RPi 3B+ iscsi how-to

Inspiration from hiroom2.com. Kudos!

Foreword

These steps are meant to be completed on a Linux computer that serves as a netboot server of the MicroMEC cluster. The steps can of course be adopted for other use cases.

- Our netboot server (ie. iscsi target server) is called `bootserv`.
- The netboot server is available on the LAN and can be pinged using the name `bootserv`.
- We refer to the RPi 3B+ with an id: `07f32691` and a name: `rpi3-1`.
- We use sudo and start the preparations in /tmp on the netboot server.

Security Note

The setup is meant for a private lab. Security considerations for exposing the rootfs via the LAN are not discussed in this how-to as of now.

Prerequisites

- A computer running Debian Linux. Any Linux flavor can be used, but our instructions refer to Debian.
- 15GB free space on the hard drive.
- Installed packages: tgt, open-iscsi.
- Fast LAN (preferably Gigabit Ethernet).

Steps

1. Download a ready made rootfs from the Open Build Service.

   We will use openSUSE Tumbleweed on our RPi 3B+: openSUSE-Tumbleweed-ARM-JeOS.aarch64-rootfs
2. Extract the downloaded rootfs

   ```
   $ cd /tmp

   $ mkdir openSUSE_Tumbleweed

   $ xz -d /tmp/openSUSE-Tumbleweed-ARM-JeOS.aarch64-rootfs.aarch64-2020.05.10-Snapshot20200526.tar.xz

   $ cd openSUSE_Tumbleweed

   $ tar xvf /tmp/openSUSE-Tumbleweed-ARM-JeOS.aarch64-rootfs.aarch64-2020.05.10-Snapshot20200526.tar.xz
   ```

3. Create a virtual loop back device that will hold the rootfs:

   ```
   $ cd /tmp

   $ dd if=/dev/zero of=07f32691-opensuse-rootfs.img bs=400M count=10

   $ sudo mkfs.ext4 07f32691-opensuse-rootfs.img

   $ sudo losetup -fP 07f32691-opensuse-rootfs.img
   ```

4. Check which loopback devices are allocated by the kernel:

   ```
   $ losetup -a
   /dev/loop0: []: (/tmp/07f32691-opensuse-rootfs.img)
   ```

5. Mount the virtual block device

   ```
   $ mkdir 07f32691-rootfs-mount

   $ sudo mount -o loop /dev/loop0 07f32691-rootfs-mount
   ```

6. Copy the content of an existing rootfs image to the mounted block device

   ```
   $ cp -R /tmp/downloaded_rootfs/*  07f32691-rootfs-mount/
   ```

7. Unmount the file and move it to the place where it will be served.

```
$ sudo umount 07f32691-rootfs-mount

$ sudo losetup -D

$ sudo mkdir /srv/iscsi

$ sudo mv 07f32691-opensuse-rootfs.img /srv/iscsi
```

8. Prepare the iscsi target and publish it

```
$ sudo tgtadm --lld iscsi --op new --mode target --tid 1 -T iqn.org.micromec:rpi3-1-opensuse-rootfs

$ sudo tgtadm --lld iscsi --op new --mode logicalunit --tid 1 --lun 1 -b /srv/iscsi/07f32691-opensuse-rootfs.img

$ sudo tgtadm --lld iscsi --op bind --mode target --tid 1 -I ALL
```

Note

If your iscsi server has other targets then you will need to pick a different tid.

At this point the rootfs is available on the local network.

9. Save the configuration on the netboot server to remain persistent

```
$ sudo tgt-admin --dump | sudo tee  /etc/tgt/conf.d/micromec-cluster.conf
```

Local Testing

1. Check the iscsi target locally

Discover the iscsi target

```
$ sudo iscsiadm --mode discovery --op update --type sendtargets --portal localhost
127.0.0.1:3260,1 iqn.org.micromec:rpi3-1-opensuse-rootfs
```

Login to the iscsi target

```
$ sudo iscsiadm -m node --targetname iqn.org.micromec:rpi3-1-opensuse-rootfs  -p localhost -l
Logging in to [iface: default, target: iqn.org.micromec:rpi3-1-opensuse-rootfs, portal: 127.0.0.1,3260] (multiple)
Login to [iface: default, target: iqn.org.micromec:rpi3-1-opensuse-rootfs, portal: 127.0.0.1,3260] successful.
```

Check if a new partition appears in the list:

```
$ cat /proc/partitions
major minor  #blocks  name
.....
   8       32    4096000 sdc
```

Mount the partition to a mount point

```
$ mkdir /tmp/test-rootfs

$ sudo mount /dev/sdc /tmp/test-rootfs

$ ls -alrt /tmp/test-rootfs
```

Umount the partition

```
$ sudo umount /tmp/test-rootfs
```

Logout from all iscsi targets

```
$ sudo iscsiadm -m node -U all
```

Remote Testing

1. Check the iscsi target remotely

Login to an other Linux computer which also has the open-iscsi tools installed.

Discover the iscsi target

```
$ sudo iscsiadm --mode discovery --op update --type sendtargets --portal bootserv
192.168.4.1:3260,1 iqn.org.micromec:rpi3-1-opensuse-rootfs
```

Login to the iscsi target

```
 $ sudo iscsiadm -m node --targetname iqn.org.micromec:rpi3-1-opensuse-rootfs -p bootserv -l
 Logging in to [iface: default, target: iqn.org.micromec:rpi3-1-opensuse-rootfs, portal: 192.168.4.1,3260]
 Login to [iface: default, target: iqn.org.micromec:rpi3-1-opensuse-rootfs, portal: 192.168.4.1,3260]
successful.
```

Check the available partitions

```
 $ cat /proc/partitions
 major minor  #blocks  name
 .....
    8       16    4096000 sdb
```

Mount the partition to a mount point

```
 $ mkdir /tmp/test-rootfs

 $ sudo mount /dev/sdb /tmp/test-rootfs

 $ ls -alrt /tmp/test-rootfs
```

Umount the partition

```
 $ sudo umount /tmp/test-rootfs
```

Logout from all iscsi targets

```
 $ sudo iscsiadm -m node -U all
```