

# EonStor GS/DS DM-Multipath for Linux Feature Guide

This document describes how to configure iSCSI target and DM-Multipath on Linux OS.

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## Summary

This application note provides instructions on how to connect a Linux server with the EonStor GS/GSe SAN storage systems via iSCSI and on how to configure multipaths for data transmission.

## Audience

This application note is intended for Infortrend customers, partners, and employees who are installing and/or configuring the EonStor GS/GSe/DS systems.

## What's in This Guide

This guide contains the following topics:

- **Configure iSCSI target on Linux:** You can find the instructions on how to configure the EonOne storage system as the iSCSI target.
- **DM-Multipath configuration:** You can find the instructions on how to enable and check the multipath configurations.

## What You Should Know Before Reading

This application note assumes that you are familiar with basic server, storage, and networking concepts and configurations.

# Introduction

## Key Features of DM-Multipath

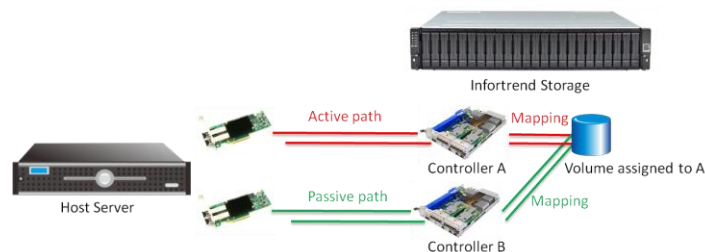
DM-Multipath (Device mapper multipathing) allows users to configure multiple I/O paths between the host server and the storage system with different path grouping policies in Linux block-level environments. For Infortrend storage systems, it is recommended that you use the Group by Priority mode for general purpose. Therefore, the I/O can be handled through the channels of the controller which the LUN was assigned to.

## Performance Balancing

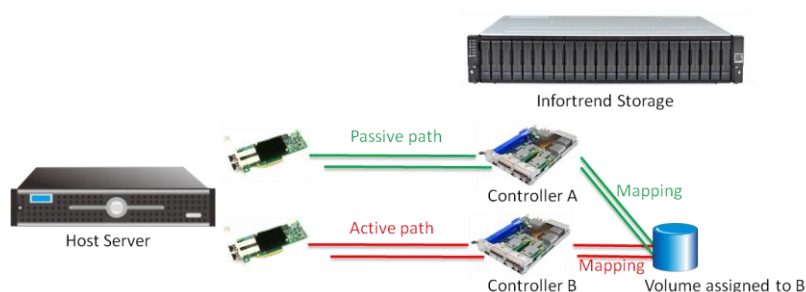
DM-Multipath can dynamically re-balance workloads across all mapped channels within the same controller.

## Path Redundancy

The mapped channels of the secondary controller are passive paths that stand by until the primary data paths fail. It is highly recommended that you create multiple pools on the storage system and assign them to different controllers to ensure that all paths on both controllers can be utilized.



**Group by Priority Multipath**



# Configure iSCSI Target on Linux

## Configure iSCSI Target

### Install iSCSI Initiator

1. Access the terminal on the Linux server via SSH and run the command:

```
yum install iscsi-initiator-utils
```

2. Confirm the question with `y` to install the iSCSI initiator:

```
Is this ok [y/N]: y
```

3. Modify the item in the `/etc/iscsi/iscsid.conf` file as shown below:

```
node.startup = automatic
```

### Install iSCSI Discovery

1. Run the command to start the iSCSI discovery with the specified iSCSI host port addresses:

```
iscsiadm -m discovery -t sendtargets -p [port ip address]
```

Example: `iscsiadm -m discovery -t sendtargets -p 172.24.110.85`

2. You can find the IQN (iSCSI Qualified Name) of the host port address as shown below:

```
172.24.110.85:3260,1 iqn.2002-10.com.infortrend:raid.uid413124.101
```

### Log in to iSCSI Targets

1. Log in to the iSCSI target (i.e. the storage system) with the acquired IQN with the command:

```
iscsiadm -m node -T [iqn] --login
```

Alternatively, you can enter the command to log in to all the available iSCSI targets:

```
iscsiadm -m node -L all
```

Example: `iscsiadm -m node -T iqn.2002-10.com.infortrend:raid.uid413124.101 --login`

If the iSCSI targets need to be updated, use the command to rescan the iSCSI targets:

```
iscsiadm -m node -R
```

## Check the Storage Disks

1. Check the disk via the command:

```
fdisk -l
```

2. You can find all disks' information in the following format:

```
Disk /dev/sdf: 325.5 GB, 325494767616 bytes, 635731968 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x00000000
```

# DM-Multipath Configurations

## Enable DM-Multipath

### Install DM-Multipath

1. Run the command to install **device-mapper-multipath**:

```
yum install device-mapper-multipath
```

### Edit the Configuration File

1. Enable DM-Multipath configuration via the command below:

```
mpathconf --enable
```

If the configuration file does not exist, a sample template configuration file will be created.

2. Modify the last section of the configuration file as shown below. The configuration file can be found in **/etc/multipath.conf**.

For Red Hat Enterprise Linux 7.8 or later Versions

```
devices {  
    device {  
        vendor            "IFT"  
        product           "GS 3000 Series"  
        path_grouping_policy group_by_prio  
        path_selector      "round-robin 0"  
        uid_attribute      ID_SERIAL  
        hardware_handler   "1 alua"  
        failback           15  
        rr_weight           uniform  
        no_path_retry      12  
        prio               alua  
    }  
}
```



For Red Hat Enterprise Linux 7

```
devices {  
    device {  
        vendor            "IFT"  
        path_grouping_policy group_by_prio  
        path_selector      "round-robin 0"  
        uid_attribute      ID_SERIAL  
        hardware_handler   "0"  
        failback           15  
        rr_weight           uniform  
        no_path_retry       12  
        prio               alua  
    }  
}
```

For Red Hat Enterprise 6:

```
devices {  
    device {  
        vendor                "IFT"  
        path_grouping_policy   group_by_prio  
        getuid_callout         "/lib/udev/scsi_id --whitelisted --device=/dev/%n"  
        path_checker           readsector0  
        path_selector          "round-robin 0"  
        hardware_handler       "0"  
        failback               15  
        rr_weight              uniform  
        no_path_retry          12  
        prio                   alua  
    }  
}
```

3. For more attributes settings, refer to the [Red Hat official documentation](#).

## Restart the DM-Multipath Service

1. To enable the changes in the configuration file, restart the DM-Multipath service with the command:

```
service multipathd.service restart
```

2. If you see a message “Redirecting to /bin/systemctl restart multipathd.service.service”, use the command:

```
systemctl restart multipathd.service
```

## Flush All Unused Multipath Device Maps

1. We strongly recommend that you flush all unused multipaths with the command if there are other multipaths in the environment:

```
multipath -F
```

## Check DM-Multipath

1. Use the command to check multipath detail information:

```
multipath -l
```

Alternatively, you can do so with the command:

```
multipath -ll
```

2. You can find the multipath information as shown below. For example, the **sdb**, **sde**, **sdc** and **sdd** paths are combined into a multipath **mpathc**.

Each path may have either status:

- Active: An active path is enabled and is currently in charge of data transmission.
- Enabled: An enabled path is enabled and stands by until any active path fails.

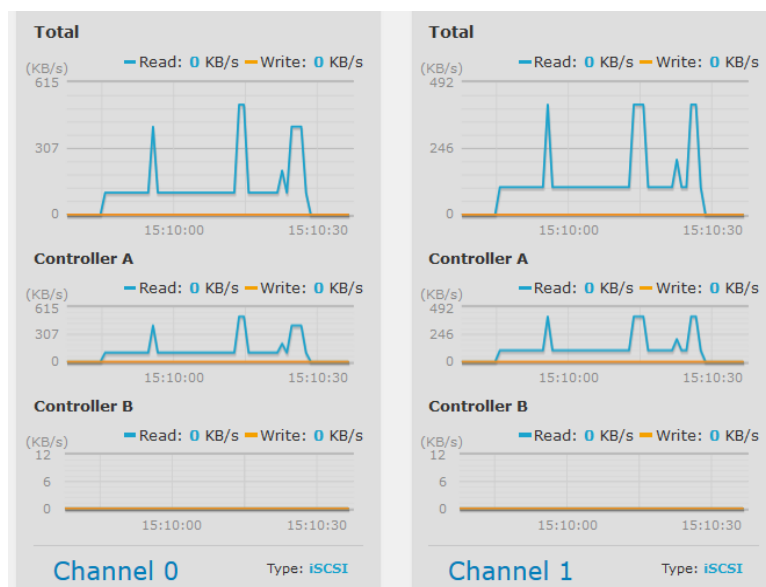
```
mpathb (3600d0231000ac8cf3b208d465aef9fa9) dm-2 IFT ,GSe 3000 Series
size=100T features='1 queue_if_no_path' hwhandler='0' wp=rw
`-+- policy='round-robin 0' prio=0 status=active
   |- 35:0:0:3 sdb 8:16 active undef running
   `-- 35:0:0:4 sdc 8:32 active undef running
```

## Perform a DM-Multipath Test

To ensure that the DM-Multipath is well configured in the Group by Priority mode, perform a test by directing data access traffic to the storage system and then checking the storage system's management interface.

The example shows the result with dd test benchmark

```
dd if=/dev/mapper/mpathc of=/dev/null iflag=direct bs=4096 count=100000
```



## Appendix

The host IQN information is required while you configure the extended LUN mapping via the iSCSI protocol. Follow the instructions to acquire the host IQN information on Linux.

### Get IQN on a Linux CentOS Server

To get the storage system's IQN from the Linux CentOS server, follow the instructions below.

1. Access the terminal via SSH and run the command:

```
yum install iscsi-initiator-utils
```

2. Confirm the question with `y` to install the iSCSI initiator:

```
Is this ok [y/N]: y
```

3. After the installation is completed, run the command to show the server's IQN:

```
cat /etc/iscsi/initiatorname.iscsi
```

4. The server's host IQN is then displayed as below:

```
InitiatorName=iqn.1994-05.com.redhat:aaa79d9cdda6
```

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