Reduxio Tech Note

ProxMox VE

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Overview

Introduction

ProxMox VE (Virtual Environment) is a complete open source server virtualization management solution. Based on KVM and container-based virtualization, it helps administrators to manage virtual machines, storage, virtualized networks, and HA clustering.

This tech note describes testing performed with ProxMox v4.1 and the Reduxio HX550 storage system.

Use Cases

Reduxio as iSCSI Storage for ProxMox

Reduxio volumes can be configured as iSCSI storage in ProxMox. Volumes can be used as LVM containers for VM disk images, or assigned directly to VMs.

Solution Architecture

Hardware Configuration

The following hardware components were used in the testing:

Table 1. Testing Hardware Configuration Specifications

No.	Hardware component	Description
1	Reduxio HX550 storage system	Reduxio HX550 dual-controller, 256GB RAM, 8x 800GB MLC SSDs, 16x 1TB 7.2k RPM SATA disks
1	ProxMox Server	Dell R620
1	Mellanox 10GbE switch	Interconnect between ESXi host and Reduxio HX550
1	MacBook Pro 15”	Administration host

Software Configuration

The following software components were used in the testing:

Table 2. Tested Software Configuration Specifications

No.	Software component	Version	Description
1	vSphere Hypervisor	6.0	VMware® vSphere Hypervisor known as ESXi, is a bare-metal hypervisor.
1	vCenter	6.0.0 U1	VMware® vCenter Server provides centralized visibility, proactive management and extensibility for VMware vSphere from a single console.
1	ProxMox VE	4.1	ProxMox virtualization server.

Configuration

To configure ProxMox to use Reduxio volumes, the following must be performed:

tbd

Configure the iSCSI Initiator

To configure the initiator and multipathing software:

1. Install the required software.	To install the Open-iSCSI initiator utilities, multipathing software, and the lsscsi command: `# apt-get -y install open-iscsi multipath-tools lsscsi`

2. Update the initiator configuration.	Add or update the `/etc/iscsi/iscsid.conf` (see file contents below):
	
	`# cp /etc/iscsi/iscsid.conf /etc/iscsi/iscsid.conf.orig`
	`# cp iscsid.conf /etc/iscsi/iscsid.conf`

3. Update the multipathing configuration file.	Add or update the `/etc/multipath.conf` (see file contents below):
	
	`# cp /etc/multipath.conf /etc/multipath.conf.orig`
	`# cp multipath.conf /etc/multipath.conf`

4. Add the Reduxio udev rules configuration file.	Add or update the `/etc/udev/rules.d/99-reduxio.rules` (see file contents below): `# cp 99-reduxio.rules /etc/udev/rules.d/99-reduxio.rules`

5. Restart the initiator and multipathing.	`# service open-iscsi restart`
	` * Starting iSCSI initiator service iscsid`
	`[ OK ]`
	` * Setting up iSCSI targets`
	`iscsiadm: No records found`
	`[ OK ]`
	` * Mounting network filesystems`
	`[ OK ]`
	
	`# service multipath-tools restart`
	`* Stopping multipath daemon multipathd`
	`[ OK ]`
	`* Starting multipath daemon multipathd`
	`[ OK ]`

/etc/iscsi/iscsid.conf

Add or update the following parameters:

```
node.startup = automatic

# The length of time to wait before retrying a failed IO . Can be reduced to a minimum since multipath
detects the failure and immediately fails to another path. The value is in seconds and the default is
typically 120.
node.session.timeo.replacement_timeout = 5

# The time to wait for an iSCSI login to complete. The value is in seconds and the default is 15.
node.conn[0].timeo.login_timeout = 15

# To specify the time to wait for logout to complete, edit the line.
# The value is in seconds and the default is 15 seconds.
node.conn[0].timeo.logout_timeout = 15

# Time interval to wait for on connection before sending a ping.
node.conn[0].timeo.noop_out_interval = 5

# To specify the time to wait for a Nop-out response before failing
# the connection, edit this line. Failing the connection will
# cause IO to be failed back to the SCSI layer. If using dm-multipath
# this will cause the IO to be failed to the multipath layer.
node.conn[0].timeo.noop_out_timeout = 5

# This retry count along with node.conn[0].timeo.login_timeout
# determines the maximum amount of time iscsid will try to
# establish the initial login. node.session.initial_login_retry_max is
# multiplied by the node.conn[0].timeo.login_timeout to determine the maximum amount.
node.session.initial_login_retry_max 8
```

/etc/udev/rules.d/99-reduxio.rules

Add or update this file:

```
# /etc/udev/rules.d/99-reduxio.rules
SUBSYSTEM=="block" , ACTION=="change", ATTRS{model}=="TCAS", ATTRS{vendor}=="REDUXIO", RUN+="/bin/sh -
c '/usr/sbin/iscsiadm -m session -R '"
SUBSYSTEM=="block" , ACTION=="change", ATTRS{model}=="TCAS", ATTRS{vendor}=="REDUXIO",
ATTR{size}=="0", RUN+="/bin/sh -c 'echo 1 > /sys$DEVPATH/../../delete '"
SUBSYSTEM=="block" , ACTION=="change", ATTRS{model}=="TCAS", ATTRS{vendor}=="REDUXIO", RUN+="/bin/sh -
c 'service multipathd reload || service multipath-tools reload ' "
SUBSYSTEM=="block" , ACTION=="change", ATTRS{model}=="TCAS", ATTRS{vendor}=="REDUXIO", RUN+="/bin/sh -
c '/usr/sbin/multipath -r $DEVNAME '"
```

/etc/multipath.conf

Add or update this file:

```
devices {
        device {
                vendor "REDUXIO"
                product "TCAS"
                revision "2300"
                path_grouping_policy "group_by_prio"
                path_checker "tur"
                hardware_handler "1 alua"
                path_selector "round-robin 0"
                prio "alua"
                failback "immediate"
                features "0"
                rr_weight "uniform"
                no_path_retry "72"
                queue_without_daemon "no"
                rr_min_io_rq 10
                rr_min_io 10
                user_friendly_names "yes"
                fast_io_fail_tmo "10"
        }
}
blacklist {
        # Note: it is highly recommended to blacklist by wwid or vendor instead of device name
        devnode "^sd[a]$"
}
```

Configure a Volume Group

To configure a new volume group in the ProxMox Server:

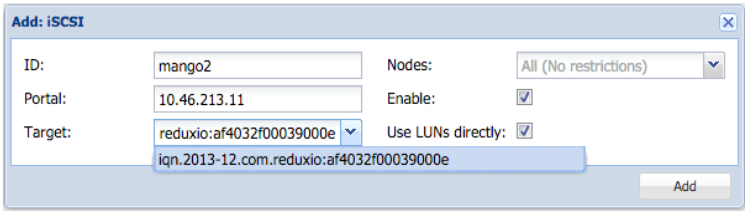
1. **Identify the ProxMox iSCSI initiator's IQN.**	Login to each ProxMox server to find its iSCSI IQN:
	`root@pve:~# cat /etc/iscsi/initiatorname.iscsi`
	`## DO NOT EDIT OR REMOVE THIS FILE!`
	`## If you remove this file, the iSCSI daemon will not start.`
	`## If you change the InitiatorName, existing access control lists`
	`## may reject this initiator. The InitiatorName must be unique`
	`## for each iSCSI initiator. Do NOT duplicate iSCSI InitiatorNames.`
	InitiatorName=iqn.1993-08.org.debian:01:768cc4f74459

2. **Create a host for each ProxMox server.**	To create a host using Reduxio Storage Manager: 1. Click the HOSTS & VOLUMES icon in the icon bar. Hosts and host groups are listed together on the left side, and volumes are listed on the right side. 2. Create a new host for each ProxMox host. Click the NEW HOST button to open the new host dialog box. 3. Enter the following information: **NAME** Enter a meaningful name, e.g. proxmox1. **ISCSI NAME** Copy/paste the IQN obtained previously. **DESCRIPTION** Enter a description, e.g. "ProxMox v4.1 Server 1 in Rack 5". 4. Click **OK** to create the host. Repeat this for all the ProxMox servers. To create the hosts using ReduxioCLI: `rdxadmin@reduxio:/ → # hosts create proxmox1 –iscsi-name iqn.1993-08.org.debian:01:768cc4f74459 –description " ProxMox v4.1 Server 1 in Rack 5"`
3. **Create a volume for the volume group.**	To create a host using Reduxio Storage Manager: 1. Click the HOSTS & VOLUMES icon in the icon bar. Hosts and host groups are listed together on the left side, and volumes are listed on the right side. 2. Create a new volume for storing VM disk images. Click the NEW VOLUME button to open the new volume dialog box. 3. Enter the following information: **NAME** Enter a meaningful name, e.g. proxmox_vol1.

	BLOCK SIZE Keep at default (4096). **DESCRIPTION** Enter a description, e.g. "ProxMox VG1". 4. Click **OK** to create the volume. To create the volume using ReduxioCLI: `rdxadmin@reduxio:/ → # volumes create proxmox_vol1 –description "ProxMox VG1"`

4. Create a host group for the ProxMox cluster and add all hosts to the host group.	To create a host group using Reduxio Storage Manager:
	
	1. Click the HOSTS & VOLUMES icon in the icon bar to open the hosts and volumes screen.
	2. Click the NEW GROUP button. The new host group dialog box will open up.
	3. Enter a host group name next in the NAME field. A host group name can be up to 31 characters, should only contain letters, numbers, dashes (-) and underscores (_), must start with a letter and cannot end with a dash.
	
	To add the hosts to the host group using the Reduxio Storage Manager:
	
	1. Click the HOSTS & VOLUMES icon in the icon bar to open the hosts and volumes screen.
	2. Select the host group. If the list is long, use the scrollbar to scroll down the list (the scrollbar is hidden and revealed when hovering to the right of the host buttons). Use the search field to filter the list.
	3. Select the HOSTS tab (this tab is selected by default).
	4. Drag the hosts to be added to the right, and drop them into the dotted box inside the host group panel.
	
	To create the host group using ReduxioCLI:
	
	`rdxadmin@reduxio:/ → # hostgroups create proxmox`
	
	To add the hosts to the host group using ReduxioCLI:
	
	`rdxadmin@reduxio:/ → # hostgroups add-host proxmox proxmox1`

5. Add an iSCSI device	1. Login to ProxMox VE web interface. 2. In **Server View**, select the **Datacenter**. 3. Select the **Storage** tab. 4. Click the **Add...** button, and select **iSCSI**. 5. Enter a name in the **ID** field. It is recommended to use the Reduxio storage system host name.

	6. In the **Portal** field, enter one of the Reduxio iSCSI port IP addresses. 7. Click the **Target** drop-down button. The ProxMox server will discover the portal IP address, and automatically fill in the target IQN.  8. Click the **Add** button. The system will be added to the list.
6. **Create a LVM volume group.**	1. Enter a name in the **ID** field. 2. Select the storage system from the **Base storage** drop-down list. 3. Select the previously created volume from the list. 4. Click the Add button to create the volume group.

Conclusion

Reduxio storage systems is recommended for integration with ProxMox VE as its primary storage system while providing high performance and high saving ratio using NoDup™ functionality. Reduxio NoDup is an in-line In-memory dedupe and compression patent-pending real-time data reduction technology with unparalleled storage efficiency and density.

References

Reduxio Documentation

- *Reduxio TimeOS™ Administration Guide*

ProxMox Documentation

- *ProxMox website*
- *ProxMox Wiki - ProxMox VE Multipathing*
- *ProxMox Wiki - Storage Model*