

实验一 QEMU 基本环境搭建

一、实验目的

1. 掌握 QEMU 基本用法
2. 掌握 ZNS SSD 设备模拟方法

二、实验内容

1. 下载 QEMU 源代码并编译安装
2. 下载 ubuntu 22.04 镜像并在 QEMU 中安装
3. 在 QEMU 中模拟 zns ssd
4. 启动 QEMU 的 ubuntu 操作系统，观察 zns ssd 是否安装成功

三、实验过程和步骤

3.1 QEMU 安装编译

命令行键入：wget <https://download.qemu.org/qemu-7.1.0.tar.xz>

相关依赖安装：

```
sudo apt install git libglib2.0-dev libfdt-dev libpixman-1-dev zlib1g-dev ninja-build
sudo apt install git-email
sudo apt install libaio-dev libbluetooth-dev libcapstone-dev libbrlapi-dev libbz2-dev
sudo apt install libcap-ng-dev libcurl4-gnutls-dev libgtk-3-dev
sudo apt install libibverbs-dev libjpeg8-dev libncurses5-dev libnuma-dev
sudo apt install librbd-dev librdmacm-dev
sudo apt install libsasl2-dev libssl2-dev libseccomp-dev libsnappy-dev libssh-dev
sudo apt install libvde-dev libvdeplug-dev libvte-2.91-dev libxen-dev libz02-dev
sudo apt install valgrind xfslibs-dev
sudo apt install libnfs-dev libiscsi-dev
```

make 编译

```
wget https://download.qemu.org/qemu-7.1.0.tar.xz
```

```
tar xvJf qemu-7.1.0.tar.xz
```

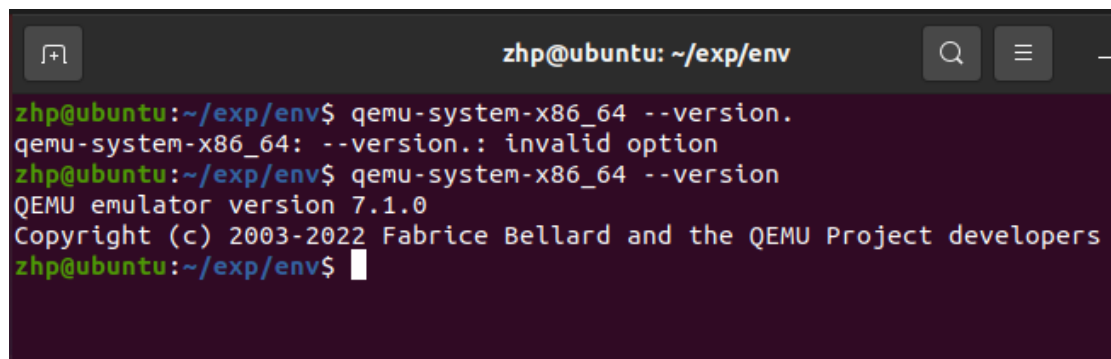
```
cd qemu-7.1.0
```

```
./configure
```

```
make
```

```
sudo make install
```

校验安装结果

A terminal window titled 'zhp@ubuntu: ~/exp/env' showing the execution of 'qemu-system-x86_64 --version'. The output indicates that the version is 7.1.0. The terminal text is as follows:

```
zhp@ubuntu:~/exp/env$ qemu-system-x86_64 --version.
qemu-system-x86_64: --version.: invalid option
zhp@ubuntu:~/exp/env$ qemu-system-x86_64 --version
QEMU emulator version 7.1.0
Copyright (c) 2003-2022 Fabrice Bellard and the QEMU Project developers
zhp@ubuntu:~/exp/env$
```

3.2 QEMU 中安装 Ubuntu server

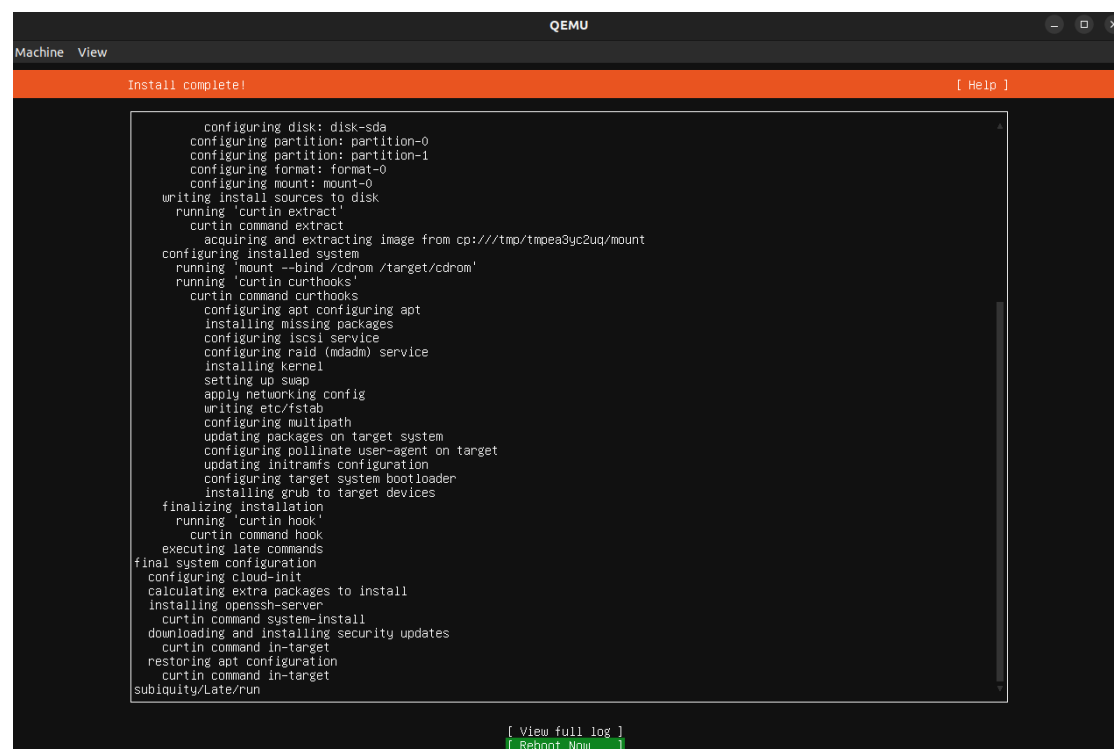
创建虚拟盘：qemu-img create -f qcow2 ubuntu.qcow2 30G

查询磁盘详情：qemu-img info ubuntu.qcow2

```
zhp@ubuntu:~/exp/env$ qemu-img info ubuntu.qcow2
image: ubuntu.qcow2
file format: qcow2
virtual size: 30 GiB (32212254720 bytes)
disk size: 6.42 GiB
cluster_size: 65536
Format specific information:
  compat: 1.1
  compression type: zlib
  lazy refcounts: false
  refcount bits: 16
  corrupt: false
  extended l2: false
zhp@ubuntu:~/exp/env$
```

启动虚拟机：qemu-system-x86_64 -m 8G -smp 2 -boot order=dc -hda ./env/ubuntu.qcow2 -cdrom ./env-resource/ubuntu-22.04.1-live-server-amd64.iso

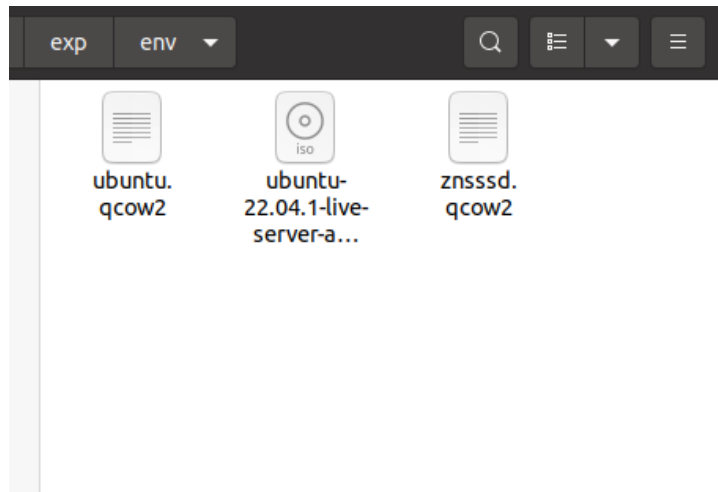
(VMware 原因，取消 KVM 设置)



3.3 模拟 NVMe ZNS SSD

创建虚拟盘：qemu-img create -f qcow2 znsssd.qcow2 10G

目录下应当有两个.qcow2 文件，表示两个虚拟盘



启动虚拟机并挂载两块硬盘

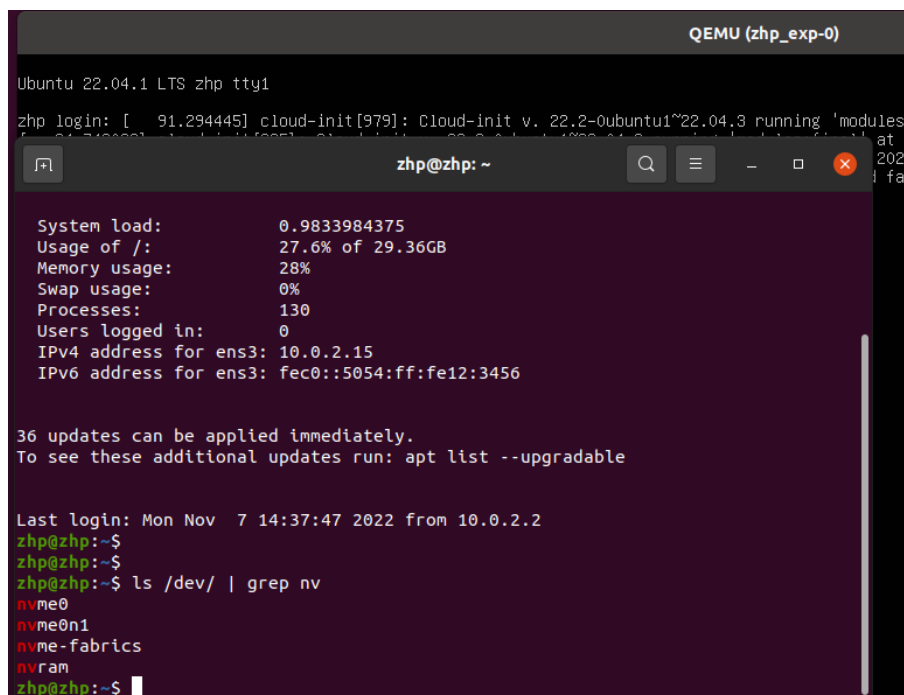
```
qemu-system-x86_64 -name zhp_exp -m 8G -smp 4 \
-hda ./exp/home/ubuntu.qcow2 \
-net user,hostfwd=tcp:127.0.0.1:7777-:22,hostfwd=tcp:127.0.0.1:2222-:2000 -net nic \
-drive file=./home/env/znsssd.qcow2,id=mynvme,format=qcow2,if=none \
-device nvme,serial=baz,id=nvme2 \
-device nvme-
ns,id=ns2,drive=mynvme,nsid=2,logical_block_size=4096,physical_block_size=4096,zoned=true,
zoned.zone_size=131072,zoned.zone_capacity=131072,zoned.max_open=0,zoned.max_active=0,
bus=nvme2
```

(取消 KVM 设置和 cpu host 设置, 否则报错)

3.4 验证 zns ssd 安装

终端连接: `ssh zhp@localhost -p 7777`

查看 nvme 设备: `ls /dev/ | grep nv`



四、实验结论和心得体会

通过本次实验，完成了 QEMU 的环境搭建，掌握了 ZNS SSD 设备模拟方法。