# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTENTS</td>
<td>1</td>
</tr>
<tr>
<td>CONTACTING VEEAM SOFTWARE</td>
<td>2</td>
</tr>
<tr>
<td>Customer Support</td>
<td>2</td>
</tr>
<tr>
<td>Online Support</td>
<td>2</td>
</tr>
<tr>
<td>Company contacts</td>
<td>2</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>PURPOSE</td>
<td>3</td>
</tr>
<tr>
<td>INTENDED AUDIENCE</td>
<td>3</td>
</tr>
<tr>
<td>SOLUTION OVERVIEW</td>
<td>4</td>
</tr>
<tr>
<td>DELL EMC DATA DOMAIN + VEEAM = BETTER TOGETHER</td>
<td>4</td>
</tr>
<tr>
<td>VEEAM OVERVIEW</td>
<td>5</td>
</tr>
<tr>
<td>ALLIANCE PRODUCT OVERVIEW</td>
<td>6</td>
</tr>
<tr>
<td>Gateway server</td>
<td>7</td>
</tr>
<tr>
<td>Compatibility and support</td>
<td>8</td>
</tr>
<tr>
<td>CONFIGURATION</td>
<td>9</td>
</tr>
<tr>
<td>DATA DOMAIN ADMINISTRATIVE ACCESS</td>
<td>9</td>
</tr>
<tr>
<td>DATA DOMAIN BOOST PROTOCOL</td>
<td>10</td>
</tr>
<tr>
<td>Connection options</td>
<td>10</td>
</tr>
<tr>
<td>Licensing</td>
<td>11</td>
</tr>
<tr>
<td>Enabling Data Domain Boost</td>
<td>11</td>
</tr>
<tr>
<td>Creating a Data Domain Boost user</td>
<td>11</td>
</tr>
<tr>
<td>Data Domain Boost user assignment</td>
<td>12</td>
</tr>
<tr>
<td>Data Domain Boost storage unit creation</td>
<td>12</td>
</tr>
<tr>
<td>Data Domain Boost feature support</td>
<td>13</td>
</tr>
<tr>
<td>Data Domain Boost configuration detail</td>
<td>15</td>
</tr>
<tr>
<td>Backup job configuration settings</td>
<td>17</td>
</tr>
<tr>
<td>NFS</td>
<td>18</td>
</tr>
<tr>
<td>Enabling NFS</td>
<td>18</td>
</tr>
<tr>
<td>NFS exports</td>
<td>18</td>
</tr>
<tr>
<td>Veeam managed Linux infrastructure server</td>
<td>19</td>
</tr>
<tr>
<td>NFS export access</td>
<td>21</td>
</tr>
<tr>
<td>Mounting the NFS export</td>
<td>21</td>
</tr>
<tr>
<td>NFS protocol: Configuration detail</td>
<td>22</td>
</tr>
<tr>
<td>Backup job configuration settings</td>
<td>23</td>
</tr>
<tr>
<td>CIFS PROTOCOL</td>
<td>24</td>
</tr>
<tr>
<td>Enabling CIFS</td>
<td>24</td>
</tr>
<tr>
<td>CIFS shares</td>
<td>24</td>
</tr>
<tr>
<td>Share access</td>
<td>25</td>
</tr>
<tr>
<td>CIFS protocol: Configuration detail</td>
<td>25</td>
</tr>
<tr>
<td>Backup job configuration settings</td>
<td>27</td>
</tr>
<tr>
<td>IMPORTANT CONSIdERATIONS</td>
<td>28</td>
</tr>
<tr>
<td>FORWARD INCREMENTAL FOREVER BACKUPS</td>
<td>28</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>30</td>
</tr>
<tr>
<td>ABOUT VEEAM SOFTWARE</td>
<td>31</td>
</tr>
</tbody>
</table>
Contacting Veeam Software

At Veeam® Software, we value the feedback from our customers. It is important not only to help you quickly with technical issues, but it is our mission to listen to your input and build products that incorporate your suggestions.

Customer Support

Should you have a technical concern, suggestion or question, please visit our Customer Center Portal at cp.veeam.com to open a case, search our knowledge base, reference documentation, manage your license or obtain the latest product release.

Online Support

If you have any questions about Veeam solutions, you can use the following resources:

• Full documentation set at www.veeam.com/documentation-guides-datasheets.html
• Community forum at forums.veeam.com

Company contacts

For the most up-to-date information about company contacts and office locations, please visit www.veeam.com/contacts.html
Introduction

Purpose

This Deployment Guide is designed to assist storage administrators with initial setup of Veeam Backup & Replication™ using Dell EMC Data Domain storage as a backup copy job target, or a primary target for backup and restore, specifically within the single site customer environment scenario. This document will review multiple storage protocols and connectivity options for connecting storage as a backup target. There are some architectural considerations and sizing guidelines identified for general backup workloads.

Intended Audience

This document is primarily aimed at solution architects, consultants, administrators and other IT professionals involved in deployment planning and implementation. At a minimum, an intermediate level of VMware virtual infrastructure knowledge and advanced understanding of Veeam Backup & Replication are recommended.
Solution Overview

Dell EMC Data Domain + Veeam = Better Together

Dell EMC Data Domain product models are available in entry-level, midrange, enterprise and virtual edition configurations. Available throughput and capacity varies based on the product model and configuration. Veeam Backup & Replication deployments with Dell EMC Data Domain should be architected to achieve desired performance based on the requirements for:

- The use of Veeam features that create a random I/O workload (e.g., these features include Instant VM Recovery®, Veeam DataLabs™ and database point in time restore)
- Fast restores from backup chains with more than six incremental backups that depend on a full backup
- Fast restores of large VMs that contain multiple virtual hard disks
- Multiple backup copies that may require long-term retention

The I/O performance demands placed on backup repository storage in these scenarios should be considered when architecting a solution for both backups, and backup copies. A variety of backup storage infrastructure configurations can be deployed with Dell EMC Data Domain, as well with other Dell EMC storage products. Users are strongly encouraged to consult with Dell EMC or a value-added reseller to define performance requirements and to design an appropriately architected backup storage infrastructure.

The industry standard 3-2-1 Rule should be used as a guideline for backup infrastructure planning:

- Maintain at least three copies of backup data
- Store backups on at least two different types of media
- Keep at least one of the backups in a different location

Example 1

A backup repository on a flash or hybrid flash storage array is used to hold short-term primary backups. Veeam Backup & Replication then creates copies of backups on a Data Domain backup repository for extended long-term retention.

![Diagram](image-url)

*Figure 1: Backups on general purpose storage array with long-term retention copies on Data Domain*
Example 2
A variant of Example 1 is to use a standard server with local flash or disk as a backup repository to hold short-term primary backups. Veeam Backup & Replication then creates copies of backups on a Data Domain backup repository for extended long-term retention.

Example 3
In addition to local backups and local backup copies, a third copy of backups can be created off site on a Data Domain backup repository. Optionally, Veeam WAN accelerators can be used to optimize data transfer over a WAN connection. Veeam WAN acceleration technology is available in the Veeam Backup & Replication Enterprise Plus edition.

Veeam Overview
Veeam Backup & Replication is an industry-leading data protection and disaster recovery solution for VMware vSphere and Microsoft Hyper-V virtual infrastructures that combines backup, replication and the fastest item-level recovery in a single product. Enabling these options from one interface, Veeam Backup & Replication serves to solve the most critical problems of virtual infrastructure management by protecting mission-critical virtual machines (VMs) from both hardware and software failure. With Veeam Backup & Replication, VM environments can publish a compressed and deduplicated backup file as a regular VMDK file, run a VM directly from a backup without modifying the backup in any way and automatically create an isolated environment. You can also run a VM directly from a backup file on regular backup storage, eliminating the need to recover the backup to production storage.

Veeam Backup & Replication is one of the most powerful solutions for VM backup, replication and recovery in VMware vSphere and Microsoft Hyper-V environments. With Veeam Backup & Replication, VMs can be backed up to disk, archived to low-cost storage or cloud environments and replicated from one host to another. Recovery of VMs can occur in a matter of minutes using Veeam's patented technology integrated with many popular primary storage vendor solutions.

The major components of Veeam Backup & Replication consist of a management server, proxy servers, backup repository servers and disk-based backup repositories. The backup management server and backup proxy servers are Windows-based installations. The backup repositories can be Windows or Linux based, network attached storage systems or tape. These resources can be virtual or physical depending upon the storage and network topology, desired throughput of backup and recovery data streams, as well as the available server resources.
Alliance Product Overview

Veeam Backup & Replication can utilize a Data Domain system as backup repository storage by means of several different connection protocols. An overview of the connection protocols includes:

- **Data Domain Boost** is a bandwidth optimized connection protocol that includes source side deduplication and compression. The Data Domain Boost protocol is supported over IP (Internet Protocol) and FC (Fibre Channel). Data Domain Boost requires the use of a Windows gateway server, which can be co-located with other Veeam services on a Veeam managed Windows infrastructure server. When deployed over FC, Data Domain Boost requires the use of a physical Windows gateway server. Data Domain Boost is a licensed feature available from Dell EMC.

- **NFS (Network File System)** is a connection protocol that facilitates mounting a Data Domain NFS export onto a Veeam managed Linux infrastructure server for use as a backup repository.

- **CIFS (Common Internet Filesystem)** is a connection protocol that facilitates mapping a Data Domain CIFS share onto a Veeam managed Windows infrastructure server. CIFS requires the use of a Windows gateway server, which can be co-located with other Veeam services on a Veeam managed Windows infrastructure server.

- **VTL (Virtual Tape Library)** is a connection protocol that presents an automated tape library to a physical Windows tape server. VTL is a licensed feature available from Dell EMC.

An overview summarizing available protocols, transports and any additional requirements is contained in the following table:
Gateway server

The use of a gateway server is applicable to Veeam Backup & Replication deployments that connect to a Data Domain system using the Data Domain Boost and CIFS connection protocols. When configured within Veeam Backup & Replication as a backup repository, a Data Domain system differs from a Linux or Windows backup repository in that it cannot host the Veeam data mover service. Gateway server deployments, and Linux backup repository server deployments include the Veeam data mover service. When any job accesses a Data Domain system, the Veeam data mover service on the gateway server or managed Linux server establishes a connection with the corresponding Veeam data mover service on a Veeam backup proxy or secondary backup repository.

Table 1: Connection protocol overview

<table>
<thead>
<tr>
<th>PROTOCOL</th>
<th>TRANSPORT</th>
<th>REQUIRES WINDOWS GATEWAY, TAPE OR LINUX SERVER</th>
<th>REQUIRES PHYSICAL SERVER</th>
<th>DDVE COMPATIBLE</th>
<th>LICENSED FEATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Domain Boost</td>
<td>IP</td>
<td>Windows gateway server</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Data Domain Boost</td>
<td>FC</td>
<td>Windows gateway server</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>NFS</td>
<td>IP</td>
<td>Linux server</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CIFS</td>
<td>IP</td>
<td>Windows gateway server</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>VTL</td>
<td>FC</td>
<td>Windows tape server</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Apart from the VTL protocol, detailed deployment information about these protocols is presented in subsequent subsections of this document.
Note that the gateway server can reside on a standalone server or can be co-located with other Veeam services on a Veeam managed Windows infrastructure server. In deployments that include fibre channel connectivity, the gateway server should be a physical host with fibre channel connectivity to a Data Domain system. Additionally, a Veeam Backup & Replication deployment may include multiple gateway servers. In cases where a single gateway server would create a performance bottleneck, multiple gateway servers can be deployed. In cases where a single gateway server would have a high latency connection to a geographically distant Data Domain system, a local gateway server can be deployed.

**Compatibility and Support**

The Dell EMC Data Domain Compatibility Guide should be referenced prior to solution deployment. The Dell EMC Data Domain Compatibility Guide is located at compatibilityguide.emc.com:8080/CompGuideApp/.
Configuration

Data Domain administrative access

Administration of a Data Domain system is typically accomplished by means of a command-line interface (CLI), or with a graphical user interface (GUI).

To invoke the command line interface, the use of a Secure Shell (SSH) compatible client is required.

In the example presented, puTTY, a free SSH client for Microsoft Windows, is used to launch a command line interface to a Data Domain system. Note that the host name parameter should specify the DNS name or IP address of the administrative port on the target Data Domain system. After the PuTTY session has been opened, the user is presented with a login prompt.

In the example provided, the user has logged in as sysadmin and entered the correct password for this user. To invoke the GUI, a web browser is configured to use the URL associated with the target Data Domain system.
In the example provided, a web browser has been used to launch the Data Domain System Manager GUI.

For additional information about administrative access to Data Domain systems, please reference the Dell EMC Data Domain Operating System Administration Guide. Examples provided in this document use the command line interface.

**Data Domain Boost protocol**

Dell EMC Data Domain Boost is a licensed protocol that enables backup servers to communicate with Data Domain systems. Data Domain Boost software consists of two software components, the Data Domain Boost libraries that are installed on a backup server, and the Data Domain Boost server that runs on a Data Domain system.

**Connection Options**

Data Domain Boost is supported over two different transports. One is referred to as DD Boost-over-IP transport and the other is DD Boost-over-Fibre Channel Transport. Note that DD Boost-over-Fibre Channel Transport requires the use of a physical gateway server. This document makes no recommendation in preference to which transport is deployed.

Veeam Backup & Replication includes built in Data Domain Boost libraries with the Veeam data mover service. There is no need to manually install the Data Domain Boost libraries. Microsoft Windows servers that are added to the Veeam Backup & Replication infrastructure include the Data Domain Boost libraries.
Licensing

The use of the Data Domain Boost protocol requires a license on the Data Domain system. Physical and virtual editions of Data Domain systems support Data Domain Boost. The way in which licenses are installed is different depending on whether the Data Domain deployment is a physical system or a virtual edition. Please consult the appropriate Dell EMC Data Domain product documentation for current license installation instructions:

• For physical Data Domain systems, please reference the Dell EMC Data Domain Boost for Partner Integration Administrative Guide.

Enabling Data Domain Boost

There are several prerequisite configuration steps that need to be executed on a Data Domain system before the system is configured within Veeam Backup & Replication. Execution of the following steps prepares the Data Domain system for use with Data Domain Boost. By default, Data Domain Boost is not enabled on a Data Domain system.

In the example provided, the ddboost status command was executed to determine status. The ddboost enable command was then executed to enable Data Domain Boost.

Creating a Data Domain Boost User

After confirming that Data Domain Boost is enabled, the next configuration step is to assign a local Data Domain system user that will be granted access to Data Domain Boost. The user assigned access to Data Domain Boost can be an existing user, or a new user can be created.

Note that although it is possible to grant the sysadmin user access to Data Domain Boost, it is not recommended. Instead, the recommendation is to create a new user that will be used exclusively for Data Domain Boost authentication.

When creating a new user, a specific role is assigned to the user. The available roles are: Admin, User, Security, Backup-Operator, or None. The None role is intended only for Data Domain Boost authentication.
In the example provided, the user add command has been executed to create a new user named DDBoost. The new user has been assigned the None role, as this user will be exclusively used for Data Domain Boost authentication. The newly created user is the user that will be authenticating the backup server with the Data Domain Boost server.

**Data Domain Boost User Assignment**

A prerequisite for user authentication is that the new user needs to be assigned Data Domain Boost access.

```
sysadmin@DataDomain-02# ddboost user assign DDBoost
User "DDBoost" assigned to DD Boost.
```

Figure 12: ddboost user assign

In the example provided, the ddboost user assign command was executed to assign Data Domain Boost access. Keep track of the user that has been assigned Data Domain Boost access. This username and password will be used within Veeam Backup & Replication when configuring authentication. Existing users that have been assigned Data Domain Boost access can be displayed with the ddboost user show command.

**Data Domain Boost Storage Unit Creation**

After creating a new user, the next configuration step is to create a Data Domain Boost storage unit. A Data Domain Boost storage unit is a filesystem path on a Data Domain system. The path correlates to a special type of Managed Tree (MTree) that includes support for the Data Domain Boost protocol. MTrees enable the optional use of significant features such as quotas and stream limits.

```
sysadmin@DataDomain-02# ddboost storage-unit create DDBoostStorageUnit01 user DDBoost
Created storage-unit "DDBoostStorageUnit01" for "DDBoost".
```

Figure 13: ddboost storage-unit create

In the example provided, the ddboost storage-unit create command has been used to create a new Data Domain Boost storage unit.

It's important to note that multiple Data Domain Boost storage units can be created on a single Data Domain system. When a deployment includes multiple Data Domain Boost storage units, each Data Domain Boost storage unit can be configured as a separate Veeam backup repository. In cases where a single gateway server would introduce a performance bottleneck, separate gateway servers can be configured for each backup repository.

Data Domain Boost storage unit names must be unique within a Data Domain system. In cases where more than a single Data Domain Boost storage unit has been created, different users can be assigned to each Data Domain Boost storage unit, if required.

```
sysadmin@DataDomain-02# ddboost storage-unit show
Name                  Pre-Comp (GiB) Status  User         Report Physical Size (MiB)
--------------------- ----------- ------ -------- ------------------
DDBoostStorageUnit01  0.0         RW      DDBoost    -
DDBoostStorageUnit02  0.0         RW      DDBoost2   -
```

Figure 14: ddboost storage-unit show

In the example provided, two Data Domain Boost storage units have been created. The **User** column indicates that each Data Domain Boost storage unit has been assigned a different user. The user effectively owns the Data Domain Boost storage unit or units it has been assigned to. Only connections with this username's credentials can access the Data Domain Boost storage unit.
Data Domain Boost feature support

Veeam Backup & Replication integration with the Data Domain Boost protocol enables several significant features including distributed segment processing, dynamic interface groups and virtual synthetic backups.

Distributed segment processing

Distributed segment processing distributes the deduplication process between the Veeam Backup & Replication gateway server and a Data Domain system. The Data Domain Boost libraries on the Veeam gateway server perform segmenting and hashing operations on an incoming backup job or backup copy job stream. The hash is sent to the Data Domain system to see if the data is unique. If the segment is not unique, it already resides on the Data Domain system and does not need to be transferred. If the segment is unique, it is compressed and then sent to the Data Domain system. When distributed segment processing is enabled, the deduplication process is effectively distributed between a Data Domain system and one or more Veeam gateway servers. Distributed segment processing makes Data Domain Boost bandwidth optimized as it reduces network bandwidth utilization when redundant data is processed during backups.

```
sysadmin@DataDomain-02# ddboost option show distributed-segment-processing
DD Boost option "distributed-segment-processing" is enabled
```

*Figure 15: ddboost option show*

In the example provided, the `ddboost option show` command was executed to display the status of the distributed segment processing feature.

Dynamic interface groups

This Data Domain Boost feature is available when using the DD Boost-over-IP Transport. The Data Domain Boost libraries installed on the Veeam Backup & Replication gateway server enable scalable link aggregation to create a single dynamic interface group. With this Data Domain Boost feature, data transfers between a Veeam gateway server and Data Domain system are automatically load balanced across the network connections in the dynamic interface group.

```
sysadmin@DataDomain-01# ifgroup show config DynamicInterfaceGroup1 interfaces
Group-name  Status  Interfaces
-------------  --------  ----------
DynamicInterfaceGroup1  enabled  11.0.1.39
DynamicInterfaceGroup1  enabled  11.0.1.47
```

*Figure 17: Dynamic interface group with two links*

In the example provided, the `ifgroup show config` command was executed to display the interfaces in the dynamic interface group named `DynamicInterfaceGroup1`. Note that both interface links are on the same subnet. The corresponding Veeam gateway server has also been configured with two interface links on the same subnet.

When multiple backup jobs are performed simultaneously, they are load balanced across available links in the dynamic interface group.

Depicted in the graphic provided, a dynamic interface group consisting of four network links connects a Veeam gateway server to a Data Domain system. Each network link has a unique IP address on the same subnet.
In the example provided, the `ddboost show connections` command was executed. Shown is a subset of the results highlighting `DynamicInterfaceGroup1`, the interface links in the group and active connections. Note that in the example, four backup jobs were in progress and that they were load balanced across available interface links.

The use of dynamic interface groups relies on having a functional administrative connection to a Data Domain system. This network link is sometimes referred to as the registered connection. Deployments may choose to configure the administrative connection in link failover mode. Alternatively, dynamic interface groups enables the ability to define and configure an alternative administrative IP address and hostname for a Data Domain system. The alternative Data Domain administrative hostname and IP address can be configured in DNS or in the `/etc/hosts` file.

For additional information about dynamic interface groups, please reference the Dell EMC Data Domain Boost for Partner Integration Administration Guide.

Virtual synthetic backups

Veeam Backup & Replication supports virtual synthetic full backups with Data Domain Boost. Virtual synthetic full backups synthesize a full backup file on a Data Domain system without any requirement to schedule active full backup jobs. To construct a full backup file, Data Domain Boost uses pointers to existing incremental backup segments on a Data Domain Boost storage unit. Virtual synthetic full backups reduce workload on the network and backup infrastructure components and may increase backup job performance.

In the example provided, backup job advanced settings have been configured to perform incremental mode backups with the creation of synthetic full backups on a specific day of the week.
In the example provided, the creation of synthetic full backups has been configured to occur every Saturday. It is possible to schedule creation of synthetic full backups on a specific day or days of the week.

Note that reverse incremental backup mode is not supported in conjunction with Data Domain Boost.

**Data Domain Boost configuration detail**

When creating a new backup repository for use with Data Domain Boost, the repository type setting should be **Deduplicating storage appliance**.

The deduplicating storage type setting should be **Dell EMC Data Domain**.

The name of the Data Domain system can be a DNS name or an IP address configured on the Data Domain system.

When connecting over fibre channel, select the Use **Fibre Channel (FC) connectivity** check box. The fibre channel infrastructure should be correctly zoned for the Veeam gateway server to access the Data Domain system.

Additionally, credentials should be supplied for the user created for Data Domain Boost authentication. This user is typically assigned the **None** role and has been granted Data Domain Boost access.

The gateway server selection defaults to **Automatic selection**. Some deployments may include multiple gateway servers. A specific gateway server can be explicitly selected by clicking the **The following server** radio button. The selected gateway server should be one that is physically close to the Data Domain system and connected by means of a low latency transport. In deployments that include multiple Data Domain Boost storage units on the same Data Domain system, a specific gateway server can be selected to reduce or eliminate any performance bottleneck that may be imposed when using a single gateway server.
The storage unit path is selected by clicking the **Browse** button. Any previously created Data Domain Boost storage units will be displayed, and a single Data Domain Boost storage unit can be selected.

Clicking the **Populate** button will populate the **Capacity** and **Free space** fields of the window.

The **Load control** portion of the window provides the ability to limit the maximum number of concurrent tasks and data transfer rates.

For additional information about the maximum concurrent task parameter, please reference the **Repository Server Resources** section of the Veeam Backup & Replication Best Practices document available at: [bp.veeam.expert/](http://bp.veeam.expert/)

Clicking the **Advanced** button opens the **Storage Compatibility Settings** window. The default settings do not need to be altered for a Data Domain system.
At this point, the backup repository settings specific to Data Domain Boost have been configured. The backup repository is prepared for usage by completing wizard.

**Backup job configuration settings**

When selecting a Data Domain Boost backup repository within a backup job, a dialog window will prompt the user to change the advanced settings for the Data Domain Boost repository type.

Clicking the **Yes** button will alter the advanced settings to disable inline data deduplication and configure storage optimization appropriately.
NFS

Veeam Backup & Replication can connect to a Data Domain system as a NFS client. The NFS protocol uses an IP connection between a Veeam managed Linux infrastructure server and a Data Domain system. A Data Domain system is configured with a NFS export that is mounted as a filesystem on a Veeam Linux backup repository. The NFS protocol does not require a Data Domain license. Physical and virtual editions Data Domain systems support NFS. Execution of the following steps prepares the Data Domain system for use with NFS.

Enabling NFS

The NFS protocol must be enabled prior to use. A prerequisite to configuring the solution is to determine current NFS status. If the status indicates that NFS is disabled, NFS should be enabled.

```
sysadmin@DataDomain-01# nfs status
The NFS system is currently active and running.
Total number of NFS requests handled = 21029.
NFS server version(s) 3 enabled.
```

Figure 28: NFS status

In the example provided, the `nfs status` command was executed to determine the status of the NFS protocol. Status returned from the command indicates that NFS is active and running. The `nfs enable` command can be executed to enable the NFS protocol if required.

NFS exports

A NFS export is a filesystem path on a Data Domain system. The path correlates to an MTree. MTree's enable the optional use of significant features such as quotas and stream limits.

One or more NFS exports should be created for mounting on a Veeam managed Linux infrastructure server for use as a backup repository path. Existing NFS exports are easily viewed, and new NFS exports can be easily created.

```
sysadmin@DataDomain-01# nfs export show list
Export Path # Client Tenant-Unit
------- ----- -------- -----
/backup /backup 1 -
data /data 0 -
/ddvar /ddvar 1 -
VeeamNFS /data/col1/VeeamNFS 2 -
(4 exports found)
```

Figure 29: NFS export show list

In the example provided, the `nfs export show list` command was executed to display existing NFS exports. The results indicate that there are four NFS exports. The NFS export named `VeeamNFS` was manually added and is displayed with the preconfigured default NFS exports (/backup, /data, and /ddvar). The NFS export named `VeeamNFS` has a filesystem path equal to `/data/col1/VeeamNFS`. 
In the example provided, the `mtree create` command was executed to create a new filesystem path equal to `/data/col1/NewExport`. This filesystem path was created for use in creating a new NFS export. Next, the `nfs export create` command was executed to create a new NFS export named `NewExport` on the filesystem path previously created. Subsequently, the `nfs export show list` command was executed to display the existing and newly created NFS exports.

**Veeam managed Linux infrastructure server**

Creating a backup repository that will utilize mounted NFS storage requires a Linux server. Linux server requirements are described in the *Veeam Backup & Replication User Guide for VMware vSphere* document. Specifically, bash shell, SSH and Perl are required. A list of required Perl modules is available in Veeam KB article 2007: [www.veeam.com/KB2007](http://www.veeam.com/KB2007). Also note that 64-bit editions of Linux must be able to run 32-bit programs.

At the point where the Linux server has been properly configured, add it to Veeam Backup & Replication as a managed infrastructure server. Within the Veeam Backup & Replication console, navigate to the *Backup Infrastructure* section, right-click *Managed Servers* and select **LINUX**.

Input the credentials required for connecting to the new Linux server.

---

© 2018 Veeam Software. Confidential information. All rights reserved. All trademarks are the property of their respective owners.
It may also be necessary to provide additional information about the credentials used to connect to the new Linux server. In the example provided, the new Linux server is an Ubuntu Server deployment. The **Elevate specified account to root** check box was selected.

After inputting the credentials for the new Linux server, click the **Apply** button to continue adding the server to the backup infrastructure.

Note that the *Veeam Backup & Replication User Guide for VMware vSphere* contains detailed information concerning Linux accounts and credentials. In the examples provided, the user account was also manually added to the Ubuntu sudoers file on the Linux server.
NFS export access

The NFS export that will be mounted on the Veeam managed Linux server should be modified to add client access. Viewing and adding NFS export clients is a simple and easy process.

```
sysadmin@DataDomain-01# nfs export show detailed VeeamNFS
NFS Export: VeeamNFS
Path: /data/coll/VeeamNFS
Tenant-Unit: -
NFSv3 Mounts: 3
Active NFSv3 clients: 0
Active NFSv4 clients: 0

+----------------+---------------------------------------------------+
<table>
<thead>
<tr>
<th>Client Options</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.18.116.78</td>
<td>(sec=sys,rw,no_root_squash,no_all_squash,secure,version=3)</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Total Client Entries: 1</td>
<td></td>
</tr>
<tr>
<td>No referrals found.</td>
<td></td>
</tr>
</tbody>
</table>
```

Figure 35: NFS export show detailed

In the example provided, the `nfs export show detailed` command was executed to display the clients that have access to the NFS export. The client with IP address `172.18.116.78` has access to the NFS export.

```
sysadmin@DataDomain-01# nfs export add VeeamNFS clients 172.18.116.75 options no_root_squash
```

Figure 36: NFS export add

In the example provided, the `nfs export add` command was executed to add client access for the client with IP address `172.18.116.75`. The `nfs export show detailed` command was then executed to display the existing and new clients that have access to the NFS export.

For additional information about managing NFS exports, please refer to the Dell EMC Data Domain Operating System Administration Guide.

Mounting the NFS export

Prior to configuring a new Linux backup repository, the Data Domain NFS export should be mounted on the Linux host. Note that on the Ubuntu Linux host used in creating the examples presented in this document, the `nfs-common` support files were installed on the host.

```
sudo mount -t nfs -o noblock,hard,intr,noserver=3.tcp.bg 172.18.116.11 /data/coll/VeeamNFS
```

Figure 37: Mount NFS export

In the example provided, the `mount` command was executed to mount a Data Domain NFS export on the mount point named `/VeeamNFS`. Note that the mount command parameters used are recommended in Veeam KB article 1741: [www.veeam.com/kb1741](http://www.veeam.com/kb1741). Also note that the Linux host `/etc/fstab` file should be modified to include the NFS mount at boot time. After mounting the NFS export, the `df` command was executed to display filesystem parameters for the mounted filesystem.
NFS protocol: Configuration detail

When creating a new backup repository for use with a Data Domain NFS export, the repository type setting should be Linux server.

The repository server should be the DNS name or IP address of the Linux server that will be used. Clicking the Populate button will display path, capacity and free space on the repository server, including the mounted Data Domain NFS export.

The Location path to folder field should contain the path of the mounted Data Domain NFS export on the Linux server. Clicking the Populate button will display the capacity and free space of the specified path.

The Load control portion of the window provides the ability to limit the maximum number of concurrent tasks and data transfer rates.
For additional information about the maximum concurrent task parameter, please reference the Repository Server Resources section of the Veeam Backup & Replication Best Practices document available at: bp.veeam.expert/.

Clicking the Advanced button opens the Storage Compatibility Settings window. The default settings should be altered for a Data Domain NFS export. Specifically, the Decompress backup data blocks before storing and Use per-VM backup files check boxes should be selected.

At this point, the backup repository settings specific to Data Domain Boost have been configured. The backup repository is prepared for usage by completing wizard.

**Backup job configuration settings**

When selecting a Linux server backup repository that uses a Data Domain NFS export within a backup job, the advanced settings should be altered. Inline data deduplication should be disabled, and storage optimization should be set to Local target (16TB+ backup files).
CIFS protocol

Veeam Backup & Replication can connect to a Data Domain system as a CIFS client. The CIFS protocol uses an IP connection between a Veeam gateway server and a Data Domain system. A Data Domain system is configured to present a CIFS share. That CIFS share is then configured as a shared folder on a Veeam backup repository. The CIFS protocol does not require a Data Domain license. Physical and virtual editions of the Data Domain systems support CIFS. Execution of the following steps prepares the Data Domain system for use with CIFS.

Enabling CIFS

The CIFS protocol must be enabled prior to use. A prerequisite to configuring the solution is to determine current CIFS status. If the status indicates that CIFS is disabled, CIFS should be enabled.

```
sysadmin@DataDomain-01# cifs status
CIFS is disabled.
sysadmin@DataDomain-01# cifs enable
The filesystem is enabled and running. Starting CIFS access...
```

*Figure 44: CIFS status*

In the example provided, the `cifs status` command was executed to determine the status of the CIFS protocol. Subsequently, the `cifs enable` command was executed to enable the CIFS protocol.

CIFS shares

A CIFS share is a filesystem path on a Data Domain system. The path correlates to an MTree. MTrees enable the optional use of significant features such as quotas and stream limits.

One or more CIFS shares should be created for use by Veeam Backup & Replication as a shared folder backup repository. Existing shares are easily viewed, and new shares can be easily created.

```
sysadmin@DataDomain-01# cifs share show
Shares information for: all shares

--------------- share ManagedTree1 ---------------
path: /data/col1/ManagedTree1
maxconn: 0
clients: *
enabled: yes
 Shares displayed: 1
```

*Figure 45: CIFS share show*

In the example provided, the `cifs share show` command was executed to display existing CIFS shares. The results indicate that there is one share with a share name equal to `ManagedTree1` and a filesystem path equal to `/data/col1/ManagedTree1`. 
In the example provided, the `mtree create` command was executed to create a new filesystem path of `/data/coll/Veeam` for use in creating a new CIFS share. Next, the `cifs share create` command was executed to create a new CIFS share named `VeeamSharedFolder` on the filesystem path. Subsequently, the `cifs shares show` command was executed to display the existing and newly created CIFS shares.

**Share access**

By default, Data Domain CIFS shares are enabled and permit anonymous connections. Data Domain systems include support for managing CIFS access control. The examples presented in this document used access settings that disabled anonymous access. A local Data Domain user was created. This user and the user’s password were used as credentials for the presented examples.

For additional information about managing access control, please refer to the *Dell EMC Data Domain Operating System Administration Guide*.

**CIFS protocol: Configuration detail**

When creating a new backup repository for use with a Data Domain CIFS share, the repository type setting should be *Shared folder*.

The path to the Data Domain system CIFS share can be a DNS name or an IP address configured on the Data Domain system, with `\Share Name` appended to it. A local Data Domain user and password should be added in cases where anonymous access has been disabled.
The gateway server selection defaults to Automatic selection. Some deployments may include multiple gateway servers, and a specific gateway server can be explicitly selected by clicking the The following server radio button. The selected gateway server should be one that is physically close to the Data Domain system and connected by means of a low latency transport. In deployments that include multiple CIFS shares on the same Data Domain system, a specific gateway server can be selected to reduce or eliminate any performance bottleneck that may be imposed when using a single gateway server.

![Gateway server selection](image)

*Figure 49: Gateway server*

The Load control portion of the window provides the ability to limit the maximum number of concurrent tasks and data transfer rates.

![Load control](image)

*Figure 50: Load control*

For additional information about the maximum concurrent task parameter, please reference the Repository Server Resources section of the Veeam Backup & Replication Best Practices document available at: bp.veeam.expert/.

Clicking the Advanced button opens the Storage Compatibility Settings window. The default settings should be altered for a Data Domain CIFS share. Specifically, the Decompress backup data blocks before storing and Use per-VM backup files check boxes should be selected.

![Storage compatibility settings](image)

*Figure 51: Storage compatibility settings*

At this point, the backup repository settings specific to a Data Domain CIFS share have been configured. The backup repository is prepared for usage by completing wizard.
Backup job configuration settings

When selecting a Data Domain CIFS share backup repository within a backup job, the advanced settings should be altered. Inline data deduplication should be disabled, and storage optimization should be set to **Local target (16TB+ backup files)**.

![Backup job advanced settings](image)
Important considerations

Forward incremental forever backups

Backup jobs configured to perform incremental mode backups without the creation of periodic synthetic full backups are supported. However, a maximum of 60 restore points can be retained using the incremental mode backup method prior to performing an active full backup. If retention requirements require more than 60 restore points, an active full backup should be performed at or before the time that 60 restore points have been created.

In the example provided, backup job advanced settings have been configured to perform incremental mode backups without the creation of synthetic full backups. When configuring a backup job with these settings, periodic defragmentation and compaction of the full backup file are recommended.
In the example provided, advanced job settings have been configured to defragment and compact the full file on the last Saturday of every month. This setting removes unused space in the backup file and reduces filesystem space consumption on the Data Domain system. In larger deployments, periodic defragmentation and compaction of the full backup file for different jobs should be performed on different days on the month.

Note that the defragmentation and compaction of the full backup file will only occur on days that a backup job is scheduled to execute. Administrators are encouraged to make sure that defragmentation and compaction of the full backup file is scheduled to occur on a day that the backup job is scheduled to execute.
## References

**Technical product documentation:**

[www.veeam.com/documentation-guides-datasheets.html](http://www.veeam.com/documentation-guides-datasheets.html)

**Veeam Backup & Replication User Guide (vSphere):**


**Dell EMC technical product documentation:**

[www.dell.com/Identity/global/LoginOrRegister/ffe8cec9-6142-430d-a90a-88bf736701e3?feir=1](http://www.dell.com/Identity/global/LoginOrRegister/ffe8cec9-6142-430d-a90a-88bf736701e3?feir=1)  
(requires a Dell EMC account where access credentials must be entered)

- Dell EMC Data Domain Operating System Administration Guide
- Dell EMC Data Domain Boost for Partner Integration Administration guide
About Veeam Software

Veeam is the global leader in Intelligent Data Management for the Hyper-Available Enterprise. Veeam Hyper-Availability Platform is the most complete solution to help customers on the journey to automating data management and ensuring the Hyper- Availability of data. We have more than 307,000 customers worldwide, including 75% of the Fortune 500 and 58% of the Global 2000. Our customer satisfaction scores, at 3.5X the industry average, are the highest in the industry. Our global ecosystem includes 57,600 channel partners; Cisco, HPE, and NetApp as exclusive resellers; and nearly 19,800 cloud and service providers. Headquartered in Baar, Switzerland, Veeam has offices in more than 30 countries. To learn more, www.veeam.com or follow Veeam on Twitter @veeam.
Intelligent Data Management fuels the Fortune 500