, whether an endpoint is connected to the network, disconnected from the network, lost, or stolen. Creating a trusted computing environment for endpoints, Encryption operates as a layer on top of the device operating system, and provides consistently-enforced authentication, encryption, and authorization to maximize the protection of sensitive information.

Endpoint - Depending on context, a computer, mobile device, or external media..

Encryption Keys - In most cases, the Encryption client uses the User key plus two additional encryption keys. However, there are exceptions: All SDE policies and the Secure Windows Credentials policy use the SDE key. The Encrypt Windows Paging File policy and Secure Windows Hibernation File policy use their own key, the General Purpose Key (GPK). The Common key makes files accessible to all managed users on the device where they were created. The User key makes files accessible only to the user who created them, only on the device where they were created. The User Roaming key makes files accessible only to the user who created them, on any Shielded Windows (or Mac) device.

Encryption sweep - The process of scanning folders to be encrypted to ensure the contained files are in the proper encryption state. Ordinary file creation and rename operations do not trigger an encryption sweep. It is important to understand when an encryption sweep may happen and what may affect the resulting sweep times, as follows: - An encryption sweep occurs upon initial receipt of a policy that has encryption enabled. This can occur immediately after activation if your policy has encryption enabled. - If the *Scan Workstation on Logon* policy is enabled, folders specified for encryption are swept on each user logon. - A sweep can be re-triggered under certain subsequent policy changes. Any policy change related to the definition of the encryption folders, encryption algorithms, encryption key usage (common verses user), triggers a sweep. In addition, toggling between encryption enabled and disabled triggers an encryption sweep.

Machine key – When encryption is installed on a server, the Machine key protects a server's file encryption and policy keys. The Machine Key is stored on the Dell Server. The new server exchanges certificates with the Dell Server during activation and uses the certificate for subsequent authentication events.

Pre-boot Authentication (PBA) - Pre-boot Authentication serves as an extension of the BIOS or boot firmware and guarantees a secure, tamper-proof environment external to the operating system as a trusted authentication layer. The PBA prevents

anything being read from the hard disk, such as the operating system, until the user has confirmed they have the correct credentials.

SED Manager - SED Manager provides a platform for securely managing self-encrypting drives. Although SEDs provide their own encryption, they lack a platform to manage their encryption and available policies. SED Manager is a central, scalable management component, which allows you to more effectively protect and manage your data. SED Manager ensures that you can administer your enterprise more quickly and easily.

Server user – A virtual user account created by Encryption for the purpose of handling encryption keys and policy updates on a server operating system. This user account does not correspond to any other user account on the computer or within the domain, and it has no user name and password that can be used physically. The account is assigned a unique UCID value in the Management Console.

System Data Encryption (SDE) - SDE is designed to encrypt the operating system and program files. To accomplish this purpose, SDE must be able to open its key while the operating system is booting. Its intent is to prevent alteration or offline attacks on the operating system by an attacker. SDE is not intended for user data. Common and User key encryption are intended for sensitive user data because they require a user password to unlock encryption keys. SDE policies do not encrypt the files needed by the operating system to start the boot process. SDE policies do not require pre-boot authentication or interfere with the Master Boot Record in any way. When the computer boots up, the encrypted files are available before any user logs in (to enable patch management, SMS, backup and recovery tools). Disabling SDE triggers automatic decryption of all SDE encrypted files and directories for the relevant users, regardless of other SDE policy values, such as SDE Encryption Rules.

Trusted Platform Module (TPM) - TPM is a security chip with three major functions: secure storage, measurement, and attestation. The Encryption client uses TPM for its secure storage function. The TPM can also provide encrypted containers for the software vault.

User Encryption – The User key makes files accessible only to the user who created them, only on the device where they were created. When running Dell Server Encryption, User encryption is converted to Common encryption. One exception is made for removable media devices; when inserted into a server with Encryption installed, files are encrypted with the User Roaming key.