

Xen - Networking

Step 0 : Xen???????

Step 1 : ??????

Step 2 : network-bridge

Step 3 : network-nat

Step 4 : network-route

Step 5 : ????

Step 0 : Xen???????

????????????????????,???????????? 3 ? 1.network-bridge , 2.network-nat ? 3.network-route ??????????????????
 ?????????(Logical NICs <-> Physical NICs).

??? Xen ?? VMware ?????????,???????? 3 ?????? Guest OS ??????????????????.?????? RHEL5 Xen ??????????.????
 ? Xen ??????????????????.??? Dom0 ? ifconfig ??????????????????,?? Dom0 ???? Hypervisor ?????? DomU ?????
 ??????????????.

```
[root@benjr ~]#ifconfig
eth0 Link encap:Ethernet HWaddr 00:02:B3:9D:87:65
... ? ...
lo Link encap:Local Loopback
... ? ...
peth0 Link encap:Ethernet HWaddr FE:FF:FF:FF:FF:FF
... ? ...
vif0.0 Link encap:Ethernet HWaddr FE:FF:FF:FF:FF:FF
... ? ...
vif1.0 Link encap:Ethernet HWaddr FE:FF:FF:FF:FF:FF
... ? ...
virbr0 Link encap:Ethernet HWaddr 00:00:00:00:00:00
... ? ...
xenbr0 Link encap:Ethernet HWaddr FE:FF:FF:FF:FF:FF
... ? ...
```

??? Linux ?????????? eth0,eth1...,??? Xen ??????????????????(?? Dom0 ?????????). ?????? eth0, lo, peth0, vif0.0,

vif1.0, virbr0, xenbr0. ????????,???????????????????? Xen ??????????????.??????????????.

????????????????????,???????????? RHEL5 ??? network-bridge ??,???????? eth0, peth0, vif0.0, vif1.0 ??, ??????
lo ? Loop device ?????????? 127.0.0.1 ?? virbr0 ??? QEMU ??? Bridge NAT ?????????? QEMU-Bridge
NAT <http://benjr.tw/?q=node/520> .

Step 1 : ??????

Xen ?????????????,?????? Physical ?(peth0,peth1...)????????? Logical ???(eth0,eth1...)??(vif<id#>.0,vif<id#>.1.),
????????????? pethx,?????????????!!!!????????????????.

????????? Guest OS ??????????. ?????????????????? ?????????????????? Guest OS ?????????.

#???? domU

[root@benjr ~]# xm list

| Name | Id | Mem(MB) | VCPUs | State | Time(s) |
|----------|----|---------|-------|-------|---------|
| Domain-0 | 0 | 7619 | 4 | r---- | 43213.6 |
| rhel4 | 1 | 512 | 1 | -b--- | 9601 |

?????:

1.???? Dom0,??DomU ???? eth0,eth1...?????????????????

2.? Dom0 ?????? vif<id#>.0,vif<id#>.1...?????,?? Dom0 ??? Hypervisor ?????? DomU ??????????????????

3.???????????, vif<id#>.x ?? id ?? DomU ? id ????? Dom0 ??? eth0 ??? vif0.0, eth1 ??? vif0.1 ??????(???????????)
??),?? vif1.0 ??? Dom U(ID=1) ? eth0 ?????? #xm list ? DomU ??? id ?!!

????????? Dom0(RHEL5) ??? Guest OS(RHEL4),????????????? 2 ?????? 2 ? Xen Bridge,?????????????,?? Xen ???
?????????????

Peth0 -> ??????(Physical NIC)

Peth1 -> ??????(Physical NIC)

Dom0 -> eth0 -> vif0.0

Dom0 -> eth1 -> vif0.1

Dom1(RHEL4) -> eth0 -> vif1.0

Dom1(RHEL4) -> eth1 -> vif1.1

??? scripts ??? /etc/xen/scripts. ? Bridge ?? Xen ??????????,????? NAT's Networking ? Routed Networking ?
 ???????.

Step 3 : network-nat

RHEL5 Xen ????????? bridge ??,???????????????????? network-nat ?? network-route ,????????? NAT ???,????????
 NAT ,NAT ????? network address translation,?????? Private IP ??? Public IP ,Private IP ??????????,????????
 Internet ???,? 10.0.0.0(subnet mask : 10.255.255.255) ,172.16.0.0(subnet mask : 172.31.255.255) ??
 192.168.0.0(subnet mask : 192.168.255.255) ?? Public IP ?? Internet ???????,?? NAT ????????????????? Private IP
 ?????????? Internet ???,???????????????????? Guest OS ???,??????????????????.

???????? Dom0(RHEL 5) Xen ????????? /etc/xen/xend-conf.sxp ????? bridge ?? NAT ??.

```
[root@benjr ~]# vi /etc/xen/xend-config.sxp
(network-script network-nat)
(network-script network-bridge)
(network-script network-route)
(vif-script vif-nat)
(vif-script vif-bridge)
(vif-script vif-route)
```

??? (network-script network-bridge) ,(vif-script vif-bridge) ? "#" (??????).????? Guest OS ?????? NAT ???,??
 ?????? Guest OS ??????.???? xen ???????.

```
[root@benjr ~]# /etc/init.d/xend restart
```

?? Guest OS ?????,????????????? GuesOS : RHEL4 ID=1,???????? RHEL4

```
[root@benjr ~]# vi /etc/xen/rhel4
name = "rhel4"
uuid = "cf67710d-b756-086b-8cde-be61d2faca1b"
maxmem = 512
memory = 512
```

```

vcpus = 1
bootloader = "/usr/bin/pygrub"
on_poweroff = "destroy"
on_reboot = "restart"
on_crash = "restart"
vfb = [ "type=vnc,vncunused=1,keymap=en-us" ]
disk = [ "phy:/dev/sda5,xvda,w" ]
vif = [ "mac=00:16:3e:27:95:c0,ip=10.0.0.1" ]

```

- **name**
??? VM ???,????????? VM ?????????.
- **uuid**
???????(Universally Unique Identifier,UUID),????????? uuid ????? VM.
- **maxmem**
????????????? Guest VM ?????????,????????????????????,????????????????? VM ?????.
- **memory**
?? VM ?????????????.
- **vcpus**
? VM ?????? CPU ??.
- **bootloader**
/usr/bin/pygrub ? VM ???? Bootloader ?????? VM ? kernel/initrd ????,??? GRUB,Xen ?????
paravirtualized ???,????? VMware ?? full virtualization ????? BIOS ??? pygrub ?????? PXEBoot ???.
- **on_poweroff/reboot/crash**
???? poweroff/reboot/crash VM ?????????,??? poweroff ?? destory ????? poweroff ??? VM ?????????
?????????,? reboot/crash ??? VM ?????.
- **vfb**
Xen ??? VM ???? VNC ?????,????? vfb(virtual framebuffer device) ?????????????? Keyboard/Mouse.
- **disk**
??? VM ?????????????? partition ???? image ???.
- **vif**
????????????? vif(virtual network devices).????????????????? vif = ["mac=00:16:3e:27:95:c0,ip=10.0.0.1"]
??? mac ?????????? IP,??? VM OS ???? IP ??.

?? DomU ? Guest OS (RHEL4) ? IP ??????? Dom0 ???????.

```

# Xen Virtual Ethernet
[root@DomU ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE=eth0
ONBOOT=yes
BOOTPROTO=static

```

```
IPADDR=10.0.0.1
NETMASK=255.255.255.0
GATEWAY=10.0.0.128
```

??? DomU ??????????

```
[root@DomU ~]#service network restart
```

? DOMU(RHEL4) ????,??DOM0 ?????????? xen bridge(xenbr0) ???,?? vif1.0(Guest OS:RHEL4 ID=1) ?? IP ????,??
 ?? Guest OS ???? default gateway.?? default gateway ? 10.0.0.128 ,???? DomU ? Guest OS ????,? Dom0 ?????????
 ?? vif(Dom ID).0 ????????? default gateway ? 10.0.0.128 ?????????? 10.0.0.129.??????,??? DomU ? Guest OS ?????
 ????? default gateway ??? . ????????? NAT ??? Dom0 ?????????? NAT ,??? Guest OS(DomU) ???? NAT ???
 private IP ???.

1. ?? domU ????????????? Private ????
2. ?? domU ????????????? dom0 ? NAT ??????????
3. ????? NAT ?? domU ????????????? private ????,???????????? DomU ??????.???? Dom0 ? default gateway.

??? Dom 0 ????????????????????? "ifconfig" ????????? vif1.0 ????? IP ? 10.0.0.128

```
[root@benjr ~]# ifconfig vif1.0
```

```
vif1.0 Link encap:Ethernet HWaddr FE:FF:FF:FF:FF:FF
  inet addr:10.0.0.128 Bcast:0.0.0.0 Mask:255.255.255.255
  inet6 addr: fe80::fcff:ffff:feff:ffff/64 Scope:Link
  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
  RX packets:98 errors:0 dropped:0 overruns:0 frame:0
  TX packets:73 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:32
  RX bytes:11014 (10.7 KiB) TX bytes:9404 (9.1 KiB)
```

?? "iptables -L" ????????? iptables ??????? 10.0.0.1 ???.

```
[root@benjr ~]# iptables -L
```



```
Chain INPUT (policy ACCEPT)
target prot opt source destination
ACCEPT udp -- anywhere anywhere udp dpt:domain
ACCEPT tcp -- anywhere anywhere tcp dpt:domain
ACCEPT udp -- anywhere anywhere udp dpt:bootps
ACCEPT tcp -- anywhere anywhere tcp dpt:bootps
Chain FORWARD (policy ACCEPT)
target prot opt source destination
ACCEPT all -- anywhere 192.168.122.0/24 state RELATED,ESTABLISHED
ACCEPT all -- 192.168.122.0/24 anywhere
ACCEPT all -- anywhere anywhere
REJECT all -- anywhere anywhere reject-with icmp-port-unreachable
REJECT all -- anywhere anywhere reject-with icmp-port-unreachable
ACCEPT all -- 10.0.0.1 anywhere PHYSDEV match --physdev-in vif1.0
ACCEPT udp -- anywhere anywhere PHYSDEV match --physdev-in vif1.0 udp
spt:bootpc dpt:bootps

Chain OUTPUT (policy ACCEPT)
target prot opt source destination
```

???? "route" ?????????? 10.0.0.1 (VM:RHEL4) ???? vif1.0

```
[root@benjr ~]# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
10.0.0.1 * 255.255.255.255 UH 0 0 0 vif1.0
192.168.122.0 * 255.255.255.0 U 0 0 0 virbr0
192.8.1.0 * 255.255.255.0 U 0 0 0 eth0
169.254.0.0 * 255.255.0.0 U 0 0 0 eth0
```

????? VM ?????? dhcp ???? ip,?????????????

http://www.nikhef.nl/pub/projects/grid/gridwiki/index.php/Xen_3.2,_CentO...

Step 4 : network-route

???

Step 5 : ????

<http://wiki.xensource.com/xenwiki/XenNetworking>

http://wiki.kartbuilding.net/index.php/Xen_Networking