

vmware Workstation -- Virtual Test Network

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Overview:

A test network is required for implementation and testing of my Masters project. After studying the Dwesa network (see my Masters proposal for more information), a similar network layout was virtually constructed. It is a fairly simple network which basically consists of three types of devices; firstly the Access Concentrator Router at the highest level, below that we have routers which route traffic for their particular subnet and below that we have devices (workstations) which are within those routed subnets.

The routers route packets to the AC if it is destined for an IP range which is not the local subnet. The AC then routes that IP packet to a subnet below it (ie: to that subnet's router) or forwards the packet to its default gateway (toward the Internet). The AC uses NAT to pass on packets to the Internet as the entire network IP range is a non-routable private IP range (192.168.0.0/16).

In this scenario, the AC has an external facing NIC which is assigned an IP address which allows it connectivity on the Rhodes network.

At the moment, the entire networks IP addresses are statically assigned, but plans for the AC to be a DHCP server (to dynamically assign IP's) are in place.

-Virtual Machine Setups (and vmware settings)

-- Workstations --

IP: In the range of its subnet (eg: 192.168.1.0/24)

Default Gateway: The subnets router IP (eg: 192.168.1.1/24)

DNS: Using Rhodes DNS servers

Operating System and Hardware: Any. Not important, only network settings apply

-- Routers --

Internal Facing IP: First IP of the subnet it serves (eg: 192.168.1.1/24)

External Facing IP: IP in the range of the AC internal IP (eg: 192.168.100.101/24)

Default Gateway: IP of the AC (192.168.100.1/24)

DNS: Using Rhodes DNS Servers (modify /etc/resolv.conf)

Hardware: 8.0 GB HDD; 256 mb RAM; single processor

Operating System: FreeBSD 6.3-Release (currently a FULL install)

Example /etc/rc.conf

```
hostname="routervmnet2.vmnet2"

keymap="us.iso"
linux_enable="YES"
local_startup="/usr/local/etc/rc.d"
moused_enable="YES"
sshd_enable="YES"
gateway_enable="YES"

ifconfig_em0_name="ext0"
ifconfig_em1_name="int0"

ifconfig_ext0="192.168.100.101/24"
ifconfig_int0="192.168.1.1/24"

defaultrouter="192.168.100.1"
static_routes="down up"
route_down="-net 192.168.1.0/24 -iface int0"
```

Routing

```
[dan@routervmnet2 ~]$ netstat -rn
Routing tables
```

```
Internet:
Destination      Gateway          Flags    Refs      Use  Netif  Expire
default          192.168.100.1  UGS          0       380  ext0
127.0.0.1        127.0.0.1      UH          0         0   lo0
192.168.1        link#2         UC          0         0  int0
192.168.1.50    00:0c:29:c2:27:4e UHLW        1       616  int0  1088
192.168.100     link#1         UC          0         0  ext0
192.168.100.1   00:0c:29:2a:46:fa UHLW        2       205  ext0  1062
```

```
Internet6:
Destination      Gateway          Flags    Netif  Expire
::1              ::1             UHL          lo0
fe80::%lo0/64   fe80::1%lo0    U           lo0
fe80::1%lo0     link#4         UHL          lo0
ff01:4::/32     fe80::1%lo0    UC           lo0
ff02::%lo0/32   fe80::1%lo0    UC           lo0
```

-- Access Concentrator --

Internal Facing IP: Statically assigned (192.168.100.1/24)

External Facing IP: Statically assigned to a registered Rhodes IP

Default Gateway: In this case, the ICT subnet gateway

DNS: Using Rhodes DNS Servers (modify /etc/resolv.conf)

Hardware: 8.0 GB HDD; 256 mb RAM; single processor

Operating System: FreeBSD 6.3-Release (currently a FULL install)

Example /etc/rc.conf

```
# Host specific items have been bracketed out for obvious reasons
hostname="[hostname]"

ifconfig_em0_name="ext0"
ifconfig_em1_name="int0"

keymap="us.iso"
linux_enable="YES"
local_startup="/usr/local/etc/rc.d"
moused_enable="YES"
sshd_enable="YES"
gateway_enable="YES"
firewall_enable="YES"
firewall_type="OPEN"
natd_enable="YES"
natd_interface="ext0"
natd_flags=""

ifconfig_ext0="inet [ipaddress] netmask [netmask]"
ifconfig_int0="inet 192.168.100.1 netmask 255.255.255.0"

defaultrouter="[interface ext0 gateway]"
static_routes="vmnet2 vmnet4"
route_vmnet2="-net 192.168.1.0/24 192.168.100.101"
route_vmnet4="-net 192.168.2.0/24 192.168.100.102"
```

Routing

```
[dan@blackspy ~]$ netstat -rn
Routing tables
```

```
Internet:
Destination      Gateway          Flags    Refs      Use  Netif  Expire
default          146.231.120.1   UGS      0         784  ext0
127.0.0.1        127.0.0.1       UH       0          0    lo0
146.231.120/21   link#1          UC       0          0  ext0
146.231.120.1   00:04:dc:5c:1e:01 UHLW    2          0  ext0   1199
192.168.1        192.168.100.101 UGS      0         560  int0
192.168.2        192.168.100.102 UGS      0          0  int0
192.168.100     link#2          UC       0          0  int0
192.168.100.101 00:0c:29:fd:e9:77 UHLW    2          14  int0   1083
192.168.100.102 link#2          UHLW    2          0  int0

Internet6:
Destination      Gateway          Flags    Refs      Use  Netif  Expire
::1              ::1             UHL      0          0    lo0
fe80::%lo0/64   fe80::1%lo0     U        0          0    lo0
fe80::1%lo0     link#4          UHL      0          0    lo0
ff01::%lo0/32   fe80::1%lo0     UC       0          0    lo0
ff02::%lo0/32   fe80::1%lo0     UC       0          0    lo0
```

-- Diagram of Virtual Test Network --

