

# 虚拟机网络性能测试

工程实践与科技创新III-D 虚拟化与云计算 EI313

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## 要求

Virtualized and bare metal network performance test.

- Download QEMU 5.2.0 from <https://www.qemu.org/download/> and compile.
- Create 2 VMs with TAP mode network (e1000 and virtio-net) by QEMU.
- Connect to your VM through VNC viewer or SSH.
- Compare the network performance (e1000 and virtio-net) of your host machine and VMs.

## 1 连接交大云服务器

下面将使用 jCloud 虚拟机来完成实验。根据交大云关于 Linux 创建云主机的文档<sup>[1]</sup>，创建 Ubuntu 18.04 虚拟主机。并通过创建浮动 IP 的方式，创建一个可以用于本地访问的外网 IP 地址。在安全组设置里放行 22 端口以启用 ssh 连接。



<input type="checkbox"/>	名称	镜像	内网IP	浮动IP	配置	状态	锁定	创建于
<input type="checkbox"/>	logcreative-vm		192.168.1.11	111.111.111.111	基础款-内存型 8 核/64 GB	运行中		8天前

图 1: 交大云主机

使用 ssh 连接远程服务器<sup>[2]</sup>，配置本地的 Windows Terminal<sup>[3]</sup>，以直接通过 ssh 连接服务器，见图 2。通过 FileZilla 以方便地向服务器传输文件，见图 3。

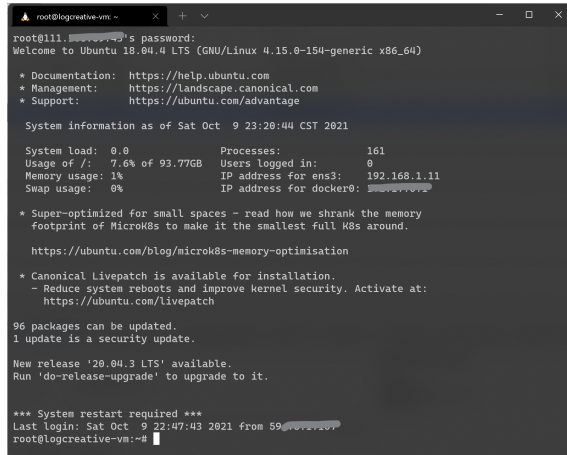


图 2: 通过 Windows Terminal 连接服务器

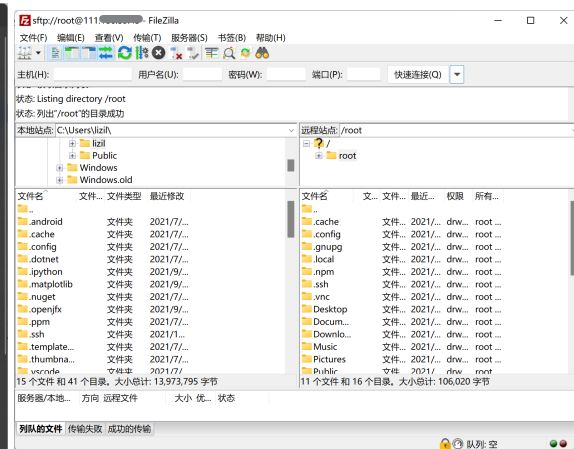


图 3: 使用 FileZilla 传输文件

## 2 编译 QEMU

采用 QEMU 5.2.0 (Dec 8th 2020)。根据官方的 wiki 说明<sup>[4]</sup>，需要安装一些额外包。通过下面的脚本进行下载、编译：

Listing 1: [INSTALL.sh](#)

```
1  #!/bin/bash
2
3  cd /home/
4  curl -O https://download.qemu.org/qemu-5.2.0.tar.xz
5  tar -xvf qemu-5.2.0.tar.xz
6  cd qemu-5.2.0
7  mkdir build
8  cd build
9  sudo apt-get install glib2.0-dev libglib2.0-dev libfdt-dev libpixman-1-dev
10 zlib1g-dev
11 sudo apt-get install git-email
12 sudo apt-get install libaio-dev libbluetooth-dev libbrlapi-dev libbz2-dev
13 sudo apt-get install libcap-dev libcap-ng-dev libcurl4-gnutls-dev libgtk-3-
14 dev
15 sudo apt-get install libibverbs-dev libjpeg8-dev libncurses5-dev libnuma-dev
16 sudo apt-get install librbd-dev librdmacm-dev
17 sudo apt-get install libsasl2-dev libssl1.2-dev libseccomp-dev libsnappy-dev
18 libssh2-1-dev
19 sudo apt-get install libvde-dev libvdeplug-dev libxen-dev liblzo2-dev
20 sudo apt-get install valgrind xfslibs-dev
21 sudo apt-get install libnfs-dev libiscsi-dev
22 sudo apt-get install ninja-build
23 sudo apt-get install libssl1.2-dev
24 ./configure --enable-kvm --enable-debug --enable-vnc --enable-werror --
25 target-list="x86_64-softmmu"
26 make -j8
```

其中 libvte-2.90-dev 包已经被废弃。编译如图 4 所示成功，安装如图 5 所示成功。

```

[2359/2378] Compiling C object tests/qtest/qos-test-p/megasas-test.c.o
[2360/2378] Compiling C object tests/qtest/qos-test-p/virtio-net-test.c.o
[2361/2378] Compiling C object tests/qtest/qos-test-p/c1000-test.c.o
[2362/2378] Compiling C object tests/qtest/qos-test-p/c1000e-test.c.o
[2363/2378] Compiling C object tests/qtest/qos-test-p/ahci-test.c.o
[2364/2378] Compiling C object tests/qtest/qos-test-p/ds1338-test.c.o
[2365/2378] Compiling C object tests/qtest/qos-test-p/vxnet3-test.c.o
[2366/2378] Compiling C object tests/qtest/qos-test-p/mc2008-test.c.o
[2367/2378] Compiling C object tests/qtest/qos-test-p/es1378-test.c.o
[2368/2378] Compiling C object tests/qtest/qos-test-p/drtm-test.c.o
[2369/2378] Compiling C object tests/qtest/qos-test-p/nvme-test.c.o
[2370/2378] Compiling C object tests/qtest/qos-test-p/pep9100-test.c.o
[2371/2378] Compiling C object tests/qtest/qos-test-p/aixio-test.c.o
[2372/2378] Compiling C object tests/qtest/qos-test-p/ac97-test.c.o
[2373/2378] Compiling C object tests/qtest/qos-test-p/virtio-png-test.c.o
[2374/2378] Compiling C object tests/qtest/qos-test-p/adm1-test.c.o
[2375/2378] Compiling C object tests/qtest/qos-test-p/aixio-tp-test.c.o
[2376/2378] Compiling C object tests/qtest/qos-test-p/spapr-phb-test.c.o
[2377/2378] Linking target tests/qtest/qos-test
root@logcreative-vm: /home/qemu-5.2.0/builds make install

```

图 4: QEMU 编译

```

Installing /home/qemu-5.2.0/pc-bios/s390-netboot.img to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/slof.bin to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/ahciboot.lfd to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/palcode-clapper to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/u-boot-sam460-20180605.bin to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/qemu_vga.ndrv to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/edk2-licenses.txt to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/hppa-firmware.img to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/opensbi-riscv2-generic-fw_dynamic.bin to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/opensbi-riscv64-generic-fw_dynamic.bin to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/opensbi-riscv64-generic-fw_dynamic.elf to /usr/local/share/qemu
Installing /home/qemu-5.2.0/pc-bios/hppa7xx.bootrom.bin to /usr/local/share/qemu
Installing /home/qemu-5.2.0/build/pc-bios/descriptors/50-ed02-1f85-secure.json to /usr/local/share/qemu/firmware
Installing /home/qemu-5.2.0/build/pc-bios/descriptors/60-ed02-aarch64.json to /usr/local/share/qemu/firmware
Installing /home/qemu-5.2.0/build/pc-bios/descriptors/60-ed02-arm.json to /usr/local/share/qemu/firmware
Installing /home/qemu-5.2.0/build/pc-bios/descriptors/60-ed02-1f85.json to /usr/local/share/qemu/firmware
Installing /home/qemu-5.2.0/build/pc-bios/descriptors/60-ed02-80_64.json to /usr/local/share/qemu/firmware
Installing /home/qemu-5.2.0/pc-bios/keymaps/si to /usr/local/share/qemu/keymaps

```

图 5: QEMU 安装

### 3 创建虚拟机

由于云主机不支持硬件虚拟化技术。

#### 参考文献

- [1] jCloud. 快速创建 Linux 云主机[M/OL]. 2021. <https://jcloud.sjtu.edu.cn/document/detail.html?mod=qstart&id=1029>.
- [2] jCloud. 使用密钥登录云主机[M/OL]. 2021. <https://jcloud.sjtu.edu.cn/document/detail.html?id=763>.
- [3] DHSLEGEN. Windows Terminal 连接远程 ssh[M/OL]. 2020. <https://www.jianshu.com/p/b7a105a67253>.
- [4] QEMU. QEMU on Linux hosts[M/OL]. 2012. [https://wiki.qemu.org/Hosts/Linux#Required\\_additional\\_packages](https://wiki.qemu.org/Hosts/Linux#Required_additional_packages).