山东大学 计算机科学与技术 学院

云计算技术 课程实验报告

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实验题目：虚拟化技术练习二 Xen		
实验学时：2	实验日期： 2025.3.26	

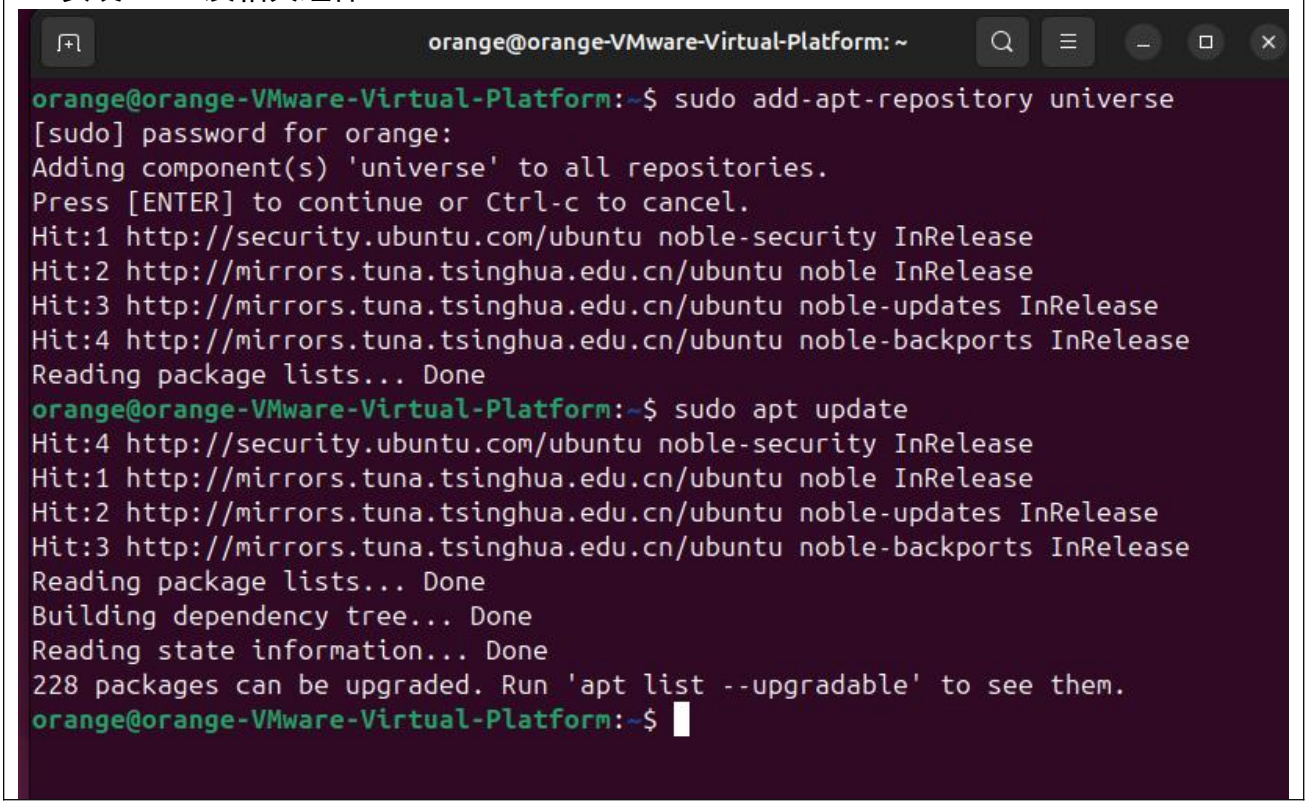
实验目的：熟悉 Xen 虚拟化环境。
具体包括：了解 Xen 虚拟化环境配置和部署，完成实验环境及实验工具的熟悉，撰写实验报告。

硬件环境：
计算机一台

软件环境：
Ubuntu，vmware

实验步骤与内容：
1. 硬件虚拟化支持：确保 CPU 支持 Intel VT-x 或 AMD-V。
在重启电脑时进入 BIOS 页面，CPU 支持 Intern VT-x。

2. 安装 Xen 及相关组件



```
orange@orange-VMware-Virtual-Platform:~$ sudo apt install xen-hypervisor xen-too
ls
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'xen-hypervisor-4.17-amd64' instead of 'xen-hypervisor'
The following additional packages will be installed:
  bridge-utils debian-archive-keyring debootstrap debugedit dmeventd dmsetup
  grub-xen-bin grub-xen-host libaio1t64 libboost-iostreams1.83.0
  libboost-thread1.83.0 libconfig-inifiles-perl libdata-validate-domain-perl
  libdata-validate-ip-perl libdata-validate-uri-perl libdaxctl1
  libdevmapper-event1.02.1 libdevmapper1.02.1 libexpect-perl libfdt1
  libfile-slurp-perl libfile-which-perl libfsverity0 libio-pty-perl
  libio-stty-perl libiscsi7 liblog-message-perl liblog-message-simple-perl
  liblua5.3-0 liblvm2cmd2.03 libmath-base85-perl libndctl6
  libnet-domain-tld-perl libnet-ipv6addr-perl libnet-netmask-perl
  libnetaddr-ip-perl libpmem1 libpmemobj1 librados2 librbd1 librdmacm1t64
  librpm9t64 librpmbuild9t64 librpmio9t64 librpmsign9t64 libsocket6-perl
  libsort-versions-perl libspice-server1 libterm-size-perl libterm-ui-perl
  libtext-template-perl liburing2 libxencall1t64 libxendevicemodel1t64
  libxenevtchn1t64 libxenforeignmemory1t64 libxengnttab1t64 libxenhypfs1t64
```

3. 配置 GRUB 以启动 Xen 内核

修改以下参数：

GRUB_CMDLINE_LINUX_DEFAULT="dom0_mem=2048M:8192M"

GRUB_CMDLINE_XEN_DEFAULT="dom0_max_vcpus=2 dom0_vcpus_pin"

```
GRUB_DEFAULT=0
GRUB_TIMEOUT_STYLE=hidden
GRUB_TIMEOUT=0
GRUB_DISTRIBUTOR=`( . /etc/os-release; echo ${NAME:-Ubuntu} )
dev/null || echo Ubuntu`
GRUB_CMDLINE_LINUX_DEFAULT="quiet splash"
GRUB_CMDLINE_LINUX_DEFAULT="dom0_mem=2048M:8192M"
GRUB_CMDLINE_XEN_DEFAULT="dom0_max_vcpus=2 dom0_vcpus_pin"
```

更新 GRUB：

```
orange@orange-VMware-Virtual-Platform:~$ sudo sed -i 's/GRUB_DEFAULT=.*/GRUB_DEF
AULT="Xen 4.17"/g' /etc/default/grub
orange@orange-VMware-Virtual-Platform:~$ sudo update-grub
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/xen.cfg'
Including Xen overrides from /etc/default/grub.d/xen.cfg
Warning: GRUB_DEFAULT changed to boot into Xen by default! Edit /etc/default/gru
b.d/xen.cfg to avoid this warning.
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-6.11.0-19-generic
Found initrd image: /boot/initrd.img-6.11.0-19-generic
Found linux image: /boot/vmlinuz-6.11.0-19-generic
Found initrd image: /boot/initrd.img-6.11.0-19-generic
Found linux image: /boot/vmlinuz-6.11.0-19-generic
Found initrd image: /boot/initrd.img-6.11.0-19-generic
Found memtest86+x64 image: /boot/memtest86+x64.bin
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
```

4. 设置网络桥接

安装桥接工具

```
orange@orange-VMware-Virtual-Platform:~$ sudo apt install bridge-utils net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
bridge-utils is already the newest version (1.7.1-1ubuntu2).
bridge-utils set to manually installed.
net-tools is already the newest version (2.10-0.1ubuntu4).
0 upgraded, 0 newly installed, 0 to remove and 226 not upgraded.
```

```
orange@orange-VMware-Virtual-Platform:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP g
roup default qlen 1000
    link/ether 00:0c:29:ae:20:1d brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.156.128/24 brd 192.168.156.255 scope global dynamic noprefixrou
te ens33
       valid_lft 1200sec preferred_lft 1200sec
    inet6 fe80::5183:9c02:45ad:27e/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

配置 Netplan

```
network:
  version: 2
  renderer: networkd
  ethernets:
    ens33:
      dhcp4: no
  bridges:
    xenbr0:
      interfaces: [ens33]
      dhcp4: yes
      parameters:
        stp: false
        forward-delay: 0
```

应用配置

```
orange@orange-VMware-Virtual-Platform:~$ sudo netplan apply

** (generate:14267): WARNING **: 23:05:50.958: Permissions for /etc/netplan/01-n
etwork-manager-all.yaml are too open. Netplan configuration should NOT be access
ible by others.

** (process:14266): WARNING **: 23:05:51.538: Permissions for /etc/netplan/01-ne
twork-manager-all.yaml are too open. Netplan configuration should NOT be accessi
ble by others.

** (process:14266): WARNING **: 23:05:51.669: Permissions for /etc/netplan/01-ne
twork-manager-all.yaml are too open. Netplan configuration should NOT be accessi
ble by others.
```

5. 重启系统并验证 Xen 环境

结论分析与体会：

学会了如何在虚拟机中安装 xen，大体步骤包括安装 Xen 核心组件、配置 GRUB 启动项、设置网络桥接后，创建 xen 虚拟机，无需强制半虚拟化模式。验证 xl list 显示 Domain-0 正常运行。