CLI Guide

Introduction

This chapter introduces the major components in Mayastor storage management. The components include both the hardware components and the logical components of the storage system. The storage management commands are issued from the Mayastor Command Line Interface (CLI) program *mayacli* either by running on the Mayastor storage server system itself or from any other system capable of RPC client.

It is very light-weight ONC RPC/XDR program that is truly cross-platform and can run from any UNIX host and even from Windows.

Major Hardware Components

The following table lists the major hardware components that are involved in the Mayastor networked storage infrastructure.
Table 1-1Major Hardware Components

Hardware Component	Description
Storage Server	The Linux Server system that is running the Mayastor software to provide enhanced disk services. Also referred as MayaNAS while acting as NAS server.
Storage Array	This includes the external direct-attached disks such as fibre channel disks, serial ATA disks and SCSI disks.
Embedded disks	This includes the disks such as IDE and SCSI disks, NVMe that are present inside the storage server.
Controller	The fibre channel HBA port that is running in target mode. For iSCSI operation it represents the attached Ethernet interfaces. For NVMe Target operation the controller can be any RDMA capable network interfaces.
Host	The Application servers that will make use of the provisioned volumes from the Storage Server over fibre channel or Ethernet interconnect.

Logical Components of Storage Server

The logical components of storage server can be configured from the physical drives provided by Storage Array or Embedded disks.
Table 1-2Logical Components of Storage Server

Component	Description
Volume group	Set of drives that are logically grouped together by the Volume Manager supported in Linux. A volume group can provide appropriate raid-level as required by the application server, if the individual drives themselves are RAID disks. A volume group provides increased data availability and I/O performance and online resizing of volume capacity.
Volume	This is the basic unit that can be created to store data in the networked storage environment. It can represent a physical disk, disk partition, Linux software raid disk, LVM logical volume, LVM snapshot volume or any other block device such as loop device, dm-crypt device.
Unconfigured capacity	Any available storage capacity that is not yet configured as volumes is referred to as Unconfigured Capacity.
Mapped volume	For block storage mapping is the process of assigning a Logical Unit Number and Controller so that it can appear as SCSI3 compliant direct access disk in the Storage Area Network (SAN). You can optionally associate access controls with mappings. For file storage mapping defines the protocol NFS or SMB
Mapped volume	Mapping is the process of assigning a Logical Unit Number and Controller so that it can appear as SCSI3 compliant direct access disk in the Storage Area Network (SAN). You can optionally associate access controls with mappings.
Bind volume	Binding is the process of bringing a mapped volume to be online. In case of network shares binding causes the shares to be exported.
Unbind volume	Unbinding changes the online device to become offline. In case of network shares unbinding will stop sharing.

Major Software Components

The Mayastor Enterprise Storage Software consists of the following major software components listed below.
Table 1-3Major Software Components of Storage Server

Component	Description
fcgate	This is the gateway driver that provides interface to SCSI commands coming from the underlying fibre channel controller or iSCSI driver
qlfctgt	Proprietary target mode driver for Qlogic Fibre-Channel HBAs. Currently it supports target mode operation for Qlogic 2/4/8 Gbps HBA
mayaiscsi	Proprietary implementation of RFC 3720 iSCSI server protocol.
mayadev	This is the virtual disk driver that implements SCSI-3 SCSI Primary Commands (SPC) and SCSI Block Commands (SBC) for SCSI disks.
mdcache	This module used for cache management for mayadev operations. (Deprecated)
mayatape	This is the virtual tape driver that implements SCSI-3 SCSI Streaming Commands (SSC) for SCSI tape devices. By default this driver emulates IBM 3580 LTO Ultrium tape drive.
mayatld	This is the virtual tape library driver that implements the SCSI-3 Medium Changer Commands. By default this driver emulates IBM 3584 Tape Library.
maya. configd	Mayastor service program for configuration and management.
mayacli	Mayastor Command Line Interface utility to manage the storage server.

Mayastor Command Line Interface

This chapter describes the Mayastor Command Line Interface program *mayacli* used for managing Mayastor storage server. The mayacli is a RPC client program and can be used on the same system as Mayastor storage server or from any other Linux system in the network by utilizing the –h parameter to mayacli. By adopting the client-server RPC based architecture model it makes it possible to administer any number of Mayastor storage servers from a single location running mayacli.

mayacli –h mayaserv1
The mayacli program makes use of Linux *tcpwrapper* library interface to prevent unauthorized access. Please consult the Linux Administrator guide for more information on *tcpwrapper*.
The mayacli program when invoked without any command statement will enter into interactive mode waiting for commands to be entered. Otherwise it will execute the command statement passed in the command line argument and exit immediately intended for scripting.

Command Description and Syntax

Each CLI command is made up of string of *keywords* separated by spaces. Each keyword could be a command, system object, parameter, etc. The keywords are case insensitive and so writeCacheEnabled is equivalent to writecacheenabled. Sometimes it can be recognized by partial keywords as long as it is not ambiguous. For example writeCacheEnabled can be recognized simply by writecache. Also some keywords can have aliases, which are easier to type. For example the keyword logicalUnitNumber can also be referred by keyword lun. The special character "*" refers to all the objects. The label name cannot use these reserved names:
command object *cmd-statement*
The following table gives the notational conventions for the command set.
Table 3-1Command notational conventions

a | b	alternatives (“*a* or *b*”)
italicized-word	non-terminals
[…] (square braces)	zero or one occurrence
{ … } (curly braces)	zero or more occurrences
(*a* | *b* | *c*)	“choose exactly one of the alternatives”

```
mayacli help

Command component `mayastor' Usage:

Mayastor Command Line Interface version 0.23

(c) Copyright 2003-2008 PavitraSoft Inc.

(c) Copyright 2010-2018 Crossmeta Solutions.


The following are the registered components for management:

    mayastor  disk  controller  volume  mapping

    host  stats  performance  iscsi  nvmet

    rg  mirror  vg  zpool  cloud

    tape  vtl  snapshot  replication  failover

    license

Valid operations include:

    create, bind, delete, set, show, and help

    start or stop on mayastor main component

You may try help on individual component to get more information.
```

Commands

The following table describes the commands that are understood by the Mayastor Command Line Interface program. Each command performs a set of operations on the Mayastor configuration.

Command	Description
bind	Apply settings to an object
create	Create a new object
delete	Delete an existing object.
set	Manipulate the settings of an object
show	Show the settings of an object.
start	Start the operation of an object.
unbind	Revoke settings to an object
stop	Stop the operation of an object.

Objects

The components of Mayastor storage server for management are identified by the following system objects.
Table 3-3Mayastor System Objects

Object	Mayastor Configuration section
controller	Represents the fibre channel HBA operating in target mode. For iSCSI operations this refers to all the Ethernet interfaces in the system. For NVMe it refers to any RDMA interface registered in the system. For network shares it represents nfs3,nfs4 or smb
iscsi	Represents the iSCSI targets, sessions and connections for management. Also for iSCSI target names and portals.
nvmet	NVMe-over-Fabrics Management
license	Product and optional features licensing
cloud	cloud profile for authentication and access mechanism to use cloud object storage
failover	High-Availability cluster management
disk	Available physical disks in the system.
host	The application server that will make use of the Mayastor volumes
mapping	Binding a volume to controller and lun for a particular host or for all the hosts.
mayastor	The overall storage server.
perf	Performance object for volumes or controllers.
stats	Statistics object for volumes or controllers.
volume	Mayastor basic unit of storage that is presented as disks to hosts.
tape	Virtual tape management
vtl	Virtual Tape Library device management
rg	For managing software raid volumes
vg	For LVM volume group management
zpool	ZFS storage pool management
mirror	Manage mirror volumes for migration purpose
snapshot	Snapshot management and policy
Replication	For Disaster recovery and Data protection

CLI Commands Reference

- cloud
- controller
- disk
- failover
- host
- iscsi
- license
- mapping
- mayastor
- mirror
- nvmet
- performance
- replication
- rg
- snapshot
- stats
- tape
- vg

- volume
- vtl
- zpool