NVMesh CLI Guide

2.5.2 — Last update: 11 March 2024

NVIDIA - Mellanox

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1. Copyright and Trademark Information

2. Preface

Excelero™ creates innovative, high performance storage solutions that accelerate business applications and deliver outstanding return on investment with the lowest cost of ownership. The NVMesh® software defined block storage product offers the performance of local flash with the convenience, efficiency and redundancy of an all-flash-array. For details, go to: www.excelero.com.

This document describes the command-line interface of the Excelero NVMesh storage solution and accompanying command-line utilities. For more information on NVMesh refer to NVMesh User Guide.

AUDIENCE

The primary audience for this document is intended to be storage and/or application administration personnel responsible for installing and deploying the Excelero NVMesh product.

NON-DISCLOSURE REQUIREMENTS

FEEDBACK

We continually try to improve the quality and usefulness of Excelero documentation. If you have any corrections, feedback, or requests for additional documentation, send an e-mail message to support@excelero.com

INFORMATION ABOUT THIS DOCUMENT

All information about this document including typographical conventions, references, and a glossary of terms can be found in the Document Reference Section.

3. Introduction

The `nvmesh` CLI tool provides a command-line user interface to manage NVMesh. This interface can be used to send one-line management commands to NVMesh or write shell scripts. Additionally, it offers an interactive shell.
`nvmesh` uses the NVMesh RESTful API, terminal command line tools and `ssh` for day-to-day management and provisioning activities with homogeneous semantics.

4. Installation

4.1. Supported Environments

Any Linux distribution with GLIBC >= 2.12.

4.2. Installation & Start

1. Install the **nvmesh-utils** package. (Available from the Excelero NVMesh yum/apt repo.)
2. To start the NVMesh-shell tool, simply run/type: `nvmesh` in your terminal window.

5. Using the NVMesh CLI

Initially, `nvmesh` doesn't know anything about the NVMesh environment and no credentials are set. The tool requires NVMesh management / API login information (administrative account) and if there is no pre-shared SSH key set up with all the involved hosts, servers and clients, the root SSH credential is required as well. The easiest and quickest way to configure the required credentials is to launch `nvmesh` and run the `check cluster` command:

```
$ nvmesh check cluster
```

The tool will ask will ask for the SSH credentials where you can choose between sudo and root.
To use sudo for SSH:

```
nvmesh # define sshuser
Do you require sudo for SSH remote command execution? [Yes|No] :y
Please provide the user name to be used for SSH connectivity: <your username>
Please provide the SSH password:
```

To use root for SSH:

```
nvmesh # define sshuser
Do you require sudo for SSH remote command execution? [Yes|No] :n
Please provide the root level SSH user name: root
Please provide the SSH password:
```

If preshared keys are set up throughout, leave the password prompt empty and just hit enter. There is no need to provide a password if preshared keys for the root level user are set up. Then it will ask for the NVMesh API user credentials and the management server to be used.
The API user and password, and the SSH user and password are stored under the users home directory. Passwords are stored encoded and obfuscated as additional protection. In addition, the NVMesh management server information is stored in the users home directory.

5.1. Prerequisites

Two configurations should be made in order to use to CLI for the first time:

1. Configuring the nvmesh.conf file to the management we want to work with and save it to: `/etc/opt/NVMesh/nvmesh.conf`.
If the **nvmesh-core** package is installed on the machine, the file will be present, otherwise, it should be created under the mentioned path and include the following content:

```
# NVMesh configuration file
# This configuration file is utilized by Excelero NVMesh(tm) applications for
```

```
various options.

# Define the management protocol
# MANAGEMENT_PROTOCOL="<https/http>"
# Example
# MANAGEMENT_PROTOCOL="https"

MANAGEMENT_PROTOCOL="https"

# Define the location of the NVMesh Management Websocket servers
# MANAGEMENT_SERVERS="<server name or IP>:<port>,<server name or IP>:<por
t>,..."
# Example:
# MANAGEMENT_SERVERS="nvmesh-management1:4001,nvmesh-management2:4001"

MANAGEMENT_SERVERS="localhost:4001"
```

2. When you first try to use the CLI/shell you will be prompted to provide a valid user name and password for the *management server* API, the CLI will authenticate the user, then you will not be prompted again unless you logout from the CLI/shell.
Also, you will need to provide valid SSH credentials for performing attach/detach operations on a remote client, you can change those credentials in the future using the define-ssh command.
The API and SSH credentials will be stored in the user's home directory under .nvmesh_cli_files/, see the nvmesh CLI Files section for more details.

5.2. nvmesh CLI Files

`/etc/opt/NVMesh/nvmesh.conf`	Stores the NVMesh management server name
`~/.nvmesh_cli_files/nvmesh_api_secrets`	Stores the API username and password
`~/.nvmesh_cli_files/nvmesh_cli_history`	Stores the NVMesh shell cli tool command history.
`~/.nvmesh_cli_files/nvmesh_ssh_secrets`	Stores the SSH user information

5.3. Interactive vs CLI

All of the tool's capabilities are available in two modes: Interactive and CLI.

CLI Mode

To use the CLI mode, just invoke `nvmesh` with all the commands and options you need to complete an action such as this example:


```
nvmesh client attach -c client1 -v volume1
```

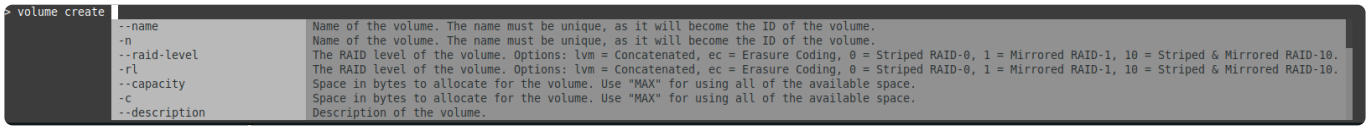
Interactive Mode

To use the interactive mode just type: `nvmesh` (with no additional arguments)

Interactive mode features:
1 .Use the '!' prefix to execute shell commands locally:

```
> !date
Tue Apr 29 19:08:48 IDT 2019
```

2. Get auto-completion by hitting tab:



3. Traverse and search the shell history using up, down arrows and Ctrl + r respectively:
`(reverse-i-search)`vol`: volume create --name v3 --raid-level 0 --target-classes rc --capacity 1000000000000 --stripe-width 2 --stripe-size 32`

5.4. Command Structure

The full command structure is as follows:

Typing `nvmesh --help` will provide the first level of the available commands:

```
Usage: nvmesh [OPTIONS] COMMAND [ARGS]...

  For interactive mode run 'nvmesh' without any additional commands. While
  in interactive mode you can use '!' prefix to execute shell commands,
  traverse and search the CLI history using 'up', 'down' arrows and 'Ctrl+r'
  respectively, and auto-complete commands by hitting 'tab'.

Options:
  --help  Show this message and exit.

Commands:
  client       Group Clients related operations
  cluster      Group Cluster related operations
  define-ssh   Define new SSH credentials
  drive        Group Drives related operations
  driveclass   Group Drive Classes related operations
```



```
  logout       Logout the current user from the CLI
  target       Group Targets related operations
  targetclass  Group Target Classes related operations
  version      Show nvmesh CLI version
  volume       Group Volumes related operations
  vpg          Group VPGs related operations
```

All of the commands (except for `logout`, `define-ssh` and `version`) are NVMesh entities.
For every entity, there is a second level of commands that are operations on that entity. Typing `nvmesh targetclass --help` will provide us with the target class operations:

```
Usage: nvmesh  targetclass [OPTIONS] COMMAND [ARGS]...

  Group Target Classes related operations

Options:
  --help  Show this message and exit.

Commands:
  create  Create a target class.
  delete  Delete target classes.
  show    Show all target classes.
  update  Update a target class.
```

5.5. Help

Typing `--help` with any combination of commands will provide a help screen with the optional commands/arguments for that command.

For example:

```
vpg create --help
Usage: nvmesh  vpg create [OPTIONS]

  Create VPGs.

  usage example: -n v11 --raid-level ec -c 100000000000 --data-blocks 2
  --parity-blocks 1 --protection-level full --stripe-width 1

Options:
  -n, --name TEXT                 Name of the volume. The name must be unique,
                                  as it will become the ID of the volume.
                                  [required]
  -rl, --raid-level [lvm|ec|0|1|10]
                                  The RAID level of the volume. Options: lvm =
```

```
                                Concatenated, ec = Erasure Coding, 0 =
                                Striped RAID-0, 1 = Mirrored RAID-1, 10 =
                                Striped & Mirrored RAID-10.  [required]
-c, --capacity INTEGER          Space in bytes to allocate for the volume.
-d, --description TEXT          Description of the volume.
--domain TEXT                   Domain to use.
-dc, --drive-classes TEXT       Limit volume allocation to specific drive
                                classes.
-tc, --target-classes TEXT      Limit volume allocation to specific target
                                classes.
--stripe-width INTEGER          Number of disks to use. Required if RAID
                                Level is 0 or 10.
--data-blocks INTEGER RANGE     Number of disks to use. Required if RAID
                                Level is ec.
--parity-blocks INTEGER RANGE   Number of disks to use. Required if RAID
                                Level is ec.
--protection-level [full|minimal|ignore]
                                Protection level to use. Required if RAID
                                Level is ec. Options: full = Full
                                Separation, minimal = Minimal Separation,
                                ignore = Ignore Separation.
--help                          Show this message and exit.
```

6. Command Reference

First level commands:

6.1. exit

```
Usage: nvmesh exit [OPTIONS]

  Exit interactive mode

Options:
  -h, --help  Show this message and exit.
```

6.2. logout

```
Usage: nvmesh logout [OPTIONS]

  Logout the current user from the CLI

Options:
  --help  Show this message and exit.
```

6.3. login

```
Usage: nvmesh login [OPTIONS]

  Define new API credentials, previous credentials will be overridden.

Options:
  -u, --user TEXT      API user name
  -p, --password TEXT  API password
```

```
  -h, --help           Show this message and exit.
```

6.4. define-ssh

```
Usage: nvmesh define-ssh [OPTIONS]

  Define new SSH credentials

Options:
  --help  Show this message and exit.
```

6.5. version

```
Usage: nvmesh  version [OPTIONS]

  Show nvmesh CLI version

Options:
  --help  Show this message and exit.
```

6.6. client

```
Usage: nvmesh client [OPTIONS] COMMAND [ARGS]...

  Client related operations

Options:
  --help  Show this message and exit.

Commands:
  attach  Attach volumes to clients.
  count   Get total clients count.
  delete  Delete clients.
  detach  Detach volumes from clients.
  show    Show all clients.
```

6.6.1. attach

```
Usage: nvmesh client attach [OPTIONS]

  Attach volumes to clients. The default access level is SHARED_READ_WRITE.
```

```
  If an access mode is provided then you can only specify one client. The
  preempt flag must be used together with an access level.

  Usage examples:

  Attach 2 volumes named 'volume-1' and 'volume-2' to 2 clients named
  'client-1' and 'client-2':

  $ nvmesh client attach -c client-1 -c client-2 -v volume-1 -v volume-2

  Attach a volume named 'volume-3' in an exclusive read/write mode to a
  client named 'client-1':

  $ nvmesh client attach -c client-1 -v volume-3 -a EXCLUSIVE_READ_WRITE

  Attach a volume named 'volume-3' in a shared read only mode to a client
  named 'client-1', preempting any existing access mode:

  $ nvmesh client attach -c client-1 -v volume-3 -a SHARED_READ_ONLY -p

Options:
  -c, --client TEXT               The hostname or address of the client
                                  [required]
  -v, --volume TEXT               The id of the volume to attach  [required]
  -a, --access [EXCLUSIVE_READ_WRITE|SHARED_READ_ONLY|SHARED_READ_WRITE]
                                  Volume access level: EXCLUSIVE_READ_WRITE,
                                  SHARED_READ_ONLY, SHARED_READ_WRITE
  -p, --preempt                   Use preempt for applying access level
  -h, --help                      Show this message and exit.
```

6.6.2. count

```
Usage: nvmesh client count [OPTIONS]

  Get total clients count.

Options:
  --help  Show this message and exit.
```

6.6.3. delete

```
Usage: nvmesh client delete [OPTIONS]

  Delete clients.
```

```
  Usage example, delete 2 clients named 'client1' and 'client2':

  $ nvmesh client delete -n client1 -n client2

Options:
  -n, --name TEXT  The id of the client to delete.  [required]
  -h, --help       Show this message and exit.
```

6.6.4. detach

```
Usage: nvmesh client detach [OPTIONS]

  Detach volumes from clients. For client that is not a localhost the
  operation will be performed via SSH.

  Usage example, detach 2 volumes named 'volume-1' and 'volume-2' from 2
  clients named 'client-1' and 'client-2':

  $ nvmesh client detach -c client-1 -c client-2 -v volume-1 -v volume-2

Options:
  -c, --client TEXT  The hostname or address of the client  [required]
  -v, --volume TEXT  The id of the volume to detach  [required]
  -f, --force        Force detach
  -h, --help         Show this message and exit.
```

6.6.5. show

```
Usage: nvmesh client show [OPTIONS]

  Show clients.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.
```

```
  Usage example:

  Skip the first 20 clients, limit the results to 5 clients and present it
  in a tabular format:

  $ nvmesh client show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific client by name. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.7. cluster

```
Usage: nvmesh cluster [OPTIONS] COMMAND [ARGS]...

  Cluster related operations

Options:
  -h, --help  Show this message and exit.

Commands:
  show       Show NVMesh cluster.
  shut-down  Start shut down process for an NVMesh cluster.
```

6.7.1. show

```
Usage: nvmesh cluster show [OPTIONS]

  Show NVMesh cluster.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.
```

```
  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example, show cluster information in a tabular format:

  $nvmesh cluster show --output-format tabular

Options:
  --output-format [tabular|rows|json]
                                The representation in which the data will be
                                displayed. Options: tabular ,rows, json
  -h, --help                    Show this message and exit.
```

6.7.2. shut-down

```
Usage: nvmesh cluster shut-down [OPTIONS]

  Start shut down process for an NVMesh cluster.

  Usage example:

  $nvmesh cluster shut-down

Options:
  -h, --help  Show this message and exit.
```

6.8. drive

```
Usage: nvmesh drive [OPTIONS] COMMAND [ARGS]...

  Drive related operations

Options:
  -h, --help  Show this message and exit.

Commands:
  add-arbiter     Add an arbitration device.
  delete          Delete drives.
  evict           Evict specific drives by serial number.
  exclude-nvme    Exclude nvme drive from NVMesh pool.
  format          Starts the format process for the specified drives.
```

```
  include-nvme    Include an nvme drive in the NVMesh pool.
  remove-arbiter  Remove an arbitration device.
  show            Show drives.
```

6.8.1. show

```
Usage: nvmesh drive show [OPTIONS]

  Show drives.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 drives, limit the results to 5 drives and present it in
  a tabular format:

  $ nvmesh drive show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific drive by name NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.8.2. delete

```
Usage: nvmesh drive delete [OPTIONS]
```

```
  Delete drives.

  Usage example, delete 2 drives named 'serial1' and 'serial2':

  $ nvmesh drive delete -n serial1 -n serial2

Options:
  -n, --name TEXT  The serial number of the drive to delete.  [required]
  -h, --help       Show this message and exit.
```

6.8.3. evict

```
Usage: nvmesh drive evict [OPTIONS]

  Evict specific drives by serial number.

  Usage example, evict 2 drives named 'serial.1' and 'serial.2':

  $ nvmesh drive evict -n serial.1 -n serial.2

Options:
  -n, --name TEXT  The serial number of the drive to evict  [required]
  -y, --yes        Automatically answer "yes" and skip operational warnings.
  -h, --help       Show this message and exit.
```

6.8.4. format

```
Usage: nvmesh drive format [OPTIONS]

  Starts the format process for the specified drives.

  Usage example, format 2 drives named 'serial.1' and 'serial.2':

  $ nvmesh drive format -n serial.1 -n serial.2

Options:
  -n, --name TEXT  The serial number of the drive to format  [required]
  -y, --yes        Automatically answer "yes" and skip operational warnings.
  -h, --help       Show this message and exit.
```

6.8.5. add-arbiter

```
Usage: nvmesh drive add-arbiter [OPTIONS]

  Add an arbitration device. For a target that is not localhost, the
  operation will be performed via SSH.

  Usage example, add an arbitration device to 2 targets named 'target-1' and
  'target-2':

  $ nvmesh drive add-arbiter -t target-1 -t target-2

Options:
  -t, --target TEXT  The hostname or address of the target  [required]
  -h, --help         Show this message and exit.
```

6.8.6. remove-arbiter

```
Usage: nvmesh drive remove-arbiter [OPTIONS]

  Remove an arbitration device. For a target that is not localhost, the
  operation will be performed via SSH.

  Usage example, remove an arbitration device from 2 targets named
  'target-1' and 'target-2':

  $ nvmesh drive remove-arbiter -t target-1 -t target-2

Options:
  -t, --target TEXT  The hostname or address of the target  [required]
  -h, --help         Show this message and exit.
```

6.8.7. include-nvme

```
Usage: nvmesh drive include-nvme [OPTIONS]

  Include an nvme drive in the NVMesh pool. For a target that is not
  localhost the operation will be performed via SSH.

  Usage example, include a nvme drive named 'serial.1' into the NVMesh pool
  of a target named 'target-1':

  $ nvmesh drive include-nvme -t target-1 -s serial.1
```

```
Options:
  -t, --target TEXT  The hostname or address of the target  [required]
  -s, --serial TEXT  The serial number of the drive  [required]
  -h, --help         Show this message and exit.
```

6.8.8. exclude-nvme

```
Usage: nvmesh drive exclude-nvme [OPTIONS]

  Exclude nvme drive from NVMesh pool. For a target that is not localhost,
  the operation will be performed via SSH.

  Usage example, exclude a nvme drive named 'serial.1' from the NVMesh pool
  of a target named 'target-1':

  $ nvmesh drive exclude-nvme -t target-1 -s serial.1

Options:
  -t, --target TEXT  The hostname or address of the target  [required]
  -s, --serial TEXT  The serial number of the drive  [required]
  -h, --help         Show this message and exit.
```

6.9. driveclass

```
Usage: nvmesh driveclass [OPTIONS] COMMAND [ARGS]...

  Drive Class related operations

Options:
  --help  Show this message and exit.

Commands:
  create  Create a drive class.
  delete  Delete drive classes.
  show    Show all drive classes.
  update  Update a drive class.
```

6.9.1. create

```
Usage: nvmesh driveclass create [OPTIONS]
```

```
  Create a drive class.

  Usage example, create a drive class named 'dc1' from 2 drives named
  'samsungDriveSerial1' and 'intelDriveSerial12', the drive class will
  consider a domain with a scope named 'Rack' and an identifier named 'A':

   $ nvmesh driveclass create --name dc1 --drive samsungDriveSerial1 --drive
   intelDriveSerial12 --domain Rack:A

Options:
  -n, --name TEXT         The name of the drive class  [required]
  -dr, --drive TEXT       The drive's serial number. NOTE: This option can be
                          used multiple times, e.g. -dr <value> -dr <value>.
                          It can also be used once with multiple values
                          separated with the ',' character, e.g. -dr
                          <value>,<value>,<value>  [required]
  -d, --description TEXT  The description of the drive class
  --domain TEXT           Domain in the following format: <scope:identifier>
  -h, --help              Show this message and exit.
```

6.9.2. delete

```
Usage: nvmesh driveclass delete [OPTIONS]

  Delete drive classes.

  Usage example, delete 2 drive classes named 'dc1' and 'dc2':

  $ nvmesh driveclass delete -n dc1 -n dc2

Options:
  -n, --name TEXT  The id of the drive class to delete. NOTE: This option can
                   be used multiple times, e.g. -n <value> -n <value>. It can
                   also be used once with multiple values separated with the
                   ',' character, e.g. -n <value>,<value>,<value>  [required]
  -h, --help       Show this message and exit.
```

6.9.3. show

```
Usage: nvmesh driveclass show [OPTIONS]

  Show drive classes.

  --output-format options:
```

```
  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 drive classes, limit the results to 5 drive classes and
  present it in a tabular format:

  $ nvmesh driveclass show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific drive class by name. NOTE:
                                  This option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.9.4. update

```
Usage: nvmesh driveclass update [OPTIONS]

  Update a drive class.

  Usage example, update a drive class named 'dc1' to include 2 drives named
  'samsungDriveSerial1' and 'intelDriveSerial12', and consider a domain with
  a scope named 'Rack' and an identifier named 'A':

   $ nvmesh driveclass update --name dc1 --drive samsungDriveSerial1 --drive
   intelDriveSerial12 --domain Rack:A

Options:
  -n, --name TEXT         The name of the drive class  [required]
```

```
  -dr, --drive TEXT       The drive's serial number. NOTE: This option can be
                          used multiple times, e.g. -dr <value> -dr <value>.
                          It can also be used once with multiple values
                          separated with the ',' character, e.g. -dr
                          <value>,<value>,<value>  [required]
  -d, --description TEXT  The description of the drive class
  --domain TEXT           Domain in the following format: <scope:identifier>
  -h, --help              Show this message and exit.
```

6.10. target

```
Usage: nvmesh target [OPTIONS] COMMAND [ARGS]...

  Target related operations

Options:
  --help  Show this message and exit.

Commands:
  count         Get total targets count.
  delete        Delete targets.
  delete-nic    Delete specific NIC.
  show          Show all targets.
```

6.10.1. count

```
Usage: nvmesh target count [OPTIONS]

  Get total targets count.

Options:
  --help  Show this message and exit.
```

6.10.2. delete

```
Usage: nvmesh target delete [OPTIONS]

  Delete targets.

  Usage example, delete 2 targets named 'server1' and 'server2':

  $ nvmesh target delete -n server1 -n server2
```

```
Options:
  -n, --name TEXT  The id of the server to delete  [required]
  -h, --help       Show this message and exit.
```

6.10.3. delete-nic

```
Usage: nvmesh target delete-nic [OPTIONS]

  Delete specific NIC.

  Usage example, delete a NIC with the ID
  '0xfe80000000000000001e670300932499' from a target named 'server-1':

  $ nvmesh target delete-nic -n 0xfe80000000000000001e670300932499 -t
  server-1

Options:
  -n, --name TEXT    ID of the NIC to delete  [required]
  -t, --target TEXT  ID of the target where the NIC resides  [required]
  -h, --help         Show this message and exit.
```

6.10.4. show

```
Usage: nvmesh target show [OPTIONS]

  Show targets.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 targets, limit the results to 5 targets and present it
  in a tabular format:
```

```
  $ nvmesh target show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific target by name. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.11. targetclass

```
Usage: nvmesh targetclass [OPTIONS] COMMAND [ARGS]...

  Target Class related operations

Options:
  --help  Show this message and exit.

Commands:
  create  Create a target class.
  delete  Delete target classes.
  show    Show all target classes.
  update  Update a target class.
```

6.11.1. create

```
Usage: nvmesh targetclass create [OPTIONS]

  Create a target class.

  Usage example, create a target class named 'tc1' from 2 targets named
  'server-1' and 'server-2', the target class will consider a domain with a
  scope named 'Rack' and an identifier named 'A':

  $ nvmesh targetclass create --name tc1 --target server-1 --target server-2
  --domain Rack:A

Options:
```

```
  -n, --name TEXT         The name of the target class  [required]
  -t, --target TEXT       The name of the target to group under the target
                          class. NOTE: This option can be used multiple times,
                          e.g. -t <value> -t <value>. It can also be used once
                          with multiple values separated with the ','
                          character, e.g. -t <value>,<value>,<value>
                          [required]
  -d, --description TEXT  The description of the target class
  --domain TEXT           Domain in the following format: <scope:identifier>
  -h, --help              Show this message and exit.
```

6.11.2. delete

```
Usage: nvmesh targetclass delete [OPTIONS]

  Delete target classes.

  Usage example, delete 2 target classes named 'tc1' and 'tc2':

  $ nvmesh targetclass delete -n tc1 -n tc2

Options:
  -n, --name TEXT  The id of the drive class to delete. NOTE: This option can
                   be used multiple times, e.g. -n <value> -n <value>. It can
                   also be used once with multiple values separated with the
                   ',' character, e.g. -n <value>,<value>,<value>  [required]
  -h, --help       Show this message and exit.
```

6.11.3. show

```
Usage: nvmesh targetclass show [OPTIONS]

  Show target classes.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.
```

```
  Usage example:

  Skip the first 20 target classes, limit the results to 5 target classes
  and present it in a tabular format:

  $ nvmesh targetclass show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific target class by name. NOTE:
                                  This option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.11.4. update

```
Usage: nvmesh targetclass update [OPTIONS]

  Update a target class.

  Usage example, update a target class named 'tc1' with 2 targets named
  'server-1' and 'server-2', the target class will consider a domain with a
  scope named 'Rack' and an identifier named 'A':

  $ nvmesh targetclass update --name tc1 --target server-1 --target server-2
  --domain Rack:A

Options:
  -n, --name TEXT         The name of the target class  [required]
  -t, --target TEXT       The name of the target to group under the target
                          class. NOTE: This option can be used multiple times,
                          e.g. -t <value> -t <value>. It can also be used once
                          with multiple values separated with the ','
                          character, e.g. -t <value>,<value>,<value>
                          [required]
  -d, --description TEXT  The description of the target class
  --domain TEXT           Domain in the following format: <scope:identifier>
  -h, --help              Show this message and exit.
```

6.12. volume

```
Usage: nvmesh volume [OPTIONS] COMMAND [ARGS]...

  Volume related operations

Options:
  -h, --help  Show this message and exit.

Commands:
  create   Create volume.
  delete   Delete volumes.
  rebuild  Rebuild volumes.
  show     Show volumes.
  update   Update volume.
```

6.12.1. create

```
Usage: nvmesh volume create [OPTIONS]

  Create volume.

  IMPORTANT: When creating a volume only one of the following can be
  defined: VPG, target/drive classes, limit by targets/drives.

  Usage example, create a volume named 'r1_vol' whose type is Mirrored
  RAID-1 and has a capacity of 1TB:

  $ nvmesh volume create -n r1_vol --raid-level 1 -c 1T

Options:
  -n, --name TEXT                 The name of the volume. The name must be
                                  unique, as it will become the ID of the
                                  volume.  [required]
  -rl, --raid-level [lvm|ec|0|1|10]
                                  The RAID level of the volume. Options: lvm =
                                  Concatenated, ec = Erasure Coding, 0 =
                                  Striped RAID-0, 1 = Mirrored RAID-1, 10 =
                                  Striped & Mirrored RAID-10. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `vpg`.  [required]
  -c, --capacity TEXT             The capacity of the allocated volume in
                                  bytes. Minimal volume capacity is 1GB.The
                                  number of bytes may be followed by the
```

```
                                following multiplicative suffixes: K/KB
                                =1000, KiB =1024, M/MB =1000^2, MiB =1024^2,
                                G/GB =1000^3, GiB =1024^3, T/TB =1000^4, TiB
                                =1024^4, , PiB =1024^5. Use "MAX" for using
                                all of the available space. All the units
                                are case insensitive.  [required]
-d, --description TEXT          Description of the volume.
--domain TEXT                   Domain to use.
--vpg TEXT                      The VPG to use.
--relative-rebuild-priority INTEGER RANGE
                                Sets the volume relative rebuild priority.
-dc, --drive-class TEXT         Limit volume allocation to specific drive
                                classes. NOTE: This option can be used
                                multiple times, e.g. -dc <value> -dc
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -dc <value>,<value>,<value>
-tc, --target-class TEXT        Limit volume allocation to specific target
                                classes. NOTE: This option can be used
                                multiple times, e.g. -tc <value> -tc
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -tc <value>,<value>,<value>
-D, --limit-by-drive TEXT       Limit volume allocation to specific drives.
                                NOTE: This option can be used multiple
                                times, e.g. -D <value> -D <value>. It can
                                also be used once with multiple values
                                separated with the ',' character, e.g. -D
                                <value>,<value>,<value>
-T, --limit-by-target TEXT      Limit volume allocation to specific targets.
                                NOTE: This option can be used multiple
                                times, e.g. -T <value> -T <value>. It can
                                also be used once with multiple values
                                separated with the ',' character, e.g. -T
                                <value>,<value>,<value>
--stripe-width INTEGER          Number of disks to use. Required if RAID
                                Level is 0 or 10.
--wait-for-status [online|offline|degraded]
                                Wait for the volume to become in a specific
                                status before continue. Options: online,
                                offline, degraded.
--timeout INTEGER               Maximum time in seconds to wait for status.
                                (default: 60 seconds)
--data-blocks INTEGER RANGE     Number of disks to use. Required if RAID
                                Level is ec.
--parity-blocks INTEGER RANGE   Number of disks to use. Required if RAID
                                Level is ec.
```

```
  --protection-level, --target-node-redundancy [full|minimal|ignore]
                                Protection level to use. Required if RAID
                                Level is ec. Options: full = Full Separation
                                (N+2 Target redundancy), minimal = Minimal
                                Separation (N+1 Target Redundancy), ignore =
                                Ignore Separation (No Target Redundancy).
                                Optional if the RAID Level is 1 or 10.
                                Options: full = Full Separation (1+1 Target
                                Node Separation) - default, ignore = Ignore
                                Separation (No Target Redundancy).
  --enable-nvmf BOOLEAN         Enables access to the NVMesh volume using
                                the NVMf protocol.
  -nc, --nvmf-client TEXT       The ID of a client that allowed to export
                                via NVMf protocol. NOTE: This option can be
                                used multiple times, e.g. -nc <value> -nc
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -nc <value>,<value>,<value>
  --enable-crc-check BOOLEAN    Enables CRC check of the volume.
  -vsg, --volume-security-group TEXT
                                The name of the associated volume security
                                group. NOTE: This option can be used
                                multiple times, e.g. -vsg <value> -vsg
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -vsg <value>,<value>,<value>
  -h, --help                    Show this message and exit.
```

6.12.2. delete

```
Usage: nvmesh volume delete [OPTIONS]

  Delete volumes.

  Usage example, delete 2 volumes named 'vol1' and 'vol2':

  $ nvmesh volume delete -n vol1 -n vol2

Options:
  -n, --name TEXT      The name of the volume to delete. NOTE: This option can
                       be used multiple times, e.g. -n <value> -n <value>. It
                       can also be used once with multiple values separated
                       with the ',' character, e.g. -n <value>,<value>,<value>
                       [required]
  -y, --yes            Automatically answer "yes" and skip operational
```

```
                        warnings.
  --wait-for-deletion   Wait for the volume to be deleted.
  --timeout INTEGER     Maximum time in seconds to wait for deletion. (default:
                        60 seconds)
  -h, --help            Show this message and exit.
```

6.12.3. rebuild

```
Usage: nvmesh volume rebuild [OPTIONS]

  Rebuild volumes.

  Usage example, rebuild 2 volumes named 'v1' and 'v2':

  $ nvmesh volume rebuild -n v1 -n v2

Options:
  -n, --name TEXT  The name of the volume to rebuild. NOTE: This option can be
                   used multiple times, e.g. -n <value> -n <value>. It can
                   also be used once with multiple values separated with the
                   ',' character, e.g. -n <value>,<value>,<value>  [required]
  -h, --help       Show this message and exit.
```

6.12.4. show

```
Usage: nvmesh volume show [OPTIONS]

  Show volumes.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 volumes, limit the results to 5 volumes and present it
  in a tabular format:
```

```
  $ nvmesh volume show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
                                  NOTE: This option is mutually exclusive with
                                  the follwoing options: `layout`.
  -n, --name TEXT                 Show a specific volume by name. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  --layout                        Show the layout of the volumes in a tabular
                                  representation, the rest of the data will be
                                  displayed in rows format.
  -h, --help                      Show this message and exit.
```

6.12.5. update

```
Usage: nvmesh volume update [OPTIONS]

  Update volume.

  Usage example, update a volume named 'r1_vol' and set its capacity to 2TB:

  $ nvmesh volume update -n r1_vol -c 2T

Options:
  -n, --name TEXT                 The name of the volume. The name must be
                                  unique, as it will become the ID of the
                                  volume.  [required]
  -c, --capacity TEXT             The capacity of the allocated volume in
                                  bytes. Minimal volume capacity is 1GB.The
                                  number of bytes may be followed by the
                                  following multiplicative suffixes: K/KB
                                  =1000, KiB =1024, M/MB =1000^2, MiB =1024^2,
                                  G/GB =1000^3, GiB =1024^3, T/TB =1000^4, TiB
                                  =1024^4, , PiB =1024^5. Use "MAX" for using
                                  all of the available space. All the units
                                  are case insensitive.
  -d, --description TEXT          Description of the volume.
```

```
--domain TEXT                   Domain to use.
-dc, --drive-class TEXT         Limit volume allocation to specific drive
                                classes. NOTE: This option can be used
                                multiple times, e.g. -dc <value> -dc
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -dc <value>,<value>,<value>
-tc, --target-class TEXT        Limit volume allocation to specific target
                                classes. NOTE: This option can be used
                                multiple times, e.g. -tc <value> -tc
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -tc <value>,<value>,<value>
-D, --limit-by-drive TEXT       Limit volume allocation to specific drives.
                                NOTE: This option can be used multiple
                                times, e.g. -D <value> -D <value>. It can
                                also be used once with multiple values
                                separated with the ',' character, e.g. -D
                                <value>,<value>,<value>
-T, --limit-by-target TEXT      Limit volume allocation to specific targets.
                                NOTE: This option can be used multiple
                                times, e.g. -T <value> -T <value>. It can
                                also be used once with multiple values
                                separated with the ',' character, e.g. -T
                                <value>,<value>,<value>
--relative-rebuild-priority INTEGER RANGE
                                Sets the volume relative rebuild priority.
--enable-nvmf BOOLEAN           Enables access to the NVMesh volume using
                                the NVMf protocol.
-nc, --nvmf-client TEXT         The ID of a client that allowed to export
                                via NVMf protocol. NOTE: This option can be
                                used multiple times, e.g. -nc <value> -nc
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -nc <value>,<value>,<value>
--enable-crc-check BOOLEAN      Enables CRC check of the volume. Can only be
                                updated on an EC volume.
-vsg, --volume-security-group TEXT
                                The name of the associated volume security
                                group. NOTE: This option can be used
                                multiple times, e.g. -vsg <value> -vsg
                                <value>. It can also be used once with
                                multiple values separated with the ','
                                character, e.g. -vsg <value>,<value>,<value>
-h, --help                      Show this message and exit.
```

6.13. vpg

```
Usage: nvmesh vpg [OPTIONS] COMMAND [ARGS]...

  VPG related operations

Options:
  --help  Show this message and exit.

Commands:
  create  Create VPGs.
  delete  Delete VPGs.
  show    Show all VPGs.
```

6.13.1. create

```
Usage: nvmesh vpg create [OPTIONS]

  Create VPG.

  Usage example, create a VPG named 'r1_vpg' whose type is Mirrored RAID-1
  and has a capacity of 1TB:

  $ nvmesh vpg create -n r1_vpg --raid-level 1 -c 1T

Options:
  -n, --name TEXT                 The name of the volume. The name must be
                                  unique, as it will become the ID of the
                                  volume.  [required]
  -rl, --raid-level [lvm|ec|0|1|10]
                                  The RAID level of the volume. Options: lvm =
                                  Concatenated, ec = Erasure Coding, 0 =
                                  Striped RAID-0, 1 = Mirrored RAID-1, 10 =
                                  Striped & Mirrored RAID-10.  [required]
  -c, --capacity TEXT             The capacity of the allocated volume in
                                  bytes. Minimal volume capacity is 1GB.The
                                  number of bytes may be followed by the
                                  following multiplicative suffixes: K/KB
                                  =1000, KiB =1024, M/MB =1000^2, MiB =1024^2,
                                  G/GB =1000^3, GiB =1024^3, T/TB =1000^4, TiB
                                  =1024^4, , PiB =1024^5. All the units are
                                  case insensitive.
  -d, --description TEXT          Description of the volume.
  --domain TEXT                   Domain to use.
```

```
  -dc, --drive-class TEXT         Limit volume allocation to specific drive
                                  classes.
  -tc, --target-class TEXT        Limit volume allocation to specific target
                                  classes.
  --stripe-width INTEGER          Number of disks to use. Required if RAID
                                  Level is 0 or 10.
  --data-blocks INTEGER RANGE     Number of disks to use. Required if RAID
                                  Level is ec.
  --parity-blocks INTEGER RANGE   Number of disks to use. Required if RAID
                                  Level is ec.
  --protection-level, --target-node-redundancy [full|minimal|ignore]
                                  Protection level to use. Required if RAID
                                  Level is ec. Options: full = Full Separation
                                  (N+2 Target redundancy), minimal = Minimal
                                  Separation (N+1 Target Redundancy), ignore =
                                  Ignore Separation (No Target Redundancy).
                                  Optional if the RAID Level is 1 or 10.
                                  Options: full = Full Separation (1+1 Target
                                  Node Separation) - default, ignore = Ignore
                                  Separation (No Target Redundency).
  --enable-crc-check BOOLEAN      Enables CRC check of the volume.
  -vsg, --volume-security-group TEXT
                                  The name of the associated volume security
                                  group. NOTE: This option can be used
                                  multiple times, e.g. -vsg <value> -vsg
                                  <value>. It can also be used once with
                                  multiple values separated with the ','
                                  character, e.g. -vsg <value>,<value>,<value>
  -h, --help                      Show this message and exit.
```

6.13.2. delete

```
Usage: nvmesh vpg delete [OPTIONS]

  Delete VPGs.

  Usage example, delete 2 VPGs named 'vpg1' and 'vpg2':

  $ nvmesh vpg delete -n vpg1 -n vpg2

Options:
  -n, --name TEXT  The name of the VPG to delete. NOTE: This option can be
                   used multiple times, e.g. -n <value> -n <value>. It can
                   also be used once with multiple values separated with the
                   ',' character, e.g. -n <value>,<value>,<value>  [required]
```

```
  -h, --help       Show this message and exit.
```

6.13.3. show

```
Usage: nvmesh vpg show [OPTIONS]

  Show VPGs.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 VPGs, limit the results to 5 VPGs and present it in a
  tabular format:

  $ nvmesh vpg show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific VPG by name. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.14. mongo-db

```
Usage: nvmesh mongo-db [OPTIONS] COMMAND [ARGS]...

  MongoDB related operations
```

```
Options:
  -h, --help  Show this message and exit.

Commands:
  show  Show Mongo DB status.
```

6.14.1. show

```
Usage: nvmesh mongo-db show [OPTIONS]

  Show Mongo DB status.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example, show MongoDB information in a tabular format:

  $nvmesh mongo-db show --output-format tabular

Options:
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json
  -h, --help                      Show this message and exit.
```

6.15. volume-security-group

```
Usage: nvmesh volume-security-group [OPTIONS] COMMAND [ARGS]...

  Volume Security Group related operations

Options:
  -h, --help  Show this message and exit.

Commands:
```

```
  create  Create a VSG.
  delete  Delete VSGs.
  show    Show VSGs.
  update  Update a VSG.
```

6.15.1. create

```
Usage: nvmesh volume-security-group create [OPTIONS]

  Create a VSG.

  Usage example, create a VSG named 'vsg1':

   $ nvmesh volume-security-group create --name vsg1 --key someKey --key
   someOtherKey

Options:
  -n, --name TEXT         The name of the VSG.  [required]
  -d, --description TEXT  The description of the VSG.
  -k, --key TEXT          The name of the key. NOTE: This option can be used
                          multiple times, e.g. -d <value> -d <value>. It can
                          also be used once with multiple values separated
                          with the ',' character, e.g. -d
                          <value>,<value>,<value>
```

6.15.2. show

```
Usage: nvmesh volume-security-group show [OPTIONS]

  Show VSGs.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:
```

```
  Skip the first 20 VSGs, limit the results to 5 VSGs and present it in a
  tabular format:

  $ nvmesh volume-security-group show --output-format tabular --skip 20
  --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific VSG by name. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit.
```

6.15.3. update

```
Usage: nvmesh volume-security-group update [OPTIONS]

  Update a VSG. The name field cannot be updated.

  Usage example, update a VSG named 'vsg1' with a description:

   $ nvmesh volume-security-group update --name vsg1 --description 'very
   important VSG'

Options:
  -n, --name TEXT         The name of the VSG.  [required]
  -d, --description TEXT  The description of the VSG.
  -k, --key TEXT          The name of the key. NOTE: This option can be used
                          multiple times, e.g. -d <value> -d <value>. It can
                          also be used once with multiple values separated
                          with the ',' character, e.g. -d
                          <value>,<value>,<value>
  -h, --help              Show this message and exit.
```

6.15.4. delete

```
Usage: nvmesh volume-security-group delete [OPTIONS]
```

```
  Delete VSGs.

  Usage example, delete 2 VSGs named 'vsg1' and 'vsg2':

  $ nvmesh volume-security-group delete -n vsg1 -n vsg2

Options:
  -n, --name TEXT  The name of the VSG to delete. NOTE: This option can be
                   used multiple times, e.g. -n <value> -n <value>. It can
                   also be used once with multiple values separated with the
                   ',' character, e.g. -n <value>,<value>,<value>  [required]
  -h, --help       Show this message and exit.
```

6.16. key-pair

Usage: nvmesh key-pair [OPTIONS] COMMAND [ARGS]…

Key Pair related operations

Options: -h, —help Show this message and exit.

Commands: create Create a key. delete Delete keys. download Download keys. show Show keys. update Update a key.

6.16.1. download

```
Usage: nvmesh key-pair download [OPTIONS]

  Download keys.

  Usage example, download a key named 'key1':

  $ nvmesh key-pair download --name key1 --destination '/etc/nvmesh/keys'

Options:
  -n, --name TEXT         The id of the key to download. NOTE: This option can
                          be used multiple times, e.g. -n <value> -n <value>.
                          It can also be used once with multiple values
                          separated with the ',' character, e.g. -n
                          <value>,<value>,<value>  [required]
  -d, --destination TEXT  The destination on the file system to where the key
                          will be downloaded.  [required]
  -h, --help              Show this message and exit.
```

6.16.2. create

```
Usage: nvmesh key-pair create [OPTIONS]

  Create a key.

  Usage example, create a key named 'key1':

   $ nvmesh key-pair create --name key1

Options:
  -n, --name TEXT         The name of the key.  [required]
  -d, --description TEXT  The description of the key.
  -h, --help              Show this message and exit.
```

6.16.3. show

```
Usage: nvmesh key-pair show [OPTIONS]

  Show keys.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 keys, limit the results to 5 keys and present it in a
  tabular format:

  $ nvmesh key-pair show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
```

```
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -n, --name TEXT                 Show a specific key by name. NOTE: This
                                  option is mutually exclusive with the
                                  follwoing options: `skip`, `limit`.
  -h, --help                      Show this message and exit
```

6.16.4. update

```
Usage: nvmesh key-pair update [OPTIONS]

  Update a key. The name field cannot be updated.

  Usage example, update a key named 'key1' with a description:

   $ nvmesh key-pair update --name key1 --description 'very important key'

Options:
  -n, --name TEXT         The name of the key.  [required]
  -d, --description TEXT  The description of the key.  [required]
  -h, --help              Show this message and exit.
```

6.16.5. delete

```
Usage: nvmesh key-pair delete [OPTIONS]

  Delete keys.

  Usage example, delete 2 keys named 'key1' and 'key2':

  $ nvmesh key-pair delete -n key1 -n key2

Options:
  -n, --name TEXT  The id of the key to delete. NOTE: This option can be used
                   multiple times, e.g. -n <value> -n <value>. It can also be
                   used once with multiple values separated with the ','
                   character, e.g. -n <value>,<value>,<value>  [required]
  -h, --help       Show this message and exit.
```

6.17. log

```
Usage: nvmesh log [OPTIONS] COMMAND [ARGS]...

  Log related operations

Options:
  -h, --help  Show this message and exit.

Commands:
  acknowledge             Acknowledge the specified logs by their ID.
  acknowledge-all-alerts  Acknowledge all logged alerts.
  show                    Show logs.
```

6.17.1. acknowledge-all-alerts

```
Usage: nvmesh log acknowledge-all-alerts [OPTIONS]

  Acknowledge all logged alerts.

Options:
  -h, --help  Show this message and exit.
```

6.17.2. acknowledge

```
Usage: nvmesh log acknowledge [OPTIONS]

  Acknowledge the specified logs by their ID.

  Usage example, acknowledge 2 logs with the IDs: 5efc7901e963fb0fb7181f0d
  and 5efcabd2938d006ed224a0ac:

  $ nvmesh logs acknowledge --id 5efc7901e963fb0fb7181f0d --id
  5efcabd2938d006ed224a0ac

Options:
  --id TEXT   The ID of the log to acknowledge  [required]
  -h, --help  Show this message and exit.
```

6.17.3. show

```
Usage: nvmesh log show [OPTIONS]

  Show logs.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  Skip the first 20 logs, limit the results to 5 logs and present it in a
  tabular format:

  $ nvmesh log show --output-format tabular --skip 20 --limit 5

Options:
  -s, --skip INTEGER              Specifies the number of entities to skip
                                  when fetching the result.
  -l, --limit INTEGER RANGE       Specifies how many entities to fetch after
                                  the skip, the maximum value is: 50.
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  --alerts                        Show alerts (errors that hasn't been
                                  acknowledged).
  -h, --help                      Show this message and exit.
```

6.18. settings

```
Usage: nvmesh settings [OPTIONS] COMMAND [ARGS]...

  Settings related operations

Options:
  -h, --help  Show this message and exit.
```

```
Commands:
  accept-eula  Accept the EULA document with a signature.
  show         Show general settings that can be updated via the CLI.
  update       Update general settings (only some settings can be updated fro
m the CLI)
```

6.18.1. show

```
Usage: nvmesh settings show [OPTIONS]

  Show general settings that can be updated via the CLI.

  --output-format options:

  tabular - Render a table using characters like dashes and vertical bars to
  emulate borders, may overflow and wrap the output if the lines exceed the
  terminal width.

  rows - Render tabular data with one column per line (allowing columns with
  line breaks).

  json - Format output as DB JSON.

  Usage example:

  $ nvmesh settings show --output-format tabular

Options:
  --output-format [tabular|rows|json]
                                  The representation in which the data will be
                                  displayed. Options: tabular ,rows, json.
  -h, --help                      Show this message and exit.
```

6.18.2. accept-eula

```
Usage: nvmesh settings accept-eula [OPTIONS]

  Accept the EULA document with a signature.

  Usage example:

   $ nvmesh settings accept-eula --signature "Joseph Heller"
```

```
Options:
  -s, --signature TEXT  The user signature.
  -h, --help            Show this message and exit.
```

6.18.3. update

```
Usage: nvmesh settings update [OPTIONS]

  Update general settings (only some settings can be updated from the CLI).

  Usage example, update the cluster name.

   $ nvmesh settings update --cluster-name "My super fast cluster"

Options:
  -i, --cluster-id TEXT  The ID of the cluster.
  -h, --help             Show this message and exit.
```

Command Line Utilities

The following section describes various command-line utilities provided in NVMesh.

nvmesh_clnt_analyzer

Analyze NVMesh volumes.

```
usage: nvmesh_clnt_analyzer [-h] [-v <vol1> <vol2> ...] [-d <debug_level>]

positional arguments:
  volume                    a volume name to analyze
  debug_level           the debug level of the output to trace/debug/info/noti
ce/warning/error
  output_file              the file name to use for an output

optional arguments:
  -h, --help            show this help message and exit
  -v <volume> [<volumeX> ...], --volumes volume [<volumeX> ...]
                        Volume list: -v vol1 vol2
                        if not used all volumes will be inspected
  -d <debug_level>, --debug_level <debug_level>
                        Set the debug level of the output to trace/debug/info/
notice/warning/error
  -o <output_file>, --output_file <output_file>
                        Where to output the script

examples:

To analyze all volumes connected to this client:

nvmesh_clnt_analyzer
```

nvmesh_configure_management_server

Set the management server for *client* or *target nodes*.

```
Usage: nvmesh_configure_management_server [--addresses <nvme42:4001,nvme43:400
1> --protocol <https/http>]

Example:
nvmesh_configure_management_server --addresses server82:4001 --protocol https
```

nvmesh_configure_nics

Define which Network Interface Cards (NICs) should be used with NVMesh *client* or *target nodes*.

`nvmesh_configure_nics` is an interactive script.

nvmesh_health_check

Display and validate the NVMesh configuration.

nvmesh_logs_collector

nvmesh_set_io1_interrupts

Distributes interrupts from drives across CPUs.

```
usage: nvmesh_set_io1_interrupts
```

nvmesh_update

Updates NVMesh kernel module.

7. Document Reference

Typographical Conventions

Throughout this document, the following typographical conventions are followed:

Style	Meaning
bold text	The name of an Excelero software component or technology
`text`	A file name, command or configuration text that can be utilized in a Linux terminal/shell, file or as a URL
term in italics	Generally, a term being used in specific relation to an element in the NVMesh

Definitions

Throughout this document, these terms have the following meanings:

Term	Definition
Management Server	The server(s), or OS image(s) running the **management module** software
Target Node/ Target	A physical server containing one or more NVMe SSDs running the **storage target module**
Client Node/ Client	An OS image instance running the **block storage client** software
Converged Node	A *target node* that is also running the **block storage client** software
Logical Volume/ Volume	A logical block device defined with the **NVMesh management module** that can be attached to *client nodes*
RDDA	Remote Direct Drive Access. Excelero's patented low-latency and CPU bypass transport technology.
TOMA	**To**pology **Ma**nager. The **storage target module** component that handles error detection and volume rebuild activities.