

Titan T3000 Data Domain Boost - File System



Dell EMC Data Domain Boost – File System: Deployment and Configuration

Abstract

This white paper focuses on the deployment and configuration of Dell EMC™ DD Boost - File System (BoostFS) for Windows and Linux application hosts.

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Revisions

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Acknowledgments

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Executive summary

Dell EMC Data Domain Boost - File System (BoostFS) provides a general file system interface to the DD Boost library, allowing standard backup applications to take advantage of DD Boost features.

The BoostFS Plug-In resides on the application system, presents a standard file system mount point to the application. With direct access to a BoostFS mount point, the application can leverage the storage and network efficiencies of the DD Boost protocol for backup and recovery. Only simple qualification is needed for the application to support BoostFS. The file system interface makes BoostFS easy to deploy, allowing it to be up and running in minutes.

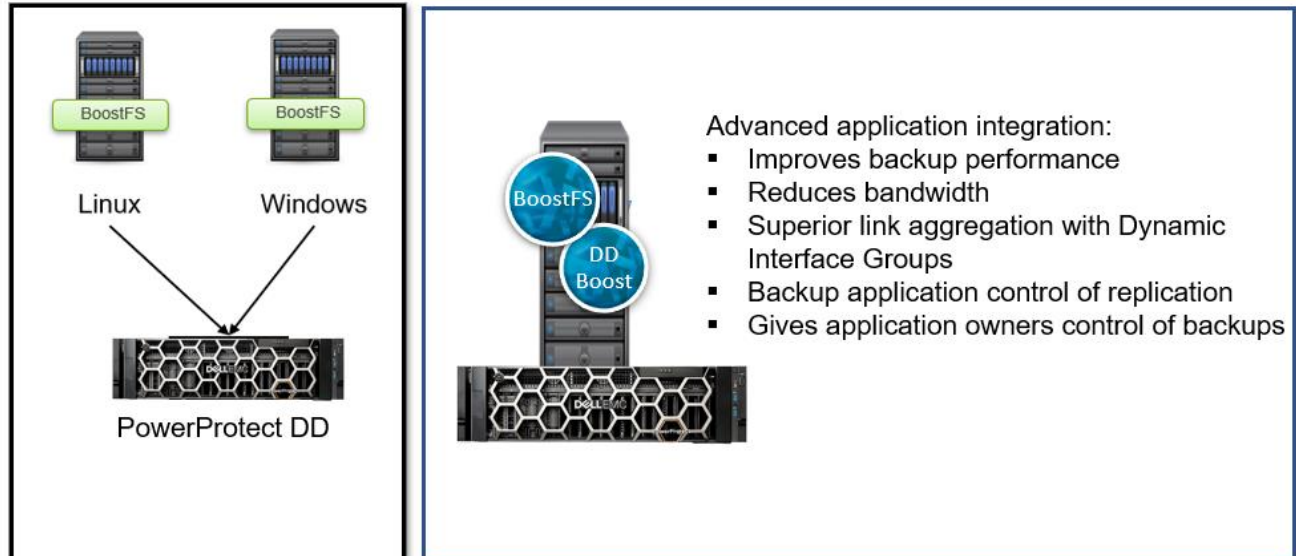
Audience

This white paper is intended for Dell Technologies customers, partners and employees interested in learning about the BoostFS Plug-In technology and all the unique benefits that it can provide.

Note - This white paper is based on DD BoostFS v7.6 release. Contents on this white paper would be updated for each version release.

1 Introduction

DD Boost software delivers an advanced level of integration with backup applications and database utilities, enhancing performance and ease of use. BoostFS Plug-In with DD Boost provides even greater application support, which enables all the benefits of DD Boost for data protection. BoostFS is supported and available for Linux and Windows hosts.



Rather than sending all data to the Dell EMC PowerProtect DD series appliance for deduplication process, DD Boost enables the backup server or application client to send only unique data segments across the network to the PowerProtect DD systems. This reduces the amount of data transferred over the network by 80 to 98 percent.

BoostFS licenses are not included with the DD Boost licensing option available on all PowerProtect DD series appliances (including DDVE). BoostFS is a separate software product which must be purchased and licensed for the clients it is deployed on.

1.1 Advantages of BoostFS

By leveraging the DD Boost technology, BoostFS helps reduce bandwidth, can improve backup-times, offers load-balancing, allows in-flight encryption, and supports the DD multi-tenancy feature set.

In-flight encryption supported via DDBoost allows applications to encrypt in-flight backup or restore data over LAN from the protection system. When configured, the client can use TLS to encrypt the session between the client and the protection system. DD 7.6.0.5 and later versions support GCM based ciphers in both Boost client and DD.

As a file server system implementation, the BoostFS workflow is similar to NFS but leverages the DD Boost protocol. In addition, BoostFS improves backup times compared to NFS and various copy-based solutions.

BoostFS supports single-node PowerProtect DD systems, high-availability (HA) systems, Extended Retention systems, PowerProtect DD Virtual Edition (DDVE), and Extended Distance Protection.

1.2 Features of BoostFS

- **Faster, more efficient backup:** Distributes parts of the deduplication process to backup server or application client - 50% faster backups and up to 98% less network bandwidth required
- **Simplified Disaster Recovery:** Enables application to control PowerProtect DD replication process with full catalog awareness
- **Advanced load balancing and failover:** Aggregates transport links for transparent load balancing and automatic link failover
- **DD Boost everywhere:** Boost File System Plug-in, which expands application support
- **Concurrent connections:** The maximum number of connections that can be used at the same time (default: 128) Minimum value is 64 and Maximum value is 256
- **Compressed restore:** This option reduces bandwidth usage when sending and receiving data but increases CPU usage. When the mount option `ddboost-read-compression` is set to `true`, data is compressed on the server before being sent to the client. When the client receives the data, it must decompress the data. Sending and receiving compressed data uses less network bandwidth but compressing and decompressing the data requires a significant amount of CPU power. By default, this option is set to `false`

```
# ddboost-read-compression=<true|false>
```
- **Multithreaded Boost Mode:** Number of threads to use in multithreaded Boost mode for writing each file (default: 2), this does not have any significance if `mtboost-enabled=false`. Min value is 0 and Max value is 16

```
# Enable Boost multithreading (default: true)
mtboost-enabled=true|false
```
- **Improved Microsoft SQL backup performance** - Starting from BoostFS 7.2.0.5 version, BoostFS for Windows provides improved Microsoft SQL backup performance. By default, this feature is disabled. This feature can be enabled using the new `data-cache=enable` mount option
- **File security** - BoostFS for Windows supports access control lists (ACLs) on files and directories within the BoostFS mount point
- **Linux automounter** - To mount file systems dynamically, use the Linux automounter with the `autofs` command. Mounts created with the `automount` command are automatically unmounted when not in use

1.2.1 DD Boost features supported by BoostFS

- Distributed Segment Processing
- Load balancing/failover
- Hard stream limits
- User authentication (Kerberos)
- Data encryption
- Replication Cloud Tier
- Transport Layer Security (TLS) anonymous authentication is supported to provide encryption

1.3 Supported environments

BoostFS for Windows requires the following:

- DD OS version 6.1.2 or later
- Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, or Windows Server 2019

BoostFS for Linux requires the following:

- DD OS version 6.0 or later
- FUSE 2.8 or later

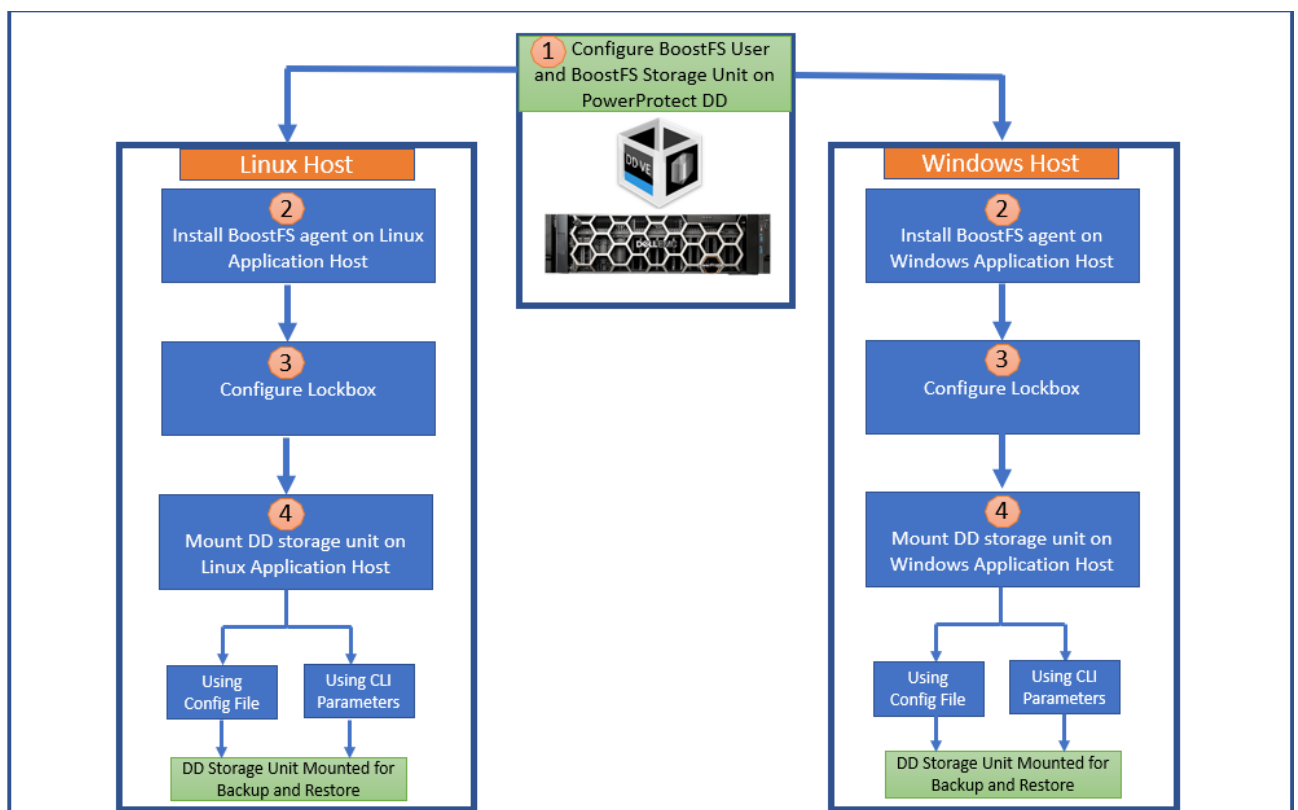
The following Linux distributions are supported:

- Red Hat Enterprise Linux versions 6, 7, and 8
- CentOS 7 and 8
- SUSE Linux Enterprise Server versions 11 and 12
- Ubuntu 14.04, 15, and 20
- Oracle Linux version 7

1.4 Supported applications

The Dell EMC DD BoostFS support matrix, available from E-Lab Navigator at <https://elabnavigator.emc.com/eln/elhome>, lists the supported applications. From the E-Lab Navigator home page, select **Data Protection and Availability Solutions > PowerProtect DD series appliances**

1.5 Roadmap to configure BoostFS Plug-In



2 Preparing PowerProtect DD system for BoostFS

2.1 Prerequisites:

- PowerProtect DD enabled for DD Boost deduplication must have a unique name. The DNS name of the PowerProtect DD system can be used, which is always unique
- Ensure that all application host systems can access the Key Distribution Center (KDC). In a Windows environment, the Windows server that hosts the Microsoft Active Directory service acts as the KDC and the domain name system (DNS). If the systems cannot reach the KDC, check the DNS settings at [/etc/resolv.conf](#)

2.2 Procedure:

1. On the PowerProtect DD system, log in as an administrative user.
2. Verify that the file system is enabled and running by entering “`filesys status`”:

```
sysadmin@[REDACTED]# filesys status
The filesystem is enabled and running.
```

3. Verify if DD Boost is already enabled by entering “`ddbboost status`”

```
sysadmin@[REDACTED]# ddbboost status
DD Boost status: enabled
```

If the DD Boost status is reported as disabled, enable it by entering “`ddbboost enable`”

```
sysadmin@[REDACTED]# ddbboost enable
DD Boost enabled.
```

4. Verify distributed segment processing is enabled by entering “`ddbboost option show`”

```
sysadmin@[REDACTED]# ddbboost option show
Option                               Value
-----                               -
distributed-segment-processing       enabled
virtual-synthetics                  enabled
global-authentication-mode           none
global-encryption-strength           none
-----                               -
```

If distributed segment processing is shown as disabled, enable it by entering “`ddbboost option set distributed-segment-processing enabled`”

```
sysadmin@[REDACTED]# ddbboost option set distributed-segment-processing enabled
DD Boost option "distributed-segment-processing" set to enabled.
```

The host name and the domain name on the PowerProtect DD system can be set using the `net set` CLI command.

```
# net set hostname [host]
# net set {domain name [local-domain-name]}
```

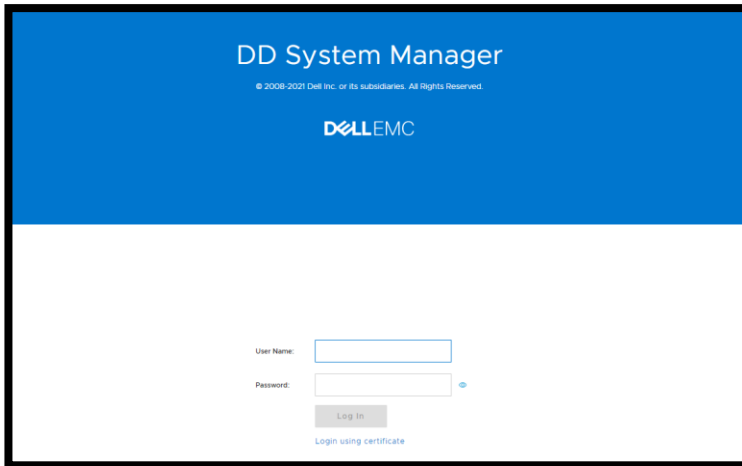
3 Creating BoostFS user and storage unit on PowerProtect DD


One or more storage units needs to be created on each PowerProtect DD system enabled for BoostFS. Storage units are accessible only to applications with the username that owns the storage unit. Each storage unit is owned by one username, and the same username can own multiple storage units. PowerProtect DD administrators can also use existing DD Operating System (DDOS) CLI commands to create and manage storage units used by BoostFS.

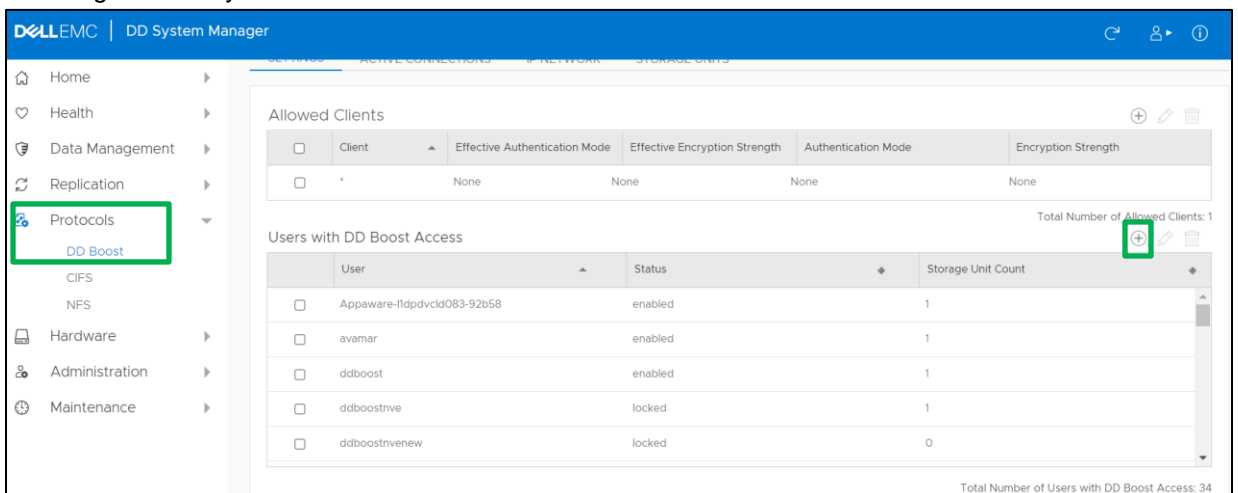
The application passes the username and password to BoostFS and DD Boost passes them to the PowerProtect DD system when attempting to connect to the PowerProtect DD system. The PowerProtect DD system then authenticates the username and password. The username and password can be shared by different applications.

3.1 Steps to create BoostFS user on PowerProtect DD system

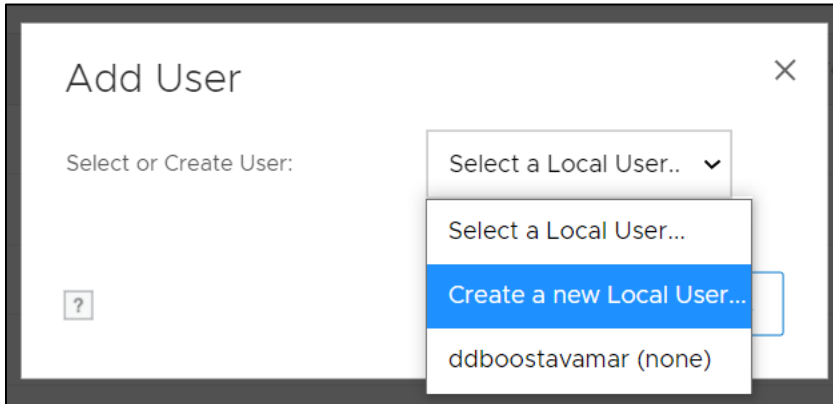
1. Login to **DD System Manager**.



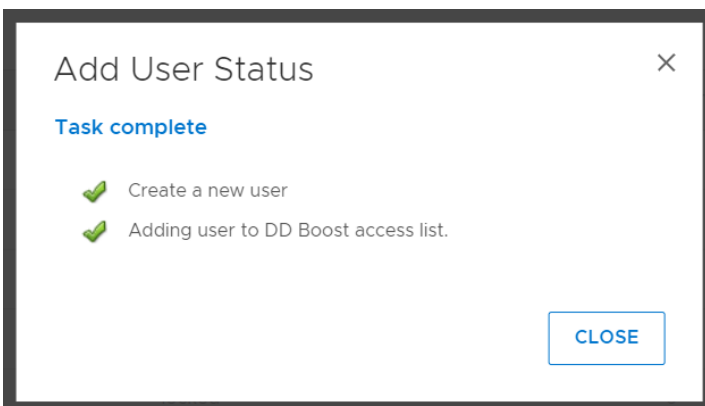
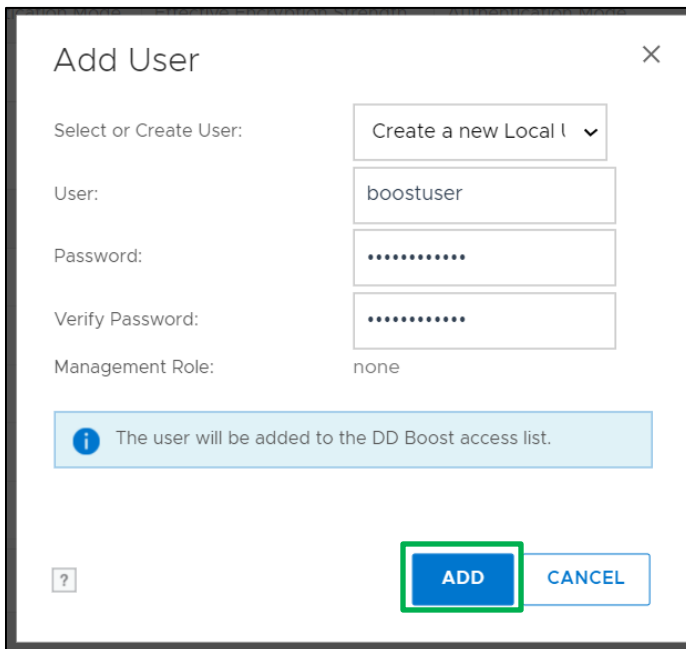
2. Navigate to **Protocols**→**DD Boost**, create a new BoostFS user under “**Users with DD Boost Access**” by selecting the add symbol “”.



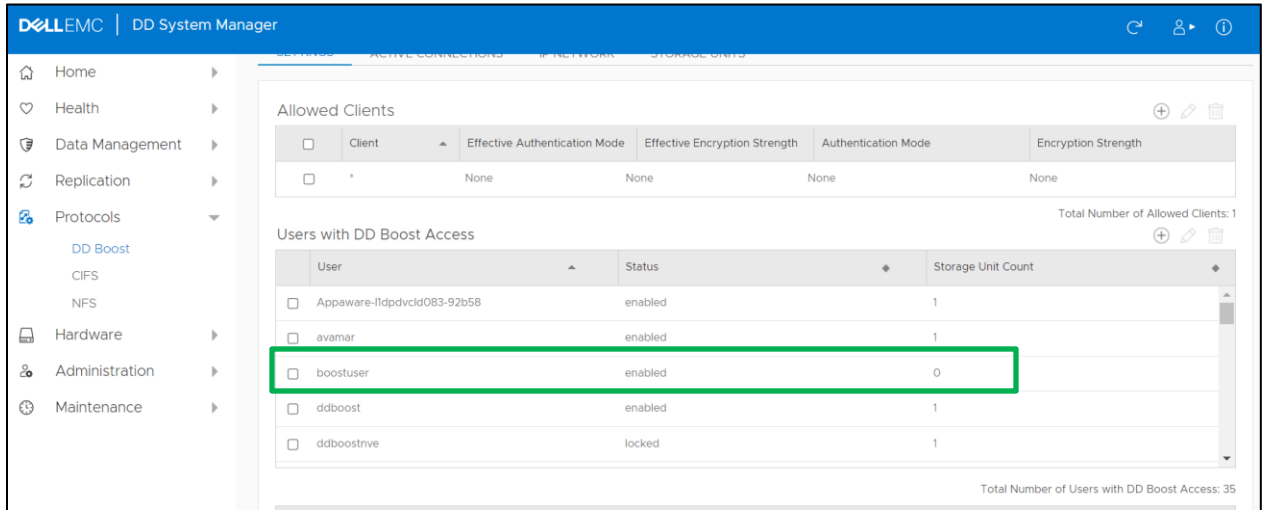
3. Select **Create a new Local User**.



4. Input the required details and select **ADD**.

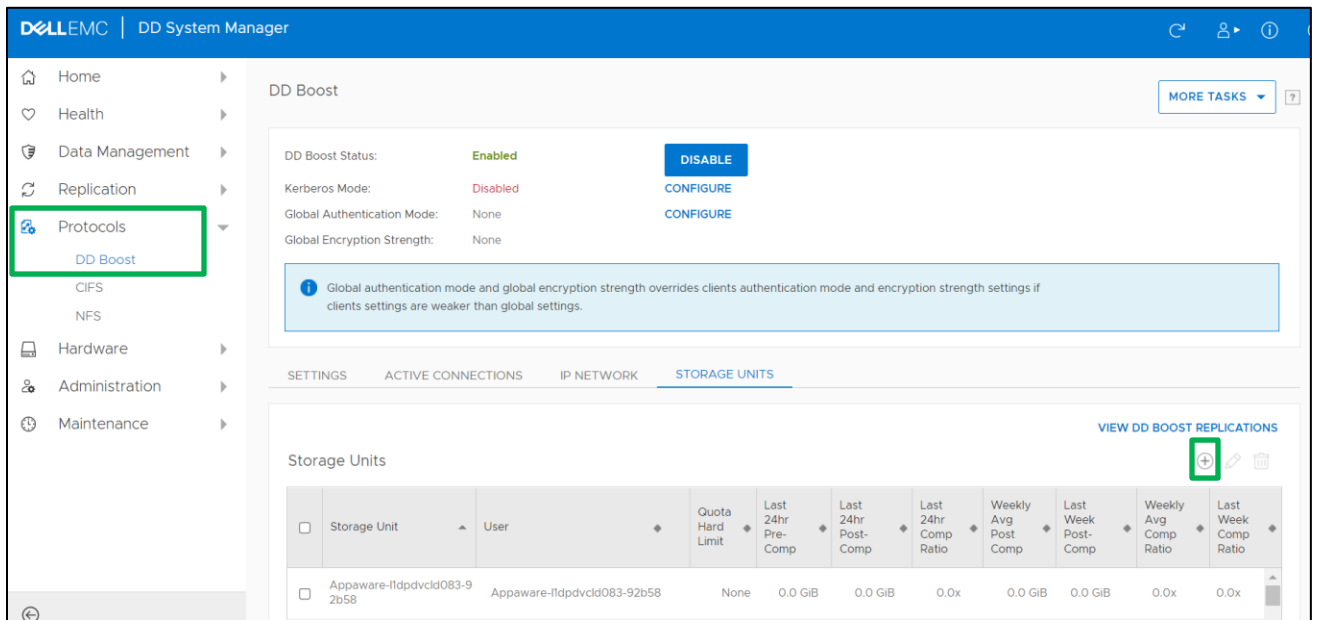


5. BoostFS user “boostuser” created successfully as shown below:

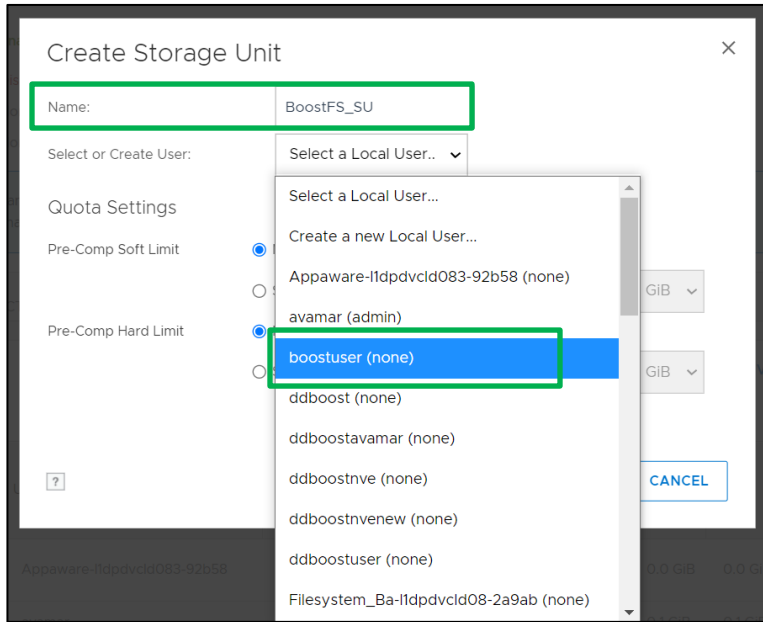


3.2 Steps to create storage unit on PowerProtect DD system

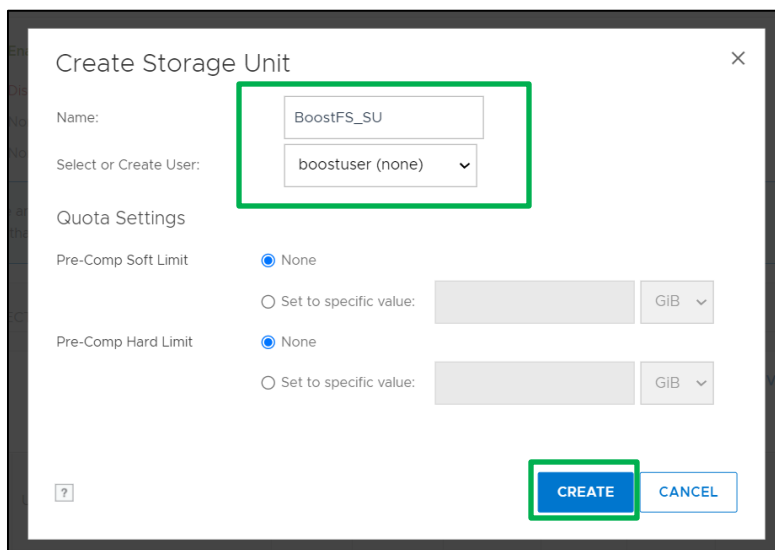
1. Navigate to **Protocols**→**DD Boost**, select the “**STORAGE UNITS**” section and select the add  icon to create a new storage unit.



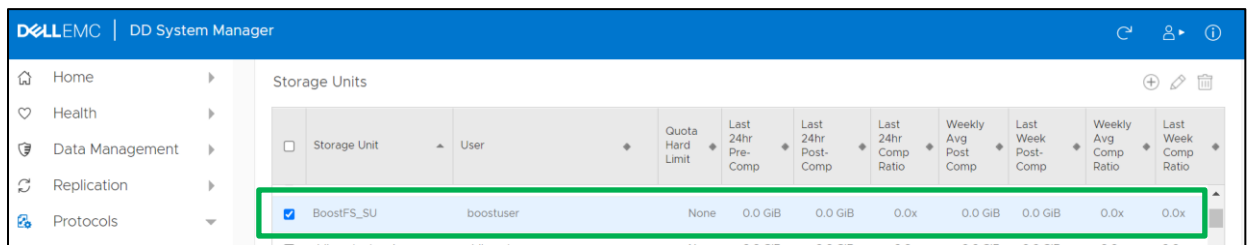
- Input the storage unit name and select BoostFS user as “boostuser” created on the previous section 3.1



- Select “CREATE” to create BoostFS storage unit “BoostFS_SU” for the BoostFS user “boostuser”



- BoostFS storage unit “BoostFS_SU” created successfully for the BoostFS user “boostuser”



4 Installation and configuration of BoostFS agent on Windows application host

Installation or upgrade of BoostFS for Windows can be done by using the MSI Installer.

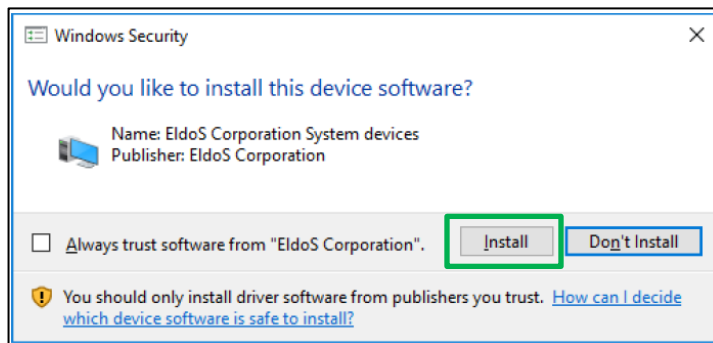
4.1 Prerequisites

When installing or upgrading BoostFS for Windows:

- Use an account with administrator rights to run the installer
- Ensure that there is enough free space to complete the installation, which requires approximately 7 MB of disk space
- Deactivate all BoostFS mount points. If any mount points are active, the upgrade and removal processes fail

CBFS driver

The MSI installer includes several binary files as well as a device driver from EldoS Corporation. BoostFS for Windows uses CBFS, a software interface from EldoS that enables file systems to exist in user space and not only within a driver in kernel space. This functionality is similar to that of FUSE on UNIX operating systems. To install BoostFS for Windows, the CBFS driver from EldoS Corporation needs to be installed.



4.2 Components of BoostFS for Windows

4.2.1 Components in the installation location

The BoostFS for Windows installation includes the following files at the installed location:

- `boostfs.exe` - An executable that supports various commands including establishing a BoostFS mount
- Shared libraries that enable `boostfs.exe`
- The RSA Lockbox libraries
- The Universal C Runtime Library (UCRT). If the UCRT is already installed on the system, `boostfs.exe` uses the system version of the UCRT
- HTML files that provide basic guidance on the use and configuration of `boostfs.exe`
- If not already installed, the 2012 and 2015 Visual C++ redistributables are installed

4.2.2 Entries on the Start Menu

Three links are added to the Start Menu under **Programs > BoostFS**.

These links open:

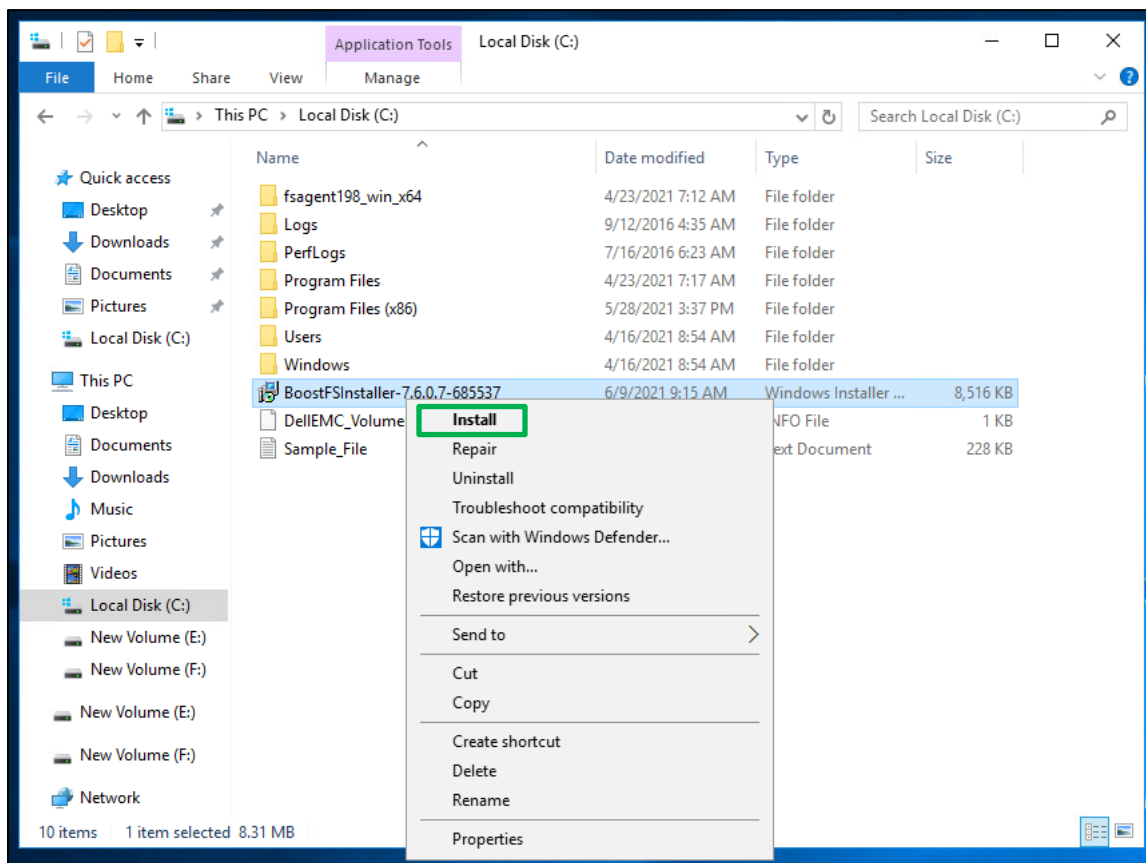
- A command prompt at the installed location of BoostFS
- The BoostFS help file
- The BoostFS configuration help file

4.2.3 Files in C:\BoostFS

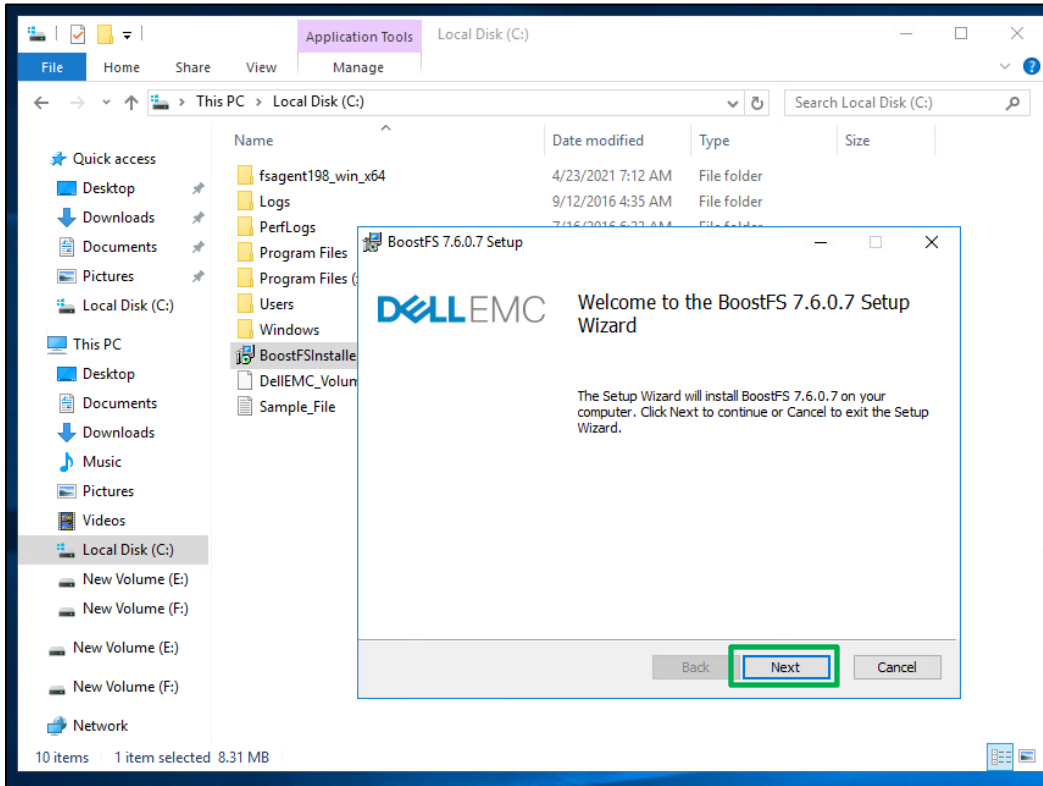
A directory is created at C:\BoostFS. This directory is the default location for BoostFS logs, Lockbox containers, and the sole location of the configuration file C:\BoostFS\boostfs.conf. The lockbox and logs directories may be configured to be placed elsewhere after installation, but the configuration file must exist in this location.

4.3 Steps to install BoostFS agent

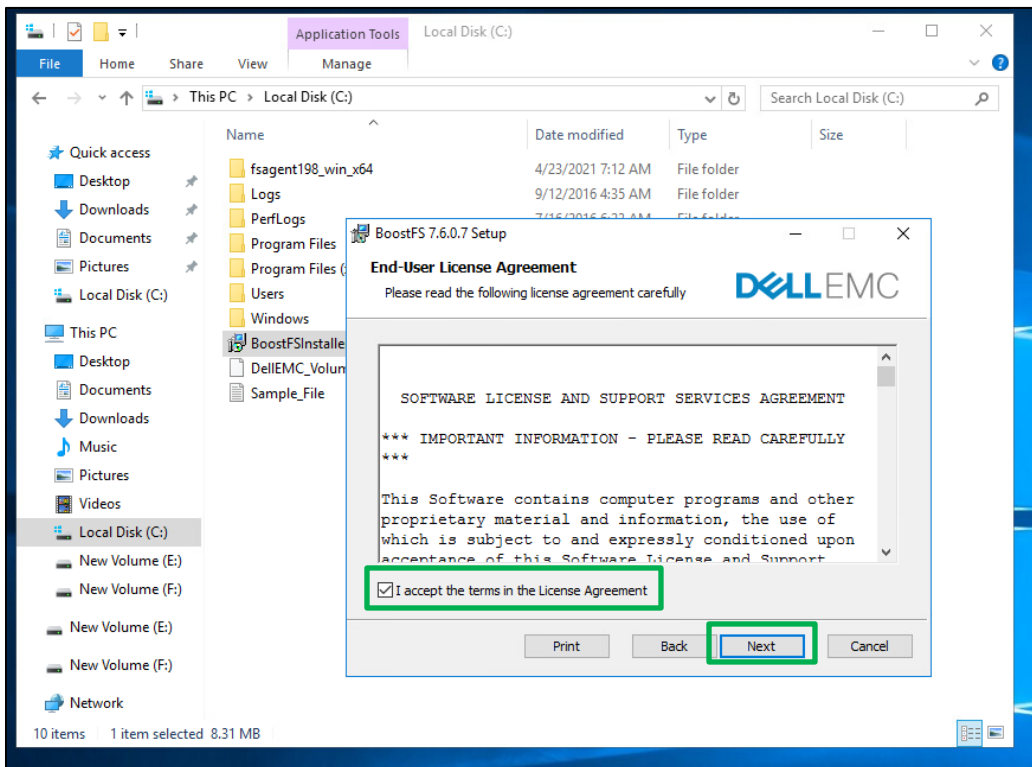
1. Login to Windows host and download the BoostFS agent package for Windows from the support site – https://support.emc.com/downloads/41514_Data-Domain-Boost-%E2%80%93-File-System
2. Select **Install** to proceed with the BoostFS agent installation on the Windows host.



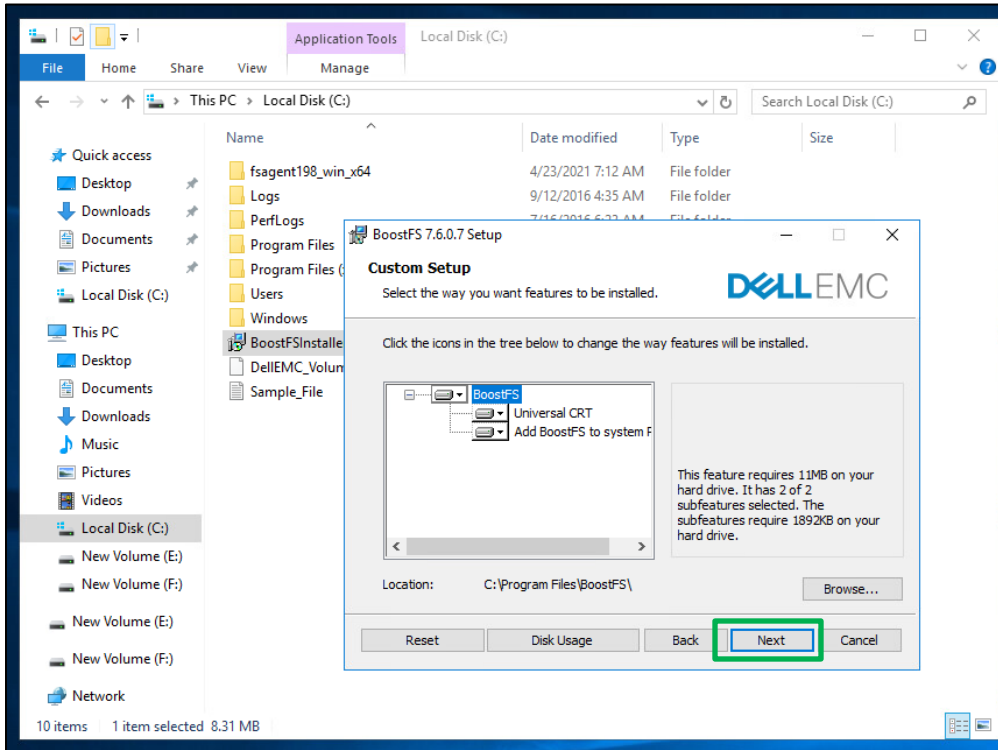
3. Select **Next** to proceed with installation.



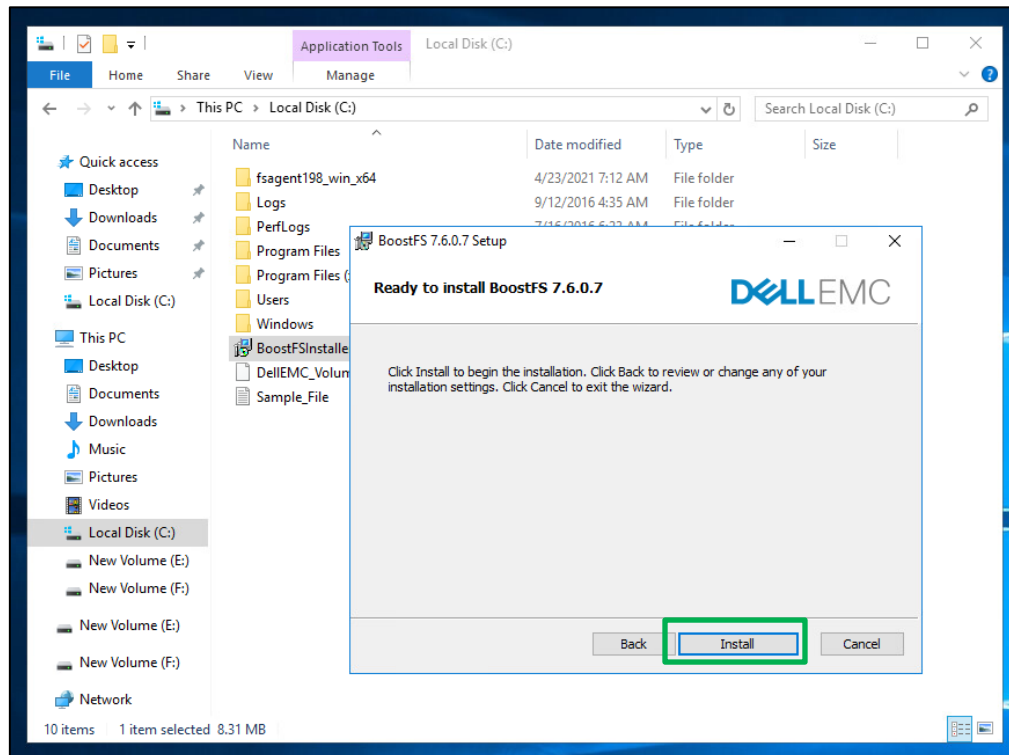
4. Accept the **End-User License Agreement** and select **Next**.



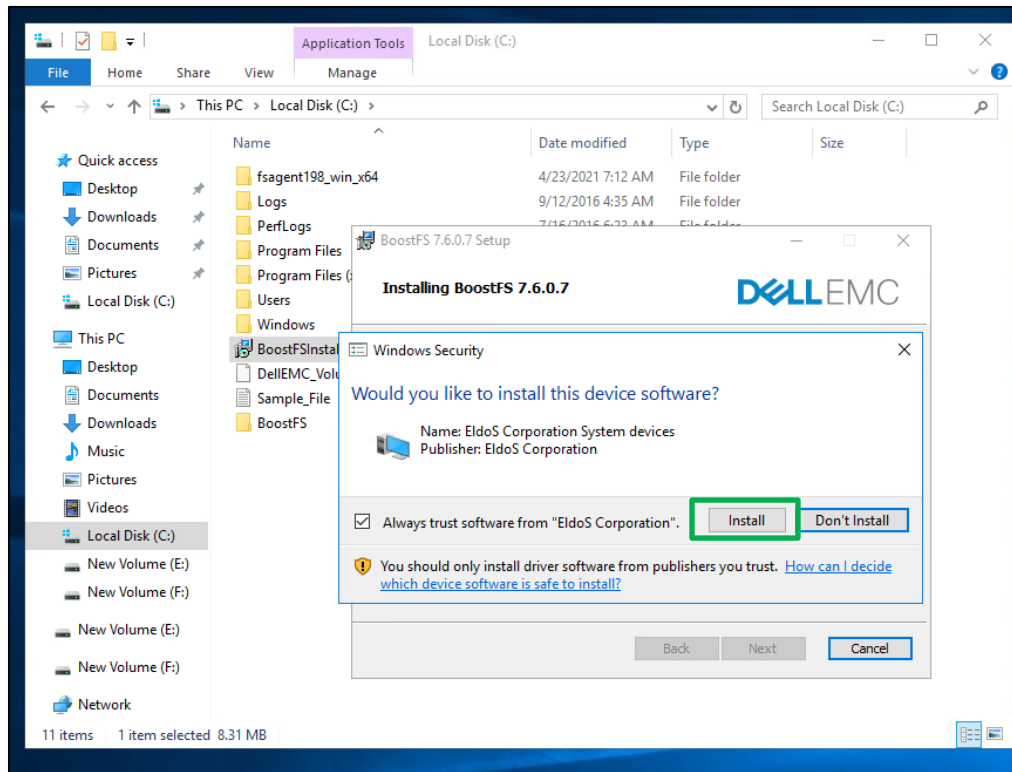
5. Select **Next**.



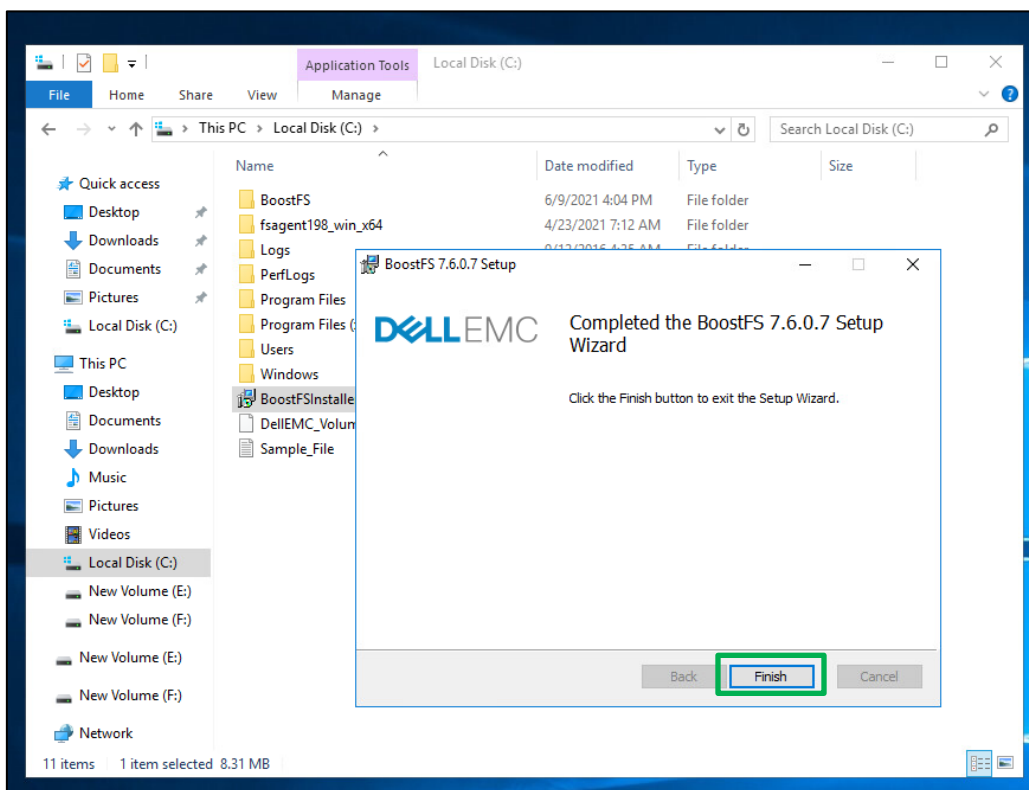
6. Select **Install** to proceed with BoostFS installation.



7. Select **Install** for installing the device driver from EldoS Corporation.



8. BoostFS agent installation on the Windows host completed successfully, select **Finish** to exit the installation.



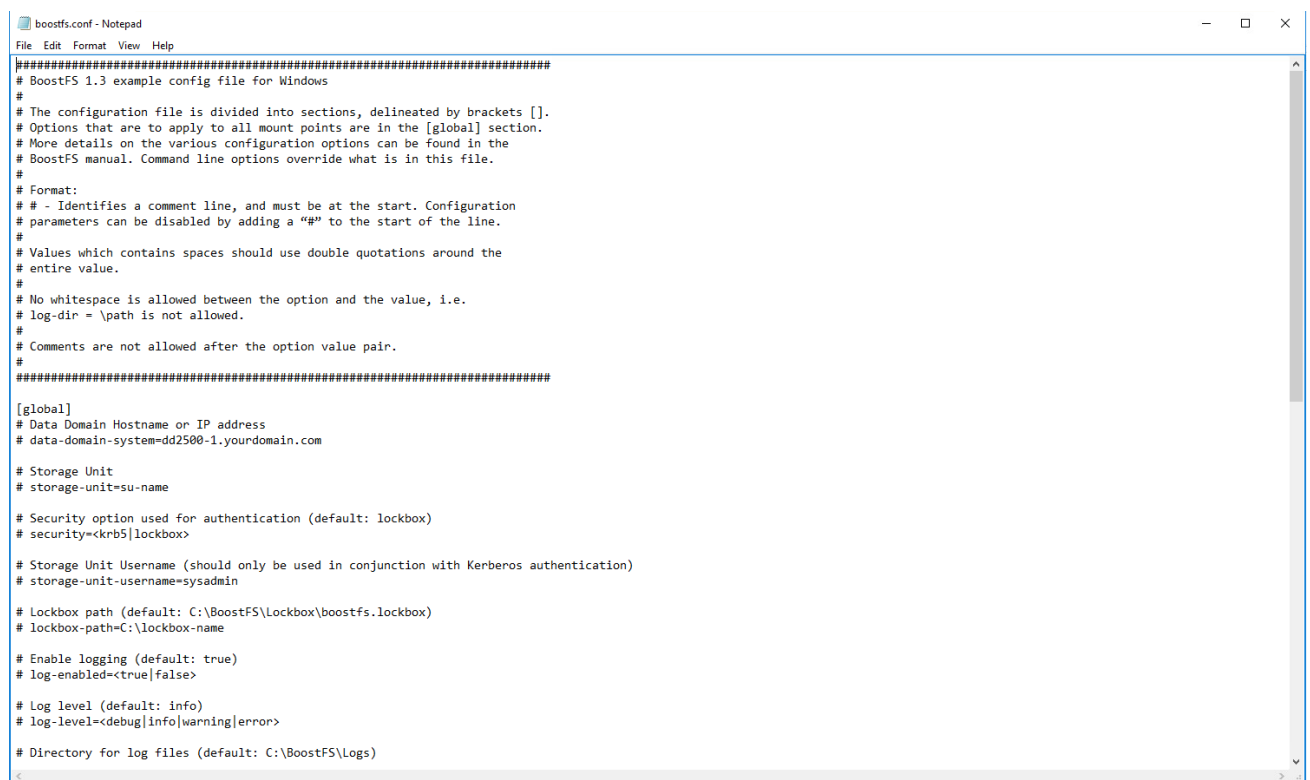
4.4 BoostFS for Windows configuration

BoostFS configuration parameters can be specified by using the command line interface (CLI), the configuration file, or both.

4.4.1 BoostFS for Windows configuration file

The BoostFS configuration file location is `C:\BoostFS\boostfs.conf`. The configuration file has sections for global and mount-point-specific parameters. Mount-point-specific parameter values override global parameter values. If the global section does not define data-domain-system and storage-unit parameters, those parameters must be passed to the mount command by using the CLI.

Note: Parameters that are configured by using the CLI override conflicting values in the configuration file.



```

boostfs.conf - Notepad
File Edit Format View Help
#####
# BoostFS 1.3 example config file for Windows
#
# The configuration file is divided into sections, delineated by brackets [].
# Options that are to apply to all mount points are in the [global] section.
# More details on the various configuration options can be found in the
# BoostFS manual. Command line options override what is in this file.
#
# Format:
# # - Identifies a comment line, and must be at the start. Configuration
# parameters can be disabled by adding a "#" to the start of the line.
#
# Values which contains spaces should use double quotations around the
# entire value.
#
# No whitespace is allowed between the option and the value, i.e.
# log-dir = \path is not allowed.
#
# Comments are not allowed after the option value pair.
#
#####

[global]
# Data Domain Hostname or IP address
# data-domain-system=dd2500-1.yourdomain.com

# Storage Unit
# storage-unit=su-name

# Security option used for authentication (default: lockbox)
# security=<krb5|lockbox>

# Storage Unit Username (should only be used in conjunction with Kerberos authentication)
# storage-unit-username=sysadmin

# Lockbox path (default: C:\BoostFS\Lockbox\boostfs.lockbox)
# lockbox-path=C:\lockbox-name

# Enable logging (default: true)
# log-enabled=<true|false>

# Log level (default: info)
# log-level=<debug|info|warning|error>

# Directory for log files (default: C:\BoostFS\Logs)

```

4.4.2 BoostFS for Windows command overview

Windows command prompt or PowerShell can be used to issue BoostFS commands.

The BoostFS installation includes a shortcut on the Start menu to open the command prompt in the directory containing the executable. During the installation process, the installer can automatically add the location of the executable to the PATH environment variable so that there is no need to specify the path when issuing BoostFS commands. If this option is not chosen during installation, the location can be manually added later.

4.5 BoostFS authentication methods

BoostFS has two authentication options:

- RSA Lockbox
- Kerberos

4.5.1 RSA Lockbox-based authentication

RSA Lockbox is the default password manager for BoostFS for Windows. To use RSA Lockbox, lockbox needs to be configured using the `boostfs lockbox set` command.

[Sharing a BoostFS Lockbox file on multiple clients](#) - Sharing a common lockbox file enables to create a single management point for BoostFS clients to access BoostFS mount points on PowerProtect or Data Domain systems.

A common Lockbox file can be created for all BoostFS clients from a primary client. Using this feature creating a separate lockbox file for each unique BoostFS client can be avoided.

The primary client is the client from which the shared Lockbox is initially created. Since some operations can only be performed from the primary client, it is recommended to record which client is the primary.

The easiest way to share a Lockbox file is to store it in a network share that is accessible by all clients that use it.

4.5.2 Kerberos-based authentication

BoostFS Windows supports the MIT implementation of Kerberos authentication as an alternative to RSA lockbox authentication.

There are three main entities involved with Kerberos Authentication:

- BoostFS client
- An Active Directory server acting as the Kerberos Key Distribution Center (KDC)
- PowerProtect DD systems running DD OS version 6.0 or later

The Kerberos file contains a "shared secret" (a password, pass phrase, or other unique identifier) between the KDC server and the PowerProtect DD appliance.

In an Active Directory environment, the Windows server that hosts the Active Directory service also acts as the Key Distribution Center (KDC) and domain name system (DNS).

[Kerberos tickets](#) - To authenticate using Kerberos, Ticket Granting Ticket (TGT) must be acquired for two types of user accounts:

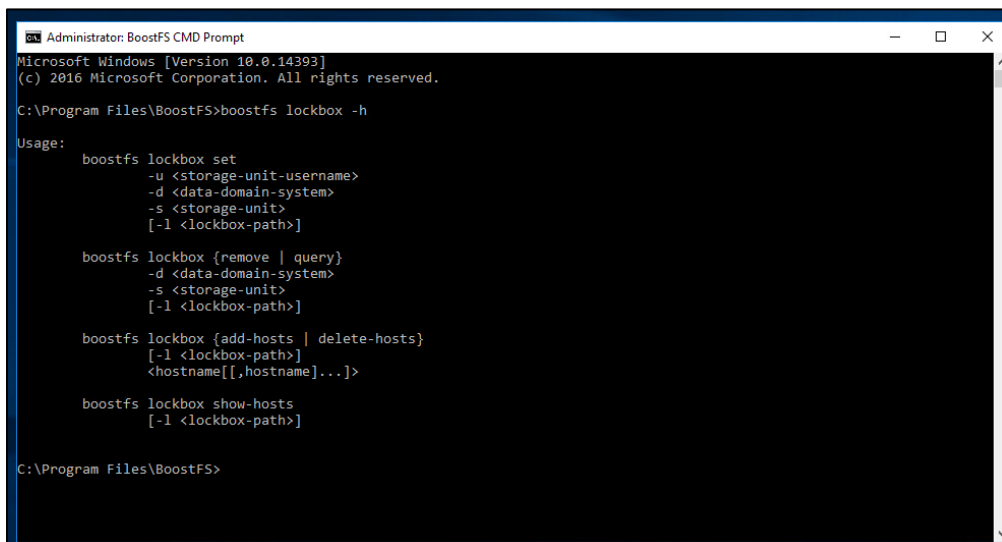
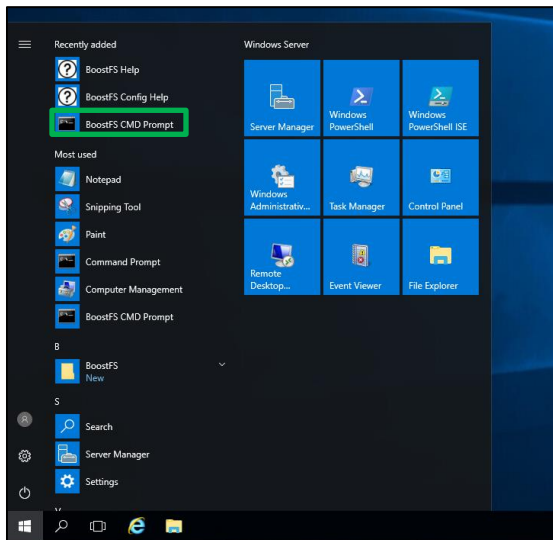
- A Kerberos Ticket Granting Ticket (TGT)
- A Kerberos ticket for various services (service tickets) that the client will use (BoostFS, DNS, CIFS, NFS)

Each user only has access to the tickets they create with the BoostFS Kerberos commands. Users cannot access tickets that others have created.

For more detailed information about using RSA Lockbox-based and Kerberos-based authentication with BoostFS for Windows, refer [Dell EMC DD BoostFS for Windows Configuration Guide](#)

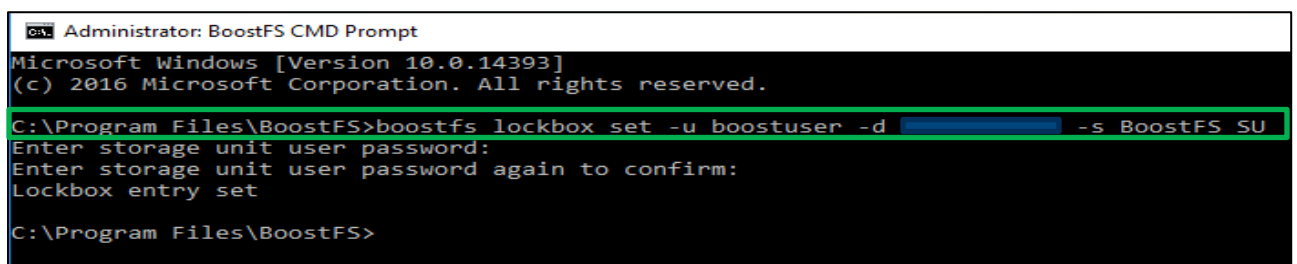
4.6 Creating lockbox entry using command line

1. Select the BoostFS Command Line Interface (CLI) and input “ `boostfs lockbox -h` ” for lockbox configuration options.



2. Input the parameters in the below format to set the lockbox entry

“`boostfs lockbox set -u <storage-unit-username> -d <data-domain-system> -s <storage-unit>`”



5 Mount/unmount the BoostFS file system

The “`boostfs mount`” command allows to mount the BoostFS file system.

BoostFS file system in either of the following two ways:

- Using a UNC mount path

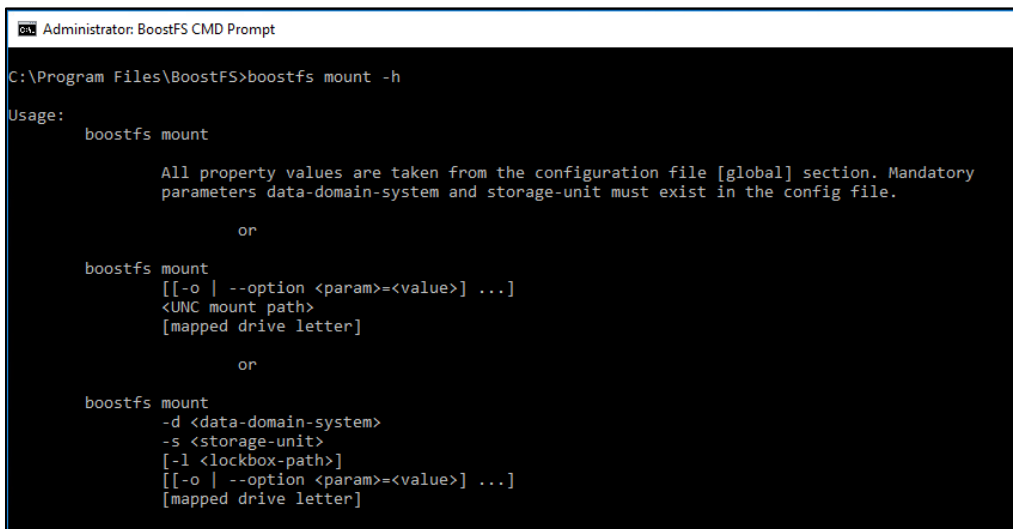

```
boostfs mount [-l <lockbox-path>] [[-o <param>=<value>] ...] <UNC-mount-path> [<drive-letter>]
```
- Using the PowerProtect DD system and storage unit names


```
boostfs mount -d <data-domain-system> -s <storage-unit> -o security=kerb5 -u <storage-unit-username> <mount-point>
```

Where -d specifies the PowerProtect DD system and -s specifies the storage unit.

5.1 Steps to mount BoostFS file system

1. From the Windows host CLI, navigate to the path where BoostFS is installed and input “`boostfs mount -h`” for mount options.



```
Administrator: BoostFS CMD Prompt
C:\Program Files\BoostFS>boostfs mount -h
Usage:
  boostfs mount

      All property values are taken from the configuration file [global] section. Mandatory
      parameters data-domain-system and storage-unit must exist in the config file.

      or

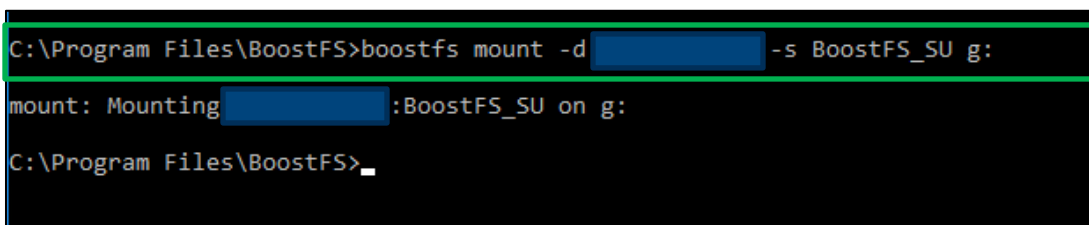
  boostfs mount
  [[-o | --option <param>=<value>] ...]
  <UNC mount path>
  [mapped drive letter]

      or

  boostfs mount
  -d <data-domain-system>
  -s <storage-unit>
  [-l <lockbox-path>]
  [[-o | --option <param>=<value>] ...]
  [mapped drive letter]
```

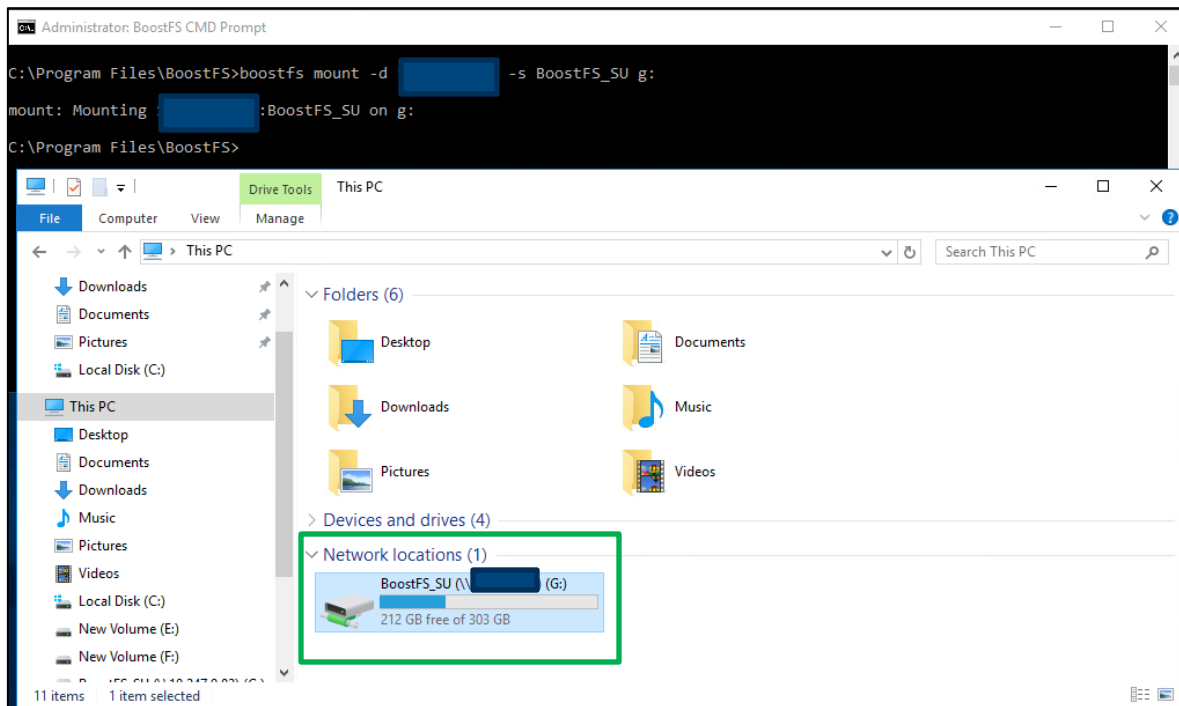
2. Input the parameters in the below format to mount the BoostFS file system.

“`boostfs mount -d <data-domain-system> -s <storage-unit> <drive-letter>`”

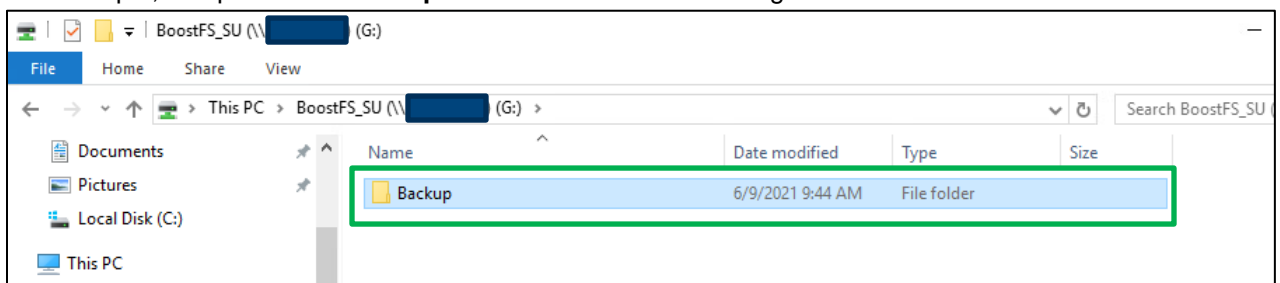


```
C:\Program Files\BoostFS>boostfs mount -d [redacted] -s BoostFS_SU g:
mount: Mounting [redacted]:BoostFS_SU on g:
C:\Program Files\BoostFS>_
```

As shown below, the BoostFS storage unit is mounted as a file system on the Windows host for performing backup and restore operations.



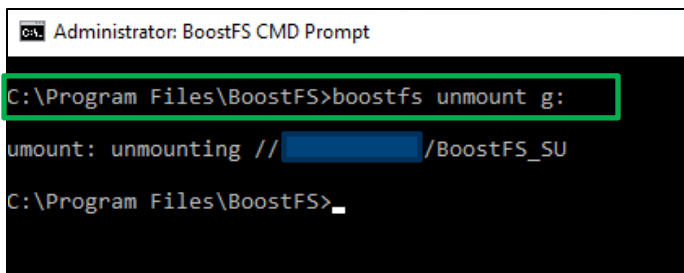
For example, sample folder “**Backup**” is created on the DD Storage Unit mounted on the Windows host.



5.2 Steps to unmount BoostFS file system

The `boostfs mount/unmount` command allows to unmount the BoostFS file system by using one of the following two formats:

- `boostfs mount/unmount <UNC-mount-path>`
- `boostfs mount/unmount <drive-letter>`



6 Installation and configuration of BoostFS agent on Linux application host

BoostFS agent for Linux is available as a single RPM installation package that both enterprise and small-scale users can download. It is available in both RPM and .deb formats. The RPM package includes the boostfs executable.

6.1 Prerequisites

Following needs to be checked before beginning the process:

- The FUSE version on the client must be 2.8 or higher

While the BoostFS process is running:

- BoostFS mount points must be deactivated
- BoostFS cannot be upgraded
- BoostFS cannot be uninstalled

6.2 Components of the BoostFS for Linux

The BoostFS for Linux client is composed of the following:

- A daemon process that supports various commands
- Two shared libraries: libDDBoost.so and libDDBoostFS.so
- .rsalib: A hidden directory that contains redistributable RSA libraries
- A configuration file
- A manual page

libDDBoost.so, a FUSE-agnostic library built on the DD Boost library, provides such services as connection management, a retry mechanism, and client logging. The packaging defaults to the Red Hat Package Manager (RPM) format, but the native packaging for other operating systems is also supported.

Note: Verify if appropriate package is used for client OS.

The role of FUSE in BoostFS for Linux

BoostFS for Linux uses FUSE, an open-source software interface that enables nonprivileged users to securely create and mount their own file-system implementations.

FUSE allows to export a virtual file system to the Linux kernel. Write operations through BoostFS and FUSE benefit from PowerProtect DD's distributed segment processing.

Using FUSE and the DD Boost plug-in, BoostFS exports a storage unit on a PowerProtect DD system to a mountpoint on a client. On the client, file system operations conducted on the mountpoint are captured by the kernel before being passed through FUSE to BoostFS.

BoostFS runs as a daemon on a client. As a software module, BoostFS serves as a layer between FUSE and DD Boost.

6.3 Steps to install BoostFS agent

1. Download and place the BoostFS agent for Linux host to `/tmp` directory.

```
[root@l1dpdvcl093 ~]# cd /tmp
[root@l1dpdvcl093 tmp]# ls
DDBoostFS-7.6.0.7-685537.rhel.x86_64.rpm
ssh-6rmf0b16n84z
systemd-private-f0ad764d432641748555dca2f8d2591e-bolt.service-Lg05Ge
systemd-private-f0ad764d432641748555dca2f8d2591e-chronyd.service-FF2PPP
systemd-private-f0ad764d432641748555dca2f8d2591e-colorctl.service-FuOh2S
systemd-private-f0ad764d432641748555dca2f8d2591e-cups.service-7IlofK
systemd-private-f0ad764d432641748555dca2f8d2591e-fwupd.service-7qHgHu
systemd-private-f0ad764d432641748555dca2f8d2591e-rtkit-daemon.service-bWUUVx
yum_save_tx.2021-05-30.06-55.N3br94.yumtx
yum_save_tx.2021-05-31.06-55.ttd0aI.yumtx
```

2. Install the BoostFS agent package using the below command:

```
"rpm -ivh DDBoostFS-7.6.0.7-685537.rhel.x86_64.rpm"
```

```
[root@l1dpdvcl093 tmp]#
[root@l1dpdvcl093 tmp]# rpm -ivh DDBoostFS-7.6.0.7-685537.rhel.x86_64.rpm
```

3. BoostFS agent is installed successfully on the Linux host.

```
[root@l1dpdvcl093 tmp]# rpm -ivh DDBoostFS-7.6.0.7-685537.rhel.x86_64.rpm
Preparing... ##### [100%]
Updating / installing...
 1:ddbostfs-7.6.0.7-685537 ##### [100%]
[root@l1dpdvcl093 tmp]#
```

6.4 BoostFS for Linux configuration

The Boost filesystem has two configuration options.

- Command-line interface (CLI)
- The configuration file: `boostfs.conf`

6.4.1 BoostFS for Linux configuration file

Configuration file is in `/opt/emc/boostfs/etc` and can be edited by the "root" user or user with sudo privileges. Parameters can be specified either in the config file or on the command line, or both.

The configuration file has a global section and a mount-point specific section. Configuration parameters configured using the command line take the highest priority and override any values in the config file. Mount-specific parameter values override global parameter values.

6.4.2 BoostFS for Linux command overview

"`boostfs`" command is used to establish the FUSE mount, create the lockbox (if desired), and set up Kerberos credentials if Kerberos is chosen as the authentication method.

6.5 BoostFS authentication methods

BoostFS has two authentication options:

- RSA Lockbox (default)
- Kerberos

6.5.1 RSA Lockbox-based authentication

RSA Lockbox is the default password manager for BoostFS for Linux. To use RSA Lockbox, the lockbox needs to be configured using the `boostfs lockbox set` command. Starting with BoostFS 1.1, a shared BoostFS lockbox file can also be configured.

Shared lockbox files - Beginning with BoostFS 1.1, a common lockbox file can be created for all BoostFS clients. Using this feature creating a separate lockbox file for each unique BoostFS client can be avoided.

Sharing a common lockbox file enables to create a single management point for BoostFS clients to access BoostFS mount points on PowerProtect DD systems.

6.5.2 Kerberos-based authentication

BoostFS Linux supports the MIT implementation of Kerberos authentication as an alternative to RSA lockbox authentication.

There are three main entities involved with Kerberos Authentication:

- BoostFS client
- Kerberos Key Distribution Center (KDC), which can be on either one of the following:
 - ✓ An Active Directory server on a domain controller in a Windows environment
 - ✓ A POSIX-based operating system with optional NIS lookups
- PowerProtect DD system running DD OS version 6.0 or later

The Kerberos file contains a "shared secret" (a password, pass phrase, or other unique identifier) between the KDC server and the PowerProtect DD appliance.

In an Active Directory environment, the Windows server that hosts the Active Directory service also acts as the Key Distribution Center (KDC) and a domain name system (DNS). When using a UNIX KDC, the DNS server does not have to be the KDC server; it can be a separate server.

Note: Before using Kerberos for BoostFS, please verify that the Kerberos client libraries for Linux distribution are installed on the machine.

Kerberos tickets - To authenticate using Kerberos, Ticket Granting Ticket (TGT) must be acquired for two types of user accounts:

- A Kerberos Ticket Granting Ticket (TGT)
- A Kerberos ticket for various services (service tickets) that the client will use (BoostFS, DNS, CIFS, NFS)

Each user only has access to the tickets they create with the BoostFS Kerberos commands. Users cannot access tickets that others have created.

For more detailed information about using RSA Lockbox-based and Kerberos-based authentication with BoostFS for Linux, refer [Dell EMC DD BoostFS for Linux Configuration Guide](#)

6.6 Creating lockbox entry using command line

1. From the `/opt/emc/ddboost/bin` directory, Type `./boostfs lockbox -h`

```
[root@l1dpdvcl093 ~]# cd /opt/emc/boostfs/bin/
[root@l1dpdvcl093 bin]# ls
boostfs boostfs_mount_enabler
[root@l1dpdvcl093 bin]# ./boostfs lockbox -h

Usage:
    boostfs lockbox set
        -u <storage-unit-username>
        -d <data-domain-system>
        -s <storage-unit>
        [-l <lockbox-path>]

    boostfs lockbox {remove | query}
        -d <data-domain-system>
        -s <storage-unit>
        [-l <lockbox-path>]

    boostfs lockbox {add-hosts | delete-hosts}
        [-l <lockbox-path>]
        <hostname[[,hostname]...]>

    boostfs lockbox show-hosts
        [-l <lockbox-path>]

[root@l1dpdvcl093 bin]#
```

2. Input the parameters in the below format to set the lockbox entry.

```
./boostfs lockbox set -u <storage-unit-username> -d <data-domain-system> -s
<storage-unit>
```

```
[root@l1dpdvcl093 bin]# ./boostfs lockbox set -u boostuser -d [REDACTED] -s BoostFS_SU
Enter storage unit user password:
Enter storage unit user password again to confirm:
Lockbox entry set
```

3. Lockbox entry set successfully.

7 Mount/unmount the BoostFS file system

The `boostfs mount` command allows to establish the BoostFS FUSE mount.

```
boostfs mount [-d|--data-domain-system] <data-domain-system> [-s|--storage-unit]
<storage-unit> [[-o|--option <param>=<value>] ...] <mount-point>
```

Before mounting the BoostFS Storage Unit, mount point needs to be created.

From command line, create a directory using the command “`mkdir /mnt/ddve_SU`” as shown below and validate the mount created using the command “`ls-lrt /mnt`”

```
[root@l1dpdvcl093 ~]# mkdir /mnt/ddve_SU
[root@l1dpdvcl093 ~]# ls -lrt /mnt
total 0
drwxr-xr-x. 2 root root 6 Jun  9 10:06 ddve_SU
[root@l1dpdvcl093 ~]#
```

7.1 Steps to mount BoostFS file system

1. From command Line Interface (CLI), navigate to the path - where BoostFS is installed and input “`./boostfs mount -h`” for mount options.

```
[root@l1dpdvcl093 bin]# ./boostfs mount -h
Usage:
  boostfs mount <mount-point>

  Property values from the configuration file apply. Mandatory options
  data-domain-system and storage-unit must be present

  or

  boostfs mount
    -d <data-domain-system>
    -s <storage-unit>
    [-l <lockbox-path>]
    [[-o | --option <param>=<value>] ...]
    <mount-point>

[root@l1dpdvcl093 bin]#
```

2. Input the parameters in the below format to mount the BoostFS file system.

```
“./boostfs mount -d <data-domain-system> -s <storage-unit> <mount-point>”
```

```
[root@l1dpdvcl093 bin]# ./boostfs mount -d [REDACTED] -s BoostFS_SU /mnt/ddve_SU
mount: Mounting 10.247.9.82:BoostFS_SU on /mnt/ddve_SU
[root@l1dpdvcl093 bin]#
```

3. As shown below the BoostFS storage unit is mounted as a file system on the Linux host for performing backup and restore operations.

```
[root@l1dpdvcl093 bin]# cd /mnt/ddve_SU
[root@l1dpdvcl093 ddve_SU]# ls
Backup
[root@l1dpdvcl093 ddve_SU]#
```

7.2 Steps to unmount BoostFS file system

1. Use the below command to unmount the BoostFS file system.

```
“./boostfs unmount <mount-point>”
```

```
[root@l1dpdvcl093 bin]# ./boostfs unmount /mnt/ddve_SU
[root@l1dpdvcl093 bin]#
```

8 Conclusion

BoostFS Plug-In leverages the DD Boost protocol, in addition, BoostFS improves the backup times compared to various copy-based solutions.

In summary, below are the key highlights of BoostFS for backup and recovery.

- Expanding the benefits of DD Boost to even more applications with BoostFS, a file system interface to DD Boost
- BoostFS can be deployed in minutes to reduce backup window and storage capacity
- Key advanced DD Boost features in a file system format

A Technical support and resources

[Dell.com/support](https://www.dell.com/support) is focused on meeting customer needs with proven services and support.

[Storage and data protection technical white papers and videos](#) provide expertise that helps to ensure customer success with Dell EMC storage and data protection products.

A.1 Related resources

- [Dell EMC DD BoostFS for Windows Configuration Guide](#)
- [Dell EMC DD BoostFS for Linux Configuration Guide](#)
- [Dell EMC DDOS Administration Guide](#)
- [Dell EMC PowerProtect DD Series Appliances](#)