Technical Documentation

RISINGTIDE systems

RTS OS

Administrator's Manual

Version: 3.6
Print Date: 11 July 2013

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Customer Support

If you have questions about installing or using RTS OS, check this document first—you will find answers to many of your questions. If you need further assistance, use the support options listed below. To expedite your service, have access to your RTS OS based storage array.

- Visit our website at www.risingtidesystems.com
- Visit our wiki at www.linux-iscsi.org
- US: Call +1-650-384-6366
- EMEA: +49-172-7277920

Confidentiality

This manual may only be used to operate purchased copies of RTS OS. Disclosure to third-parties not in possession of rightfully purchased or licensed RTS OS copies is prohibited.

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Document: Version 3.6
Print date: 11 July 2013
Language: English

Contents

1 Introduction

The target audience of this manual are system and storage administrators. The intent of this manual is to provide the necessary background, concepts, tools and commands for effectively administrating data storage arrays running the RisingTide Systems (RTS) storage operating system (RTS OS).

RTS OS includes the RTS Enterprise Unified SAN Target, the RTSadmin system management tools, and a preconfigured set of OS enhancements provided by RTS to run high-performance, and robust enterprise storage array. RTS OS is based on the enterprise software platform of SLES 11 SP2.

The key steps to configure RTS OS based SANs are described in this RTS OS Admin Manual as follows:

- Section 2 provides an overview over RTS OS, and describes how to obtain and install RTS OS.
- Section 3 describes how to setup hardware RAID devices to use for your backstore.
- Section 4 describes how to use and setup the Logical Volume Manager (LVM) for your backstore.
- Section 5 provides a quick start tutorial how to set up RTS OS SAN targets with RTSadmin.
- Sections 6–9 provide an in-depth technical description of RTSadmin.
- Section 11 describes the RTS OS update services available with a subscription.
- Section 13 describes how to setup Microsoft Windows, vSphereVMware, Linux and VirtualBox iSCSI initiators for RTS OS SANs.
- Section 14 describes how to obtain technical support with the RTS OS built-in *rts-support* tool.

2 Overview

2.1 The RTS OS Stack

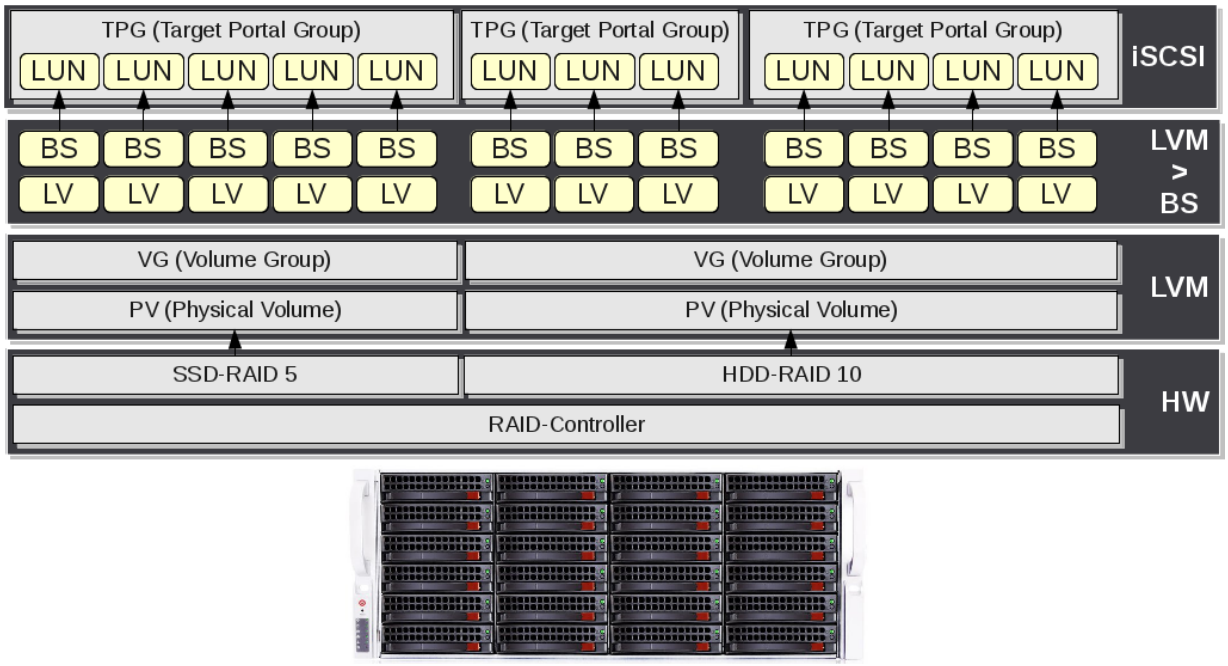

Figure 1: Structural overview over SCSI entities and relationships ("BS" means back store).

The RTS OS software stack is divided in two main sections, software modules and hardware drivers.

2.2 Fabrics

RTS OS supports the following network fabrics and protocols for exporting storage devices (backstores) over the corresponding network:

2.2.1 iSCSI

iSCSI (Internet SCSI) encapsulates the Small Computer System Interface (SCSI) protocol in TCP/IP packets to link storage devices over commodity IP networks. RTS OS can provide SANs over any standard IP network infrastructure, including LANs, WANs, cellular, and the Internet.

RTS recommends all Intel 1 Gb/s NICs and the Intel X520-DA2 dual-10 Gb/s NICs.

Note: RTS strongly recommends against using iSCSI TOE functionality with RTS OS.

2.2.2 Fibre Channel

Fibre Channel (FC) is a low-latency high-performance storage area network (SAN) protocol and fabric. RTS OS supports Fibre Channel with the Host Bus Adapters (HBAs) from QLogic:

- QLogic 2400 Series (single-port QLE246x), 4GBFC
- QLogic 2500 Series (dual-port QLE256x), 8GBFC
- QLogic 2600 Series (dual-port), 16 GBFC incl. high-speed and SR-IOV support

2.2.3 Fibre Channel over Ethernet

Fibre Channel over Ethernet (FCoE) tunnels Fibre Channel packets traffic through enhanced Ethernet networks. FCoE is layered directly on top of Ethernet, i.e. it doesn't use IP and thus isn't routable. As a result, FCoE storage devices cannot be accessed beyond the Ethernet subnet that they reside on, and they require specific FCoE enabled switches.

2.2.4 InfiniBand/SRP

SRP is a high-performance communication protocol that allows the transport of SCSI traffic across RDMA InfiniBand interconnects. It has traditionally been used in high-performance computing (HPC) environments, and recently has enjoyed increasing popularity for SANs.

RTS OS supports SRP on Host Channel Adapters (HCAs) from Mellanox:

- Mellanox ConnectX-2 VPI PCIe Gen2 HCAs (x8 lanes), single/dual-port QDR 40 Gb/s IB
- Mellanox ConnectX-3 VPI PCIe Gen3 HCAs (x8 lanes), single/dual-port FDR 56 Gb/s IB
- Mellanox ConnectX-IB PCIe Gen3 HCAs (x16 lanes), single/dual-port FDR 56 Gb/s IB

2.2.5 InfiniBand/iSER

iSER is a high-performance communication protocol that extends iSCSI to use RDMA. RDMA has been supported on InfiniBand networks, and is now also supported by RoCE on "lossless" Ethernet networks and by iWARP enhanced TOE NICs over standard Ethernet networks.

RTS OS supports iSER on Host Channel Adapters (HCAs) from Mellanox:

- Mellanox ConnectX-2 VPI PCIe Gen2 HCAs (x8 lanes), single/dual-port QDR 40 Gb/s IB
- Mellanox ConnectX-3 VPI PCIe Gen3 HCAs (x8 lanes), single/dual-port FDR 56 Gb/s IB
- Mellanox ConnectX-IB PCIe Gen3 HCAs (x16 lanes), single/dual-port FDR 56 Gb/s IB

2.2.6 Loopback

The loopback fabric module is a high-speed SCSI emulation device that can export any type of raw hardware to local applications and virtual machines as a fully SCSI SPC-3/4 compliant block device, including emulation of advanced functionality.

2.2.7 vHost

The RTS vHost fabric module implements very high-speed SCSI I/O processing based on the Linux virtio mechanism. RTS vHost provides virtually bare-metal local SCSI storage performance for KVM guests. Linux guest VMs are supported, while Windows guest support is currently in Alpha release stage with a virtual LSI MegaRAID SAS driver.

2.3 Backstores

RTS OS supports the following backstores (physical or virtual block storage devices) for export over any of the above fabrics:

2.3.1 FILEIO

FILEIO is any file on a mounted filesystem, which may be backed by a file or an underlying real block device. FILEO is recommended mostly for testing purposes, as the performance bottleneck with a block device residing in a filesystem is limited to the filesystem performance envelope.